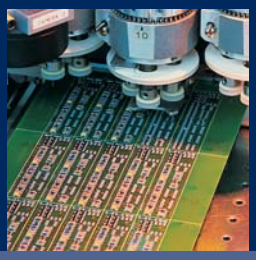
LAMBDA

Power Products

AC/DC Power Supplies
DC/DC Converters
Noise Filters

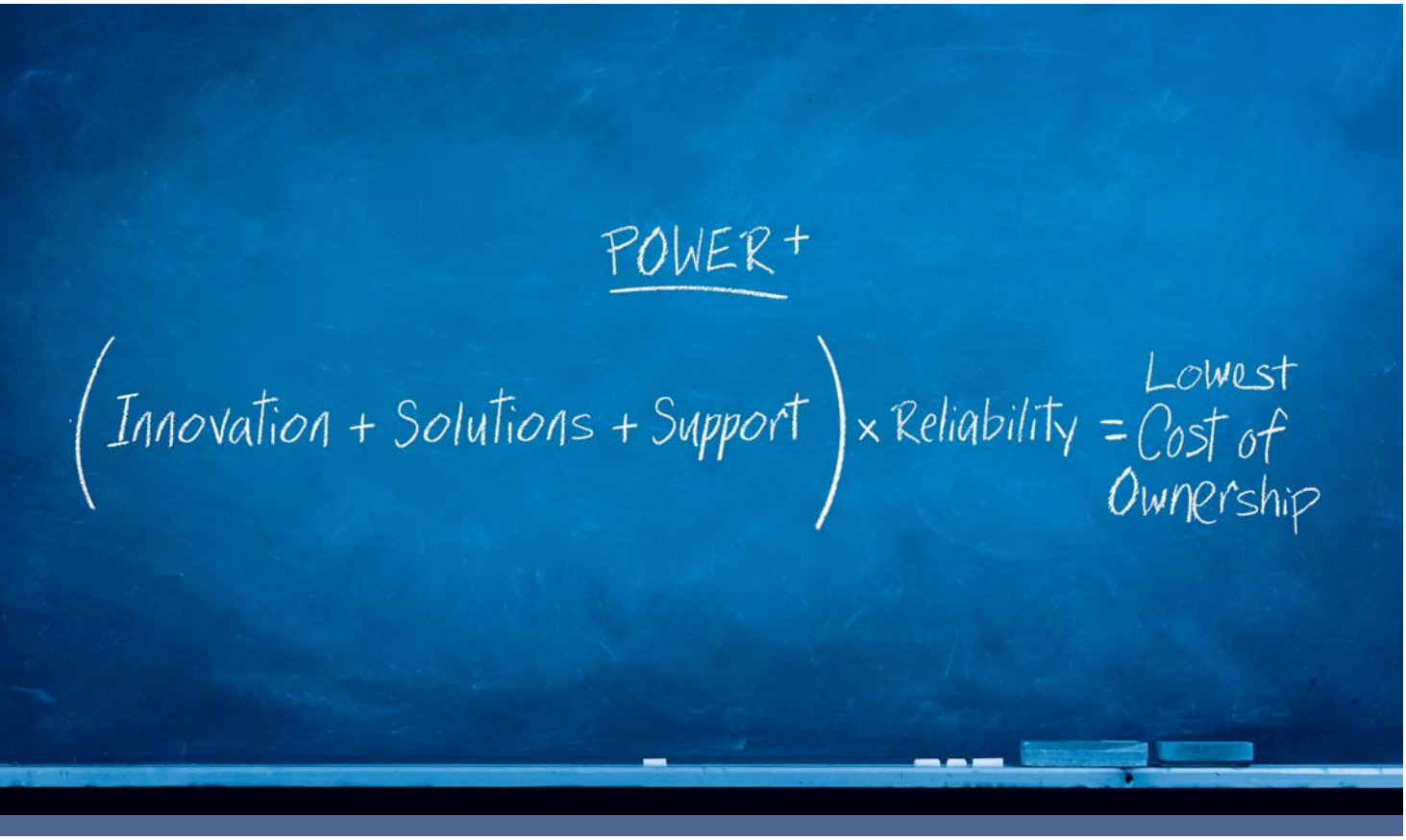


2007/2008

Power+ INNOVATION · SOLUTIONS · SUPPORT · RELIABILITY

LAMBDA

Power+. Theory equals reality.



Power alone is not enough which is why Lambda offers Power+

Power+ is our promise to deliver the lowest cost of ownership in the market through a combination of technical innovation driven by our customers needs, a wide range of power solutions, global application and logistics support, and also reliability in our products and everything we do.

Lambda Power+ turning the theory of lowest cost of ownership into reality.

INNOVATION • SOLUTIONS • SUPPORT • RELIABILITY

About Lambda

Lambda Europe is part of the Japan based Densei Lambda group of companies and owned by TDK Corporation TDK ADR (NYSE), TDK (LON) TDK (BRU) a leading global electronics company headquartered in Tokyo, www.tdk.com. We are a world class leader in the design, manufacture and marketing of power supplies for a wide range of applications including test and measurement, factory automation, process control, medical, communications, computing and COTS (commercial off-the-shelf). Founded in 1948 we have developed a worldwide reputation and heritage for high quality, robust power supplies and have **recognised leadership** as the No1 supplier to the global Industrial power supply market.

One thing has remained consistent over the last half century though, the need for change.

- As our Customer's product requirements become more diverse, we responded by broadening our product range from low cost 5W open frame **AC-DC** power supplies to 7,500W hot swap units and we continually add new models every year.
- We developed a large **DC-DC converter** portfolio to power many applications in the recent growth of communications, and we continue to launch leading edge products to support that market.
- The need for fast customisation has been met by our **local European Custom Product Solutions** Engineering Teams.
  A wide variety of products can be developed, ranging from simple modifications, value added solutions, or complete 'ground up' custom products.

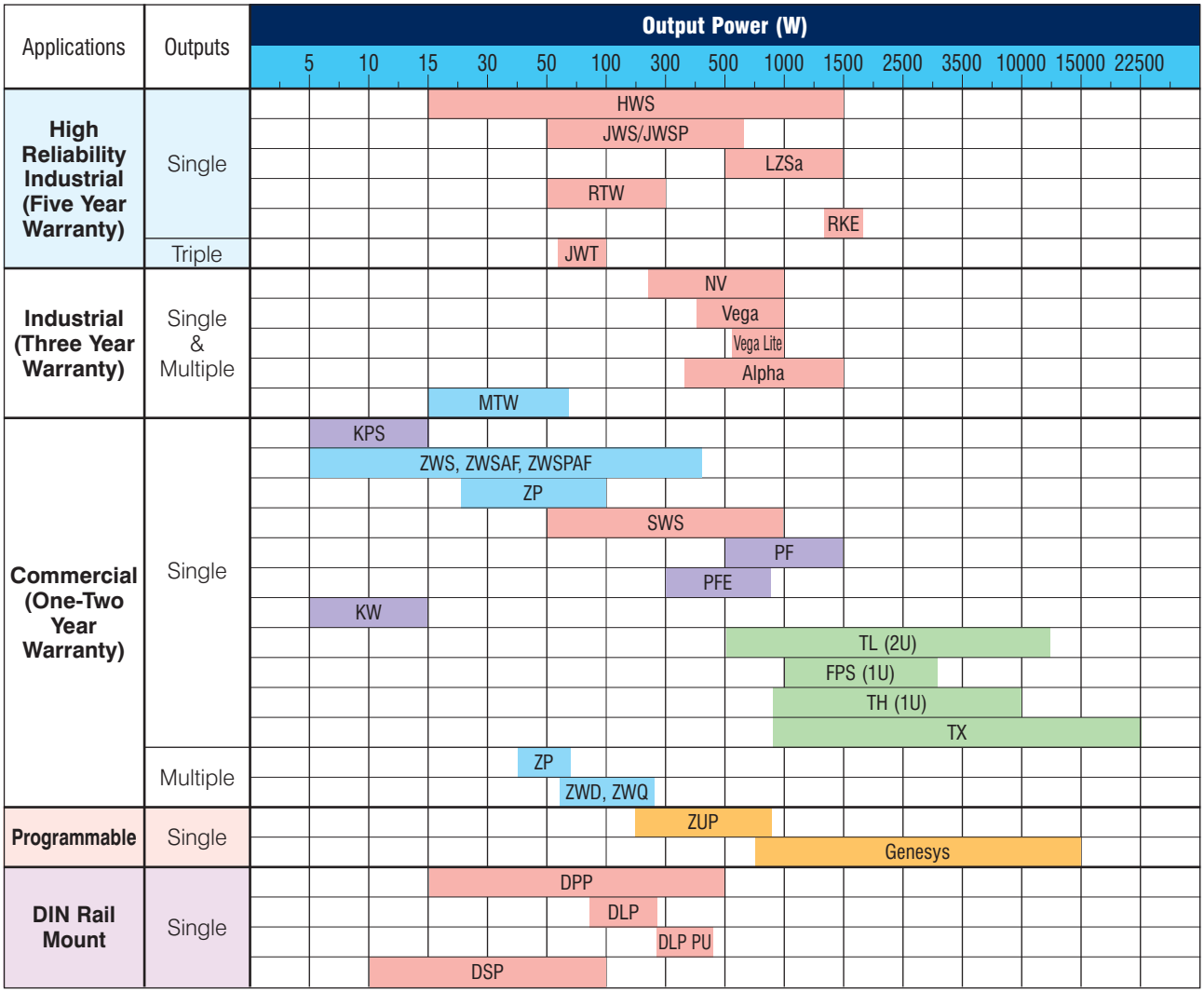
- Not all of our Customer needs are product based though. **Financial stability** and the resources to continue to invest even in economic down cycles, play a key factor in partner selection. Backed by the multi-billion resources of TDK Corporation, we have increased our R&D and capital expenditures to offer our customers the latest in leading edge technologies.
- The end products that use Lambda power supplies are often designed on one continent and built in another. We can truly provide that **global support** with nine manufacturing sites, eight R&D facilities, sales and service offices across the world, and our authorised distribution network.
- The desire for **information** - 24/7. Our web site has a huge library of data, from legacy products that were designed decades ago to the latest generation products.
- As we continually launch new products, we invite you to **check** for updates through our website **www.lambda-europe.com** in conjunction with using this catalogue.

  You can also take advantage of our **Interactive Product Selectors** on line

  Thank you for requesting our catalogue, we welcome your feedback. You can contact us at powersolutions@lambda-europe.com.

Enclosed or L Bracket	PCB Mount
Open Frame	Rack Mount Hot Swap
Rack or Bench Mount	

AC-DC Selector



DC-DC Selector

Enclosed or L Bracket | PCB Mount | Non Isolated

Nominal Input Voltage	# of Outputs	Output Power (W) 3 10 30 50 100 150 300 600	Page No.
5V	Single	PS	219
		PL5, 10, 15	210
		CC-E	149
		CE	152
		iAA, iBA	158
	Dual	PS	219
		CC-E	149
12V	Single	PS	219
		PL5, 10, 15, 20	210
		PXC, PXD, PXE, PXF	222
		CC-E	149
		CE	152
		iAC, iBC	158
	Dual	PS	219
		CC-E	149
		PXC, PXD, PXE, PXF	222
	Triple	PXF	231
24V	Single	PS	219
		PXC, PXD, PXE, PXF	222
		PH-F	205
		PH-S	207
		PAH-300	199
		PAF	184
		PAE	181
		CE	152
		CC-E	149
		iHA	167
		iQB, iQE	171
	Dual	PS	219
		PXC, PXD, PXE, PXF	222
		CC-E	149
	Triple	PXF	231
48V	Single	PS	219
		PXC, PXD, PXE, PXF	222
		PAE	181
		iPB	169
		iSA	179
		iEA, iEB	163
		iHA	167
		PAQ	202
		PH-F	205
		PH-S	207
		PAH, PAH200H, PAH300/350/450	193
		PAF	184
		CC-E	149
		iQP, iQN, iQM, iQE, iQD, iQB	177
	Dual	PS	219
		PXC, PXD, PXE, PXF	222
		PAQ	202
		CC-E	149
	Triple	PXF	231
	Multiple	Vega	116
82-185VDC	Single	PH-F	205
		PH-S	207
200-400VDC	Single	PH-F	205
		PH-S	207
		PAF	184

AC/DC POWER SUPPLIES

DC/DC CONVERTERS

PROGRAMMABLE

SPECIAL ASSEMBLIES

FILTERS

LATEST

NEW NV MEDICAL RANGE

LAMBDA

- Up to 1500W output
- Up to 16 outputs
- Voltages up to 48V, Current up to 300 Amps
- Fast-on output connection
- Worldwide approvals & CB report
- Medical Approval Option
- 3 Year Warranty

Alpha

400, 600, 1000 & 1500 Watts Modular

Key Market Segments & Applications

Instrumentation
Medical
Automation
Security
Network Servers and Routers
Broadcast
ATE
Industrial Computing
Lifesciences/Laboratory

INPUT		
Input Voltage	Alpha 400 Alpha 600 Alpha 1000 Alpha 1500	90 - 264Vac 90 - 264Vac, 160 - 358Vdc 85 - 264Vac, 120 - 360Vdc 85 - 264Vac (1000W below 150Vac input)
Input Frequency	47 - 63Hz (440Hz with reduced PFC - consult factory)	
Inrush Current	<50A at 25°C and 264Vac (cold start)	
Input Fuse	250Vac HBC Fast Acting (not user accessible) 10A for 400W 12A for 600W 20A for 1000W and 1500W	
Leakage Current	1.1mA max at 264Vac & 63Hz	
Lower Leakage Option	see configuring guide	
Power Factor	0.99 typical	

OUTPUT		
Voltage / Current	See module output table	
Turn on Delay	1.5s max	at 90Vac (150Vac for Alpha 1500W) & 100% rated output power
Rise Time	<50ms	to 90% of voltage, monotonic rise above 10%
Turn on Overshoot	<5% or 250mV	Load type dependant, no overshoot with resistive load
Efficiency	75%	typical at 230Vac & 100% rated power, config dependent
Hold up	15ms min	at 90Vac & 100% rated output power 13ms for 1000W, 8ms for 1500W and at 207Vac for 1500W
Ripple & Noise	<2%	(or 100mV if greater) Pk- Pk, using EIAJ test method & 20MHz bandwidth
Voltage Accuracy	<1%	of set Voltage
Remote Sense	Yes	Standard on single output modules
Minimum Load	No	on any output
Temperature Coefficient	<0.02%	of rated voltage per °C
Load Regulation	<0.5% or 25mV	for 0-100% load change (with sense connected, <2% without)
Line Regulation	<0.5%	for 90 - 264Vac input change (210-264Vac for 1500W)
Cross Regulation	<0.2%	for 100% load change on any other output
Transient Response	<10%	of set voltage for 50% load change (above 25% load)
Recovery	500µs	for recovery to 1% or 100mV of set voltage (1000µs for S module)
Over Voltage Protection	Standard	for all outputs
Over Current Protection	Standard	for all outputs
Short Circuit Protection	<150%	of rated current, when output voltage <1%
Over Temperature Protection	Yes	Shuts down all outputs. Cycle ac off / on to reset
		Note shutdown temp varies according to ambient, output power and input V

SAFETY APPROVALS

	Date	Amendments		Date	Amendments
EN 60950-1*	2001		IEC 60601-1[a]	1988	A1, A2
UL 60950-1	2003		UL 60601-1[a]	2003	
CSA22.2 No 60950-1	2003				
IEC60950-1*	2001		CE Mark	LV Directive 73/23/EEC (EN60950-1)	

* CB Certificate and report available on request

a - Only for LL, RL and TL leakage variants. CA400 + CA1000 only

PRODUCT, GENERIC & COLLATERAL STANDARDS

Low Voltage Power Supply, EMC	EN61204-3: 2001	Compliant to High Severity Immunity	Class A emissions for CA1000 / CA1500
Medical Electrical Equipment, EMC	EN61601-1-2: 2001	Compliant	Class A emissions for CA1000 / CA1500
Immunity for residential, commercial and light industrial environments	EN61000-6-1: 2001	Compliant	
Immunity for industrial environments	EN61000-6-2: 2001	Compliant	
Emissions for residential, commercial and light industrial environments	EN61000-6-3: 2001	Compliant	CA1000 and CA1500 not compliant
Emissions for industrial environments	EN61000-6-4: 2001	Compliant	

EMISSIONS

Radiated Electric Field	EN55022	Class B (as per CISPR.22) Class A for Alpha 1000/1500	See application note for details. Only for 'S' type leakage versions
Conducted Emissions	EN55022	Class B (as per CISPR.22) Class A for Alpha 1000/1500	Only for 'S' type leakage versions. 'M' & 'L' types meet Class A
Conducted Harmonics	EN61000-3-2: 2001	Compliant to Class A	
Flicker	EN61000-3-3: 1995 + A1:2001	Compliant - d_{max} only.	

IMMUNITY

				Criteria
Electrostatic Discharge	EN61000-4-2	Level 4	Air discharge 15kV Contact discharge 8kV	A
Electromagnetic Field	EN61000-4-3	Level 3	10V/m (tested to 12V/m)	A
Fast / Burst Transient	EN61000-4-4	Level 4	Input 4kV Outputs 2kV, Tested at 5kHz and 100kHz	A
Surge Immunity	EN61000-4-5	Level 3	Line to Line (Differential) 1.1kV Line to Earth (Common Mode) 2.2kV	A
Conducted RF Immunity	EN61000-4-6	Level 3	10V (tested to 12V)	A
Power Frequency Magnetic Field	EN61000-4-8	Level 4	30A Continuous	A
Voltage Dips, Variation, Interruptions	EN61000-4-11	Class 3		A B for 5s interruptions
Voltage Fluctuations	EN61000-4-14	Class 3	For 100 to 240V nominal	A

ENVIRONMENT

Temperature	0°C to 70°C operational, -40° to 85°C storage (max 12 months)
Derating	50°C to 70°C derate each output by 2.5% per °C
Low Temperature Start-up	-20°C
Humidity	5-95% RH non condensing
Shock	3000 shocks, each of 10*g* (16ms) half sine
Vibration	10 - 200Hz @ 1.5*g*
Altitude	3,000 metres operational (15,000 metres non operational)
Pollution	Degree 2, Material group 3
IP Rating	IP 10

ISOLATION

Input to Output	Reinforced	4.3 kV (dc)	Output to Earth	Operational	500 V (dc)
Input to Earth	Basic	2.3 kV (dc)	Output to Output	Operational	500 V (dc)

OUTPUT VOLTAGES (single output modules)			
Module	Adjustment Range (Volts)	Amps	Slots
A	4.5 - 5.5	60	2
AA	4.5 - 6.5	60	2
B	4.5 - 5.5	25	1
BB	4.5 - 6.5	25	1
C	5 - 16	16[a]	1
D	18 - 29	8	1
F	9 - 16	33	2
G	17.5 - 29	25[b]	2
J	30 - 48	10[c]	2
K	18 - 29	15	2
L	1.8 - 3.2	25	1
M	5 - 16	8	1
N	18 - 32	5[d]	1
Q	2.7 - 3.9	25	1
R	2.7 - 3.9	60	2
S	2.5 - 5.7	85	2
T	1.8 - 3.2	60	2
U	10 - 21	16	1
W	4.5 - 5.5	15	1
Z	4.5 - 5.5	25	1

(twin output modules)					
Module	V1 Adjustment Range (Volts)	Amps	V2 Adjustment Range (Volts)	Amps	Slots
E	5 - 16	8	5 - 16	8	1
EB	4.5 - 5.5	9	4.5 - 5.5	9	1
EQ	4.5 - 5.5	9	2.7 - 3.9	9	1
H	18 - 32	5	18 - 32	5	1
P	18 - 29	5	5 - 16	8	1

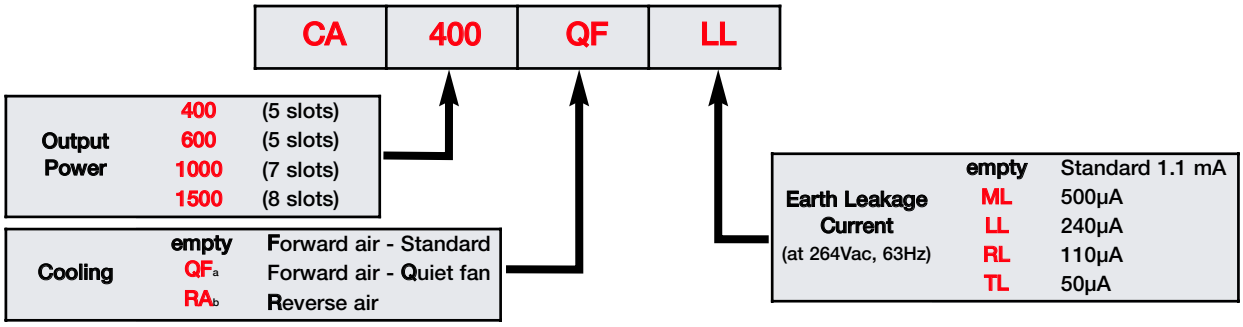
a) 12A max above 12V
b) 21A max above 24.5V
c) Derate output current by 0.25A / V above 40V
d) 1A max above 29V

Alpha Configuring Guide

The extensive range of output modules and options make it possible to achieve many combinations of Volts and Amps. To achieve the optimum configuration, please contact our sales office. However you can also create your own configuration from this datasheet by using the guide below.

Configuring from Datasheet

1 Calculate total output power to determine Alpha 400W, 600W, 1000W or 1500W and select converter, then select required Cooling and Leakage Current from the following table:-



Notes:
a) CA400/600 only. CA400 derates to 300W, CA600 derates to 475W
b) Contact sales office for details

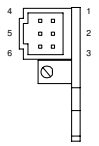
2 Select Output Modules and Options from the Output Voltages tables.
Example - if you require 5.2V / 18A with output inhibit : -
a) select B as closest match for voltage and current and prefix with voltage (e.g. **5.2B**)
b) add suffix for option (if required)
'_PA' for parallel/current share (for N+1 redundant applications)
'_PP' for parallel (increase current from one PSU)
'_IN' for inhibit
'_RP' for remote programming
'_MF' (only applicable on 1st module) for global inhibit, ac fail and 5V/50mA standby supply
c) repeat for other outputs

Ensure that the total width of all selected modules is within the slots for the chosen converter. For example:-

CA600LL 5A 12/12E 24D which represents a four output 600W Alpha with Forward air, 240µA Earth Leakage, with:-
Output 1 = 5V / 60A with remote sense
Output 2 = 12V / 8A
Output 3 = 12V / 8A
Output 4 = 24V / 8A with remote sense

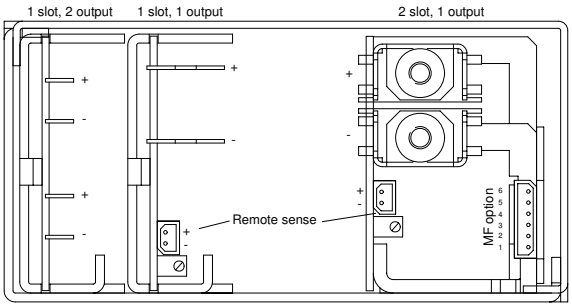
3 **Contact Lambda to validate configuration and issue a part number.**

Option Connections

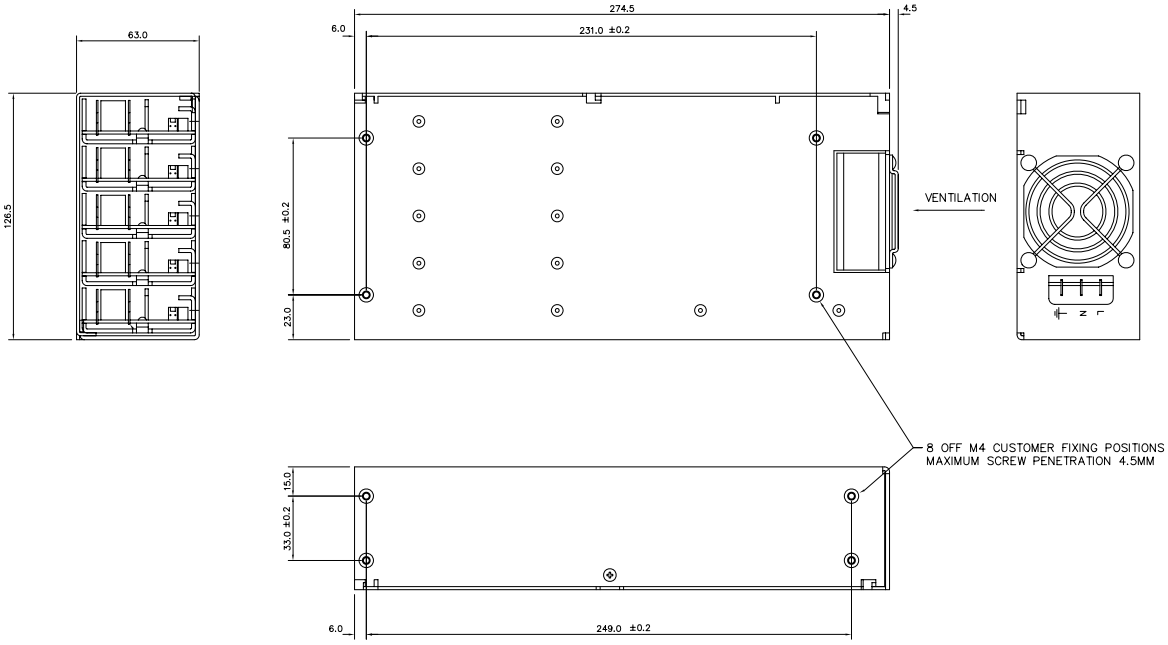


IN, PA, PP, RP Option

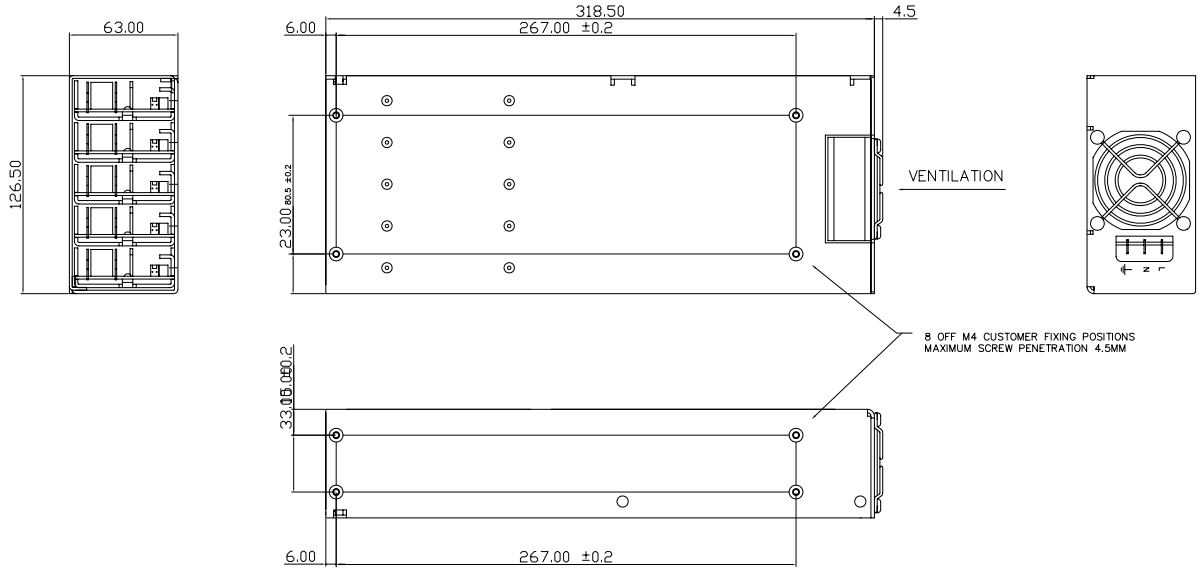
Pin	IN option	PA option	PP option	RP option	MF option
1	n/c	+ Sense	+ Sense	+ Sense	Inhibit (low)
2	Module Good	Module Good	n/c	- Sense	5V supply
3	Inhibit	Star point	n/c	Control 2	Power Fail
4	n/c	- Sense	- Sense	n/c	0V
5	- Power	- Power	n/c	Control 1	Inhibit (high)
6	- Power	Star point	n/c	n/c	n/c



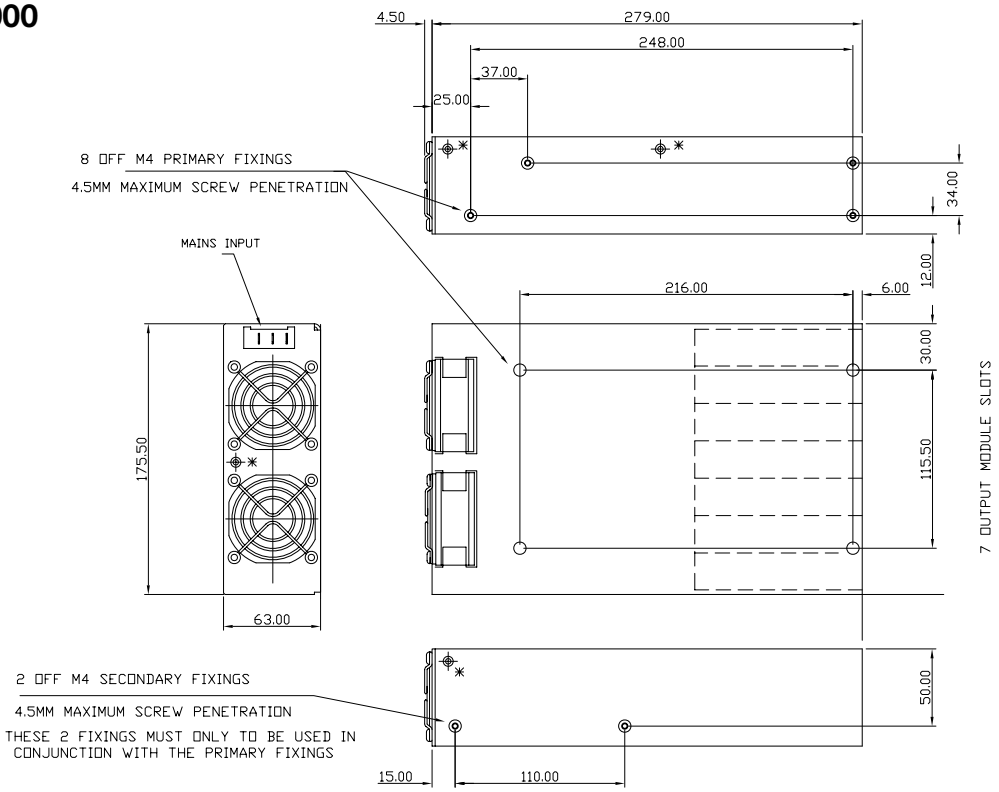
Alpha 400



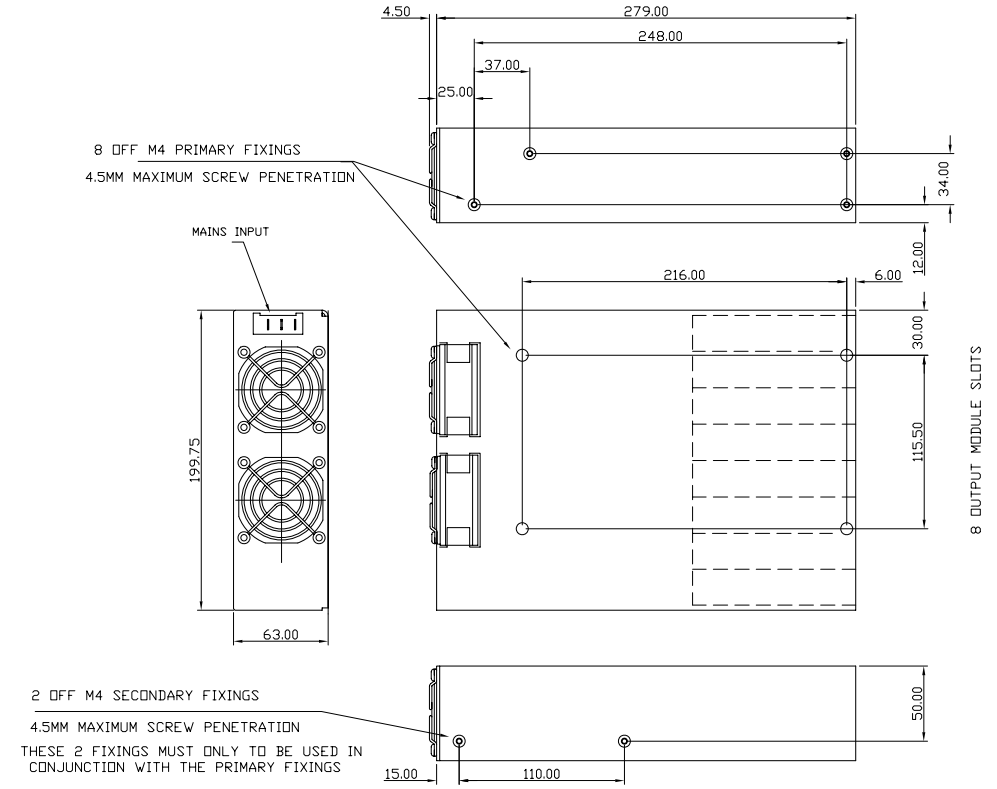
Alpha 600

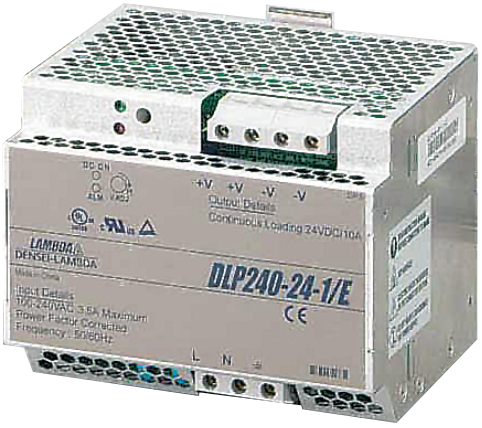


Alpha 1000



Alpha 1500





LAMBDA

- Low Cost
- 3 Year Warranty
- Low Cost
- 3 Year Warranty
- Semi F47 Compliant (DLP180&240 only)
- Convection Cooled
- Conducted and Radiated EMI, Class B
- Input Transient Protection, IEC61000-4
- NEC Class 2 Compliant (DLP75&100/C2 models only)

DLP Series

75 to 240W, 24V Output DIN Rail Mount POwer Supply

Key Market Segments & Applications

Industrial Controls:	Motor Control Systems
Factory Automation:	Process Control, Automotive,
Chemical Processing	
Test & Measurement:	Burn in & Test, Instrumentation
Measurement	

DLP Features and Benefits

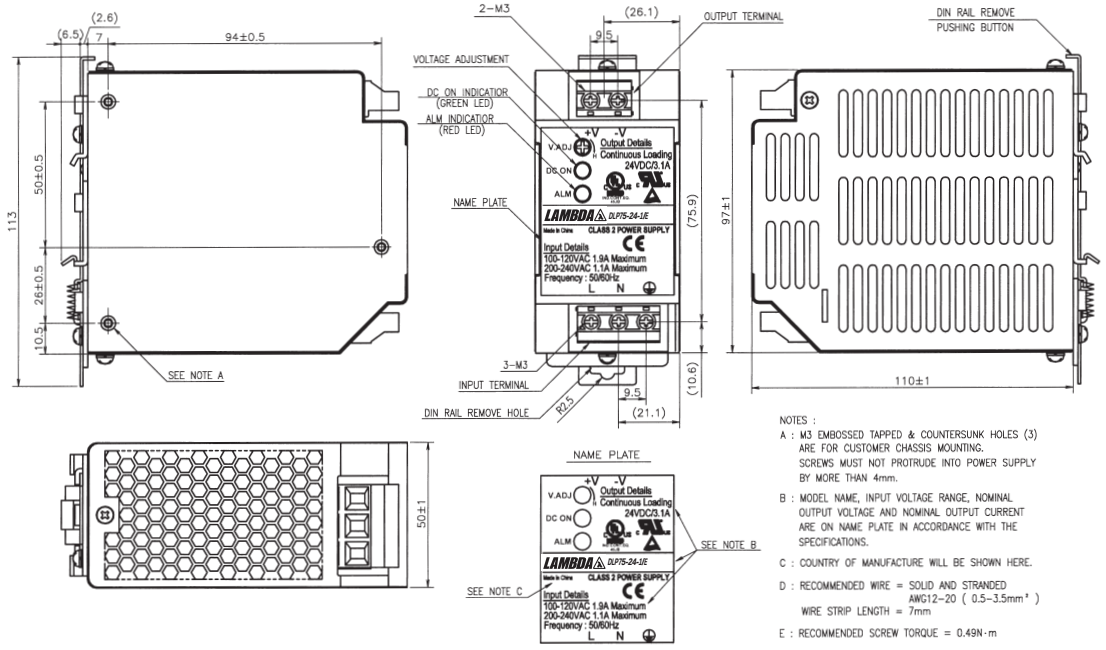
Features	*Benefits*
• PFC Compliant to EN61000-3-2	• Supports Global Use
• UL508 Approvals	• Enables System Certification
• 3 Year Warranty	• Fit & Forget

Specifications

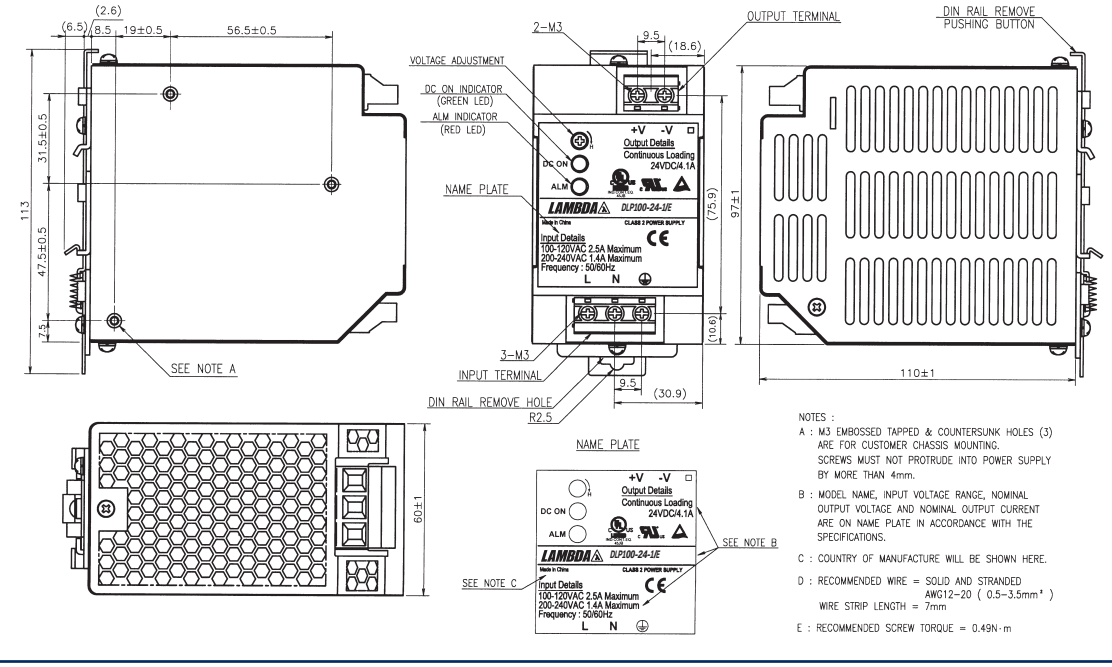
ITEMS / MODELS		DLP75-24-1/E DLP75-24-1/C2EJ	DLP100-24-1/E DLP100-24-1/C2EJ	DLP120-24-1/E	DLP180-24-1/E	DLP240-24-1/E
Output Voltage	V	24	24	24	24	24
Output Current (/C2 models)	A	3.1 (2.5)	4.1 (3.7)	5.0	7.5	10
Output Power (/C2 models)	W	75 (60)	98.4 (88.8)	120	180	240
Output Voltage Adjustment	V	21.6 - 28 (fixed for /C2 models)				
Load Regulation	-	192mV				
Line Regulation	-	120mV				
Ripple/Noise (0-60°C)	mV	240				
AC Input Voltage & Frequency	-	85-132/170-265VAC, 47-63Hz Auto select			85-265VAC (47-63Hz) or 120-370VDC(1)	
Input Current 100/230VAC	A	1.7/0.8	2.3/1.2	2.4/1.3	2.3/1.0	3.0/1.3
/C2	A	1.4/0.7	2.0/1.0		-	
Efficiency 100/230VAC	%	81/83	82/85	83/85	84/87	82/86
Power Factor	-	Meets EN61000-3-2 (DLP180, 240: >0.95)				
Inrush Current (Typ) 100/230VAC	A	20/45				
Leakage Current	mA	Less than 0.75mA				
Hold-up Time 100/230VAC	ms	20/30 (Semi F47 Compliance, DLP 180 & 240 only)				
Overcurrent Protection	-	>105%,Fold Back	>105%, Constant Current			
/C2	-	~2.6A	~3.75A		-	
Overvoltage Protection	-	30-35V, latching, cycle AC line to reset (26-30V DLP75-24-1/C2EJ)				
LED Indicators	-	Green LED = DC ok Red LED = overcurrent				
Operating Temperature (2)	-	Convection cooled, -10°C to 60°C, derate linearly to 60% load from 50 to 60°C				
Storage Temperature	-	-30°C~+85°C				
Humidity (Non-Condensing)	%RH	30-90% operating 10-95% non operating				
Withstand Voltage	-	Input - Ground 2kVAC, Input to Output 3kVAC, Output - Ground 500VAC				
Vibration	-	9.8m/s² (1.0G) at DIN rail; (10-55Hz: 9.8m/s² Constant, X,Y, Z each 1 hour)				
Shock	-	196m/s² (20G)				
Safety Agency Approvals	-	UL508, NEC Class 2(3) (/C2 models), UL60950, CSA60950, EN60950, CE, EN50178 Cat III (Pri)				
Conducted EMI	-	FCC-B, EN55011/EN55022-B, VCCI-B; Meets IEC61000-4-1				
Radiated EMI	-	EN55011/EN55022-B, FCC-Class B, VCCI-B				
ESD	-	IEC61000-4-2 ±10kV (Air), ±5kV (Contact)				
Radiated RFI	-	IEC61000-4-3 80-1000MHz,12V/m 80% AM 1kHz				
Fast Transient Burst	-	IEC61000-4-4 2.4kV 5kHz				
Lightning Surge	-	IEC61000-4-5 4.4kV, 1.2x50μs (Common Mode) 2.4kV 1.2x50μs (Normal)				
Conducted RFI	-	IEC61000-4-6 150kHz-80MHz, 12V, 80% AM 1kHz				
Magnetic Field	-	IEC61000-4-8 36A/m				
Voltage Dips	-	IEC61000-4-11 70% 10ms, 40% 100ms, 0% 5s				
Size	mm	50x97x110	60x97x110	60x97x110	80x97x110	120x97x110
Weight	g	470	540	540	780	1000
Warranty	-	3 Years				

(1) DC input is not safety approved
(2) DLP240-24-1/E, 170-265VAC: -10°C~+70°C, derated linearly to 60% load from 50° to 70°C.
DLP75-24-1/C2EJ: -10°C~+70°C, derated linearly to 75% load from 50° to 60°C.
DLP100-24-1/C2EJ: -10°C~+70°C, derated linearly to 80% load from 50° to 60°C.
(3) Evaluated to NEC NFPA70 Class 2 output per UL1310

DLP75 Outline Drawing

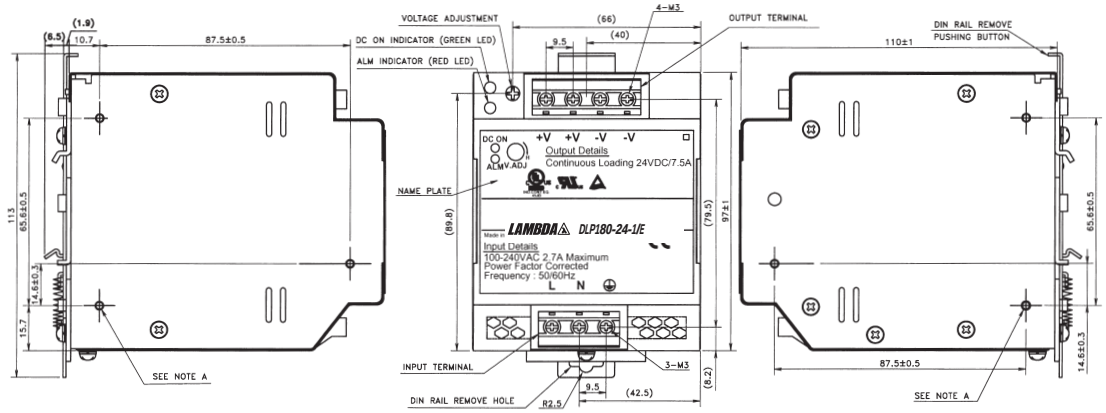


DLP100/120 Outline Drawing



Also available
DLP-PU parallel unit
for redundancy

DLP180 Outline Drawing



NOTES:

A: M3 EMBOSSED TAPPED & COUNTERSUNK HOLES(6) ARE FOR CUSTOMER CHASSIS MOUNTING. SCREWS MUST NOT PROTRUDE INTO POWER SUPPLY BY MORE THAN 4mm.

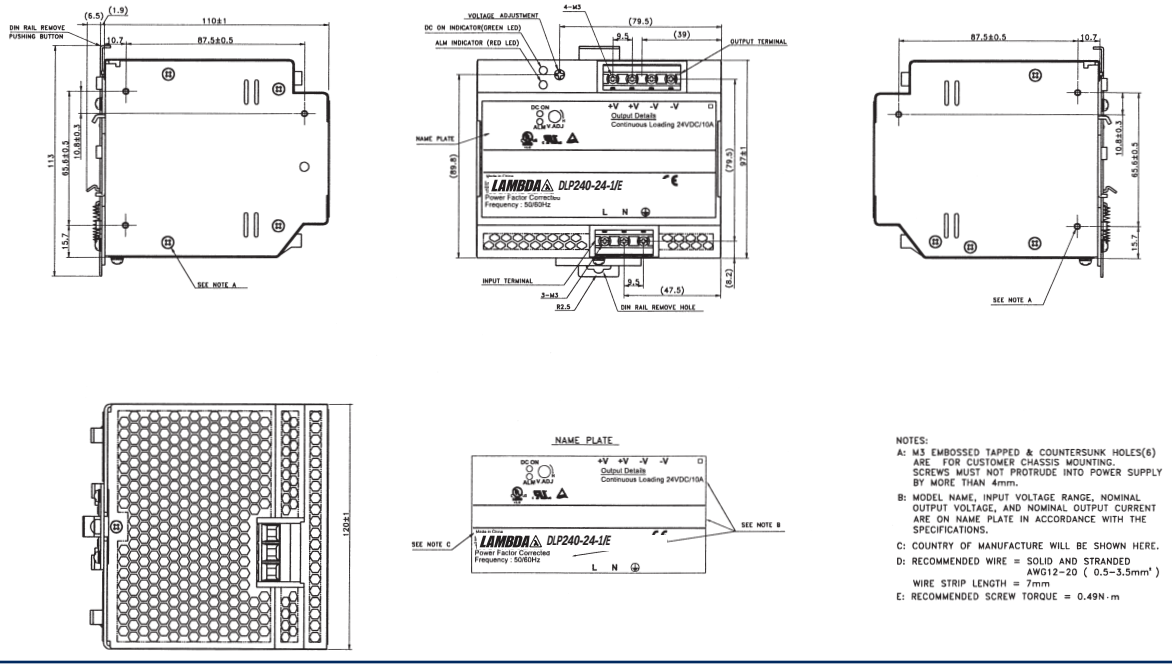
B: MODEL NAME, INPUT VOLTAGE RANGE, NOMINAL OUTPUT VOLTAGE, AND NOMINAL OUTPUT CURRENT ARE ON NAME PLATE IN ACCORDANCE WITH THE SPECIFICATIONS.

C: COUNTRY OF MANUFACTURE WILL BE SHOWN HERE.

D. RECOMMENDED WIRE = SOLID AND STRANDED AWG12-20 (0.5-3.5mm)
WIRE STRIP LENGTH = 7mm

E. RECOMMENDED SCREW TORQUE = 0.49N·m

DLP 240 Outline Drawing



NOTES:

A: M3 EMBOSSED TAPPED & COUNTERSUNK HOLES(6) ARE FOR CUSTOMER CHASSIS MOUNTING. SCREWS MUST NOT PROTRUDE INTO POWER SUPPLY BY MORE THAN 4mm.

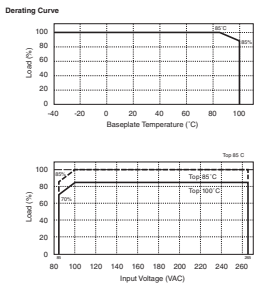
B: MODEL NAME, INPUT VOLTAGE RANGE, NOMINAL OUTPUT VOLTAGE, AND NOMINAL OUTPUT CURRENT ARE ON NAME PLATE IN ACCORDANCE WITH THE SPECIFICATIONS.

C: COUNTRY OF MANUFACTURE WILL BE SHOWN HERE.

D: RECOMMENDED WIRE = SOLID AND STRANDED AWG12-20 (0.5-3.5mm')
WIRE STRIP LENGTH = 7mm

E: RECOMMENDED SCREW TORQUE = 0.49N·m

Derating Curve



LAMBDA

- OR-ing Diodes Included
- Alarm Signals
- LED Indicators
- DIN Rail Mounting

DLP-PU Series

Power Supply Parallel or Redundancy Module

Key Market Segments & Applications

Industrial Controls:	Motor Control Systems
Factory Automation:	Process Control, Automotive, Chemical Processing
Test & Measurement:	Burn in & Test, Instrumentation Measurement

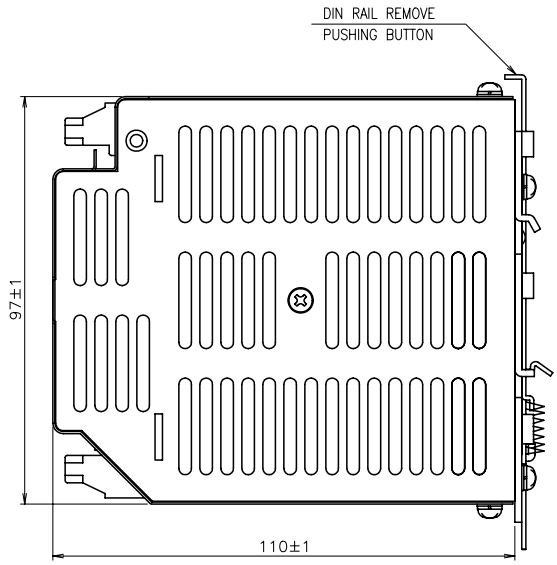
DLP-PU Features and Benefits

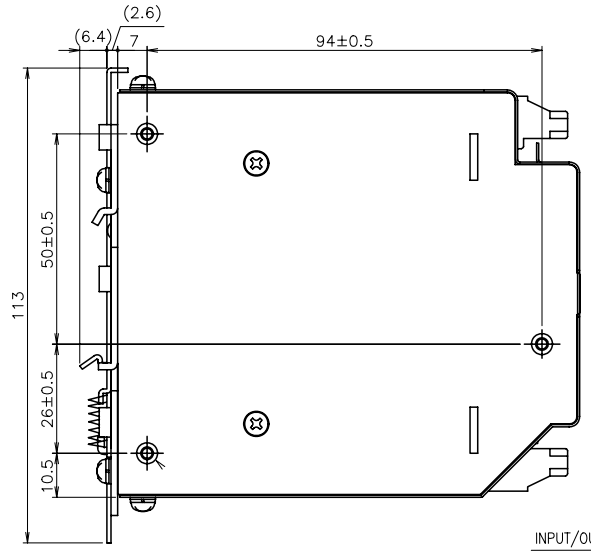
Features	*Benefits*
• Internal ORing Diodes	• Allows Redundant Operating
• Can Connect Two Units in Parallel	• Enables System Scalability
• Output Voltage Monitoring (via relays)	• Remote Alarm Notification
• DIN Rail Mounting	• Easier System Integration

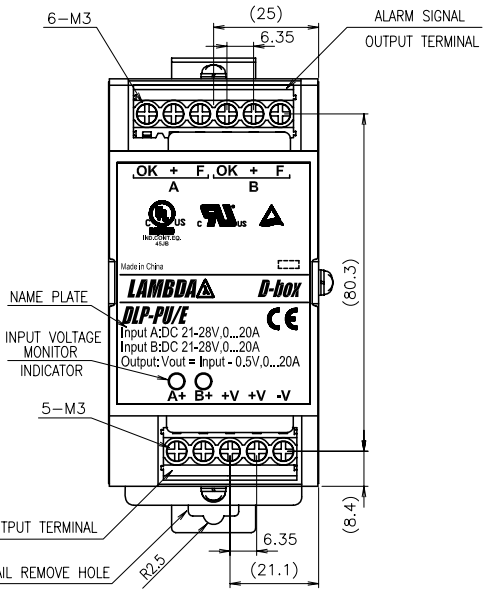
Specifications

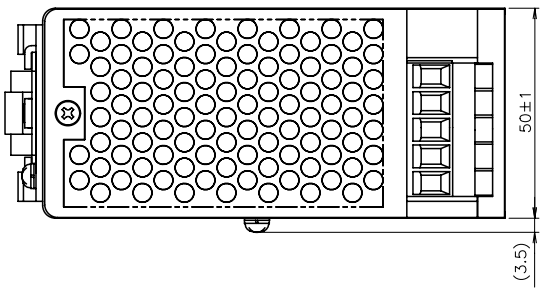
ITEMS	MODELS	DLP-PU/E
Input Voltage Range	VDC	21 - 28VDC
Number of inputs	-	Two
Maximum Input Current	A	20A per input
Maximum Output Current	A	20A
Overcurrent protection	-	None
Voltage Drop	VDC	0.5V
Maximum Reverse Voltage	VDC	35VDC
LED Indicators	-	Two green LEDs indicating each input is "good"
Input Voltage Alarm	-	Relay off when input is <19.2V (±1%) or > 30V (±5%). NO and NC contacts
Relay contact rating (max)	-	28VDC, 1A or 120VAC, 0.5A (5mA minimum recommended)
Cooling	-	Convection
Operating Temperature		-10 to +70°C, derate linearly to 60% from 60 to 70°C
Storage Temperature	-	-30 to +90°C
Humidity	-	Operating: 30 - 90%RH, Storage: 10 - 95%RH (non condensing)
Withstand Voltage	-	Input or Output - Chassis, Input or Output - Relay Contacts, Relay Contacts to Chassis; 500VAC for 1 min.
Isolation Resistance	-	Input or Output - Chassis, Input or Output - Relay Contacts, Relay Contacts to Chassis; >10M Ohms at 25°C, 70%RH and 500VDC
Vibration	-	Non operating, mounted on DIN Rail,10-55Hz (sweep for 1 min), 9.8m/s² constant X, Y, Z each for 1 hour
Shock	-	196m/s²
Safety Agency Approval	-	UL60950, CSA60950, EN60950, UL508, CSA22.2 No.14, EN60529 IP20, EN50178 Cat 1
Size	mm/in	50 x 97 x 110mm, 1.97x 3.81 x 4.33"
Weight	g	470g
Warranty	yrs	Three Years

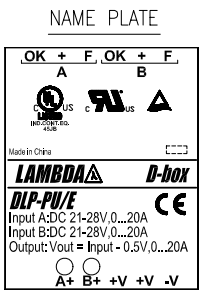
DLP-PU Outline Drawing





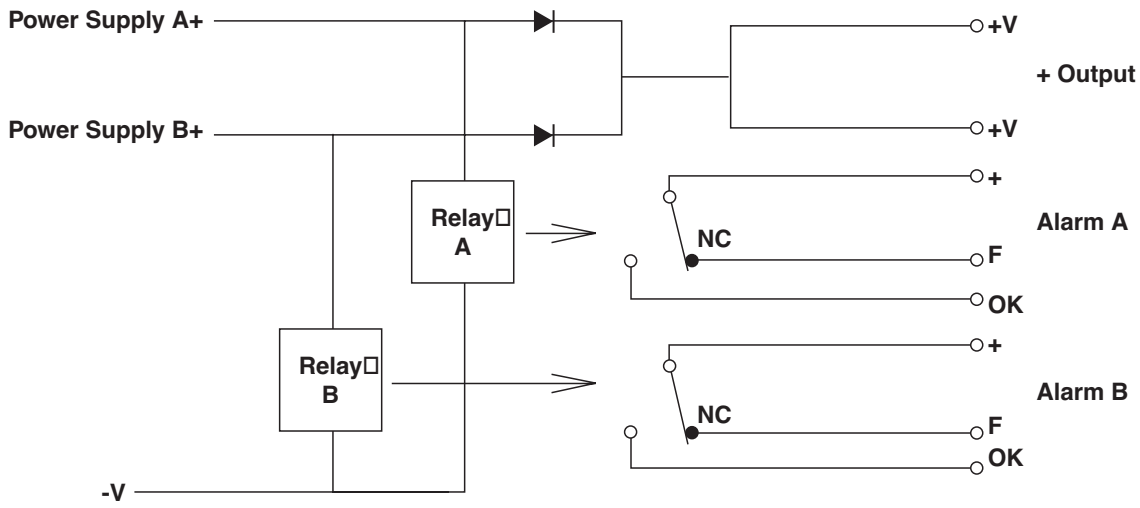






Block Diagram

DLP-PU Block Diagram



LAMBDA

- Low Cost
- 5V to 48V Outputs
- Universal Input
- Compact Size
- NEC Class 2 Compliant
- UL508 Listed
- -10 to +71°C Operation
- RoHS Compliant

DPP 15-100 Series

15-100W, 5-48V Output DIN Rail Mount Power Supplies

Key Market Segments & Applications

Industrial Controls:	Motor Control Systems
Factory Automation:	Process Control, Automotive, Chemical Processing
Test & Measurement:	Burn in & Test, Instrumentation Measurement

DPP Features and Benefits

Features	*Benefits*
• PFC Compliant to EN61000-3-2	• Supports Global Use
• UL508 Approvals	• Easier System Configuration
• TS35/7.5 or TS35/15 DIN Rail Mounting	• Easy System Integration

Specifications

ITEMS / MODELS		DPP15	DPP25/30	DPP50	DPP100
AC Input Voltage range (1)	VAC	85 - 264VAC			85 - 132VAC 176 - 264VAC
Input Frequency	Hz	47 - 63Hz			
DC Input Voltage range	-	90 - 375VDC			210 - 375VDC
Inrush Current (115 / 230VAC)	A	<35A	35 / 45A	35 / 50A	35 / 55A
Power Factor	-	Meets EN61000-3-2 Class A			
Max Input Current (230VAC)	A	0.4	0.72	1.35	2.2
Output Voltage Accuracy	%	±1% (24V outputs preset at 24.5V)			
Line Regulation	%	< 0.5%			
Load Regulation	%	< 0.5%			
Ripple/Noise	mV	<50mV (20MHz Bandwith)			
Overcurrent Protection (Typ)	-	>120%			
Overvoltage Protection	V	125 - 137.5%, Cycle AC line to reset			
Hold Up Time (115VAC input)	ms	> 20ms			
Parallel switch	-	No			Yes
LED Indicator	-	Green LED = On			
Operating Temperature	-	-10 to +71°C (Derate linearly 5%/°C from 61 to 71°C)			
Storage Temperature	-	-25 to +85°C			
Operating Humidity	-	20 - 90% RH (non condensing)			
Cooling (2)	-	Convection			
Withstand Voltage	-	Input to Output 3kVAC for 1 min.			
Shock	-	Half sine wave, 4G, 22ms, 3 times per face, X, Y, Z			
Vibration	-	10-500Hz (20 min sweep) 0.002G^2/Hz, 1Grms acceleration X, Y, Z, 1 hour			
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC			
Safety Agency Approvals	-	UL60950-1, UL508, UL1310(3) (Class 2), EN60950-1, CE Mark			
Emissions	-	EN55011, EN55022 Radiated & Conducted, EN61000-6-3			
Immunity	-	EN61000-6-2, EN61000-4-2 Level4, EN61000-4-3, EN61000-4-6 Level 3 EN61000-4-4 Level 4 (I/P) Level 3 (O/P), EN61000-4-5 Level 4, EN61000-4-8, EN61000-4-11			
Weight (Typ)	g	130	260		390
Size (WxHxD)	mm	23 x 75 x 97	45 x 75 x 91		73 x 75 x 97
Case material	-	Plastic			
MTBF (MIL-HDBK-217F, GF25)	Hours	287,000	>288,000	273,000	239,000
Warranty	-	Two years			

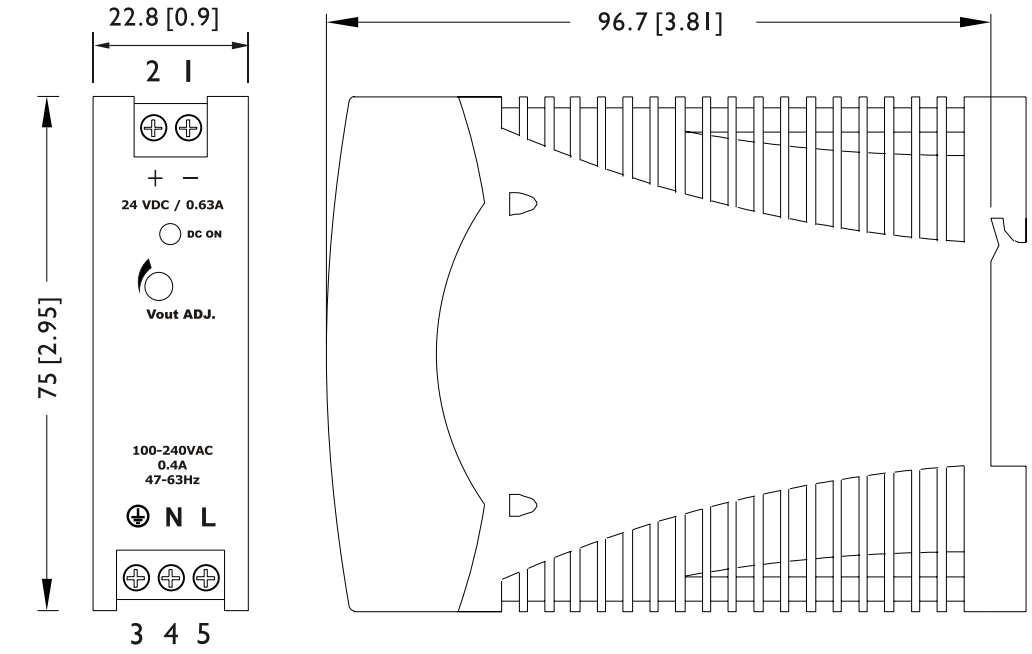
(1) Auto Select - DPP100 only
(2) Recommend 25mm clearance on all sides.
(3) Does not include DPP25-5 & DPP100-24 models. Evaluated to NEC NFPA70 Class 2 output per UL1310.

Model Selector

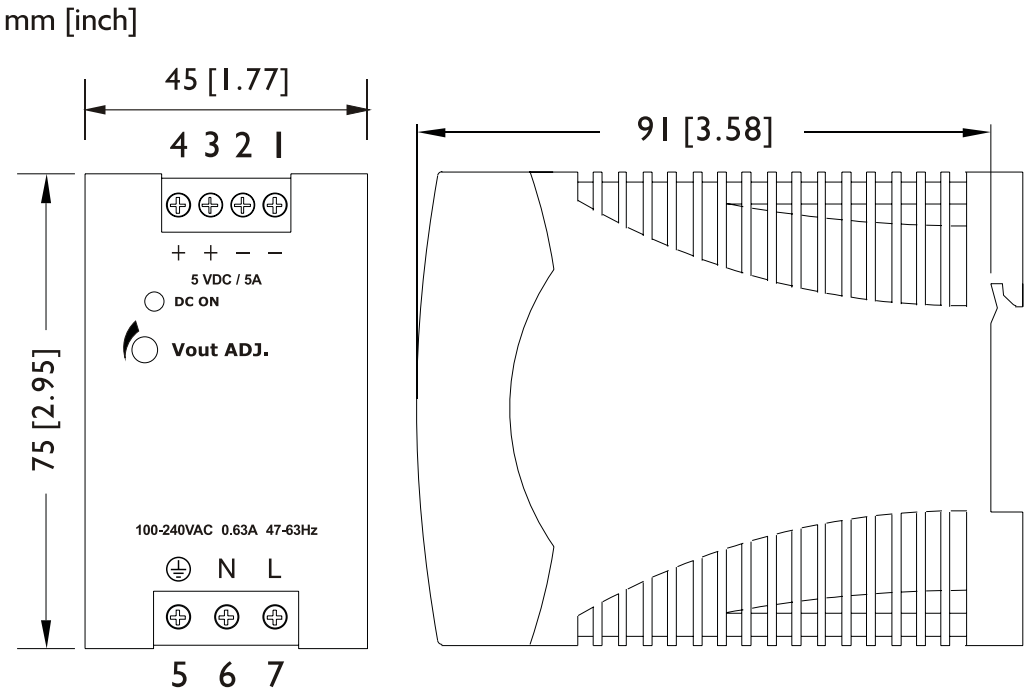
Model	Voltage (V)	Voltage Adjust (V)	Current (A)	Power (W)	Effic. (typ) %
DPP25-5	5	5-6	5	25	78
DPP30-12	12	9.9-12.1	2.5	30	82
DPP50-15	15	11.9-15.1	3.4	50	85
DPP15-24	24	22.5-28.5	0.63	15	80
DPP30-24	24	22.5-28.5	1.3	30	84
DPP50-24	24	22.5-28.5	2.1	50	86
DPP100-24	24	22.5-28.5	4.2	100	87
DPP50-48	48	48-56	1.05	50	87

DPP15 Outline Drawing

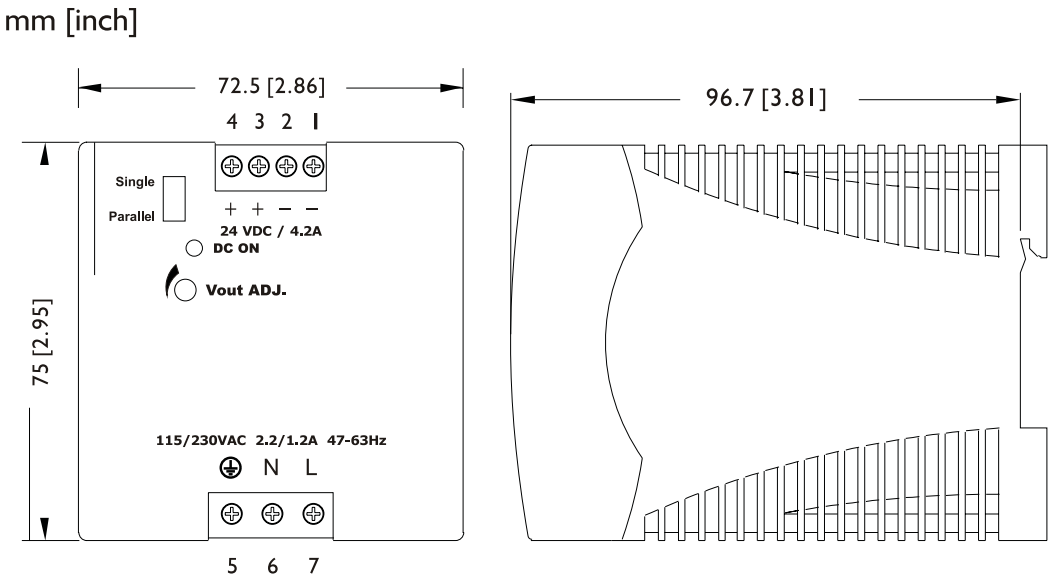
mm [inch]



DPP25-DPP50 Outline Drawing



DPP100 Outline Drawing



LAMBDA

- Low Cost
- 12, 24 or 48V Outputs
- Wide Range AC Input
- Active PFC
- Parallel Function Switch
- -25 to +71°C Operation

DPP120&240 Series

120W & 240W Single Output DIN Rail Mount Power Supplies

Key Market Segments & Applications

Industrial Controls:	Motor Control Systems
Factory Automation:	Process Control, Automotive, Chemical Processing
Test & Measurement:	Burn in & Test, Instrumentation Measurement

DPP 120 & 240 Features and Benefits

Features	*Benefits*
• PFC Compliant to EN61000-3-2	• Supports Global Use
• UL508 Approvals	• Easier System Configuration
• TS35/7.5 or TS35/15 DIN Rail Mounting	• Easy System Integration

Specifications

ITEMS \ MODELS		DPP120	DPP240
AC Input Voltage range	VAC	90 - 132/186-264VAC (auto select)	
Input Frequency	Hz	47 - 63Hz	
DC Input Voltage range	VDC	210 - 370VDC	
Inrush Current (115 / 230VAC)	A	24/48A	30/60A
Power Factor	-	typ 0.7 at 230VAC input	
Input Current (115/230VAC)	A	2.8/1.4A	5.4/2.2A
Output Voltage	V	12 , 24 or 48V	24 or 48V
Output Voltage Accuracy	%	-0, +1% of Nominal	
Line Regulation	%	±0.5%	
Load Regulation	%	±1% Single Mode	±5% Parallel Mode
Ripple and Noise (20MHz BW)	mV	<50mV	<100mV
Overcurrent Protection (Typ)	-	120 - 145%	
Overvoltage Protection	V	120 - 145%	
Hold Up Time (230VAC input)	ms	>30 ms	
Efficiency (typ)	%	84 - 90% (see table)	
Parallel operation	-	Up to 3 units	
LED Indicators	-	Green LED = On, Red LED = DC Output Low	
DC Good Relay (24V model only)	-	0.3A rated normally open relay contacts, closes when output is above 17.6 - 19.4V	
Operating Temperature	-	-25 to +71°C (Derate linearly 2.5% per °C from 61 to 71°C)	
Storage Temperature	-	-25 to +85°C	
Operating Humidity	-	20 - 95% RH (non condensing)	
Cooling	-	Convection	
Withstand Voltage	-	Input to Output 3kVAC for 1 min.	
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC	
Safety Agency Approvals	-	UL508 Listed, UL60950-1, EN60950-1, CE	
Conducted & Radiated EMI	-	EN55022 class B	
Weight (Typ)	g	920	1000
Size (HxWxD)	mm	125 x 63.5 x 123.6	125 x 83 x 126
Case material	-	Metal	
Warranty	yrs	Two years	

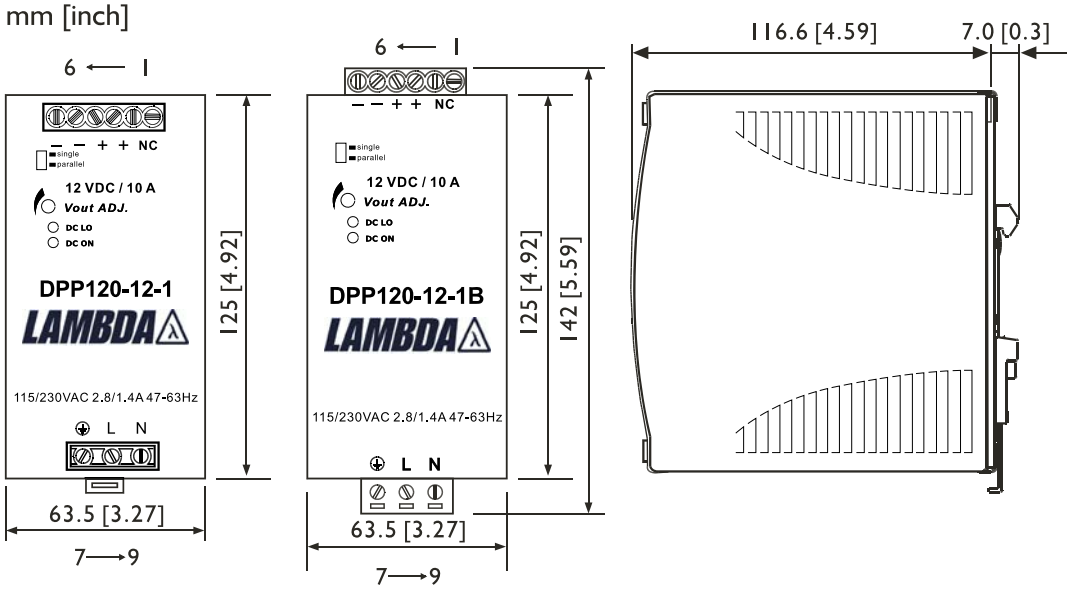
Model Selector

Model	Voltage (V)	Voltage Adjust (V)	Current (A)	Power (W)	Effic. (typ) %
DPP120-12	12	11.4 - 14.5	10	120	84
DPP120-24	24	22.5 - 28.5	5	120	86
DPP120-48	48	45 - 55	2.5	120	87
DPP240-24	24	22.5 - 28.5	10	240	89
DPP240-48	48	47 - 56	5	240	90

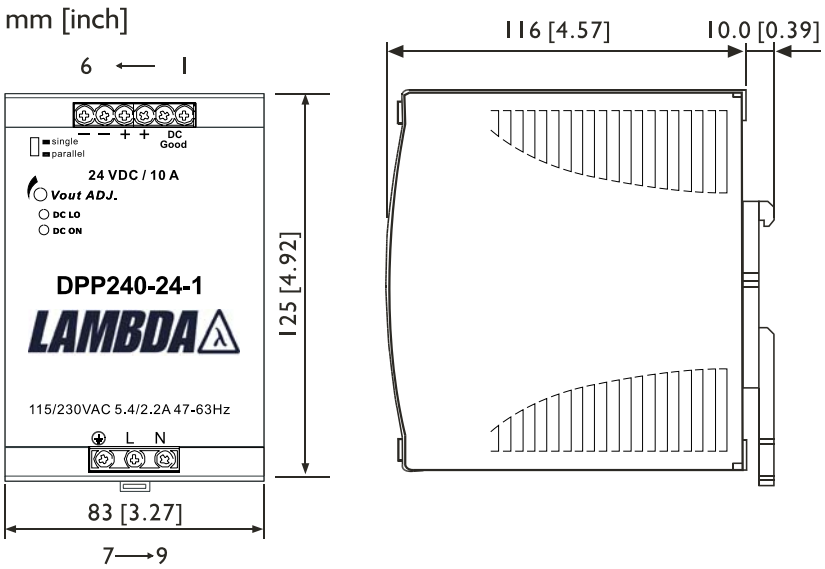
PIN Assignments

PIN	Function
1	DC Good Relay
2	DC Good Relay
3	V+
4	V+
5	V-
6	V-
7	Chassis
8	L
9	N

DPP120 Outline Drawing



DPP240 Outline Drawing



LAMBDA

- Low Cost
- 24 or 48V Outputs
- Wide Range AC Input
- Active PFC
- Parallel Function Switch
- -25 to +71°C Operation

DPP480 Series

480W Single Output DIN Rail Mount Power Supplies

Key Market Segments & Applications

Industrial Controls:	Motor Control Systems
Factory Automation:	Process Control, Automotive, Chemical Processing
Test & Measurement:	Burn in & Test, Instrumentation Measurement

DPP480 Features and Benefits

Features	*Benefits*
• PFC Compliant to EN61000-3-2	• Supports Global Use
• UL508 Approvals	• Easier System Configuration
• TS35/7.5 or TS35/15 DIN Rail Mounting	• Easy System Integration

Specifications

ITEMS \ MODELS		DPP480-24-1	DPP480-48-1
AC Input Voltage range	VAC	90 - 264VAC	
Input Frequency	Hz	47 - 63Hz	
DC Input Voltage range	VDC	120 - 370VDC	
Inrush Current (115 / 230VAC)	A	25 / 50A	
Power Factor	-	Meets EN61000-3-2 Class A, typ 0.99 at 230VAC input	
Input Current (115/230VAC)	A	7 / 3.5A	
Output Voltage	V	24V	48V
Output Current	A	20A	10A
Output Voltage Adjustment Range	-	22.5 - 28.5V	47 - 56V
Output Voltage Accuracy	%	-0, +1% of Nominal	
Line Regulation	%	±0.5%	
Load Regulation	%	±0.5% (±5% when set in parallel mode)	
Ripple and Noise (20MHz BW)	mV	100mV	
Overcurrent Protection (Typ)	-	120 - 140%	
Overvoltage Protection	V	30 - 33V	57 - 63V
Hold Up Time (115VAC input)	ms	> 30ms	
Efficiency (typ)	%	89%	90%
Parallel operation	-	Set in single or parallel (droop) mode - maximum of 3 units	
LED Indicators	-	Green LED = On, Red LED = DC Output Low	
DC Good Relay (24V model only)	-	0.3A rated normally open relay contacts, closes when output is above 17.6 - 19.4V	
Operating Temperature	-	-25 to +71°C (Derate linearly 2.5%/°C from 61 to 71°C)(2)	
Storage Temperature	-	-25 to +85°C	
Operating Humidity	-	20 - 95% RH (non condensing)	
Cooling (1)	-	Convection	
Withstand Voltage	-	Input to Output 3kVAC for 1 min.	
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC	
Safety Agency Approvals	-	UL508 Listed, UL60950-1, EN60950-1, CE	
Conducted & Radiated EMI	-	EN55022 class A	
Weight (Typ)	g	1920g	
Size (WxHxD)	mm	175 x 125 x 123	
Case material	-	Metal	
Warranty	yrs	Two years	

Notes: (1) Recommend 1" clearance on all sides
(2) Derating curve applies for input of 110V and above. For 90V input derating at 4% per deg

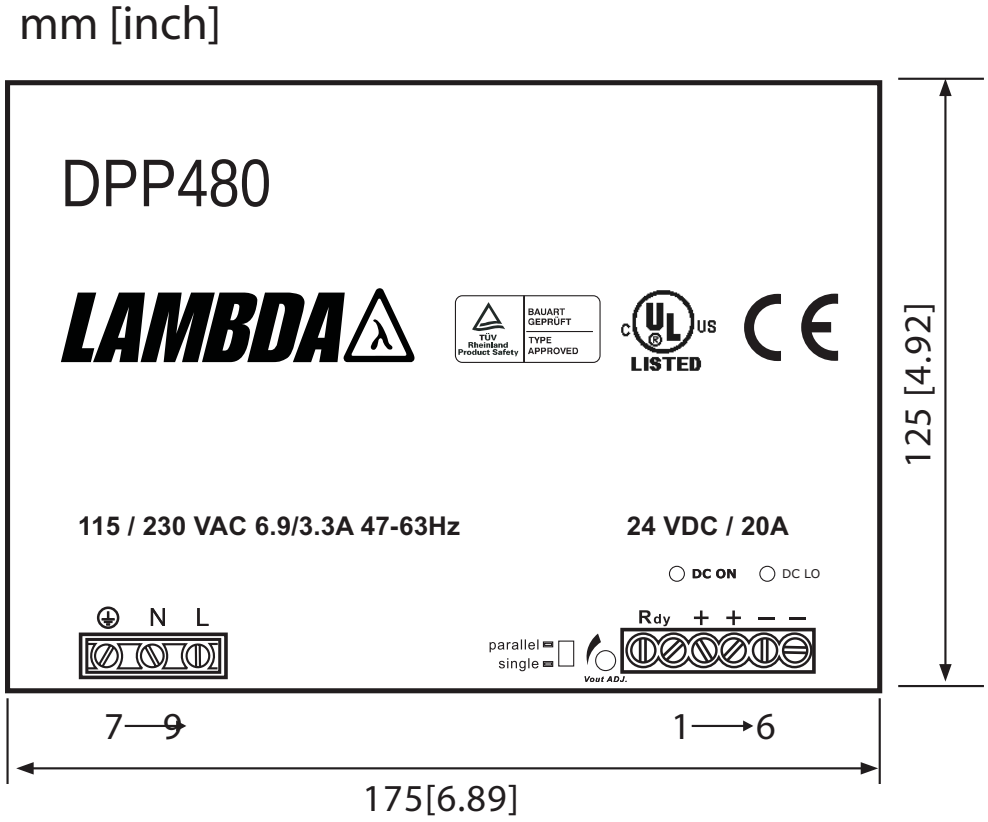
Model Selector

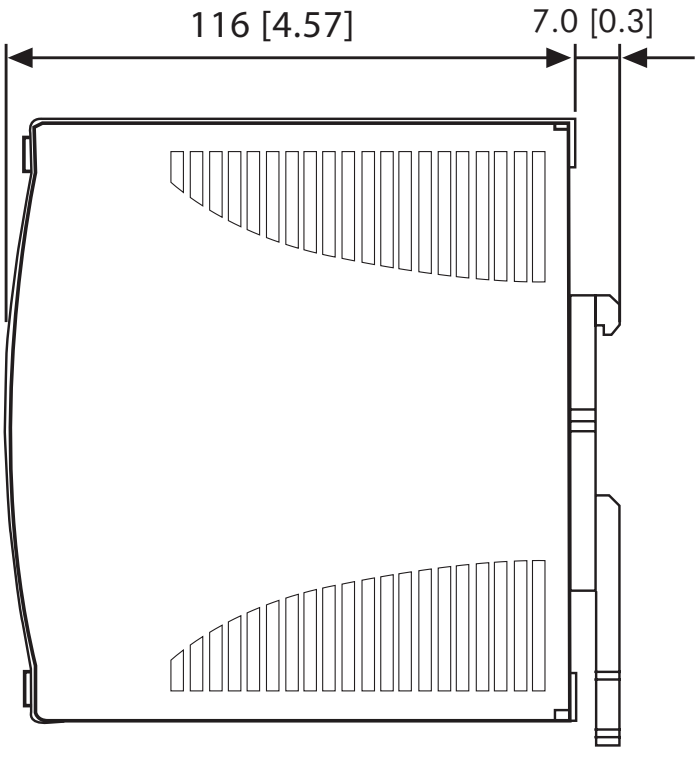
Model	Voltage (V)	Voltage Adjust (V)	Current (A)	Power (W)	Effic. (typ) %
DPP480-24-1	24	22.5 - 28.5	20	480	89
DPP480-48-1	48	47.0 - 56.0	10	480	90

PIN Assignments

PIN	Function
1	DC Good Relay
2	DC Good Relay
3	V+
4	V+
5	V-
6	V-
7	Chassis
8	N
9	L

DPP480 Outline Drawing





- Low Profile for Building Automation
- 5V to 24V Outputs
- Wide Range AC Input
- -25 to +71°C Operation
- Convection Cooled
- UL1310 Class II
- Class 2 Double Insulation

DSP Series

7.5W to 100W Low Profile Din Rail Mount Power Supplies

Key Market Segments & Applications

Building Services Automation: Alarms and Security, Access and Fire Safety Systems, Lighting and Environment Control Systems.

DSP Features and Benefits

Features	*Benefits*
• Low 56mm Profile	• Fits into wall mounted cabinets
• Wide Range AC	• Global use with no input selector switches
• Full Power at 61˚C	• No derating needed

Specifications

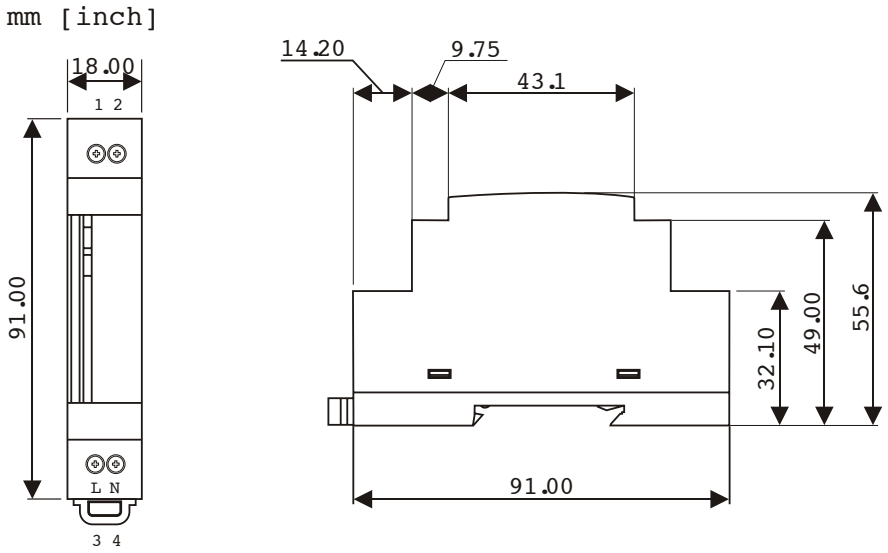
ITEMS / MODEL		DSP10	DSP30	DSP60	DSP100
AC Input Voltage range	VAC	90 - 264VAC, Class II double insulated (No ground connection required)			
Input Frequency	Hz	47 - 63Hz			
DC Input Voltage range	VDC	120 - 370VDC			
Inrush Current (115 / 230VAC)	A	15 / 30A	25 / 50A	30 / 60A	30 / 60A
Power Factor		Meets EN61000-3-2, EN61000-3-3			
Output Voltage Accuracy	%	±1% of Nominal			
Line Regulation	%	1%			
Load Regulation	%	1%			
Ripple and Noise (20MHz BW)	mV	50mV(1)			
Overcurrent Protection (Typ)	-	110 - 160%, fold forward under short circuit (DSP100-24/C2 102-108%)			
Overvoltage Protection	V	120 - 145%			
Hold Up Time (115VAC input)	ms	See Model Selector			
LED Indicators	-	Green LED = On, Red LED = DC Output Low			
Operating Temperature	-	-25 to +71°C (Derate linearly 2.5%/°C from 61 to 71°C)			
Temperature Coefficient	%/°C	±0.02%/°C			
Storage Temperature	-	-25 to +85°C			
Operating Humidity	-	20 - 95% RH (non condensing)			
Cooling	-	Convection			
Withstand Voltage	-	Input to Output 3kVAC for 1 min.			
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC			
Safety Agency Approvals	-	UL1310 Class 2(2), UL508 Listed, UL60950-1, EN60950-1, CE			
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8 & -11			
Conducted & Radiated EMI	-	EN55022 class B	EN55022 class A		
Weight (Typ)	g	60	200	250	320
Size (WxHxD)	mm	18 x 91 x 55.6	53 x 91x 55.6	71 x 91 x 55.6	90 x 91 x 56.8
Case material	-	Plastic			
Warranty	yrs	Two years			

Note 1: For DSP100-24/C2 Ripple & Noise measured with Vin 115- 230 Vac
Note 2: Excludes Models: DSP60-5, DSP60-12, DSP100-12, DSP100-15, DSP100-24

Model Selector

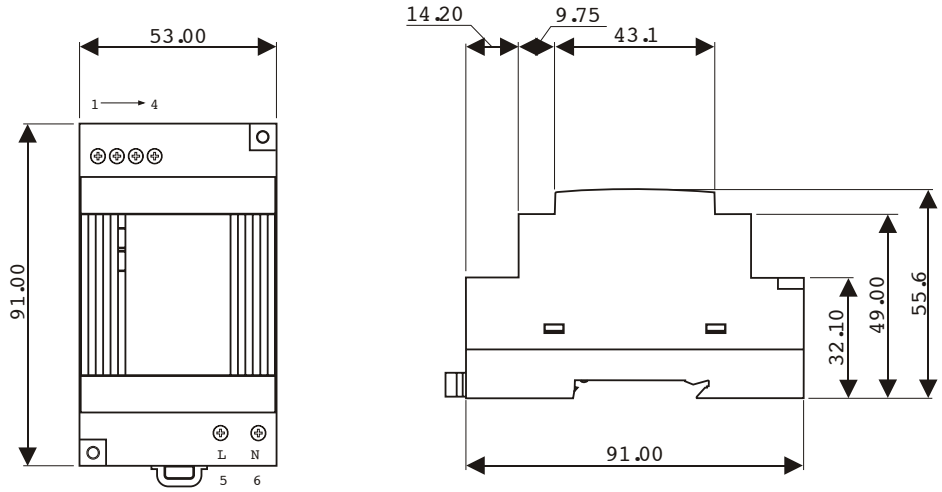
Model	Voltage (V)	Voltage Adjust (V)	Current (A)	Power (W)	Efficiency (Typ %)
DSP10-5	5	5 - 5.5	1.50	7.5	74
DSP30-5	5	5 - 5.5	3.00	15.0	80
DSP60-5	5	5 - 5.5	7.00	35.0	80
DSP10-12	12	12 - 14	0.83	10.0	78
DSP30-12	12	12 - 14	2.10	25.2	84
DSP60-12	12	12 - 14	4.50	54.0	84
DSP100-12	12	12 - 14	6.00	72.0	82
DSP10-15	15	13.5 - 16.5	0.67	10.1	78
DSP30-15	15	13.5 - 16.5	2.00	30.0	85
DSP60-15	15	13.5 - 16.5	4.00	60.0	85
DSP100-15	15	13.5 - 16.5	5.00	75.0	85
DSP10-24	24	24 - 28	0.42	10.1	80
DSP30-24	24	24 - 28	1.30	31.2	86
DSP60-24	24	24 - 28	2.50	60.0	86
DSP100-24	24	24 - 28	4.20	100.8	85

DSP10 Outline Drawing



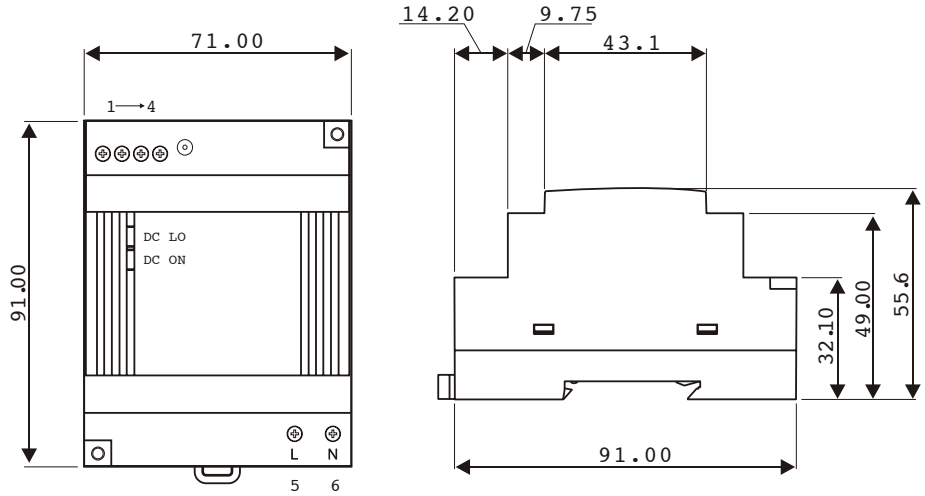
DSP30 Outline Drawing

mm [inch]



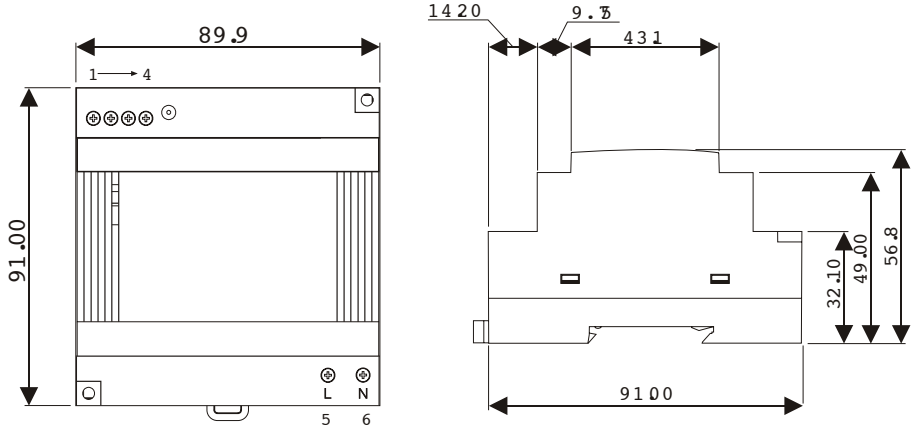
DSP60 Outline Drawing

mm [inch]



DSP100 Outline Drawing

mm [inch]



LAMBDA

- 1U High
- Up to 3000W (3 units) in 19" Rack
- Hotswap capable (Oring Diodes Built In)
- Low Cost
- PoE Option

FPS1000 Series

1000W Front End Power Supplies

Key Market Segments & Applications

Power for Distributed Power Architecture
Factory Automation
RF Amplifiers

FPS Features and Benefits

Features	*Benefits*
• 1U High	• Lower Cost of Ownership
• Hotswap capable	• Suitable for N+1 Redundancy
• High Efficiency	• Less Heat Dissipated in System
• Full Array of Signals	• Easier System Monitoring

Specifications

ITEMS / MODELS			12V Nominal	24V Nominal	32V Nominal	48V Nominal
Output Voltage Range	(1)	V	10.5 - 13.2	21.5 - 29V	28.8 - 38.4V	43 - 58V
Output Current		A	72A	40A	31A	21A
Line Regulation		-	<0.4%			
Load Regulation		-	<0.8%			
Output Noise		mV	150mV	200mV	250mV	300mV
Overvoltage Protection		V	14.3 to 15.7	31 to 34V	41.5V to 45.5V	62 to 66V
Overcurrent Protection		-	105 - 125%, Constant Current type			
Load Sharing		-	Single wire current sharing, up to 8 units			
Remote Sense		-	Compenstates for 1V on each output lead			
I²C Monitoring		-	Optional (Specify /S)			
Signals (opto isolated)		-	DC OK, AC Fail, and Overtemperature warning, high on fail			
Remote On/Off		-	On: 0 - 0.6V or short, Off: 2- 15V or open			
Auxiliary Output		-	11.2-12.5VDC 0.25A			
AC Input	(2)	-	85 - 265VAC, 47 - 63Hz², 120-360VDC. (Derate 10% < 100VAC)			
Leakage Current		mA	<1.1mA at 230VAC input			
Inrush Current		A	<40A			
Hold up time (100VAC input)		-	20ms typical (800W loading)			
Efficiency (typ) 100/200VAC		-	81 / 83%	84 / 86%	84 / 86%	85 / 88%
Power Factor Correction		-	EN61000-3-2 class A (20-100% load), >0.98 at full load			
Immunity		-	EN61000-4-2, -3, -4, -5, -6, -11			
EMC (conducted and radiated)		-	EN55022, level B, FCC Class B			
Operating Temperature		°C	0 to +70°C, derate 2%/°C from 50 to 60°C, 2.5%/°C from 60 to 70°C			
Storage Temperature		°C	-30 to +85°C			
Withstand Voltage		-	Input to Output 3kVAC, Input to Output 2kVAC, Output to Ground 500VAC for 1 min.			
Cooling		-	Two internal fans, airflow from front to back (variable speed)			
Humidity		-	Operating: 10 - 90% RH, Storage: 10 - 95% RH (non condensing)			
Shock & Vibration		-	Meets ETS 300 019			
Safety Agency		-	UL60950-1, EN60950-1, CE Mark			
Input / Output Connector		-	Positronic PCIB24W9M400A1 (Mating #PCIB24W9F400A1)			
Front panel indicators		-	AC OK, DC OK, DC Fail			
Size (LxWxH)		mm	Stand alone: 41 x 127 x 290; Rack: 44 x 400 x 351			
Weight		g	2,000			
Warranty		yr	Two Years			

Note 1 : Via Trim pin on output connector

Note 2 : 47-440Hz with reduced PFC (100-265VAC)

Model Number

Front AC Input Panel Configuration	Output Voltage	Output Current	Max Power	I2C Interface
FPS100012/P	12V	72A	864W	No
FPS100012/PS	12V	72A	864W	Yes
FPS100024/P	24V	40A	960W	No
FPS100024/PS	24V	40A	960W	Yes
FPS100032/P	32V	31A	992W	No
FPS100032/PS	32V	31A	992W	Yes
FPS100048/P	48V	21A	1008W	No
FPS100048/PS	48V	21A	1008W	Yes
FPSS1U/P	Rack (3 slot), contains two blanking panels			
FPST1U/P	Rack with 3 individual outputs (floating)			
Rear AC Input Panel Configuration	**Output Voltage**	**Output Current**	**Max Power**	**I2C Interface**
FPS100012	12V	72A	864W	No
FPS100012/S	12V	72A	864W	Yes
FPS100024	24V	40A	960W	No
FPS100024/S	24V	40A	960W	Yes
FPS100032	32V	31A	992W	No
FPS100032/S	32V	31A	992W	Yes
FPS100048	48V	21A	1008W	No
FPS100048/S	48V	21A	1008W	Yes
FPSS1U	Rack (3 slot), contains two blanking panels			
FPST1U	Rack with 3 individual outputs (floating)			

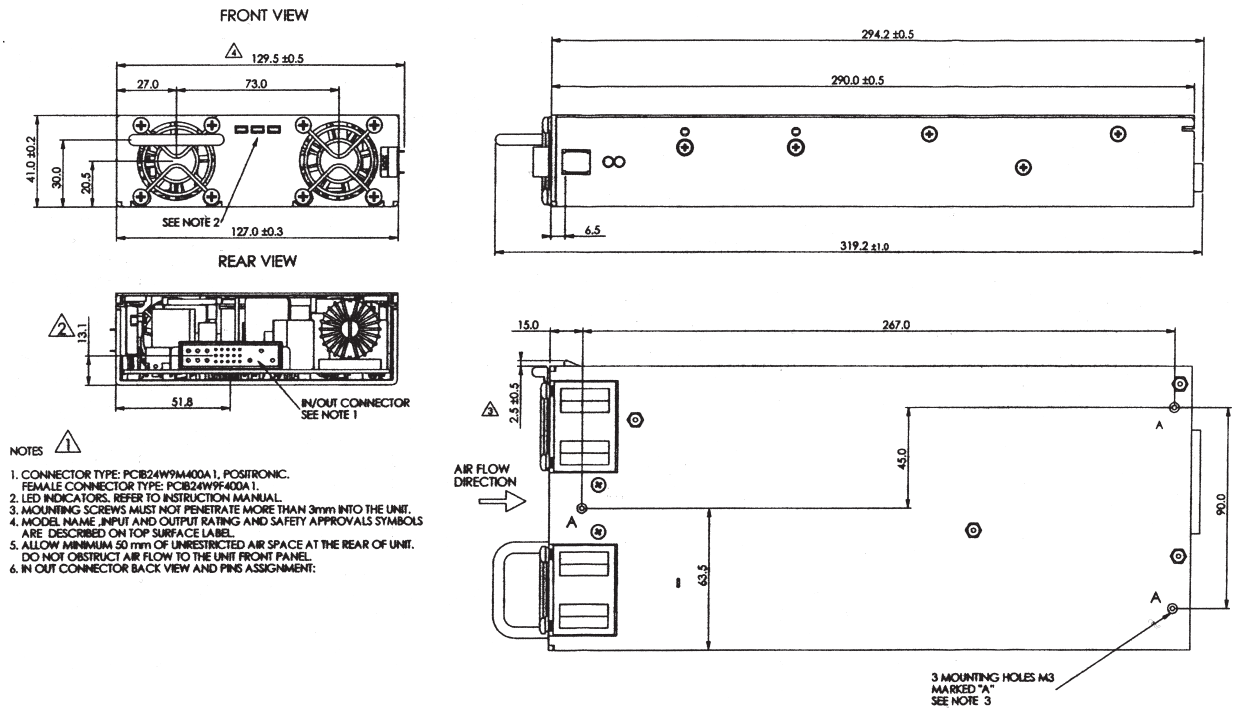
Suffix	Description
/POE*	1500VAC Output to Ground Isolation (output noise 400mV)
*FPS100048 only	(Approvals: CE Mark, UL/TUV due June 2007)

Full System (3 Modules & FPS s1U rack)

FPS3000 - XX / X

XX		
12	BLANK	= Standard
24	S	= 12C
32	P	= FRONT AC INPUT
48		

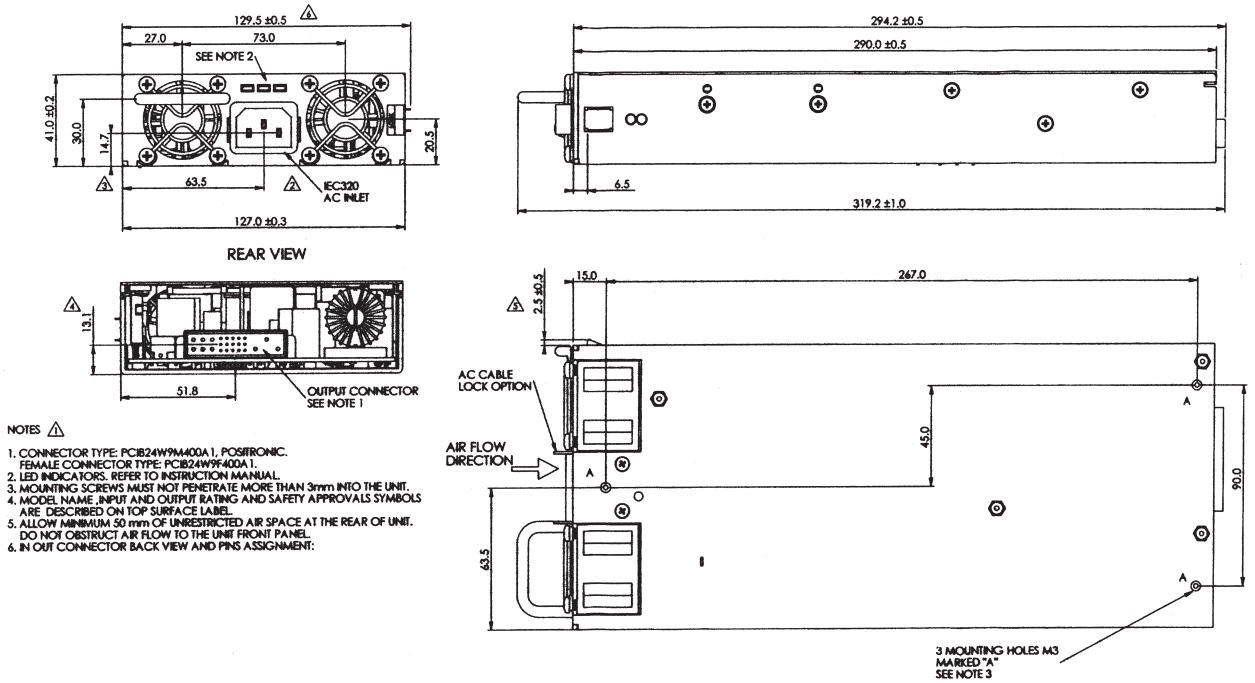
FPS1000 Outline Drawing



NOTES

1. CONNECTOR TYPE: PCIB24W9M400A1, POSITRONIC. FEMALE CONNECTOR TYPE: PCIB24W9F400A1.
2. LED INDICATORS. REFER TO INSTRUCTION MANUAL.
3. MOUNTING SCREWS MUST NOT PENETRATE MORE THAN 3mm INTO THE UNIT.
4. MODEL NAME ,INPUT AND OUTPUT RATING AND SAFETY APPROVALS SYMBOLS ARE DESCRIBED ON TOP SURFACE LABEL.
5. ALLOW MINIMUM 50 mm OF UNRESTRICTED AIR SPACE AT THE REAR OF UNIT. DO NOT OBSTRUCT AIR FLOW TO THE UNIT FRONT PANEL.
6. IN OUT CONNECTOR BACK VIEW AND PINS ASSIGNMENT:

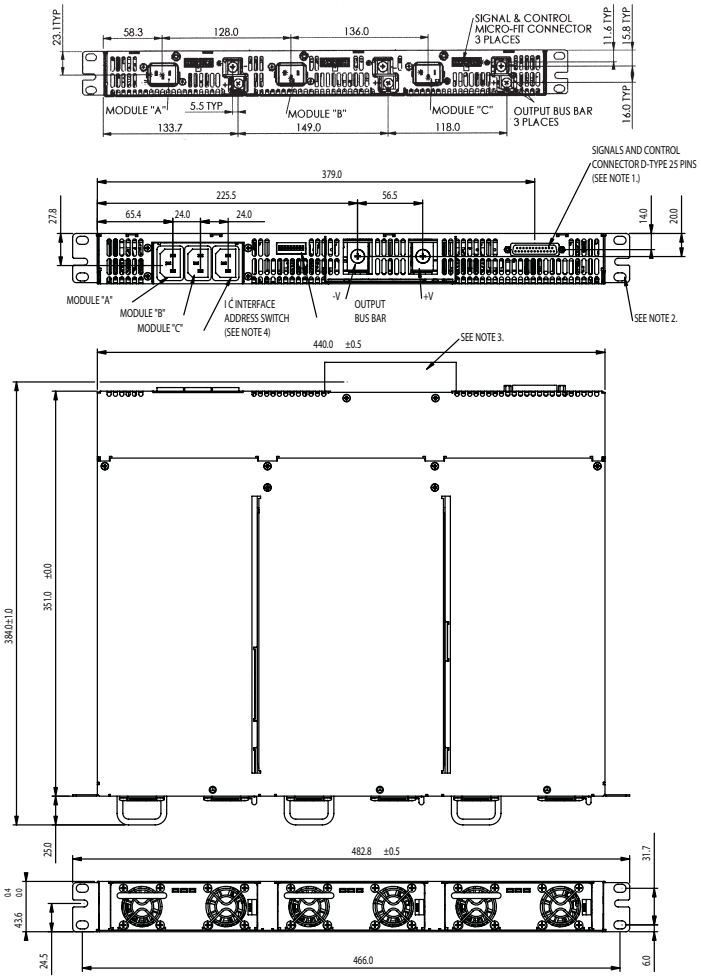
FPS1000/P Outline Drawing



NOTES

1. CONNECTOR TYPE: PCIB24W9M400A1, POSITRONIC.
   FEMALE CONNECTOR TYPE: PCIB24W9F400A1.
2. LED INDICATORS. REFER TO INSTRUCTION MANUAL.
3. MOUNTING SCREWS MUST NOT PENETRATE MORE THAN 3mm INTO THE UNIT.
4. MODEL NAME, INPUT AND OUTPUT RATING AND SAFETY APPROVALS SYMBOLS ARE DESCRIBED ON TOP SURFACE LABEL.
5. ALLOW MINIMUM 50 mm OF UNRESTRICTED AIR SPACE AT THE REAR OF UNIT. DO NOT OBSTRUCT AIR FLOW TO THE UNIT FRONT PANEL.
6. IN OUT CONNECTOR BACK VIEW AND PINS ASSIGNMENT:

FPSS1U Outline Drawing



LAMBDA

- 5 Year Warranty
- UL508 approved
- SEMI F47 Compliant (high line AC)
- Universal Input (85 - 265VAC)
- High Efficiency
- RoHS Compliant Design

Key Market Segments & Applications

Factory Automation	Process Control, NC-Machining, Automotive, Packaging Equipment, Materials Handling, Chemical Processing, Robots
Test & Measurement Automated Service	Burn-in & Test, Automated Test, Instrumentation, Measurement, Detection

HWS Series

Single Output Industrial Power Supplies

HWS Features and Benefits

Features	*Benefits*
• 5 Year Warranty	• Lower Cost of Ownership
• High Efficiency	• Easier System Cooling
• Wide Range AC Input	• Supports Global Use

Specifications

ITEMS \ MODELS		HWS15	HWS30	HWS50	HWS100	HWS150
Input Voltage range		85 - 265VAC (47 - 63Hz) or 120 - 370VDC				
Input Current (Typ) (1)	A	0.4 / 0.2	0.8 / 0.4	0.7 / 0.35	1.3 / 0.65	1.9 / 0.95
Inrush Current 100/200VAC	A	14 / 28				
Power Factor		Meets EN61000-3-2				
Temperature Coefficient		<0.02%/°C				
Overcurrent Protection	-	>104%				
Overvoltage Protection	V	Yes (See page 2)				
Hold Up Time (Typ)	ms	20				
Leakage Current (max)	mA	<0.5mA (Typ 0.3mA at 100VAC, 0.5mA at 230VAC)				
Remote Sense		No			Yes	
Indicator		Green LED = ON				
Operating Temp. (no cover)		-10C to +70C, derate linearly to 20% load from 50C to 70C				
Storage Temperature		-30 to +85C				
Humidity (non condensing)		Operating: 30 - 90%RH, Non operating 10 - 95%RH				
Cooling		Convection				
Withstand Voltage		Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.				
Isolation Resistance		>100M at 25C & 70%RH, Output to Ground 500VDC				
Vibration (non operating)		10 - 55Hz (1 minute sweep), 19.6m/s² constant X, Y, Z 1 hour				
Shock		< 196.1m/s²				
Safety Agency Approvals		-UL60950-1, CSA60950-1, EN60950-1, EN50178, Built to meet UL508 CE Mark				
Line Dip		Complies with SEMI F47 (200VAC line only)				
Conducted & Radiated	EMI	EN55011 / EN55022-B, FCC-B, VCCI-B				
Immunity		IEC61000-4-2(Level 2,3), -3(Level 3), -4(Level 4), -5(Level 3,4), -6(Level 3), -8(Level4, -11				
Weight (Typ)	g	180	220	280	450	500
Size (WxHxD)	mm	26.5x82x80	26.5x82x95	26.5x82x120	28x82x160	37x82x160
Warranty		Five Years				

Notes: (1) 100/200VAC

See website for HWS/ME medical EN/UL60601-1 approved models
and HWS/HD heavy duty / harsh environment models with -40 degree C startup

Model Selector

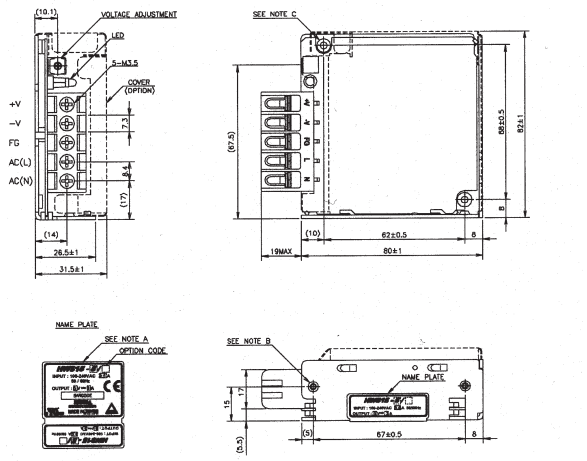
Model	Voltage	Adjust Range	Max Curr. A	Load Reg mV	Line Reg mV	Ripple Noise mV	Over voltage V	Eff. typ % 100/200 VAC
HWS15-3/A	3.3V	2.97 - 3.96	3	40	20	120	4.13-4.95	68/71
HWS30-3/A	3.3V	2.97 - 3.96	6	40	20	120	4.13-4.95	70/73
HWS50-3/A	3.3V	2.97 - 3.96	10	40	20	120	4.13-4.95	76/78
HWS100-3/A	3.3V	2.97 - 3.96	20	40	20	120	4.13-4.95	78/81
HWS150-3/A	3.3V	2.97 - 3.96	30	40	20	120	4.13-4.95	78/81
HWS15-5/A	5V	4.0 - 6.0	3	40	20	120	6.25-7.25	77/79
HWS30-5/A	5V	4.0 - 6.0	6	40	20	120	6.25-7.25	77/80
HWS50-5/A	5V	4.0 - 6.0	10	40	20	120	6.25-7.25	82/83
HWS100-5/A	5V	4.0 - 6.0	20	40	20	120	6.25-7.25	83/86
HWS150-5/A	5V	4.0 - 6.0	30	40	20	120	6.25-7.25	83/86
HWS15-12/A	12V	9.6 - 14.4	1.3	96	48	150	15-17.4	80/81
HWS30-12/A	12V	9.6 - 14.4	2.5	96	48	150	15-17.4	81/83
HWS50-12/A	12V	9.6 - 14.4	4.3	96	48	150	15-17.4	81/83
HWS100-12/A	12V	9.6 - 14.4	8.5	96	48	150	15-17.4	83/86
HWS150-12/A	12V	9.6 - 14.4	13	96	48	150	15-17.4	83/86
HWS15-15/A	15V	12.0 - 18.0	1	120	60	150	18.8-21.8	80/81
HWS30-15/A	15V	12.0 - 18.0	2	120	60	150	18.8-21.8	81/83
HWS50-15/A	15V	12.0 - 18.0	3.5	120	60	150	18.8-21.8	81/83
HWS100-15/A	15V	12.0 - 18.0	7	120	60	150	18.8-21.8	83/86
HWS150-15/A	15V	12.0 - 18.0	10	120	60	150	18.8-21.8	83/86
HWS15-24/A	24V	19.2 - 28.8	0.65	192	96	200	30-34.8	82/83
HWS30-24/A	24V	19.2 - 28.8	1.3	192	96	200	30-34.8	83/86
HWS50-24/A	24V	19.2 - 28.8	2.2	192	96	200	30-34.8	82/84
HWS100-24/A	24V	19.2 - 28.8	4.5	192	96	200	30-34.8	84/87
HWS150-24/A	24V	19.2 - 28.8	6.5	192	96	200	30-34.8	85/88
HWS15-48/A	48V	38.4 - 52.8	0.33	384	192	200	55.2-64.8	80/80
HWS30-48/A	48V	38.4 - 52.8	0.65	384	192	200	55.2-64.8	82/83
HWS50-48/A	48V	38.4 - 52.8	1.1	384	192	200	55.2-64.8	83/85
HWS100-48/A	48V	38.4 - 52.8	2.1	384	192	200	55.2-64.8	84/87
HWS150-48/A	48V	38.4 - 52.8	3.3	384	192	200	55.2-64.8	85/88

Options

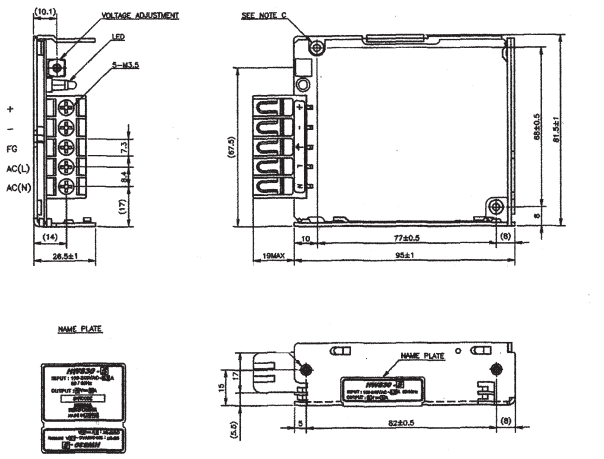
Suffix	Description
Blank	Screw terminals, no cover
/A	Screw terminals, cover
/R	Remote on/off (50-150W only)
	Example: HWS50-24/RA

Full size drawings and more information available at www.lambda-europe.com/hws

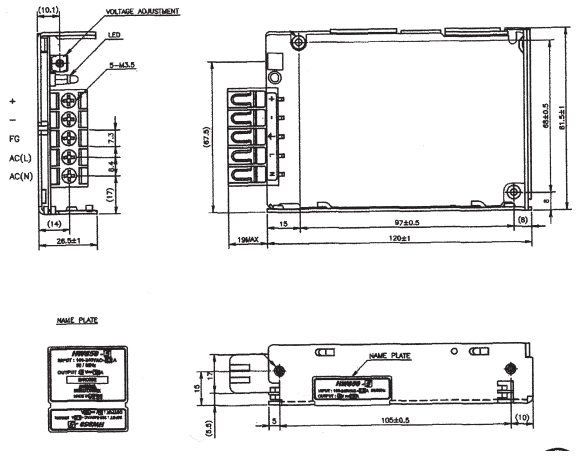
HWS15 Outline Drawing



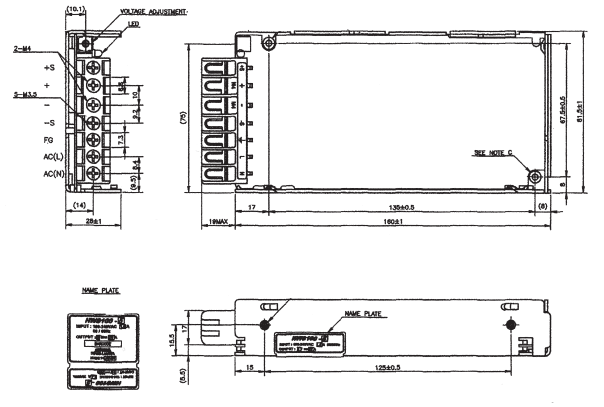
HWS30 Outline Drawing



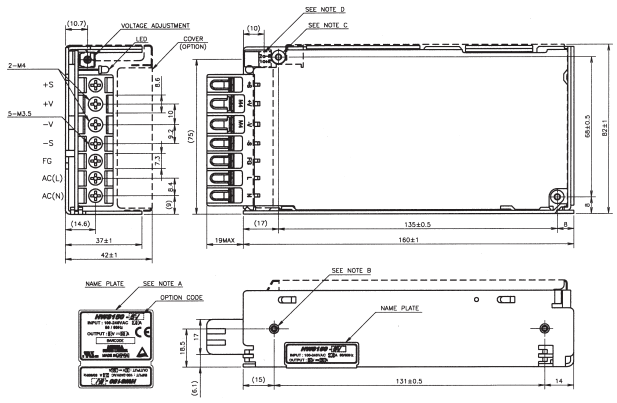
HWS50 Outline Drawing



HWS100 Outline Drawing



HWS150 Outline Drawing



Note: All fixing holes M3 tapped max. depth 6mm

LAMBDA

- 5 Year Warranty
- UL508 Approved
- SEMI F47 Compliant (high line AC)
- Universal Input (85 - 265VAC)
- High Efficiency
- RoHS Compliant Design

HWS300/600 Series

Single Output Industrial Power Supplies

Key Market Segments & Applications

Factory Automation:
Test & Measurement:
Automated Service

HWS300/600 Features and Benefits

Features	*Benefits*
• 5 Year Warranty	• Lower Cost of Ownership
• High Efficiency	• Easier System Cooling
• Wide Range AC Input	• Supports Global Use

Specifications

ITEMS \ MODEL			HWS300	HWS600
Input Voltage range		-	85 - 265VAC (47 - 63Hz) or 120 - 330VDC	
Input Current (Typ)	(1)	A	5V: 3.8/1.9; 12-48V: 4.2/2.1	5V: 7.5/3.6; 12-48V: 8.1/3.9
Inrush Current	(1)	A	20 / 40	
Power Factor		-	Meets EN61000-3-2	
Temperature Coefficient		-	<0.02%/°C	
Overcurrent Protection		-	>105% (>101% of peak current for 24V output models)	
Overvoltage Protection	V		3.3V: 125-150%, 5V to 24V: 125-145%, 48V: 115-135% (Recycle AC or remote on/off to reset)	
Hold Up Time (Typ)		ms	20	
Leakage Current (230VAC, 50Hz)		mA	<0.75mA	
Remote Sense		-	Yes	
Indicator		-	Green LED = ON	
Remote on/off		-	Yes (Isolated from output)	
Parallel operation		-	Single wire connection (up to 5 units)	
DC Good		-	Yes	
Remote Adjust (PV) Option		-	1-6V external adjusts output 20-120% of nominal (20-110% 48V model)	
Operating Temperature		°C	-10°C to +70°C, derate linearly to 50% load from 50°C to 70°C	
Storage Temperature		°C	-30 to +85°C	
Humidity (non condensing)		-	Operating: 10 - 90%RH, Non operating 10 - 95%RH	
Cooling		-	Internal fan	
Withstand Voltage	-		Input to Ground 2.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.	
Isolation Resistance		-	>100M at 25°C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)		-	10 - 55Hz (1 minute sweep), 19.6m/s^2 constant X, Y, Z 1 hour	
Shock		-	< 196.1 m/s^2	
Safety Agency Approvals	(2)	-	UL60950-1, CSA60950-1, EN60950-1, EN50178, UL508 (HIS300-24, 600-24 only), CE Mark	
Line Dip		-	Complies with SEMI F47 (200VAC line only)	
Conducted & Radiated EMI		-	EN55011 / EN55022, FCC VCCI Class B	
Recommended EMI Filter		-	MC1206	MC1210
Immunity		-	IEC61000-4-2, -3, -4, -6 (Level 3), -5, -8 (Level 4), -11	
Weight (Typ)		g	1,000	1,600
Size (WxHxD)		mm	61 x 82 x 165	100 x 82 x 165
Warranty		yrs	Five Years	

Notes:
1. 100/200VAC
2. For EN60601-1 see options

Models

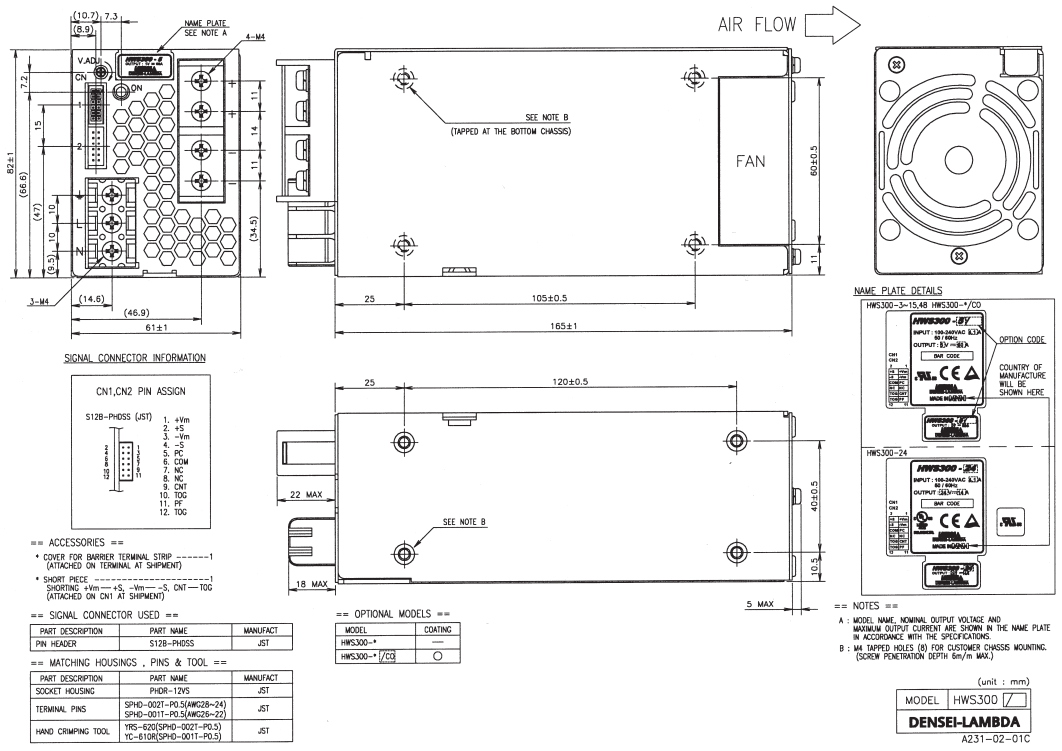
Model	Voltage	Adjust Range	Max Curr. A	Peak Curr. A[2]	Load Reg mV	Line Reg mV	Ripple Noise mV	Eff. typ %[1]
HWS300-3	3.3V	2.64 - 3.96	60	-	30	20	120	74/77
HWS600-3	3.3V	2.64 - 3.96	120	-	30	20	120	74/77
HWS300-5	5V	4 - 6V	60	-	30	20	120	79/82
HWS600-5	5V	4 - 6V	120	-	30	20	120	80/83
HWS300-12	12V	9.6 - 14.4	27	-	72	48	150	80/83
HWS600-12	12V	9.6 - 14.4	53	-	72	48	150	80/83
HWS300-15	15V	12 - 18.0	22	-	96	60	150	80/83
HWS600-15	15V	12 - 18.0	43	-	96	60	150	80/83
HWS300-24	24V	19.2 - 28.8	14	16.5	144	96	150	82/85
HWS600-24	24V	19.2 - 28.8	27	31	144	96	150	82/85
HWS300-48	48V	38.4 - 52.8	7	-	288	192	350	82/85
HWS600-48	48V	38.4 - 52.8	13	-	288	192	350	82/85

Notes
(1) 100/200VAC
(2) 200-265VAC Input, 10s maximum on time with 35% duty cycle

Options

Suffix	Description
/PV	HWS300, 600 (standard on HWS1500): 1-6V program voltage input to adjust output 20-120% of nominal (20-110% for 48V)
/HD	See HWS50-1500/HD Datasheet for details. -40 to +71 (74)°C operation, conformally coated PCBs
/ME	See HWS30-600/ME Datasheet for details of UL60601-1, EN60601-1 medically approved models

HWS300 Outline Drawing



== ACCESSORIES ==

* COVER FOR BARRIER TERMINAL STRIP -------1
(ATTACHED ON TERMINAL AT SHIPMENT)

* SHORT PIECE ----------1
SHORTING +Vm — +S, -Vm — -S, CNT — TOG
(ATTACHED ON CN1 AT SHIPMENT)

== SIGNAL CONNECTOR USED ==

PART DESCRIPTION	PART NAME	MANUFACT
PIN HEADER	S12B-PHDSS	JST

== MATCHING HOUSINGS , PINS & TOOL ==

PART DESCRIPTION	PART NAME	MANUFACT
SOCKET HOUSING	PHDR-12VS	JST
TERMINAL PINS	SPHD-002T-P0.5(AWG28~24) SPHD-001T-P0.5(AWG26~22)	JST
HAND CRIMPING TOOL	YRS-620(SPHD-002T-P0.5) YC-610R(SPHD-001T-P0.5)	JST

== OPTIONAL MODELS ==

MODEL	COATING
HWS300-*	—
HWS300-*/CO	○

== NOTES ==

A : MODEL NAME, NOMINAL OUTPUT VOLTAGE AND MAXIMUM OUTPUT CURRENT ARE SHOWN IN THE NAME PLATE IN ACCORDANCE WITH THE SPECIFICATIONS.

B : M4 TAPPED HOLES (8) FOR CUSTOMER CHASSIS MOUNTING. (SCREW PENETRATION DEPTH 6m/m MAX.)

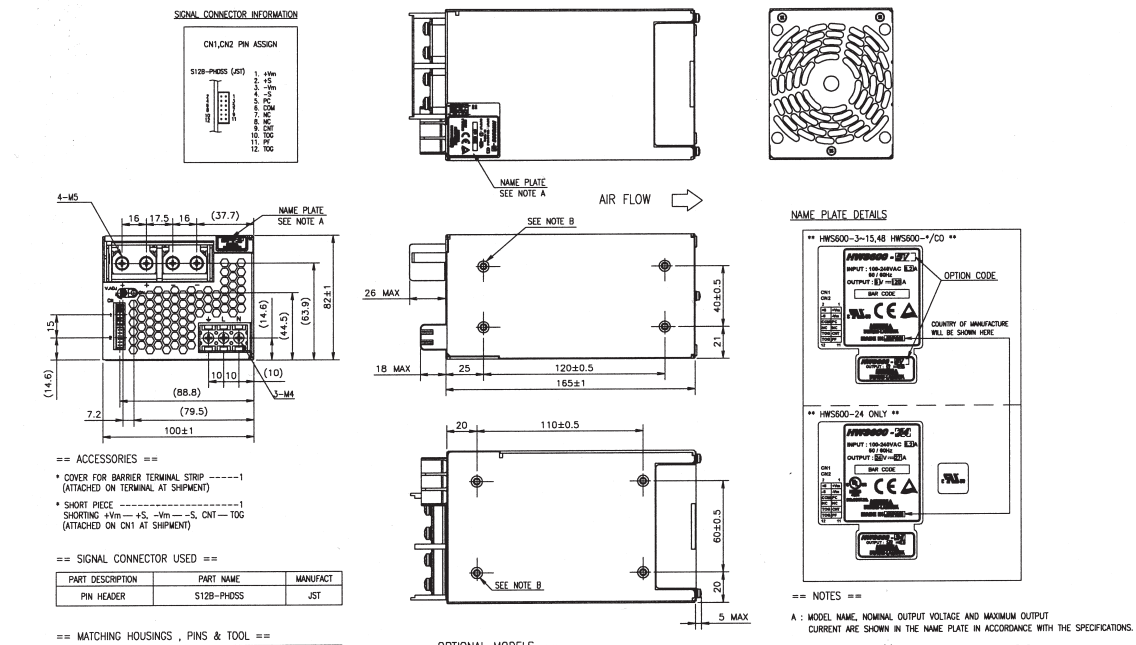
(unit : mm)

MODEL HWS300 □

DENSEI-LAMBDA

A231-02-01C

HWS600 Outline Drawing



== ACCESSORIES ==

* COVER FOR BARRIER TERMINAL STRIP -----1
(ATTACHED ON TERMINAL AT SHIPMENT)

* SHORT PIECE ----------1
SHORTING +Vm — +S, -Vm — -S, CNT — TOG
(ATTACHED ON CN1 AT SHIPMENT)

== SIGNAL CONNECTOR USED ==

PART DESCRIPTION	PART NAME	MANUFACT
PIN HEADER	S12B-PHDSS	JST

== MATCHING HOUSINGS , PINS & TOOL ==

PART DESCRIPTION	PART NAME	MANUFACT
SOCKET HOUSING	PHDR-12VS	JST
TERMINAL PINS	SPHD-002T-P0.5(AWG28~24) SPHD-001T-P0.5(AWG26~22)	JST
HAND CRIMPING TOOL	YRS-620(SPHD-002T-P0.5) YC-610R(SPHD-001T-P0.5)	JST

== OPTIONAL MODELS ==

MODEL	COATING
HWS600-*	—
HWS600-*/CO	○

== NOTES ==

A : MODEL NAME, NOMINAL OUTPUT VOLTAGE AND MAXIMUM OUTPUT CURRENT ARE SHOWN IN THE NAME PLATE IN ACCORDANCE WITH THE SPECIFICATIONS.

B : M4 TAPPED HOLES (8) FOR CUSTOMER CHASSIS MOUNTING. (SCREW PENETRATION DEPTH 6m/m MAX.)

(unit : mm)

MODEL HWS600 □

DENSEI-LAMBDA

A232-02-01B

LAMBDA

HWS1500 Series

Single Output Industrial Power Supplies

- 5 Year Warranty
- High Power Density
- SEMI F47 Compliant (high line AC)
- Universal Input (85 - 265VAC)
- High Efficiency
- RoHS Compliant Design

Key Market Segments & Applications

Factory Automation:
Test & Measurement:
Automated Service
Broadcast and Communications
Display Systems
Semiconductor Manufacturing Equipment

HWS1500 Features and Benefits

Features	*Benefits*
• 5 Year Warranty	• Lower Cost of Ownership
• High Efficiency	• Easier System Cooling
• Wide Range AC Input	• Supports Global Use

Specifications

ITEMS / MODEL			HWS1500
Input Voltage range		-	85 - 265VAC (47 - 63Hz)
Input Current (Typ)	(1)	A	19/10
Inrush Current	(1)	A	20 / 40
Power Factor		-	Meets EN61000-3-2
Temperature Coefficient		-	<0.02%/°C
Overcurrent Protection		-	>105%
Overvoltage Protection		V	Typically 125 - 145% (Recycle AC or remote on/off to reset)
Hold Up Time (Typ)		ms	20
Leakage Current (max)		mA	<1.5mA at 230VAC 60Hz
Remote Sense		-	Yes
Indicator		-	Green LED = ON
Remote on/off		-	Yes (Isolated from output)
Parallel operation		-	Single wire connection (up to 5 units)
DC Good		-	Yes
Remote Adjust (PV)		-	1-6V external voltage adjusts output 20-120% of nominal (20-110% 48V model)
Operating Temperature		-	-10°C to +70°C, derate linearly to 50% load from 50°C to 70°C (3)
Storage Temperature		-	-30 to +85°C
Humidity (non condensing)		-	10 - 90%RH
Cooling		-	Internal fan
Withstand Voltage		-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.
Isolation Resistance		-	>100M at 25C & 70%RH, Output to Ground 500VDC
Vibration (non operating)		-	10 - 55Hz (1 minute sweep), 19.6m/s² constant X, Y, Z 1 hour
Shock		-	< 196.1 m/s²
Safety Agency Approvals		-	UL60950-1, CSA60950-1, EN60950-1, EN50178, CE Mark
Line Dip		-	Complies with SEMI F47 (200VAC line only)
Conducted & Radiated EMI		-	EN55011 / EN55022-A, FCC-A, VCCI-A
Recommended EMI Filter		-	MC1230
Immunity		-	Built to meet IEC61000-4-2 (Level 2,3), -3, (Level 3), -4 (Level 3), -5 (Level 3,4), -6 (Level 3), -8 (Level 4), -11
Weight (Typ)		g	3800
Size (WxHxD)		mm	280 x 126.5 x 82
Warranty		yrs	Five Years

Notes: (1) 100/200VAC
(2) Start up at -20°C
(3) HWS1500 with 85VAC input: -10 to 50°C derate to 80% load, derating linearly to 40% load from 50°C to 70°C
(4) For EN60601-1 see options

Models

Model	Voltage	Adjust Range	Max Curr. A	Peak Curr. A(2)	Load Reg mV	Line Reg mV	Ripple Noise mV	Eff. typ % (1)
HWS1500-12	12V	9.6-14.4	125	-	72	48	150	82/85
HWS1500-15	15V	12.0-18.0	100	-	90	60	150	83/87
HWS1500-24	24V	19.2-28.8	65/70[1]	105	144	96	200	84/88
HWS1500-48	48V	38.4-52.8	32	-	288	192	200	86/90

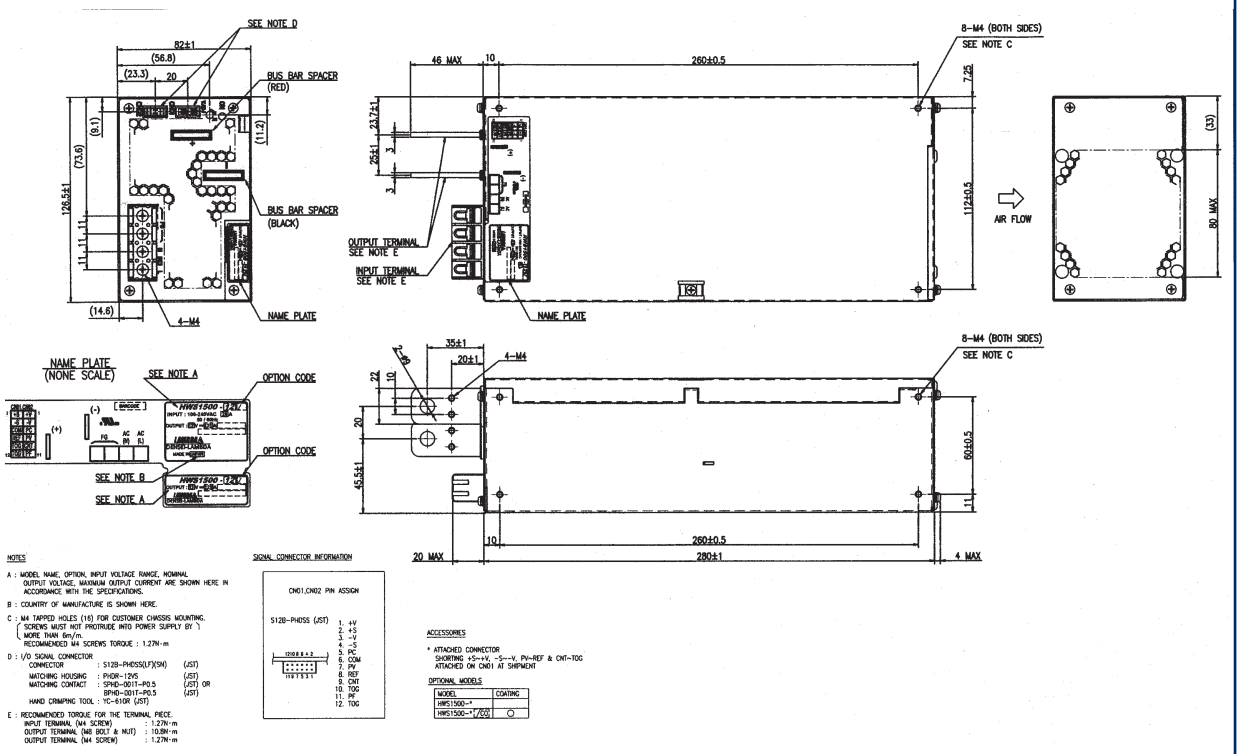
(1) 100/200VAC
(2) 200-265VAC Input, 10s maximum on time with 35% duty cycle.

Options

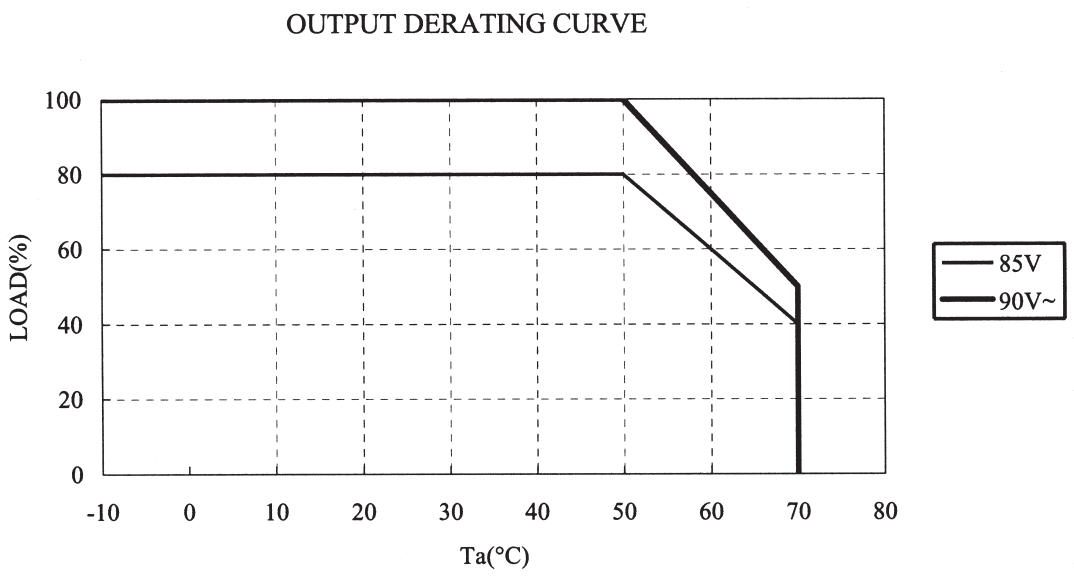
Suffix	Description
/HD	See HWS50-1500/HD Datasheet for details, -40 to +71 (74)°C operation, conformally coated PCBs
/ME	See HWS30-600/ME Datasheet for details of UL60601-1, EN60601-1 medically approved models.

Visit
www.lambda-europe.com/hws
for more information
on the RoHS Compliant
HWS Series

HWS1500 Outline Drawing



Derating Graph



LAMBDA

- 5 Year Warranty
- -10 to +71°C Operation (-40°C start up)
- Universal Input (85 - 265VAC)
- Conformally coated PCB's
- RoHS Compliant Design

Key Market Segments & Applications

Factory Automation:
Test & Measurement: LED Displays

HWS 50-1500/HD Series

Single Output Industrial Power Supplies

HWS/HD Features and Benefits

Features	*Benefits*
• 5 Year Warranty	• Lower Cost of Ownership
• Conformally coated PCB's	• Operates in Harsh Environments
• Wide Range AC Input	• Supports Global Use

Specifications

ITEMS \ MODELS		HWS50	HWS100	HWS150	HWS300	HWS600	HWS1500
Input Voltage range		85 - 265VAC (47 - 63Hz) or 120 - 370VDC (330VDC max for HWS300 & 600) N/A for 1500					
Input Current (Typ) (1)	A	0.7 / 0.35	1.3 / 0.65	1.9 / 0.95	4.1 / 2.1	8.1 / 3.9	19 / 10
Inrush Current (1)	A	14 / 28				20 / 40	
Power Factor	-	Meets EN61000-3-2					
Temperature Coefficient	-	<0.02%/°C					
Overcurrent Protection	-	>104%					
Overvoltage Protection	V	Yes (See table on page 2)					
Hold Up Time (Typ)	ms	20					
Leakage Current (60Hz)	mA	<0.5mA			<0.75mA		≤1.5mA
Remote Sense	-	No	Yes				
Indicator	-	Green LED = ON					
Remote On/Off	-	No			Yes (Isolated from output)		
Parallel operation	-	No			Single wire connection (5 units max)		
DC Good	-	No			Yes		
Operating Temperature and Derating (operation to +74°C - contact factory)		HWS50-150: -10°C to +71°C, (-10 - +50°C: 100%, +60°C: 60%, +71°C: 20%) HWS300-1500: -10°C to +71°C, (-10 to +50°C: 100%, derate linearly to 50% load from +50 to +71°C) Guaranteed start up at -40°C (see specification sheets on website for details and derating)					
Storage Temperature		-40 to +85°C					
Humidity (non condensing)		Operating: 30 - 90%RH (10 -90% on HWS300-1500), Non operating 10 - 95%RH					
Cooling	-	Convection			Internal fan		
Withstand Voltage (2)	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.					
Isolation Resistance	-	>100MΩ at 25°C & 70%RH, Output to Ground 500VDC, >10M Output to remote on/off 100VDC					
Vibration (non operating)	-	MIL-STD-810F 514.5 Category 4, 10 (HWS1500 Cat 4, figure 514.5C-1)					
Shock (in packaging)	-	MIL-STD-810F 516.5 Category I, VI (HWS1500 <196.1m/s^2)					
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, EN50178, CE Mark					
Line Dip	-	Complies with SEMI F47 (200VAC line only)					
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC-B, VCCI-B (Curve A for HWS1500)					
Immunity		IEC61000-4-2 (Level 2,3), -3, -4, -6, (Level 3), -5, -8 (Level 4), -11					
Weight (Typ)	g	280	450	500	1000	1600	3800
Size (WxHxD)	mm	26 x 82 x 120	28 x 82 x 160	37 x 82 x 160	61 X 82 X 165	100 X 82 X 165	126.5 X 82 X 280
Warranty	yr	Five Years					

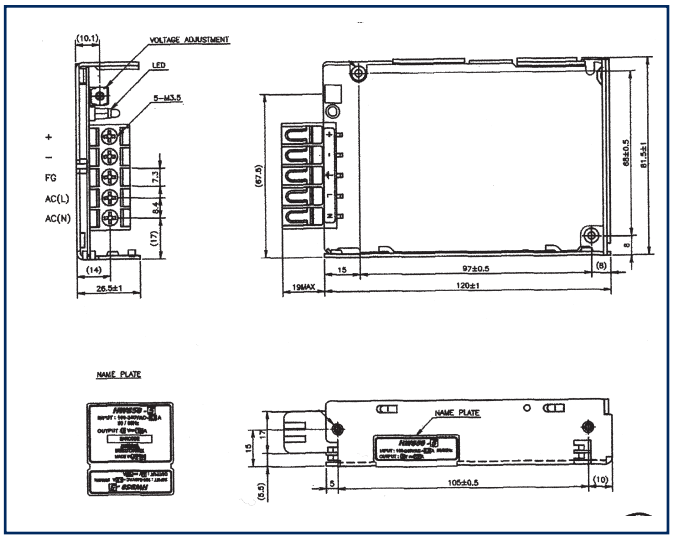
(1) 100/200VAC input (2) HWS300-600 2.5kVAC Input to ground

Output Ratings

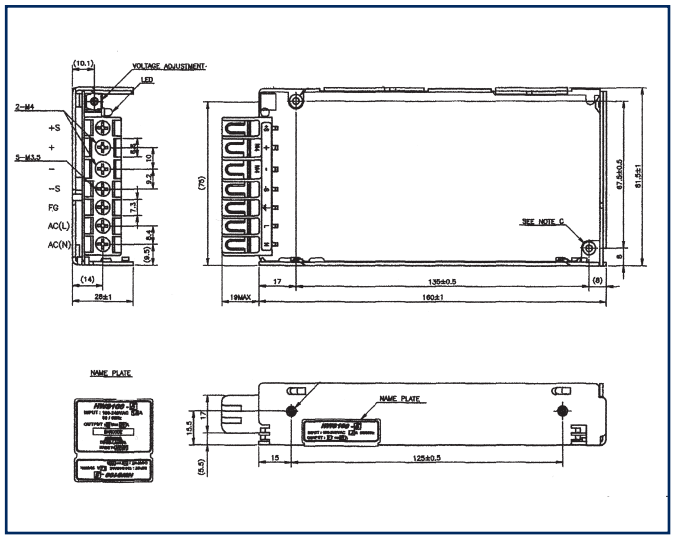
Model	Voltage	Adjust Range	Min Curr(A)[3]	Max Curr(A)[4]	Max Power(W)	Load Reg(mV)	Line Reg(mV)	Ripple Noise(mV)	Overvoltage (V)	Efficiency (typ)%[1]
HWS50-3/HD	3.3V	2.97 - 3.96	0.1	10	33	40	20	120	4.13 - 4.95	76/78
HWS100-3/HD	3.3V	2.97 - 3.96	0.2	20	66	40	20	120	4.13 - 4.95	78/81
HWS150-3/HD	3.3V	2.97 - 3.96	0.3	30	99	40	20	120	4.13 - 4.95	78/81
HWS300-3/HD	3.3V	2.64 - 3.96	0.0	60	198	30	20	120	4.13 - 4.95	74/77
HWS600-3/HD	3.3V	2.64 - 3.96	0.0	120	396	30	20	120	4.13 - 4.95	75/78
HWS50-5/HD	5V	4.0 - 6.0	0.1	10	50	40	20	120	6.25 - 7.25	82/84
HWS100-5/HD	5V	4.0 - 6.0	0.2	20	100	40	20	120	6.25 - 7.25	83/86
HWS150-5/HD	5V	4.0 - 6.0	0.3	30	150	40	20	120	6.25 - 7.25	83/86
HWS300-5/HD	5V	4.0 - 6.0	0.0	60	300	30	20	120	6.25 - 7.25	79/82
HWS600-5/HD	5V	4.0 - 6.0	0.0	120	600	30	20	120	6.25 - 7.25	80/83
HWS50-12/HD	12V	9.6 - 14.4	0.04	4.3	51.6	96	48	150	15 - 17.4	81/83
HWS100-12/HD	12V	9.6 - 14.4	0.09	8.5	102	96	48	150	15 - 17.4	83/86
HWS150-12/HD	12V	9.6 - 14.4	0.1	13	156	96	48	150	15 - 17.4	83/86
HWS300-12/HD	12V	9.6 - 14.4	0.0	27	324	72	48	150	15 - 17.4	80/83
HWS600-12/HD	12V	9.6 - 14.4	0.0	53	636	72	48	150	15 - 17.4	80/83
HWS1500-12/HD	12V	9.6 - 14.4	0.0	125	1500	72	48	150	15 - 17.4	82/85
HWS50-15/HD	15V	12.0 - 18.0	0.04	3.5	52.5	120	60	150	18.8 - 21.8	81/83
HWS100-15/HD	15V	12.0 - 18.0	0.07	7	105	120	60	150	18.8 - 21.8	83/86
HWS150-15/HD	15V	12.0 - 18.0	0.1	10	150	120	60	150	18.8 - 21.8	83/86
HWS300-15/HD	15V	12.0 - 18.0	0.0	22	330	90	60	150	18.8 - 21.8	80/83
HWS600-15/HD	15V	12.0 - 18.0	0.0	43	645	90	60	150	18.8 - 21.8	81/84
HWS1500-15/HD	15V	12.0 - 18.0	0.0	100	1500	90	60	150	18.7-21.8	83/87
HWS50-24/HD	24V	19.2 - 28.8	0.02	2.2	52.8	192	96	150	30 - 34.8	82/84
HWS100-24/HD	24V	19.2 - 28.8	0.05	4.5	108	192	96	150	30 - 34.8	84/87
HWS150-24/HD	24V	19.2 - 28.8	0.07	6.5	156	192	96	150	30 - 34.8	85/88
HWS300-24/HD	24V	19.2 - 28.8	0.0	14 (16.5 pk)	336	144	96	150	30 - 34.8	82/85
HWS600-24/HD	24V	19.2 - 28.8	0.0	27 (31 pk)	648	144	96	150	30 - 34.8	82/85
HWS1500-24/HD	24V	19.2 - 28.8	0.0	65/70 (-/105PK)[1]	1560/1680[1]	144	96	200	30 - 34.8	84/88
HWS1500-36/HD	36V	28.8 - 43.2	0.0	42/46.5 (-/70PK)[1]	1512/1674[1]	150	144	200	45 - 49.7	84/88
HWS50-48/HD	48V	38.4 - 52.8	0.01	1.1	52.8	384	192	200	55.2 - 64.8	83/85
HWS100-48/HD	48V	38.4 - 52.8	0.02	2.1	100.8	384	192	200	55.2 - 64.8	84/87
HWS150-48/HD	48V	38.4 - 52.8	0.03	3.3	158.4	384	192	200	55.2 - 64.8	85/88
HWS300-48/HD	48V	38.4 - 52.8	0.0	7	336	288	192	350	55.2 - 64.8	82/85
HWS600-48/HD	48V	38.4 - 52.8	0.0	13	624	288	192	350	55.2 - 64.8	83/86
HWS1500-48/HD	48V	38.4 - 52.8	0.0	32	1536	288	192	200	55.2 - 64.8	86/90

(3) Minimum load for maximum stability at -40°C start up
(4) Peak load for 10s maximum on time, 35% duty cycle

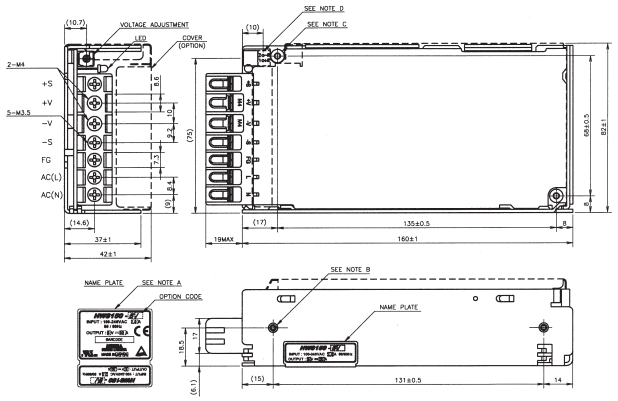
HWS50 Outline Drawing



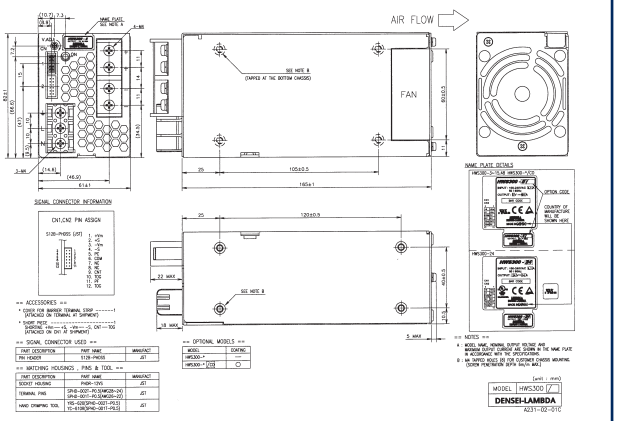
HWS100 Outline Drawing



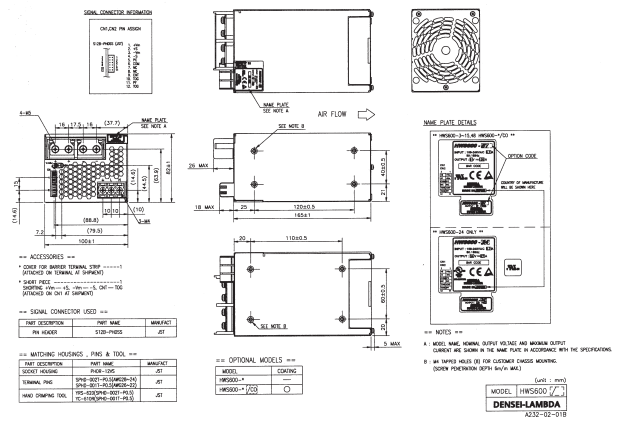
HWS150 Outline Drawing



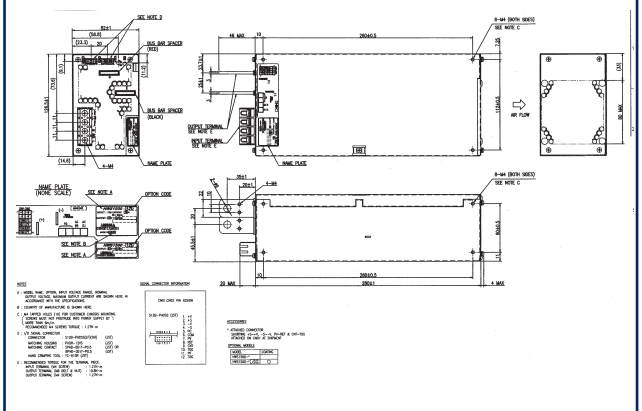
HWS300 Outline Drawing



HWS600 Outline Drawing



HWS1500 Outline Drawing



LAMBDA

- 5 Year Warranty
- Medical Approvals
- Universal Input (85 - 265VAC)
- High Efficiency
- Broad 30W to 1500W product range
- RoHS Compliant Design

HWS30-1500/ME Series

Single Output Medical Power Supplies

Key Market Segments & Applications

Non-Surgical Medical Equipment
Analysers

HWS/ME Features and Benefits

Features	*Benefits*
• 5 Year Warranty • Medical Approvals • Wide Range AC Input	• Lower Cost of Ownership • Reduces System Approval Times • Supports Global Use

Specifications

ITEMS / MODELS			HWS30 HWS50	HWS100 HWS150	HWS300	HWS600	HWS1500
Input Voltage range			85 - 265VAC (47 - 63Hz) or 120-370VDC		85 - 265VAC (47 - 330VDC		85-265VAC (47 - 63Hz)
Input Current (Typ)	(1)	A	0.8 / 0.4 0.7 / 0.35	1.3 / 0.65 1.9 / 0.95	4.1 / 2.1	8.1 / 3.9	19/10
Inrush Current	(1)	A	14 / 28		20 / 40		
Power Factor / Flicker			Meets EN61000-3-2, EN61000-3-3				
Temperature Coefficient		-	<0.02%/°C				
Overcurrent Protection		-	>104%				
Overvoltage Protection		V	Yes (See table on page 2)				
Hold Up Time (Typ)		ms	20				
Leakage Current (60Hz)		mA	<0.5mA				
Remote Sense		-	No		Yes		
Indicator		-	Green LED = ON				
Remote On/Off		-	No		Yes (Isolated from output)		
Parallel operation		-	No		Single wire conn. (5 units max)		
DC Good		-	No		Yes		
Voltage Programming			No				Yes
Operating Temperature and Derating		-	HWS30-150: -10°C to +70°C, (-10 - +50°C: 100%, +60°C: 60%, +70°C: 20%) HWS300-1500: -10°C to +70°C, (-10 - +50°C: 100%, derate linearly to 50% load from +50 to +70°C)				
Storage Temperature		°C	-30 to +85°C				
Humidity (non condensing)		-	Operating: 30 - 90%RH (10 -90% on HWS300-1500), Non operating 10 - 95%RH				
Cooling		-	Convection				Internal fan
Withstand Voltage	(3)	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.				
Isolation Resistance		-	>100M at 25C & 70%RH, Output to Ground 500VDC, >10M Output to remote on/off 100VDC				
Vibration (non operating)		-	10 - 55Hz (1 min sweep), 19.6m/s² constant, X, Y, Z axis, one hour each				
Shock (in packaging)		-	< 196.1m/s²				
Safety Agency Approvals		-	UL60601-1, EN60601, CSA-C22.2 No6011-M90 (C-UL) (basic insulation), CE Mark				
Line Dip		-	Complies with SEMI F47 (200VAC line only)				
Conducted & Radiated EMI		-	EN55011 / EN55022-B, FCC-B, VCCI-B (HWS600 & 1500 Class A)				
Immunity		-	IEC61000-4-2 (Level 2,3), -3, -4, -6, (Level 3), -5 (Level 3,4), -11				
Weight (Typ)		g	220 280	450 500	1000	1600	3800
Size (WxHxD)		mm	26 x 82 x 95 26 x 82 x 120	28 x 82 x 160 37 x 82 x 160	61 x 82 x 165	100 x 82 x 165	280 x 82 x 126.5
Warranty		yrs	Five Years				

(1) 100/200VAC input (2) See clause 19.5DV.2 of UL60601 for equipment in proximity of patient (3) HWS300-600 2.5kVAC Input to ground

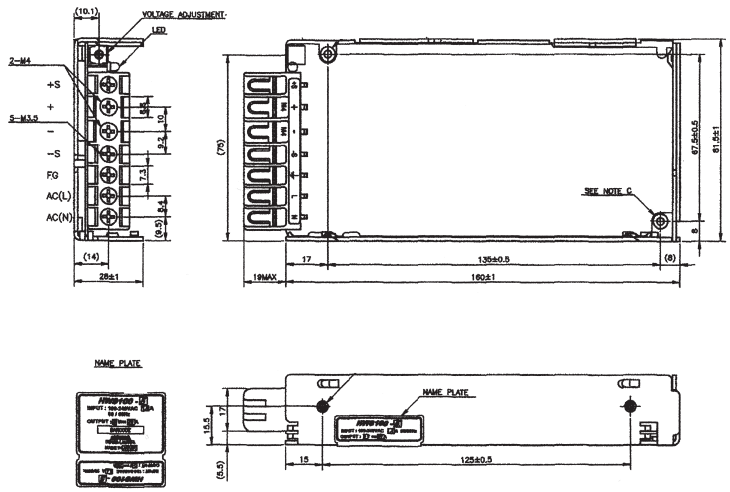
Output Ratings

Model	Voltage	Adjust Range	Max Curr(A)[4]	Max Power(W)	Load Reg(mV)	Line Reg(mV)	Ripple Noise(mV)	Overvoltage (V)	Efficiency (typ)%[1]
HWS30-5/ME	5V	4.0 - 6.0	6	30	40	20	120	6.25-7.25	77/80
HWS50-5/ME	5V	4.0 - 6.0	10	50	40	20	120	6.25-7.25	82/84
HWS100-5/ME	5V	4.0 - 6.0	20	100	40	20	120	6.25-7.25	83/86
HWS150-5/ME	5V	4.0 - 6.0	30	150	40	20	120	6.25-7.25	83/86
HWS30-12/ME	12V	9.6 - 14.4	2.5	30	96	48	150	15-17.4	81/83
HWS50-12/ME	12V	9.6 - 14.4	4.3	51.6	96	48	150	15-17.4	81/83
HWS100-12/ME	12V	9.6 - 14.4	8.5	102	96	48	150	15-17.4	83/86
HWS150-12/ME	12V	9.6 - 14.4	13	156	96	48	150	15-17.4	83/86
HWS300-12/ME	12V	9.6 - 14.4	27	324	72	48	150	15-17.4	80/83
HWS30-15/ME	15V	12.0 - 18.0	2	30	120	60	150	18.8-21.8	81/83
HWS50-15/ME	15V	12.0 - 18.0	3.5	52.5	120	60	150	18.8-21.8	81/83
HWS100-15/ME	15V	12.0 - 18.0	7	105	120	60	150	18.8-21.8	83/86
HWS150-15/ME	15V	12.0 - 18.0	10	150	120	60	150	18.8-21.8	83/86
HWS300-15/ME (5)	15V	12.0 - 18.0	22	330	90	60	150	18.8-21.8	82/85
HWS30-24/ME	24V	19.2 - 28.8	1.3	31.2	192	96	200	30-34.8	83/86
HWS50-24/ME	24V	19.2 - 28.8	2.2	52.8	192	96	150	30-34.8	82/84
HWS100-24/ME	24V	19.2 - 28.8	4.5	108	192	96	150	30-34.8	84/87
HWS150-24/ME	24V	19.2 - 28.8	6.5	156	192	96	150	30-34.8	85/88
HWS300-24/ME	24V	19.2 - 28.8	14 (16.5 pk)	336	144	96	150	30-34.8	82/85
HWS600-24/ME	24V	19.2 - 28.8	27 (31 pk)	648	144	96	150	30-34.8	82/85
HWS1500-24/ME	24V	19.2 - 28.8 4.8 - 28.8[7]	65/70[1] (105pk[6])	1560/1680[1], (2520 pk[6])	144	96	200	30-34.8	84/88
HWS1500-36/ME	36V	28.8 - 43.2 7.2 - 43.2[7]	42/46.5[1] (70 pk)[6]	1512/1674[1] (2520 pk[6])	150	144	200	34-49.7	84/88
HWS30-48/ME	48V	38.4 - 52.8	0.65	31.2	384	192	200	55.2-64.8	82/83
HWS50-48/ME	48V	38.4 - 52.8	1.1	52.8	384	192	200	55.2-64.8	83/85
HWS100-48/ME	48V	38.4 - 52.8	2.1	100.8	384	192	200	55.2-64.8	84/87
HWS150-48/ME	48V	38.4 - 52.8	3.3	158.4	384	192	200	55.2-64.8	85/88
HWS1500-48/ME	48V	38-4 - 52.8 9.6- 52.8[7]	32	1536	288	192	200	55.2-64.8	86/90

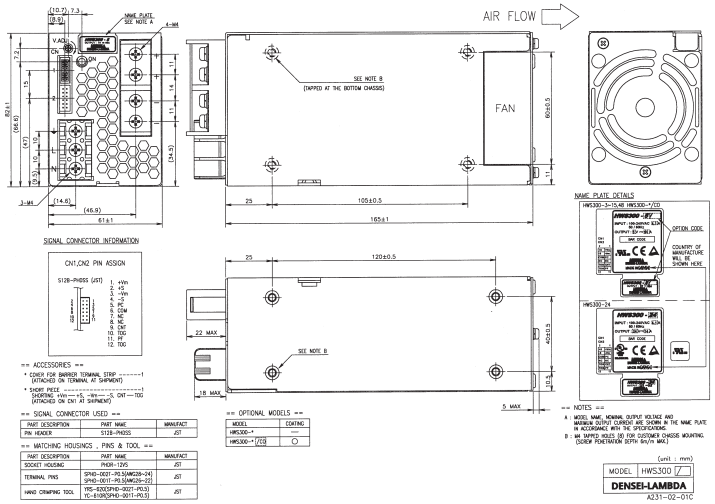
(4) Peak load for 10s maximum on time, 35% duty cycle
(5) Safety Agency in progress - contact factory for status
(6) 200-265AC Input
(7) Using voltage programming input - see installation manual for details
(8) HWS30 - 150/ME are without cover
HWS300 - 1500 are with cover

Please refer to website Tech Files for outline drawings and additional data for full range
www.lambda-gb.com/HWSME

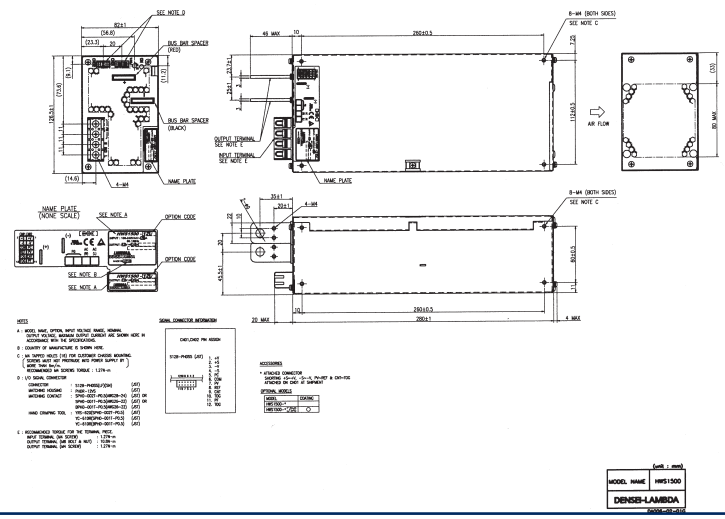
HWS100 Outline Drawing



HWS300 Outline Drawing



HWS1500 Outline Drawing



LAMBDA

JWS-P Series

Single Output Peak Power Industrial Power Supplies

- 5 Year Warranty
- Power factor Corrected
- Approved to VDE0160 Machinery Directive
- Universal Input (85 - 265VAC)
- 200% Peak Power Capability for 10 seconds

Key Market Segments & Applications

Factory Automation Equipment,	Process Control, NC-Machining, Automotive, Packaging
	Materials Handling, Chemical Processing, Robots
Test & Measurement	Burn-in & Test, Automated Test, Instrumentation, Measurement, Detection

JWS-P Features and Benefits

Features	*Benefits*
◆ VDE0160 Approved	◆ No additional Approvals Needed
◆ 5 Year Warranty	◆ Lower Cost of Ownership
◆ Power Factor Corrected	◆ Supports Global Use
◆ 200% Peak Power	◆ Able to support motor start up currents

Specifications

ITEMS \ MODEL		JWS70P	JWS120P	JWS240P	JWS480P
Input Voltage range	-	85 - 265VAC (47 - 63Hz) or 120 - 330VDC			
Inrush Current (100/200VAC)	A	14 / 28	25 / 50	20 / 40	
Input Current (Typ)	A	1.0 / 0.5	1.6 / 0.8	3.2 / 1.6	6.4 / 3.2
Power Factor		Meets EN61000-3-2			
Temperature Coefficient		<0.02%/°C			
Overcurrent Protection	-	>102%			
Overvoltage Protection	V	Yes			
Hold Up Time (Typ)	ms	20			
Leakage Current (max)	mA	0.75			
Remote Sense	-	Yes			
Remote On / Off	-	No		Yes	
AC Power Fail	-	No		Yes	
Operating Temperature	-	-10°C~+60°C,derate linearly to 60% load from 50°C~60°C		-10°C~+65°C, derate linearly to 55% load from 50°C~65°C	
Storage Temperature	-	-30 to +85°C			
Operating Humidity (*1)	-	30 - 90% RH			
Storage Humidity (*1)	-	10 - 95% RH			
Cooling	-	Convection		Internal Fan	
Withstand Voltage	-	Input to Ground 2kVAC (20mA), Input to Output 3kVAC (20mA), Output to Ground 500VAC (100mA) for 1 min			
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC			
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s^2 constant X, Y, Z 1 hour			
Shock	-	< 196.1 m/s^2			
Safety Agency Approvals	-	UL1950, CSA950, EN60950, VDE0160, CE Mark, Built to meet DENTORI			
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC Class B, VCCI-B			
Weight (Typ)	g	700	900	1900	3000
Recommended EMI Filter	-	MAW1202-22		MAW1205-22	MB1210
Size (WxHxD)	mm				
Warranty	-	Five Years			

*1 non condensing

Model Selector

Model	Voltage	Adjust Range	Average Current (A)	Peak Current (A) *1	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)	Efficiency (typ) %
JWS70P-24	24V	21.6 - 26.4	3	6	192	96	240	80
JWS120P-24	24V	21.6 - 26.4	5	10	192	96	240	80
JWS240P-24	24V	21.6 - 28.8	10	20	192	96	240	80
JWS480P-24	24V	21.6 - 28.8	20	40	192	96	240	80
JWS240P-36	36V	32.4 - 43.2	6.65	13.3	288	144	360	80
JWS70P-48	48V	43.2 - 52.8	1.5	3	384	192	480	80
JWS120P-48	48V	43.2 - 52.8	2.5	5	384	192	480	80
JWS240P-48	48V	43.2 - 52.8	5	10	384	192	480	80
JWS480P-48	48V	43.2 - 52.8	10	20	384	192	480	80

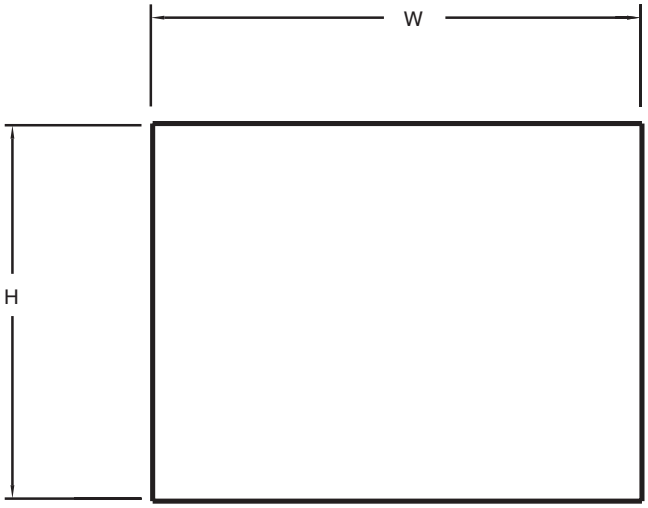
Note *1: Peak current for up to 10 seconds with a 50% duty cycle

Dimensions Table

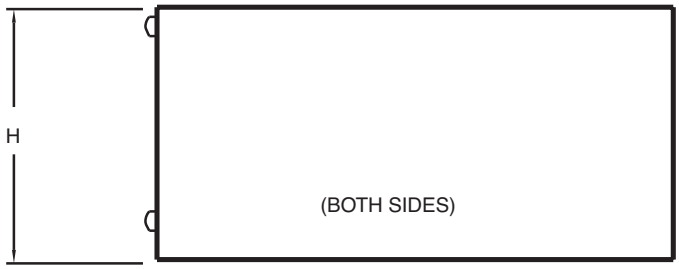
	Height (H)	Width (W)	Depth (D)
JWS70P	50	92	188
JWS120P	65	92	198
JWS240P	92	120	190
JWS480P	92	160	201

All Dimensions in mm

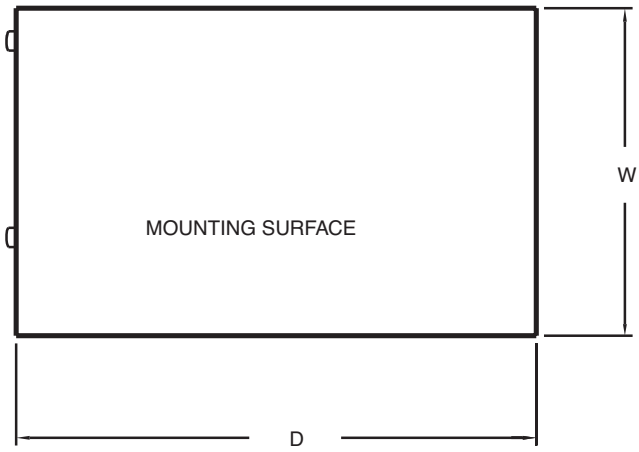
JWS Outline Drawing



FRONT VIEW



SIDE VIEW



See www.lambda-europe.com/jws-p
for detailed drawing

LAMBDA

- 5 Year Warranty
- Power Factor Corrected
- Approved to VDE01 60 Machinery Directive
- Universal Input (85 265VAC)

Key Market Segments & Applications

Factory Automation: Process Control, NC-Machining, Automotive, Packaging Equipment, Materials Handling, Chemical Processing, Robots

Test & Measurement: Burn-in & Test, Automated Test, Instrumentation, Measurement, Detection

JWS Series

Single Output Industrial Power Supplies

JWS Features and Benefits

Features	*Benefits*
◆ VDE01 60 Approved	◆ No Additional Approvals Needed
◆ 5 Year Warranty	◆ Lower Cost of Ownership
◆ Power Factor Corrected	◆ Supports Global Use
◆ Level B EMI	◆ Assists Systems Compliance

Specifications

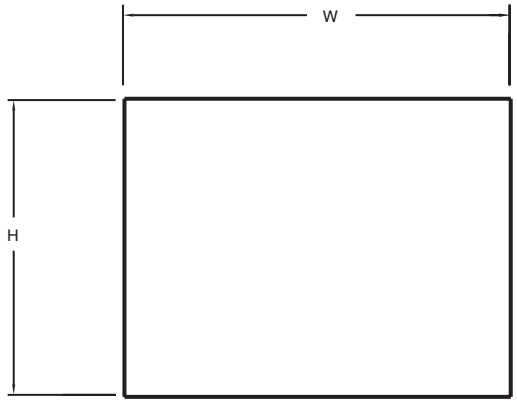
ITEMS \ MODEL		JWS50	JWS75	JWS100	JWS150	JWS300	JWS600
Input Voltage range	-	85 - 265VAC (47 - 63Hz) or 120 - 330VDC					
Inrush Current (100 / 200VAC)	A	14 / 28			25 / 50	20 / 40	
Power Factor	-	Meets EN61000-3-2					
Temperature Coefficient	-	<0.02%/oC					
Overcurrent Protection	-	>105%					
Overvoltage Protection	V	Yes					
Hold Up Time (Typ)	ms	20					
Leakage Current (max)	mA	0.75					
Remote Sense	-	No		Yes			
Remote On / Off	-	Specify as Option /R				Standard	
AC Power Fail	-	Not Available				Standard	
Parallel Connection	-	Not Available				Standard	
Operating Temp. (open frame)	-	-10°C~+60°C, derate linearly to 60% load from 50°C~60°C					
Operating Temp. (with cover)	-	-10°C~+50°C, derate linearly to 60% load from 40°C~50°C (JWS50-150)					
		-10°C~+65°C, derate linearly to 55% load from 50°C~65°C (JWS300-600)					
Storage Temperature	-	-30 to +85°C					
Operating Humidity (*1)	-	30 - 90% RH				10 - 90% RH	
Storage Humidity (*1)	-	10 - 95% RH					
Cooling	-	JWS50 - JWS150 Convection, JWS300 & JWS600 Internal fan					
Withstand Voltage	-	Input to Ground 2kVAC (20mA), Input to Output 3kVAC (20mA),					
	-	Output to Ground 500VAC (100mA) for 1 min.					
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC					
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s² constant X, Y, Z 1 hour					
Shock	-	< 196.1 m/s²					
Safety Agency Approvals	-	UL1950, CSA950, EN60950, VDE0160, CE Mark, Built to meet DENTORI					
Conducted & Radiated EMI		EN55011 / EN55022-B, FCC Class B, VCCI-B					
Recommended EMI Filter	-	MAW1202-22			MAW1203-22MB1210	MB1216	
Weight (Typ)	g	350	450	650	850	1900	3000
Size (WxHxD)	mm	See side 2					
Warranty	-	Five Years					

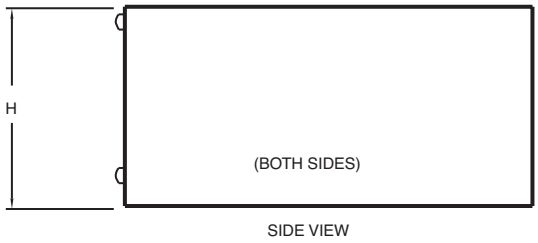
*1 non condensing

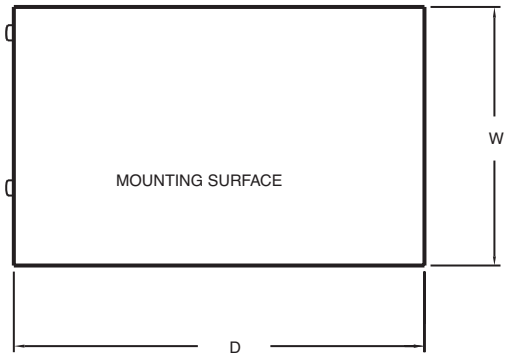
Model Selector

Model	Voltage	Adjust Range	Max Curr.	Load Reg mV	Line Reg mV	Ripple Noise	Eff. (typ)%
JWS300-2	2.0V	1.8 - 2.4	60	20	20	120	60
JWS600-2	2.0V	1.8 - 2.4	120	30	20	120	61
JWS50-3/A	3.3V	2.85 - 3.63	10	40	20	120	65
JWS75-3/A	3.3V	2.85 - 3.63	15	40	20	120	67
JWS100-3/A	3.3V	2.85 - 3.63	20	40	20	120	67
JWS150-3/A	3.3V	2.85 - 3.63	30	40	20	120	67
JWS300-3	3.3V	2.97 - 3.96	60	20	20	120	68
JWS600-3	3.3V	2.97 - 3.96	120	30	20	120	70
JWS50-5/A	5.0V	4.5 - 5.5	10	40	20	120	74
JWS75-5/A	5.0V	4.5 - 5.5	15	40	20	120	74
JWS100-5/A	5.0V	4.5 - 5.5	20	40	20	120	75
JWS150-5/A	5.0V	4.5 - 5.5	30	40	20	120	75
JWS300-5	5.0V	4.5 - 6.0	60	20	20	120	74
JWS600-5	5.0V	4.5 - 6.0	120	30	20	120	75
JWS100-6/A	6.0V	5.4 - 6.6	16.7	48	24	120	75
JWS300-6	6.0V	5.4 - 7.2	50	36	24	150	74
JWS600-6	6.0V	5.4 - 7.2	100	36	24	120	75
JWS600-8	8.0V	7.2 - 9.6	68	48	32	150	77
JWS50-9/A	9.0V	8.1 - 9.9	5.6	76	36	150	74
JWS100-9/A	9.0V	8.1 - 9.9	11.2	72	36	150	75
JWS300-9	9.0V	8.1 - 10.8	34	54	36	150	76
JWS600-9	9.0V	8.1 - 10.8	68	54	36	150	77
JWS50-12/A	12.0V	10.8 - 13.2	4.3	96	48	150	76
JWS75-12/A	12.0V	10.8 - 13.2	6.3	96	48	150	76
JWS100-12A	12.0V	10.8 - 13.2	8.5	96	48	150	76
JWS150-12/A	12.0V	10.8 - 13.2	13	96	48	150	77
JWS300-12	12.0V	10.8 - 14.4	27	48	48	150	76
JWS600-12	12.0V	10.8 - 14.4	53	72	48	150	80
JWS50-15/A	15.0V	13.5 - 16.5	3.5	120	60	150	77
JWS75-15/A	15.0V	13.5 - 16.5	5	120	60	150	77
JWS100-15/A	15.0V	13.5 - 16.5	7	120	60	150	77
JWS150-15/A	15.0V	13.5 - 16.5	10	120	60	150	78
JWS300-15	15.0V	13.5 - 18.0	22	60	60	150	77
JWS600-15	15.0V	13.5 - 18.0	43	90	60	150	81
JWS50-24/A	24.0V	21.6 - 26.4	2.2	150	96	150	79
JWS75-24/A	24.0V	21.6 - 26.4	3.2	150	96	150	79
JWS100-24/A	24.0V	21.6 - 26.4	4.5	150	96	150	79
JWS150-24/A	24.0V	21.6 - 26.4	6.5	150	96	150	80
JWS300-24	24.0V	21.6 - 28.8	14	144	96	150	80
JWS600-24	24.0V	21.6 - 28.8	27	144	96	150	82
JWS50-28/A	28.0V	25.2 - 30.8	2	160	112	150	79
JWS100-28/A	28.0V	25.2 - 30.8	3.6	160	112	150	79
JWS150-28/A	28.0V	25.2 - 30.8	5.5	160	112	150	80
JWS300-28	28.0V	25.2 - 33.6	12	168	112	150	80
JWS600-28	28.0V	25.2 - 33.6	23	168	112	150	82
JWS50-48/A	48.0V	43.2 - 52.8	1.1	240	192	200	79
JWS75-48/A	48.0V	43.2 - 52.8	1.6	240	192	200	79
JWS100-48/A	48.0V	43.2 - 52.8	2.1	240	192	200	79
JWS150-48/A	48.0V	43.2 - 52.8	3.3	240	192	200	80
JWS300-48	48.0V	43.2 - 52.8	6.5	288	192	350	80
JWS600-48	48.0V	43.2 - 52.8	13	288	192	350	83

JWS Outline Drawing







Dimensions Table

	Height (H)	Width (W)	Depth (D)
JWS50	37	85	159
JWS75	42	92	175
JWS100	50	92	188
JWS150	65	92	198
JWS300	92	120	190
JWS600	92	160	201

See www.lambda-europe.com/jws for detailed drawing

Options

Suffix	Description
Blank	Screw terminals, no cover (JWS50 - JWS150)
/A*	Screw terminals, cover (JWS50 - JWS150)
/B	Molex terminals, no cover (JWS50 & JWS75)
/C	Molex terminals, cover (JWS50 & JWS75)
/R	Remote On / Off (JWS50 - JWS150)
Example	JWS50-5/RA
Note:	* Standard US stock item.

LAMBDA

- 5 Year Warranty
- Power Factor Corrected
- Approved to VDE01 60 Machinery Directive
- Universal Input (85 265VAC)

Key Market Segments & Applications

Factory Automation: Process Control, NC-Machining, Automotive, Packaging Equipment, Materials Handling, Chemical Processing, Robots

Test & Measurement: Burn-in & Test, Automated Test, Instrumentation, Measurement, Detection

JWT Series

Triple Output Industrial Power Supplies

JWT Features and Benefits

Features	*Benefits*
◆ VDE01 60 Approved	◆ No Additional Approvals Needed
◆ 5 Year Warranty	◆ Lower Cost of Ownership
◆ Power Factor Corrected	◆ Supports Global Use
◆ Level B EMI	◆ Assists Systems Compliance

Specifications

ITEMS \ MODEL		JWT75	JWT100
Max Output Power	W	75	100
Efficiency (Typ)	%	72	
Input Voltage range	-	85 - 265VAC (47 - 63Hz) or 120 - 330VDC	
Input Current Typ	A	1.2 / 0.6	1.4 / 0.7
Inrush Current	A	14A at 100VAC, 28A at 200VAC input	
Power Factor	-	Meets EN61000-3-2	
Output Voltage Accuracy	-	V1 variable, V2 & V3 +/-5%	
Temperature Coefficient	-	V1 & V2 <0.02%/°C, V3 <0.03%/°C	
Overcurrent Protection	-	>105%	
Overvoltage Protection	V	Main output only: 5.7 - 7V	
Hold Up Time (Typ)	ms	20	
Leakage Current	-	0.75mA Max, 0.44mA typical at 230VAC	
Operating Temperature	-	-10°C to +65°C, derate linearly to 50% load from 50°C to 65°C -10°C to +50°C, derate linearly to 60% load from 40°C to 50°C with cover	
Storage Temperature	-	-30 to +85°C	
Humidity	-	30 - 90% RH (operating), 10 - 95% RH (non operating)	
Cooling	-	Convection	
Withstand Voltage	-	Input to Ground 2kVAC (20mA), Input to Output 3kVAC (20mA), Output to Ground 500VAC (100mA) for 1 min.	
Isolation Resistance	-	>100M at 25°C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 2G constant X, Y, Z 1 hour	
Shock	-	<20G	
Safety Agency Approvals	-	UL1950, CSA950, EN60950, VDE0160, CE Mark, Built to meet DENTORI	
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC Class B, VCCI-B	
Recommended EMI Filter	-	MAW1202-22	
Weight (Typ)	g	600	720
Size (WxHxD)	mm	42 x 92 x 188	48 x 92 x 203
Warranty	-	Five Years	

Note: See Installation Manual for full details, test methods of parameters and application notes.

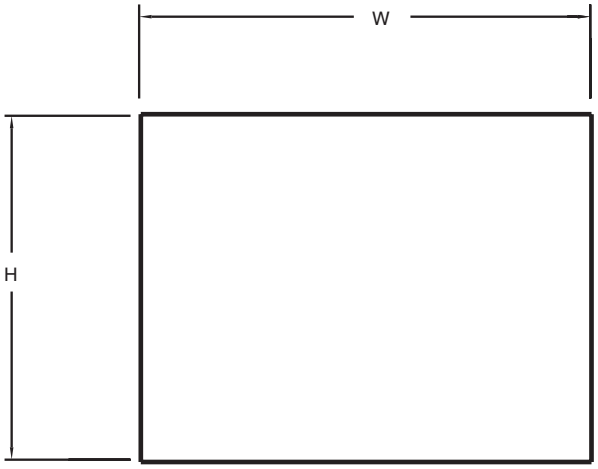
Model Selector

Model	Output	Voltage	Adjust. Range	Min Current (A)	Max Current (A)	Load Reg (mV)	Line Reg (mV)	Ripple Noise (mV)
JWT75-522/A	V1	+5V	5 - 5.25	0.8	8	40	20	120
	V2	+12V	-	0	4	100	48	150
	V3	-12V	-	0	0.5	150	48	150
JWT75-5FF/A	V1	+5V	5 - 5.25	0.8	8	40	20	120
	V2	+15V	-	0	3.2	120	60	150
	V3	-15V	-	0	0.5	150	60	150
JWT75-525/A	V1	+5V	5 - 5.25	0.8	8	40	20	120
	V2	+12V	-	0	4	100	48	150
	V3	-5V	-	0	0.5	100	20	150
JWT100-522/A	V1	+5V	5 - 5.25	1.3	13	40	20	120
	V2	+12V	-	0	5.5	100	48	150
	V3	-12V	-	0	1	150	48	150
JWT100-5FF/A	V1	+5V	5 - 5.25	1.3	13	40	20	120
	V2	+15V	-	0	4.5	120	60	150
	V3	-15V	-	0	1	150	60	150
JWT100-525/A	V1	+5V	5 - 5.25	1.3	13	40	20	120
	V2	+12V	-	0	5.5	100	48	150
	V3	-5V	-	0	1	100	20	150

Options

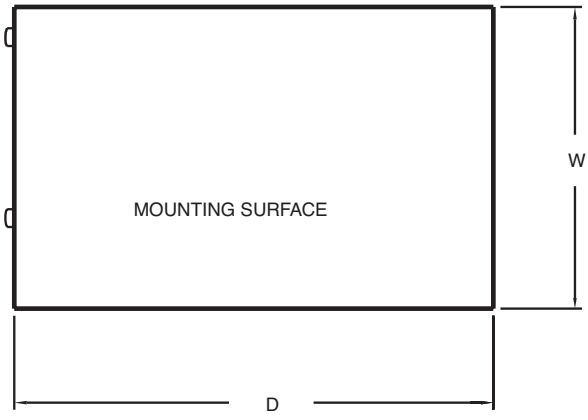
	Description
Blank	Screw terminals, no cover
/A	Screw terminals, cover (Standard US stock item)
/B	Molex terminals, no cover
/C	Molex terminals, cover
/R	Remote On / Off
Example	JWT75-525/RC

JWT Outline Drawing



FRONT VIEW

SIDE VIEW



See www.lambda-europe.com/jwt
for detailed drawing

LAMBDA

KPS Series

5 to 15W AC-DC Board Mount Power Supplies

- Small Size & Lightweight
- PCB Board Mountable
- Low Cost
- Universal Input Voltage
- RoHS Compliant

Key Market Segments & Applications

Factory Automation
Telecom
Datacom
Printers and motor drives
Instruments

KPS Features and Benefits

Features	*Benefits*
• Small Size	• Minimises PCB Space
• Wide Input Range	• Global use with no manual intervention
• No External Components Needed	• Easy To Use

Specifications

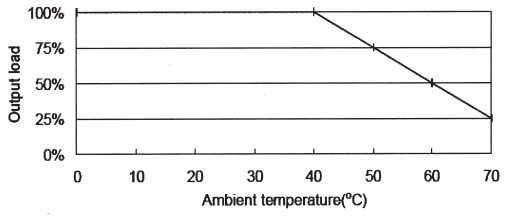
ITEMS \ MODEL		KPS-5	KPS-10	KPS-15
Input Voltage range		85 - 264VAC (47 - 440Hz) or 110 - 370VDC		
Inrush Current (115 / 230VAC)	A	20 / 40		
Input Current (115/230VAC)	A	0.13 / 0.07	0.27 / 0.13	0.4 / 0.2
Temperature Coefficient		±0.05%/°C		
Voltage Accuracy		±1%		
Minimum Load	A	None		
Load Regulation		±1% (10% to 100% load)		
Line Regulation (1)		±0.5%		
Ripple & Noise (2)	mV	1% or 50mV whichever is greater		
Short Circuit Protection	-	Continuous - hiccup mode		
Overvoltage Protection	V	130-150%		
Hold Up Time (Typ@115VAC)	ms	8	16	16
LED Indicator		Green LED = OK		
Operating Temperature		0 to +70°C with derating		
Storage Temperature		-20 to +85°C		
Humidity (non condensing)		10 - 95% RH		
Cooling		Convection		
Withstand Voltage		Input to Output 3kVAC		
Vibration (non operating)		23.52m/s² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)		
Shock		< 196.1 m/s² (20G)		
Safety Agency Approvals	-	UL60950, CSA60950, EN60950-1 Class II, CE Mark		
Conducted & Radiated EMI		EN55022-B, FCC Class B		
Immunity		EN61000-4 -2, -3, -4, -5, -6		
Weight (Typ)	g	29g	60g	80g
Size (WxLxH; H above pcb)	mm	55 X 35 X 20	64 X 45 X 23	70 X 48 X 23
Warranty		One Year		

Notes:
(1) KPS-5 Measured from 100 - 240VAC
(2) Measured with 0.1uF ceramic & 10uF electrolytic at 20MHz BW

Models

Model	Output Voltage (V)	Maximum Output (A)	Peak Load (A)	Output Pwr (W)	Eff (typ)%
KPS5-3R3	3.3	1.25	-	4.1	70
KPS5-5	5.0	1.00	-	5.0	70
KPS5-12	12.0	0.42	-	5.0	70
KPS5-15	15.0	0.33	-	5.0	70
KPS5-24	24.0	0.23	-	5.5	77
KPS10-3R3	3.3	2.50	3.80	8.3	65
KPS10-5	5.0	2.00	2.80	10.0	70
KPS10-12	12.0	0.84	1.20	10.1	75
KPS10-15	15.0	0.67	1.00	10.1	75
KPS10-24	24.0	0.42	0.65	10.1	78
KPS15-3R3	3.3	3.00	4.50	9.9	70
KPS15-5	5.0	3.00	4.50	15.0	73
KPS15-12	12.0	1.25	1.80	15.0	80
KPS15-15	15.0	1.00	1.50	15.0	80
KPS15-24	24.0	0.63	0.95	15.1	82

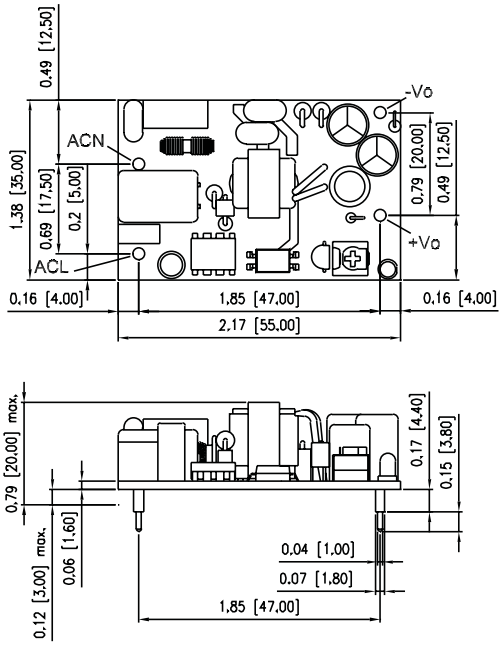
DERATING CURVE FOR KPS SERIES



INTERMEDIATE VOLTAGES
AVAILABLE PLEASE CONSULT SALES

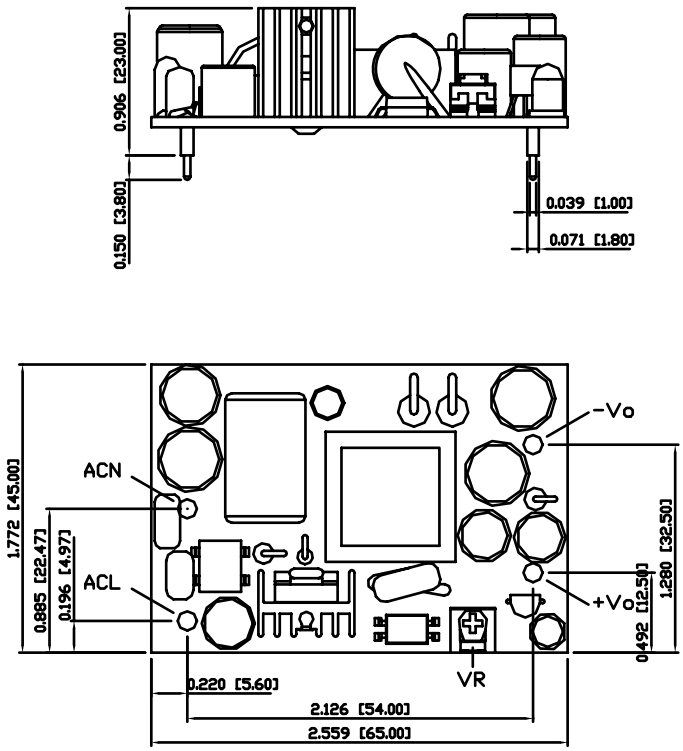
NEW 'A' VERSION
COMING SOON
Please check www.lambda-gb.com/kps
for availability

KPS5 Outline Drawing

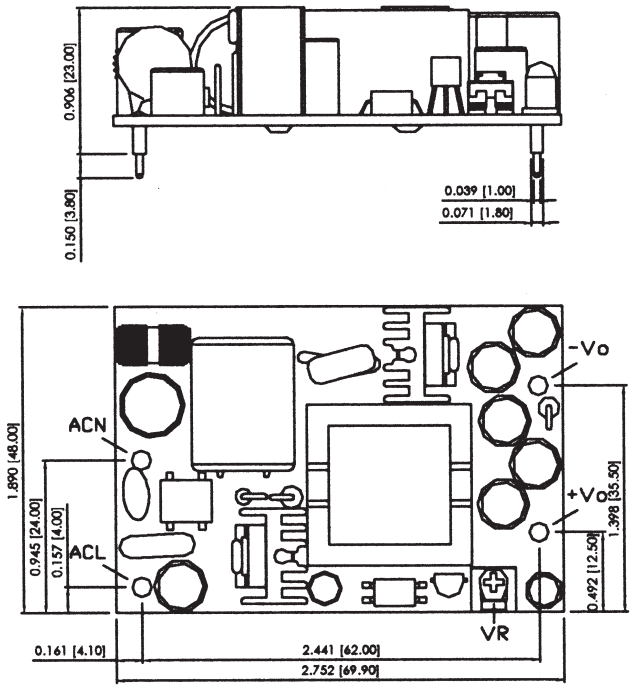


All Dimensions are in inches[mm]
Tolerances:.XX±.02[.X±.5] uniess otherwise noted

KPS10 Outline Drawing



KPS15 Outline Drawing



- Small size and lightweight
- PC Board Mountable
- -10 to +70 °C Continuous Operation
- 85 - 265VAC Wide Range Input
- World-wide Agency Approvals
  UL, CSA, TUV and CE Mark
- Convection Cooled
- Low Noise Conducted EMI Class B

KW Series

Compact AC-DC PCB-Mount Power Supplies

KW Features and Benefits

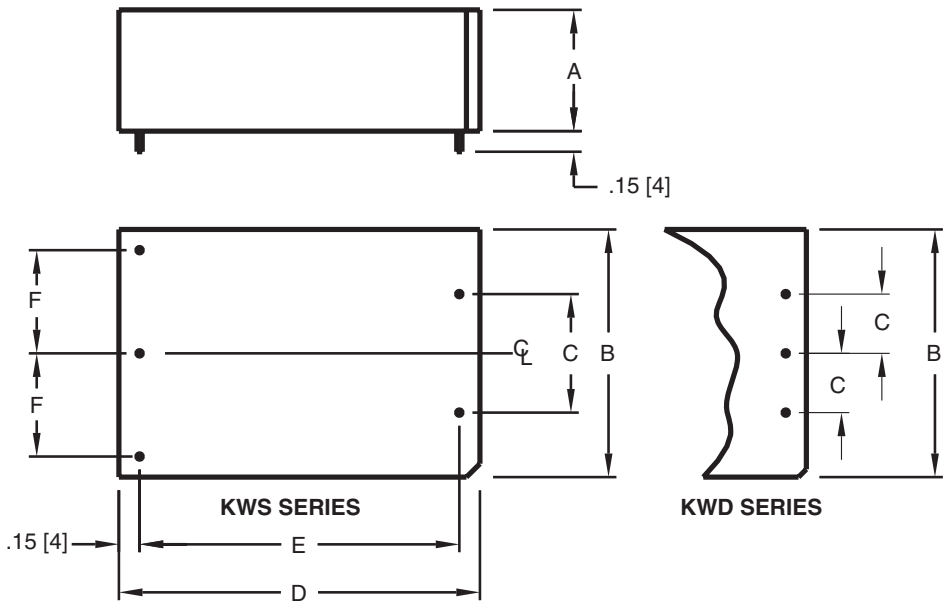
Features	*Benefits*
◆ Small size	◆ Minimizes pcb space
◆ Wide input range	◆ Global use with no manual intervention
◆ No external components needed	◆ Easy to use

Specifications

ITEMS \ MODEL		5V	12V	15V	±12V	±15V
AC Input		85-265VAC 47-440Hz				
DC Input	VDC	110-340VDC				
Efficiency (typical)	%	73	76	76	73	73
Inrush Current Limiting (1)	A	5 & 10W: 15/30A, 15W: 20/40A				
Conducted EMI	-	FCC20780 class B, VDE0871 Class B, VCCI-2 (with external cap).				
Output Voltage Accuracy	%	± 5% (fixed)				
Line Regulation	%	0.4%				
Load Regulation	%	0.8%				
Ripple and Noise (pk-pk)	mV	120	150			
Hold-up Time (typical)	ms	17ms				
Overvoltage Protection (typical)	%	~110% (zener clamp)				
Overload Protection	-	~125% (avoid prolonged operation in overload)				
Cooling	-	Convection				
Operating Temperature	-	-10°C to 70°C, derate linearly to 25% load from 50°C to 70°C				
Humidity	%RH	20% to 90% RH (non-condensing)				
Isolation	VAC	Input to output: 3kVAC; Input to Case: 2kVAC; Output to Case: 500VAC				
Mounting	-	PC board mountable				
Safety Agency Approval	-	UL60950-1; CSA 22.2 No. 60950-1-03; EN60950-1 & CE Mark (LVD)				
Weight	g	5W: 75, 10W: 100, 15W: 150				
Warranty	-	1 year				

(1) 100/200VAC @ 25°C

KW Drawing



DIMENSIONS:

MODEL	A	B	C	D	E	F
KWS5	.807 (20.5)	1.77 (45.0)	.787 (20.0)	2.16 (55.0)	1.850 (47.0)	.688 (17.5)
KWS10	.807 (20.5)	1.77 (45.0)	.787 (20.0)	2.52 (64.0)	2.125 (54.0)	.688 (17.5)
KWS15	.925 (23.5)	1.889 (48.0)	.905 (23.0)	2.75 (70.0)	2.440 (62.0)	.787 (20.0)
KWD5	.807 (20.5)	1.77 (45.0)	.393 (10.0)	2.16 (55.0)	1.850 (47.0)	.688 (17.5)
KWD10	.807 (20.5)	1.77 (45.0)	.393 (10.0)	2.52 (64.0)	2.125 (54.0)	.688 (17.5)
KWD15	.925 (23.5)	1.889 (48.0)	.453 (11.5)	2.75 (70.0)	2.440 (62.0)	.787 (20.0)

WEIGHT:

MODEL	GRAMS
KWS5	75
KWS10	100
KWS15	150
KWD5	75
KWD10	100
KWD15	150

NOTE:
1. DIMENSIONS ARE IN INCHES
   EXCEPT DIMENSIONS ( ) ARE IN MM.
2. PIN: 5x .039 (1.0).

Output Ratings

Model	Voltage (V)	Power (W)	Current (A)
Single Output			
KWS5-5	5V	5	1.00
KWS10-5	5V	10	2.00
KWS15-5	5V	15	3.00
KWS5-12	12V	5	0.45
KWS10-12	12V	10	0.90
KWS15-12	12V	15	1.30
KWS5-15	15V	5	0.35
KWS10-15	15V	10	0.70
KWS15-15	15V	15	1.00
Dual Output			
KWD5-1212	±12V	5	±0.22
KWD10-1212	±12V	10	±0.45
KWD15-1212	±12V	15	±0.65
KWD5-1515	±15V	5	±0.18
KWD10-1515	±15V	10	±0.36
KWD15-1515	±15V	15	±0.52

PIN Out Table

PIN	Function
FG	Case (Frame Ground)
AC(N)	AC Neutral
AC(L)	AC Line
-V	Negative Voltage Out
+V	Positive Voltage Out
COM	Output common

LAMBDA

- 5 Year Warranty
- -40°C to +71°C Operation
- MIL-STD-810E Vibration / Shock
- Input transient protected
- UL508, SEMIF47, Factory Mutual (Class 1, Division 2)

Key Market Segments & Applications

Factory Automation
Process & Controls
Harsh Environments

LZSa Series

Single Output Industrial Power Supplies

LZSa Features and Benefits

Features	*Benefits*
• Rugged mechanical design	• High reliability in harsh conditions
• Superior thermal design	• Longer life even at 71°C operation
• Wide range adjustment of output	• Reduces need for custom outputs
• Input voltage transient protected	• Reduced system filtering

Specifications

ITEMS / MODELS		LZSa500	LZSa1000	LZSa1500*
Input Voltage	-	85 - 265V 47-440Hz, 100-400VDC (1500W model derates below 180VAC - see table)		
Inrush Current (110 / 220VAC)	A	20 / 40A	40 / 80A	
Power Factor	-	EN61000-3-2 Class A		
Efficiency (typical)	%	84%		
Ripple & Noise	-	75mV Pk-Pk	75mV Pk-Pk	75mV Pk-Pk
Line Regulation	%	0.1%		
Load Regulation	%	0.1%		
Transient Response	-	±1% deviation, recovering to ±0.2% in <1.25ms (25% load change)		
Overcurrent Protection	-	110 - 130%		
Overvoltage Protection	V	User adjustable from front panel from 20-36V (Factory set at 31V)		
Thermal Protection	-	Internal thermostat. Recycle AC to reset		
Hold Up Time at 110VAC	ms	20ms Hold Up, 20ms Ride Through		
Remote Sense	-	Compenstates for a total of 1V cable drop		
Remote Adjust	-	Using front panel potentiometer, Resistance (1k/V), or Voltage (1V/V)		
Remote On / Off	-	TTL compatible, active high		
Signals	-	Optocoupled transistor for AC Fail, DC Good, Inverter OK, 200kHz sync signal (ref-sense)		
Indicators	-	Green LED indicates output good, red LED indicates overvoltage or over temperature		
Parallel Connection	-	Single wire current share		
Operating Temperature	°C	-40°~+71°C, derate linearly to 60% load from 60°C~70°C (20 min warm up period needed for <-30°C)		
Storage Temperature	°C	-40° to +85°C		
Temperature Coefficient	-	0.01%/°C		
Humidity (non condensing)	%RH	10 - 90%RH		
Cooling	-	Internal fan		
Withstand Voltage	-	Input - Ground 2,121VDC, Input - Output 4,242VDC, Output - Ground 500VDC		
Vibration	-	MIL-STD-810E, Method 516.4 Proc. I, II, IV, VI		
Shock	-	MIL-STD-810E, Method 514.4, Category 1, 9		
Safety Agency Approvals	-	UL60950-1, UL508, EN60950-1, FM 3600, 3611, 3810, & CE Mark. SEMIF47(>100VAC)		
Leakage current	uA	<500uA at 265VAC, 60Hz		
Emissions	-	EN55022/EN55011 Class B, EN61000-3-3		
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11. IEEE C62.41 (6kV/30 Ohm, Criteria A)		
Altitude	m	3,000m operating, 12,000m non operating		
Weight	kg	2.95	3.7	
Size (WxHxD)(w/o bus bars)	mm	108 x 121 x 260	143 x 121 x 267	
Warranty	yrs	Five Years		

Notes: (Consult Installation Manual for detailed specifications, test methods and application notes)

Output Ratings

Model	Nominal Voltage (V)	Adjustment Range (V)	Maximum Current (A)	Maximum Power (W)
LZSa500-3	24	18 - 29.4	21	504
LZSa1000-2	12	10 - 15.75	84	1008
LZSa1000-3	24	18 - 29.4	42	1008
LZSa1500-3	24	18 - 29.4	63	1512(1)

Note (1) 1512W @ 180-265VAC
1200W @ 120VAC
1104W @ 100 VAC
1008W @ 85VAC

LZSa Connection Diagram

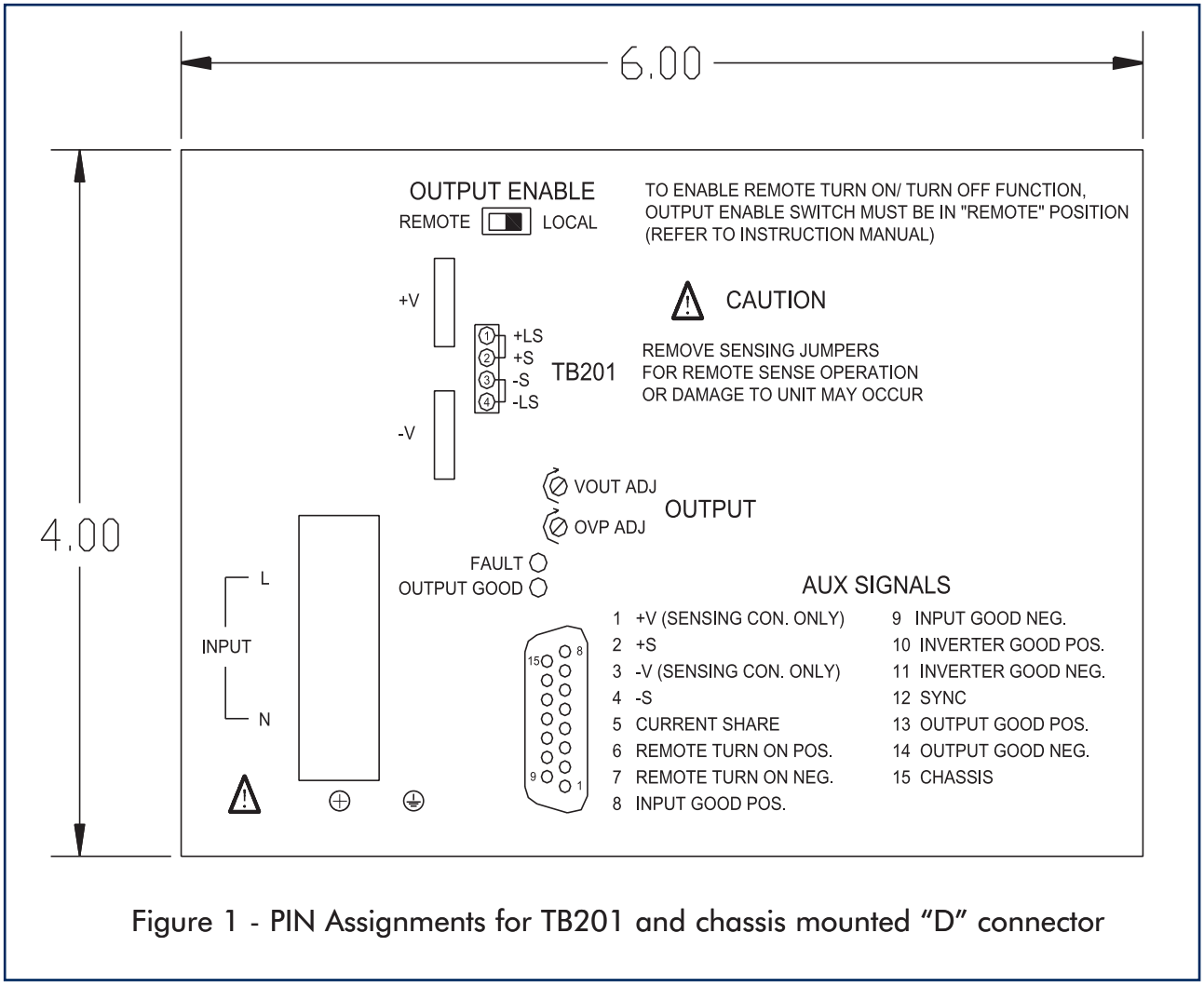
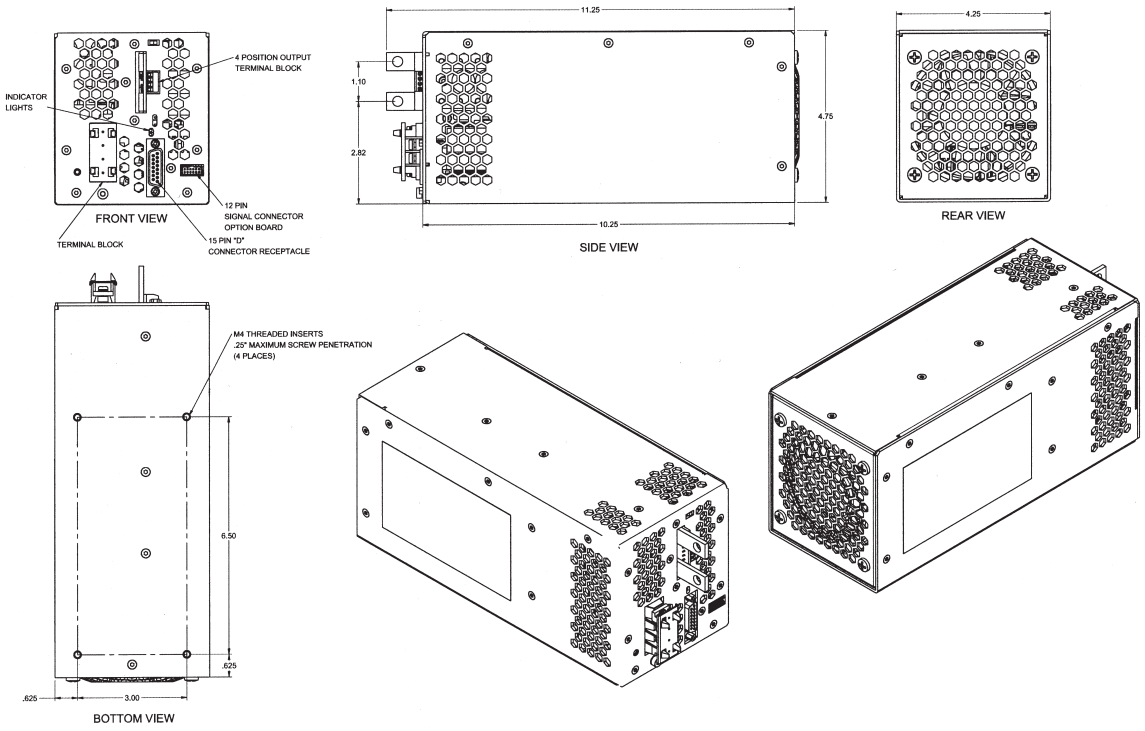
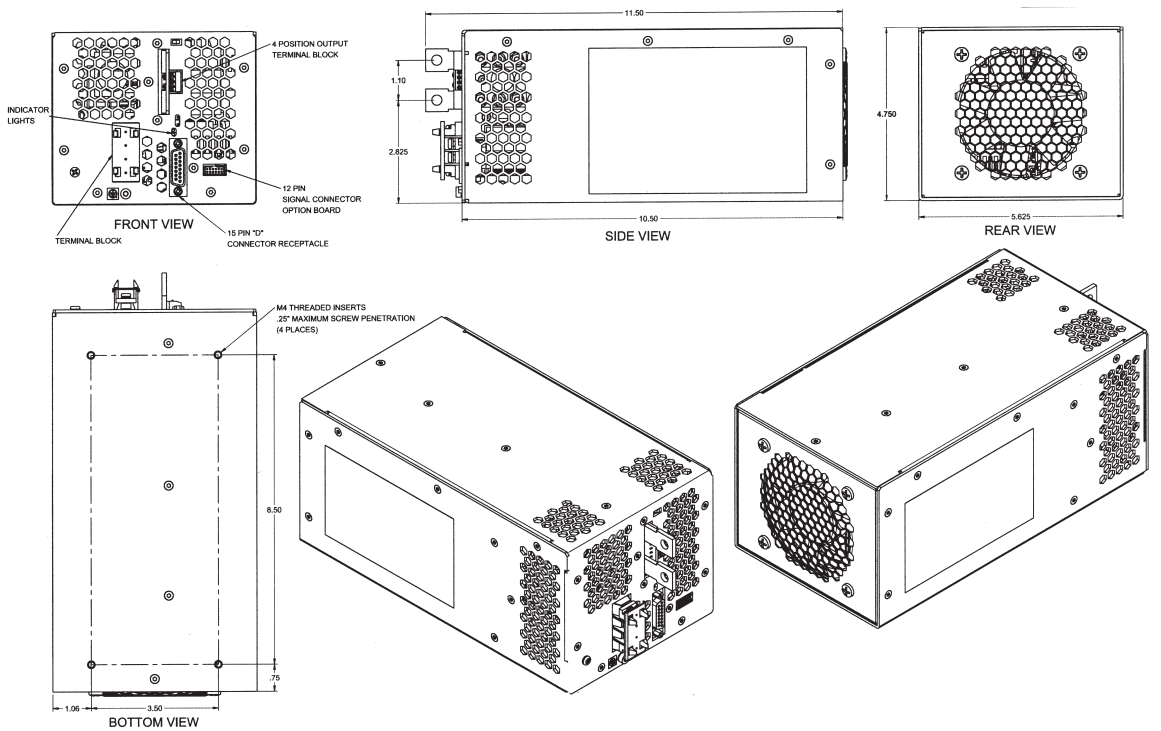


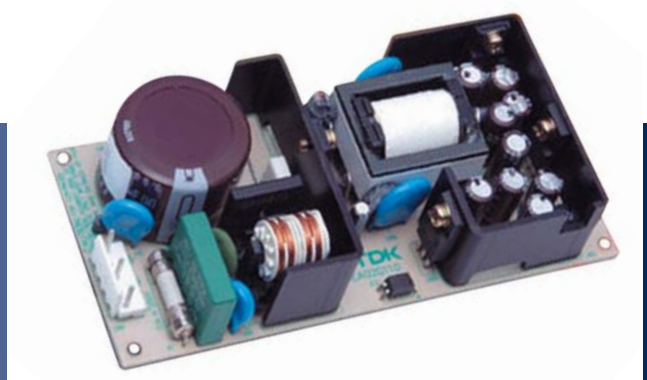
Figure 1 - PIN Assignments for TB201 and chassis mounted "D" connector

LZSa500 Outline Drawing



LZSa1000/1500 Outline Drawing





Manufactured by TDK
TDK-Lambda is a collaborative product brand between TDK and the Lambda group.

MTW Series

15W to 60W Low Profile Triple Output Power Supplies

- 26mm height
- 3 year Warranty
- Peak Load capable
- Light weight
- Output 1 isolated from outputs 2 & 3

Key Market Segments & Applications

Factory Automation
Test & Measurement
Automated Service
Portable Equipment

MTW Features and Benefits

Features	*Benefits*
◆ Low Profile	◆ Assists System Integration
◆ Three Year Warranty	◆ Low Cost of Ownership
◆ Output 1 is isolated from outputs 2 & 3	◆ Outputs V2 & V3 can be connected in series

Specifications

ITEMS / MODELS			MTW15-51212 MTW15-51515	MTW30-51212 MTW30-51515	MTW60-51212 MTW60-51515
Input Voltage Range		V	85 - 265VAC (47 - 440Hz)		
Input Current Typ	(1)	A	0.42 / 0.25	0.8 / 0.4	1.4 / 0.8
Inrush Current	(1)	A	25 / 50	20 / 40	20 / 40
Leakage Current (240VAC, 60Hz)	mA		0.75mA Max		
Max Output Power		W	16 17.5	30 33	60 62.5
Efficiency (Typ)		%	71	76	76
Hold Up Time	(1)	ms	20 / 150	20 / 140	10 / 20
Output Voltage Adjustment		-	Fixed		
Overcurrent Protection		-	Yes, automatic recovery. Hiccup style on MTW30 & 60		
Overvoltage Protection		V	V1: Zener Clamp	V1: Zener Clamp	V1 & V2: Zener Clamp
Operating Temperature		-	-20°C start up. -10 to +60°C, derating linearily to 70% load above 50°C		
Storage Temperature		-	-30 to +75°C		
Humidity (Non condensing)		-	10 - 90%RH (Operating & storage) at 35°C		
Cooling		-	Convection		
Withstand Voltage		-	Input to ground 2kVAC, Input to output 3kVAC, Output to ground 500VAC		
Vibration (non operating)		-	5 - 10Hz: 10mm amplitude, 10 - 200Hz: 2G (19.6m/s^2)10m sweep time, 3 axis, 1 hour each		
Shock		-	Acceleration: 60G (588m/s^2) Half sine wave, 6 - 16ms pulse duration, 3x each direction		
Safety Agency Approvals		-	UL60950-1, CSA C22.2 No 60950-1 (C-UL), EN60950-1		
Immunity		-	EN61000-4-2 (Lv 4), -3, -4 (Lv 3), -5 (Lv 4), -6 (Lv 3), -8 (Lv 4), -11		
Conducted EMI		-	FCC-Class B, EN55011-B, EN55022-B		
Weight (Typ)		g	150	210	330
Size (WxHxL)		mm	50 x 26 x 127	65 x 26 x 140	83 x 26 x 185
Warranty		yrs	Three Years		

Notes:
(1) 100/240VAC
(2) Output V1 is isolated from outputs V2 & V3

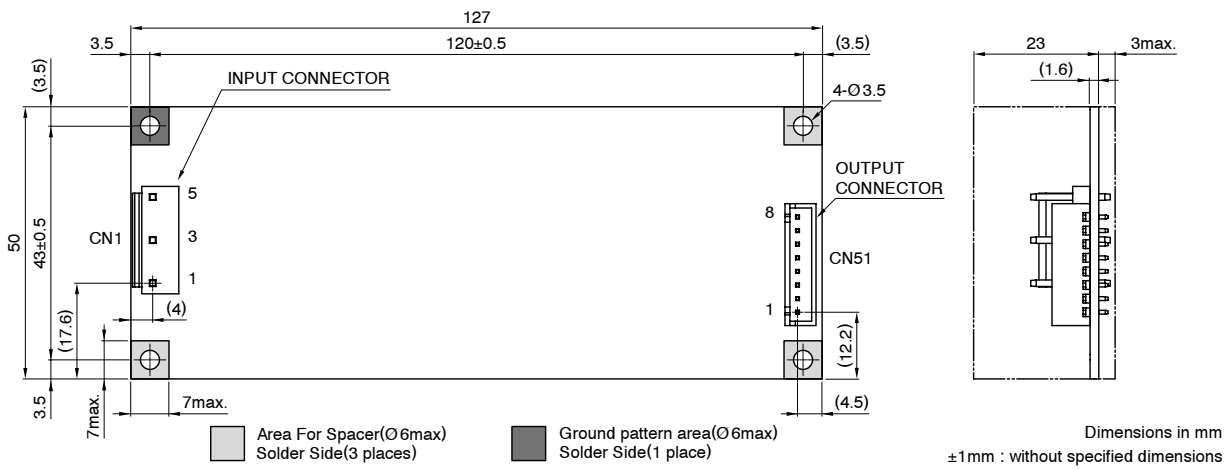
Model Selector

Model	Output	Voltage (V)	Regulation	Minimum Current (A)	Maximum Current (A)	Peak Current (A)	Ripple & Noise (mV)
MTW15-51212	V1	5V	4.75 - 5.25V	0	2.0	3.0	120
	V2	12V	11.4 - 12.6V	0	0.3	0.6	150
	V3	-12V	11.4 - 12.6V	0	0.2	0.3	150
MTW15-51515	V1	5V	4.75 - 5.25V	0	2.0	3.0	120
	V2	15V	14.4 - 15.6V	0	0.3	0.6	150
	V3	-15V	14.4 - 15.6V	0	0.2	0.3	150
MTW30-51212	V1	5V	4.9 - 5.3V	0	3	4.5	120
	V2	12V	11.4 - 12.6V	0	1.2	2.0	150
	V3	-12V	11.4 - 12.6V	0	0.3	0.45	150
MTW30-51515	V1	5V	4.9 - 5.3V	0	3	4.5	120
	V2	15V	14.25 - 15.75V	0	0.8	2.0	150
	V3	-15V	14.25 - 15.75V	0	0.3	0.45	150
MTW60-51212	V1	5V	4.9 - 5.3V	0	5.0	7.0	120
	V2	12V	11.4 - 12.6V	0	2.5	3.5	150
	V3	-12V	11.4 - 12.6V	0	0.5	0.7	150
MTW60-51212	V1	5V	4.9 - 5.3V	0	5.0	7.0	120
	V2	15V	14.25 - 15.75V	0	2.0	3.5	150
	V3	-15V	14.25 - 15.75V	0	0.5	0.7	150

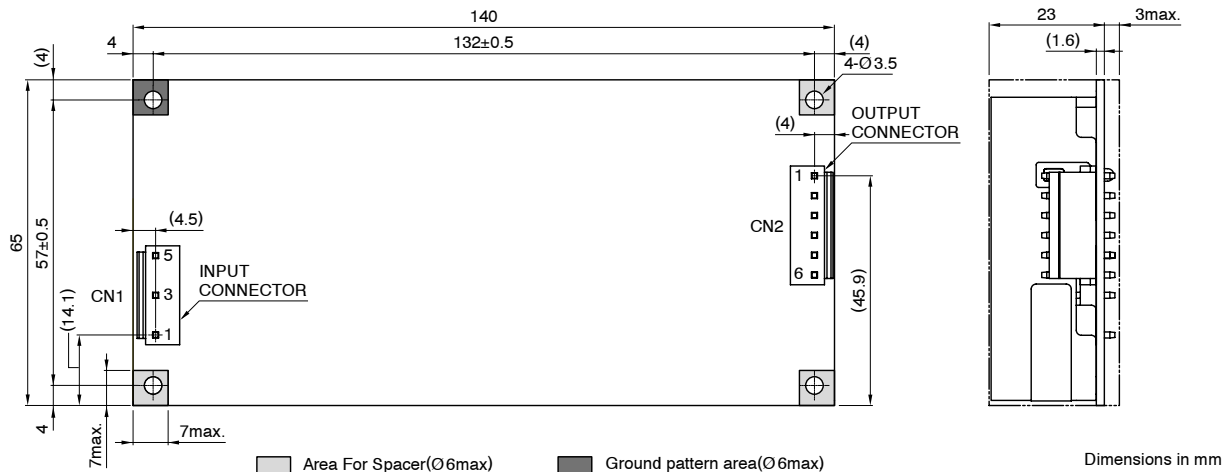
Mating Connectors

	Model	Input	Output
Connectors JST	MTW15	B3P5-VH-B	B8B-XH-2
	MTW30	B3P5-VH-B	B6P-VH-B
	MTW60	B3P5-VH-B	B8P-VH-B

Outline Drawing (MTW15)



Outline Drawing (MTW30)



LAMBDA

- High Efficiency
- High Power Density (9.3W/in^3)
- Up to 5 outputs
- No minimum load
- Fits 1U applications
- Medical Approval
- 3 Year Warranty
- Temperature controlled Fan Option

NV-Power

175/180/200 Watts, flexible power solution

Key Market Segments & Applications

Instrumentation
Medical
Automation
Security
Network Servers and Routers
Broadcast
ATE
Industrial Computing
Lifesciences/Laboratory

Features and Benefits

Feature	Benefit
◆ High Efficiency	◆ Minimises heat in system
◆ Low Profile	◆ Fits 1U applications
◆ High Power Density	◆ Less Space

INPUT

Input Voltage	90 - 264Vac / 120 - 350Vdc	Input Frequency	45 - 63Hz (440Hz with reduced PFC - consult factory)
Input Harmonics	EN61000-3-2 compliant	Inrush Current	<40A at 25°C and 264Vac, (cold start)
Input Fuse	Fast acting (not user accessible)	Power Factor	0.97 typical
Earth Leakage Current	123µA max at 120Vac (60Hz), 257µA max at 240Vac (60Hz) Worst case leakage current is less than 300µA at 264Vac, 63Hz (normal condition, 500µA Single Fault Condition)		

AVAILABLE OUTPUTS

Channel 1	Adjustment Range	Channel 2_1	Adjustment Range	Channel 3_3	Adjustment Range	Channel 4_4	Adjustment Range
5 5V / $25A_2$	5 - 5.5V	1 1.8V / 15A	0.9 - 3.3V			T -12V / 1A	Fixed
		2 2.7V / 15A	2.5 - 3.3V			F -15V / 1A	Fixed
		3 3.3V / 15A	2.5 - 3.3V	T 12V / 5A	12 - 15V	3H -3.3V / $2A_9$	Fixed
		0 Omit		F 15V / 5A	12 - 15V	5H -5V / $2A_9$	Fixed
T 12V / 15A	12 - $15V_5$	5 5V / 10A	3.3 - 5.5V	G 24V / 2.5A	18 - 24V	TH -12V / $2A_9$	Fixed
F 15V / 12A	12 - $15V_6$	0 Omit		0 Omit		FH -15V / $2A_9$	Fixed
G 24V / 7.5A	24 - $28V_7$	5 5V / $8A_8$	3.3 - 5.5V			0H Fan supply only	
		0 Omit				0 Omit	

1. 1.8V, 2.7V, 3.3V channel 2 only available with 5V Channel 1
   5V/10A channel 2 only available with 12V or 15V Channel 1
   5V/8A channel 2 only available with 24V Channel 1.
2. Maximum combined output current from Ch1 & Ch2 = 25A
   Models with 5V channel 1 are limited to 175W output power
3. Follow letters in red by 'Y' for negative output channel 3.
4. Follow letters in red by 'P' for positive output channel 4.
5. 12 - 12.5V if 24V channel 3 fitted.
6. 14.5 - 15V if 24V channel 3 fitted.
7. 24 - 24.5V if 5V channel 2 fitted
   24 - 26V if 24V channel 3 fitted.
8. 7A max if fitted with '-F' option.
9. 1.5A max if fitted with '-F' option.

Other output options are available, please contact factory with your requirements.

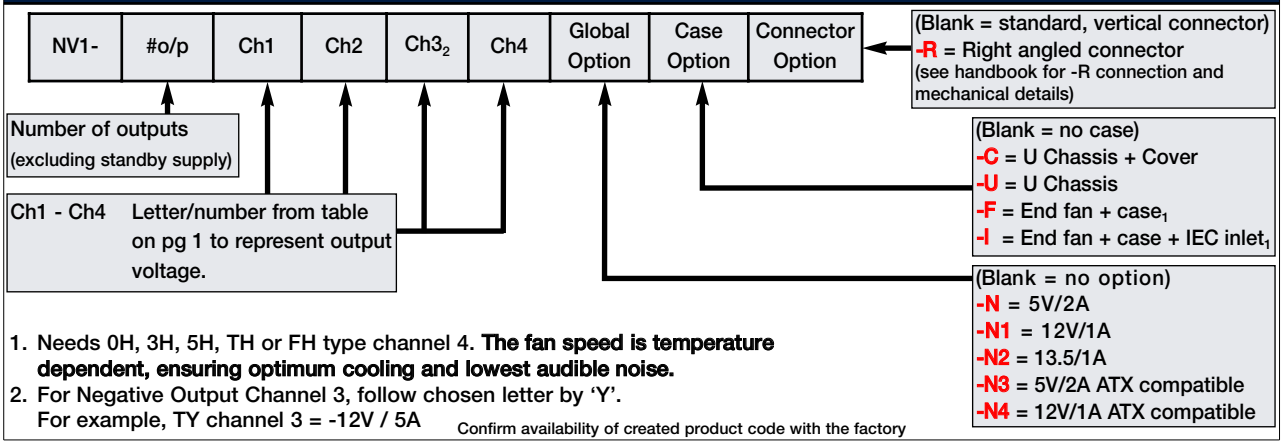
ISOLATION

Input to Output	Reinforced	4.3kV (dc) Note: Basic for IEC/EN/UL/CSA60601-1. Medical Reinforced version available, see separate datasheet.		
Input to Earth	Basic	2.3 kV (dc)	Output to Earth	200 V (dc)

OUTPUT SPECIFICATION

Remote Sense	Yes	Channels 1 & 2 - Max 0.5V total line drop.
Total Regulation	1%	Including Line (for 90-264Vac input change), Load (for 0-100% load change) and Cross (for 0-100% load change on any other output) regulation
Ripple & Noise	1%	(or 50mV if higher) pk-pk, using EIAJ test method & 20MHz bandwidth
Voltage Accuracy	±1%	±4% for Channel 4 with 'T' or 'F' type outputs, +4%/-3% for all other Ch 4
Turn on Time	1.5s max	at 90 Vac & 100% rated output power
Efficiency	up to 90%	configuration dependent
Hold up	16ms min	at 90 Vac
Min Load	None	on any output
Transient Response	<4%	of set voltage for 50% load change (in 50µs within the range 25 - 100% load)
Recovery	<500µs	for recovery to 1% of set voltage
Short circuit protection	Yes	
Over Temperature protection	Yes	
Over Voltage Protection	Yes	See Application Notes for details
Ch1 Good Signal	Yes	Provides a Logic 'Low' signal after Channel 1 output is within 90% (±5%) of nominal.
Peak Output Power	200W	Single output units with 12V, 15V or 24V (T, F or G). Average output power must not exceed 180W over any 5 minute period.

HOW TO CREATE A PRODUCT CODE



1. Needs 0H, 3H, 5H, TH or FH type channel 4. **The fan speed is temperature dependent, ensuring optimum cooling and lowest audible noise.**
2. For Negative Output Channel 3, follow chosen letter by 'Y'. For example, TY channel 3 = -12V / 5A

Confirm availability of created product code with the factory

QUICK SELECTOR - preferred configurations

Model	CH1	CH2	CH3	CH4	CH5	Global Option[1]
NV1-1T000	12V / 15A	-	-	-	-	No
NV1-1G000	24V / 7.5A	-	-	-	-	No
NV1-453TT	5V / 25A	3.3V / 15A	12V / 5A	-12V / 1A	-	No
NV1-453TT-N3	5V / 25A	3.3V / 15A	12V / 5A	-12V / 1A	5V / 2A	ATX (-N3)
NV1-453FF	5V / 25A	3.3V / 15A	15V / 5A	-15V / 1A	-	No
NV1-453FF-N3	5V / 25A	3.3V / 15A	15V / 5A	-15V / 1A	5V / 2A	ATX (-N3)
NV1-4G5TT	24V / 7.5A	5V / 8A	12V / 5A	-12V / 1A	-	No
NV1-4G5TT-N3	24V / 7.5A	5V / 8A	12V / 5A	-12V / 1A	5V / 2A	ATX (-N3)
NV1-4G5FF	24V / 7.5A	5V / 8A	15V / 5A	-15V / 1A	-	No
NV1-4G5FF-N3	24V / 7.5A	5V / 8A	15V / 5A	-15V / 1A	5V / 2A	ATX (-N3)

Above Units available on rapid delivery.
Additional variants available 'Build to Order' - see above

1. see page 3 for details of global option

GLOBAL SIGNALS (-N, -N1 and -N2 Option Models)	
Remote on/off	TTL logic level high inhibits all outputs (except Standby)
Power Good	Open collector output (referenced to PSU 0V). Turns on to indicate ac supply is good and output 1 is within regulation.
Standby Supply	Isolated supply, not affected by remote on/off -N option = 5V / 2A (2.5A peak) -N1 Option = 12V / 1A -N2 Option = 13.5V / 1A

GLOBAL SIGNALS (-N3 and -N4 Option Models)	
ATX Remote on/off	TTL logic level high or open circuit will inhibit all outputs (except Standby)
ATX Power Good	Logic high indicates ac supply is good and output 1 is within regulation.
Standby Supply	Common 0V with power supply. Not affected by ATX remote on/off -N3 Option = 5V / 2A -N4 Option = 12V / 1A.

IMMUNITY EN61000-6-2:2001				Criteria
Electrostatic Discharge	EN61000-4-2	Level 3	Air discharge 8kV Contact discharge 4kV Not applicable to open frame units	A
Electromagnetic Field	EN61000-4-3	Level 3	(12V/m)	A
Fast / Burst Transient	EN61000-4-4	Level 4	(tested to 4.4kV)	A
Surge Immunity	EN61000-4-5	Level 3	Common mode - 2.2kV Differential - 1.1kV	A
Conducted RF Immunity	EN61000-4-6	Level 3	(12V)	A
Power Frequency Magnetic Field	EN61000-4-8	Level 4	(30A/m)	A
Voltage Dips, Variations, Interruptions	EN61000-4-11	Class 3	Criteria B for 5 sec interruption	A

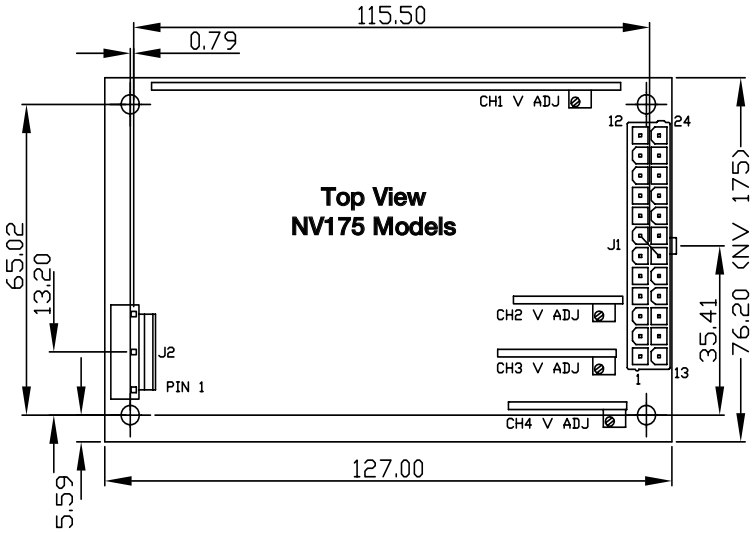
EMISSIONS EN61000-6-3:2001, EN60601-1-2:2001		
Radiated Electric Field	EN55011, EN55022	(as per CISPR.11/22) Class B, FCC47 part 15 subpart B (2005) see application note for details
Conducted Emissions	EN55011, EN55022	(as per CISPR.11/22) Class B, FCC47 part 15 subpart B (2005)
Conducted Harmonics	EN61000-3-2	Class A
Flicker	EN61000-3-3	Compliant - d_{max} only

ENVIRONMENT	
Temperature	0 to 50°C operational, -40°C to 85°C storage (max 12 months). Full load, with either '-F' option fitted or 2m/s air blown from input to output
Convection Rating	See Application note for details
Derating	50 to 70°C derate each output by 2.5% per °C
Low Temp Startup	-20°C
Humidity	5 - 95% RH non condensing
Shock	±3 x 30*g* shocks in each plane, total 18 shocks 30*g* shock = 11ms (+/-0.5msec), half sine Conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, JIS C0041-1987. Conforms to MIL-STD-810E/F, Method 514.4, Pro I, Cat 1,9
Vibration	Single axis 10 - 500 Hz at 2*g* (sweep and endurance at resonance) in all 3 planes Conforms to EN60068-2-6, IEC68-2-6 Conforms to MIL-STD-810E, Method 516.5, Pro I, IV, VI
Altitude	3,000 metres operational
Pollution	Degree 2, Material group IIIb

SAFETY APPROVALS					
	Date	Amendments		Date	Amendments
EN 60950-1	2006		EN 61010-1	2001	
UL 60950-1	2007		IEC 61010-1*	2001	
CSA 22.2 No 60950-1	2003		IEC 60601-1*	1988	
IEC 60950-1*	2005		EN 60601-1	1990	A1, A2
CE Mark	LV Directive 2006/95/EC (EN60950-1)		UL 60601-1	2003	with revisions 2006
** CB certificate and Report available on request*			*Check with factory for status of approvals*		

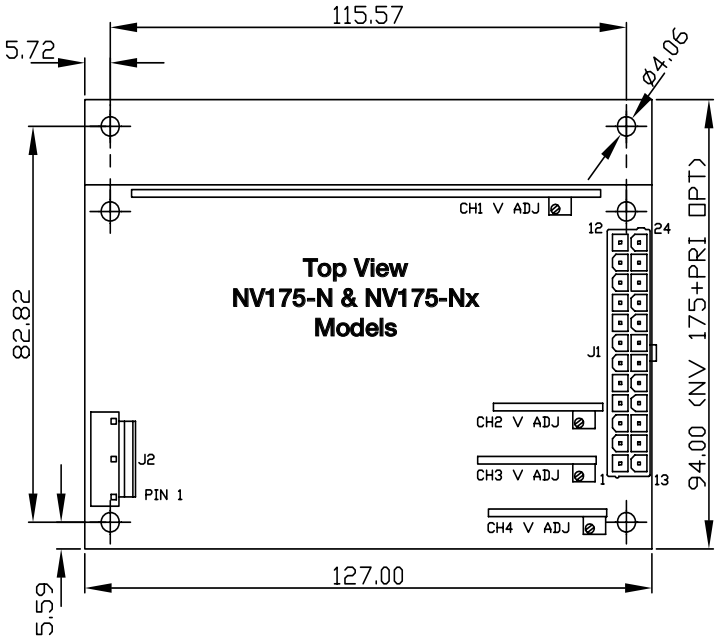
OUTLINE & CONNECTION DRAWINGS

All drawings relate to both 175W and 180W versions



J2

PIN	FUNCTION
1	EARTH
2	NOT CONNECTED
3	LIVE
4	NOT CONNECTED
5	NEUTRAL

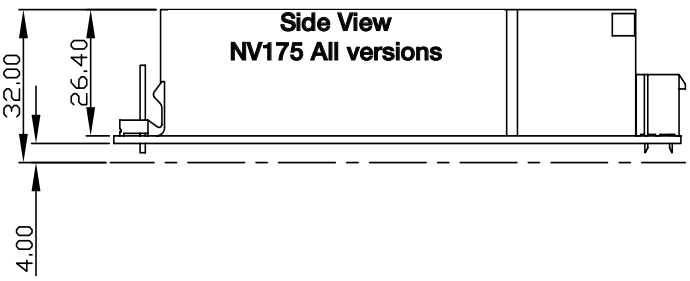


J1

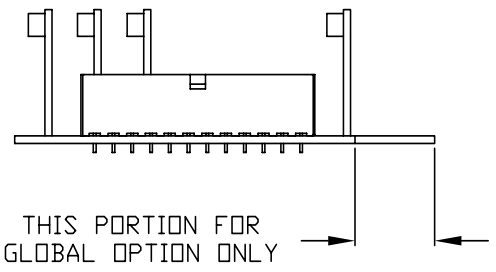
PIN	FUNCTION	PIN	FUNCTION
12	STANDBY +Ve	24	STANDBY RETURN
11	POWER GOOD	23	REMOTE ON/OFF
10	CH1 OUTPUT	22	CH1 POWER GOOD
9	CH1 OUTPUT	21	CH1 OUTPUT
8	CH1 OUTPUT	20	CH1 OUTPUT
7	+SENSE CH1	19	-SENSE CH1
6	0V COMMON	18	0V COMMON
5	0V COMMON	17	0V COMMON
4	CH2 OUTPUT	16	0V COMMON
3	CH2 OUTPUT	15	CH2 OUTPUT
2	+SENSE CH2	14	-SENSE CH2
1	CH3 OUTPUT	13	CH4 OUTPUT

MATING PARTS (MOLEX OR EQUIVALENT)

CONN	HOUSING	PINS
J1	39-01-2245	44476-3112
J2	09-50-8051	08-52-0113



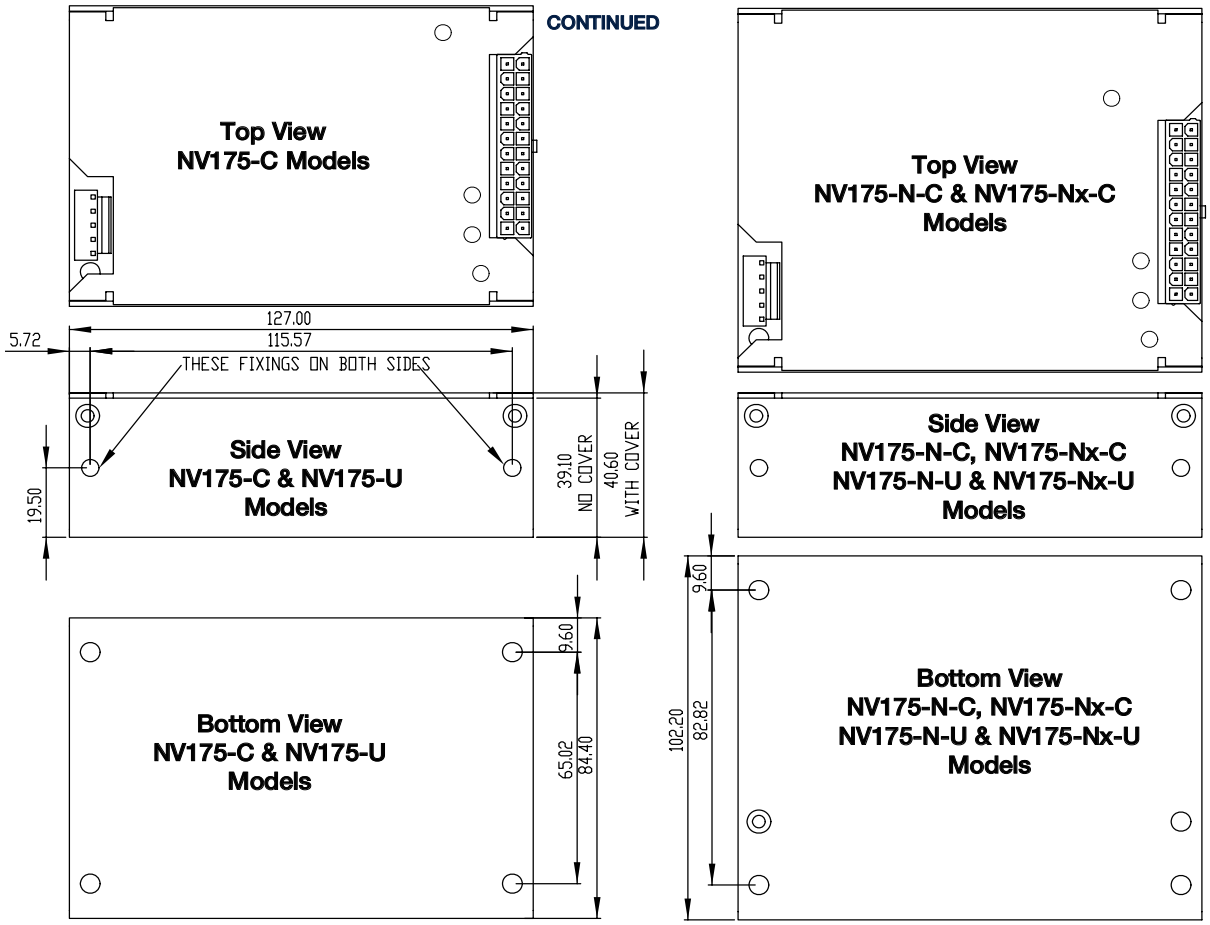
End View

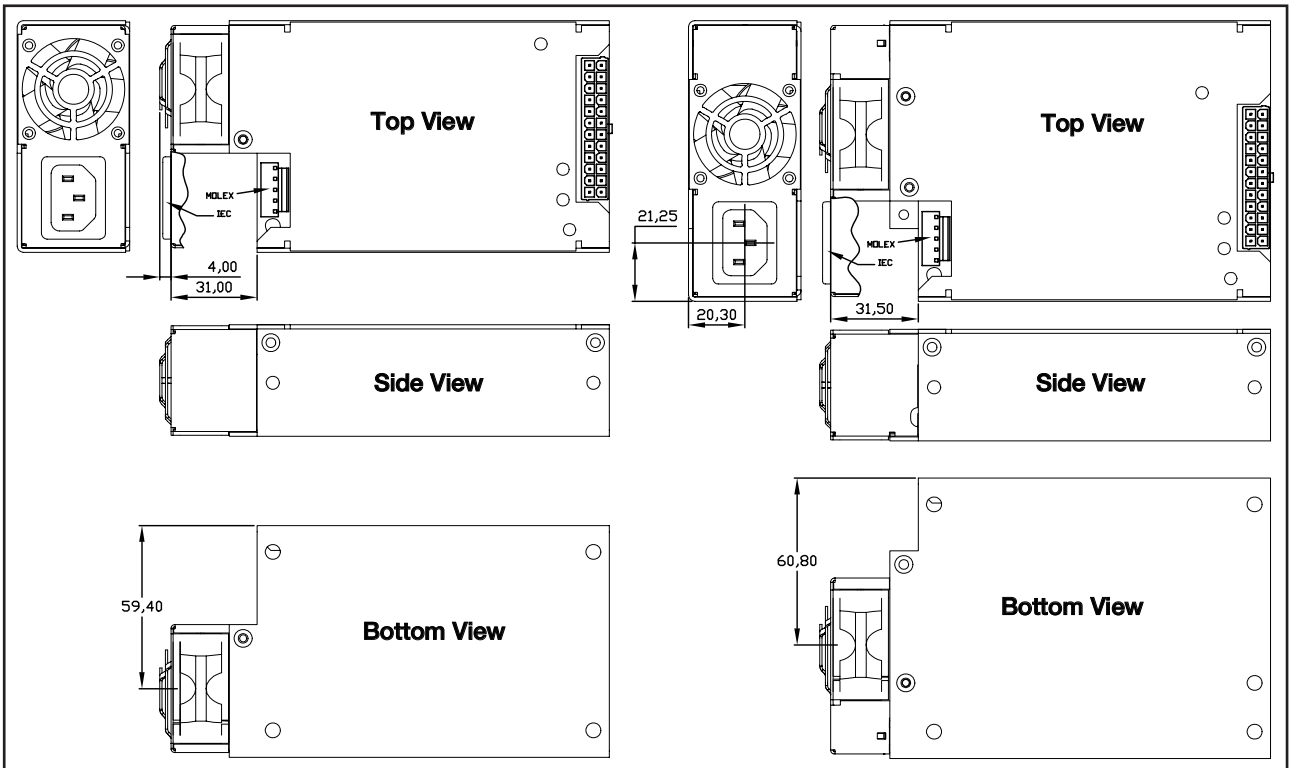


Notes 1. All customer fixings M3 2. Maximum Penetration 4.5mm 3. Maximum torque 0.9Nm 4. All tolerances +/-0.5mm

OUTLINE & CONNECTION DRAWINGS

CONTINUED





Other dimensions same as cases without fans (above)

Notes 1. All customer fixings M3 2. Maximum Penetration 4.5mm 3. Maximum torque 0.9Nm 4. All tolerances +/-0.5mm

LAMBDA

- High Efficiency
- High Power Density (6.6W/in^3)
- Up to 5 outputs
- No minimum load
- Fits 1U applications
- Medical Approval
- 3 Year Warranty
- Temperature controlled Fan Option

NV-Power

300 Watts, flexible power solution

Key Market Segments & Applications

Instrumentation
Medical
Automation
Security
Network Servers and Routers
Broadcast
ATE
Industrial Computing
Lifesciences/Laboratory

Features and Benefits

Feature	Benefit
◆ High Efficiency	◆ Minimises heat in system
◆ Low Profile	◆ Fits 1U applications
◆ High Power Density	◆ Less Space

INPUT

Input Voltage	90 - 264Vac / 120 - 350Vdc (Below 100Vac input, derate by 3W per Volt)	Input Frequency	45 - 63Hz (440Hz with reduced PFC - consult factory)
Input Harmonics	EN61000-3-2 compliant	Inrush Current	<15A at 25°C and 264Vac, (cold start)
Input Fuse	6.3A, Fast acting (not user accessible)	Power Factor	0.97 typical
Earth Leakage Current	123µA max at 120Vac (60Hz), 257µA max at 240Vac (60Hz) Worst case leakage current is less than 300µA at 264Vac, 63Hz (normal condition, 500µA Single Fault Condition)		

AVAILABLE OUTPUTS

Channel 1	Adjustment Range$_5$	Channel 2	Adjustment Range$_5$	Channel 3	Adjustment Range	Channel 4$_2$	Adjustment Range
5 5V / 40A$_1$	5 - 5.5V	1 1.8V / 15A	0.9 - 3.8V	T 12V / 5A$_4$	12 - 15V	3H -3.3V / 2A$_3$	Fixed
		2 2.7V / 15A	2.5 - 3.8V	TH 12V / 8A$_6$	12 - 15V	5H -5V / 2A$_3$	Fixed
		3 3.3V / 15A	2.5 - 3.8V	F 15V / 4A$_4$	12 - 15V	T -12V / 1A	Fixed
		2H 2.7V / 24A	2.5 - 3.8V	FH 15V /6.4A$_6$	12 - 15V	TH -12V / 2A$_3$	Fixed
		3H 3.3V / 24A	2.5 - 3.8V	G 24V / 2.5A	18 - 24V	F -15V / 1A	Fixed
		0 Omit		0 Omit		FH -15V / 2A$_3$	Fixed
						0H Fan supply only	
						0 Omit	

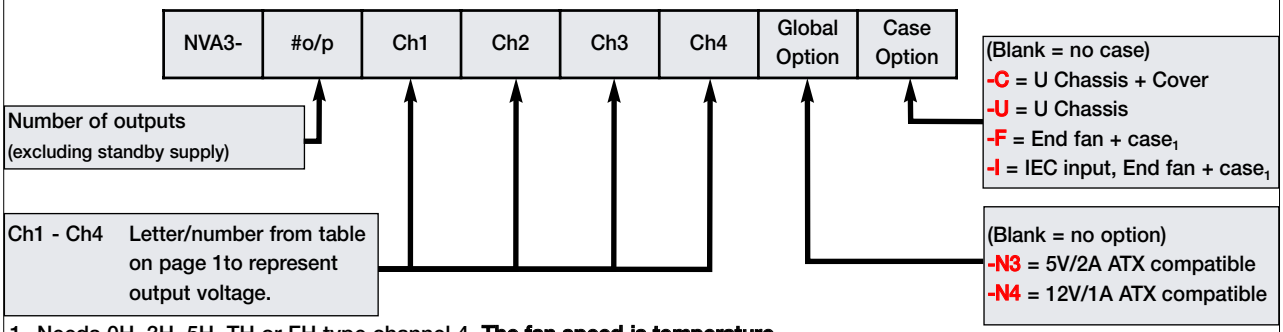
1. Maximum combined output current from Ch1 & Ch2 = 40A
2. Follow letters in red by 'P' for positive output channel 4.
3. 1.5A max if fitted with '-F' option.
4. 60W max output power
5. Max voltage at the output (includes remote sense)
6. 96W max output power

Other output options are available, please contact factory with your requirements.

ISOLATION				
Input to Output	Reinforced	4.3kV (dc) Note: Basic for IEC/EN/UL/CSA60601-1		
Input to Earth	Basic	2.25 kV (dc)	Output to Earth	200 V (dc)

OUTPUT SPECIFICATION		
Remote Sense	Yes	Channels 1 & 2 - Max 0.5V total line drop.
Total Regulation	1.5%	For channels 1, 2 and 3 (2.5% for channel 4) Including Line (for 90-264Vac input change), Load (for 0-100% load change) and Cross (for 0-100% load change on any other output) regulation.
Ripple & Noise	1%	(or 50mV if higher) pk-pk, using EIAJ test method & 20MHz bandwidth
Voltage Accuracy	±1%	±5% for Channel 4
Turn on Time	1.5s max	at 90 Vac & 100% rated output power
Efficiency	up to 90%	configuration dependent
Hold up	16ms min	at 90 Vac
Min Load	None	on any output
Transient Response	<5%	of set voltage for 40% load change (in 50µs within the range 25 - 100% load)
Recovery	<500µs	for recovery to 1% of set voltage
Short circuit protection	Yes	
Over Temperature protection	Yes	
Over Voltage Protection	Yes	See Application Notes for details
Ch1 Good Signal	Yes	Provides a Logic 'Low' signal after Channel 1 output is within 90% (±5%) of nominal.

HOW TO CREATE A PRODUCT CODE



1. Needs 0H, 3H, 5H, TH or FH type channel 4. **The fan speed is temperature dependent, ensuring optimum cooling and lowest audible noise.**

Confirm availability of created product code with the factory

QUICK SELECTOR - preferred configurations

Model	CH1	CH2	CH3	CH4	CH5	Global Option[1]
NVA3-453TT	5V / 40A	3.3V / 15A	12V / 5A	-12V / 1A	-	No
NVA3-453TT-N3	5V / 40A	3.3V / 15A	12V / 5A	-12V / 1A	5V / 2A	ATX (-N3)
NVA3-350TT	5V / 40A	-	12V / 5A	-12V / 1A	-	No
NVA3-350TT-N3	5V / 40A	-	12V / 5A	-12V / 1A	5V / 2A	ATX (-N3)
NVA3-453FF	5V / 40A	3.3V / 15A	15V / 5A	-15V / 1A	-	No
NVA3-453FF-N3	5V / 40A	3.3V / 15A	15V / 5A	-15V / 1A	5V / 2A	ATX (-N3)
NVA3-350FF	5V / 40A	-	15V / 5A	-15V / 1A	-	No
NVA3-350FF-N3	5V / 40A	-	15V / 5A	-15V / 1A	5V / 2A	ATX (-N3)

Above Units available on rapid delivery.
See over for additional variants available 'Build to Order'

1. see page 3 for details of global option

GLOBAL SIGNALS (-N3 and -N4 Option Models)	
ATX Remote on/off	TTL logic level high or open circuit will inhibit all outputs (except Standby)
ATX Power Good	Logic high indicates ac supply is good and output 1 is within regulation.
Standby Supply	Common 0V with power supply. Not affected by ATX remote on/off -N3 Option = 5V / 2A -N4 Option = 12V / 1A.

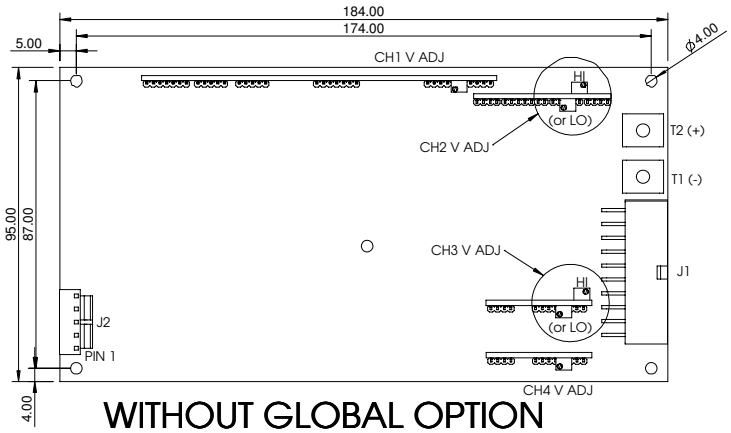
IMMUNITY EN61000-6-2:2005, EN60601-1-2:2001				Criteria
Electrostatic Discharge	EN61000-4-2	Level 3	Air discharge 8kV Contact discharge 4kV Not applicable to open frame units	A
Electromagnetic Field	EN61000-4-3	Level 3	(12V/m)	A
Fast / Burst Transient (ac input)	EN61000-4-4	Level 4	(tested to 4.4kV)	A
Fast / Burst Transient (dc output)	EN61000-4-4	Level 4	(tested to 2.2kV)	A
Surge Immunity	EN61000-4-5	Level 3	Common mode - 2.2kV Differential - 1.1kV	A
Conducted RF Immunity	EN61000-4-6	Level 3	(12V)	A
Power Frequency Magnetic Field	EN61000-4-8	Level 4	(30A/m)	A
Voltage Dips, Variations, Interruptions	EN61000-4-11	Class 3	Criteria B for 5 sec interruption	A
Voltage Fluctuations	EN61000-4-14	Class 3	For 100 - 240V Nominal	A

EMISSIONS EN61000-6-3:2001, EN60601-1-2:2001		
Radiated Electric Field	EN55011, EN55022	(as per CISPR.11/22) Class B, FCC47 part 15 subpart B (2005) see app note for details
Conducted Emissions	EN55011, EN55022	(as per CISPR.11/22) Class B, FCC47 part 15 subpart B (2005)
Conducted Harmonics	EN61000-3-2	Class A
Flicker	EN61000-3-3	Compliant - d_{max} only

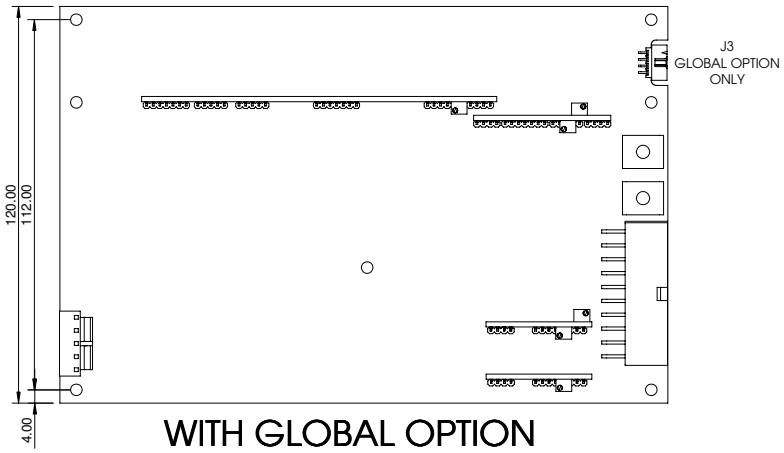
ENVIRONMENT	
Temperature	0 to 50°C operational, -40°C to 85°C storage (max 12 months). Full load, with either '-F' option fitted or 2m/s air blown from input to output
Derating	50 to 70°C derate each output by 2.5% per °C
Low Temp Startup	-20°C
Humidity	5 - 95% RH non condensing
Shock	±3 x 30*g* shocks in each plane, total 18 shocks 30*g* shock = 11ms (+/-0.5msec), half sine Conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, JIS C0041-1987. Conforms to MIL-STD-810E/F, Method 514.4, Pro I, Cat 1,9
Vibration	Single axis 10 - 500 Hz at 2*g* (sweep and endurance at resonance) in all 3 planes Conforms to EN60068-2-6, IEC68-2-6 Conforms to MIL-STD-810E, Method 516.5, Pro I, IV, VI
Altitude	3,000 metres operational
Pollution	Degree 2, Material group 3

SAFETY APPROVALS					
	Date	Amendments		Date	Amendments
EN 60950-1	2006		EN 61010-1	2001	
UL 60950-1	2007		IEC 61010-1*	2001	
CSA 22.2 No 60950-1	2003		IEC 60601-1*	1988	A1, A2
IEC 60950-1*	2005		EN 60601-1	1990	A1, A2, A13
CE Mark	LV Directive 2006/95/EC (EN60950-1)		UL 60601-1	2003	with revisions 2006
** CB certificate and Report available on request*			*Check with factory for status of approvals*		

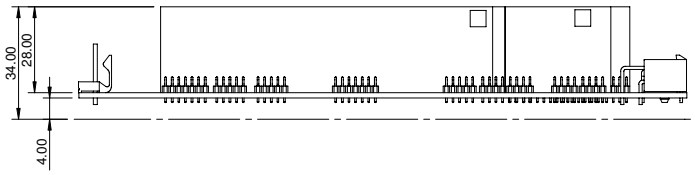
OUTLINE & CONNECTION DRAWINGS

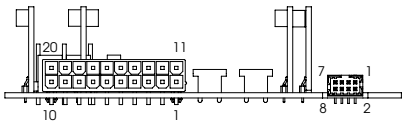


WITHOUT GLOBAL OPTION



WITH GLOBAL OPTION





J2

PIN	CONNECTION
1	EARTH
2	NOT CONNECTED
3	LIVE
4	NOT CONNECTED
5	NEUTRAL

J1

PIN	CONNECTION	PIN	CONNECTION
11	0V COMMON	1	0V COMMON
12	0V COMMON	2	0V COMMON
13	CH2 +Ve	3	CH2 +Ve
14	CH2 +Ve	4	CH2 +Ve
15	+SENSE CH1	5	-SENSE CH1
16	+SENSE CH2	6	-SENSE CH2
17	CH1 GOOD	7	N/C
18	CH3 +Ve	8	CH3 +Ve
19	0V COMMON	9	0V COMMON
20	CH4 O/P	10	CH4 O/P

T1 & T2 (SEE TOP LEFT)

J3 (GLOBAL OPTION ONLY)

PIN	CONNECTION	PIN	CONNECTION
1	STANDBY -Ve	5	N/C
2	STANDBY +Ve	6	N/C
3	STANDBY -Ve	7	POWER GOOD
4	STANDBY +Ve	8	REM ON/OFF

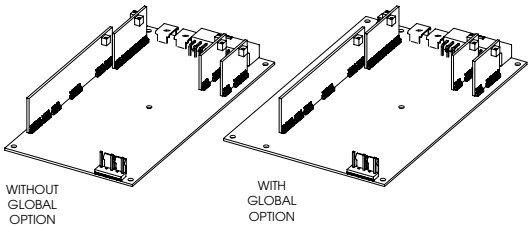
MATING PARTS (MOLEX OR EQUIVALENT)

CONNECTOR	HOUSING	CRIMP PIN
J1	39-01-2205	44476-3112
J2	09-50-8051	08-52-0113
J3	51110-0860	50394
T1 & T2	N/A	TAG 19073-0165

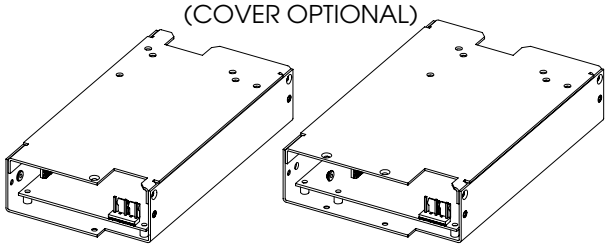
Notes 1. All customer fixings M3 2. Maximum Penetration 4.5mm 3. Maximum torque 0.9Nm 4. All tolerances +/-0.5mm

OUTLINE & CONNECTION DRAWINGS

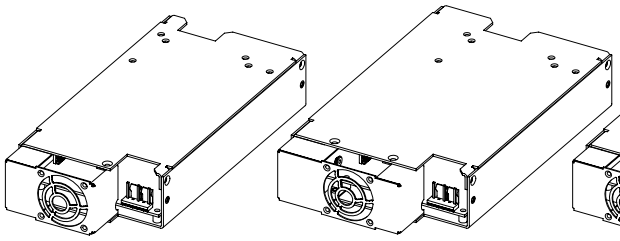
OPEN FRAME



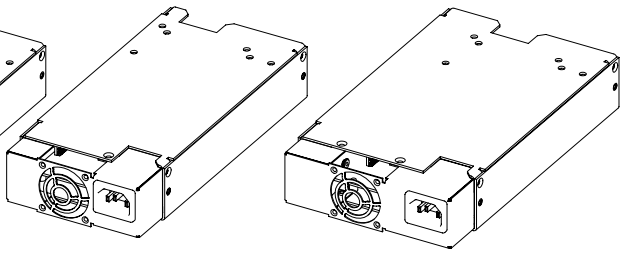
'U' CHANNEL (COVER OPTIONAL)



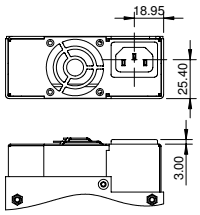
FAN OPTION

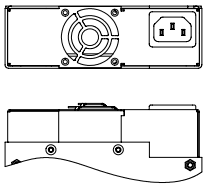


FAN+IEC OPTION

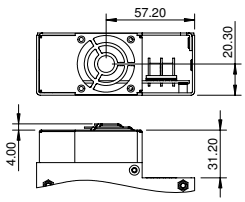


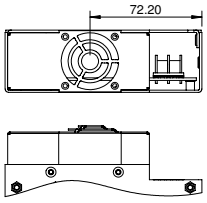
FAN+IEC OPTION



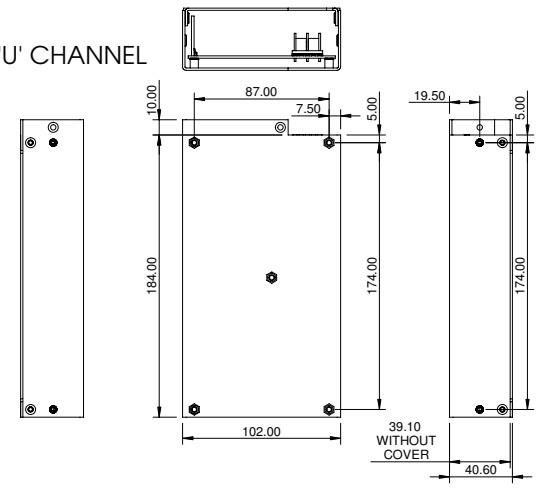


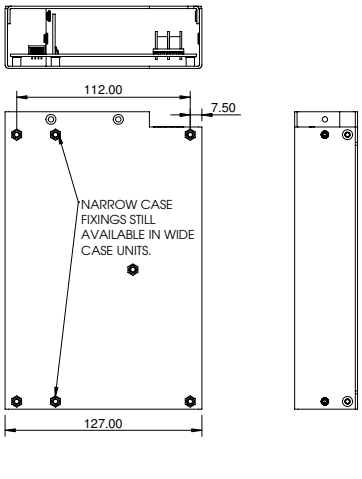
FAN OPTION





'U' CHANNEL





Other dimensions same as cases without fans (above)

Notes 1. All customer fixings M3 2. Maximum Penetration 4.5mm 3. Maximum torque 0.9Nm 4. All tolerances +/-0.5mm

LAMBDA

- High Efficiency
- High Power Density (7.0W/in^3)
- Designed for Distributed Power
- No minimum load
- Fits 1U applications
- Medical Approval
- 3 Year Warranty

NV-Power

350 Watts, Front End Power Solution

Key Market Segments & Applications

Instrumentation
Medical
Automation
Security
Network Servers and Routers
Broadcast
ATE
Industrial Computing
Lifesciences/Laboratory

Features and Benefits

Feature	Benefit
◆ High Efficiency	◆ Minimises heat in system
◆ Low Profile	◆ Fits 1U applications
◆ High Power Density	◆ Less Space

NV350-FEP CONFIGURING

It is possible to create your own NV350-FEP configuration online at www.nv-power.com or by using the guide below.

1. Select required Cooling, Connection and Controls/Signals from the following table:

Output Power	**NF3**	350W				
Cooling	**S**	**S**tandard air - forward				
	R	**R**everse air				
	C	**C**ustomer air - no fan[1]				
Input Connection	**S**	**S**crew				
	I	IEC320[2]				
Leakage Current	**S**	**S**tandard	leakage current:- 130µA max at 120Vac (60Hz), 260µA max at 240Vac (60Hz)[3]			
Primary Option	**ES5V**	ac good,	psu enable,	5V/2A standby		
	ES12V	ac good,	psu enable,	12V/1A standby		
	IS5V	ac good,	psu inhibit,	5V/2A standby		
	IS12V	ac good,	psu inhibit,	12V/1A standby		

NF3	S	S	S	ES5V

1 - Thermocoupled sample recommended to ensure adequate cooling - consult sales
2 - Not with customer air Cooling
3 - Worst case leakage current is less than 300µA at 264Vac, 63Hz Normal Condition (<500µA Single fault condition)

NV350-FEP CONFIGURING

2. Select output required from the Module Table below.
   Example - if you require 12V 29A :-
   a) select FE module and prefix with voltage eg **12FE**

   This will create a complete product description eg **NF3SSSES5V 12FE** which represents a two output NV350-FEP with Forward air, Screw i/p terminals, 300µA Leakage, ac good, PSU enable & 5V/2A aux supply
   Output 1 = 12V / 29.2A with screw terminals
   Output 2 = 12V / 2A with screw terminals
   Max 350W continuous output power

3. Contact Lambda to issue a part number.

OUTPUT MODULE (Type FE)

Output 1			Output 2			Total
Voltage Range	Maximum Current	Maximum Power	Output Voltage	Maximum Current	Maximum Power	Max Output Power
11.5 - 13.2 V	29.2A	350W	12 V	2A	24W	350W

INPUT	
Input Voltage	90-264Vac
Input Frequency	47 - 63 Hz (up to 440Hz with reduced PFC)
Input Harmonics	EN61000-3-2 compliant
Inrush Current	<15A at 25°C and 264Vac (cold start)
Input Fuse	6.3A / 250Vac HBC Fast Acting (not user accessible)
Power Factor	0.97 (typical)
Leakage Current	130µA max at 120Vac (60Hz), 260µA max at 240Vac (60Hz) Worst case leakage current is less than 300µA at 264Vac, 63Hz Normal Condition (<500µA Single fault condition)

OUTPUT		
Voltage / Current	See module tables	
Turn on Time	1.5s max	at 90Vac and 100% rated output power
Rise time	<50ms	to 90% of voltage, monotonic rise above 10%
Efficiency	90%	Typical
Hold up	16ms min	at 90Vac and 100% rated power
Ripple and Noise	<1%	Pk-Pk, using EIAJ test method & 20MHz bandwidth
Voltage Accuracy	<1%	of set voltage (±5% for channel 2)
Remote Sense	Yes	Standard on single o/p + ch1 of dual modules, max 0.5V total line drop
Minimum Load	No	on any output
Temperature Coefficient	<0.02%	of rated voltage per °C
Total Regulation	1%	Including:- Load Regulation for 0-100% load change and Line Regulation for 90-264Vac input change (2% for channel 2)
Transient Response	<4%	of set voltage for 50% load change
Recovery	500µs	for recovery to 1% of set voltage
Over Voltage Protection (ch1)	15 - 16V	
Over Current Protection (ch1)	110 - 150%	of rated current, hiccup mode. Module primary side protected
Short Circuit Protection	Yes	
Over Temperature Protection	Yes	Cycle ac off/on to reset Shutdown temperature varies according to ambient, o/p power & i/pV

ISOLATION			
Input to Output	Reinforced	4.3kV (dc)	Note: Basic for IEC/EN/UL/CSA60601-1
Input to Earth	Basic	2.3kV (dc)	
Output to Earth		200V (dc)	

SIGNALS - Standard	
Ch1 Good	Open collector output, (emitter connected to Ch1 0V) 'On' indicates output is within 90% (±5%) of nominal
Ch1 Remote Sense - Ch1 Remote Sense +	Connections for remote sense. Up to 0.5V total line drop can be compensated. If remote sense is not required, do not connect either 'Sense -' or 'Sense +'

GLOBAL INTERFACE SIGNALS - with Primary Option	
AC good collector AC good emitter	Uncommitted optocoupler. Turns on typically 5ms after ac is good and off typically 5ms before any channel falls below 95% of nominal
ES & IS Logic 0	TTL low enables (ES) or inhibits (IS) the entire psu including fan (except standby)
ES & IS Logic 1	TTL high enables (ES) or inhibits (IS) the entire psu including fan (except standby)
Standby Supply	5V / 2A (2.5A peak) or 12V / 1A (1.2A peak)

ENVIRONMENT	
Temperature	0° to 50° operational, -40° to 85°C storage (max 12 months)
Derating	50°C to 70°C derate each output and total output power by 2.5% per °C
Low Temperature Start-up	-20°C
Humidity	5-95% RH non condensing
Shock	±3 x 30*g* shocks in each plane, total 18 shocks 30*g* shock = 11ms (±0.5ms), half sine conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, JIS C0041-1987.
Vibration	Single axis 10 - 500Hz at 2*g* (sweep and endurance at resonance) in all 3 planes
Altitude	3,000 metres operational (15,000 metres non operational)
Pollution	Degree 2, Material group IIIb

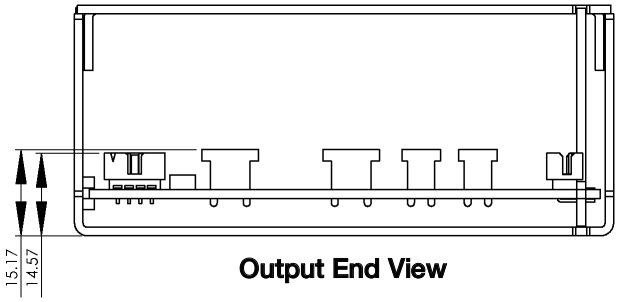
IMMUNITY EN61000-6-2:2005, EN60601-1-2:2001			Criteria	
Electrostatic Discharge	EN61000-4-2	Level 4	Air discharge 15kV Contact discharge 8kV	A
Electromagnetic Field	EN61000-4-3	Level 3	tested to 12V/m	A
Fast / Burst Transient (ac Input)	EN61000-4-4	Level 4	tested to 4.4kV	A
Fast / Burst Transient (dc Output)	EN61000-4-4	Level 4	tested to 2.2kV	A
Surge Immunity	EN61000-4-5	Level 3	Common mode to 2.2kV Differential mode to 1.1kV	A
Conducted RF Immunity	EN61000-4-6	Level 3	tested to 12V	A
Power Frequency Magnetic Field	EN61000-4-8	Level 4	Tested to 30A/m, 50/60Hz	A
Voltage Dips, Variation, Interruptions	EN61000-4-11	Class 3	Criteria B for 5 sec interruption	A
Voltage Fluctuations	EN61000-4-14	Class 3	For 100 - 240V Nominal	A

SAFETY APPROVALS					
	Date	Amendments		Date	Amendments
EN 60950-1	2006		EN 61010-1	2001	
UL 60950-1	2003		IEC 61010-1*	2001	
CSA22.2 No 60950-1	2003		IEC 60601-1*	1988	A1, A2
IEC60950-1*	2001		EN 60601-1[a]	1990	A1, A2, A13
CE Mark	LV Directive 2006/95/EC (EN60950-1)		UL 60601-1	2003	with revisions 2006

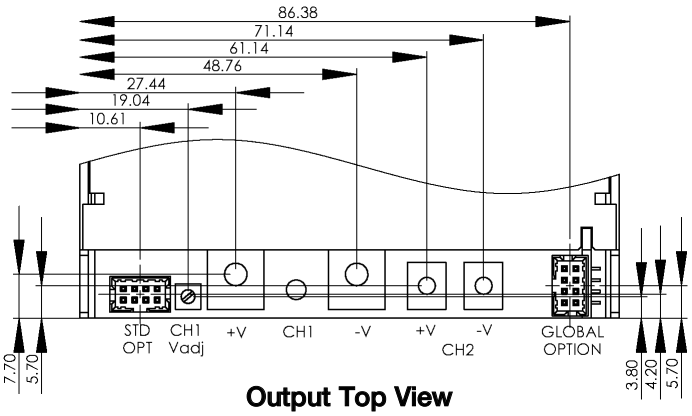
* CB Certificate and report available on request
a - Not applicable to IEC320 input version

EMISSIONS EN61000-6-3:2001, EN60601-1-2:2001		
Radiated Electric Field	EN55011, EN55022	(as per CISPR.11/22) Class B, FCC47 part 15 subpart B (2005) see application note for details
Conducted Emissions	EN55011, EN55022	(as per CISPR.11/22) Class B, FCC47 part 15 subpart B (2005)
Conducted Harmonics	EN61000-3-2	Class A
Flicker	EN61000-3-3	Compliant - d_{max} only.

OUTPUT CONNECTIONS



Output End View

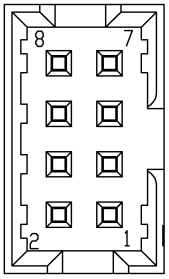


Output Top View

Connection Guidelines

Ring Tags: Up to 50A. AMP PIDG terminals
Red: M3 36151, M4 320551, M5 130660
Blue: M3 320561, M4 320560, M5 130663
Yellow: M4 320568, M5 130167
Crimp tool: 16900 Die set 169404

Signal Connection



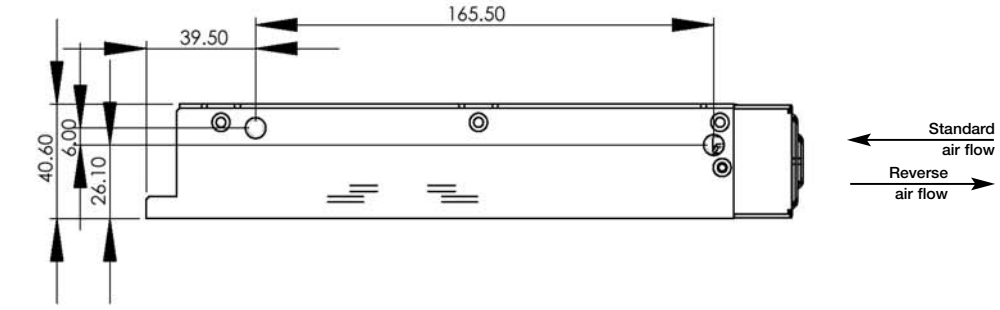
Housing: Molex 51110-0860
Crimp pin: 50394
Hand crimp tool: 69008-0959

Standard Signals

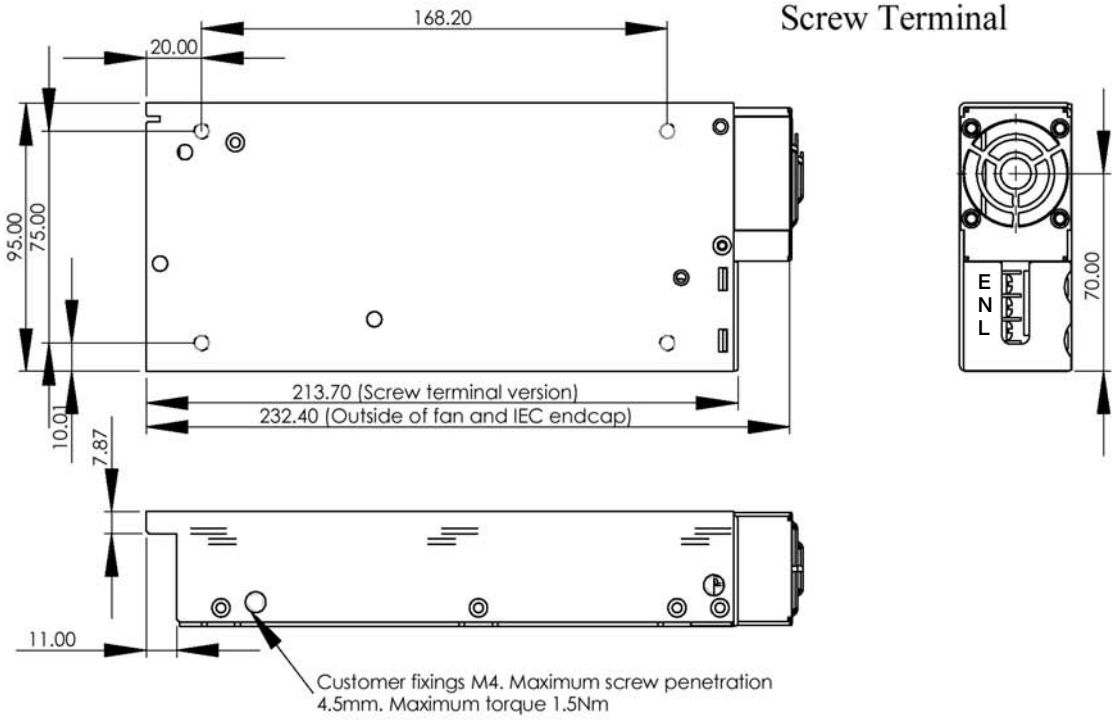
1	Do not connect
2	Do not connect
3	Do not connect
4	Do not connect
5	Ch1 0V
6	Ch1 Output Good
7	Ch1 Remote Sense –
8	Ch1 Remote Sense +

Primary Option Signals

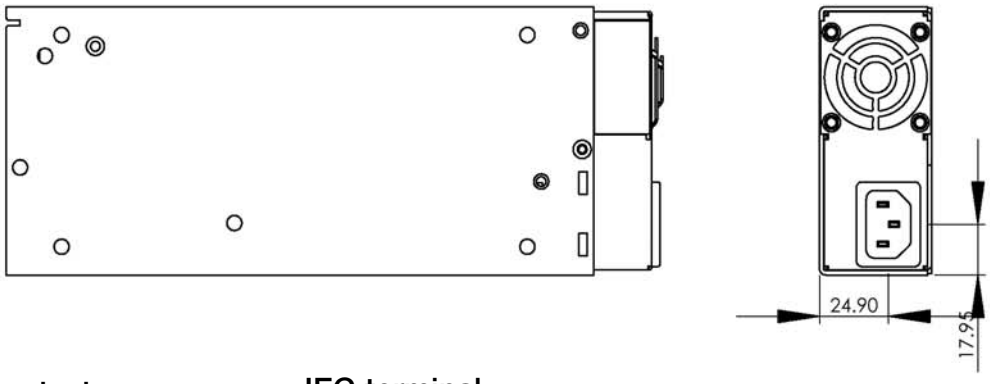
1	+V Standby
2	0V Standby
3	ES & IS Logic 1
4	ES & IS Logic 0
5	Do not connect
6	Do not connect
7	AC Good Collector
8	AC Good Emitter



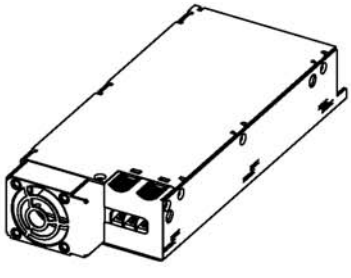
Screw Terminal



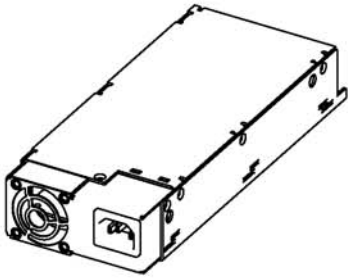
IEC Inlet



Screw terminal



IEC terminal



NOTES
1) Tolerances:
Edge to edge/Edge to centre, +/-0.5
Centre to centre +/-0.2

LAMBDA

- High Efficiency
- High Power Density (up to 12W/in^3)
- Up to 8 outputs (6 for 350W)
- No minimum load
- Fits 1U applications
- Medical Approval
- 3 Year Warranty

NV-Power

350 / 960 Watts, Modular power solution

Key Market Segments & Applications

Instrumentation
Medical
Automation
Security
Network Servers and Routers
Broadcast
ATE
Industrial Computing
Lifesciences/Laboratory

Features and Benefits

Feature	Benefit
◆ High Efficiency	◆ Minimises Heat in System
◆ Low Profile	◆ Fits 1U Applications
◆ High Power Density	◆ Less Space

NV350 / NV700 CONFIGURING

The extensive range of output modules and options make it possible to achieve almost any combination of Volts and Amps. You can create your own NV350 or NV700 configuration online at **www.nv-power.com**. This method checks your configuration and offers the optimum solution. Alternatively, you can do this manually by using the guide below.

1. Calculate total output power to ensure power requirements within 350W or 960W, then select required Cooling, Connection and Controls/Signals from the following table:

Output Power	**NV3** 350W **NV7** 960W					
Cooling	**S**	**S**tandard air - forward				
	R	**R**everse air$_4$				
	C	**C**ustomer air - no fan$_1$				
Input Connection	**S**	**S**crew				
	I	IEC320$_2$				
Leakage Current	**S**	**S**tandard	leakage current:- 130µA max at 120Vac (60Hz), 260µA max at 240Vac (60Hz)$_5$			
Primary Option$_3$	**ES5V**	ac good,	psu enable,	5V/2A standby		
	ES12V	ac good,	psu enable,	12V/1A standby		
	IS5V	ac good,	psu inhibit,	5V/2A standby		
	IS12V	ac good,	psu inhibit,	12V/1A standby		
	EN5V	ac good,	psu enable,	5V/2A standby,	global module good	
	EN12V	ac good,	psu enable,	12V/1A standby,	global module good	
	IN5V	ac good,	psu inhibit,	5V/2A standby,	global module good	
	IN12V	ac good,	psu inhibit,	12V/1A standby,	global module good	

NV3	S	S	S	EN5V

1 - Thermocoupled sample recommended to ensure adequate cooling - consult sales
2 - Not with customer air Cooling
3 - The Primary Option uses 1 slot
4 - Not with NV7
5 - Worst case leakage current is less than 300µA at 264Vac, 63Hz Normal Condition (<500µA Single Fault Condition)

NV-POWER CONFIGURING

2. Select Output Modules from the Module Tables below ensuring that no more that 6 slots (NV-350) or 8 slots (NV-700) in total are used.
   Example - if you require 5.2V 40A :-
   a) Select B as closest match for voltage & current and prefix with voltage eg **5.2B**
   b) Repeat for other outputs.

   This will create a complete product description eg **NV3SSSES5V 5.2B 12/15DB** which represents a three output NV350 with Forward air cooling, Screw input terminals, standard leakage filter, ac good, PSU enable & 5V/2A aux supply
   Output 1 = 5.2V / 40A
   Output 2 = 12V / 13A with screw terminals
   Output 3 = 15V / 4A with screw terminals
   Max 350W continuous output power
3. Contact Lambda to validate configuration and issue a part number.

DUAL OUTPUT MODULES

Module Code: DB Slots: 2

Output 1 Voltage Range	Output 1 Current	Output 2 Voltage Range	Output 2 Current	Max Power
3.2 - 3.6	25A	3.3 - 5.5	10A	55W
		7 - 15	5A	60W
		24 - 32	2A	50W
4.75 - 5.5	25A	3.3 - 5.5	10A	55W
		7 - 15	5A	60W
		24 - 32	2A	50W
12 - 15	13A[4]	3.3 - 5.5	10A	55W
		7 - 15	5A	60W
		24 - 32	2A	50W
24 - 28	7A[5]	3.3 - 5.5	10A	55W
		7 - 15	5A	60W
		24 - 32	2A	50W

DUAL OUTPUT MODULE

Module Code: DA Slots: 1 (one per power supply)

Output 1 Voltage	Output 1 Current	Output 2 Voltage	Output 2 Current
12	3A	-12	1A

SINGLE OUTPUT MODULES

Module Code	Slots	Voltage Range	Current
B	2	3.2 - 3.6	40A
		4.75 - 5.5	40A[1]
BH	2	12 - 15.5	20A[2]
		24 - 28	10A[3]

1. for NV3 - derate linearly from 40A at 5.2V to 36A at 5.5V
   for NV7 - derate linearly from 40A at 5V to 36A at 5.5V
2. for NV3 - derate linearly from 20A at 13.2V to 16.5A at 15.5V
   for NV7 - derate linearly from 20A at 12.5V to 15.5A at 15.5V
3. for NV3 - derate linearly from 10A at 25.7V to 8.5A at 28V
   for NV7 - derate linearly from 10A at 24V to 8.5A at 28V
4. derate linearly from 13A at 12.5V to 10A at 15.5V
5. derate linearly from 7A at 25V to 6A at 28V

INPUT

Input Voltage	90-264Vac		Input Frequency	47 - 63 Hz (up to 440Hz with reduced PFC)	
Input Harmonics	EN61000-3-2 compliant		Power Factor	0.97 typical	
Inrush Current	NV-350 <15A	at 25°C and	Input Fuse	NV-350 6.3A	250Vac HBC Fast Acting
	NV-700 <40A	264Vac (cold start)		NV-700 16A	(not user accessible)
Leakage Current	130µA max at 120Vac (60Hz), 260µA max at 240Vac (60Hz) Worst case leakage current is less than 300µA at 264Vac, 63Hz (Normal Condition, <500µA Single Fault Condition)				

OUTPUT

Maximum Output Power	NV7 = 960W NV3 = 350W	700W below 150Vac input NV3 Reverse air = 250W
Voltage / Current	See module tables	
Turn on Time	1.5s max	at 90Vac and 100% rated output power
Rise time	<50ms	to 90% of voltage, monotonic rise above 10%
Efficiency	up to 90%	configuration dependent
Hold up	16ms min	at 90Vac and 100% rated power (12ms for NV-700 above 700W output power)
Ripple and Noise	<1%	pk-pk, using EIAJ test method & 20MHz bandwidth
Voltage Accuracy	<1%	of set voltage (±5% for channel 2) (DA module: +5/-1% for channel 1, +2/-3.5% for channel 2)
Remote Sense	Yes	standard on single o/p + ch1 of dual modules, max 0.5V total line drop (DA module: None)
Minimum Load	No	on any output (DA module: 150mA on channel 1)
Temperature Coefficient	<0.02%	of rated voltage per °C
Load Regulation	<1%	for 0-100% load change (<2% for channel 2) (DA module: <3%)
Line Regulation	<0.1%	for 90-264Vac input change
Cross Regulation	<0.1%	for 100% load change on any output (DA module: 0.2% for channel 1, 3% for channel 2)
Transient Response	<4%	of set voltage for 50% load change
Recovery	500µs	for recovery to 1% of set voltage (DA module: 1000µs)
Over Voltage Protection	Yes	
Over Current Protection (singles)	110 - 150%	of module current. Hiccup mode. Module primary side protected
Power Limit (duals)	110 - 150%	of max Power ch1 + ch2. Hiccup mode. Module primary side protected (DA module: 110-220% for channel 1, 110 - 170% for channel 2)
Short Circuit Protection	Yes	
Over Temperature Protection	Yes	cycle ac off/on to reset Shutdown temperature varies according to ambient, output power & input Voltage.

ISOLATION			
Input to Output	Reinforced	4.3kV (dc)	Note: Basic for IEC/EN/UL/CSA60601-1
Input to Earth	Basic	2.3kV (dc)	
Output to Earth		200V (dc)	

SIGNALS - Standard	
Ch1/Ch2 Module Good	Open collector output. 'On' indicates output is within 90% (±5%) of nominal
Module Inhibit	TTL logic high inhibits the output (both outputs for duals) of the module
Ch2 On/Off (duals only)	TTL logic low inhibits output 2 of the module
	All signals referenced to 0V of channel

GLOBAL INTERFACE SIGNALS - with Primary Option	
AC good collector AC good emitter	Uncommitted optocoupler. Turns on typically 5ms after ac is good and off typically 5ms before any channel falls below 95% of nominal
Global module good collector Global module good emitter	Uncommitted optocoupler. Turns on typically 200ms after all outputs are within 90% (±5%) of nominal and off typically 5ms before any channel falls below 90% (±5%) of nominal. Do not connect for ES and IS type primary option.
EN/ES & IN/IS Logic 0	TTL low enables (EN or ES) or inhibits (IN or IS) the entire psu including fan (except standby)
EN/ES & IN/IS Logic 1	TTL high enables (EN or ES) or inhibits (IN or IS) the entire psu including fan (except standby)
Standby Supply	5V / 2A (2.5A peak) or 12V / 1A (1.2A peak)

ENVIRONMENT	
Temperature	0° to 50° operational, -40° to 85°C storage (max 12 months)
Derating	50°C_a to 70°C derate total output power and each output current by 2.5% per °C
Low Temperature Start-up	-20°C
Humidity	5-95% RH non condensing
Shock	±3 x 30*g* shocks in each plane, total 18 shocks 30*g* shock = 11ms (±0.5ms), half sine conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, JIS C0041-1987.
Vibration	Single axis 10 - 500Hz at 2*g* (sweep and endurance at resonance) in all 3 planes
Altitude	3,000 metres operational (15,000 metres non operational)
Pollution	Degree 2, Material group IIIb
a - 45°C for NV7 with input voltage below 100Vac	

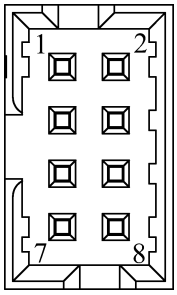
IMMUNITY EN61000-6-2:2005, EN60601-1-2:2001				Criteria
Electrostatic Discharge	EN61000-4-2	Level 4	Air discharge 15kV Contact discharge 8kV	A
Electromagnetic Field	EN61000-4-3	Level 3	(12V/m)	A
Fast / Burst Transient (ac input)	EN61000-4-4	Level 4	(tested to 4.4kV)	A
Fast / Burst Transient (dc output)	EN61000-4-4	Level 4	(tested to 2.2kV)	A
Surge Immunity	EN61000-4-5	Level 3	Common mode - 2.2kV Differential - 1.1kV	A
Conducted RF Immunity	EN61000-4-6	Level 3	(12V)	A
Power Frequency Magnetic Field	EN61000-4-8	Level 4	(30A/m)	A
Voltage Dips, Variations, Interruptions	EN61000-4-11	Class 3	Criteria B for 5 sec interruption	A
Voltage Fluctuations	EN61000-4-14	Class 3	For 100 - 240V Nominal	A

SAFETY APPROVALS					
	Date	Amendments		Date	Amendments
EN 60950-1	2006		EN 61010-1	2001	
UL 60950-1	2003		IEC 61010-1*	2001	
CSA22.2 No 60950-1	2003		IEC 60601-1*	1988	A1, A2
IEC 60950-1*	2005		EN 60601-1	1990	A1, A2, A13
CE Mark	LV Directive 2006/95/EC (EN60950-1)		UL 60601-1	2003	with revisions 2006
* CB Certificate and report available on request			Please check with Technical Sales for status of approvals		

EMISSIONS EN61000-6-3:2001, EN60601-1-2:2001		
Radiated Electric Field	EN55011, EN55022	(as per CISPR.11/22) Class B, FCC47 part 15 subpart B (2005) see app note for details
Conducted Emissions	EN55011, EN55022	(as per CISPR.11/22) Class B, FCC47 part 15 subpart B (2005)
Conducted Harmonics	EN61000-3-2	Class A
Flicker	EN61000-3-3	Compliant - d_{max} only

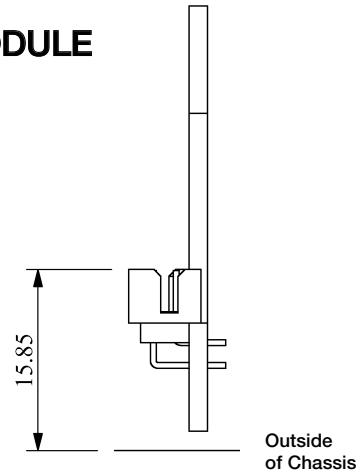
PRIMARY OPTION / DA MODULE

DA Module
1 +12V (channel 1)
2 +12V (channel 1)
3 +12V (channel 1)
4 0V (common ch1 / ch2)
5 0V (common ch1 / ch2)
6 0V (common ch1 / ch2)
7 -12V (channel 2)
8 -12V (channel 2)



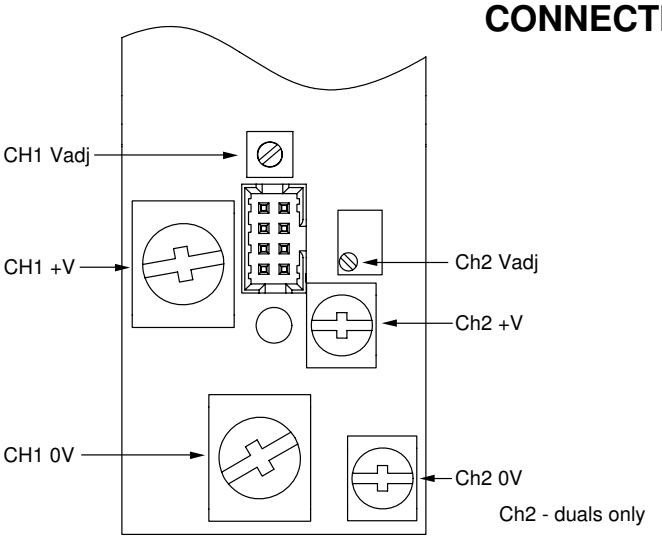
Primary Option
1 +V Standby
2 0V Standby
3 EN/ES & IN/IS Logic 1
4 EN/ES & IN/IS Logic 0
5 Global Module Good Collector
6 Global Module Good Emitter
7 AC good Collector
8 AC good Emitter

Housing: Molex 51110-0860
Crimp pin: 50394
Hand crimp tool: 69008-0959

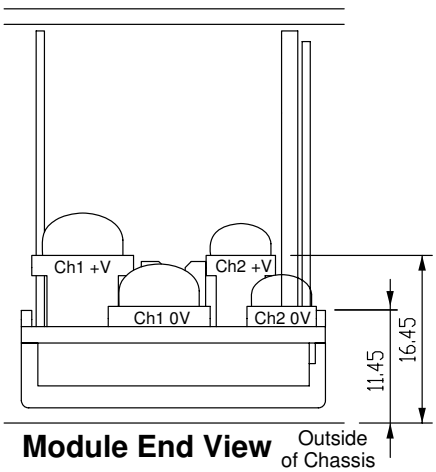


Option End View

OUTPUT CONNECTIONS



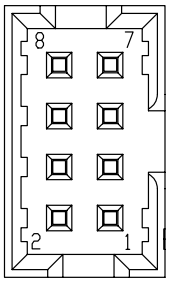
Module Top View



Module End View

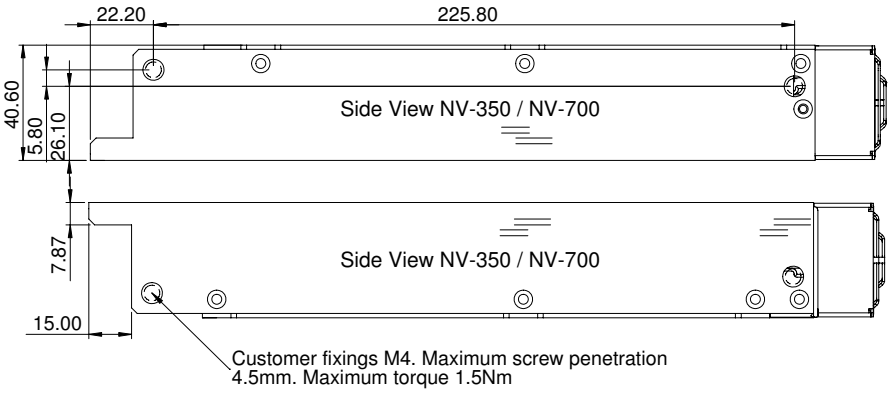
Connection Guidelines

Ring Tags: Up to 50A, AMP PIDG terminals
Red: M3 36151, M4 320551, M5 130660
Blue: M3 320561, M4 320560, M5 130663
Yellow: M3 M4 320568, M5 130167
Crimp tool: 16900 Die set 169404

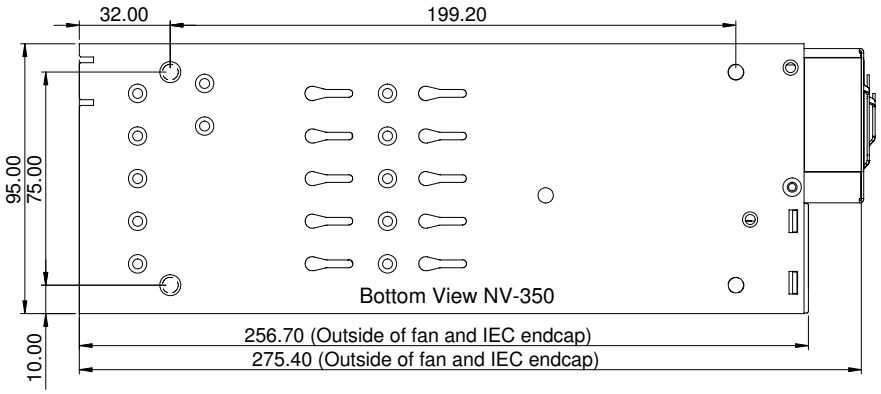


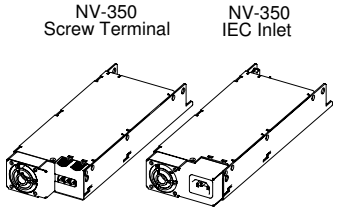
Signals
1 Ch2 0V
2 Ch2 Output Good
3 Ch2 On/Off
4 Module Inhibit
5 Ch1 0V
6 Ch1 Output Good
7 Ch1 Remote Sense -
8 Ch1 Remote Sense +

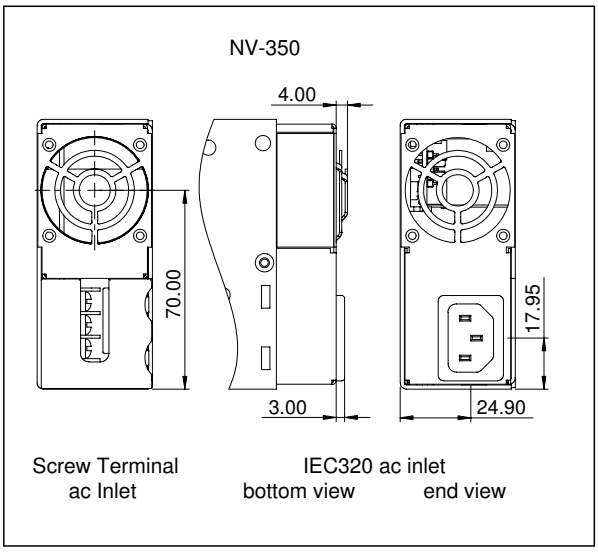
Housing: Molex 51110-0860
Crimp pin: 50394 Hand crimp tool: 69008-0959
Note: Do not connect pins 1-3 on single output modules

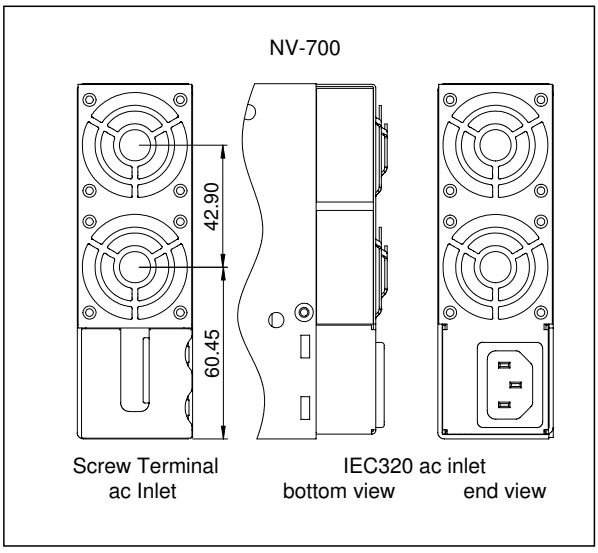


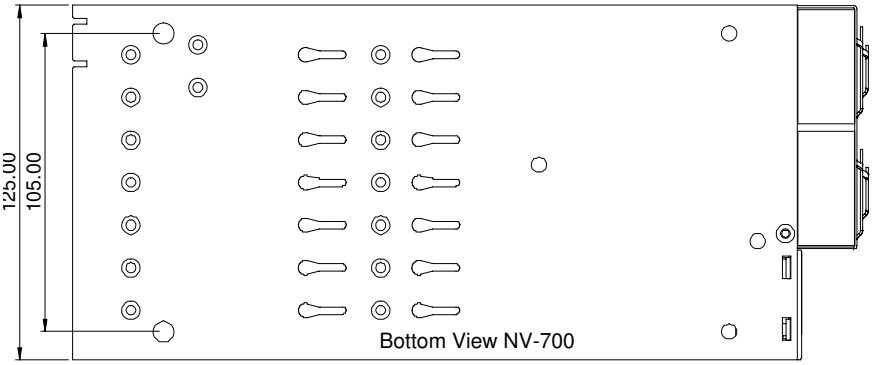
NOTES
1) Dimensions in mm
2) Tolerances:
Edge to edge/Edge to centre, +/-0.5
Centre to centre +/-0.2

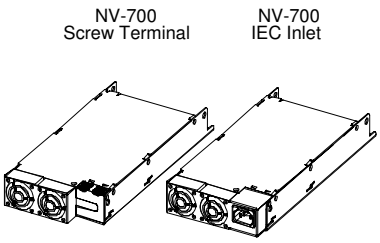












LAMBDA

- Suitable for use in Custom Power Supplies
- Provides high voltage DC to Lambda's PH Power Modules
- Parallel operation on PF Series
- 12.7mm profile

PF Series

Rectifier & Power factor Correction Modules

PF Features and Benefits

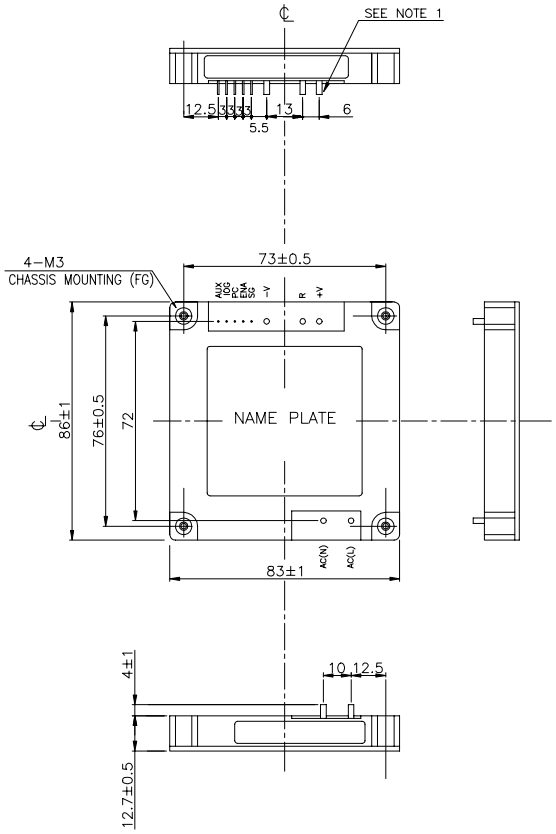
Features	Benefits
◆ Low profile	◆ Assist system integration
◆ Parallel	◆ For higher power or N+1 operation
◆ Power Factor corrected (PF)	◆ Supports Global Use
◆ Operation up to 85°C	◆ Operates in harsh environments

Specifications

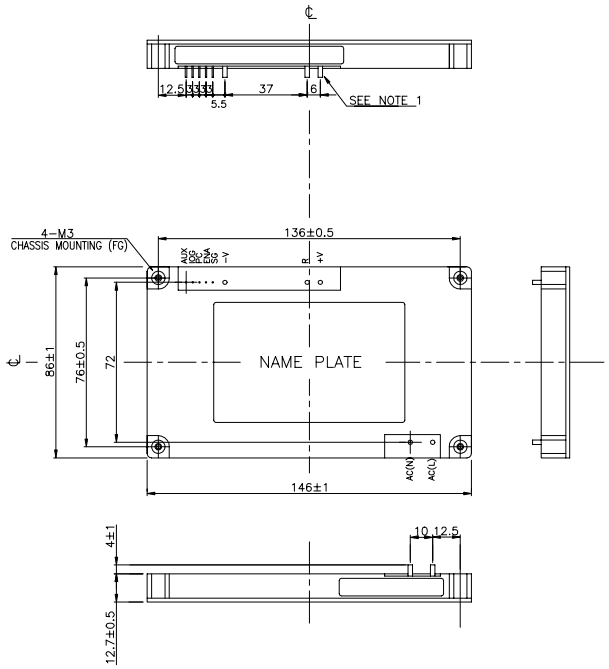
Items	-	PF500A-360	PF1000A-360
AC Input Voltage range & Frequency	VAC	85-265 wide range	
Input Frequency	-	47 - 63Hz	
Output Voltage	VDC	360	
Output Power at 100/200VAC	W	504/756W	1008/1512W
Load Regulation	-	10V	
Line Regulation	-	5V typical	
Inrush Current	A	External pins provided connection for in rush resistor	
Efficiency (typ) at full load	%	90% (100VAC), 95% (200VAC)	
Power Factor	-	Meets EN61000-3-2 (0.95 typical)	
Overcurrent Protection	-	Converter shutdown	
Overvoltage Protection	V	390 - 400VDC, manual reset	
Thermal Shutdown	-	Shuts down Inverter, manual reset	
AC Fail Signal	-	-	
Inverter Good Signal	-	Yes, when inverter is operating correctly	
Enable Signal	-	Signal provided to enable "PH" DC-DC converters	
Parallel Connection	-	Single wire current share	
Auxiliary Output Voltage	-	Yes - see installation manual	
Operating Baseplate Temperature	°C	-20 to +85°C (no derating)	
Storage Temperature	°C	-40 to +85	
Cooling	-	Conduction (see installation manuals for heatsinks)	
Withstand Voltage	-	Input - Ground 3kVAC for 1 min	
Safety Agency Approvals	-	UL1950, CSA22.2 No.234, EN60950, & CE Mark	
Weight	g	130	200
Size (WxHxD)	mm	See outline line drawings	
Warranty	-	Two Years	

Notes: (Consult Installation Manual for detailed specifications, test methods and application notes)

PF500A Outline Drawing



PF1000A Outline Drawing



LAMBDA

- Low Profile, Small Size
- 100°C Baseplate Temperature
- High Power Density
- High Efficiency

Key Market Segments & Applications

Custom Fanless Power Supplies

LED Signs Traffic Signalling Toll Equipment

Bulk DC Power for DC-DC Converters & POL Converters

PFE300-700 Series

300 to 714W Full Brick AC-DC Power Supply

PFE300-700 Features and Benefits

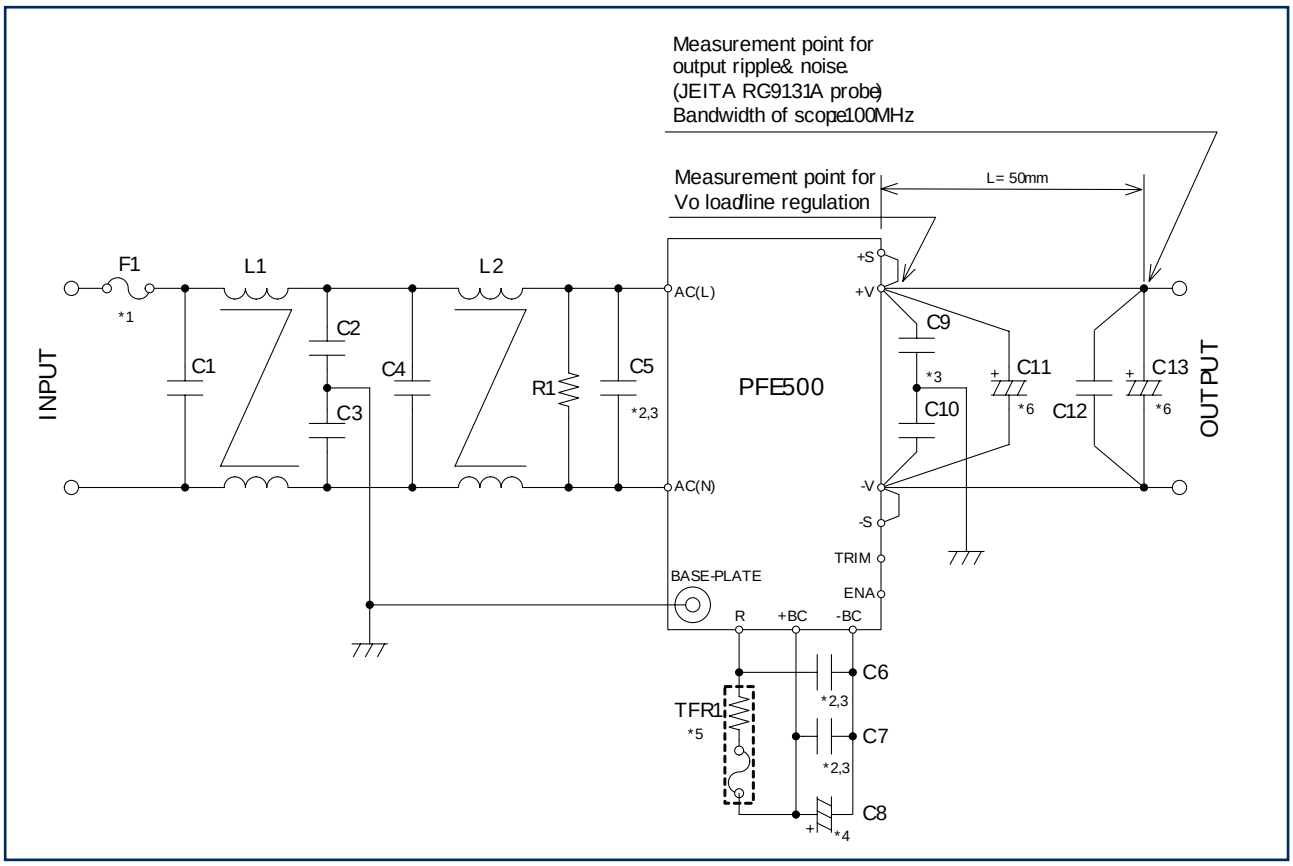
Features	*Benefits*
• Low Profile	• Assists System integration
• High Efficiency	• Easier to Cool
• Power Factor Corrected (PFC)	• Supports Global Use
• Operation up to 100°C Baseplate	• Operates in Harsh Environments

Specifications

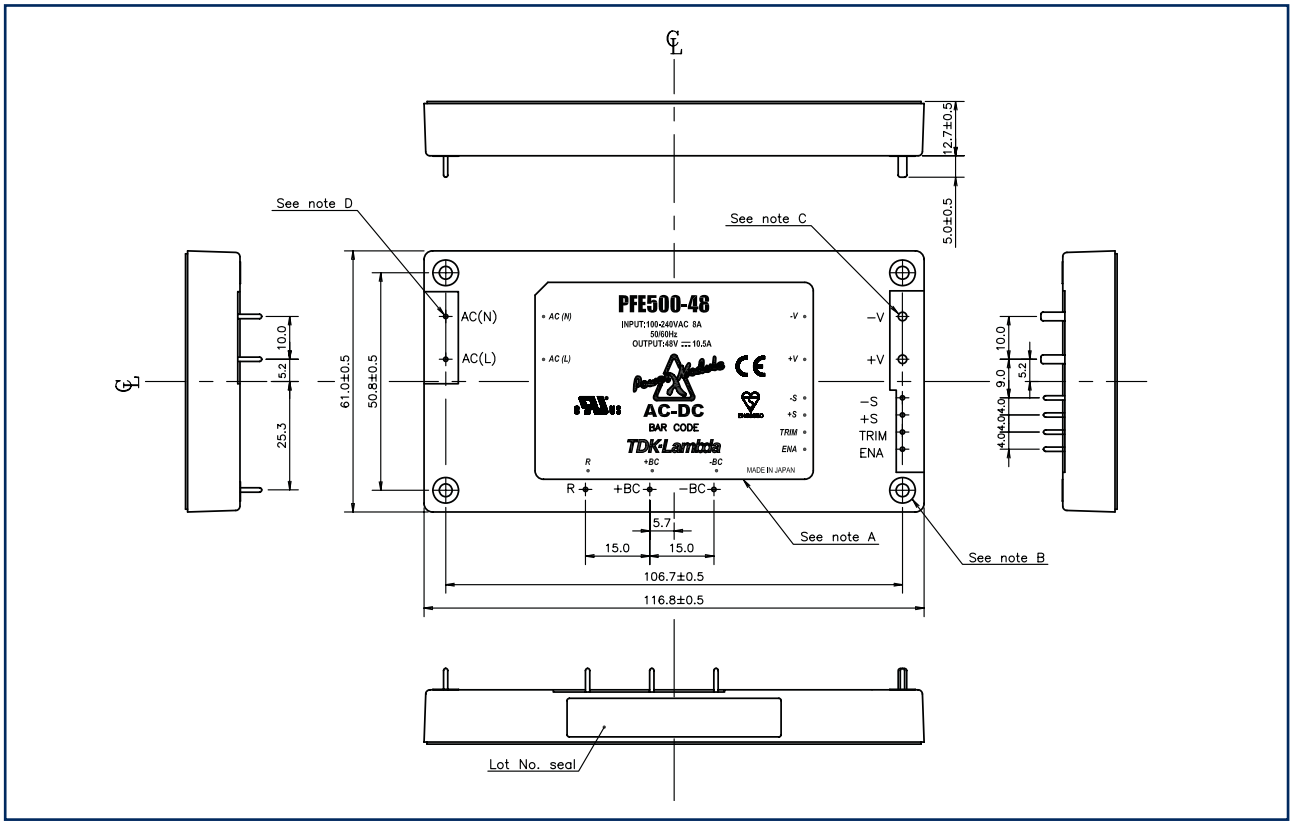
ITEMS \ MODEL		PFE300-12 PFE500-12	PFE300-28 PFE500-28	PFE300-48 PFE500-48	PFE700-48
AC Input	VAC	85 to 265VAC, 47-63Hz			
Input Current (100/220VAC)	A	4.0 / 2.0	4.0 / 2.0	4.0 / 2.0	8.8 / 4.4
		5.0 / 3.0	6.2 / 3.2	6.2 / 3.2	
Inrush Current (100/200VAC)(1)	A	20 / 40 peak			
Power Factor		0.95 minimum			
Output Voltage (Nominal)	VDC	12V	28V	48V	51V
Output Voltage Setpoint Accuracy	-	±2%			±1V
Output Current	A	25	10.8	6.3	14
		33	18	10.5	
Output Power	W	396	504	504	714
Output Voltage adjustment	VDC	9.6 - 14.4V	22.4 - 33.6V	38.4 - 57.6V	Fixed
Ripple and Noise (1)	mV	120	280	480	4000
Line regulation	mV	48	56	96	-
Load regulation	mV	48	56	96	-
Total Regulation	V	-	-	-	50 - 57
Over Current Protection	%	105 - 140% (Automatic Recovery)			
Over Voltage Protection	-	125 - 145%			60 - 69.6V
Parallel Operation	-	No			Yes
Power On Signal (ENA)	-	Open collector (10mA sink current). Low (on) when output is present			
Efficiency (200VAC typ)	%	83	86	86	89
Operating Baseplate Temperature	°C	-40 to +100°C (2)	-40 to +100°C (2)		See derating curves
		-40 to +85°C (2)			
Storage Temperature	°C	-40 to +100°C			
Humidity (non condensing)	-	Operating: 20 - 95%RH, Non Operating: 10 - 95%RH			
Cooling	-	Conduction			
Withstand Voltage	-	Input to Output 3kVAC, Input to Baseplate 2.5kVAC, Output to Baseplate 1.5kVDC			
Isolation Resistance	-	Output to baseplate: 100M Ohm at 500VDC, 25oC ambient, 70%RH			
Vibration (non operating)	-	10-55Hz (1 min sweep), constant amplitude 0.825mm (max 49m/s²), X, Y, Z 1 hour each			
Shock	-	196.1m/s²			
Safety Agency Approvals		UL60950-1, CSA60950-1 (cUL), EN60950-1, CE mark (LVD)			
Weight	g	250			
Size (WxHxD)	mm(in)	61 x 12.7 x 116.8mm (2.4 x 0.5 x 4.6)			
Warranty	yrs	2 years			

Notes: (Consult Installation Manual for detailed specifications, test methods and application notes)
1) External components are required, consult Application Notes 2) Full load, no derating required

PFE500 Basic connection

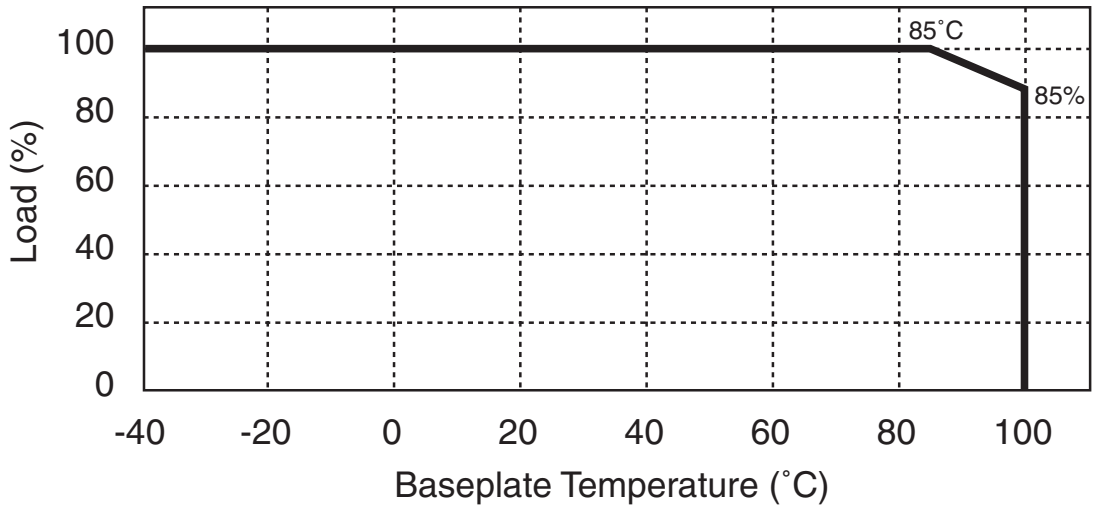


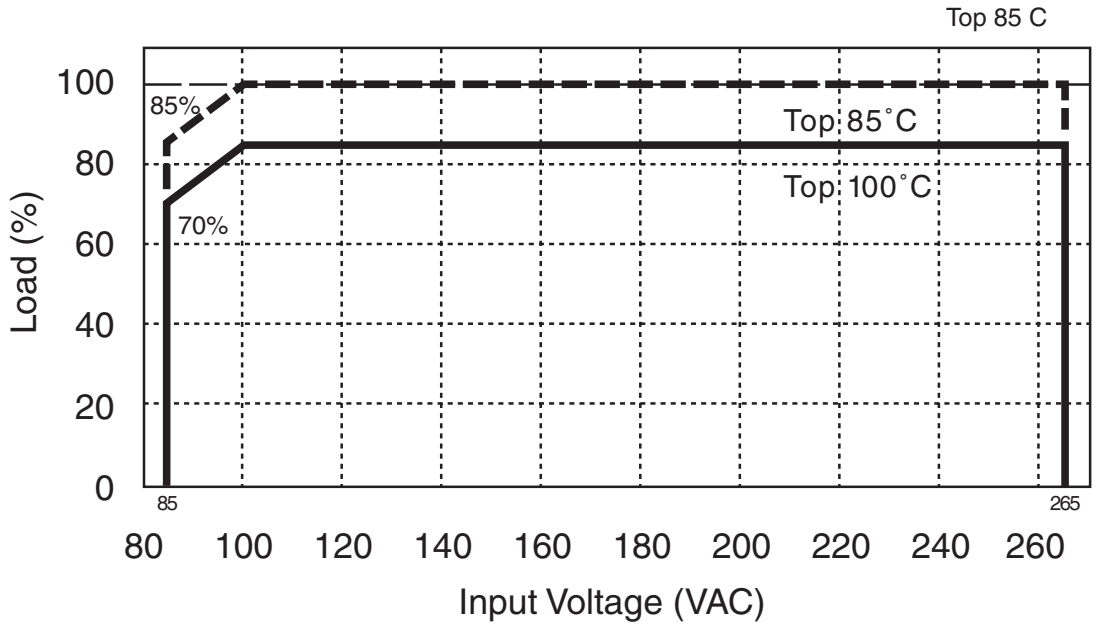
Outline Drawing



PFE700-48 Derating Curve

Derating Curve





LAMBDA

RKE Series

1.5kw Single Output Industrial Power Supplies

- 5 Year Warranty
- Wide Remote Adjustment Range
- SEMI F47 Compliant (high line AC)
- Universal Input (85 - 265VAC)
- High Efficiency
- RoHS Compliant Design

Key Market Segments & Applications

Factory Automation:
Test & Measurement:
Automated Service
Broadcast and Communications
Display Systems
Semiconductor Manufacturing Equipment

RKE Features and Benefits

Features	*Benefits*
• 5 Year Warranty	• Lower Cost of Ownership
• High Efficiency	• Low Energy Loss
• Wide Range AC Input	• Supports Global Use

Specifications

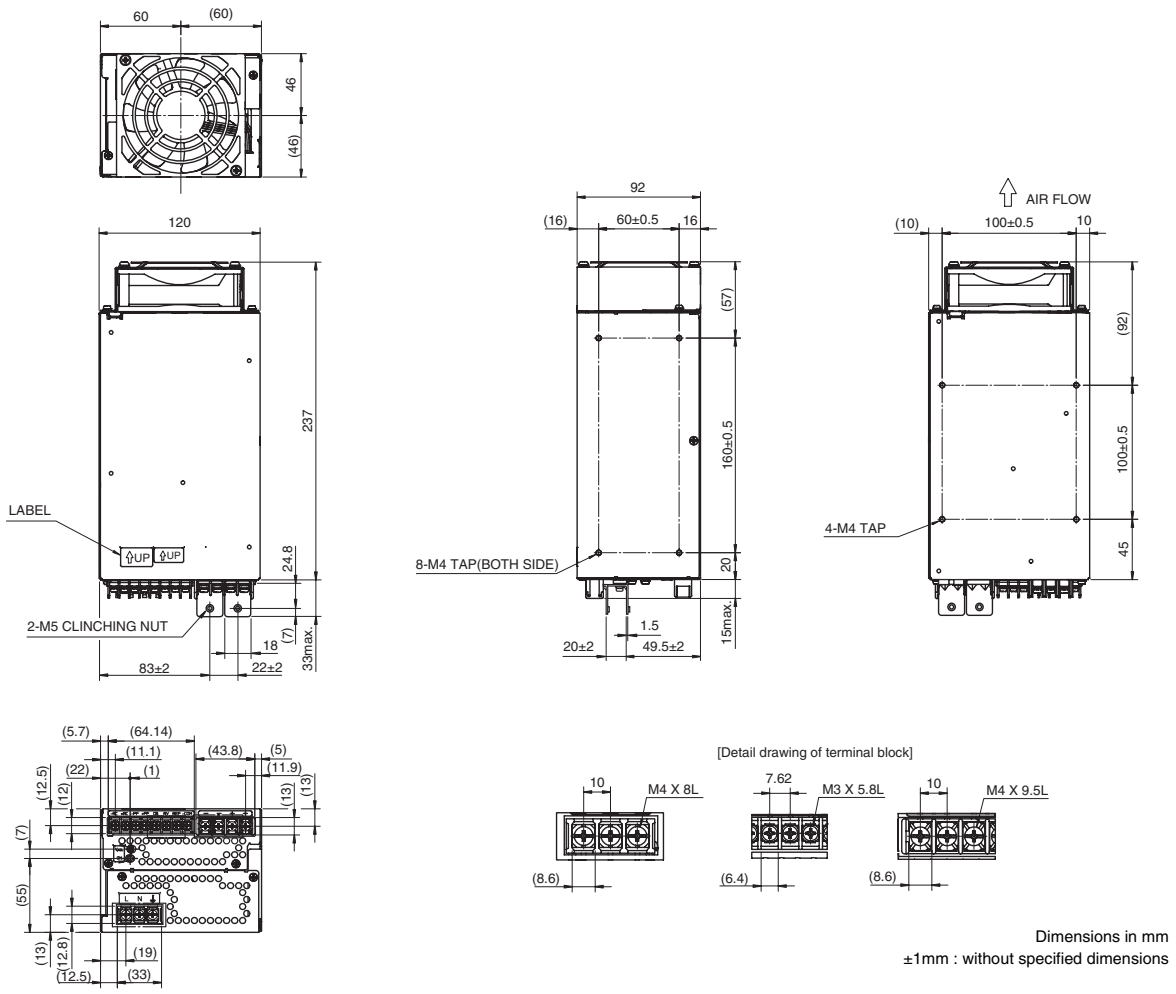
ITEMS \ MODEL		RKE 24-50R	RKE 36-42R	RKE 48-32R
Input Voltage range	-	85 - 265VAC (47 - 66Hz)		
Input Current (Typ) 100/240VAC	A	12/8	13/10	13/10
Power Factor	-	0.95 Typical		
Overcurrent Protection	A	52.5 to 57.5	44.1 to 48.3	33.6 to 36.8
Overvoltage Protection	V	32 to 36.4	56 to 60	56 to 60
Hold Up Time (Typ)	ms	30	17	17
Leakage Current	mA	0.75 max at 230VAC 50Hz		
Remote Sense	-	No		
Indicator	-	Green LED = ON		
Remote on/off	-	Yes		
Parallel operation	-	Yes		
Remote Adjust (RV)		70-130%	17-153%	70-115%
Operating Temperature	-	-10°C to +65°C (See derating curve)		
Storage Temperature	-	-30 to +75°C		
Humidity (non condensing)	-	10 - 95%RH		
Cooling	-	Internal fan		
Withstand Voltage	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.		
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC		
Vibration 5-10Hz	-	All amplitude 10mm (3 directions, each 1h, sweep time 10min, non-operation)		
Vibration 10-200Hz	-	Acceleration 19.6m/s^2 (2G) (3 directions, each 1h, sweep time 10mins non-operation)		
Shock - Acceleration	-	294m/s^2 (30G) 3 directions, each 3 times, non-operation)		
Shock - Pulse duration	-	11±5ms		
Safety Agency Approvals	-	UL60950, CSA622,2 NO 60950 (C-VL) EN60950 (TUV)		
Conducted & Radiated EMI	-	EN55011-B, EN55022-B, FCC-Class B, VCCI-Class B		
Immunity	-	EN50082-2, EN61000-4-2, 3, 4, 5, 6, 8, 11		
Weight (Typ)	g	3000		
Size (WxHxD)	mm	237 x 120 x 92		
Warranty	yrs	Five Years		

Models

Model	Max Current. Voltage	Power A	Efficiency typ W	%
RKE 24-50R	24V	50	1200	86
RKE 36-42R	36V	42	1512	86
RKE 48-32R	48V	32	1536	88

For full specification data and
RKY 3 Phase (280v) models
Please visit www.lambda-europe.com/rky

RKE 1500W Outline Drawing

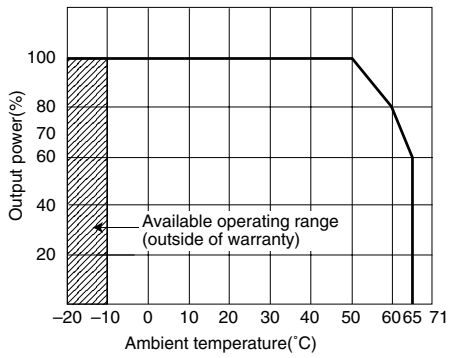


Dimensions in mm
±1mm : without specified dimensions

• Do not insert M4 tap installation screws more than 6mm into the power supply.

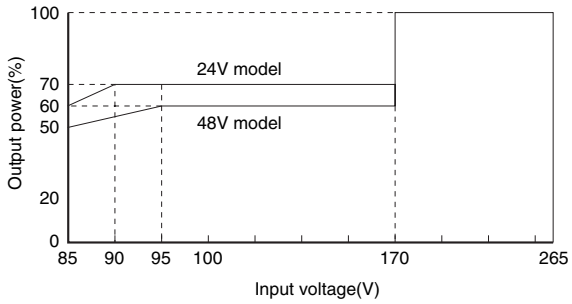
Derating Graph

OUTPUT POWER-AMBIENT TEMPERATURE(DERATINGS)



Input Voltage Derating

INPUT VOLTAGE DERATING



LAMBDA

- 5 Year Warranty
- Ultra Thin Package
- SEMI F47 Compliant (high line AC)
- Universal Input (85 - 265VAC)
- High Efficiency

Key Market Segments & Applications

Semiconductor Fabrication
Test & Measurement:
LED Signs

RTW Series

Single Output Industrial Power Supplies

RTW Features and Benefits

Features	*Benefits*
◆ 5 Year Warranty	◆ Lower Cost of Ownership
◆ Ultra Thin Package	◆ Allows use in small spaces
◆ Wide range AC Input	◆ Supports global use

Specifications

ITEMS \ MODELS		50W	100W	150W	300W
Input Voltage range	(1)	85 - 265VAC (47 - 440Hz), 120-370VDC			
Input Current (100/200VAC) (Typ)	A	0.7 / 0.4	1.5 / 0.75	1.9 / 1.0	2.0 / 4.0
Inrush Current (100/200VAC)	A	14 / 28			15 / 30
Power Factor	-	Meets EN61000-3-2			
Overcurrent Protection	-	Yes, typically 105 - 125% (100 & 150W hiccup style)			
Overvoltage Protection	V	Yes, typically 120-140%. Cycle input to reset			
Hold Up Time (100/200VAC)	ms	>20			
Leakage Current (max at 240VAC)	mA	0.6	0.45	0.65	0.75
Load Regulation	%	0.4% (0-100% load change)			
Line Regulation	%	0.2% (85-132 or 170-265VAC line change)			
Remote Sense	-	Yes			
Current Share	-	No			Yes
Remote On/Off	-	Yes, see instruction manual on website			
DC Fail Signal	-	No			Yes
Indicator	-	Green LED = ON			
Operating Temperature	-	-10°C to +71°C, -20°C start up. See derating curves on sheet 2			
Storage Temperature	°C	-30 to +75°C			
Humidity (non condensing)	-	10 - 95%RH			
Cooling	-	Convection			
Withstand Voltage	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.			
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC			
Vibration (non operating)	-	5 - 200Hz (10 min sweep), 19.6m/s², 1 hour (Amplitude 10mm)			
Shock (Vertical mounting)	-	392m/s²	196m/s²	588m/s²	
Safety Agency Approvals	-	UL60950-1, CSA60950-1 (cUL), EN60950-1, CE Mark			
Line Dip	-	Complies with SEMI F47 (200VAC line only)			
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC-B			
Immunity	-	IEC61000-4-2 (Level 4), -3, -4 (Level 3), -5 (Level 4)			
Weight (Typ)	g	290	450	600	1300
Size (WxHxD)	in	0.87x3.23x4.88	0.98x3.23x6.3	1.18x3.62x7.09	1.57x4.72x9.84
Warranty	yr	Five Years			

(1) Safety approvals do not cover DC input (2) 100/200VAC See website technical downloads for detailed information

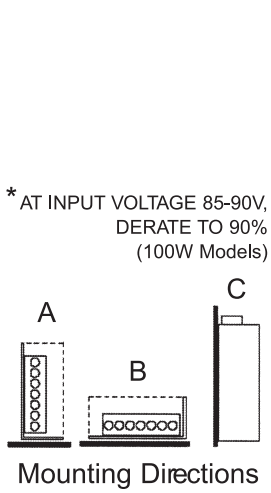
Output Ratings

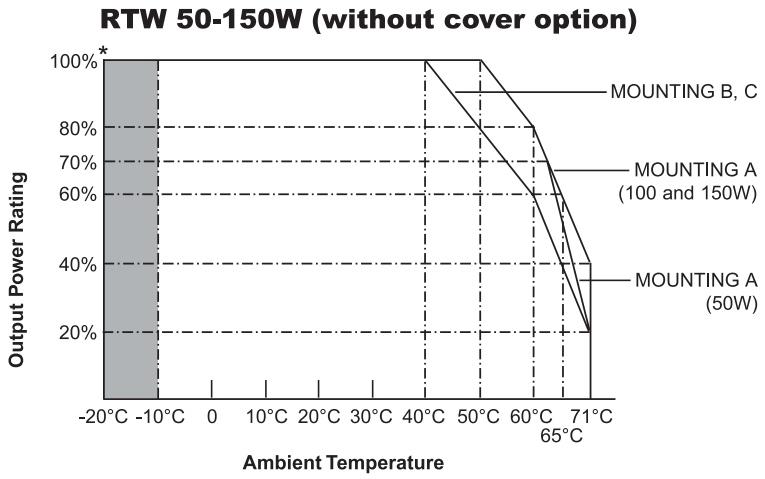
Model	Voltage	Adj. Range	Max Curr. (A)	Max Pwr (W)	Ripple/Noise (mV)	Eff (typ)%[2]	Pack. Size
RTW03-12R	3.3V	2.6 - 4.0	12.5	41.2	120	75 / 77	50W
RTW03-25R	3.3V	2.6 - 4.0	25	82.5	120	79 / 81	100W
RTW03-35R	3.3V	2.6 - 4.0	35	115.5	120	80 / 83	150W
RTW03-70RL	3.3V	1.8 - 3.6	70	231	120	83 / 86	300W
RTW05-10R	5V	4.0 - 5.8	10	50	120	80 / 82	50W
RTW05-20R	5V	4.0 - 5.8	20	100	120	83 / 85	100W
RTW05-30R	5V	4.0 - 5.8	30	150	120	83 / 86	150W
RTW05-60RL	5V	3.5 - 5.6	60	300	120	84 / 87	300W
RTW12-4R3	12V	9.6 - 13.2	4.3	51.6	150	81 / 83	50W
RTW12-8R4	12V	9.6 - 13.2	8.4	100.8	150	84 / 86	100W
RTW12-12R	12V	9.6 - 13.2	12.5	150	150	84 / 87	150W
RTW12-25RL	12V	7.2 - 14.4	25	300	150	83 / 86	300W
RTW15-3R5	15V	12.0 - 16.5	3.5	52.5	150	82 / 85	50W
RTW15-6R7	15V	12.0 - 16.5	6.7	100.5	150	85 / 87	100W
RTW15-10R	15V	12.0 - 16.5	10	150	150	84 / 87	150W
RTW15-20RL	15V	10.5 - 18.0	20	300	150	83 / 86	300W
RTW24-2R2	24V	19.2 - 26.4	2.2	52.8	200	82 / 85	50W
RTW24-4R2	24V	19.2 - 26.4	4.2	100.8	200	85 / 87	100W
RTW24-6R3	24V	19.2 - 26.4	6.3	151.2	150	86 / 88	150W
RTW24-13RL	24V	16.8 - 26.4	13	312	200	85 / 88	300W
RTW28-1R8	28V	22.4 - 30.8	1.8	50.4	200	82 / 85	50W
RTW28-3R6	28V	22.4 - 30.8	3.6	100.8	200	85 / 87	100W
RTW28-5R4	28V	22.4 - 30.8	5.1	151.2	200	86 / 88	150W
RTW28-11RL	28V	19.6 - 33.6	11	308	200	85 / 88	300W
RTW48-1R1	48V	38.4 - 52.8	1.1	52.8	300	82 / 85	50W
RTW48-2R1	48V	38.4 - 52.8	2.1	100.8	300	85 / 88	100W
RTW48-3R2	48V	38.4 - 52.8	3.2	153.6	200	86 / 89	150W
RTW48-6R5L	48V	33.6 - 55.0	6.5	312	300	86 / 89	300W

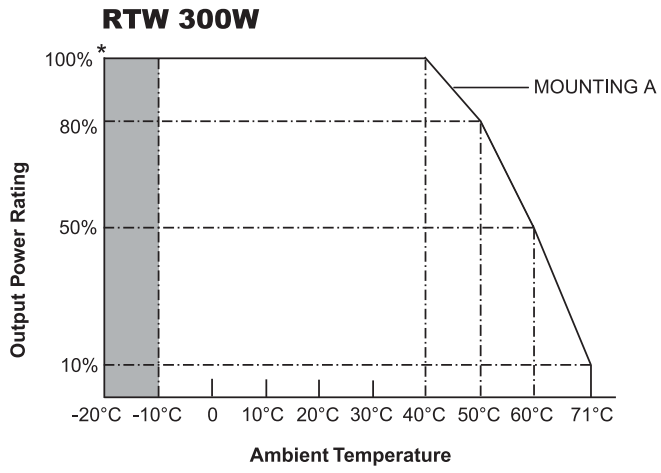
Options

Suffix	Description
Blank	No cover or L bracket (Not available on 300W models)
L	L bracket mounting
C	L bracket & cover (50W, 100W & 150W models)
H	L bracket & cover (300W models)

Derating Curves







For full specification data and
Please visit www.lambda-gb.com/rtw

LAMBDA

- Low Cost
- Active Power Factor Correction - SWS 100 & 150
- Universal Input (85 - 265VAC)
- Input Transient Protected IEC61000-4
- DIN Rail Mounting Bracket Available

SWS50-150W Series

50 to 150W, Single Output General Purpose Power Supplies

Key Market Segments & Applications

Factory Automation	Process Control, NCMachining, Automotive, Packaging Equipment, Materials Handling, Chemical Processing, Robots
Test & Measurement	Burn-in & Test, Automated, Detection Test, Instrumentation, Measurement
Automated Service	Vending Machines, Elevators, Video Gaming, Point of Sale Equipment

SWS50-150 Features and Benefits

Features	*Benefits*
• Meets IEC61000-4	• Greater Reliability
• Global Safety Approvals	• Supports Global Use
• Power Factor Corrected	• Supports Global Use
• Level B EMI	• Assists System Compliance

Specifications

ITEMS / MODEL		SWS50	SWS75	SWS100	SWS150
Input Voltage range (1)	-	85 - 265VAC (47 - 63Hz) or 120 - 370VDC			
Inrush Current 115/230VAC	A	20/40 Ta=25°C Cold Start		16/32 Ta=25°C Cold Start	
Power Factor	-	Meets EN61000-3-2			
Input Current 115/230VAC	A	1.2/0.6	1.6/0.8	1.2/0.6	1.8/0.9
Temperature Coefficient	-	<0.02%/°C			
Overcurrent Protection	-	>105%, Constant Current Limit			
Overvoltage Protection	V	115 -135%, Cycle AC line to reset			
Hold Up Time (Typ) 115/230VAC	ms	20ms @ 115VAC			
Leakage Current (max) typ115/230VAC	mA	0.3mA/0.6mA		0.25mA/0.5mA	
Remote Sense	-	Not Available			
LED Indicator	-	Green LED = On			
Operating Temperature	-	-10 to +60°C (See table for derating - model specific)			
Storage Temperature	-	-30 to +85°C			
Operating Humidity (2)	-	30 - 90% RH			
Storage Humidity (2)	-	10 - 95% RH			
Cooling		Convection			
Withstand Voltage	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.			
Isolation Resistance	-	>100MΩ at 25C & 70%RH, Output to Ground 500VDC			
Vibration (non operating)	-	19.6m/s²(10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)			
Shock	-	< 196.1 m/s² (20G)			
Safety Agency Approvals	-	UL60950-1, EN60950-1, IEC60950-1, CE Mark, EN50178			
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC Class B, VCCI-B			
Immunity	-	EN61000-4-2,-3,-4,-5,-6,-8,-11			
Weight	g	400	480	600	750
Size (WxHxD)	mm	92 x 37 x 159	94 x 43 x 170	96 x 45 x 188	99 x 51 x 198
Warranty	-	Two Years			

(1) Derate to 85% load below 100VAC input
(2) non condensing

Model Selector

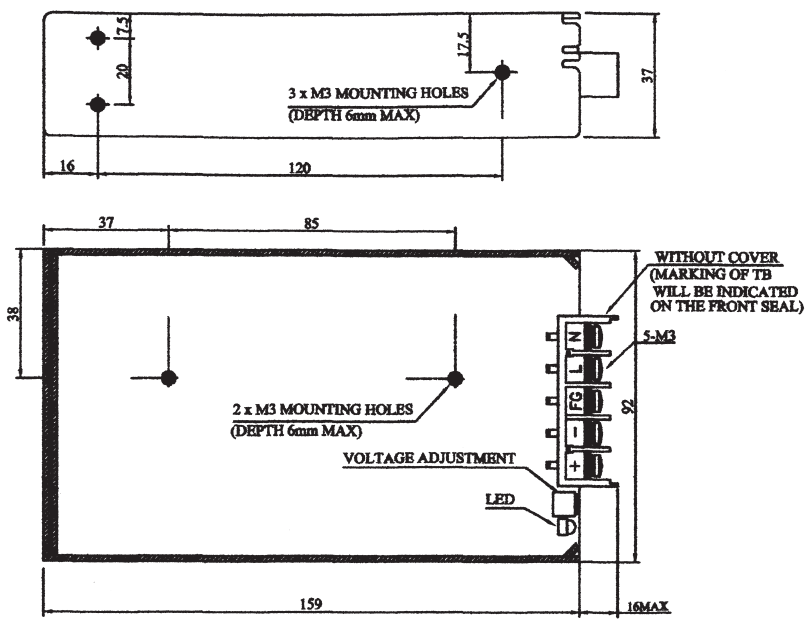
Model	Voltage	Adjust Range	Max Curr. A	Load Reg mV	Line Reg mV	Ripple Noise mV	Eff. (typ)%
SWS50-3	3.3V	3-3.6V	10	40	20	80	73/70
SWS75-3	3.3V	3-3.6V	15	40	20	80	72/68
SWS100-3	3.3V	3-3.6V	20	40	20	100	69/70
SWS150-3	3.3V	3-3.6V	30	40	20	100	70/72
SWS50-5	5V	4.5-5.5V	10	50	20	80	77/75
SWS75-5	5V	4.5-5.5V	15	50	20	80	77/74
SWS100-5	5V	4.5-5.5V	20	40	20	100	75/77
SWS150-5	5V	4.5-5.5V	30	40	20	100	76/78
SWS50-12	12V	10.8-13.2V	4.3	96	48	80	82/79
SWS75-12	12V	10.8-13.2V	6.3	96	48	80	83/81
SWS100-12	12V	10.8-13.2V	8.5	96	48	100	79/81
SWS150-12	12V	10.8-13.2V	12.5	96	48	100	79/82
SWS50-15	15V	13.5-16.5V	3.5	120	60	100	84/80
SWS75-15	15V	13.5-16.5V	5	120	60	100	85/82
SWS100-15	15V	13.5-16.5V	6.7	120	60	100	81/83
SWS150-15	15V	13.5-16.5V	10	120	60	100	81/83
SWS50-18	18V	16.2-19.8V	2.8	130	75	100	84/80
SWS150-18	18V	16.2-19.8V	8.4	144	72	120	82/84
SWS50-24	24V	21.6-26.4V	2.1	144	96	100	84/80
SWS75-24	24V	21.6-26.4V	3.2	144	96	100	85/82
SWS100-24	24V	21.6-26.4V	4.3	144	96	150	82/84
SWS150-24	24V	21.6-26.4V	6.3	144	96	150	82/85

Vertical Mount Convection	25°C	30°C	35°C	40°C	45°C	50°C	55°C	60°C
SWS50	100%	100%	100%	100%	100%	100%	93%	85%
SWS75 (5V model)	100%	100%	100%	100%	93%	85%	73%	60%
SWS75 (12V & 24V)	100%	100%	100%	100%	100%	93%	85%	60%
SWS100	100%	100%	100%	100%	100%	87%	73%	60%
SWS150 (5V model)	100%	95%	90%	85%	73%	60%	-	-
SWS150 (12V & 24V)	100%	100%	100%	100%	100%	100%	80%	60%

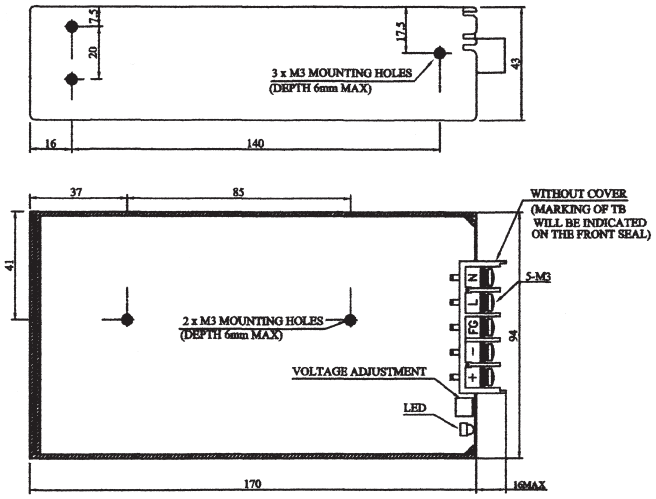
1.2m/s Forced Air	50°C	55°C	60°C	65°C	70°C
SWS50	100%	100%	100%	-	-
SWS75	100%	100%	90%	80%	70%
SWS100	100%	100%	90%	80%	70%
SWS150	100%	100%	90%	80%	70%

Derate to 80% load from 0 to -10°C

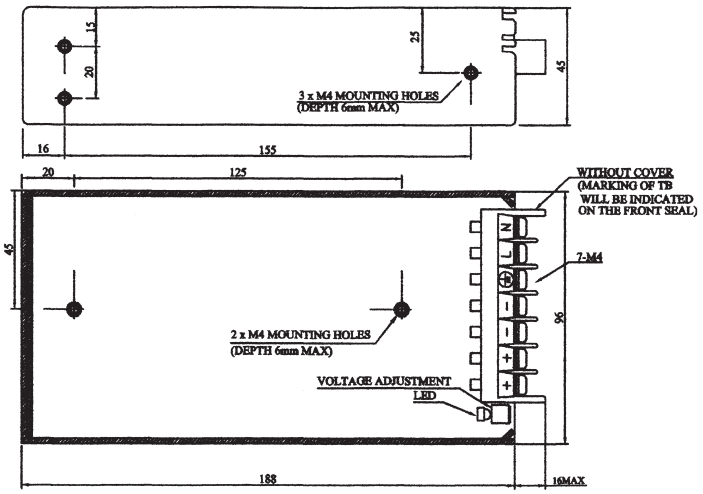
SWS50 Outline Drawing



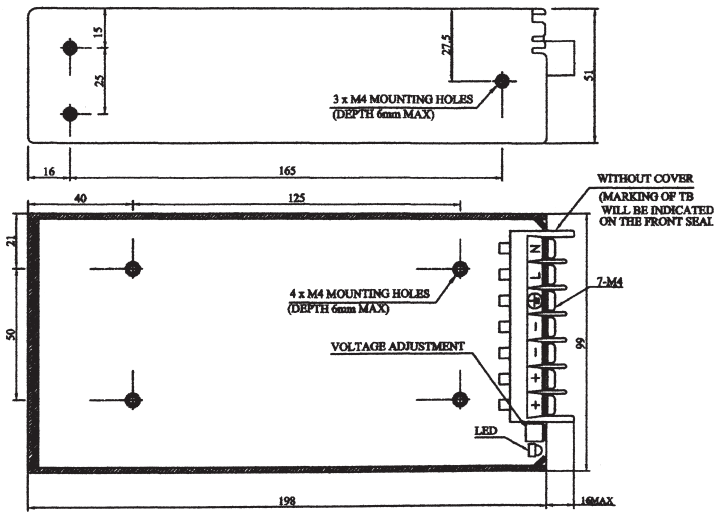
SWS75 Outline Drawing



SWS100 Outline Drawing



SWS150 Outline Drawing



LAMBDA

SWS300&600 Series

Single Output General Purpose Power Supplies

- Low Cost
- Active Power Factor Correction
- Input Transient Protected IEC61000-4
- Enclosed

Key Market Segments & Applications

Factory Automation	Process Control, NC-Machining, Automotive, Packaging Equipment, Materials Handling, Chemical Processing, Robots
Test & Measurement	Burn-in & Test, Automated, Detection Test, Instrumentation, Measurement
Automated Service	Vending Machines, Elevators, Video Gaming, Point of Sale Equipment

SWS Features and Benefits

Features	*Benefits*
• Meets IEC61000-4	• Greater Reliability
• Global Safety Approvals	• Supports Global Use
• Power Factor Corrected	• Supports Global Use
• Level B EMI	• Assists System Compliance

Specifications

ITEMS / MODEL		SWS300	SWS600
Input Voltage range (1)	-	85 - 265VAC (47 - 63Hz) or 120 - 370VDC	
Inrush Current (115 / 230VAC)	A	20 / 40	
Power Factor	-	Meets EN61000-3-2	
Input Current (100/200VAC)	A	3.6 / 1.8A	7.2 / 3.6A
Temperature Coefficient	-	<0.02%/°C	
Overcurrent Protection	--	>105%, Constant current style	
Overvoltage Protection	V	3.3V: 4.1-5.3V, 5V: 6.25-7.25V, 12V: 13.8-16.8V, 15V: 18.7-22.5V, 24V: 30-34.8V, 36V: 41.4-50.4V, 48V: 60-69.9V	
Overtemperature Protection	-	Yes, cycle AC to reset	
Hold Up Time (Typ)	ms	20ms at 115/230VAC	
Leakage Current (max)	mA	0.75mA	1.5mA
Remote Sense	-	None	Yes
Parallel Connection	-	None	Yes
Remote On/Off	-	None	Yes
AC Fail Signal	-	None	Yes, open collector output
LED Indicator	-	Green LED = On	
Operating Temperature	-	-10 to +65°C (See table for derating - model specific)	
Storage Temperature	°C	-30 to +85°C	
Operating Humidity	-	30 - 90% RH (non condensing)	
Storage Humidity	-	10 - 95% RH (non condensing)	
Cooling	-	Internal fan	
Withstand Voltage	-	I/P to Grnd 2kVAC, I/P to O/P 3kVAC, O/P to Grnd 500VAC, O/P to CNT 100VAC for 1 min	
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	-	10 - 55Hz (sweep for 1 min)19.6m/s² constant X, Y, Z 1 hour each plane)	
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11	
Safety Agency Approvals	-	UL60950, CSA60950, EN60950, EN50178, CE Mark	
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC Class B	
Weight (Typ)	g	950	2000
Size (WxHxD)	mm	52 x 102 x 198	92 x 120 x 190
Warranty	yrs	Two Years	

Notes: (1) Derate linearly to 85% load from 115VAC to 85VAC input (derate to 90% load for SWS600-5)

Models

Model	Voltage	Adjust Range	Max Curr.	Load Reg mV	Line Reg mV	Ripple Noise	Eff.(3) (typ)%
SWS300-3	3V	2.97-3.96V	55	40	20	120	67/70
SWS300-5	5V	4.5-6V	55	40	20	120	76/79
SWS300-12	12V	9.6-13.2	26	96	48	120	77/80
SWS300-15	15V	13.2-18V	21	120	48	120	79/83
SWS300-24	24V	20-28.8	13	120	48	150	82/85
SWS300-36	36V	28.8-40V	8.7A	180	72	200	82/85
SWS300-48	48V	40-57.6	6.7	240	96	240	83/86
SWS600-3	3.3V	2.97-3.96V	100 (2)	40	20	120	69/71
SWS600-5	5V	4.5-6V	100 (2)	40	20	100	74/77
SWS600-12	12V	9.6-13.2	50	96	48	120	78/81
SWS600-15	15V	13.2-18V	40	120	48	120	80/83
SWS600-24	24V	20-28.8	25	120	48	150	81/84
SWS600-36	36V	28.8-40V	16.7	180	72	200	81/85
SWS600-48	48V	40-57.6	12.5	240	96	240	82/85

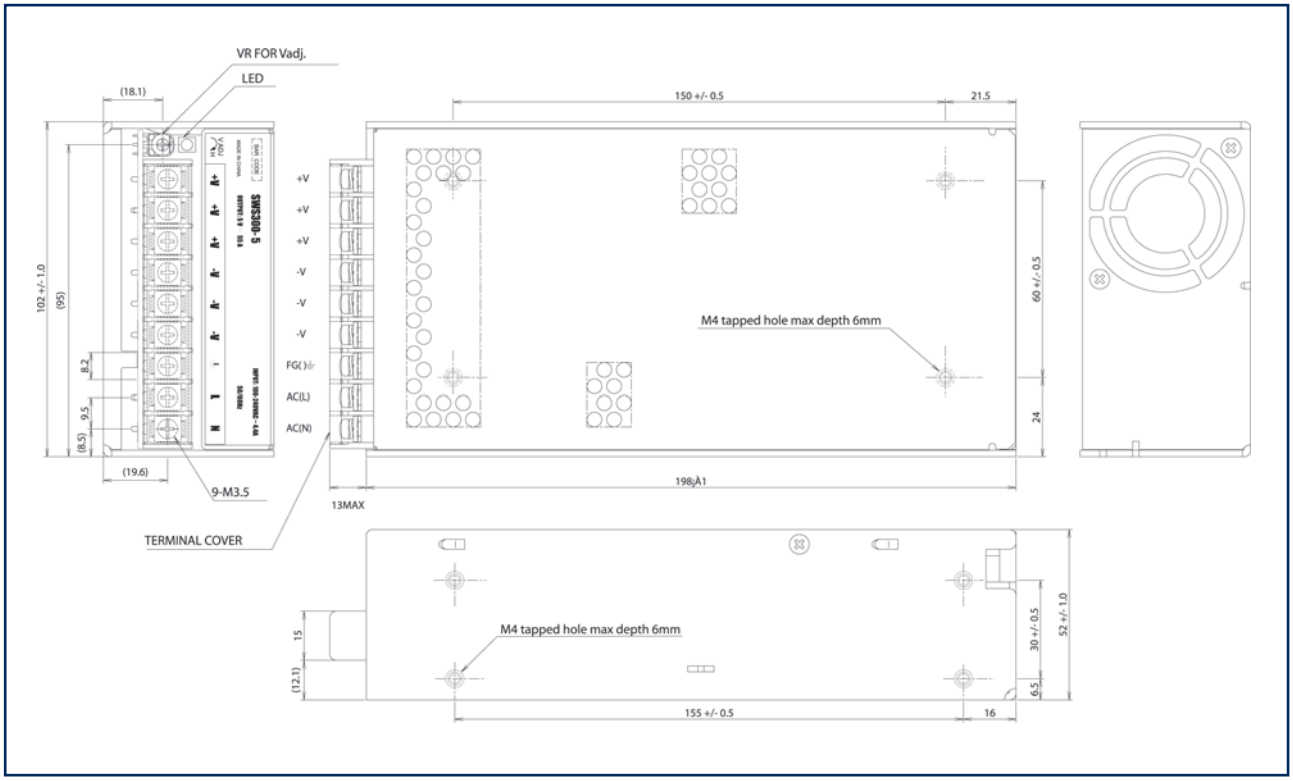
Notes:
(2) SWS600-5 has peak rating of 120A for 10s
(3) 115/230VAC

Derating

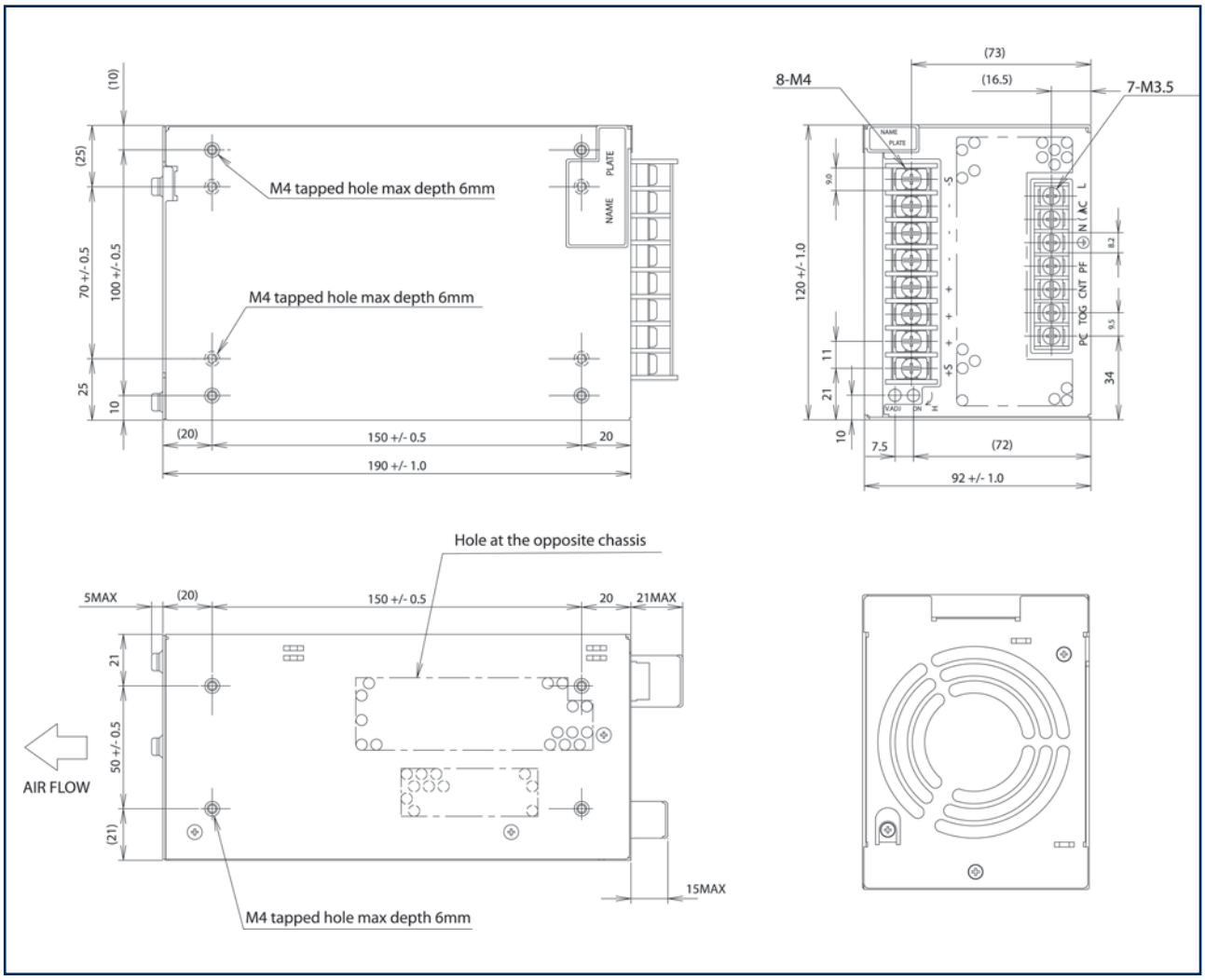
Model	50°C	55°C	60°C	65°C
SWS300	100%	91.6%	83.3%	50%
SWS600	100%	85%	70%	55%

Additional derating required when operating SWS600 with side ventilation holes blocked - see installation manual.

SWS 300 Outline Drawing



SWS 600 Outline Drawing



LAMBDA

- Low Cost
- Low Profile
- Active Power Factor Correction
- Universal Input (85 - 265VAC)
- Input Transient Protected IEC61000-4
- Enclosed
- Medical Approvals (SWS1000L)

SWS600/1000L Series

15W to 60W Low Profile Triple Output Power Supplies

SWS6000/1000L Features and Benefits

Features	Benefits
◆ Meets IEC61000-4	◆ Greater reliability
◆ Global safety Approvals	◆ Supports Global Use
◆ Power Factor Corrected	◆ Supports Global Use
◆ Level B EMI	◆ Assists System Compliance

Specifications

ITEMS \ MODEL		SWS600L	SWS1000L
Input Voltage range	-	85 - 265VAC (47 - 63Hz) or 120 - 350VDC	
Inrush Current (115 / 230VAC)	A	20 / 40	
Power Factor	-	Meets EN61000-3-2 Class A	
Input Current (100/200VAC)	A	7.1 / 3.6	12 / 6A
Temperature Coefficient	-	<0.02%/°C	
Overcurrent Protection	-	>105%, Constant current style	
Overvoltage Protection	V	125% -145%	
Overtemperature Protection	-	Yes, cycle AC or Remote On/Off to reset	
Hold Up Time (Typ)	ms	20ms at 115/230VAC	
Leakage Current (max)	mA	<0.75mA	<0.3mA
Remote Sense	-	Yes	
Parallel Connection	-	Yes	
Remote On/Off (CNT)	-	Yes	
Voltage Programming (1)	-	Yes, 1-6V adjusts output from 20 - 120% of nominal	
DC Good & Fan Fail Signal	-	Yes, open collector output	
Auxiliary Output	-	12V 0.1A	
LED Indicator	-	Green LED = On	
Operating Temperature	-	-40°C start up. -20 to 74°C, derating linearly to 50% load above 50°C	
Storage Temperature	-	-40 to +85°C	-30 to +85°C
Humidity (non condensing)	-	20 - 90% RH operating, 10 - 95%RH non operating	
Cooling	-	Internal fan	
Withstand Voltage(One minute)	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC, Output to CNT 100VAC	Input to Ground 2.6kVAC, Input to Output 4kVAC, Output to Ground 600VAC, Output to CNT 120VAC
Isolation Resistance	-	>50M at 25C & 70%RH, Output to Ground 500VDC	
Vibration (non operating)	-	10 - 55Hz (sweep for 1 min)23.52m/s² constant X, Y, Z 1 hour each plane)	
Shock	-	235.2m/s²	
Immunity	-	EN61000-4-2, -3, -4, -5, -6, -8, -11	
Safety Agency Approvals	-	UL, CSA, EN60950-1, UL60601-1 (1000W only), IEC61010-1 (600W only), EN50178, CE Mark	
Conducted & Radiated EMI	-	EN55011 / EN55022-B, FCC Class B	
Weight (Typ)	g	1600	2200
Size (WxHxD)	mm	61 x 120 x 199	61 x 150 x 240
Warranty	yrs	Three Years	

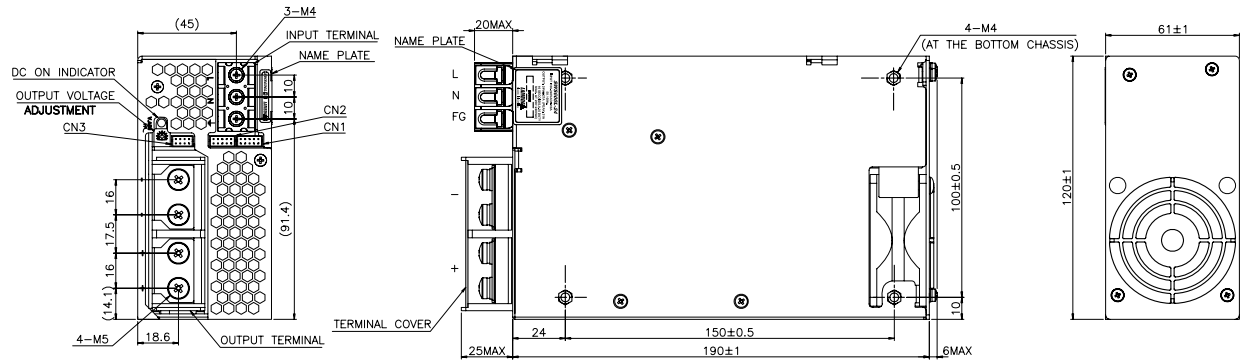
Notes: (1) Not available on 3.3V & 5V SWS1000L models

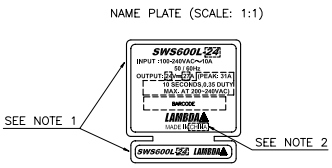
Model Selector

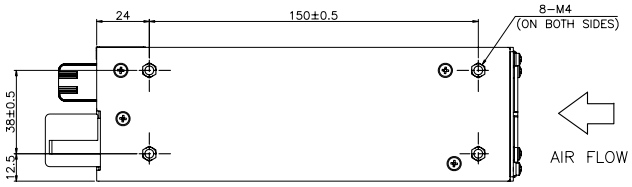
Model	Voltage	Max Adjust Range	Max Curr. (A)	Load Pwr (W)	Line Reg (mV)	Ripple Reg (mV)	Noise (mV)	Eff.(2) (typ)%
SWS600L-5	5V	3.96 - 6V	120A	600W	30	20	120	75 / 77
SWS1000L-5	5V	4 - 6V	200A	1000W	30	20	120	79 / 81
SWS600L-12	12V	8.25 - 14.4V	53A	636W	72	48	150	79 / 82
SWS1000L-12	12V	9.6 - 14.4V	88A	1056W	72	48	150	82 / 84
SWS600L-24	24V	16.5 - 28.8V	27A	648W	144	96	150	81 / 84
SWS1000L-24	24V	19.2 - 28.8V	44A	1056W	144	96	150	84 / 86
SWS1000L-36	36V	28.8 - 43.2V	29A	1044W	216	144	200	84 / 86
SWS1000L-48	48V	38.4 - 57.6V	22A	1056W	288	192	200	84 / 86

Notes:
(2) 115 / 230VAC

SWS600L Outline Drawing







NOTE:

1: MODEL NAME, INPUT VOLTAGE RANGE, NOMINAL OUTPUT VOLTAGE, NOMINAL OUTPUT CURRENT AND PEAK OUTPUT CURRENT ARE SHOWN ON THE NAME PLATE IN ACCORDANCE WITH THE SPECIFICATIONS
2: COUNTRY OF MANUFACTURE IS SHOWN ON THE NAME PLATE IN ACCORDANCE WITH THE SPECIFICATIONS
3: M4 TAPPED HOLES (12) FOR CUSTOMER CHASSIS MOUTING
(SCREW PENETRATION DEPTH 6m/m MAX.)
4: RECOMMENDED SCREW TORQUE OUTPUT TERMINAL(M5 SCREW) = 2.5N·m
INPUT TERMINAL(M4 SCREW) = 1.27N·m

SIGNAL CONNECTOR USED

PART DESCRIPTION	PART NAME	MANUFACT
PIN HEADER	S10B−PHDSS (CN1,CN2) S8B−PHDSS (CN3)	JST

MATCHING HOUSINGS, PIN & TOOL

PART DESCRIPTION	PART NAME	MANUFACT
SOCKET HOUSING	PHDR−10VS (CN1,CN2) PHDR−8VS (CN3)	JST
TERMINAL PINS	SPHD−002T−P05(AWG28~24) SPHD−001T−P05(AWG26~24)	JST
HAND CRIMPING TOOL	YRS−620(SPHD−002T−P0.5) YC−610R(SPHD−001T−P0.5)	JST

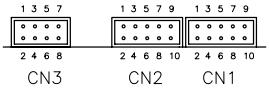
SIGNAL CONNECTOR INFORMATION

PIN CONFIGURATION AND FUNCTIONS OF CN1,CN2

PIN No.	FUNCTION
1	+Vm : +OUTPUT VOLTAGE MONITOR
2	+S : +SENSING
3	−Vm : −OUTPUT VOLTAGE MONITOR
4	−S : −SENSING
5	N.C. : NO CONNECTION
6	PC : CURRENT BALANCE
7	PV : ADJUSTMENT OF OUTPUT VOLTAGE
8	COM : GROUND FOR PC AND PV SIGNAL
9	CNT2 : REMOTE ON/OFF
10	TOG : REMOTE ON/OFF GROUND

PIN CONFIGURATION AND FUNCTIONS OF CN3

PIN No.	FUNCTION
1	COM : GROUND FOR PC AND PV SIGNAL
2	COM : GROUND FOR PC AND PV SIGNAL
3	AUX : AUXILIARY OUTPUT (12V 0.1A)
4	CNT1 : REMOTE ON/OFF
5	G2 : GROUND FOR AUX AND CNT1
6	G2 : GROUND FOR AUX AND CNT1
7	ALM : ALARM
8	G1 : ALARM GROUND



LAMBDA

- 1U High
- Up to 10kW in 19" Rack
- Hot Swap Capable
- High Efficiency

Key Market Segments & Applications

Power for distributed Power Architecture
Factory Automation

TH Series

1200W to 2500W Front End Power Supplies

TH Features and Benefits

Features	*Benefits*
• 1U High	• Utilises less cabinet space
• HotSwap Capable	• Suitable for N+1 redundancy
• High efficiency	• Higher Density
• Full array of signals	• Easier System Monitoring

Specifications

ITEMS / MODEL		TH120012(5) 12V Nominal	TH120024 24V Nominal	TH120048	TH200048	TH250048
				48V Nominal		
Output Voltage Range	VDC	10.5-14	21-28	42-56	42-56	42-56
Total Regulation	%	±1%				
Output Current	A(max)	100	50	25	40	50
Current limit (1)	A	120	60	30	48	60
Short Circuit Current	%	150	75	37	60	75
Output Noise	mV	250mV peak to peak (10kHz to 20MHz)				
Output Rise Time	ms	100-400 ms				
Dynamic Response	%	3% in 10ms for a 10-100% load change				
Overvoltage Protection (1)	VDC	13-15	27-30	50-60	50-60	50-60
Load Sharing	%	±5%				
Remote Sense	V	Compensates for 1V total cable drop (stand alone unit only)				
I²C Programing	-	Set output Volt, Monitors AC present, Converter OK, Thermal Profile, Fan fail				
Signals (opto isolated) (4)	-	AC Fail, Module Alarm, Temp Alarm				
Remote On/Off	V	Shuts down outputs by applying 3.3 to 5V				
Margining	V	Applying 0-5V raises output voltage 0-10V				
Auxiliary Outputs (3)	-	O/P#1 12V@100mA				
AC Input	VAC	90-264	90-264	90-264	180-264	180-264
Input Frequency	Hz	47-63				
Power Factor	-	0.99 typ. @ 230VAC, full load, meets EN61000-3-2				
Inrush Current (2)	A	30 amps peak				
Efficiency (at full load)	%	86	90	92	92	92
Immunity	-	EN61000-4-2,-3,-4,-5,-6,-8,-11				
EMC (conducted and radiated)	-	EN55022, Level B, FCC Class B				
Operating Temperature	°C	-40 to 70, derate linearly to 60% load above 50°C				
Storage Temperature	°C	-40 to 85				
Humidity	%	5 to 95 (non-condensing)				
Altitude	ft	-200 to 8000				
Shock	G	IEC68-2-27, Mil-STD-810E, 20G				
Vibration	Hz	IEC68-2-64 (random) 20-2000Hz, 30 minutes				
Safety Agency		UL60950, CSA 22.2 No. 60950-00, EN60950, CE Mark				
Size (L x W x H)	mm	362 x 102 x 43 (stand alone), 414 x 440 x 43 (THR4 Rack)				
Weight	Kg	Stand alone unit 2.7kg, Rack 4.05kg				
Warranty	-	2 Years				

1 Adjustable via 1˚C or through Lambda Network Interface Card
2 Excludes Xcaps in the EMC input filter
3 Operates independent of main DC output and is referenced to (-)Vout
4 All three signals share a common return - logic ground
5 Use Rack Model THR400

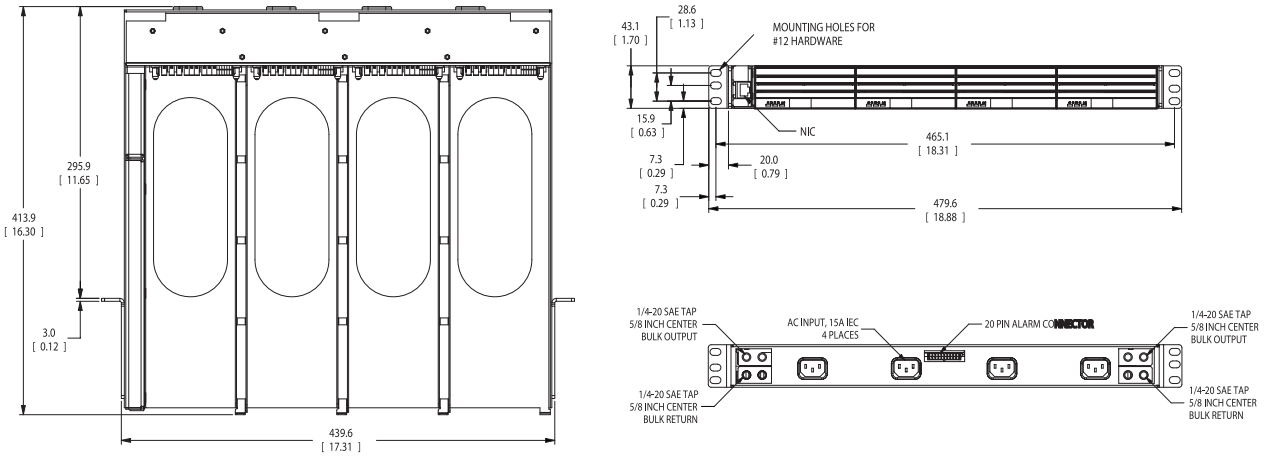
Model Selector

Model	Output Voltage	Output Current	Maximum Power
TH120012 (5)	12V	100A	1200W
TH120024	24V	50A	1250W
TH120048	48V	25A	1250W
TH200048	48V	40A	2000W
TH250048	48V	50A	2500W
THR4	19" Rack holds up to 4 TH Modules. 200A Max. output current		
THR400	19" Rack for 400A output holds up to 4 TH Modules. Screw terminal mains input connection		
THRBP	Blanking panel for one module slot		
THR4NIC	Network interface card for 48V systems		
THR4NIC12	Network interface card for 12V systems		
THR4NIC24	Network interface card for 24V systems		

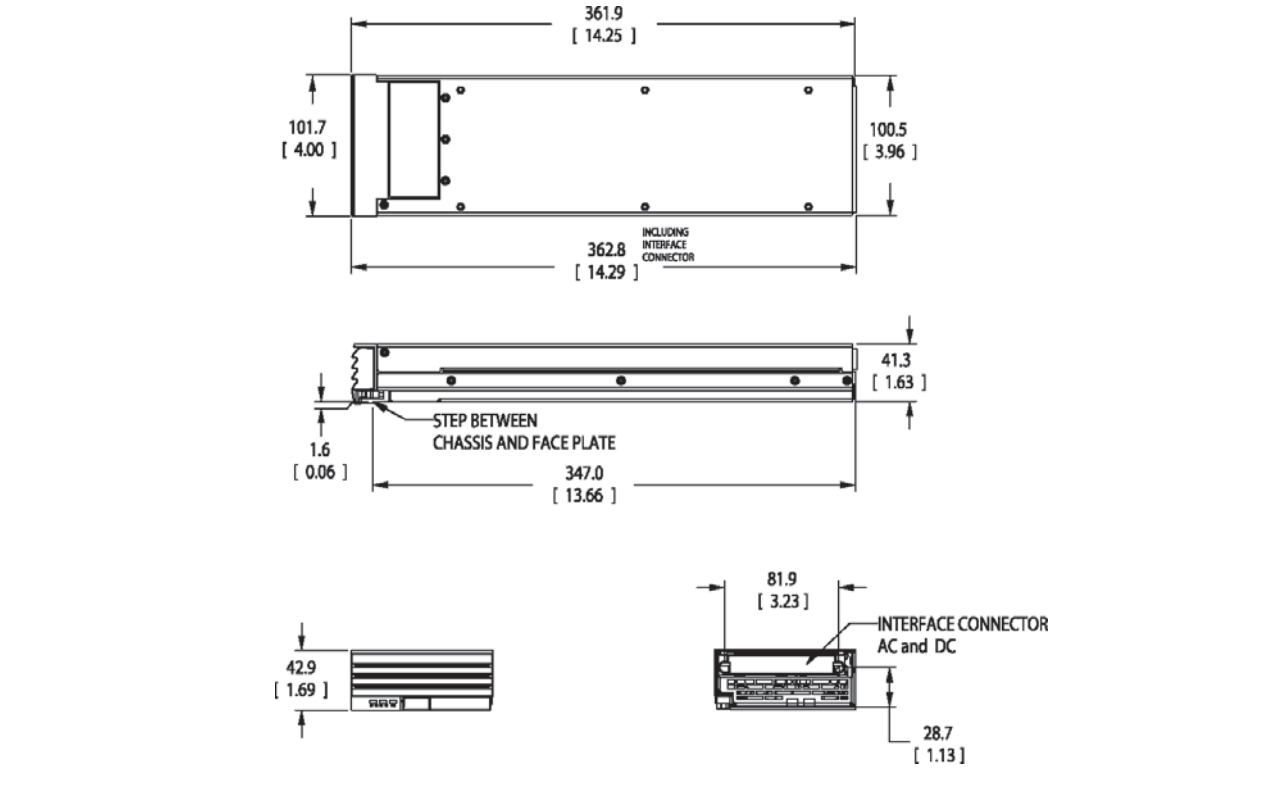
Connector Pinout

PIN	Description	PIN	Description
1	SHELF_BIAS_12V	11	V_MAIN_3-
2	SCL	12	I_SHARE
3	SDA	13	V_MARGIN
4	LOGIC_GRND	14	SHELF_BIAS_5V
5	MODULE_DISABLE	15	THERMAL_ALARM
6	MODULE_AC FAIL_0	16	MODULE_ALARM_0
7	MODULE_AC FAIL_1	17	MODULE_ALARM_1
8	MODULE_AC FAIL_2	18	MODULE_ALARM_2
9	MODULE_AC FAIL_3	19	MODULE_ALARM_3
10	OPEN	20	MODULE_PRESENT
Note:	PIN 1 Top Left (Rear of Rack)		PIN 11 Bottom Left (Rear of Rack)

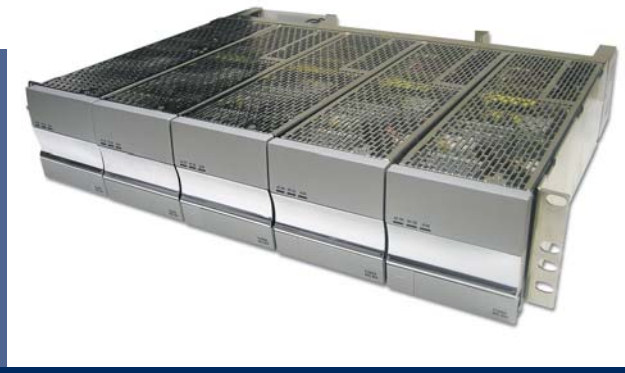
TH Rack Outline Drawing



TH Outline Drawing



LAMBDA



TL Series

500W to 2500W Front End Power Supplies

- 2U high
- Up to 12,500W in 19" rack
- Hotswap capable
- >92% efficiency
- Full power at 65C ambient

Key Market Segments & Applications

Power for Distributed Power Architecture
Factory Automation
Process Control

TL Features and Benefits

Features	Benefits
◆ 2U high	◆ Utilises less cabinet space
◆ Hotswap capable	◆ Suitable for N+1 redundancy
◆ High efficiency	◆ Higher density
◆ Full array of signals	◆ Easier system monitoring

Specifications

ITEMS	MODEL		12V Nominal (Factory Set)	24V Nominal (Factory Set)	48V Nominal (Factory Set)
Output Voltage Range	(1)	VDC	10.5-14V	21 - 28V	42 - 56V
Total Regulation		%	±1		
Current limit		%	105 to 120%, Factory Programmable		
Short Circuit Current		%	150% maximum, Factory Programmable		
Output Noise		mV	480mV maximum, peak to peak (10Hz to 20MHz)		
Output Rise Time		-	100 - 400ms		
Dynamic Response		-	3% in 10ms for a 10 - 100% load change		
Overvoltage Protection	(4)	VDC	13.5 to 15V	27 to 30V	54 to 60V
Load sharing		-	±10%		
Remote Sense		-	Compensates for 1V total cable drop (stand alone unit only)		
I2C programming	(1)	-	Set Output Volt., Monitors AC Present, Converter OK, Thermal profile, Fan fail		
Signals (opto isolated)	(2)	-	Converter OK, AC Present, and Over-temperature alarms. Active Low on Fail		
Remote On/Off	(3)	-	Shuts down output(s) by applying 5V		
Margining		-	Applying 0-5V raises output voltage 0-10V		
Auxiliary Output		-	12V 0.1A bias voltage		
AC Input		-	TL500 & 1000: 90~264VAC, 95VAC start up; TL1500 & 2500: 180~264VAC, 185VAC start up		
Power Factor		-	0.99 Typical meets EN61000-3-2		
Inrush Current		A	<40A		
Leakage Current		mA	<3.2mA		
Efficiency (typical)		%	92%		
Immunity		-	EN61000-4-2, -3, -4, -5, -6, -8		
EMC (conducted and radiated)		-	EN55022, level B, FCC Class B		
Operating Temperature		-	-40°C to +65°C, short duration at 75°C, no derating		
Storage Temperature		-	-40 to +85°C		
Humidity		-	5 - 95% RH non condensing		
Altitude		-	-200 to 8000 feet, derate max. ambient 2°C/1000 feet		
Shock		-	IEC68-2-27, MIL STD 810E, 20G		
Vibration		-	IEC68-2-64 (random) 20 - 200Hz, 30 minutes		
Safety Agency	(5)	-	UL60950, CSA 22.2 No. 60950-00, EN60950, CE Mark		
Size (L x W x H)		mm	282 x 87 x 88 (stand alone), 356 x 480 (incl. ears) x 88 (TLR5 rack)		
Weight		kg	Stand alone unit: 2.5, Rack: 4.3		
Warranty		-	Two Years		

(1) Contact Factory for application
(2) All three signals share a common return - Logic GND
(3) Either stand alone unit or entire rack
(4) Factory Programmable
(5) Use cable assembly TLRC01 for safety compliance

Output Connector (Module)

TL Module Connector (Part Number: FCI 51732-007)

	D	C	B	A
6	Converter OK	12VAux	SCL	SDA
5	Logic GND	n/c	Reserved	Overtemp
4	AC Present	Reserved	n/c	LOC0
3	Present	n/c	LOC1	LOC2
2	Remote on/off	Short Pin	n/c	I Share
1	+Remote Sense	-Remote Sense	n/c	V Margin
P2		Negative Output		
P1		Positive Output		

Note: View facing rear of module

Output Signal Connector (Rack)

TL Rack Connector (Part Number: Molex 43045)

1	12V Aux	11	Signal GND
2	SCL	12	I Share
3	SDA	13	V Margin
4	Logic GND	14	n/c
5	Remote on/off	15	Overtemp
6	AC Present (Bay 1)	16	Converter OK 1
7	AC Present (Bay 2)	17	Converter OK 2
8	AC Present (Bay 3)	18	Converter OK 3
9	AC Present (Bay 4)	19	Converter OK 4
10	AC Present (Bay 5)	20	Converter OK 5

Note: 1. Pin 1 is top left, view from rear of rack
Pin 11 is bottom left, view from rear of rack
2. Module Bay 1 is far left of rack, view from front

Models

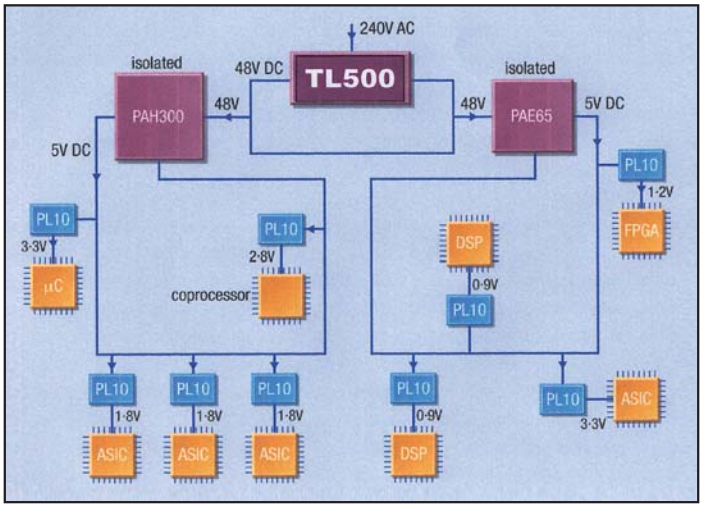
Model	Output Voltage	Output Current	Maximum Power
TL50012	12V	40A	500W
TL75012	12V	60A	750W
TL50024	24V	20A	500W
TL100024	24V	40A	1000W
TL150024	24V	55A	1500W
TL50048	48V	10A	500W
TL100048	48V	20A	1000W
TL150048	48V	30A	1500W
TL200048	48V	40A	2000W
TL200080*	30-60V	40A	2400W
	>60-80V	20A	1600W
TL250048	48V	50A	2500W

TLR5 19" Rack, holds up to 5 TL Modules
TLRBP Blanking Panel for One Module Slot
TLRC01 Signal Cable
TLCKI2C Communications Kit
TLHB19 *Angled Baffle Kit (for horizontal air flow)

* Contact Factory for specific details.

With 24 and 48 VDC outputs the TL Series is ideally suited to powering distributed power architecture. The diagram below shows a typical application using a TL500-48 in conjunction with Lambda's Range of Industry Standard DC - DC "Brick" converters and the PL10 Range of Non-isolated converters.

For more comprehensive information on Lambda's Range of DC - DC converters visit www.lambda-europe.com

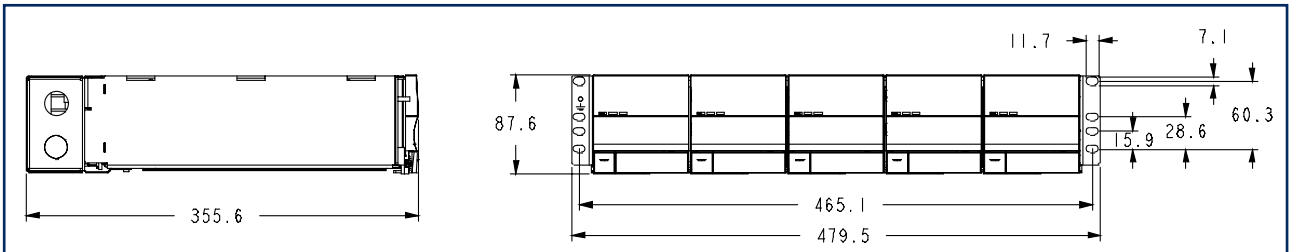


Coming soon

- Built in I²C
- New Interface Card
- V & I Monitoring
- Temperature Monitoring
- Black Box Memory
- Remote Programmable

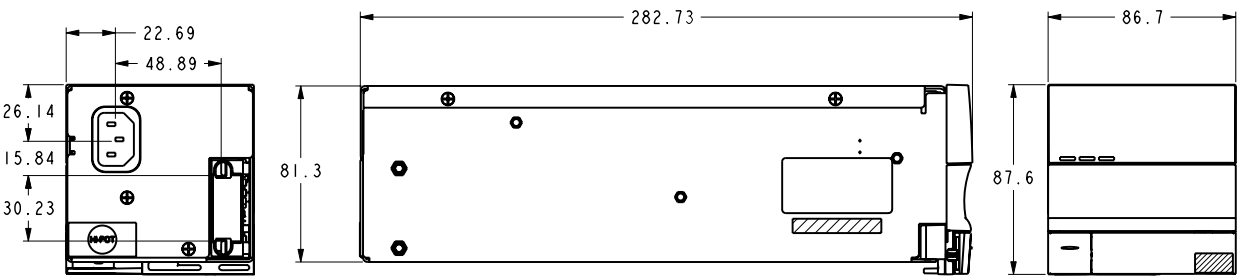
Contact your local sales office for details

TL RACK Outline Drawing



Model shown is a 2U rack with a top to bottom airflow through shuttles Also available from Lambda is a 3U TL rack with front to back air flow providing greater heat dissipation for higher temperature.

TL Module Outline Drawing



LAMBDA

- 2U high
- Up to 22,500W in 19" rack
- Hotswap capable

Key Market Segments & Applications

Power for Distributed Power Architecture
Factory Automation

TX Series

2500W to 7500W Front End Power Supplies

TX Features and Benefits

Features	Benefits
◆ 2U high	◆ Utilises less cabinet space
◆ Hotswap capable	◆ Suitable for N+1 redundancyy
◆ High efficiency	◆ Higher density
◆ Full array of signals	◆ Easier system monitoring

Specifications

MODEL		TX250024	TX375024	TX500048	TX750048
ITEMS		24V Nominal		48V Nominal	
Output Voltage Range	VDC	21-28		42-56	
Total Regulation	%	±1%			
Output Current	A(max)	100	150	100	150
Current limit (1)	A	105	155	110	155
Short Circuit Current	rms A	35	50	35	50
Output Noise	mV	150mV peak to peak (10kHz to 20MHz)			
Output Rise Time	ms	100-400 ms			
Dynamic Response	%	3% in 10ms for a 10-100% load change			
Overvoltage Protection(1)	VDC	27-30		54-60	
Load Sharing	%	±5% of full load			
Remote Sense	V	Compensates for 1V total cable drop (stand alone unit only)			
i²C Programing	-	Set output Volt, Monitors AC present, Converter OK, Thermal Profile, Fan fail			
Signals (opto isolated)	(6)-	AC Fail, Module Alarm, Temp Alarm			
Remote On/Off (5)	V	Shuts down outputs by applying 3.3 to 5V			
Margining	V	Applying 0-5V raises output voltage 0-10V			
Auxiliary Output (4)	-	12V@500mA			12V@2A
AC Input	VAC	180-264 (200-277 for TX500048)			
Input Frequency	Hz	47-63			
Power Factor	-	0.99 typ. @ 230VAC, full load, meets EN61000-3-2			
Inrush Current (2)	A	30 amps peak			
Efficiency (at 230VAC)	%	90	90	92	92
Immunity	-	EN61000-4-2,-3,-4,-5,-6,-8,-11			
EMC (conducted and radiated)	-	EN55022, Level B, FCC Class B			
Operating Temperature	°C	-40 to 65 (full power)			-40 to 65 (3)
Storage Temperature	°C	-40 to 85			
Humidity	%	5 to 95 (non-condensing)			
Altitude	ft	-200 to 8000			
Shock	G	IEC68-2-27, Mil-STD-810E, 20G			
Vibration	Hz	IEC68-2-64 (random) 20-2000Hz, 30 minutes			
Safety Agency	-	UL60950, EN60950, CE Mark			
Size (L x W x H)	mm	405 x 132 x 82 (stand alone), 534 x 410 x 89 (THR3 Rack)			
Weight	Kg	Stand alone unit 6.75kg, Rack 5.4kg			
Warranty	-	2 Years			

1 Adjustable via i²C or through Lambda Network Interface Card
2 Excludes Xcaps in the EMC input filter
3 TX750048 derate 2%/°C above 50°C to 65°C
4 Operates independent of main DC output and is referenced to (-)Vout
5 Either stand alone unit or entire rack
6 All three signals share a common return - logic ground

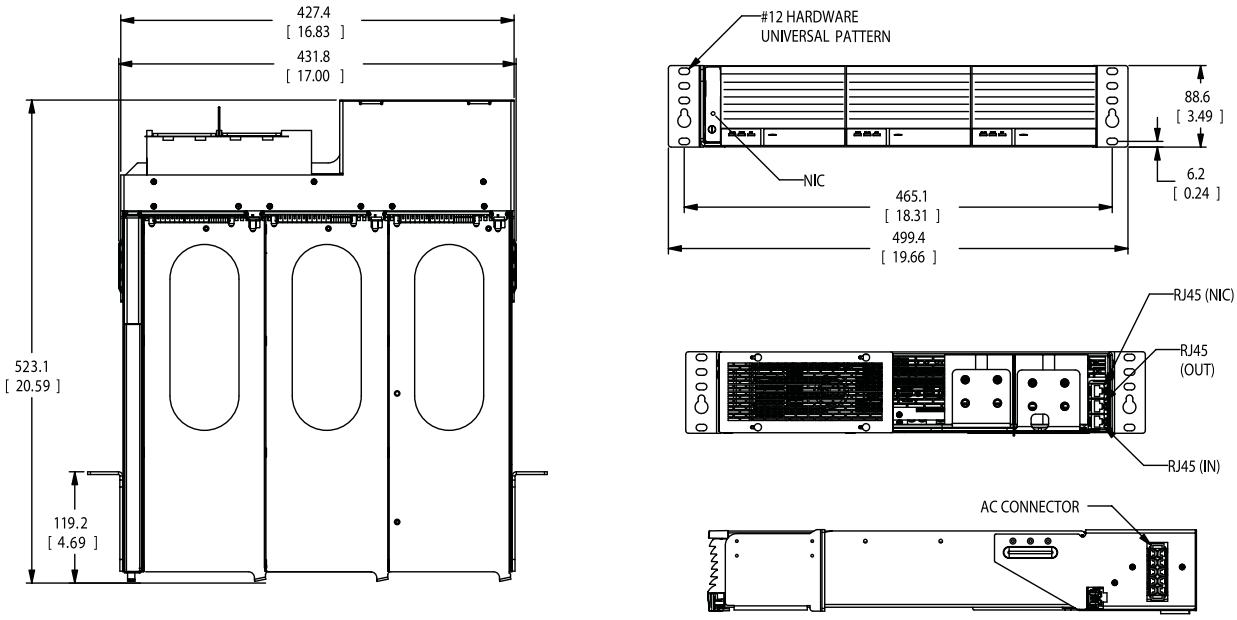
Model Selector

Model	Output Voltage	Output Current	Maximum Power
TX250024	24V	100A	2400W
TX375024	24V	150A	3600W
TX500048	48V	100A	4800W
TX750048	48V	150A	7200W
TXR3	19" Rack holds up to 3 TX Modules		
TXRBP	Blanking panel for one module slot		

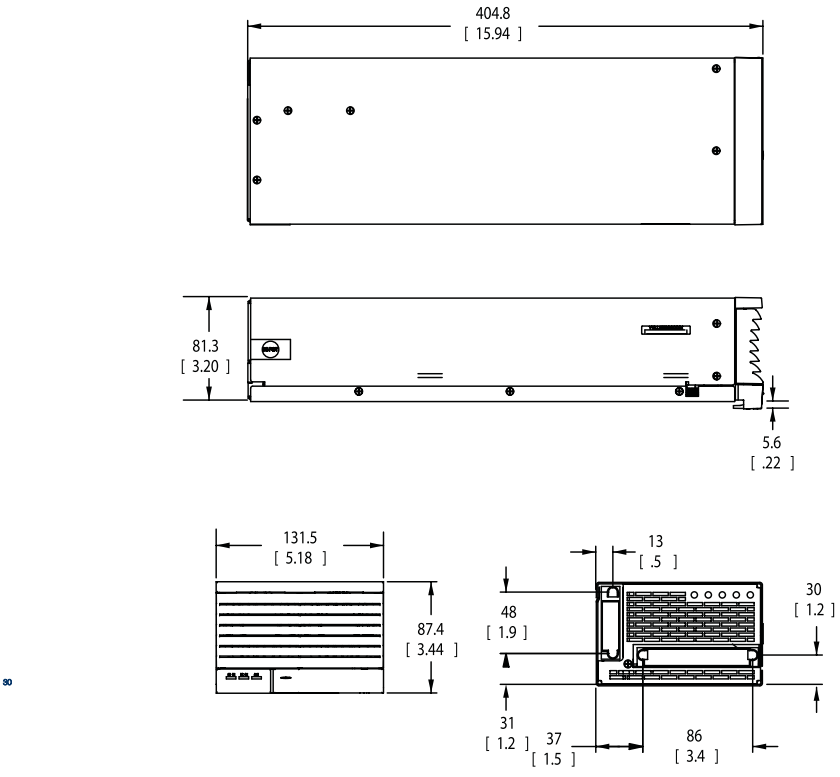
Connector Pinout

PIN	Description	PIN	Description
10	OPEN	20	MODULE_PRESENT
9	OPEN	19	OPEN
8	MODULE_AC FAIL_2	18	MODULE_ALARM_2
7	MODULE_AC FAIL_1	17	MODULE_ALARM_1
6	MODULE_AC FAIL_0	16	MODULE_ALARM_0
5	MODULE_DISABLE	15	THERMAL_FAIL
4	LOGIC_GRND	14	OPEN
3	SDA	13	V_MARGIN
2	SCL	12	I_SHARE
1	SHELF_BIAS	11	Vmain_2
Note:	PIN 10 Top Left	PIN 20 Top Right	

TX Rack Outline Drawing



TX Outline Drawing



LAMBDA

- Industry Leading Power Density
- Up to 11 outputs
- Voltages up to 62V, Current up to 114 Amps
- Screw, Fast-on or IEC connection
- Worldwide approvals & CB report
- Medical Approval Option
- 3 Year Warranty

Vega

450, 650 & 900 Watts Modular

Key Market Segments & Applications

Instrumentation
Medical
Automation
Security
Network Servers and Routers
Broadcast
ATE
Industrial Computing
Lifesciences/Laboratory

INPUT		
	Vega 450, 650, and 900	**Vega dc (450W)**
Input Voltage	90 - 264Vac & 130 - 330 Vdc 900W version is 150-264Vac only	34 - 75Vdc Derate linearly below 44V to 340W at 34V
Input Frequency	47 - 63Hz (440Hz with reduced PFC - consult factory)	dc only
Inrush Current	<40A at 25°C and 264Vac (cold start)	<40A at 25°C, ETSI EN300 132-2
Input Fuse	16A / 250Vac HBC Fast Acting (not user accessible)	20A Fast Acting (not user accessible)
Leakage Current	1.5mA max at 264Vac & 63Hz	n/a
Lower Leakage Option	see configuring guide	n/a
Power Factor	0.99 typical	n/a

OUTPUT		
Voltage / Current	See module output table	
Turn on Delay	1.5s max	at 90Vac (150Vac for 900W, 48Vdc for Vega dc) & 100% rated output power
Rise Time	<50ms	to 90% of voltage, monotonic rise above 10%
Turn on Overshoot	<5% or 250mV	Load type dependant, no overshoot with resistive load
Efficiency	75%	typical at 230Vac (48Vdc for Vega dc) & 100% rated power, config dependent
Hold up	16ms min	at 90Vac (150Vac for 900W) & 100% rated output power. 10ms min for Vega dc
Ripple & Noise	<1% or 50mV	Pk- Pk, using EIAJ test method & 20MHz bandwidth
Voltage Accuracy	<1%	of set Voltage
Remote Sense	Yes	Standard on single output modules, max 0.75V total line drop Option for twin output modules
Minimum Load	No	on any output
Temperature Coefficient	<0.02%	of rated voltage per °C
Load Regulation	<0.5% or 25mV	for 0-100% load change
Line Regulation	<0.1%	for 90 - 264Vac input change (150-264Vac for 900W, 34-75Vdc for Vega dc)
Cross Regulation	<0.2%	for 100% load change on any other output
Transient Response	<6% or 300mV	of set voltage for 50% load change (above 25% load)
Recovery	500µs	for recovery to 1% or 100mV of set voltage
Over Voltage Protection	120 - 130% 140 - 150% 120 - 150%	of set voltage for outputs > 4.1V (Tracking OVP) of set voltage for outputs < 4.1V (Tracking OVP) of max rated output (Fixed OVP)
Over Current Protection	105 - 125%	of rated current, constant current characteristic
Short Circuit Protection	<150%	of rated current, when output voltage <1%
Over Temperature Protection	Yes	Shuts down all outputs and fan. Cycle ac off / on to reset
		Note 1 shutdown temp varies according to ambient, output power and input V 2 ac fail signal (if fitted) provides 5ms warning of thermal shutdown

SAFETY APPROVALS

	Date	Amendments		Date	Amendments
EN 60950-1	2006		EN 61010-1	2001	
UL 60950-1	2003		IEC 61010-1*	2001	
CSA22.2 No 60950-1	2003		IEC 60601-1[a]	1988	A1, A2
IEC60950-1*	2005		EN 60601-1[a]	1990	A1, A2, A13
CE Mark	LV Directive 2006/95/EC (EN60950-1)		UL 60601-1[a]	2003	with revisions 2006
* CB Certificate and report available on request			a - Only for L, R and T leakage variants. Not applicable to Vega dc		

EMISSIONS BS EN61000-6-3:2001 (Residential, Commercial & Light Industrial Supply), also complies with BS EN61000-6-4:2001

Radiated Electric Field	EN55022	Class B (as per CISPR.22) Class A for Vega dc	See application note for details. Only for 'S' type leakage versions
Conducted Emissions	EN55022	Class B (as per CISPR.22) Class A for Vega dc	Only for 'S' type leakage versions. 'M' & 'L' types meet Class A
Conducted Harmonics	EN61000-3-2	Compliant to Class A	Not applicable to Vega dc
Flicker	EN61000-3-3	Compliant	Not applicable to Vega dc

IMMUNITY BS EN61000-6-2:2001 (Industrial Environment), also complies with BS EN61000-6-1:2001

				Criteria
Electrostatic Discharge	EN61000-4-2	Level 4	Air discharge 15kV Contact discharge 8kV	A
Electromagnetic Field	EN61000-4-3	Level 3	10V/m (tested to 12V/m)	A
Fast / Burst Transient	EN61000-4-4	Level 4 Level 3 for Vega dc	Input 4kV, (2kV for Vega dc) Outputs 2kV, (1kV for Vega dc) Tested at 5kHz and 100kHz	A
Surge Immunity	EN61000-4-5	Level 3 Level 2 for Vega dc	Line to Line 1kV tested to 1.1kV (0.5kV, tested to 0.55kV for Vega dc) Line to Earth 2kV tested to 2.2kV (1kV, tested to 1.1kV for Vega dc)	A
Conducted RF Immunity	EN61000-4-6	Level 3	10V (tested to 12V)	A
Power Frequency Magnetic Field	EN61000-4-8	Level 4	30A Continuous	A
Voltage Dips, Variation, Interruptions	EN61000-4-11	Class 3 na - Vega dc		A B for 5s interruptions

ENVIRONMENT

Temperature	0° to 65° operational, -25° to 85°C storage (max 12 months)
Derating	50°C to 65°C derate each output by 2.5% per °C (1.5% per °C for Vega dc)
Low Temperature Start-up	-20°C
Humidity	5-95% RH non condensing
Shock	±3 x 20*g* shocks in each plane, total 18 shocks 20*g* shock = 11ms (±0.5ms), half sine conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, JIS C0041-1987 conforms to MIL-STD-810E/F, Method 514.4, Pro I, Cat 1, 9
Vibration	Single axis 10 - 500Hz at 2*g* (sweep and endurance at resonance) in all 3 planes Conforms to EN60068-2-6, IEC68-2-6 Conforms to MIL-STD-810E, Method 516.5, Pro I, IV, VI
Altitude	3,000 metres operational (15,000 metres non operational)
Pollution	Degree 2, Material group 3
IP Rating	IP 10

ISOLATION

Input to Output	Reinforced	4.3 kV (dc)	Output to Earth	Operational	200 V (dc)
Input to Earth	Basic	2.3 kV (dc)	Output to Output	Operational	200 V (dc)

OUTPUT VOLTAGES (single output modules)					
Module	Adjustment Range (Volts)			Amps	Slots
B1L	1.8	-	3.8[e]	20	1
C1	1.8	-	4.1[e]	35	1
C1Y	1.8	-	4.1[e]	40	1
D1L	1.8	-	3.8[e]	50	1.5
E1	1.8	-	3.8[e]	60	2
F1[a]	1.8	-	3.8	80	2
Z2	1.8	-	3.8[e]	95	3
Z3	1.8	-	3.8[e]	114	4
B1H	3.9	-	5.5[d]	20	1
L1	4.2	-	5.5[d]	35	1
D2	3.8	-	9[k]	45	1.5
D1H	3.9	-	5.5[d]	50	1.5
E2	3.8	-	8[k]	60	2
Z18	4.2	-	5.5	66	2
F2[a]	3.8	-	8	75	2
Z4	3.9	-	5.5[d]	95	3
Z6	3.9	-	5.5[d]	104	3.5
B2	5	-	9[f]	25	1
B3	9.1	-	16.2[g]	12	1
C3	9.1	-	16.2[g]	18	1
D3	8	-	16.5[g]	24	1.5
E3L	8	-	13.9[l]	40	2
Z7	8	-	16.5[g]	45	3
EE2	7.6	-	16[g]	45	4
D4	14	-	21.5[i]	18	1.5
E4	14	-	19.9[m]	30	2
E3H	14	-	15	36	2
C4	16.3	-	21.5[i]	14	1
CC3	18.2	-	32.4[j]	18	2
E5L[o]	20	-	24	27	2
B5	21.6	-	31[h]	6	1
C5	21.6	-	31[j]	10	1
D5	21	-	28	15	1.5
E5H[o]	24	-	28	25	2
Z19[co]	24	-	28	36	3.5
HH5/3	25.3	-	44.2[b]	5	1
DD4	28	-	43[s]	18	3
EE4[c]	28	-	38	22.5	4
HH5/4	32.5	-	53[t]	4.5	1
BB4	32.6	-	43[q]	10	2
EE5L[co]	40	-	48	18	4
C5B4	43	-	48	10	2
EE5H[o]	48	-	56	18	4
CC5	48.1	-	62[r]	10	2
DD5	42	-	56	15	3

(twin output modules)										
Module	V1 Adjustment Range (Volts)			Amps	V2 Adjustment Range (Volts)			Amps	Slots
H1L/1L					1.8	-	3.8[n]	8	1
H1L/1H					3.9	-	5.5[d]	8	1
H1L/2	1.8	-	3.8[n]	12	5.6	-	9[f]	6	1
H1L/3					9.1	-	16.2[u]	6	1
H1L/4					16.3	-	25[p]	4.5	1
H1H/1L					1.8	-	3.8[n]	8	1
H1H/1H					3.9	-	5.5[d]	8	1
H1H/2	3.9	-	5.5[d]	12	5.6	-	9[f]	6	1
H1H/3					9.1	-	16.2[u]	6	1
H1H/4					16.3	-	25[p]	4.5	1
H2/1L					1.8	-	3.8[n]	8	1
H2/1H					3.9	-	5.5[d]	8	1
H2/2	5.6	-	9[f]	10	5.6	-	9[f]	6	1
H2/3					9.1	-	16.2[u]	6	1
H2/4					16.3	-	25[p]	4.5	1
H3/1L					1.8	-	3.8[n]	8	1
H3/1H					3.9	-	5.5[d]	8	1
H3/2	9.1	-	16.2[u]	10	5.6	-	9[f]	6	1
H3/3					9.1	-	16.2[u]	6	1
H3/4					16.3	-	25[p]	4.5	1
H5/1L					1.8	-	3.8[n]	8	1
H5/1H					3.9	-	5.5[d]	8	1
H5/2	16.2	-	28	5	5.6	-	9[f]	6	1
H5/3					9.1	-	16.2[u]	6	1
H5/4					16.3	-	25[p]	4.5	1

Wide Range Programmable Modules					
Module	Voltage Range			Amps	Slots
W2[a]	1	-	7.5	30	1
W5	0.5	-	32	8.5	1

Select features from table below

Follow by		
	F or T	Fixed or Tracking Overvoltage protection
	F or S	Fast-on or Screw terminal
	R or V	Resistance (0-32kOhm)
		Voltage (0-5V) programming
	1, 2, 3 or 4	1 Inhibit, Fixed Current Limit
		2 Inhibit, Programmable current limit (0-5V)
		3 Enable, Fixed Current Limit
		4 Enable, Programmable current limit (0-5V)

Follow non wide range modules by F (Fast-on) or S (Screw) terminal

Options - Single output Modules*		Options - Twin Output Modules*	
N	Output Inhibit, Module Good Current Sharing	N	Output Inhibit, Module Good, Remote Sense
		R	Remote sense only

* see configuring guide

a) F1, F2 and W2 modules not for Vega 900
b) 38V max for 900W
c) Only available for Vega 900
d) 5.1V max for 900W
e) 3.4V max for 900W
f) 8V max for 900W
g) 15V max for 900W
h) 28V max for 900W
i) 18V max for 900W
j) 30V max for 900W
k) 7.5V max for 900W
l) 12.5V max for 900W
m) 19V max for 900W
n) 3.4V max for 900W
o) 'N' option not available
p) 24V max for 900W
q) 40V max for 900W
r) 60V max for 900W
s) 36V max for 900W
t) 52V max for 900W
u) 15.5V max for 900W

Vega Configuring Guide

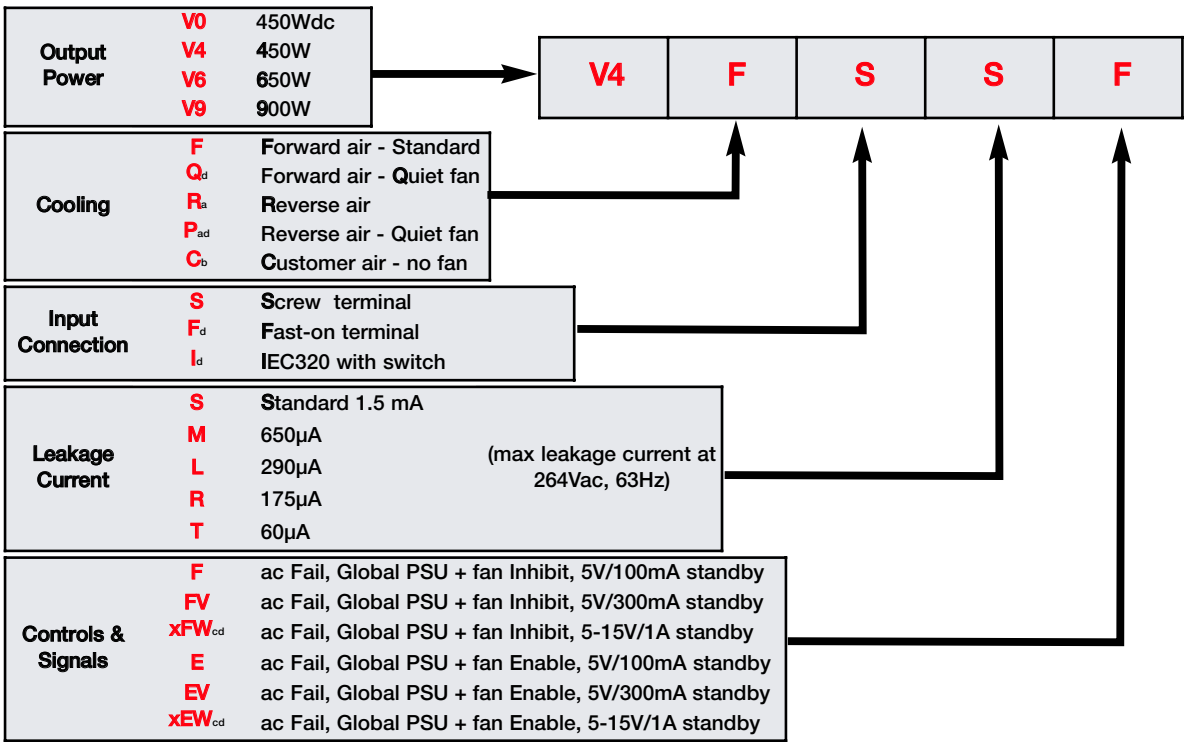
The extensive range of output modules and options make it possible to achieve almost any combination of Volts and Amps. The 'online' configurator is the best way to achieve the optimum configuration, however you can also create your own Vega configuration from this datasheet by using the guide below.

Web Configurator

1 Visit **http://www.lambda-gb.com**, select 'Vega Configurator' and follow the online instructions.
2 Enter your required Volts / Amps, type of output connection and any additional functions (if required)
3 Enter preferred type of cooling, input connection, lower leakage current (if required) and controls & signal functions, (if required)
4 Configurator will select the most suitable modules and options and give a unique part number.

Configuring from Datasheet

1 Calculate total output power to determine Vega 450W, 650W or 900W and select converter, then select required Cooling, Connection, Leakage Current and Controls/Signals from the following table:-

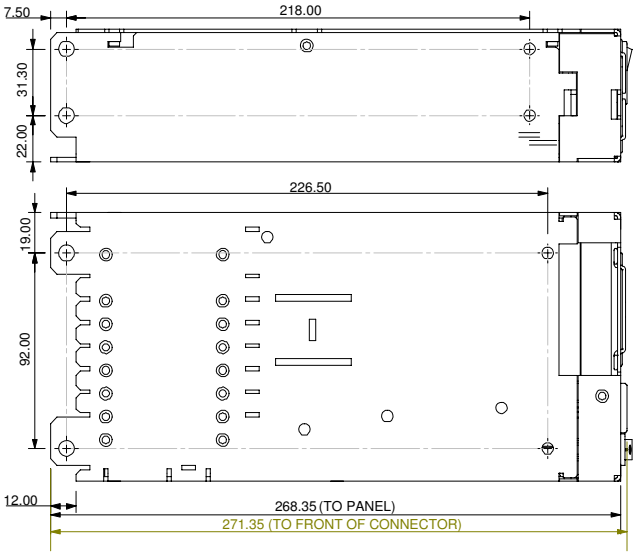


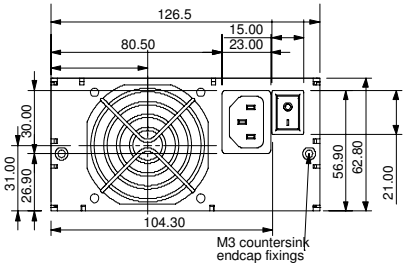
Notes:
a) Not available for Vega 900
b) Thermocoupled sample recommended to ensure adequate cooling - consult sales
c) xFW and xEW options increase leakage current by 90µA
Replace 'x' with required output voltage (5FW = 5V aux supply)
d) Not available for Vega dc.

2 Select Output Modules and Options from the Output Voltages tables.
Example - if you require 5.2V / 18A with output inhibit : -
a) select B1H as closest match for voltage and current and prefix with voltage (eg **5.2B1H**)
b) add suffix S or F for Screw or Fast-on connection (eg 5.2B1H**S**)
c) add suffix N for output inhibit eg 5.2B1HS**N**
d) repeat for other outputs

Ensure you do not select more than a total of 5 slots width of module. This will create a complete product description eg:-
V6FSSF 5L1S 12/12H3/3S 24C5S which represents a four output 650W Vega with Forward air, Screw input terminals, 1.5mA Earth Leakage, ac Fail, Global Inhibit & 5V / 100mA aux supply with the following outputs:-
Output 1 = 5V / 35A with output inhibit, Module Good and Current Share option
Output 2 = 12V / 10A
Output 3 = 12V / 6A
Output 4 = 24V / 10A

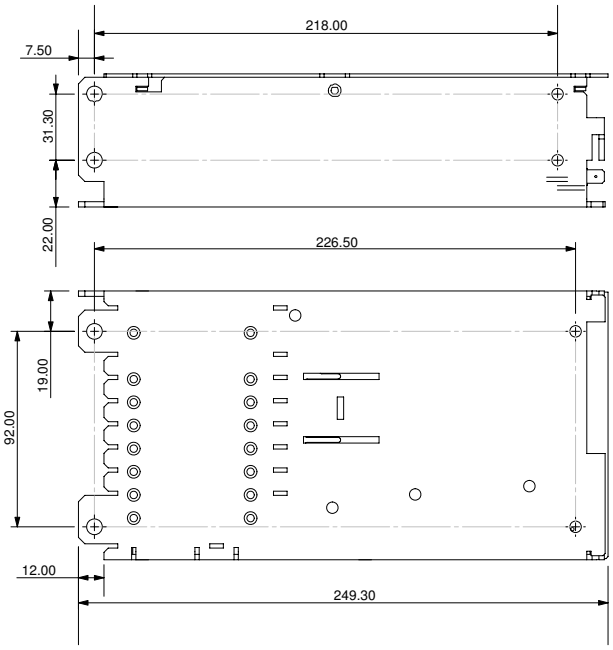
3 **Contact Lambda to validate configuration and issue a part number.**

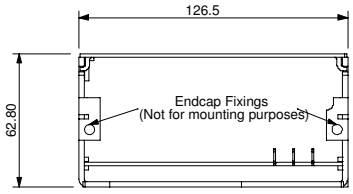




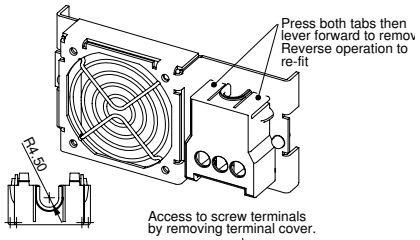
IEC-320 Connector Case

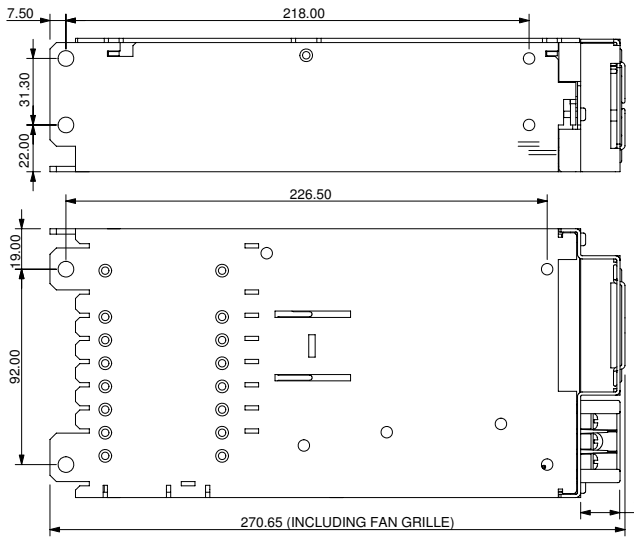
All versions have:-
8 x M4 Customer fixings
Max thread penetration:- 4.5mm

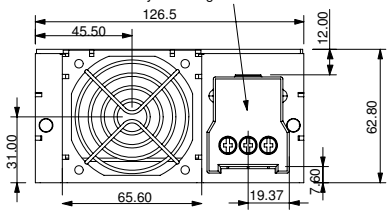




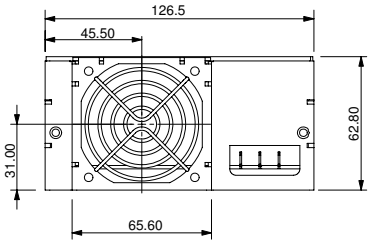
Customer Air Case (no fan)







Screw & Fast-on Terminal Case



LAMBDA

- Industry Leading Power Density
- 1 to 11 outputs
- Voltages from 1.8 to 56V
- Current up to 60 Amps
- Screw connection
- Worldwide approvals & CB report
- Medical Approval Option
- 3 Year Warranty

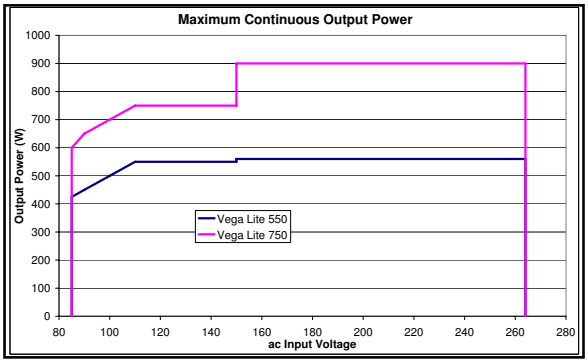
Vega-Lite

550-900 Watts, Modular power solution

Key Market Segments & Applications

Instrumentation
Medical
Automation
Security
Network Servers and Routers
Broadcast
ATE
Industrial Computing
Lifesciences/Laboratory

INPUT	
Voltage Range	85 - 264Vac
Frequency	47 - 63Hz (440Hz with reduced PFC - consult factory)
Inrush Current	<40A at 25°C and 264Vac (cold start)
Fuse	16A / 250Vac High Breaking Capacity, Fast Acting (not user accessible)
Leakage Current	1.5mA max at 264Vac & 63Hz (medical version also available)
Power Factor	0.99 typical



OUTPUT		
Voltage / Current	See module tables	
Turn on Delay	1.5s max	at 90Vac & 100% rated output power
Rise Time	<50ms	to 90% of voltage, monotonic rise above 10%
Turn on Overshoot	<5% or 250mV	Load type dependant, no overshoot with resistive load
Efficiency	75%	typical at 230Vac & 100% rated power, configuration dependent
Hold up	16ms min	at 100Vac & 100% rated output power
Ripple & Noise	<1%	(or 50mV if higher) Pk- Pk, using EIAJ test method & 20MHz bandwidth
Voltage Accuracy	<1%	of set Voltage
Remote Sense	Yes	Standard on single output modules, max 0.75V total line drop Option for twin output modules
Minimum Load	No	on any output
Temperature Coefficient	<0.02%	of rated voltage per °C
Load Regulation	<0.5% or 25mV	for 0-100% load change
Line Regulation	<0.1%	for 100 - 264Vac input change
Cross Regulation	<0.2%	for 100% load change on any other output
Transient Response Recovery	<6% or 300mV	of set voltage for 50% load change (above 25% load)
	500µs	for recovery to 1% or 100mV of set voltage
Over Voltage Protection	120 - 130%	of set voltage for outputs > 4.1V (Tracking OVP)
	140 - 150%	of set voltage for outputs < 4.1V (Tracking OVP)
	120 - 150%	of max rated output (Fixed OVP)
Over Current Protection	105 - 125%	of rated current, constant current characteristic
Short Circuit Protection	<150%	of rated current, when output voltage <1%
Over Temperature Protection	Yes	Shuts down all outputs and fan. Cycle ac off / on to reset
		Note 1 shutdown temp varies according to ambient, output power and input V 2 ac fail signal (if fitted) provides 5ms warning of thermal shutdown

OUTPUT VOLTAGES (single modules)								
	Module Width (Slots)							
	1 slot		1.5 slots		2 slots		3 slots	
Output Voltage	Module	Current	Module	Current	Module	Current	Module	Current
1.8V	1.8C1S	35A	1.8D1LS	50A	1.8E1S	60A		
2V	2C1S	35A	2D1LS	50A	2E1S	60A		
3.3V	3.3C1S	35A	3.3D1LS	50A	3.3E1S	60A		
5V	5L1S	35A	5D1HS	50A	5E2S	60A		
6.5V	6.5B2S	25A	6.5D2S	45A	6.5E2S	60A		
12V	12C3S	18A	12D3S	24A	12E3LS	40A		
15V	15C3S	18A	15D3S	24A	15E4S	30A		
18V	18C4S	14A	18D4S	18A	18E4S	30A		
24V	24C5S	10A	24D5S	15A	24E5HS	25A		
28V	28C5S	10A	28D5S	15A	28E5HS	25A		
36V	36HH5/4S	4.5A			36BB4S	10A		
48V	48HH5/4S	4.5A			48C5B4S	10A	48DD5S	15A

OUTPUT VOLTAGES (twin modules) - all 1 slot width							
		Channel 1					
	Output Voltage	5V / 12A	12V / 10A	15V / 10A	18V / 5A	24V / 5A	28V / 5A
Channel 2	1.8V / 8A	5/1.8H1H/1LS					
	2V / 8A	5/2H1H/1LS					
	3.3V / 8A	5/3.3H1H/1LS					
	5V / 8A		12/5H3/1HS	15/5H3/1HS	18/5H5/1HS	24/5H5/1HS	28/5H5/1HS
	12V / 6A	5/12H1H/3S	12/12H3/3S	15/12H3/3S	18/12H5/3S	25/12H5/3S	28/12H5/3S
	15V / 6A	5/15H1H/3S	12/15H3/3S	15/15H3/3S	18/15H5/3S	25/15H5/3S	28/15H5/3S
	18V / 4.5A				18/18H5/4S	24/18H5/4S	28/18H5/4S
	24V / 4.5A				18/24H5/4S	24/24H5/4S	28/24H5/4S

OUTPUT VOLTAGES (single modules)						
Module	Adjustment Range (Volts)			Amps	Slots	
C1S	1.8	-	3.4	35	1	
D1LS	1.8	-	3.4	50	1.5	
E1S	1.8	-	3.4	60	2	
L1S	4.2	-	5.1	35	1	
D2S	3.8	-	7.5	45	1.5	
D1HS	3.9	-	5.1	50	1.5	
E2S	3.8	-	7.5	60	2	
B2S	5	-	8	25	1	
C3S	9.1	-	15	18	1	
D3S	8	-	15	24	1.5	
E3LS	8	-	12.5	40	2	
D4S	14	-	18	18	1.5	
E4S	14	-	19	30	2	
C4S	16.3	-	18	14	1	
C5S	21.6	-	30	10	1	
D5S	21	-	28	15	1.5	
E5HS	24	-	28	25	2	
HH5/4S	32.5	-	48	4.5	1	
BB4S	32.6	-	40	10	2	
C5B4S	43	-	48	10	2	
DD5S	42	-	56	15	3	

TWIN OUTPUT MODULES									
Module	V1 Adjustment Range (Volts)			Amps	V2 Adjustment Range (Volts)			Amps	Slots
H1H/1LS	3.9	-	5.1	12	1.8	-	3.4	8	1
H1H/3S	3.9	-	5.1	12	9.1	-	15.5	6	1
H3/1HS	9.1	-	15.5	10	3.9	-	5.1	8	1
H3/3S	9.1	-	15.5	10	9.1	-	15.5	6	1
H5/1HS	16.2	-	28	5	3.9	-	5.1	8	1
H5/3S	16.2	-	28	5	9.1	-	15.5	6	1
H5/4S	16.2	-	28	5	16.3	-	24	4.5	1

Options - Single output Modules*		Options - Twin Output Modules*	
N	Output Inhibit, Module Good Current Sharing	N	Output Inhibit, Module Good, Remote Sense
		R	Remote Sense Only
* see configuring guide			

SAFETY APPROVALS

	Date	Amendments		Date	Amendments
EN 60950-1	2006		EN 61010-1	2001	
UL 60950-1	2003		IEC 61010-1*	2001	
CSA22.2 No 60950-1	2003		IEC 60601-1	1988	A1, A2
IEC 60950-1*	2005		EN 60601-1[a]	1990	A1, A2, A13
CE Mark	LV Directive 2006/95/EC (EN60950-1)		UL 60601-1[a]	2003	with revisions 2006

* CB Certificate and report available on request

a - Only for 'L' type leakage variants
Check with technical Sales for status of approvals

ISOLATION

Input to Output	Reinforced	4.3 kV (dc)	Output to Earth	Operational	200 V (dc)
Input to Earth	Basic	2.3 kV (dc)	Output to Output	Operational	200 V (dc)

EMISSIONS BS EN61000-6-3:2001 (Residential, Commercial & Light Industrial Supply), also complies with BS EN61000-6-4:2001

Radiated Electric Field	EN55022	Class B (as per CISPR.22)	See application note for details. Only for 'S' type leakage versions
Conducted Emissions	EN55022	Class B (as per CISPR.22)	Only for 'S' type leakage versions. 'L' types meet Class A
Conducted Harmonics	EN61000-3-2	Compliant to Class A	
Flicker	EN61000-3-3	Compliant	

IMMUNITY BS EN61000-6-2:2001 (Industrial Environment), also complies with BS EN61000-6-1:2001

				Criteria
Electrostatic Discharge	EN61000-4-2	Level 4	Air discharge 15kV Contact discharge 8kV	A
Electromagnetic Field	EN61000-4-3	Level 3	10V/m (tested to 12V/m)	A
Fast / Burst Transient	EN61000-4-4	Level 4	Input 4kV Outputs 2kV Tested at 5kHz and 100kHz	A
Surge Immunity	EN61000-4-5	Level 3	Line to Line 1kV (tested to 1.1kV) Line to Earth 2kV (tested to 2.2kV)	A
Conducted RF Immunity	EN61000-4-6	Level 3	10V (tested to 12V)	A
Power Frequency Magnetic Field	EN61000-4-8	Level 4	30A Continuous	A
Voltage Dips, Variation, Interruptions	EN61000-4-11	Class 3		A B for 5s interruptions

ENVIRONMENT

Temperature	0° to 65° operational, -25° to 85°C storage (max 12 months)
Derating	50°C to 65°C derate each output by 2.5% per °C
Low Temperature Start-up	-20°C
Humidity	5-95% RH non condensing
Shock	±3 x 20*g* shocks in each plane, total 18 shocks 20*g* shock = 11ms (±0.5ms), half sine conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, JIS C0041-1987 conforms to MIL-STD-810E/F, Method 514.4, Pro I, Cat 1, 9
Vibration	Single axis 10 - 500Hz at 2*g* (sweep and endurance at resonance) in all 3 planes Conforms to EN60068-2-6, IEC68-2-6 Conforms to MIL-STD-810E, Method 516.5, Pro I, IV, VI
Altitude	3,000 metres operational (15,000 metres non operational)
Pollution	Degree 2, Material group 3
IP Rating	IP 10

Vega Configuring Guide

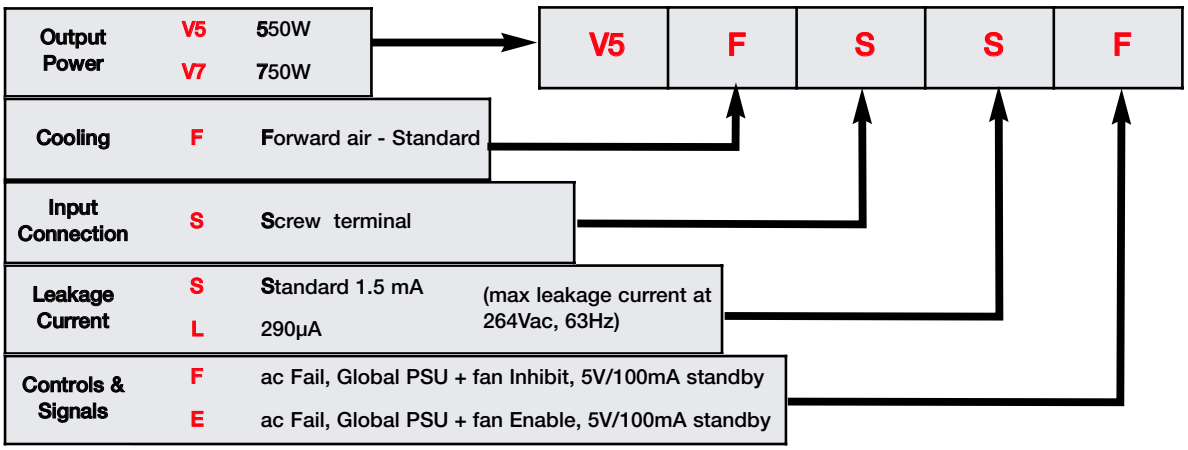
The extensive range of output modules and options make it possible to achieve all popular combinations of Volts and Amps. The 'online' configurator is the best way to achieve the optimum configuration, however you can also create your own Vega configuration from this datasheet by using the guide below.

Web Configurator

1 Visit http://www.lambda-gb.com, select 'Vega Configurator' and follow the online instructions.
2 Enter your required Volts / Amps, and any additional functions (if required)
3 Enter preferred type of cooling, input connection, lower leakage current (if required) and controls & signal functions, (if required)
4 Configurator will select the most suitable modules and options and give a unique part number.

Configuring from Datasheet

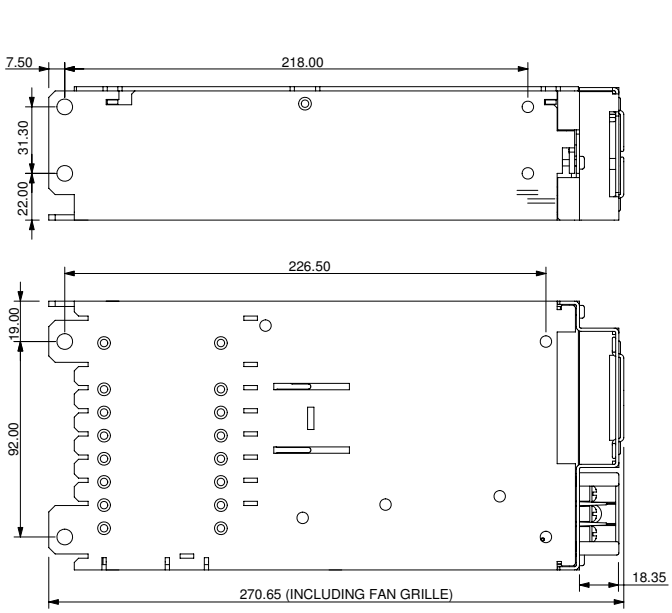
1 Calculate total output power to determine Vega 550W (700W at 150 Vac and above) or 750W (900W at 150Vac and above) and select converter, then select required Cooling, Connection, Leakage Current and Controls/Signals from the following table:-

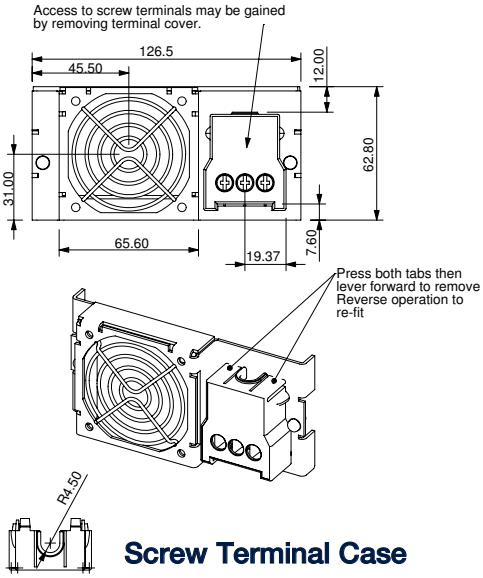


2 Select Output Modules and Options from the Available Output Voltages tables.
Example - if you require 5V / 18A with output inhibit : -
a) select 5L1S as closest match for voltage and current
b) add suffix N for output inhibit eg **5L1SN**
c) repeat for other outputs

Ensure you do not select more than a total of 5 slots width of module. This will create a complete product description eg:-
V5FSSF 5L1S 12/12H3/3S 24C5S which represents a four output 550W Vega with Forward air, Screw input terminals, 1.5mA Earth Leakage, ac Fail, Global Inhibit & 5V / 100mA aux supply.
Output 1 = 5V / 35A with output inhibit, Module Good and Current Share option
Output 2 = 12V / 10A
Output 3 = 12V / 6A
Output 4 = 24V / 10A

3 **Contact Lambda to validate configuration and issue a part number.**

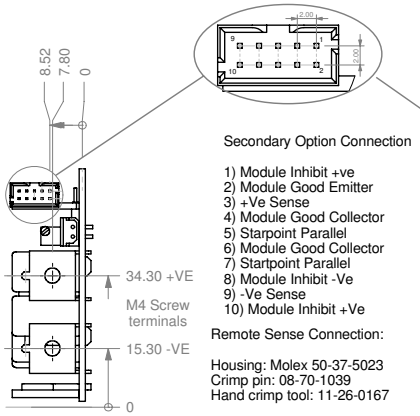




Screw Terminal Case

8 x M4 Customer fixings

Max thread penetration:- 4.5mm



Dual Slot Single Output

Secondary Option Connection

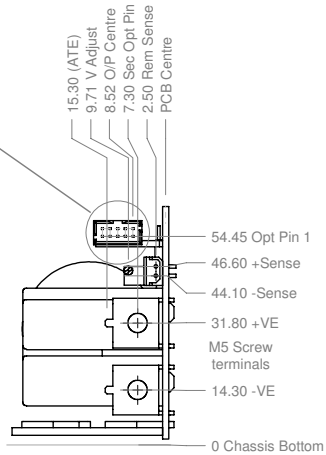
1) Module Inhibit +ve
2) Module Good Emitter
3) +Ve Sense
4) Module Good Collector
5) Starpoint Parallel
6) Module Good Collector
7) Startpoint Parallel
8) Module Inhibit -Ve
9) -Ve Sense
10) Module Inhibit +Ve

Remote Sense Connection:

Housing: Molex 50-37-5023
Crimp pin: 08-70-1039
Hand crimp tool: 11-26-0167

Secondary Option Connection

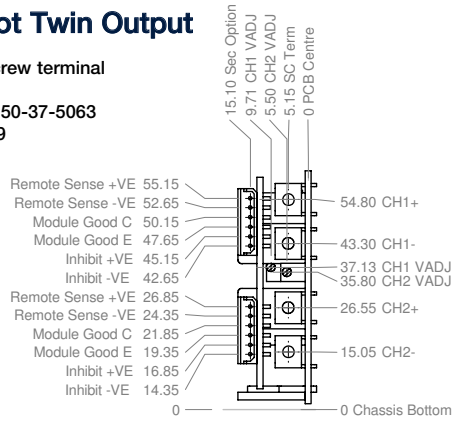
Housing: Molex 51110-1060
Crimp pin: 50394
Hand crimp tool: 69008-0959



Single Slot Single Output

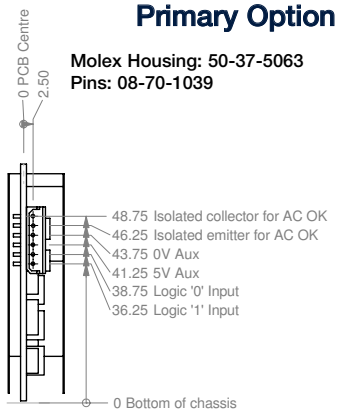
Single Slot Twin Output

Module: - M3 screw terminal
Option:
Molex Housing: 50-37-5063
Pins: 08-70-1039

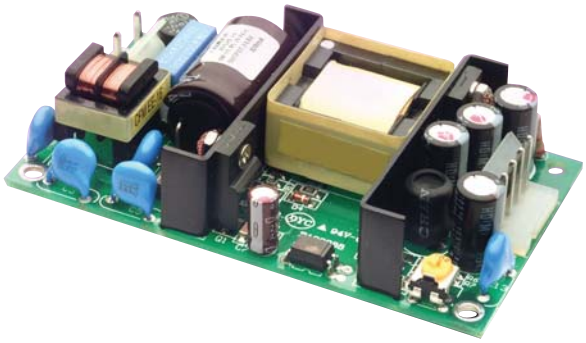


Primary Option

Molex Housing: 50-37-5063
Pins: 08-70-1039



LAMBDA



- Wide Range AC Input
- Low Profile, Industry Standard Footprint
- Global Safety Agency Compliance
- RoHS Compliant

ZP20 Series

2" x 3.5" 20W AC-DC Power Supplies

Key Market Segments & Applications

Video/Audio Routers
Datacom
Point of Sale
Test and Measurement
LED Signs and Lighting

ZP20 Features and Benefits

Features	*Benefits*
• Industry Standard Footprint	• Available to Second Source
• Up to 82% efficiency	• Less System Heating
• Broad Product Range	• Optimization of Power Supply to System
• Meets EN61000-4 Immunity	• Greater Reliability

Specifications

ITEMS \ MODEL		ZPS20
Input Voltage range	-	85 - 264VAC (47 - 440Hz) or 120 - 370VDC
Inrush Current (132/264VAC)	A	20 / 40 (cold start)
Input Current (115/230VAC)	A	0.25 / 0.12
Temperature Coefficient	-	±0.05%/°C
Voltage Accuracy	-	±1%
Minimum Load	A	None
Load Regulation	-	±1%
Line Regulation	-	±0.5%
Ripple & Noise (1)	mV	1% or 50mV whichever is greater
Short Circuit Protection	-	Continuous - hiccup mode
Overvoltage Protection	V	Typically 110-130% of nominal
Hold Up Time (Typ)	ms	16ms at 115VAC input
Operating Temperature		0 to +70°C with derating
Storage Temperature	-	-20 to +85°C
Humidity (non condensing)	-	10 - 95% RH
Cooling	-	Convection
Withstand Voltage		Input to Ground 1.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.
Isolation Resistance		>100M at 25C & 70%RH, Output to Ground 500VDC
Vibration (non operating)		23.52m/s² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)
Shock	-	< 196.1 m/s² (20G)
Safety Agency Approvals	-	UL60950, CSA60950, EN60950-1 Class II, CE Mark (LVD)
Conducted & Radiated EMI	-	EN55022-B, FCC Class B
Immunity	-	EN61000-4-2,-3,-4,-6,-8
Weight (Typ)	g	100g
Size (WxLxH)	mm	88.9 X 50.8 X 20.32 (including underside components)
Warranty	-	One Year

Notes:
(1) Measured with 0.1uF ceramic & 10uF electrolytic at 20MHz BW

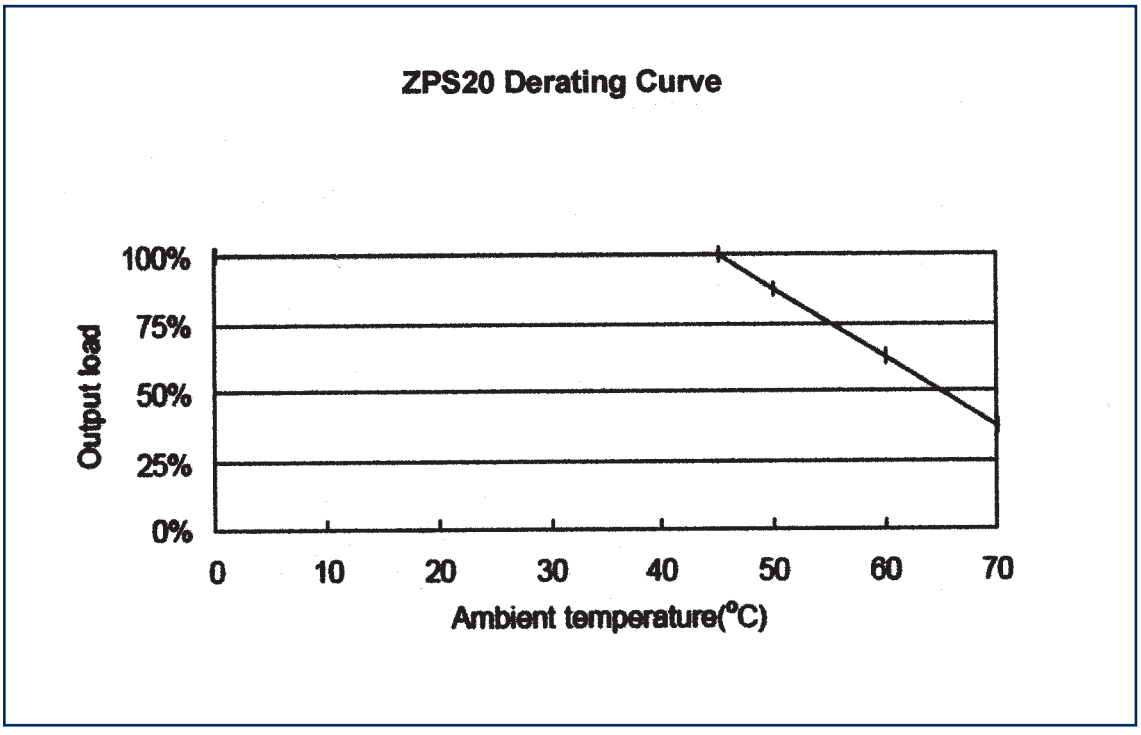
Models

Model		Output Voltage (V)	Maximum Output (A)	Peak Load (A) (2)
ZPS20-3R3	V1	3.3	4.4	6.6
ZPS20-5	V1	5.0	4.4	6.6
ZPS20-9	V1	9.0	2.4	4.0
ZPS20-12	V1	12.0	1.8	2.7
ZPS20-15	V1	15.0	1.4	2.1
ZPS20-24	V1	24	0.9	1.4

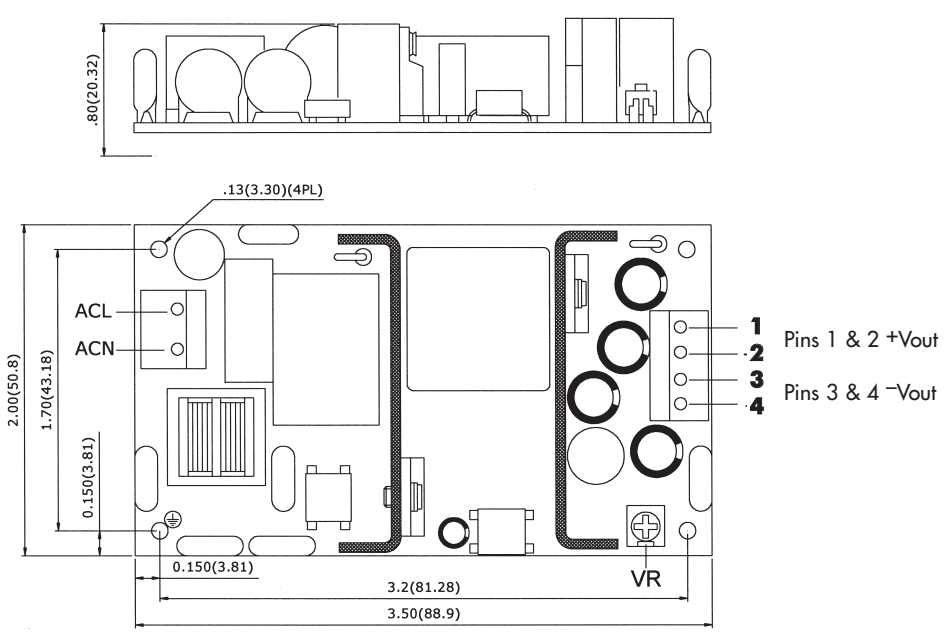
Notes: (2) Average not to exceed max power, <30s, 10% duty cycle

INTERMEDIATE VOLTAGES
AVAILABLE PLEASE CONSULT SALES

NEW 'A' VERSION
COMING SOON
Please check www.lambda-gb.com/zps
for availability

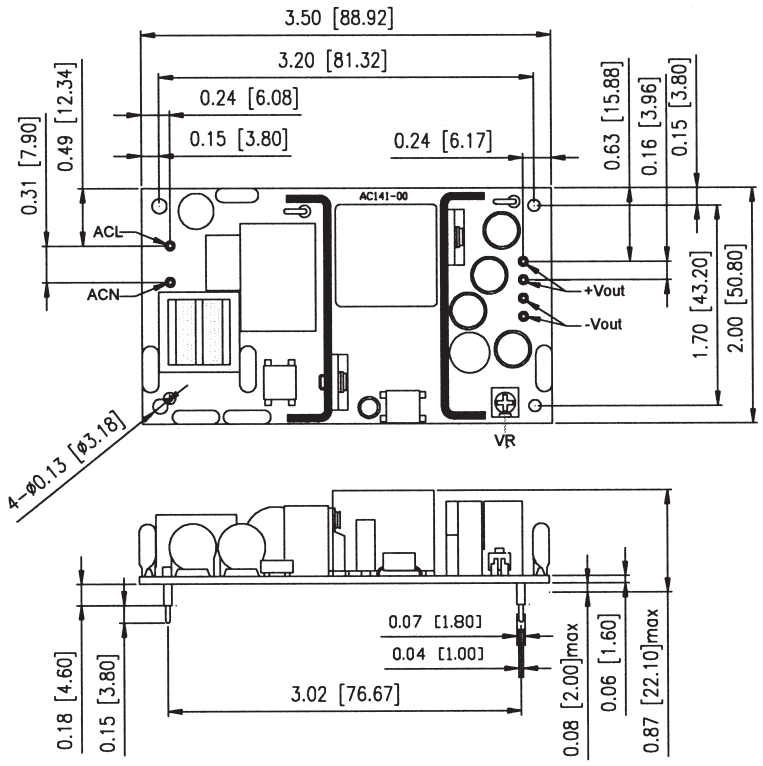


ZPS20 Outline Drawing



Input Connector Mates with Molex Housing 09-50-3031 and Molex 2478 Series Crimp Terminal
Output Connector Mates with Molex Housing 09-50-3041 and Molex 2478 Series Crimp Terminal

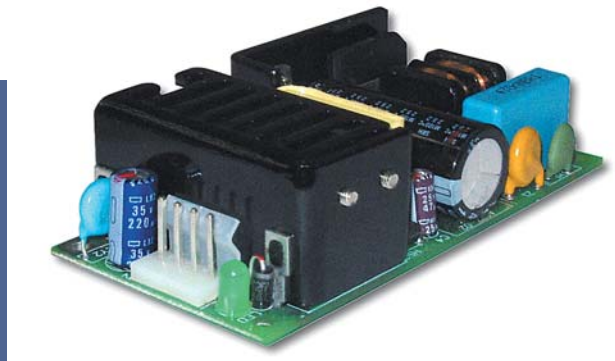
ZPS20-P Outline Drawing



Options

ADD SUFFIX -P FOR PCB MOUNT PINS

LAMBDA



- Single and Multiple Outputs
- Wide Range AC Input
- Low Profile, Industry Standard Footprint
- Global Safety Agency Compliance
- RoHS Compliant

Key Market Segments & Applications

Video/Audio Routers
Datacom
Point of Sale
Test and Measurement
LED Signs and Lighting

ZP40 & 60 Series

2" x 4" 40W to 60W AC-DC Power Supplies

ZP40 & 60 Features and Benefits

Features	*Benefits*
• Industry Standard Footprint	• Available to Second Source
• Up to 88% efficiency	• Less System Heating
• Broad Product Range	• Optimization of Power Supply to System
• Meets EN61000-4 Immunity	• Greater Reliability

Specifications

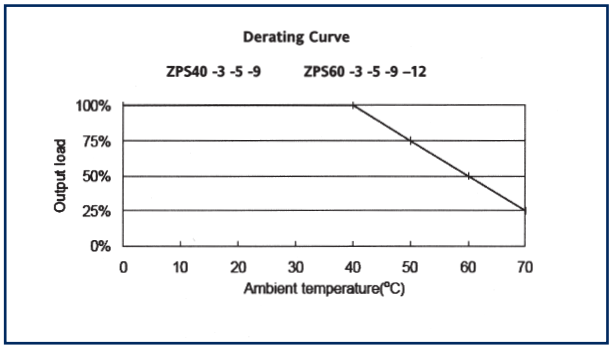
ITEMS / MODEL		ZPS40	ZPS60	ZPD40	ZPT40
Input Voltage range	-	90 - 264VAC (47 - 440Hz) or 120 - 370VDC			
Inrush Current (132/265VAC)	A	25 / 50 (cold start)			
Input Current (115/230VAC)	A	1.6 / 1.0			
Temperature Coefficient	-	±0.05%/°C			
Voltage Accuracy	-	±1%		V1: ±3%, V2: ±4%, V3: ±3%	
Minimum Load	A	None		V1: 0.4A, V2: 0.2A	
Load Regulation (1)	-	±1%		V1: ±3%, V2: ±5%, V3: ±1%	
Line Regulation (2)	-	±0.5%		V1: ±1%, V2: ±2%, V3: ±1%	
Ripple & Noise (3)(4)	mV	1% or 50mV whichever is greater			
Short Circuit Protection	-	Continuous - hiccup mode			
Overvoltage Protection	V	Typically 110-130% of nominal			
Hold Up Time (Typ)	ms	8ms at 115VAC input			
LED Indicator	-	Green LED = OK		None	
Operating Temperature		0 to +70°C with derating			
Storage Temperature	-	-20 to +85°C			
Humidity (non condensing)	-	10 - 95% RH			
Cooling	-	Convection			
Withstand Voltage		Input to Ground 1.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.			
Isolation Resistance		>100M at 25C & 70%RH, Output to Ground 500VDC			
Vibration (non operating)		23.52m/s² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)			
Shock	-	< 196.1 m/s² (20G)			
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1 Class I, CE Mark (LVD)			
Conducted & Radiated EMI	-	EN55022-B, FCC Class B			
Immunity	-	EN61000-4-2,-3,-4,-6,-8			
Weight (Typ)	g	180g			
Size (WxLxH)	mm	101.6 X 50.8 X 30.48 (including underside components)			
Warranty	-	One Year			

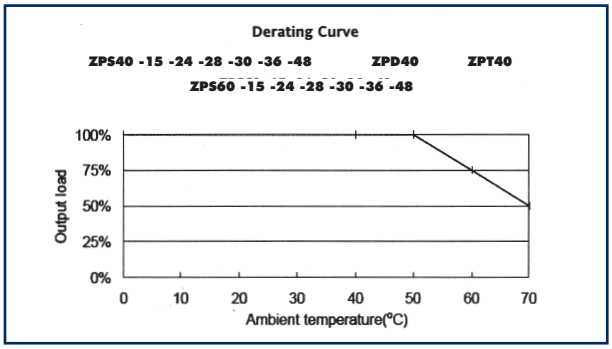
Notes:
(1) ZPD, ZPT for a 60% to 100% or 100% to 60% change in load
(2) ZPT40-3512N V2: ±3%, ZPS/ZPD40: 100-240VAC
(3) Measured with 0.1uF ceramic & 10uF electrolytic at 20MHz BW
(4) ZPT40-3512N, V1 & V2 100mV

Models

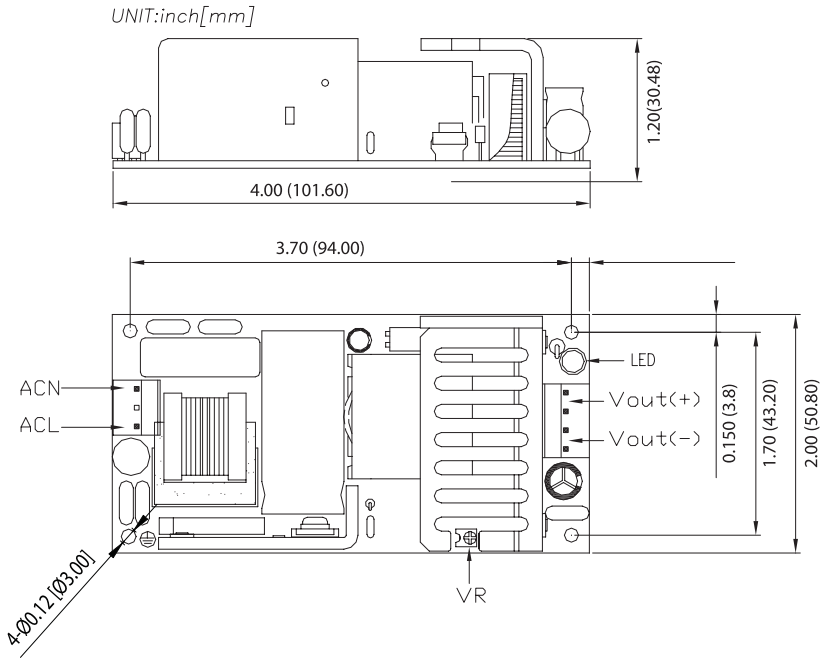
	Model		Output Voltage (V)	Maximum Output (A)	Peak Load (A) (5)	Output Pwr (W)	Eff.(3) (typ)%
Single Output	ZPS40-3R3	V1	3.3	6.0	7.2	20.0	74
	ZPS60-3R3	V1	3.3	8.0	8.5	26.0	74
	ZPS40-5	V1	5.0	6.0	7.2	30.0	78
	ZPS60-5	V1	5.0	8.0	9.0	40.0	78
	ZPS40-9	V1	9.0	4.45	5.34	40.0	82
	ZPS60-9	V1	9.0	6.67	8.0	60.0	82
	ZPS40-12	V1	12.0	3.34	4.0	40.0	84
	ZPS60-12	V1	12.0	5.0	6.0	60.0	84
	ZPS40-15	V1	15.0	2.67	3.2	40.0	85
	ZPS60-15	V1	15.0	4.0	4.8	60.0	85
	ZPS40-24	V1	24.0	1.67	2.0	40.0	86
	ZPS60-24	V1	24.0	2.5	3.0	60.0	86
	ZPS40-28	V1	28.0	1.43	1.71	40.0	86
	ZPS60-28	V1	28.0	2.14	2.57	60.0	86
	ZPS40-30	V1	30.0	1.33	1.6	40.0	86
	ZPS60-30	V1	30.0	2.0	2.4	60.0	86
	ZPS40-36	V1	36.0	1.11	1.33	40.0	87
	ZPS60-36	V1	36.0	1.67	2.0	60.0	87
	ZPS40-48	V1	48.0	0.834	1.0	40.0	88
	ZPS60-48	V1	48.0	1.25	1.5	60.0	88
Dual	ZPD40-512	V1	+5.0	3.2	5.0	40.0	77
		V2	+12.0	2.0	2.5		
	ZPD40-524	V1	+5.0	3.2	5.0	40.0 (6)	78
		V2	+24.0	1.0	1.5		
Triple Output	ZPT40-5125N	V1	+5.0	3.2	5.0	40.5 (6)	75
		V2	+12.0	2.0	2.5		
		V3	-5.0	0.3	0.5		
	ZPT40-51212N	V1	+5.0	3.2	5.0	42.6 (6)	75
		V2	+12.0	2.0	2.5		
		V3	-12.0	0.3	0.5		
	ZPT40-51515N	V1	+5.0	3.2	5.0	42.0 (6)	75
		V2	+15.0	1.5	2.3		
		V3	-15.0	0.3	0.5		
	ZPT40-52412N	V1	+5.0	3.2	5.0	42.6 (6)	75
		V2	+24.0	1.0	1.5		
		V3	-12.0	0.3	0.5		
	ZPT40-5245N	V1	+5.0	3.2	5.0	40.5 (6)	75
		V2	+24.0	1.0	1.5		
		V3	-5.0	0.3	0.5		
	ZPT40-52412P	V1	+5.0	3.2	5.0	42.6 (6)	75
		V2	+24.0	1.0	1.5		
		V3	+12.0	0.3	0.5		
	ZPT40-3512N	V1	+3.3	5.0	7.0	30.0	70
		V2	+5.0	2.0	3.5		
		V3	-12.0	0.3	0.5		

Notes: (5) Average not to exceed max power, <30s, 10% duty cycle
(6) 50With 30CFM forced air cooling, derate linearly to 35W from 50°C to 70°C



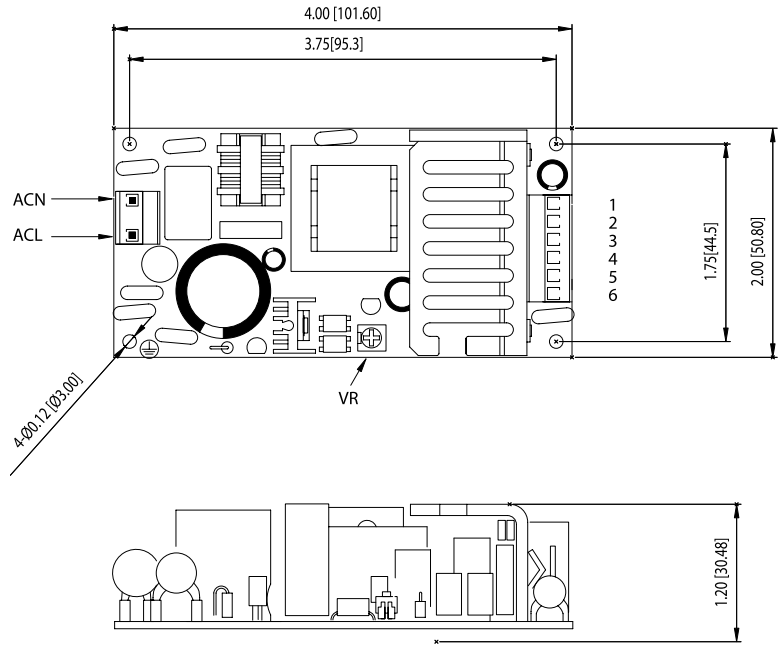


ZPS Outline Drawing



Input Connector Mates with Molex Housing 09-50-3031 and Molex 2478 Series Crimp Terminal
Output Connector Mates with Molex Housing 09-50-3041 and Molex 2478 Series Crimp Terminal

ZPD/ZPT Outline Drawing



Input Connector Mates with Molex Housing 09-50-3031 and Molex 2478 Series Crimp Terminal
Output Connector Mates with Molex Housing 09-50-3061 and Molex 2478 Series Crimp Terminal

INTERMEDIATE VOLTAGES
AVAILABLE PLEASE CONSULT SALES

NEW 'A' VERSION

COMING SOON

Please check www.lambda-gb.com/zps
for availability

Pin Connection (ZPD/ZPT)

PIN	Function	PIN	Function
1	V2	2	V1
3	V1	4	COM
5	COM	6	V3

LAMBDA

- PFC
- Wide Range AC Input
- Low Profile, Industry Standard Footprint
- Global Safety Agency Compliance
- RoHS Compliant

ZP100 Series

3" x 5" 100W AC-DC Power Supplies

Key Market Segments & Applications

Video/Audio Routers
Datacom
Point of Sale
Test & Measurement
LED Signs and Lighting

ZP100 Features and Benefits

Features	*Benefits*
• Industry Standard Footprint	• Available to second source
• Up to 85% efficiency	• Less system heating
• Broad product range	• Optimisation of power supply to system
• Meets EN61000-4 immunity	• Greater reliability

Specifications

ITEMS / MODEL		ZPS100
Input Voltage range	-	90 - 264VAC (47 - 440Hz) or 120 - 370VDC
Inrush Current (132/264VAC)	A	25 / 50 (cold start)
Input Current (115/230VAC)	A	1.1 / 0.6
Temperature Coefficient	-	±0.05%/°C
Voltage Accuracy	-	±1%
Minimum Load	A	None
Load Regulation	-	±1%
Line Regulation	-	±0.5%
Ripple & Noise (1)	mV	1% or 50mV whichever is greater
Short Circuit Protection	-	Continuous - hiccup mode
Overvoltage Protection	V	Typically 110-130% of nominal
Hold Up Time (Typ)	ms	8ms at 115VAC input
LED Indicator	-	Green LED = OK
Operating Temperature		0 to +70°C with derating
Storage Temperature	-	-20 to +85°C
Humidity (non condensing)	-	10 - 95% RH
Cooling	-	Convection
Withstand Voltage		Input to Ground 1.5kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.
Isolation Resistance		>100M at 25C & 70%RH, Output to Ground 500VDC
Vibration (non operating)		23.52m/s² (10 - 55Hz: constant sweep 1 min X, Y, Z for 1 hour)
Shock	-	< 196.1 m/s² (20G)
Safety Agency Approvals	-	UL60950, CSA60950, EN60950-1 Class II , CE Mark (LVD)
Conducted & Radiated EMI	-	EN55022-B, FCC Class B
Immunity	-	EN61000-4-2,-3,-4,-6,-8
Weight (Typ)	g	385g
Size (WxLxH)	mm	127 X 76.2 X 34 (including underside components)
Warranty	-	One Year

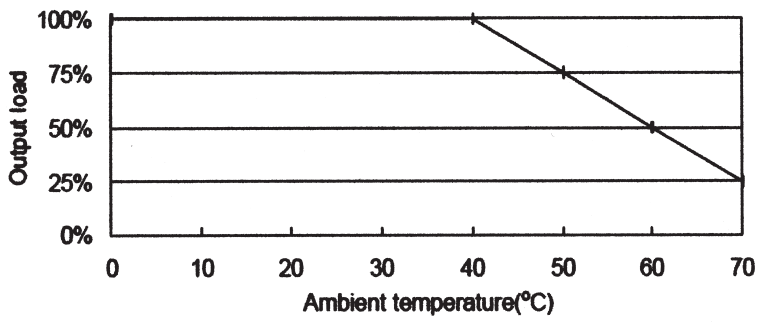
Notes:
(1) Measured with 0.1uF ceramic & 10uF electrolytic at 20MHz BW

Models

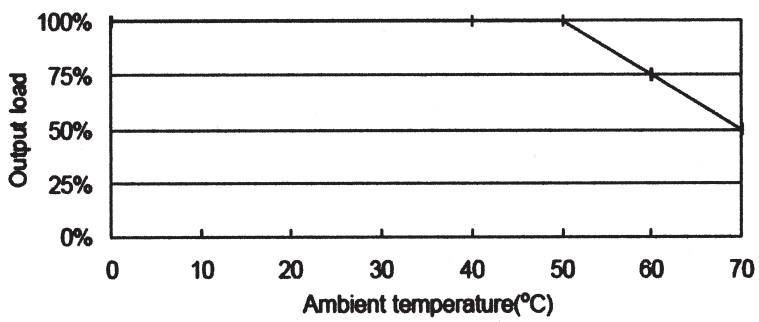
Model		Output Voltage (V)	Maximum Output (A)
ZPS100-3R3	V1	3.3	20
ZPS100-5	V1	5	20
ZPS100-9	V1	9	11.2
ZPS100-12	V1	12	8.4
ZPS100-15	V1	15	6.7
ZPS100-18	V1	18	5.6
ZPS100-24	V1	24	4.2
ZPS100-28	V1	28	3.6
ZPS100-48	V1	48	2.1

INTERMEDIATE VOLTAGES
AVAILABLE
PLEASE CONSULT SALES

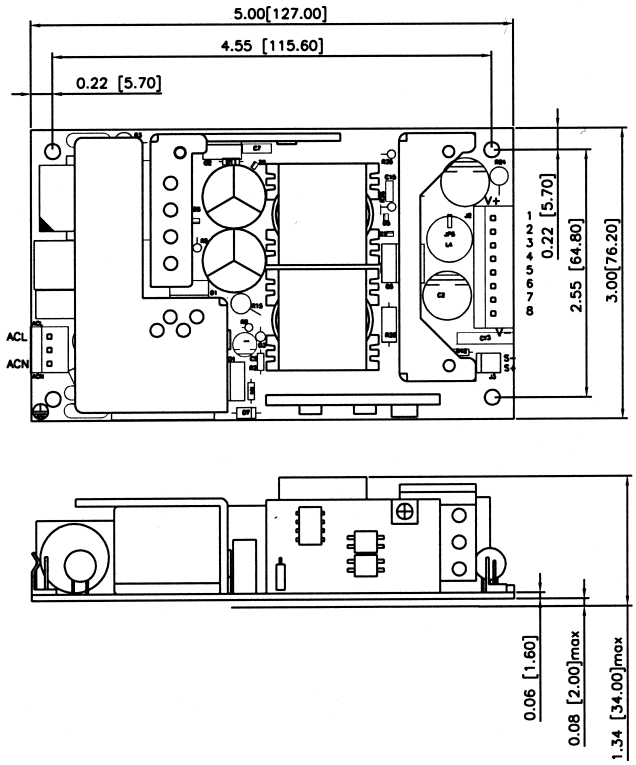
ZPS100-3R3 -5 -9 -48 DERATING CURVE



ZPS100-12 -15 -18 -24 -28 DERATING CURVE

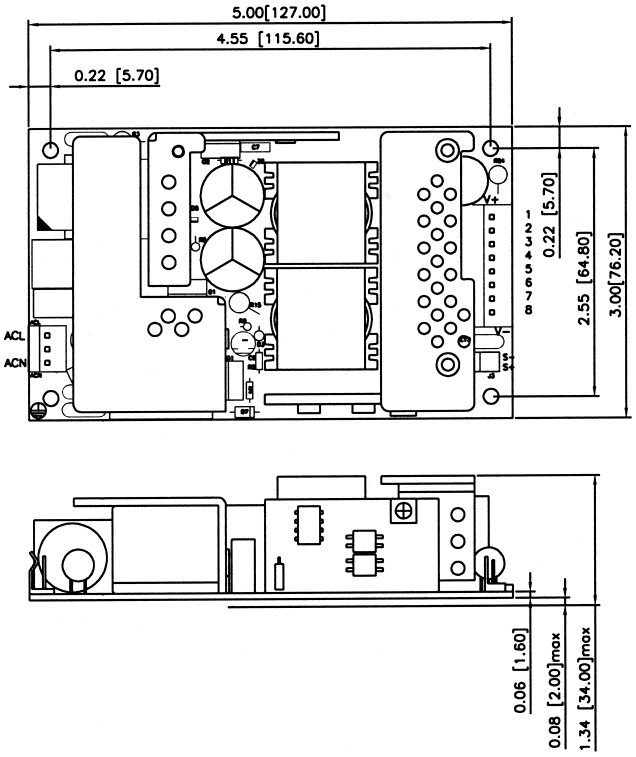


ZPS100 Outline Drawing



ZPS100-5 Outline Drawing

All Dimensions are in inches[mm]
Tolerances:.XX±.02[.XX±.5] uniess otherwise noted



Input Connector Mates with Molex Housing 09-50-3031 and Molex 2478 Series Crimp Terminal
Output Connector Mates with Molex Housing 09-50-1081 and Molex 5194 Series Crimp Terminal

LAMBDA

- Universal Input (85 - 265VAC)
- Power Factor Corrected
- 200% Peak Power capability on 24V output
- 2 Year Warranty
- Individual output adjustment

ZWD-PAF Series

100W to 440W
Dual Output Power Supplies

Key Market Segments & Applications

Factory Automation
Printer and Motor Drives
Kiosks

ZWD-PAF Features and Benefits

Features	*Benefits*
• Input Transient Protected	• Withstands Harsh Environments
• Power Factor Corrected	• Supports Global Use
• 200% Peak Power Capability	• Can Drive High current Start Up Devices or pulse loads

Specifications

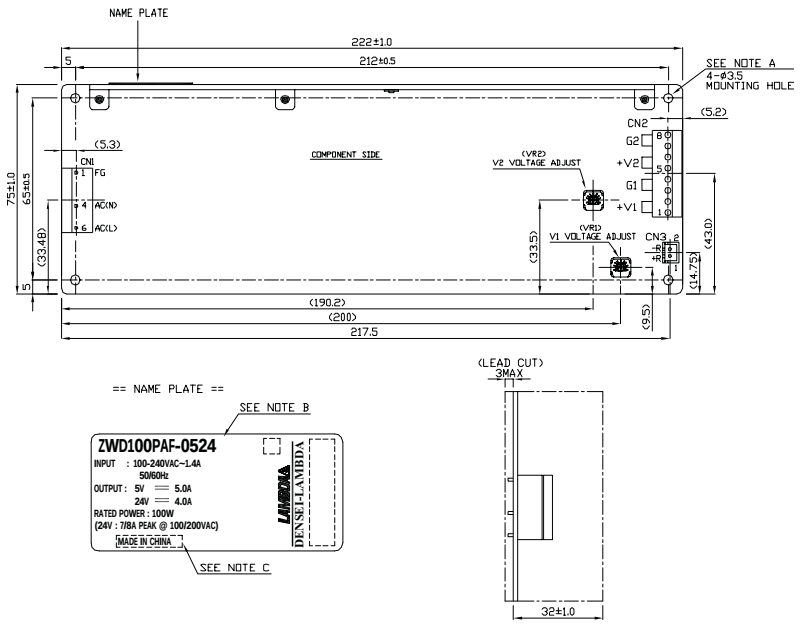
ITEMS / MODEL			ZWD100PAF-0524	ZWD150PAF-0524	ZWD225PAF-0524
Input Voltage		-	85-265VAC (47-63Hz), 120-370VDC		
Input Current	(1)	A	1.3 / 0.65	1.9 / 0.97	2.81 / 1.43
Inrush Current	(1)(2)	A	15 / 30		
Power Factor		-	0.99 at 100VAC, 0.95 at 200VAC, Meets EN61000-3-2		
Leakage Current		mA	0.75mA max		
Temperature Coefficient		-	<0.02%/°C		
Overcurrent Protection	(3)	-	5V output: >105%, 24V output: >205%		
Overvoltage Protection	(4)	V	120- 145%		
Hold Up Time (Typ)	(1)	ms	5V output: 40ms, 24V output: 20ms		
Efficiency	(2)	%	79 / 81	80 / 82	81 / 83
Remote On/Off		-	On 24V output only, remove jumper to shutdown		
Line Regulation		mV	5V output: 20mV, 24V output: 96mV		
Load Regulation		mV	5V output: 40mV, 24V output: 150mV		
Ripple & Noise		mV	5V output: 120mV, 24V output: 100W, 150mV; 150/225W, 240mV		
Operating Temperature		-	(Open frame or L bracket) -10°C to +70°C, derate linearly to 0% load from 50°C to 70°C		
Operating Temperature		-	(With /A cover option) -10°C to +60°C, derate linearly to 0% load from 40°C to 60°C		
Storage Temperature		-	-30 to +85°C		
Humidity (non condensing)		-	Operating: 20 - 90%RH, Non-operating: 10 - 95% RH		
Cooling		-	Convection cooled		
Withstand Voltage		-	I/P to Gnd 2kVAC (20mA), I/P to O/P 3kVAC (20mA), O/P to Gnd 500VAC (100mA) for 1 min.		
Isolation Resistance		-	>100M at 25°C & 70%RH, Output to Ground 500VDC		
Vibration (non operating)		-	10 - 55Hz (1 minute sweep), 19.6m/s² constant X, Y, Z 1 hour		
Shock		-	< 196.1 m/s²		
Safety Agency Approvals		-	UL60950, CSA60950, EN60950, EN50178, CE Mark		
Conducted & Radiated EMI		-	EN55022-B, FCC Class B, VCCI-B		
Recommended EMI Filter		-	MAW1203-22	MAW1205-22	MAW1205-22
Immunity		-	EN61000-4-2, -3, -4, -5, -6, -8, -11		
Weight (Typ)		g	460 (780 with cover)	530 (885 with cover)	670 (1065 with cover)
Size (WxHxD)		in	2.95 x 8.74 x 1.38	3.35 x 8.74 x 1.57	3.74 x 8.74 x 1.77
Warranty		yrs	Two Years		

Notes: See installation manual for full specification.
(1) 100/200VAC (2) 25°C ambient (cold start) (3) Avoid prolonged operation in overload (4) OVP on 24V output will shutdown 24V output only

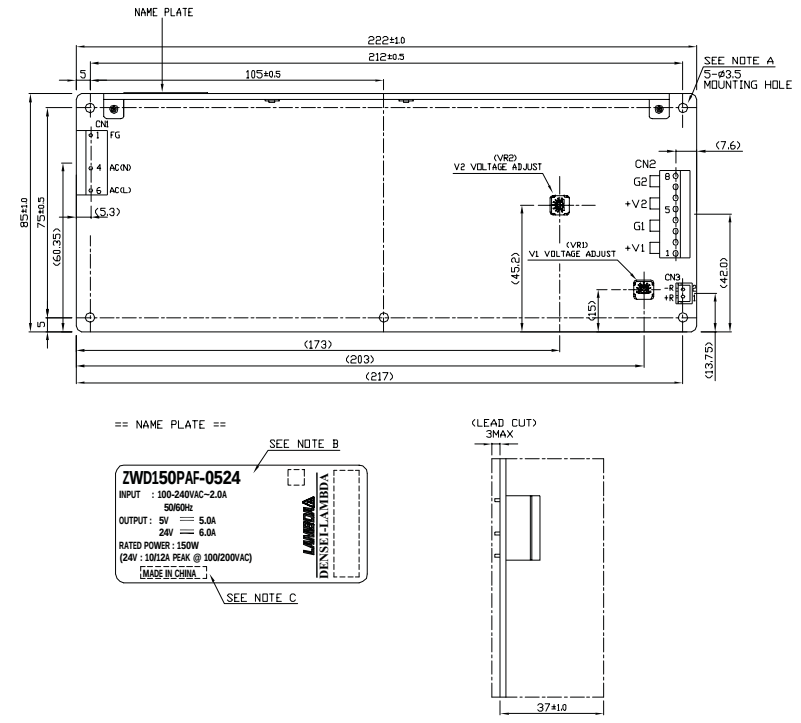
Model Selector

Model	Output Voltage	Output Voltage Accuracy	Output Adjust Range	Max Current	Peak[1,5] Current	Peak[1,5] Power	Max Average Power	Total[1,5] Peak Power
ZWD100PAF-0524	5V	4.9 - 5.1V	4.5 - 5.5V	5A	-	-	100W	172 / 196W
	24V	23.52 - 24.48V	22.8 - 27.6V	4A	7 / 8A	168 / 192W		
ZWD150PAF-0524	5V	4.9 - 5.1V	4.5 - 5.5V	5A	-	-	150W	246 / 294W
	24V	23.52 - 24.48V	22.8 - 27.6V	6A	10 / 12A	240 / 288W		
ZWD225PAF-0524	5V	4.9 - 5.1V	4.5 - 5.5V	5A	-	-	225W	344 / 440W
	24V	23.52 - 24.48V	22.8 - 27.6V	9A	14 / 18A	336 / 432W		

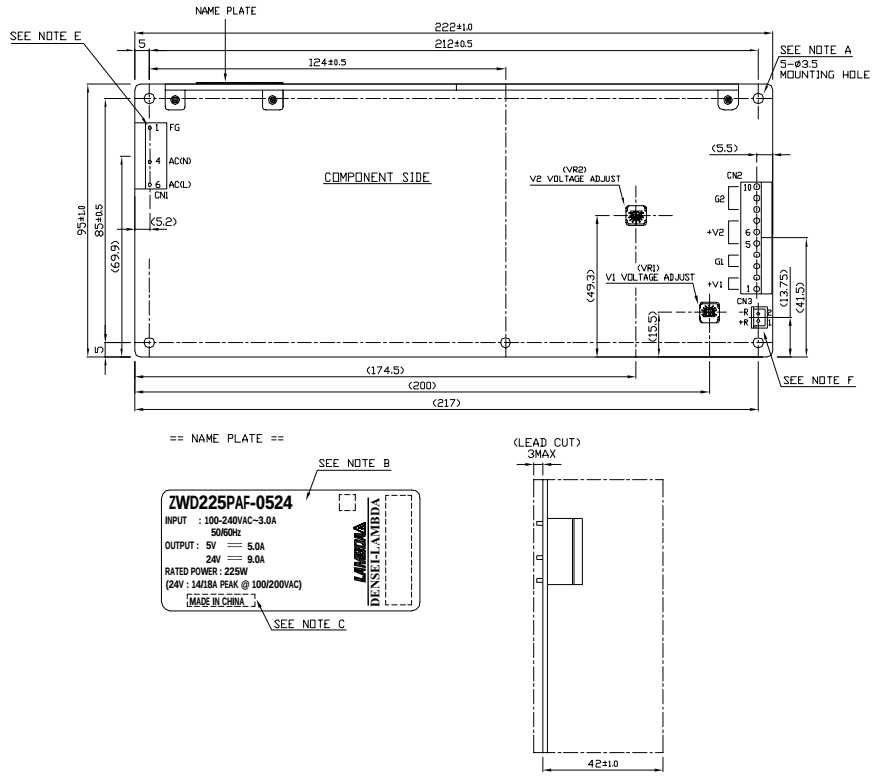
ZWD100 Outline Drawing



ZWD150 Outline Drawing



ZWD225 Outline Drawing



Notes:

(5) ZWS100PAF: For <10s max, duty cycle ≤0.35
ZWS150PAF: Up to 10A peak, <10s max, duty cycle ≤0.35; from 10-12A, <5s, duty cycle ≤0.2
ZWS225PAF: Up to 14A peak, <10s max, duty cycle ≤0.35; from 14-18A, <5s, duty cycle ≤0.2

Options

Suffix	Description
blank	Molex Input & Output Connector
/L	L Bracket
/A	Cover & L Bracket
/J	JST Input & Output Connector
/T	Vertical Mount Screw Terminals

Prefered option combination: blank, /L, /TL, or /TA
Example: ZWD100PAF-0524/TA

LAMBDA

- Universal Input (85 - 265VAC)
- Power Factor Corrected
- Floating Adjustable Fourth Output
- Low Profile <1U High

ZWQ Series

80W to 170W
Quad Output Power Supplies

Key Market Segments & Applications

Factory Automation
Test & Measurement
Light Industrial Equipment

ZWQ Features and Benefits

Features	Benefits
• Low Profile	• Fits in 1U Enclosures
• Adjustable Main and Fourth Output	• System Optimization
• Power Factor Corrected	• Supports Global Use
• Floating Fourth Output	• Can be used as Positive or Negative Output

Specifications

Items	Models		ZWQ80 -5222	ZWQ80 -5223	ZWQ80 -5224	ZWQ80 -5225	ZWQ130 -5222	ZWQ130 -5223	ZWQ130 -5224	ZWQ130 -5225
Input Voltage		-	85-265VAC (47-63Hz), 120-370VDC							
Input Current	(1)	A	1.6 / 0.8				2.6 / 1.3			
Inrush Current	(1)	A	14/28							
Power Factor		-	Meets EN61000-3-2							
Temperature Coefficient		-	<0.02%/°C							
Max Output Power (convection)		W	80				130			
Max Output Power (forced air)		W	104	88.7	104	104	170	149.6	170	170
Overpower Protection	(2)	W	>109	>93	>109	>109	>173	>152	>173	>173
Minimum Load		A	V1: 0.9A Conv, 1.4A Forced Air				V1: 1.5A Conv, 2.1A Forced Air			
Output Voltage Accuracy		%	±5% for outputs V2 and V3							
Efficiency (Typ)		%	72							
Hold Up Time	(1)	ms	20							
Leakage Current		-	0.75mA max, 0.2mA (Typ) at 100VAC / 0.44mA(Typ) at 230VAC							
Remote On / Off		-	See installation manual (Not available with /A cover option)							
Oper Temp (convection cooled)		-	-10°C to 60°C, derate linearly to 50% load from 40°C to 60°C. (3)							
Oper Temp (forced air cooled)		-	-10°C to 70°C, derate linearly to 50% load from 50°C to 70°C. (>30cfm airflow)(3)							
Storage Temperature		-	-30° to +85°C							
Humidity (non condensing)		-	Operating: 30 - 90% RH; Non-operating 10-95% RH							
Withstand Voltage			I/P~Grnd 2kVAC (20mA), I/P~O/P 3kVAC (20mA), O/P~Grnd 500VAC (100mA) for 1 min.							
Isolation Resistance		-	>100M at 25°C & 70%RH, Output to Ground 500VDC							
Vibration (non operating)		-	10 - 55Hz (1 minute sweep), 19.6m/s² constant X, Y, Z 1 hour							
Shock		-	< 196.1 m/s²							
Safety Agency Approvals		-	UL1950, CSA950, EN60950, CE Mark, EN50178							
Conducted & Radiated EMI		-	EN55011, EN55022-B, FCC Class B, VCCI-B							
Immunity		-	EN61000-4-2,-3,-4,-5,-6,-8,-11							
Weight (Typ)		g	550				730			
Size (W x H x D)		mm	93.5 x 35 x 210 (refer to outline drawing)				106 x 35 x 225 (refer to outline drawing)			
Warranty		yrs	One Year							

(1) 100/200VAC (2) Avoid prolonged operation in overload (3) /A version - additional derating, see installation manual

Model Selector

Model	Output	Voltage (V)	Voltage Adjust Range (V)	Convect. (A)	Peak or Forced Air (A)(4)	Max Load Reg (mV)	Max Line Reg (mV)	Ripple Noise (mV)	OVP (V)(5)
ZWQ80-5222	V1	5	5.0-5.25	8.0	10.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	2.0	2.5	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	2.0	2.5	300	48	150	16.5-22.5
	V4	12	11.4-12.6	3.0	4.0	300	48	150	13.8-16.2
ZWQ80-5223	V1	5	5.0-5.25	8.0	10.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	2.0	2.5	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	2.0	2.5	300	48	150	16.5-22.5
	V4	3.3	2.0-3.63	7.0	9.0	100	20	120	3.79-4.95
ZWQ80-5224	V1	5	5.0-5.25	8.0	10.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	2.0	2.5	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	2.0	2.5	300	48	150	16.5-22.5
	V4	24	22.8-25.2	1.5	2.0	400	96	200	27.6-32.4
ZWQ80-5225	V1	5	5.0-5.25	8.0	10.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	2.0	2.5	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	2.0	2.5	300	48	150	16.5-22.5
	V4	5	2.0-5.25	7.0	9.0	100	20	120	5.7-7.0
ZWQ130-5222	V1	5	5.0-5.25	15.0	19.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	4.0	5.0	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	4.0	5.0	300	48	150	16.5-22.5
	V4	12	11.4-12.6	4.0	5.0	300	48	150	11.4-12.6
ZWQ130-5223	V1	5	5.0-5.25	15.0	19.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	4.0	5.0	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	4.0	5.0	300	48	150	16.5-22.5
	V4	3.3	2.0-3.63	10.0	12.0	100	20	120	3.79-4.95
ZWQ130-5224	V1	5	5.0-5.25	15.0	19.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	4.0	5.0	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	4.0	5.0	300	48	150	16.5-22.5
	V4	24	22.8-25.2	2.0	2.5	400	96	200	27.6-32.4
ZWQ130-5225	V1	5	5.0-5.25	15.0	19.0	100	20	120	5.7-7.0
	V2	+12/15*	+12/+15	4.0	5.0	300	48	150	16.5-22.5
	V3	-12/15*	-12/-15	4.0	5.0	300	48	150	16.5-22.5
	V4	5	2.0-5.25	10.0	12.0	100	20	120	5.7-7.0

* User selectable via connector or PCB. Outputs are floating from V1 & V4

Options

Suffix	Description
blank	No cover or L Bracket
/L	L Bracket
/A	Cover and L Bracket

LAMBDA

- Universal Input (85 - 265VAC)
- Input Transient Protected
- 2 Year Warranty
- High Quality Design
- Peak Power Capability

Key Market Segments & Applications

Factory Automation	Process Control, NC-Machining, Automotive, Packaging Equipment, Materials Handling, Chemical Processing, Robots
Test & Measurement	Burn-in & Test, Automated Test, Instrumentation, Measurement, Detection
Light Industrial	Gaming, Vending, Printers

ZWS Series

Single Output Low Cost, Worldwide Use

ZWS Features and Benefits

Features	*Benefits*
• Input Transient Protected	• Withstands Harsh Environments
• 2 Year Warranty	• Lower Cost of Ownership
• Peak Power Capability	• Can Drive High current Start Up Devices

Specifications

ITEMS \ MODELS		ZWS5 ZWS10	ZWS15 ZWS30	ZWS50
AC Input Voltage range	-	85-265VAC (47-440Hz)		
DC Input Voltage range	-	110 - 330VDC		
Inrush Current (100/200VAC) (1)	A	15 / 30		
Power Factor (Passive)	-	None		
Temperature Coefficient	-	<0.02%/°C		
Overcurrent Protection (2)	-	~125%		
Overvoltage Protection	V	~140% diode clamp		~115 - 130%, manual reset
Hold Up Time (Typ) @ 100VAC	ms	17		
Remote Sense	-	None		
Operating Temperature (3)	-	(open frame) -10°C~+60°C, derate linearly to 70% load from 50°C~60°C		
Operating Temperature	-	(with cover)Additional derating applies, please consult Installation Manual		
Storage Temperature	-	-30 to +85°C		
Humidity (non condensing)	-	10 - 95% RH		
Cooling	-	Convection		
Withstand Voltage	-	Input to Ground 2kVAC (20mA), Input to Output 3kVAC (20mA), Output to Ground 500VAC (100mA) for 1 min.		
Isolation Resistance	-	>100M at 25C & 70%RH, Output to Ground 500VDC		
Vibration (non operating)	-	10 - 55Hz (1 minute sweep), 19.6m/s² constant X, Y, Z 1 hour		
Shock	-	< 196.1 m/s²		
Safety Agency Approvals	-	UL1950, CSA950, EN60950, CE Mark		
Conducted & Radiated		EM EN55022-B, FCC Class B, VCCI-B		
Recommended EMI Filter	-	MAW12R5-22	MAW1201-22	MAW1202-22
Weight (Typ)	g	120/120	MAW1202-22 140/270	370
Size (WxHxD)	mm	See table		
Warranty	-	2 years		

Notes:
(1) 25C ambient (cold start)
(2) Avoid prolonged operation in overload

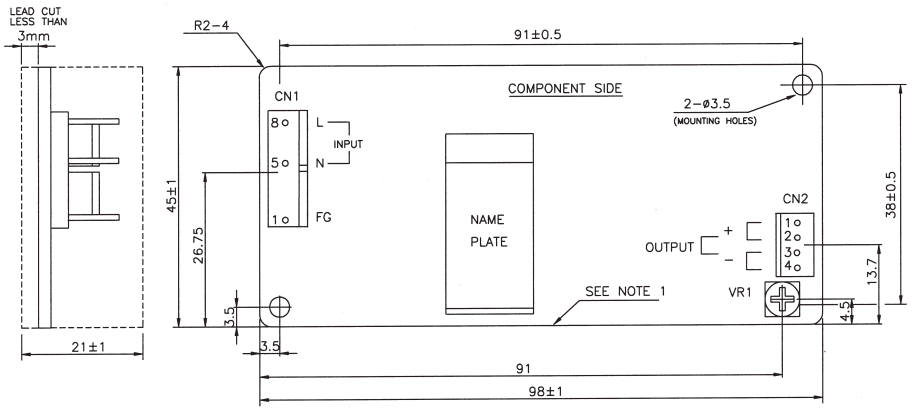
Output Ratings

Model	Voltage	Adjust Range	Max Curr. A	Peak Curr. A	Load Reg mV	Line Reg mV	Ripple Noise mV	Eff. %
ZWS5-3	3.3V	2.97-3.63	1	1.2	40	20	120	62
ZWS10-3	3.3V	2.97-3.63	2	2.4	40	20	120	62
ZWS15-3	3.3V	2.97-3.63	3	3.6	40	20	120	63
ZWS30-3	3.3V	2.97-3.63	6	7.2	40	20	120	70
ZWS50-3	3.3V	2.97-3.63	10	12	40	20	120	73
ZWS5-5	5V	4.5-5.5	1	1.2	40	20	120	67
ZWS10-5	5V	4.5-5.5	2	2.4	40	20	120	70
ZWS15-5	5V	4.5-5.5	3	3.6	40	20	120	71
ZWS30-5	5V	4.5-5.5	6	7.2	40	20	120	75
ZWS50-5	5V	4.5-5.5	10	12	40	20	120	77
ZWS5-12	12V	10.8-13.2	0.42	0.51	96	48	150	68
ZWS10-12	12V	10.8-13.2	0.85	1.02	96	48	150	70
ZWS15-12	12V	10.8-13.2	1.25	1.5	96	48	150	71
ZWS30-12	12V	10.8-13.2	2.5	3	96	48	150	77
ZWS50-12	12V	10.8-13.2	4.3	5.16	96	48	150	80
ZWS5-15	15V	13.5-16.5	0.34	0.41	120	60	150	68
ZWS10-15	15V	13.5-16.5	0.7	0.84	120	60	150	71
ZWS15-15	15V	13.5-16.5	1	1.2	120	60	150	71
ZWS30-15	15V	13.5-16.5	2	2.4	120	60	150	77
ZWS50-15	15V	13.5-16.5	3.5	4.2	120	60	150	81
ZWS5-24	24V	21.6-26.4	0.22	0.27	150	96	200	70
ZWS10-24	24V	21.6-26.4	0.45	0.54	150	96	200	71
ZWS15-24	24V	21.6-26.4	0.65	0.78	150	96	200	71
ZWS30-24	24V	21.6-26.4	1.3	1.56	150	96	200	78
ZWS50-24	24V	21.6-26.4	2.1	2.52	150	96	200	82
ZWS30-36	36V	32.4-39.6	0.9	1.08	240	144	300	78
ZWS50-36	36V	32.4-39.6	1.4	1.68	240	144	300	82
ZWS30-48	48V	43.2-52.8	0.7	0.84	300	192	400	78
ZWS50-48	48V	43.2-52.8	1.1	1.32	300	192	400	82

Note for Peak Current: For 10s maximum, 35% duty cycle, average power not to exceed maximum ratings.

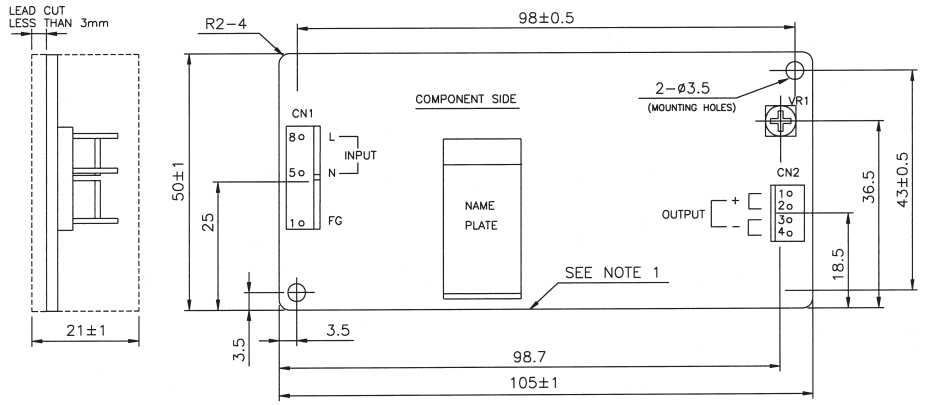
Options

Suffix	Description
/A	Cover option
/J	JST Connectors
/JA	JST Connectors & Cover



ZWS5

ZWS Outline Drawings



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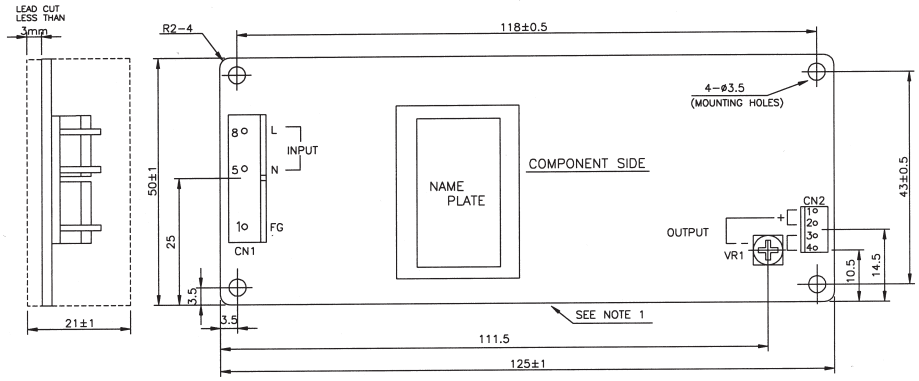

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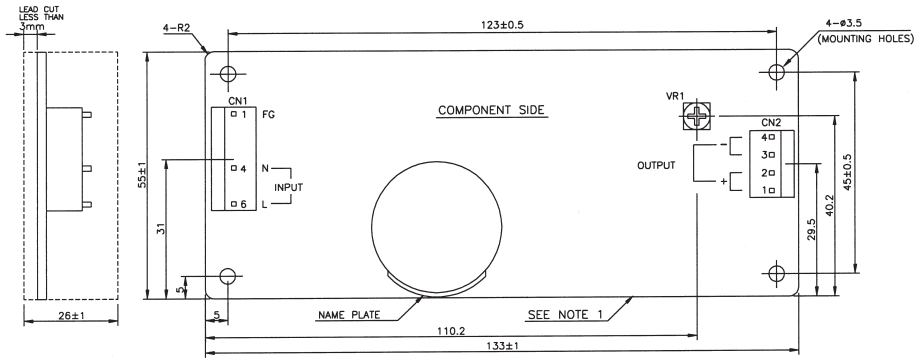

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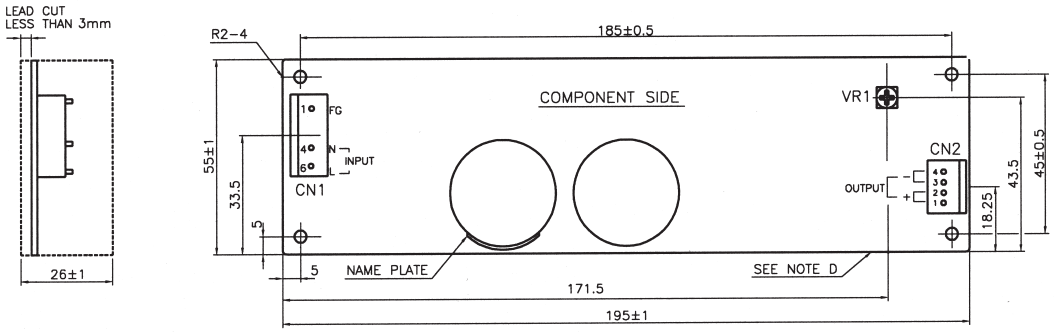

ZWS50

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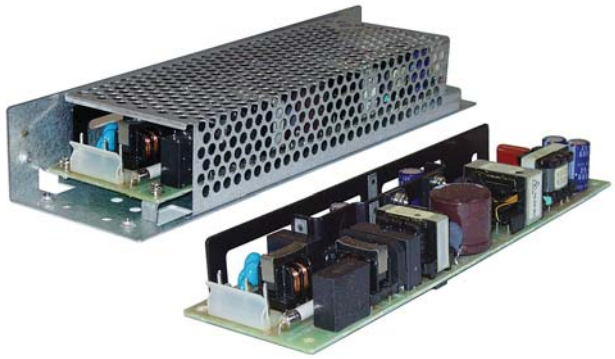


- Universal Input (85 - 265VAC)
- Power factor Corrected
- Input transient Corrected
- Peak Power capability
- 2 year warranty
- High quality design

ZWS-AF Series

Single Output, Low Cost, Worldwide Use

Key Market Segments & Applications

Factory Automation	Process Control, NC-Machining, Automotive, Packaging Equipment, Materials Handling, Chemical Processing, Robots
Test & Measurement	Burn-in & Test, Automated Test, Instrumentation, Measurement, Detection
Light Industrial	Gaming, Vending, Printers

ZWS-AF Features and Benefits

Features	*Benefits*
• Input Transient Protected	• Withstands Harsh Environments
• 2 Year Warranty	• Low Cost of Ownership
• Power Factor Corrected	• Supports Global Use
• Peak Power Capability	• Can Drive High current Start Up Devices

Specifications

ITEMS / MODELS			ZWS50AF	ZWS75AF	ZWS100AF	ZWS150AF
AC Input Voltage range		VAC	85-265VAC (47-63Hz)			
DC Input Voltage range		VDC	120-370VDC			
Input Current (Typ)	(1)	A	0.8/0.4	1.2/0.6	1.4/0.7	2.0/1.0
Inrush Current		A	14/28 25°C Ambient, Cold Start			
Power Factor	(1)	-	Meets EN61000-3-2 (0.99/0.95)			
Maximum Ripple and Noise		mV	120mV for 5V output, 150mV all other outputs			
Temperature Coefficient		-	<0.02%/°C			
Overcurrent Protection	(4)	-	>105% of Peak Current Capability			
Hold Up Time (Typ)	(1)	ms	20			
Leakage Current		-	0.5mA max 0.1mA (Typ) at 100VAC 0.16mA (Typ) at 230VAC			
Remote On / Off		-	See installation manual (Not available with /A cover option)			
Operating Temperature		-	Convection cooling - See table on page 2			
Operating Temperature		-	0.7m/s air -10°C to +70°C, derate linearly to 70% load from 60°C to 70°C (2)			
Storage Temperature		-	-30° to +85°C			
Humidity (non condensing)		-	Operating: 30 - 90% RH, storage 10-95% RH			
Withstand Voltage		-	I/P~Grnd 2kVAC (20mA), I/P~O/P 3kVAC (20mA), O/P~Grnd 500VAC (100mA) for 1 min.			
Isolation Resistance		-	>100M at 25C & 70%RH, Output to Ground 500VDC			
Vibration (non operating)		-	10 - 55Hz (1 minute sweep), 19.6m/s² constant X, Y, Z 1 hour			
Shock		-	< 196.1 m/s²			
Safety Agency Approvals		-	UL1950, CSA950, EN60950, EN50178			
Conducted & Radiated EMI		-	designed to meet EN55011, EN55022-B, FCC Class B, VCCI-B			
Immunity		-	designed to meet EN61000-4-2,-3,-4,-5,-6,-8,-11			
Weight (Typ)		g	210	290	380	500
Size (W x H x D)		mm	55 x 26 x 195	55 x 32 x 222	62 x 35 x 222	75 x 40 x 222
Warranty		yrs	Two Years			

Notes:
(1) 100/200VAC (2) ZWS150AF -10 to 60°C, derate linearly to 70% load from 50°C to 60°C
(3) The peak current draw must not exceed a 10 second duration with a duty cycle of 35%
(4) Constant current limit with automatic recovery. Do not operate in a over-load or shorted output condition for more than 30 seconds.
(5) An overvoltage condition on the output will shut down the power supply. The power supply must be re-set by cycling the AC input.

Output Ratings

Model	Voltage	Output Adjust Range (V)	Max Curr. (A)	Max Peak Curr. (A)[3]	Max Output Power (W)	Peak Output Power[3] (W)	Eff. (%)	Max Load Reg.(mV)	Max Line Reg.(mV)	OVP (V)[5]
ZWS75AF3	3.3V	2.85-3.63	15.0	-	49.5	-	67	40	20	3.79-4.95
ZWS150AF3	3.3V	2.85-3.63	30.0	-	99.0	-	74	40	20	3.79-4.95
ZWS50AF5	5V	4.5-5.5	10.0	-	50.0	-	75	40	20	5.75-7.00
ZWS75AF5	5V	4.5-5.5	15.0	-	75.0	-	75	40	20	5.75-7.00
ZWS100AF5	5V	4.5-5.5	20.0	-	100.0	-	75	40	20	5.75-7.00
ZWS150AF5	5V	4.5-5.5	30.0	-	150.0	-	77	40	20	5.75-7.0
ZWS50AF12	12V	10.8-13.2	4.3	5.2	51.6	62.4	78	96	48	13.8-16.2
ZWS75AF12	12V	10.8-13.2	6.3	7.5	75.6	90.0	78	96	48	13.8-16.2
ZWS100AF12	12V	10.8-13.2	8.5	10.0	102.0	120.0	79	96	48	13.8-16.2
ZWS150AF12	12V	10.8-13.2	12.5	15.0	150.0	180.0	79	96	48	13.8-16.2
ZWS50AF15	15V	13.5-16.5	3.5	4.2	52.5	63.0	79	120	60	17.3-20.3
ZWS75AF15	15V	13.5-16.5	5.0	6.0	75.0	90.0	79	120	60	17.3-20.3
ZWS100AF15	15V	13.5-16.5	6.7	8.0	100.5	120.0	79	120	60	17.3-20.3
ZWS150AF15	15V	13.5-16.5	10.0	12.0	150.0	180.0	81	120	60	17.3-20.3
ZWS50AF24	24V	21.6-26.4	2.1	2.6	50.4	62.4	81	150	96	27.6-32.4
ZWS75AF24	24V	21.6-26.4	3.2	3.8	76.8	91.2	82	150	96	27.6-32.4
ZWS100AF24	24V	21.6-26.4	4.3	5.0	103.2	120.0	81	150	96	27.6-32.4
ZWS150AF24	24V	21.6-26.4	6.3	7.5	151.2	180.0	82	150	96	27.6-32.4
ZWS75AF36	36V	32.4-39.6	2.1	2.5	75.6	90.0	82	200	144	41.4-48.6
ZWS100AF36	36V	32.4-39.6	2.8	3.4	100.8	122.4	82	200	144	41.4-48.6
ZWS150AF36	36V	32.4-39.6	4.2	5.0	151.2	180.0	82	200	144	41.4-48.6
ZWS75AF48	48V	43.2-52.8	1.6	1.9	76.8	91.2	82	240	192	55.2-64.8
ZWS100AF48	48V	43.2-52.8	2.1	2.5	100.8	120	82	240	192	55.2-64.8
ZWS150AF48	48V	43.2-52.8	3.2	3.8	153.6	182.4	82	240	192	55.2-64.8

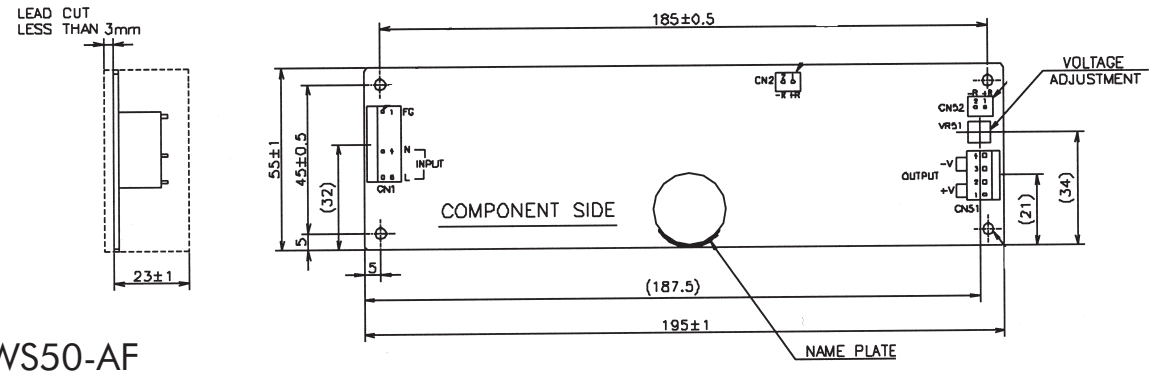
Derating - Convection Cooling

Model	40°C	45°C	50°C	55°C	60°C
ZWS50AF	100%	100%	100%	85%	70%
ZWS75AF	100%	100%	100%	85%	70%
ZWS100AF	100%	100%	100%	80%	60%
ZWS150AF	100%	87%	75%	62%	50%

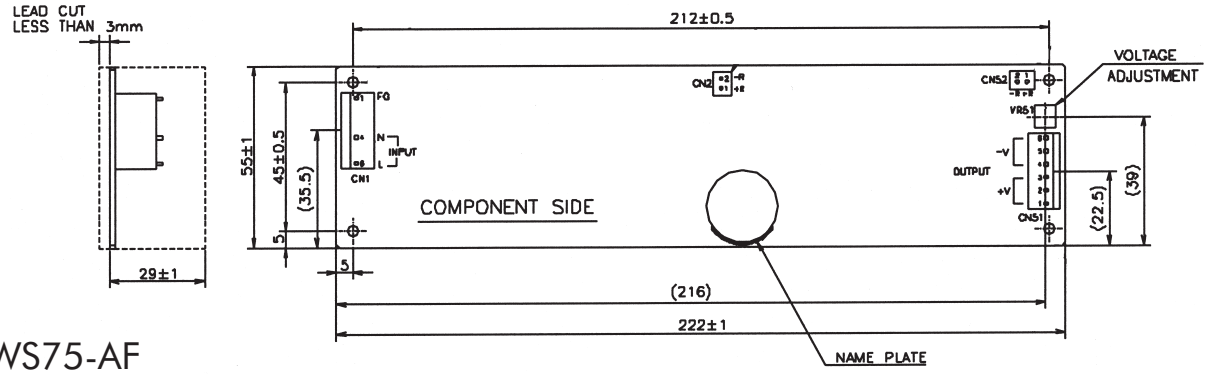
Options

Suffix	Description
-	Molex Input & Output Connectors
/A	With cover & L Bracket
/J	JST Input & Output Connectors
/JA	JST Connectors & Cover

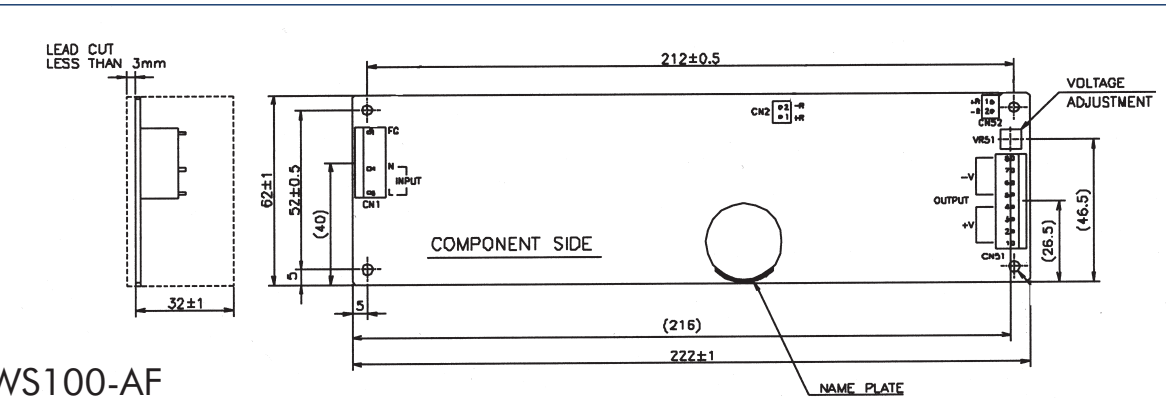
ZWS-AF Outline Drawings



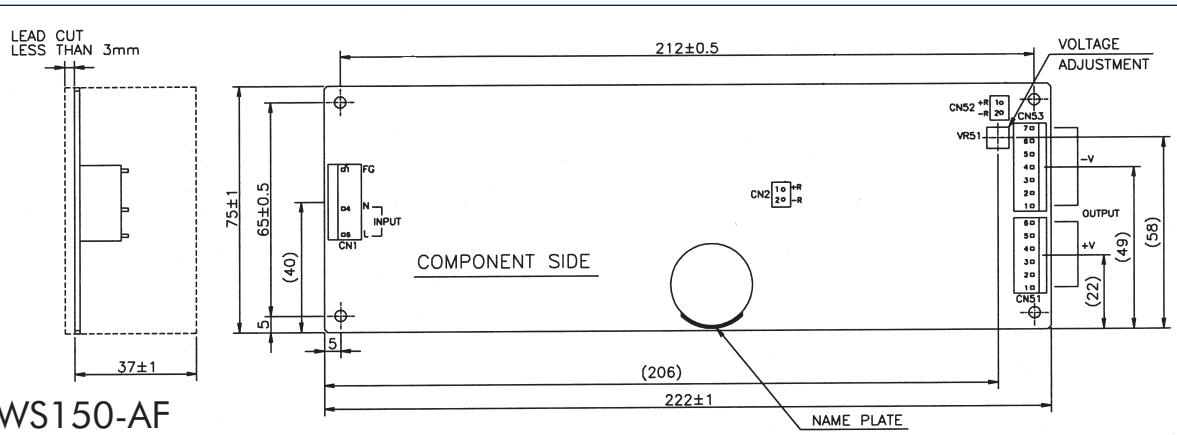
ZWS50-AF



ZWS75-AF



ZWS100-AF



ZWS150-AF

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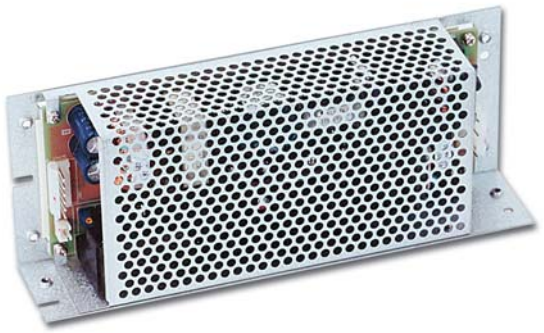


- Universal Input (85 - 265VAC)
- Power Factor Corrected
- 200% Peak Power capability
- 2 Year Warranty
- Less than 0.5mA earth leakage current

Key Market Segments & Applications

Factory Automation	Process Control, NC-Machining, Automotive, Packaging Equipment, Materials Handling, Chemical Processing, Robots
Test & Measurement	Burn-in & Test, Automated Test, Instrumentation, Measurement, Detection
Light Industrial	Gaming, Vending, Printers

ZWS-PAF Series

150W to 480W
Single Output Power Supplies

ZWS-PAF Features and Benefits

Features	*Benefits*
• Input Transient Protected	• Withstands Harsh Environments
• Power Factor Corrected	• Supports Global Use
• 200% Peak Power Capability	• Can Drive High current Start Up Devices

Specifications

ITEMS / MODELS			ZWS150PAF	ZWS240PAF
Input Voltage			85-265VAC (47-63Hz), 120-370VDC	
Input Current (Forced air)	(1)	A	2.8/1.4	4.0/2.0
Inrush Current	(1,2)	A	14 / 28	
Power Factor			0.99 at 100VAC, 0.95 at 200VAC, Meets EN61000-3-2	
Leakage Current		mA	0.5mA Max. Typically 0.1mA (100VAC), 0.22mA (230VAC)	
Temperature Coefficient			<0.02%/°C	
Overcurrent Protection	(3)	-	>102% of peak current capability	
Overvoltage Protection		V	24V: 30-35V, 36V: 43.2-50.4, 48V: 55.2-64.8V	
Hold Up Time (Typ) at 100VAC		ms	20 (16ms at forced air power ratings)	
Efficiency		%	82	
Remote On/Off			See installation manual (Not available with /A cover option)	
Line Regulation		%	0.4%	
Load Regulation		%	0.8%	
Ripple & Noise		%	1%	
Operating Temperature	(4)		(Open frame or L bracket) -10°C to +70°C, derate linearly to 70% load from 60°C to 70°C	
Operating Temperature	(4)		(With /A cover option) -10°C to +60°C, derate linearly to 70% load from 50°C to 60°C	
Storage Temperature			-30 to +85°C	
Humidity (non condensing)			Operating: 30 - 90% RH, Operating: 10 - 95% RH	
Cooling			Convection or Forced Air Cooled (1.5m/s)	
Withstand Voltage			Input to Ground 2kVAC (20mA), Input to Output 3kVAC (20mA), Output to Ground 500VAC (100mA) for 1 min.	
Isolation Resistance			>100M at 25C & 70% RH, Output to Ground 500VDC	
Vibration (non operating)			10 - 55Hz (1 minute sweep), 19.6m/s^2 constant X, Y, Z 1 hour	
Shock			< 196.1 m/s^2	
Safety Agency Approvals			UL60950, CSA60950, EN60950, EN50178, CE Mark	
Conducted & Radiated EMI			EN55022/EN55022-B, FCC Class B, VCCI-B	
Recommended EMI Filter			MAW1205-22	
Immunity			EN61000-4-2, -3, -4, -5, -6, -8, -11	
Weight (Typ)		g	500g (800g with cover)	750g (1100g with cover)
Size (WxHxD)		mm	See Outline Drawings	
Warranty		yrs	Two Years	

Notes:
(1) 100/200VAC
(2) 25°C ambient (cold start)
(3) Avoid prolonged operartion in overload
(4) With 0.7m/s airflow. See derating table for convection cooling

Model Selector

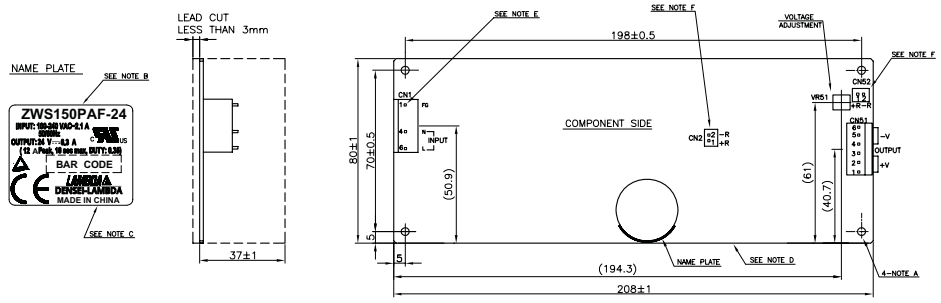
Model	Voltage	Max Adjust Range	Max Current Convection	Max Power Convection	Max Current Forced Air(6)	Power Forced Air(6)	Peak Current(5)	Peak Power(5)
ZWS150PAF24	24V	21.6 - 28.8V	6.3A	151.2W	8.4A	201.6W	12A	288W
ZWS150PAF36	36V	32.4 - 41.4V	4.2A	151.2W	5.6A	201.6W	8A	288W
ZWS150PAF48	48V	43.2 - 52.8V	3.1A	148.8W	4.3A	206.4W	6A	288W
ZWS240PAF24	24V	21.6 - 28.8V	10A	240W	12.5A	300W	20A	480W
ZWS240PAF36	36V	32.4 - 41.4V	6.7A	241.2W	8.4A	302.4W	13.3A	478.8W
ZWS240PAF48	48V	43.2 - 52.8V	5A	240W	6.3A	302.4W	10A	480W

Note 5: For 10s maximum, 35% duty cycle, average power not to exceed maximum ratings
Note 6: With 1.5m/s forced air

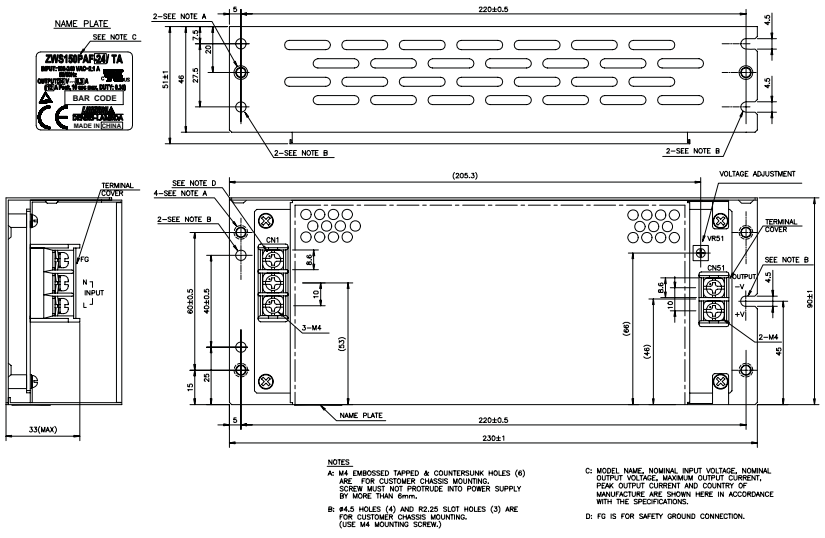
Model Derating for Convection Cooling

Model	25°C	30°C	35°C	40°C	45°C	50°C	55°C	60°C
ZWS150PAF**	100%	100%	100%	100%	100%	100%	85%	70%
ZWS150PAF**/A	100%	100%	90%	80%	72.5%	65%	-	-
ZWS240PAF**	100%	100%	100%	100%	100%	86.7%	73.3%	60%
ZWS240PAF**/A	100%	90%	80%	70%	60%	50.0%	-	-

ZWS150PAF Outline Drawing

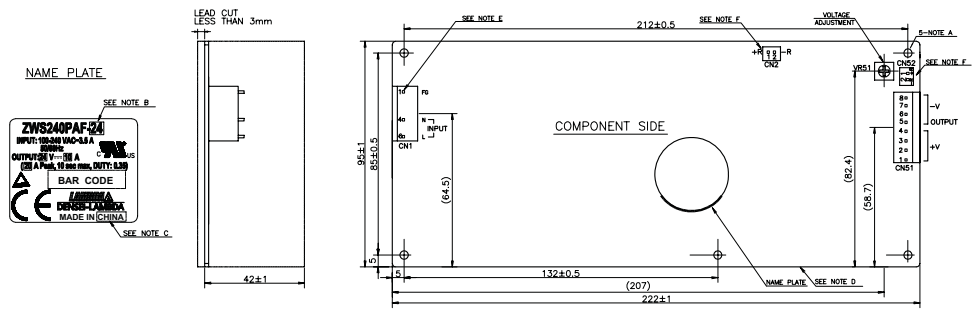


ZWS150PAF/TL Outline Drawing

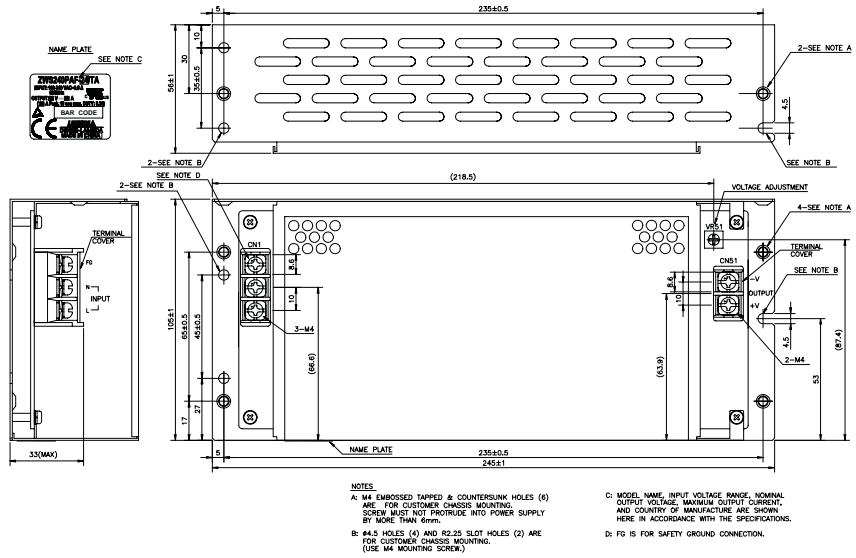


NOTES
A: M4 EMBOSSED TAPPED & COUNTERSUNK HOLES (6) ARE FOR CUSTOMER CHASSIS MOUNTING. SCREW MUST NOT PROTRUDE INTO POWER SUPPLY BY MORE THAN 6mm.
B: ø4.5 HOLES (4) AND R2.25 SLOT HOLES (3) ARE FOR CUSTOMER CHASSIS MOUNTING. (USE M4 MOUNTING SCREW.)
C: MODEL NAME, NOMINAL INPUT VOLTAGE, NOMINAL OUTPUT VOLTAGE, MAXIMUM OUTPUT CURRENT, PEAK OUTPUT CURRENT AND COUNTRY OF MANUFACTURE ARE SHOWN HERE IN ACCORDANCE WITH THE SPECIFICATIONS.
D: FG IS FOR SAFETY GROUND CONNECTION.

ZWS240PAF Outline Drawing



ZWS240PAF/TL Outline Drawing



Options

Suffix	Option
Blank	Molex Input & Output Connectors
/L	L Bracket
/A	Cover and L Bracket
/J	JST Input & Output Connectors
/T	Vertical Mount Screw Terminals
/S	Horizontal Mount Screw Terminals

Preferred option combinations: Blank, /L, /TL or /TA.
Example: ZWS240PAF24/TA

LAMBDA

Manufactured by TDK
TDK-Lambda is a collaborative product brand between TDK and the Lambda group

CC-E Series

Ultra Compact, 1.5W to 25W Single and Dual DC-DC Converters

- Compact Footprint/Low Profile
- Through Hole or SMT Versions
- 5V, 12V, 24V & 48V Inputs
- 3.3 to 30V[1] Single, ±12 to 15V Dual Outputs
- Output Voltage Adjustment
- Input - Output Isolation
- RoHS Compliant
- 5 Year Warranty

Key Market Segments & Applications

Telecommunications Datacom
Instrumentation

CC-E Features and Benefits

Features	*Benefits*
• Compact	• Less PCB Area Used
• Self Contained	• Requires No External Components
• Multiple Input Voltage configurations	• Easier System Configuration
• Open Frame (no potting)	• Lighter in Weight, Suitable for Surface Mount (R Version)

Specifications

Nominal Output Voltage	V	3.3V	5V	12/15V	±12/15 (24/30)[1]
DC Input	V	5V: 4.5-9.0V, 12V: 9-18V, 24V: 18-36V, 48V: 36-76V			
Efficiency	%	71 to 90% model dependant			
Output Voltage Tolerance	%	1.5-10W: ±3%, 15-25W: ±5%			±5%
Output Adjustment (via trim pin)	V	3.15-3.6V	4.75-6.0V	11.4-15V	22.8 - 30V
Line Regulation	mV	20 (40 CC15; 30 CC25)		40	80
Load Regulation	mV	40 (120 CC15; 200 CC25)		100	600[2]
Temperature Coefficient	%	<± 0.02%/°C			
Preload	-	No preload required			
Output Ripple (typ./max.BW 50MHz)	mV	40/120		30/120	
Overcurrent Protection	-	Output current limiting with automatic recovery, shutdown CC15, 25 type			
Overvoltage Protection	-	No			
Remote On/ Off	-	CC1R5, 3, 6, & 10: RC terminal open, output is OFF; RC terminal to -Vin (0-0.4V), output is ON			
		CC15 & CC25: RC terminal open, output is ON; RC terminal to +Vin, output is OFF			
Operating Temp.- Convection	°C	-40 to 85°C, derates linearly to 40% load from 50°C to 85°C			
Operating Temp.- Forced Air	°C	-40°C to 85°C with 1m/s air full load			
Storage Temperature	°C	-40°C to 85°C			
Humidity (non Condensing)	-	95% RH max.(maximum wet-bulb temperature: 38°C)			
Isolation Voltage	-	500VAC 1 min. Input to output, input to case, output to case			
Isolation Resistance	-	Input to output, input to case, output to case: 50M ohm min. (500VDC)			
Shock	m/s^2	$980m/s^2$ (100G) 6ms (6 directions, each 3 times)			
Vibration (non Operating)	-	10 to 55Hz (sweep for 15min) 1.52mm constant, 3 directions X, Y, Z each 2 hours			
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1			
Weight	g	CC1R5: 3.2, CC3: 4.5, CC6: 5.8, CC10:10.0, CC15: 12.5, CC25: 20.0			
Size (L x W x H) (Through Hole & SMD package)	mm	CC1R5: 16.51 x 16.61 x 8.51; CC3: 22.86 x 16.61 x 8.51; CC6: 22.86 x 21.11 x 8.51 CC10: 35.56 x 22.61 x 8.51 CC15: 38.10 x 32.11 x 7.49; CC25: 43.21 x 44.91 x 7.49 CC3: SIP type 27.69 x 9.19 x 17.91			
Warranty	-	5 years			

Notes:
1. For 24V/30V output - connnect across +Vout & -Vout and leave "common out" pin not connected
2. Based upon equal load current from both outputs
3. For 15V output connect trim to -Vout
4. See Installation Manual for full specifications, test methods of parameters and application notes

Model Selector

Output Voltage (V)	Output Current (A)	Output Power (W)	5V Input	12V Input	24V Input	48V Input
Single Outputs						
3.3	0.4	1.5	CC1R5-0503SF-E	CC1R5-1203SF-E	CC1R5-2403SF-E	CC1R5-4803SF-E
3.3	0.8	3	CC3-0503SF-E	CC3-1203SF-E	CC3-2403SF-E	CC3-4803SF-E
3.3	1.2	6	CC6-0503SF-E	CC6-1203SF-E	CC6-2403SF-E	CC6-4803SF-E
3.3	2.5	10	CC10-0503SF-E	CC10-1203SF-E	CC10-2403SF-E	CC10-4803SF-E
3.3	4.5	15	-	-	CC15-2403SF-E	-
3.3	7.5	25	-	-	CC25-2403SF-E	-
5	0.3	1.5	CC1R5-0505SF-E	CC1R5-1205SF-E	CC1R5-2405SF-E	CC1R5-4805SF-E
5	0.6	3	CC3-0505SF-E	CC3-1205SF-E	CC3-2405SF-E	CC3-4805SF-E
5	1.0	5	CC6-0505SF-E	-	-	-
5	1.2	6	-	CC6-1205SF-E	CC6-2405SF-E	CC6-4805SF-E
5	2.0	10	CC10-0505SF-E	CC10-1205SF-E	CC10-2405SF-E	CC10-4805SF-E
5	3.0	15	-	-	CC15-2405SF-E	-
5	5.0	25	-	-	CC25-2405SF-E	-
12(15)	0.125(0.1)	1.5	CC1R5-0512SF-E	CC1R5-1212SF-E	CC1R5-2412SF-E	CC1R5-4812SF-E
12(15)	0.25(0.2)	3	CC3-0512SF-E	CC3-1212SF-E	CC3-2412SF-E	CC3-4812SF-E
12(15)	0.5(0.4)	6	CC6-0512SF-E	CC6-1212SF-E	CC6-2412SF-E	CC6-4812SF-E
12(15)	0.8(0.64)	10	CC10-0512SF-E	-	-	-
12(15)	1.0(0.8)	10	-	CC10-1212SF-E	CC10-2412SF-E	CC10-4812SF-E
Dual Outputs						
±12 (15)[3]	0.06(0.05)	1.5	CC1R5-0512DF-E	CC1R5-1212DF-E	CC1R5-2412DF-E	CC1R5-4812DF-E
±12 (15)[3]	0.125(0.1)	3	CC3-0512DF-E	CC3-1212DF-E	CC3-2412DF-E	CC3-4812DF-E
±12 (15)[3]	0.25(0.2)	6	CC6-0512DF-E	CC6-1212DF-E	CC6-2412DF-E	CC6-4812DF-E
±12 (15)[3]	0.4(0.32)	10	CC10-0512DF-E	-	-	-
±12 (15)[3]	0.45(0.36)	10	-	CC10-1212DF-E	CC10-2412DF-E	CC10-4812DF-E

Options

Version	Description
F-E	Through hole mounting (DIP)
R-E	Surface mount (DIP)
S-E	Through hole mounting (SIP) *(SIP option available for CC3 only)*

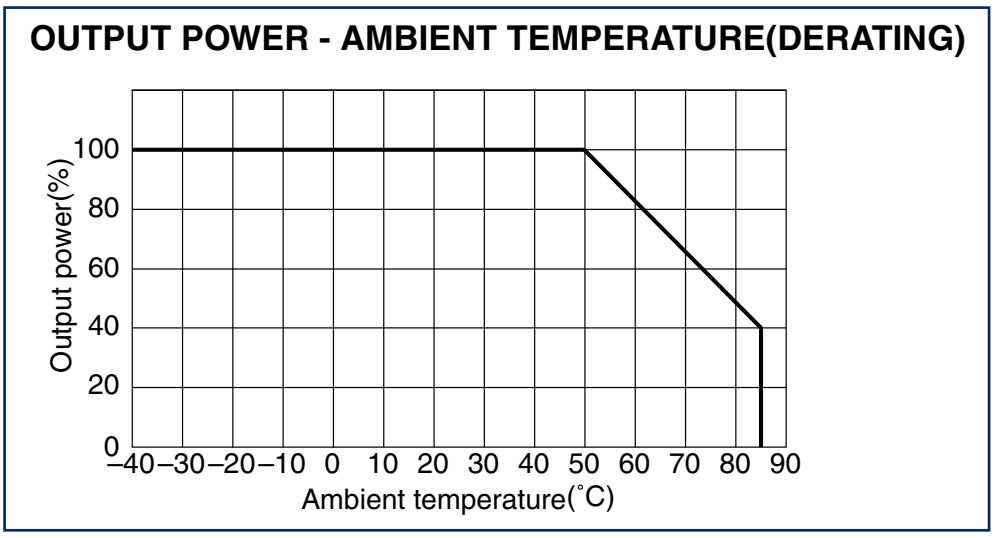
Pinout (CC1R5, 3, 6, and 10)

Pin	Single	Dual
1	+Vin	+Vin
2	RC	RC
3	-Vin	-Vin
4	NC	Common out
5	-Vout	-Vout
6	TRM	TRM
7	+Vout	+Vout

For CC15 and 25 see Installation Manual online

For Full Detailed Drawings and Application Notes
please visit
www.lambda-europe.com/cc-e

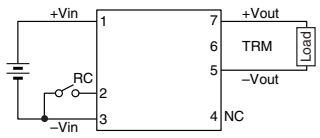
Derating Curve for Convection Cooling



Pin Out Diagrams

CONNECTIONS

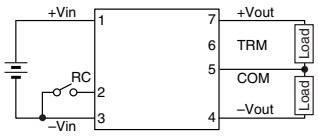
CC1R5-□□□□S□-E



TERMINAL PIN CONFIGUTATION

No.1	+Vin
No.2	RC
No.3	–Vin
No.4	NC
No.5	–Vout
No.6	TRM
No.7	+Vout

CC1R5-□□□□D□-E

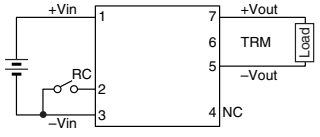


TERMINAL PIN CONFIGUTATION

No.1	+Vin
No.2	RC
No.3	–Vin
No.4	–Vout
No.5	Common out
No.6	TRM
No.7	+Vout

CONNECTIONS

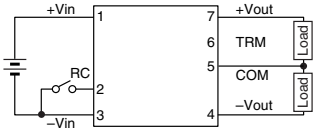
CC3-□□□□S□-E



TERMINAL PIN CONFIGUTATION

No.1	+Vin
No.2	RC
No.3	–Vin
No.4	NC
No.5	–Vout
No.6	TRM
No.7	+Vout

CC3-□□□□D□-E

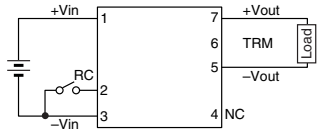


TERMINAL PIN CONFIGUTATION

No.1	+Vin
No.2	RC
No.3	–Vin
No.4	–Vout
No.5	Common out
No.6	TRM
No.7	+Vout

CONNECTIONS

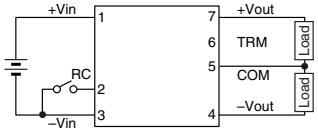
CC6-□□□□S□-E



TERMINAL PIN CONFIGUTATION

No.1	+Vin
No.2	RC
No.3	–Vin
No.4	NC
No.5	–Vout
No.6	TRM
No.7	+Vout

CC6-□□□□D□-E

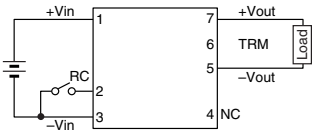


TERMINAL PIN CONFIGUTATION

No.1	+Vin
No.2	RC
No.3	–Vin
No.4	–Vout
No.5	Common out
No.6	TRM
No.7	+Vout

CONNECTIONS

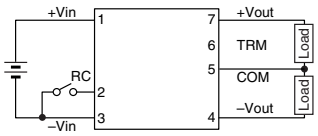
CC10-□□□□S□-E



TERMINAL PIN CONFIGUTATION

No.1	+Vin
No.2	RC
No.3	–Vin
No.4	NC
No.5	–Vout
No.6	TRM
No.7	+Vout

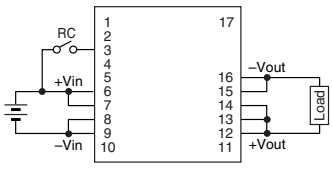
CC10-□□□□D□-E



TERMINAL PIN CONFIGUTATION

No.1	+Vin
No.2	RC
No.3	–Vin
No.4	–Vout
No.5	Common out
No.6	TRM
No.7	+Vout

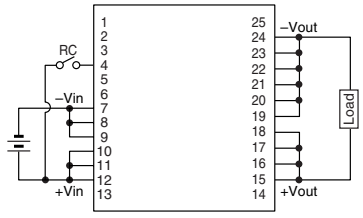
CC15-xxxxSF-E (DIP TYPE)
CONNECTION



TERMINAL PIN CONFIGUTATION

No.1	NC	No.10	NC
No.2	NC	No.11	NC
No.3	RC	No.12	+Vout
No.4	NC	No.13	+Vout
No.5	NC	No.14	+Vout
No.6	+Vin	No.15	–Vout
No.7	+Vin	No.16	–Vout
No.8	–Vin	No.17	NC
No.9	–Vin		

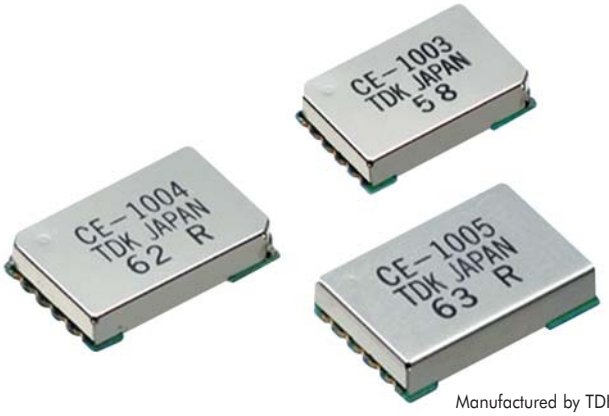
CC25-xxxxSF-E (DIP TYPE)
CONNECTION



TERMINAL PIN CONFIGUTATION

No.1	NC	No.10	+Vin	No.19	–Vout
No.2	NC	No.11	+Vin	No.20	–Vout
No.3	NC	No.12	+Vin	No.21	–Vout
No.4	RC	No.13	NC	No.22	–Vout
No.5	NC	No.14	NC	No.23	–Vout
No.6	NC	No.15	+Vout	No.24	–Vout
No.7	–Vin	No.16	+Vout	No.25	NC
No.8	–Vin	No.17	+Vout		
No.9	–Vin	No.18	+Vout		

LAMBDA



Manufactured by TDK
TDK-Lambda is a collaborative product brand between TDK and the Lambda group.

- 3 to 5V or 6 to 16V Input
- 1 to 5V Outputs (programmable)
- Surface Mount
- Low 4.5mm Profile
- Non Isolated Output

Key Market Segments & Applications

Telecommunications
Datacom
Instrumentation

CE 1000 Series

1.5 - 2.5A Point of Load Converter

CE 1000 Features and Benefits

Features	*Benefits*
◆ Output voltage programing	◆ Reduces the number of models needed
◆ Five sided shielding	◆ Reduced EMI

Specifications

ITEMS \ MODELS		CE-1003	CE-1004	CE-1005
Nominal Output Voltage	VDC	1.5 to 3.3	3.3 to 5.0	1 to 3.3
Input Voltage Range	VDC	6 - 16		3 - 5.25
Input Current (max)	A	2.4		
Output Voltage Tolerance	%	N/A		±3%
Ripple & Noise (typ) (pk - pk)	mV	100	100	50
Total Regulation (max)	mV	±5%	±5%	±4%
Overload Protection (typ)	A	2	2	3
Overvoltage Protection	-	None		
Remote Sense	-	None		
Remote On / Off (1)	-	ON = 2 - 6V; OFF= 0 - 0.6V		ON = <0.5V; OFF= >2V
Sequencing	-	None		
Temperature (operating)	°C	-40 to +85°C (CE1003, 1004 derate linearily to 80% load above 70°C)		
Temperature (storage)	°C	-40 to +85°C		
Humidity (operating)	-	10-90% RH Non condensing @ max temp 38°C		
Humidity (storage)	-	Sealed packaging, see Technical Download		
Cooling	-	Convection or forced air		
Isolation Voltage	VDC	N/A		
Vibration (non operating)	-	Frequency: 10-2000Hz, Sweep time: 4 minutes per cycle Amplitude: 10G, 30 minutes each x, y, and z direction		
Shock	-	Peak Acceleration: 100G, Duration: 6msec; three times each axis		
Safety Agency Approvals	-	N/A		
Weight (max)	g	1.8	1.8	1.7
Size	mm	18.3 x 12.3 x 4.5		
Warranty	-	1 year		

Notes:
(1) Pin 5

Model Selector

Model	Output Voltage (V)	Output Adjust (V)	Output Current (A)	Efficiency (typ)
CE-1003	1.5 - 3.3	1.5 - 3.3[2]	1.5	86.5%
CE-1004	3.3 - 5	3.3 - 5[2]	1.5	86.5%
CE-1005	1.0 - 3.3	1.0 - 3.3	2.5[3]	91.5%

Notes:
(2) See Programming Table
(3) See CE-1005 Derating Table

CE-1005 Derating Table

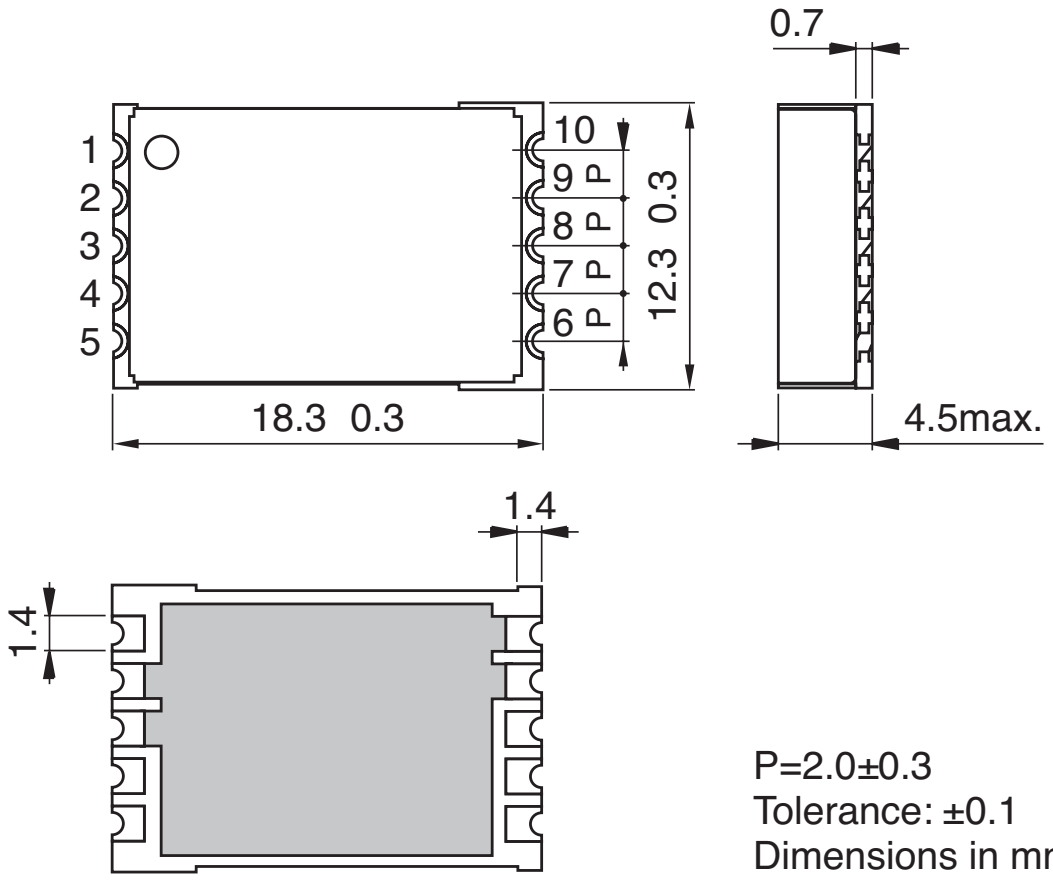
Vout	3.3 Vin	5.0 Vin
1.0	1.75A	1.5A
1.2	1.85A	1.65A
1.5	2.00A	1.85A
1.8	2.15A	2.0A
2.0	2.25A	2.2A
2.5	2.50A	2.5A
3.3	-	2.5A

CE-1004, 1005 Programming Table

Pin 7	Pin 8	Pin 9	Output Voltage (Vout) CE-1003	CE-1004
0	0	0	3.3	5.0
0	0	1	3.0	4.8
0	1	0	2.8	4.5
0	1	1	2.5	4.3
1	0	0	2.3	4.0
1	0	1	2.0	3.8
1	1	0	1.8	3.5
1	1	1	1.5	3.3

0 = Short to GND
1 = Open
See web site for detailed specifications

Outline Drawing



Pinout

Pin	CE-1003 CE-1004	CE-1005
1	Vin	+V input
2	Vin	+V input
3	GND	-V input
4	GND	-V input
5	On / Off	Remote On/Off
6	GND	-V output
7	GND	-V output
8	Vset	Output trim
9	Vout	+V output
10	Vout	+V output

LAMBDA

Manufactured by TDK
TDK-Lambda is a collaborative product brand between TDK and the Lambda group.

CE 1050 Series

1.2 - 2.5A Point of Load Converter

- 9 to 26V Input
- 3.3 to 12V Outputs
- Surface Mount
- Low 5.5mm Profile
- Non Isolated Output

Key Market Segments & Applications

Telecommunications
Datacom
Instrumentation

CE 1050 Features and Benefits

Features	*Benefits*
◆ Wide range output	◆ Reduces need for custom models
◆ Constant switching frequency	◆ Easier system filtering
◆ Five sided shielding	◆ Reduced EMI

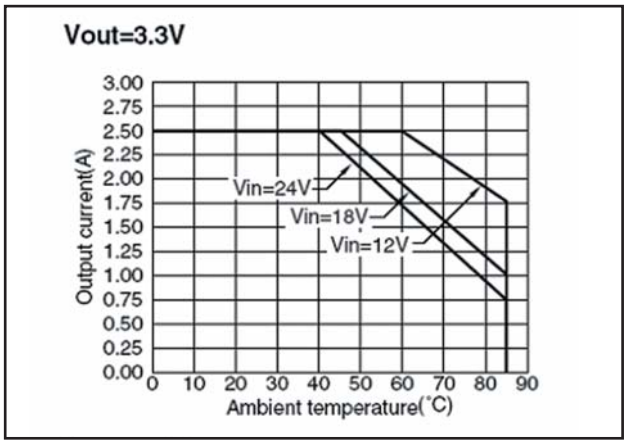
Specifications

ITEMS / MODELS		CE-1050
Nominal Output Voltage (1)	VDC	+3.3 to +12.6
Input Voltage Range	VDC	9 - 26.4
Input Current (max)	A	1.8
Output Voltage Tolerance	%	N/A
Ripple & Noise (typ) (pk - pk)	mV	50
Total Regulation (typ)	mV	Vout=3.3 to 5.0:±3.5%; Vout ø5.0: ±5%
Overload Protection	A	3.5
Overvoltage Protection	-	None
Remote Sense	-	None
Remote On / Off	-	Voltage on pin 5: ON = 3 - 6V; OFF= 0 - 0.3V
Sequencing	-	None
Temperature (operating)	°C	-20 to +85°C
Temperature (storage)	°C	-20 to +85°C
Humidity (operating)	-	10-90% RH Non condensing @ max temp 38°C
Humidity (storage)	-	Sealed packaging, see Technical Download
Cooling	-	Convection or forced air
Isolation Voltage	VDC	N/A
Vibration (non operating)	-	Frequency: 10-2000Hz, Sweep time: 4 minutes per cycle Amplitude: 10G, 30 minutes each x, y, and z direction
Shock	-	Peak Acceleration: 100G, Duration: 6msec; three times each axis
Safety Agency Approvals	-	N/A
Weight (max)	g	3.7
Size	mm	21.3 x 16.4 x 5.5
Warranty	-	1 year

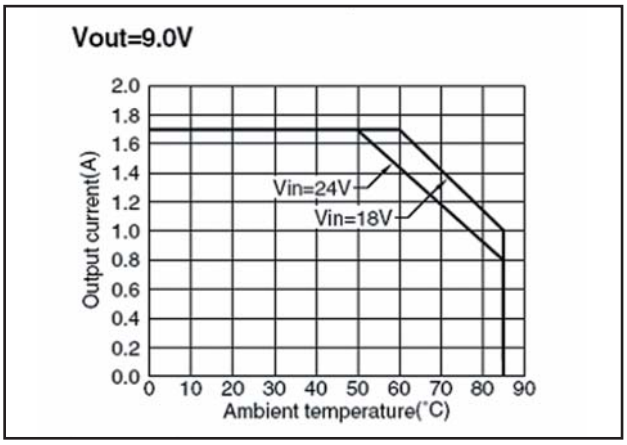
Notes: (1) Input / output voltage differential must Ø 4V.

Derating Curve

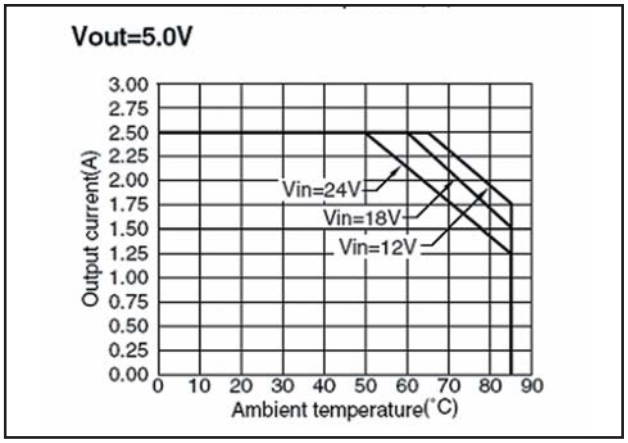
Vout=3.3V



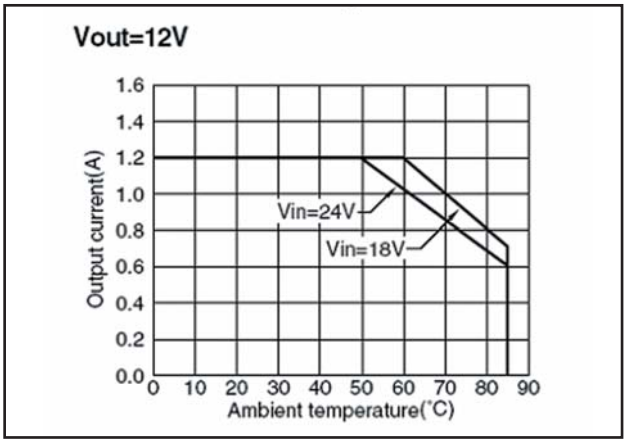
Vout=9.0V



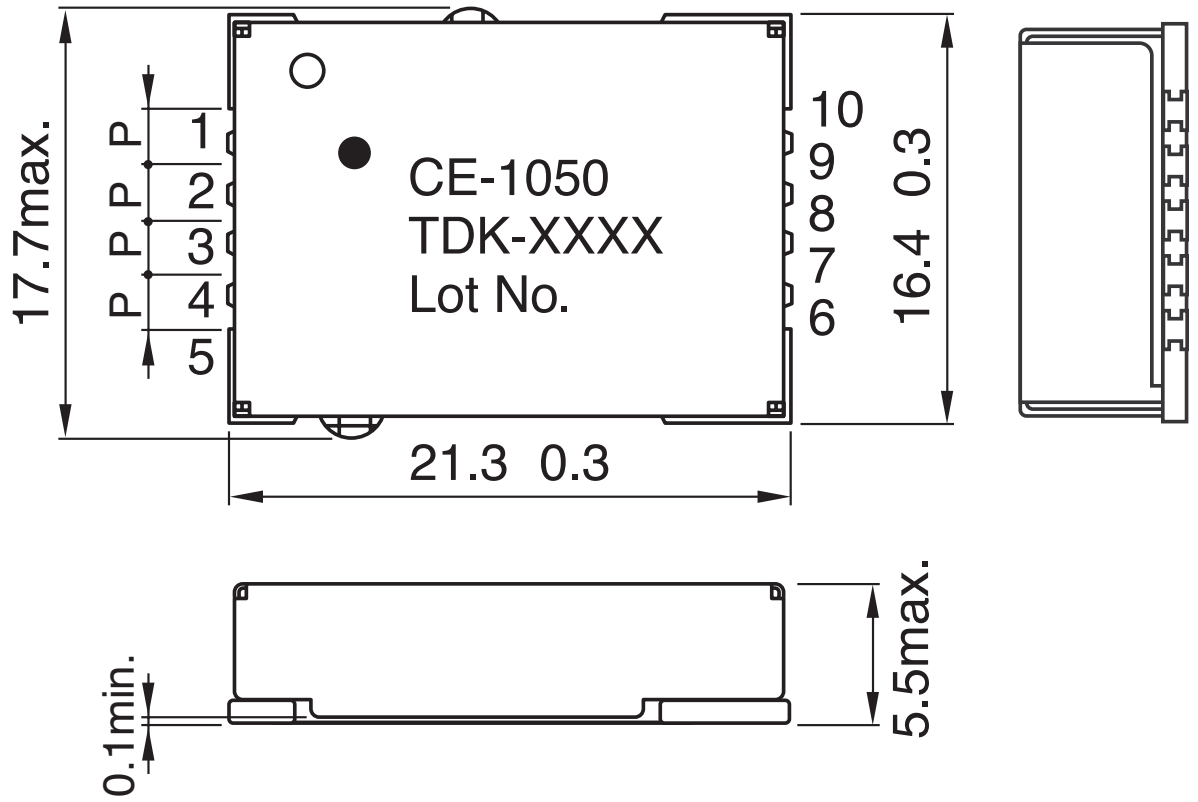
Vout=5.0V



Vout=12V



Outline Drawing



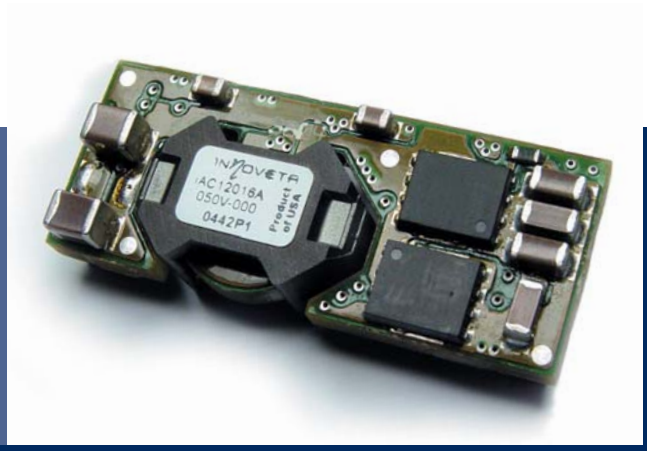
Model Selector

Model	Output[1] Voltage (V)	Output[1] Adjust (V)	Output Current (A)	Efficiency (typ)
CE-1050	3.3 - 12.6V	3.3 - 12.6V	see curves	90%

Pinout

PIN	Function	Description
1	Vin	+V input
2	Vin	+V input
3	GND	-V input
4	GND	-V input
5	On / Off	Remote On/Off
6	GND	-V output
7	GND	-V output
8	Vset	Output trim
9	Vout	+V output
10	Vout	+V output

LAMBDA



- Standard Industry Footprint
- 3.0-5.5V and 6.0-14.0V Input
- 0.8-5.0V Nominal Outputs
- Surface Mount
- Low 8.5mm Profile
- Non Isolated Output

iAA/iAC Series

15 to 16A Point of Load Converter

iAA / iAC Features and Benefits

Features	Benefits
◆ High operating efficiency (up to 95%)	◆ Reduced system heating
◆ Constant switching frequency	◆ Easier system filtering
◆ Starts with pre-biased output	◆ Supports complex digital systems

Specifications

ITEMS / MODEL		iAA05015A008V	iAA05015A025V	iAA05015A033V	iAC12016A008V
Nominal Output Voltage	VDC	0.75-3.63	2.5	3.3	0.8 - 5.0
Input Voltage Range	VDC	3.0-5.5 (2)	3.0-5.5 (2)	4.5-5.5	6.0(1)-14 or 9.6-14
Input Current (max)	A		16		18
Output Voltage Tolerance	VDC	±3.3% Vo, set	2.413 - 2.588	3.19 - 3.41	-2.5 to +3.5% Vo, set
Ripple & Noise (max) (pk to pk) (3)	mV	75			100
Line Regulation (max)	mV	5			10
Load Regulation (max)	mV	10			15
Overload Protection	%	Inception - 175-235% of rated output; Short circuit - auto recovery			
Overvoltage Protection	-	N/A			
Remote Sense	-	Yes			
Remote On / Off	-	Positive or Negative Logic available, see Feature Set			
Sequencing	-	Not Available			See Feature Set
Temperature (operating)	°C	-40 to 125			
Temperature (storage)	°C	-55 to 125			
Humidity (operating)	-	20-95% RH Non condensing			
Humidity (storage)	-	Per IPC / JEDEC J-STD-020, for MSL-2 (<30C/60%RH) in original packaging			
Cooling	-	Convection or forced air			
Isolation Voltage	-	N/A			
Vibration (non operating)	-	5 to 50Hz @ 0.5g (4.9m/s²), and 50 to 500Hz @ 1.5g (14.7m/s²) per Bellcore TR-EOP-000063-5.4.4			
Shock	-	196.1m/s²			
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950)			
Weight (max)	g	12			
Size	mm	33 x 13.5 x 8.5			
Warranty	-	3 Years			

Notes: See website for detailed specifications

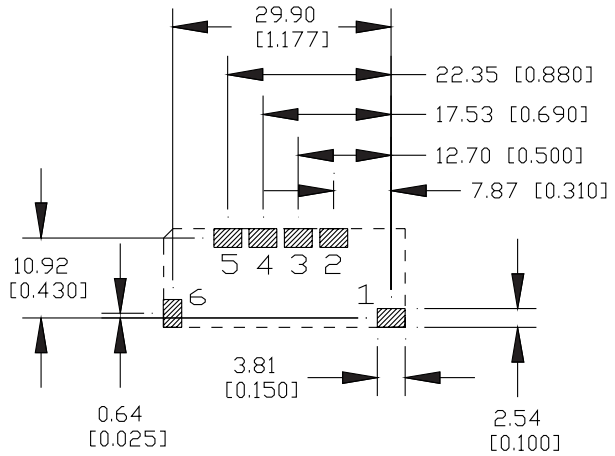
(1) 8.3 - 14V when output is >3.63V

(2) 4.5 - 5.5V when output is ≥3.0V

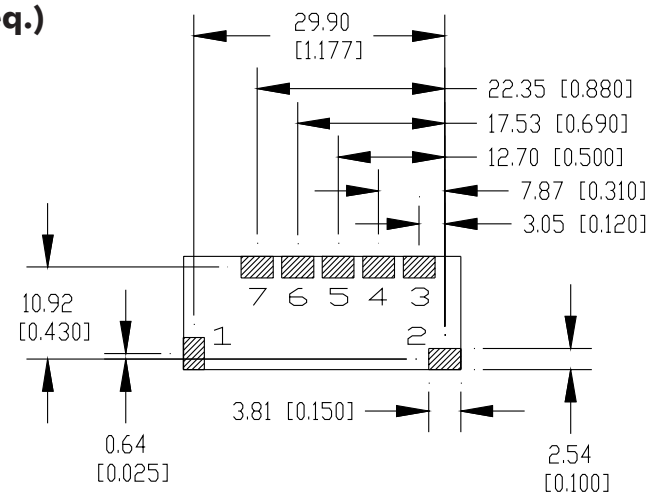
(3) Measured across one 0.1uF ceramic capacitor and one 47uF ceramic capacitor; BW = 20MHz

Recommended Footprint (Top View)

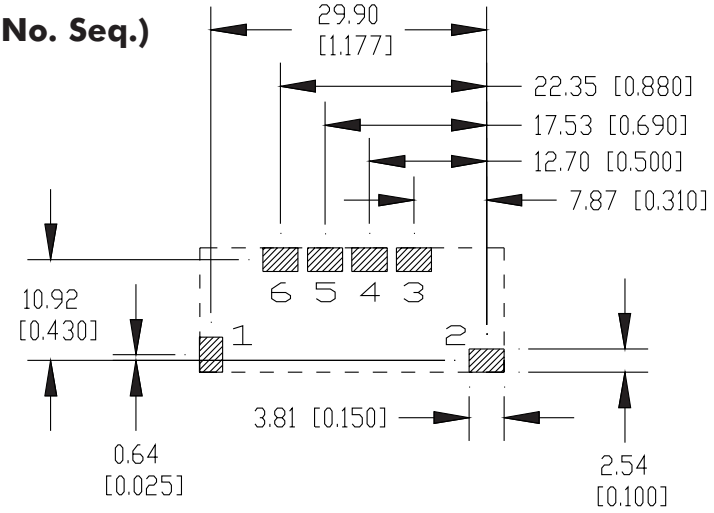
iAA



iAC (Seq.)



iAC (No. Seq.)



Model Selector

Model	Output Voltage (V)	Output Adjust (V)	Output Curr. (A)	Max. Output Power (W)	Efficiency at Full Load (%)
iAA05015A008V-001-R	0.75 - 3.63	0.75 - 3.63	15	49.5	94.5
iAA05015A025V-001-R	2.5	2.25 - 2.75	15	37.5	93
iAA05015A033V-001-R	3.3	2.97 - 3.63	15	49.5	95
iAC12016A008V-001-R	0.8 - 5.0	0.8 - 5.0	16	80	94 @ 5V

Feature Set

	Feature Set	Pos. Logic On / Off	Neg. Logic On / Off	Input Voltage	Sequencing
iAA	00	X			
	01*		X		
iAC	00	X		6.0 - 14.0	X
	01*		X	6.0 - 14.0	X
	02	X		6.0 - 14.0	
	03		X	6.0 - 14.0	
	04	X		9.6 - 14.0	X
	05		X	9.6 - 14.0	X
	06	X		9.6 - 14.0	
	07		X	9.6 - 14.0	

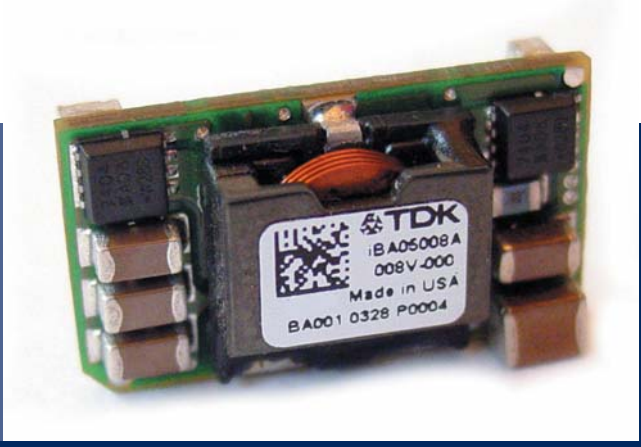
* Preferred feature set

Model Number Example: iAC12016A008V-0**01**-R

Pinout

PIN	iAA	Function iAC(Seq)	iAC(No Seq)
1	Vin	On/Off	On/Off
2	Gnd	Vin	Vin
3	Vout	Seq	Gnd
4	Trim	Gnd	Vout
5	Sense	Vout	Trim
6	On/Off	Trim	Sense
7	-	Sense	-

LAMBDA



- Standard Industry Footprint
- 3.0-5.5V and 6.0-14.0V Input
- 0.8-5.0V Nominal Output
- Surface Mount
- Low 8.38mm Profile
- Non Isolated Output

iBA/iBC Series

7 to 8A Point of Load Converter

iBA/iBC Features and Benefits

Features	Benefits
◆ High operating efficiency (up to 95%)	◆ Reduced system heating
◆ Constant switching frequency	◆ Easier system filtering
◆ Starts with pre-biased output	◆ Supports complex digital systems

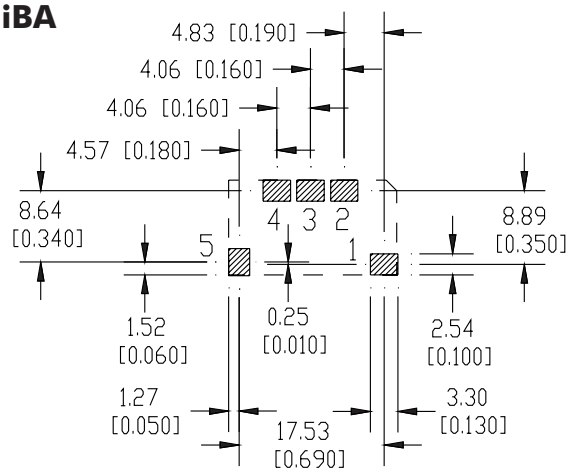
Specifications

ITEMS / MODEL		iBA05008A008V	iBC12007A008V
Nominal Output Voltage	VDC	0.75 - 3.63	0.8 - 5.0
Input Voltage Range (2)	VDC	3.0 - 5.5	6.0(1) - 14 or 9.6 - 14
Input Current (max)	A	8.5	
Output Voltage Tolerance	VDC	N/A	
Ripple & Noise (max) (pk to pk) (3)	mV	75	100
Line Regulation (max)	mV	20	
Load Regulation (max)	mV	30	30
Overload Protection	%	Inception- 185-215% of rated output; Short circuit - auto recovery	
Overvoltage Protection	-	N/A	
Remote Sense	-	No	
Remote On / Off	-	Positive or Negative Logic available, see Feature Set	
Sequencing	-	No	Yes
Temperature (operating)	°C	-40 to 125	
Temperature (storage)	°C	-55 to 125	
Humidity (operating)	-	20-95% RH Non condensing	
Humidity (storage)	-	Per IPC / JEDEC J-STD-020, for MSL-2 (<30C/60%RH) in original packaging	
Cooling	-	Convection or forced air	
Isolation Voltage	VDC	none	
Vibration (non operating)	-	5 to 50Hz @ 0.5g (4.9m/s²), and 50 to 500Hz @ 1.5g (14.7m/s²) per Bellcore TR-EOP-000063-5.4.4	
Shock	-	196.1m/s²	
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950)	
Weight (max)	g	7	
Size	mm	20.3 x 11.4 x 8.38	27.9 x 11.4 x 8.38
Warranty	-	3 Years	

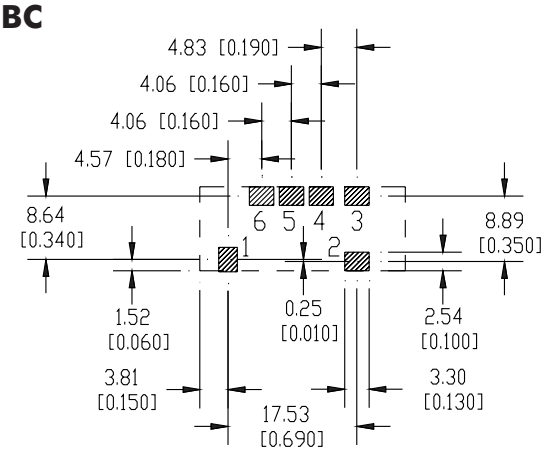
Notes: See website for detailed specifications
(1) 8.3-14V when output is >3.63V
(2) 4.5-5.5V when output is ≥3.0V
(3) Measured across one 0.1uF ceramic capacitor and one 47uF ceramic capacitor; BW = 20MHz

Recommended Footprint (Top View)

iBA



iBC



Feature Set

	Feature Set	Pos. Logic On / Off	Neg. Logic On / Off	Sequencing	(6-14V) Input Rng.	(9.6-14) Input Rng.
iBA	00	X				
	01		X			
iBC	00	X		X	X	
	01*		X	X	X	
	02	X			X	
	03		X		X	
	04	X		X		X
	05		X	X		X
	06	X				X
	07		X			X

* Preferred feature set

Model Number Example: iBC12007A008V-0**01**-R

Pinout

PIN	Function iBA	iBC
1	Vin	On/Off
2	Gnd	Vin
3	Trim	Seq
4	Vout	Gnd
5	On/Off	Trim
6	-	Vout

Model Selector

Model	Output Voltage	Output Adjust	Output Curr. (A)	Max. Output Power (W)	Efficiency at Full Load (%)
iBA05008A008V-001-R	0.75 - 3.63	0.75 - 3.63	8	26.4	94 @ 3.3V
iBC12007A008V-001-R	0.8 - 5.0	0.8 - 5.0	7	35	93 @ 5.0V

LAMBDA

- Standard Eighth Brick Footprint
- 36-75VDC Input
- 1.2V 25A - 12V 6.5A Nominal Output
- Through Hole Mounting
- Low 8.8mm Profile
- 1500VDC Basic Isolation

iEA Series

30 - 78W Eighth Brick DC-DC Converters

iEA Features and Benefits

Features	Benefits
◆ High operating efficiency (up to 91%)	◆ Reduced system heating
◆ Constant switching frequency	◆ Easier system filtering
◆ Open frame design	◆ Better thermal performance

Specifications

ITEMS / MODEL		iEA480						
Nominal Output Voltage	VDC	1.2	1.5	1.8	2.5	3.3	5	12
Input Voltage Range	VDC	36-75						
Input Current (max)	A	4						
Output Voltage Tolerance	VDC	1.16 - 1.24	1.45 - 1.55	1.74 - 1.86	2.42 - 2.58	3.20 - 3.40	4.85 - 5.15	11.58 - 12.42
Ripple & Noise (max) (pk to pk) (1)	mV	100					125	200
Line Regulation (max)	mV	5				7	10	24
Load Regulation (max)	mV	7				8	10	24
Overload Protection (typ)	A	35			31	29	20	8.5
Overvoltage Protection	%	122-146% Vo, nom typical						
Remote Sense	-	Yes						
Remote On / Off	-	Positive or Negative Logic, see Feature Set						
Temperature (operating)	°C	-40 to 125						
Temperature (storage)	°C	-55 to 125						
Humidity (operating)	-	20-95% RH Non condensing						
Humidity (storage)	-	10-95% RH Non condensing						
Cooling	-	Convection or forced air						
Isolation Voltage	VDC	1500						
Vibration (non operating)	-	5 to 50Hz @ 0.5g (4.9m/s^2), and 50 to 500Hz @ 1.5g (14.7m/s^2) per Bellcore TR-EOP-000063-5.4.4						
Shock	-	196.1m/s^2						
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950), CE Mark (LVD)						
Weight (max)	g	30.4						
Size	mm	58.4 x 22.9 x 8.8						
Warranty	-	3 Years						

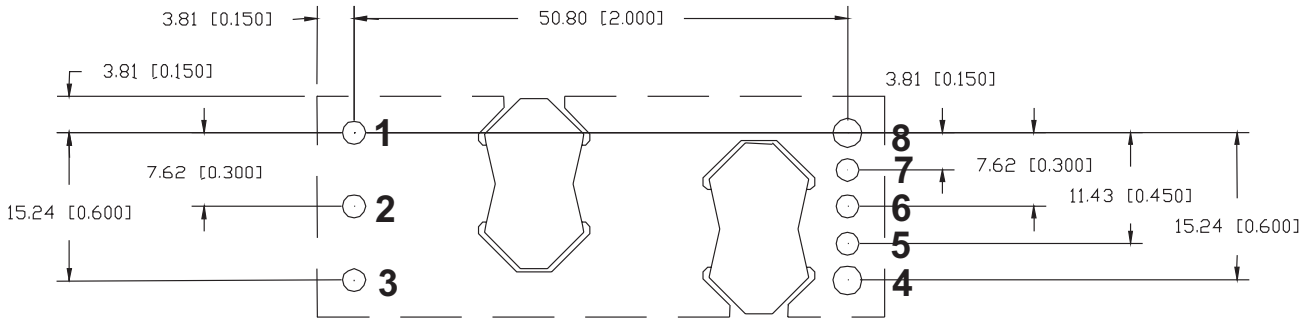
Notes: See website for detailed specifications

(1) Measured across one 0.1uF ceramic capacitor and one 10uF tantalum ceramic capacitor; BW = 20MHz

Model Selector

Model	Voltage (V)	Adjust Range (V)	Max. Curr. (A)	Max. Output Power (W)	Efficiency at Full Load (%)
iEA48025A012V-001-R	1.2	1.08 to 1.32	25	30	78
iEA48025A015V-001-R	1.5	1.35 to 1.65	25	37.5	81
iEA48025A018V-001-R	1.8	1.62 to 1.98	25	45	83
iEA48025A025V-001-R	2.5	2.25 to 2.75	25	62.5	86
iEA48020A033V-001-R	3.3	2.97 to 3.63	20	66	90
iEA48015A050V-001-R	5	4.5 to 5.5	15	75	90
iEA48007A120V-001-R	12	10.8 to 13.2	6.5	78	91

Recommended Footprint (Top View)



Pinout

PIN	Function
1	Vin (+)
2	On / Off
3	Vin (-)
4	Vout (-)
5	Sense (-)
6	Trim
7	Sense (+)
8	Vout (+)

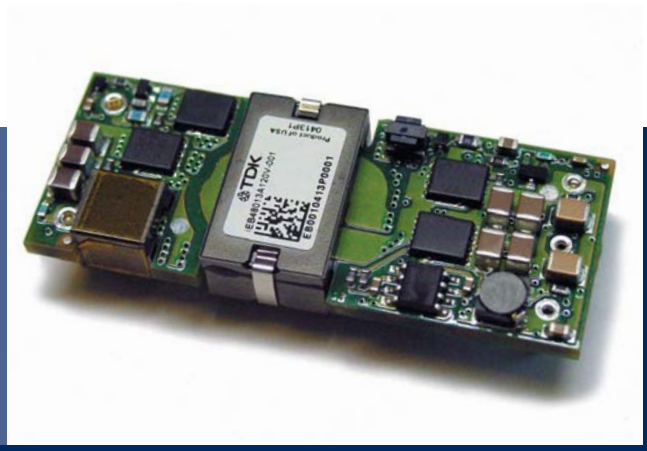
Feature Set

Feature Set	Pos. Logic On / Off	Neg. Logic On / Off	0.110" Pin Len.	0.200 Pin Len.	0.145" Pin Len.	Latching OVP
00	X				X	
01*		X			X	
02	X		X			
03		X	X			
04	X			X		
05		X		X		
11		X			X	X
15		X		X		X

* Preferred feature set

Model Number Example: iEA48020A033V-0**01**-R

LAMBDA



- Standard Eighth Brick Footprint
- 42-56VDC Input
- 12V 13.5A Nominal Output
- Through Hole Mounting
- Low 8.5mm Profile
- 2250VDC Basic Isolation

iEB Series

150W 12V Eighth Brick Intermediate Bus Converter

iEB Features and Benefits

Features	Benefits
◆ High operating efficiency (94%)	◆ Reduced system heating
◆ Constant switching frequency	◆ Easier system filtering
◆ Nominal 12V output	◆ Ideal for non-isolated point of load converters

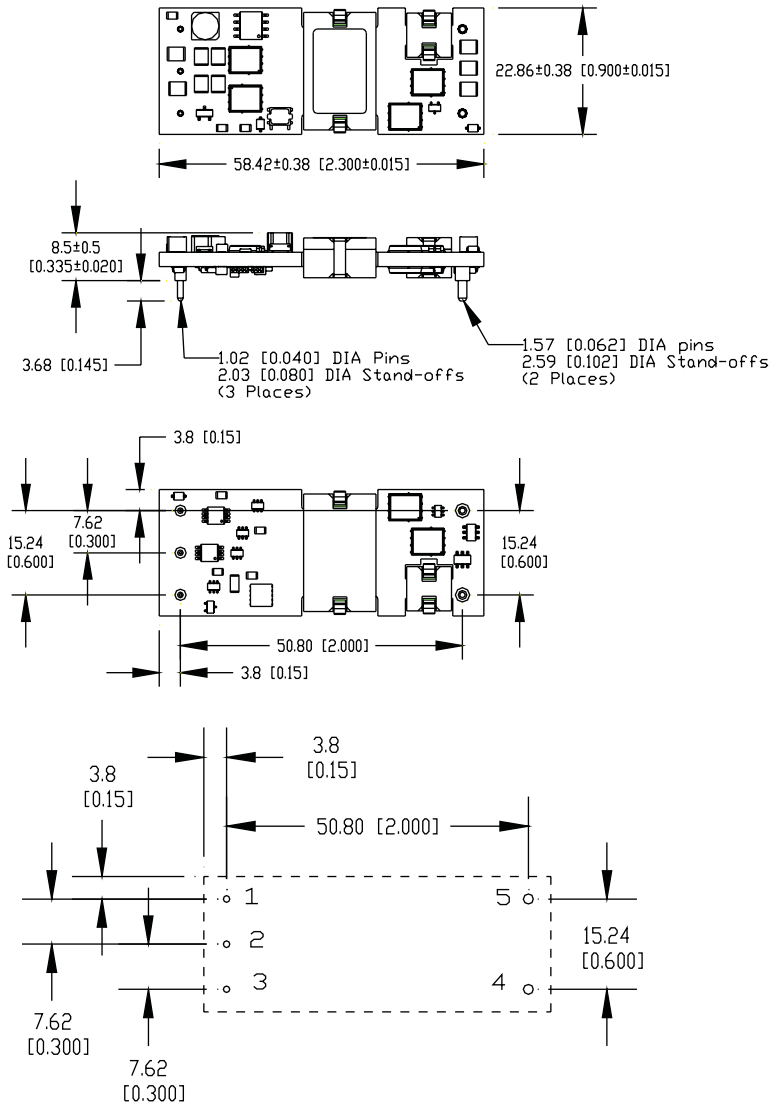
Specifications

ITEMS / MODEL		iEB48013A120V
Nominal Output Voltage	VDC	12
Input Voltage Range	VDC	42 - 56
Input Current (max)	A	6
Output Voltage Tolerance	VDC	8.9 to 14.4V
Ripple & Noise (max) (pk to pk) (1)	mV	200
Line Regulation (typ)	mV	3500
Load Regulation (typ)	mV	750
Overload Protection (typ)	A	Overcurrent threshold 20A, short circuit 6A - auto recovery
Remote Sense	-	no
Remote On / Off	-	Positive or Negative Logic, see Feature Set
Temperature (operating)	°C	-40 to 120
Temperature (storage)	°C	-55 to 125
Humidity (non-condensing)	-	20-95% RH Non-condensing
Humidity (storage)	-	10-95% RH Non-condensing
Cooling	-	Convection or forced air
I/O Isolation Voltage	VDC	2250VDC (Basic isolation)
Vibration (non-operating)	-	5 to 50Hz@0.5g (4.9m/s^2), and 50 to 500Hz@1.5g (14.7m/s^2) per Bellcore TR-EOP-000063-5.4.4
Shock	-	196.1m/s^2
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950), CE Mark (LVD)
Weight (max)	g	27
Size	mm	58.42 x 22.86 x 8.5
Warranty	-	3 Years

Notes: See website for detailed specifications

(1) Measured across one 0.1uF, and 2x22uF ceramic capacitors; BW = 20MHz

Outline Drawing



Feature Set

Feature Set	Positive Logic On / Off	Negative Logic On / Off	0.110" Pin Len.	0.145" Pin Len.	0.200" Pin Len.
00	X			X	
01*		X		X	
02	X		X		
03		X	X		
04	X				X
05		X			X

* Preferred feature set

Model Number Example: iEB48013A120V-0**05**-R

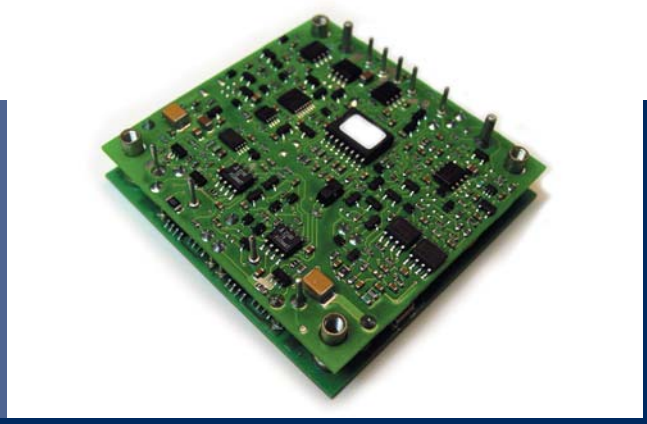
PIN Assignments

PIN	Function
1	Vin (+)
2	On / Off
3	Vin (-)
4	Vout (-)
5	Vout (+)

Model Selector

Model	Voltage (V)	Adjust Range (V)	Max. Curr. (A)	Max. Output Power (W)	Efficiency at Full Load (%)
iEB48013A120V-001-R	12	-	13.5	150	94

LAMBDA



- Standard Half Brick Footprint
- 36-75VDC Input
- 1.2V 60A - 28V 16A Nominal Outputs
- Through Hole Mounting
- Low 12.7mm Profile
- 1500VDC Basic Isolation

iHA Series

72 - 448W Half Brick Converter

iHA Features and Benefits

Features	Benefits
◆ High operating efficiency (up to 93.5%)	◆ Reduced system heating
◆ Constant switching frequency	◆ Easier system filtering
◆ Baseplate	◆ Allows for improved thermal management with optional heatsink

Specifications

ITEMS \ MODEL		iHA48								
Nominal Output Voltage	VDC	1.2	1.5	1.8	2.5	3.3	5	12	24	28
Input Voltage Range	VDC	36 - 75 (28V/16A: 40 -60)								
Input Current (max)	A	2.6 - 12.8 Amps model dependent								
Output Voltage Tolerance	VDC	1.16-1.24	1.46-1.55	1.75-1.85	2.43-2.58	3.20-3.40	4.84-5.15	11.64-12.36	23.28-24.72	27.16-28.84
Ripple & Noise (max) (pk to pk) (1)	mV	60		80	75	55	70	100	600	675
Line Regulation (max)	mV	4			5	6	8	15	25	30
Load Regulation (max)	mV	6			8	10		25	50	
Overload Protection (typ)	%	Inception- 113-156% of rated output; Short circuit auto recovery								
Overvoltage Protection (typ)	VDC	1.5	1.8	2.2	3.0	4.0	6.0	14.5	29.0	33
Remote Sense	-	Yes								
Remote On / Off	-	Positive or Negative Logic available, see Feature Set								
Temperature (operating)	°C	-40 to 115 Vo≤ 5.0V; -40 to 110 for Vo ≥ 12V								
Temperature (storage)	°C	-55 to 125								
Humidity (operating)	-	20-95% RH Non condensing								
Humidity (storage)	-	10-95% RH Non condensing								
Cooling	-	Convection or forced air								
Isolation Voltage	VDC	1500V Input to output & baseplate, 500V Output to baseplate								
Vibration (non operating)	-	5 to 50Hz @ 0.5g (4.9m/s^2), and 50 to 500Hz @ 1.5g (14.7m/s^2) per Bellcore TR-EOP-000063-5.4.4								
Shock	-	196.1m/s^2								
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950), CE Mark (LVD)								
Weight (max)	g	85								
Size	mm	57.9 x 61.0 x 12.7								
Warranty	-	3 years								

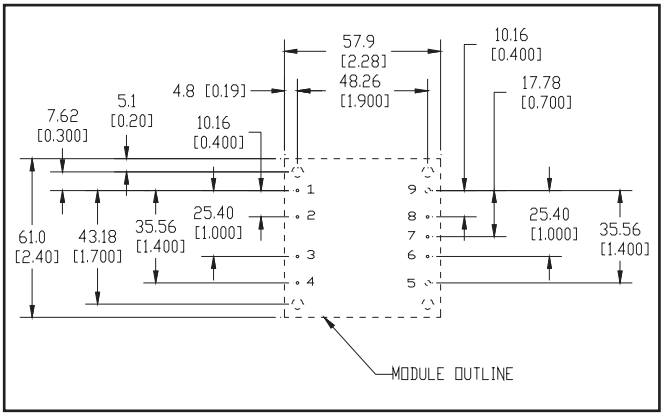
Notes:

(1) Measured across 47uF +1uF +0.1uF ceramic caps for 1.2-5Vo, across 1uF +0.1uF ceramic caps +10uF Tan cap for 12Vo, across 200uF Al electrolytic +10uF +1uF +0.1uF ceramic caps for 24-28Vo BW = 20MHz.

Model Selector

Model	Voltage (V)	Adjust Range (V)	Max. Curr. (A)	Max. Output Power (W)	Efficiency at Full Load (%)
iHA48060A012V-001-R	1.2	.65 - 1.32	60	72	83
iHA48060A015V-001-R	1.5	.81 - 1.65	60	90	86
iHA48060A018V-001-R	1.8	0.97 - 1.98	60	108	86.5
iHA48060A025V-001-R	2.5	1.35 - 2.75	60	150	88.5
iHA48040A033V-001-R	3.3	1.78 - 3.63	40	132	91.5
iHA48060A033V-001-R	3.3	1.78 - 3.63	60	198	90
iHA48040A050V-001-R	5	2.7 - 5.5	40	200	91
iHA48025A120V-001-R	12	6.48 - 13.2	25	300	91.5
iHA48013A240V-001-R	24	13 - 26.4	12.5	300	91
iHA48011A280V-001-R	28	15.12 - 30.8	11	308	91
iHA48016A280V-001-R	28	14 - 30.8	16	448	93.5

Recommended Footprint (Top View)



Pinout

PIN	Function	PIN	Function
1	Vin (+)	2	On / Off
3	Case (Omit opt.)	4	Vin (-)
5	Vout (-)	6	Sense (-)
7	Trim	8	Sense (+)
9	Vout (+)		

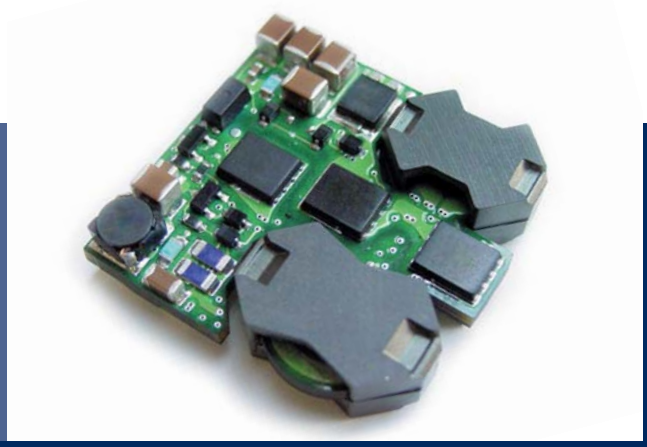
Feature Set

Feature Set	On / Off Logic	Omit Pin 3	Output OVP	Pin Length
00	Positive	No	Latching	0.145
01*	Negative	No	Latching	0.145
02	Positive	Yes	Auto-Recovery	0.145
03	Negative	Yes	Auto-Recovery	0.145
04	Positive	No	Latching	0.110
05	Negative	No	Latching	0.110
06	Positive	Yes	Auto-Recovery	0.110
07	Negative	Yes	Auto-Recovery	0.110

* Preferred feature set

Model Number Example: iHA48040A050V-0**01**-R

LAMBDA



- Compact 30.5 x 29.3 x 8.1 mm
- 36-75VDC Input
- 1.5V 10A - 18V 2.5A Nominal Outputs
- Surface Mount
- Low 8.81mm Profile
- 1500VDC Basic Isolation

iPB Series

15 - 45W Pico Brick Converter

iPB Features and Benefits

Features	*Benefits*
◆ High operating efficiency (up to 89%)	◆ Reduced system heating
◆ Constant switching frequency	◆ Easier system filtering
◆ 33% smaller than eighth brick	◆ Optimization of board space

Specifications

ITEMS / MODEL		iPB480							
Nominal Output Voltage	VDC	1.5	1.8	2.5	3.3	5	12	15	18
Input Voltage Range	VDC	36 - 75							
Input Current (max)	A	2.0 - 2.2 Amps model dependent							
Output Voltage Tolerance	VDC	1.45-1.55	1.74-1.86	2.41-2.58	3.19-3.41	4.8-5.2	11.52-12.48	14.4-15.6	17.1-18.9
Ripple & Noise (max) (pk to pk) (1)	mV	100				125		100	
Line Regulation (max)	mV	5			6	8	24	30	36
Load Regulation (max)	mV	10			12	15	96	120	144
Overload Protection (typ)	%	Inception - 120-150% of rated output; Short circuit - auto recovery							
Overvoltage Protection	VDC	1.8	2.2	3	12	10	19	19	27
Remote Sense	-	No							
Remote On / Off	-	Yes (Negative Logic)							
Temperature (operating)	°C	-40 to 115					-40 to 125		
Temperature (storage)	°C	-55 to 125							
Humidity (operating)	-	20-95% RH Non condensing							
Humidity (storage)	-	Per IPC / JEDEC J-STD-020, for MSL-1 (<30C/85%RH) in original packaging							
Cooling	-	Convection or forced air							
Isolation Voltage	VDC	1500							
Vibration (non operating)	-	5 to 50Hz @ 0.5g (4.9m/s^2), and 50 to 500Hz @ 1.5g (14.7m/s^2) per Bellcore TR-EOP-000063-5.4.4							
Shock	-	196.1m/s^2							
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950), CE Mark (LVD)							
Weight (max)	g	18							
Size	mm	30.5 x 29.3 x 8.81							
Warranty	-	3 years							

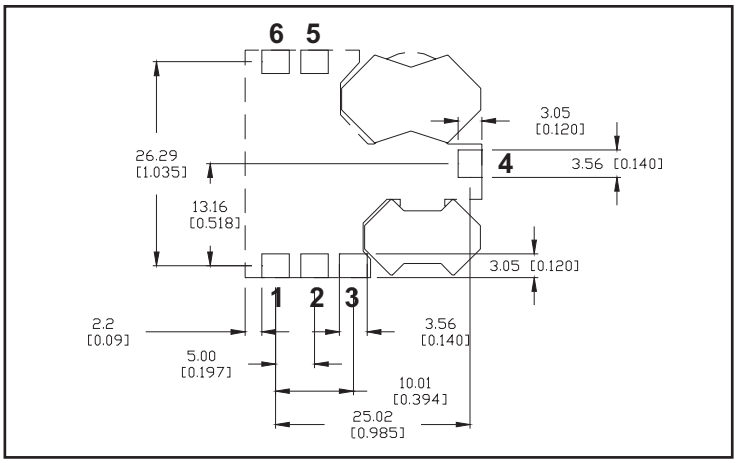
Notes: See website for detailed specifications

(1) Measured across one 3.3uF ceramic capacitor and one10uF Tan capacitor; BW = 20MHz

Model Selector

Model	Voltage (V)	Adjust Range (V)	Max. Curr. (A)	Max. Output Power (W)	Efficiency at Full Load (%)
iPB48010A015V-001-R	1.5	1.43 - 1.65	10	15	79
iPB48010A018V-001-R	1.8	1.62 - 1.98	10	18	82
iPB48010A025V-001-R	2.5	2.25 - 2.75	10	25	86
iPB48010A033V-001-R	3.3	2.97 - 3.46	10	33	88
iPB48007A050V-001-R	5	4.5 - 5.5	7	35	89
iPB48004A120V-001-R	12	10.8 - 13.2	3.5	42	85
iPB48003A150V-001-R	15	13.5 - 16.5	2.75	41	87
iPB48003A180V-001-R	18	16.2 - 19.8	2.5	45	88

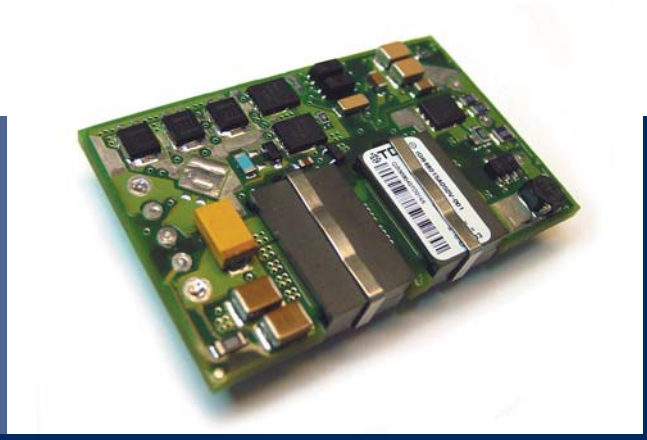
Recommended Footprint (Top View)



Pinout

PIN	Function
1	Vout (+)
2	Vout (-)
3	Vout Trim
4	On / Off
5	Vin (-)
6	Vin (+)

LAMBDA



- Standard Quarter Brick Footprint
- 18-36, 36-75VDC Inputs
- 1.2V 25A, 12V 12.5A Nominal Outputs
- Through Hole Mounting
- Low 8.81mm Profile
- 1500VDC Basic Isolation

iQB Series

25 - 150W Quarter Brick Converter

iQB Features and Benefits

Features	Benefits
◆ High operating efficiency (up to 92%)	◆ Reduced system heating
◆ Constant switching frequency	◆ Easier system filtering
◆ Low component count	◆ Higher reliability

Specifications

ITEMS / MODEL		iQB						
Nominal Output Voltage	VDC	1.2	1.5	1.8	2.5	3.3	5	12
Input Voltage Range	VDC	36-75				18-36,36-75	36-75	
Input Current (max)	A	2 - 6.5 Amps model dependent						
Output Voltage Tolerance	VDC	1.16 - 1.24	1.45 - 1.55	1.74 - 1.86	2.42 - 2.58	3.20 - 3.40	4.85 - 5.15	11.58 - 12.42
Ripple & Noise (max) (pk to pk) (1)	mV	75	100				125	150-250
Line Regulation (max)	mV	5					10	24
Load Regulation (max)	mV	7					10	24
Overload Protection (typ)	%	Inception- 120-153% of output rating; Short circuit auto recovery						
Overvoltage Protection	VDC	1.41 to 1.8	1.7 to 2.3	2.15 to 2.58	2.7 to 3.5	3.75 to 4.4	5.7 to 6.7	13.6 to 16
Remote Sense	-	Yes						
Remote On / Off	-	Positive or Negative Logic available, see Feature Set						
Temperature (operating)	°C	-40 to 120 (115°C for 24V input model)						-40 to 115
Temperature (storage)	°C	-55 to 125						
Humidity (operating)	-	20-95% RH Non condensing						
Humidity (storage)	-	10-95% RH Non condensing						
Cooling	-	Convection or forced air						
Isolation Voltage	VDC	1500						
Vibration (non operating)	-	5 to 50Hz @ 0.5g (4.9m/s2), and 50 to 500Hz @ 1.5g (14.7m/s2) per Bellcore TR-EOP-000063-5.4.4						
Shock	-	196.1m/s2						
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950), CE Mark (LVD)						
Weight (max)	g	39						
Size	mm	57.9 x 36.8 x 8.81 (10.11 for 12V 8.3A model)						
Warranty	-	3 Years						

Notes: See website for detailed specifications

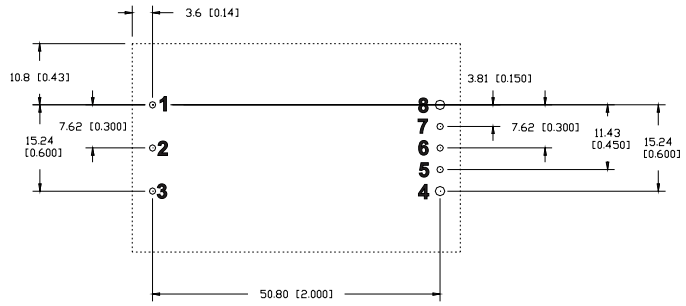
(1) Measured across one 1uF ceramic capacitor and one10uF Tan capacitor; BW = 20MHz

Model Selector

Model	Voltage (V)	Adjust Range (V)	Max. Curr. (A)	Max. Output Power (W)	Efficiency at Full Load (%)
iQB48025A012V-001-R	1.2	1.08 to 1.32	25	30	78
iQB48025A015V-001-R	1.5	1.35 to 1.65	25	37.5	82
iQB48015A018V-001-R	1.8	1.62 to 1.98	15	27	85
iQB48025A018V-001-R	1.8	1.62 to 1.98	25	45	84
iQB48010A025V-001-R	2.5	2.25 to 2.75	10	25	87
iQB48020A025V-001-R	2.5	2.25 to 2.75	20	50	86
iQB48025A025V-001-R	2.5	2.25 to 2.75	25	62.5	85
iQB48010A033V-001-R	3.3	2.97 to 3.63	10	33	90
iQB24015A033V-001-R*	3.3	2.97 to 3.63	15	49.5	89
IQB48020A033V-001-R	3.3	2.97 to 3.63	20	66	89
iQB48025A033V-001-R	3.3	2.97 to 3.63	25	82.5	88
iQB48008A050V-001-R	5	4.5 to 5.5	8	40	90
iQB48015A050V-001-R	5	4.5 to 5.5	15	75	90
iQB48004A120V-001-R	12	9.6 to 13.2	4.17	50	91
iQB48008A120V-001-R	12	9.6 to 13.2	8.33	100	90
iQB48012A120V-001-R	12	9.6 to 13.2	12.5	150	92

* 24V Nominal Input

Recommended Footprint (Top View)



Feature Set

Feature Set	On / Off Logic	Pin Length
00	Positive	0.145"
01*	Negative	0.145"
02	Positive	0.110"
03	Negative	0.110"
04	Positive	0.200
05	Negative	0.200

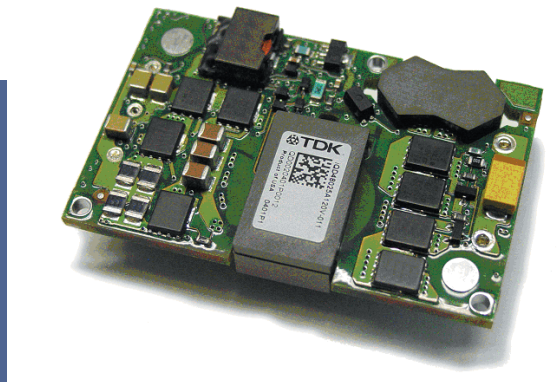
* Preferred feature set

Model Number Example: iQB48015A050V-0**01**-R

Pinout

PIN	Function	PIN	Function
1	Vin (+)	2	On / Off
3	Vin (-)	4	Vout (-)
5	Sense (-)	6	Trim
7	Sense (+)	8	Vout (+)

LAMBDA



- Standard Quarter Brick Footprint
- 42-53VDC Input
- 12V 27A Nominal Outputs
- Through Hole Mounting
- Low 9.65mm Profile
- 2250VDC Basic Isolation

iQD Series

300W 12V Quarter Brick Intermediate Bus Converter

iQD Features and Benefits

Features	*Benefits*
◆ High operating efficiency (95%)	◆ Reduced system heating
◆ Constant switching frequency	◆ Easier system filtering
◆ Nominal 12V output	◆ Ideal for non isolated point of load converters

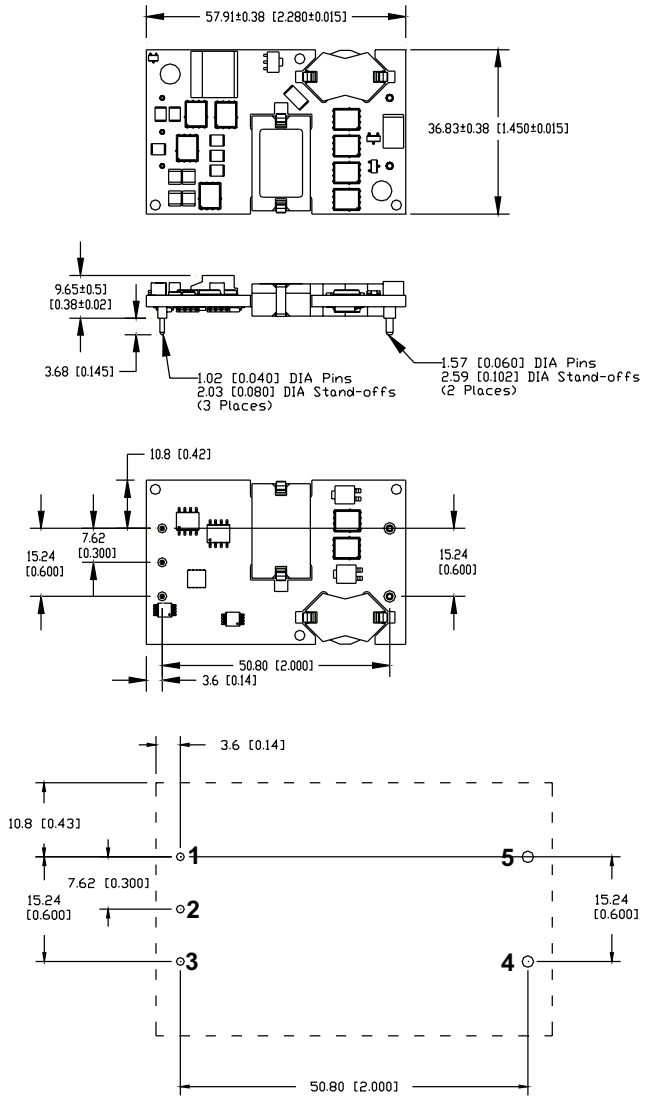
Specifications

ITEMS / MODEL		iQD48025A120V
Nominal Output Voltage	VDC	12
Input Voltage Range	VDC	42 - 53
Input Current (max)	A	10
Output Voltage Tolerance	VDC	8.9 - 13.6
Ripple & Noise (max) (pk to pk) (1)	mV	200
Line Regulation (typ)	mV	2700
Load Regulation (typ)	mV	800
Overload Protection (typ)	A	Overcurrent threshold 36A; Short circuit 8A - auto recovery
Overvoltage Protection	-	N/A
Remote Sense	-	No
Remote On / Off	-	Positive or Negative Logic, see Feature Set
Temperature (operating)	°C	-40 to 120
Temperature (storage)	°C	-55 to 125
Humidity (operating)	-	20-95% RH Non condensing
Humidity (storage)	-	10-95% RH Non condensing
Cooling	-	Convection or forced air
I/O Isolation Voltage	VDC	2250
Vibration (non operating)	-	5 to 50Hz @ 0.5g (4.9m/s^2), and 50 to 500Hz @ 1.5g (14.7m/s^2) per Bellcore TR-EOP-000063-5.4.4
Shock	-	196.1m/s2
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950), CE Mark (LVD)
Weight (max)	g	47
Size	mm	57.91 x 36.83 x 9.65
Warranty	-	3 Years

Notes: See website for detailed specifications

(1) Measured across one 22uF ceramic capacitor; BW = 20MHz

Outline Drawing



Footprint –Top View

Feature Set

Feature Set	Positive Logic On / Off	Negative Logic On / Off	0.200" Pin Len.	0.145" Pin Len.	0.180" Pin Len.
00	X			X	
01*		X		X	
04	X		X		
05		X	X		
07		X			X

* Preferred feature set

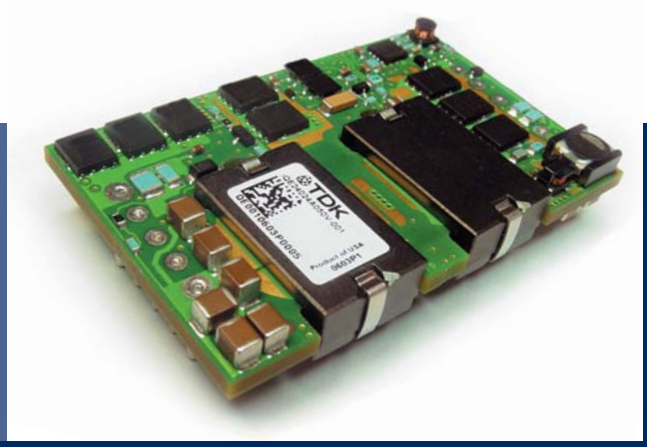
Model Number Example: iQD48025A120V-0**01**-R

Pinout

PIN	Function
1	Vin (+)
2	On / Off
3	Vin (-)
4	Vout (-)
5	Vout (+)

Model Selector

Model	Voltage (V)	Adjust Range (V)	Max. Curr. (A)	Max. Output Power (W)	Efficiency at Full Load (%)
iQD48025A120V-001-R	12	N/A	27	300	95



- Standard Quarter Brick Footprint
- 18-36VDC Input
- 3.3V 30A - 15V 7A Nominal Outputs
- Through Hole Mounting
- Low 10.41mm Profile
- 1500VDC Basic Isolation

iQE Series

96 - 120W, 24V Input Quarter Brick Converter

iQE Features and Benefits

Features	Benefits
◆ High operating efficiency (>90%)	◆ Reduced system heating
◆ Constant switching frequency	◆ Easier system filtering
◆ Low component count	◆ Higher reliability

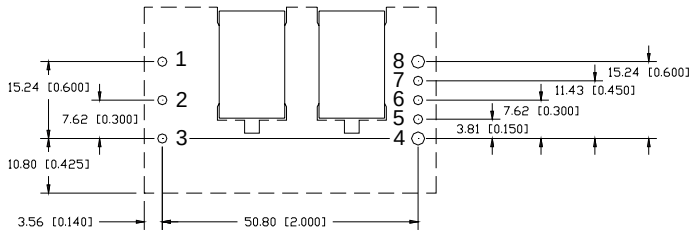
Specifications

ITEMS / MODEL		iQE24				
Nominal Output Voltage	VDC	3.3	5	8	12	15
Input Voltage Range	VDC	18-36				
Input Current (max)	A	10				
Output Voltage Tolerance	VDC	3.2 - 3.4	4.85 - 5.15	7.76 - 8.24	11.58 - 12.42	14.48 - 15.52
Ripple & Noise (max) (pk to pk) (1)	mV	150	150	150	150	150
Line Regulation (max)	mV	10	15	25	30	30
Load Regulation (max)	mV	10	30	25	30	30
Overload Protection (typ)	%	Inception - 133-158% of rated output; Short circuit - auto recovery				
Overvoltage Protection	VDC	3.8 - 4.6	5.7 - 6.7	8.9 - 11	13.6 - 16.5	16.7 - 21
Remote Sense	-	Yes				
Remote On / Off	-	Positive or Negative Logic available, see Feature Set				
Temperature (operating)	°C	-40 to 125				
Temperature (storage)	°C	-55 to 125				
Humidity (operating)	-	20-95% RH Non condensing				
Humidity (storage)	-	10-95% RH Non condensing				
Cooling	-	Convection or forced air				
Isolation Voltage	VDC	1500				
Vibration (non operating)	-	5 to 50Hz @ 0.5g (4.9m/s^2), and 50 to 500Hz @ 1.5g (14.7m/s^2) per Bellcore TR-EOP-000063-5.4.4				
Shock	-	196.1m/s^2				
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950)				
Weight (max)	g	50				
Size	mm	57.9 x 36.8 x 10.41				
Warranty	-	3 Years				

Notes: See website for detailed specifications

(1) Measured across one 22uF and one 0.1uF ceramic capacitor; BW = 20MHz

Recommended Footprint (Top View)



Model Selector

Model	Voltage (V)	Adjust Range (V)	Max. Curr. (A)	Max. Output Power (W)	Efficiency at Full Load (%)
iQE24030A033V-001-R	3.3	2.97 - 3.63	30	99	90.5
iQE24024A050V-001-R	5	4.5 - 5.5	24	120	90
iQE24012A080V-001-R	8	7.2 - 8.8	12	96	92
iQE24009A120V-001-R	12	10.8 - 13.2	8.75	105	88
iQE24007A150V-001-R	15	13.5 - 16.5	7	105	90

Feature Set

Feature Set	Positive Logic On / Off	Negative Logic On / Off	0.110" Pin Len.	0.180" Pin Len.	0.145" Pin Len.
00	X				X
01		X			X
02	X		X		
03		X	X		
06	X			X	
07*		X		X	

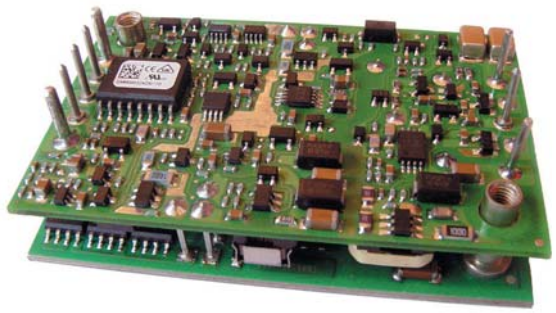
* Preferred feature set

Model Number Example: iQE24030A033V-0**07**-R

Pinout

PIN	Function
1	Vin (+)
2	On / Off
3	Vin (-)
4	Vout (-)
5	Sense (-)
6	Trim
7	Sense (+)
8	Vout (+)

LAMBDA



- Standard Quarter Brick Footprint
- 36-75VDC Input
- 1.2V 100A - 35V 6A Nominal Outputs
- Through Hole Mounting
- Low 12.7mm Profile
- 1500VDC Basic Isolation

iQM/iQN/iQP Series

72 - 300W Quarter Brick Converter

iQM/iQN/iQP Features and Benefits

Features	Benefits
◆ High operating efficiency (up to 92%)	◆ Reduced system heating
◆ Constant switching frequency	◆ Easier system filtering
◆ Baseplate	◆ Allows for improved thermal management with optional heatsink

Specifications

ITEMS \ MODEL		iQM (iQP)								
Nominal Output Voltage	VDC	1.2	1.5	1.8	2.5	3.3	5	12	28	35
Input Voltage Range	VDC	36 - 75								
Input Current (max)	A	2.8 - 10.5 Amps model dependent								
Output Voltage Tolerance	VDC	1.16 - 1.24	1.45 - 1.55	1.74 - 1.86	2.42 - 2.58	3.20 - 3.40	4.85 - 5.15	11.6 - 12.4	27.44 - 28.56	34.48 - 35.53
Ripple & Noise (max) (pk to pk) (1)	mV	80 (50)	90 (100)	90 (80)	90 (75)	100 (80)	100	120 (200)	200	250
Line Regulation (max)	mV	5				6.6	8 (10)	24	56	100
Load Regulation (max)	mV	5	7	6	5	6.6	10	24	N/A	N/A
Overload Protection (typ)	%	Inception- 108-117% of rated output; Short circuit auto recovery								
Overvoltage Protection	VDC	1.5	1.83	2.25	3.1	4.1	6.1	14.5	33.6	39.7
Remote Sense	-	Yes								
Remote On / Off	-	Positive or Negative Logic available, see Feature Set								
Temperature (operating)	°C	-40-120(121)			-40-117(121)		-40-115(119)	-40-117(116)	40-115	-40-119
Temperature (storage)	°C	-55 to 125								
Humidity (operating)	-	20-95% RH Non condensing								
Humidity (storage)	-	10-95% RH Non condensing								
Cooling	-	Convection or forced air								
Isolation Voltage	VDC	1500V Input to output & base plate, 500V Output to base plate								
Vibration (non operating)	-	5 to 50Hz @ 0.5g (4.9m/s^2), and 50 to 500Hz @ 1.5g (14.7m/s^2) per Bellcore TR-EOP-000063-5.4.4								
Shock	-	196.1m/s^2								
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950), CE Mark (LVD)								
Weight (max)	g	60								
Size	mm	57.9 x 36.8 x 12.7								
Warranty	-	3 years								

Notes: See website for detailed specifications

(1) iQM 1.2 -5.0V Measured across 47uF +1uF +0.1uF ceramic caps.
(1) iQM 12V Measured across 47uF +1uF +0.1uF ceramic caps + 470uF Al electrolytic
(1) iQN 28V Measured across 40uF +1uF +0.1uF ceramic caps + 2x220uF Al electrolytic
(1) iQN 35V Measured across 47uF +1uF +0.1uF ceramic caps + 68uF Al electrolytic
(1) iQP 1.2 - 12V Measured across 47uF +1uF +0.1uF ceramic caps + 1000uF Al electrolytic

Model Selector

Model	Voltage (V)	Adjust Range (V)	Max. Curr. (A)	Max. Output Power (W)	Efficiency at Full Load (%)
iQM48060A012V-001-R	1.2	.96 - 1.32	60	72	80.5
iQP48100A012V-001-R	1.2	.96 - 1.32	100	120	80
iQM48060A015V-001-R	1.5	1.2 - 1.65	60	90	83.5
iQP48090A015V-001-R	1.5	1.2 - 1.65	90	135	84
iQM48060A018V-001-R	1.8	1.44 - 1.98	60	108	85
iQP48085A018V-001-R	1.8	1.44 - 1.98	85	153	86.5
iQM48050A025V-001-R	2.5	2.0 - 2.75	50	125	88.5
iQM48060A025V-001-R	2.5	2.0 - 2.75	60	150	87.5
IQP48080A025V-001-R	2.5	2.0 - 2.75	80	200	89
iQM48035A033V-001-R	3.3	2.64 - 3.63	50	165	90.5
iQM48050A033V-001-R	3.3	2.64 - 3.63	35	115.5	91.5
iQP48070A033V-001-R	3.3	2.64 - 3.63	70	231	91.5
iQM48033A050V-001-R	5	4.0 - 5.5	33	165	91
iQP48050A050V-001-R	5	4.0 - 5.5	50	250	91.5
iQM48017A120V-001-R	12	9.6 - 13.2	17	204	90.5
IQP48021A120V-001-R	12	9.6 - 13.2	21	252	92
iQP48025A120V-001-R	12	9.6 - 13.2	25	300	91.5
iQN48007A280V-001-R	28	16.8 - 30.8	7	196	92
iQN48006A350V-001-R	35	17 - 35	6	210	90

Pinout

PIN	Function (iQM, iQN)	Function (iQP)
1	Vin (+)	Vin (+)
2	On / Off	On / Off
3	Vin (-)	Vin (-)
4	Vout (-)	Vout (-)
5	Sense (-)	Vout (-)
6	Trim	Sense (-)
7	Sense (+)	Trim
8	Vout (+)	Sense (+)
9	no pin	Vout (+)
10	no pin	Vout (+)

Feature Set

Feature Set	On / Off Logic	OVP	Pin Length
00	Positive	Latch	0.145
01*	Negative	Latch	0.145
02	Positive	Latch	0.110
03	Negative	Latch	0.110
04	Positive	Latch	0.200
05**	Negative	Latch	0.200
06	Positive	Non-Latch	0.145
07	Negative	Non-Latch	0.145
08	Positive	Latch	0.180
09	Negative	Latch	0.180

* Preferred feature set for iQM/iQN
** Preferred feature set for iQP

Model Number Example: iQM48050A033V-0**01**-R, iQP48050A05V-0**05**-R

LAMBDA

- Standard Sixteenth Brick Footprint (DOSA)
- 36-75VDC Input
- 1.2V 30A - 12V 6.5A Nominal Outputs
- Through Hole Mounting
- Low 12.7mm Profile
- 1500VDC Basic Isolation

iSA Series

36 - 82.5W Sixteenth Brick Converter

iSA Features and Benefits

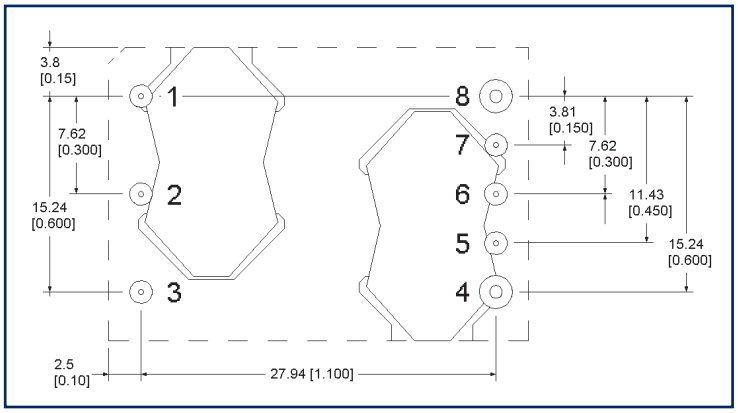
Features	Benefits
◆ High operating efficiency (up to 90%)	◆ Reduced system heating
◆ Constant switching frequency	◆ Easier system filtering
◆ 44% smaller than eighth bricks	◆ Optimization of board space

Specifications

ITEMS / MODEL		iSA480						
Nominal Output Voltage	VDC	1.2	1.5	1.8	2.5	3.3	5	12
Input Voltage Range	VDC	36 to 75						
Input Current (max)	A	4						
Output Voltage Tolerance	VDC	1.164-1.236	1.45-1.55	1.74-1.86	2.42-2.58	3.20-3.40	4.85-5.15	11.58-12.42
Ripple & Noise (max) (pk to pk)	mV	75			100			200
Line Regulation (max)	mV	7					10	24
Load Regulation (max)	mV	8					10	24
Overload Protection	%	Inception- 130-147% of rated output; Short circuit auto recovery						
Overvoltage Protection	VDC	1.5-2.0	1.7-2.3	2.1-2.6	2.7-3.5	3.75-4.65	5.7-6.7	13.6-15.7
Remote Sense	-	Yes						
Remote On / Off	-	Positive and Negative Logic available, see Feature Set						
Temperature (operating)	°C	-40 to 125						
Temperature (storage)	°C	-55 to 125						
Humidity (operating)	-	20-95% RH Non condensing						
Humidity (storage)	-	10-95% RH Non condensing						
Cooling	-	Convection or forced air						
I/O Isolation Voltage	VDC	1500						
Vibration (non operating)	-	5 to 50Hz @ 0.5g (4.9m/s^2), and 50 to 500Hz @ 1.5g (14.7m/s^2) per Bellcore TR-EOP-000063-5.4.4						
Shock	-	196.1m/s^2						
Safety Agency Approvals	-	UL60950 (US and Canada), VDE0805 (IEC60950), CB scheme (IEC60950), CE Mark (LVD)						
Weight (max)	g	30.4						
Size	mm	33 x 22.9 x 12.7						
Warranty	-	3 Years						

Notes: See website for detailed specifications

Recommended Footprint (Top View)



Model Selector

Model	Voltage (V)	Adjust Range (V)	Max. Curr. (A)	Max. Output Power (W)	Efficiency at Full Load (%)
iSA48030A012V-001-R	1.2	1.08 to 1.32	30	36	75
iSA48030A015V-001-R	1.5	1.35 to 1.65	30	45	79
iSA48030A018V-001-R	1.8	1.62 to1.98	30	54	82
iSA48025A025V-001-R	2.5	2.25 to 2.75	25	62.5	85
iSA48025A033V-001-R	3.3	2.97 to 3.63	25	82.5	88
iSA48015A050V-001-R	5	4.5 to 5.5	15	75	90
iSA48007A120V-001-R	12	10.8 to 13.2	6.5	78	90

Feature Set

Feature Set	Pos. Logic On / Off	Neg. Logic On / Off	0.110" Pin Len.	0.180" Pin Len.	0.145" Pin Len.	Latching OVP
00	X				X	
01*		X			X	
02	X		X			
03		X	X			
06	X			X		
07		X		X		
11		X			X	X
17		X		X		X

* Preferred feature set

Model Number Example: iSA48025A033V-0**01**-R

Pinout

PIN	Function
1	Vin (+)
2	On / Off
3	Vin (-)
4	Vout (-)
5	Sense (-)
6	Trim
7	Sense (+)
8	Vout (+)

LAMBDA

- Output currents up to 30A
- RoHS Compliant
- Industry Standard Package and Pinout
- 24V - 48V Input Models
- Output Voltage Adjustment
- Remote On/Off

PAE50/100 Series

High Efficiency Eighth Brick DC-DC Converters

Key Market Segments & Applications

Telecommunications
Data Communications
Networking Equipment
Test Equipment
Industrial Electronics
Distributed Power Architecture

PAE50/100 Features and Benefits

Features	*Benefits*
• High Efficiency	• Reduces System Heating
• Same Pinout as Quarter Bricks	• Reduces PCB Area
• Meets Basic Isolation	• Assists Safety Approval

Specifications

ITEMS / MODELS			PAE50S24	PAE50S48 PAE100S48
Input Voltage Range		VDC	18-36	36-76
Output Voltage Accuracy		%	±1	
Max Ripple & Noise		mV	100	
Max Line Regulation		mV	10	
Max Load Regulation		mV	10	
Overcurrent Protection	(1)	-	PAE50 models 105% - 150%, PAE100 models 105% - 140%	
Overvoltage Protection (max)	(2)	-	115% - 135% (120%-140% 5V-6V models)	
Remote Sense		-	Yes	
Remote On / Off		-	Yes (open = off; short to 0V = on)	
Operating Temperature		-	-40°C to +85°C	
Operating Humidity		-	5 - 95% RH (non-condensing)	
Storage Temperature		-	-40°C to +100°C	
Storage Humidity		-	5 - 95% RH (non-condensing)	
Cooling		-	Convection or Forced Air	
I/O Isolation Voltage		-	Input to Output 1500VDC	
Vibration (non operating)		-	10 - 55Hz (1 minute), Amplitude 0.825mm (49m/s² max) X, Y, Z 1 hour	
Shock		-	< 196.1 m/s²	
Safety Agency Approvals		-	UL60950-1, CSA60950-1, EN60950-1, CE Mark	
Weight (Typ)		g	25	
Size (WxHxD)		mm	22.76 X 8.5 X 57.9 (See Outline Drawing)	
Warranty		-	Two Years	

Notes:
(1) Converter shut down, auto restart
(2) Auto restart on /V models

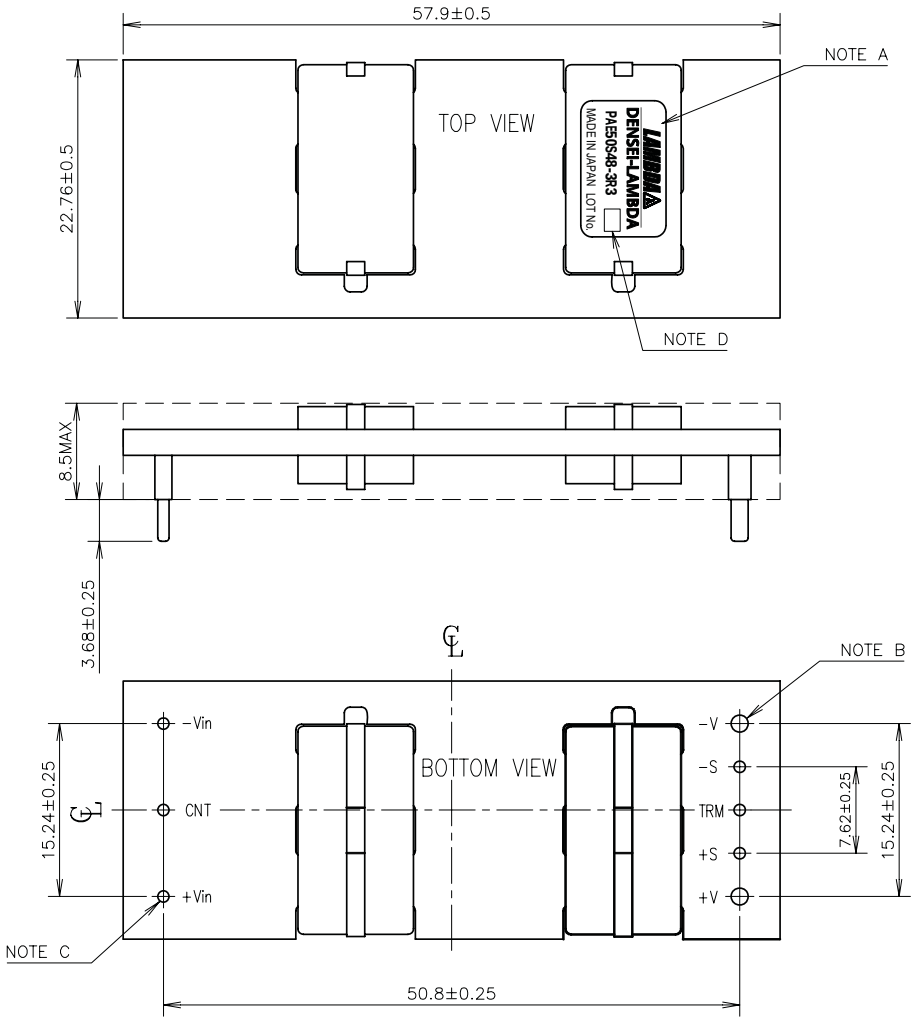
Model Selector

Models	Voltage (V)	Adjust Range	Max. Curr. (A)	Max. Output Power (W)	Efficiency at Full Load (%)	Input Curr. (A)
PAE50S48-1R8	1.8	1.44 - 1.98	20	36.0	87	0.87
PAE100S48-1R8	1.8	1.44 - 1.98	30	54.0	87	1.30
PAE50S48-2R5	2.5	2.00 - 2.75	18	45.0	89	1.06
PAE100S48-2R5	2.5	2.00 - 2.75	25	62.5	89	1.47
PAE50S48-3R3	3.3	2.64 - 3.63	16	52.8	91	1.21
PAE100S48-3R3	3.3	2.64 - 3.63	25	82.5	91	1.89
PAE50S48-5	5.0	4.25 - 5.75	10	50.0	91	1.15
PAE100S48-5	5.0	4.25 - 5.75	20	100.0	91	2.29
PAE50S24-5	5.0	4.00 - 5.50	10	50.0	91	2.29
PAE50S24-6	6.0	4.80 - 6.60	8.4	50.4	91	2.31
PAE100S48-3A3/H	3.3	2.64 - 3.63	30	99.0	90	2.30

Remote On/Off Option

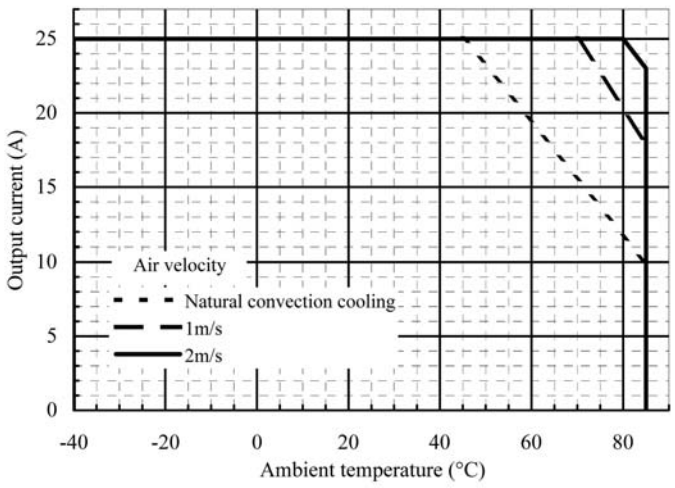
Suffix	Function
Blank	Manual Reset
/V	Auto Reset (Preferred)

Outline Drawing



Derating Curve

PAE100S48-3R3



LAMBDA

- Up to 100A Output Current
- Fast Transient Response
- Current Share
- Full power at 85°C baseplate
- Wide Adjustable Output Range

Key Market Segments & Applications

Servers & Rail System

High End Computers

Customer Power Supplies:

PAF400F Series

200V to 400VDC Input Full Half brick DC-DC Converters

PAF 400F Features and Benefits

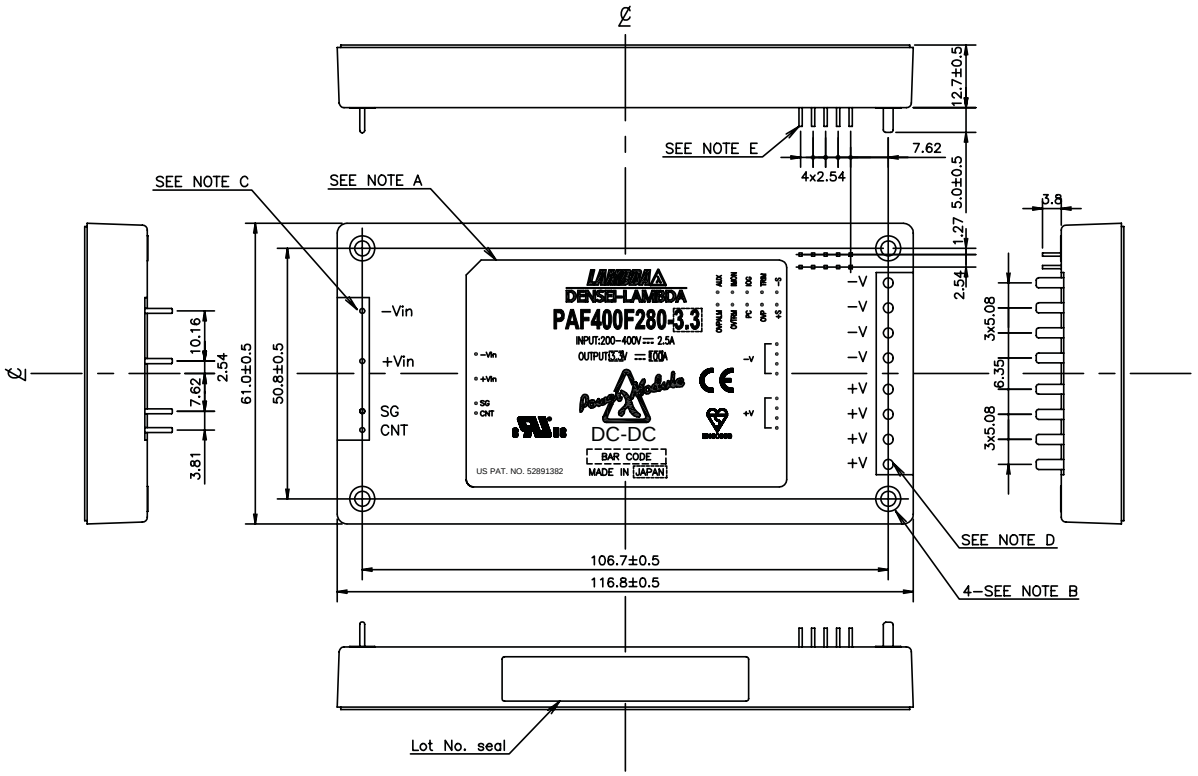
Features	*Benefits*
◆ Wide adjustment range	◆ Reduces need for custom modules
◆ Parallel Pin	◆ Modules can be connected togetherr for higher current
◆ ASIC Design	◆ Reduced component count, increased MTBF

Specifications

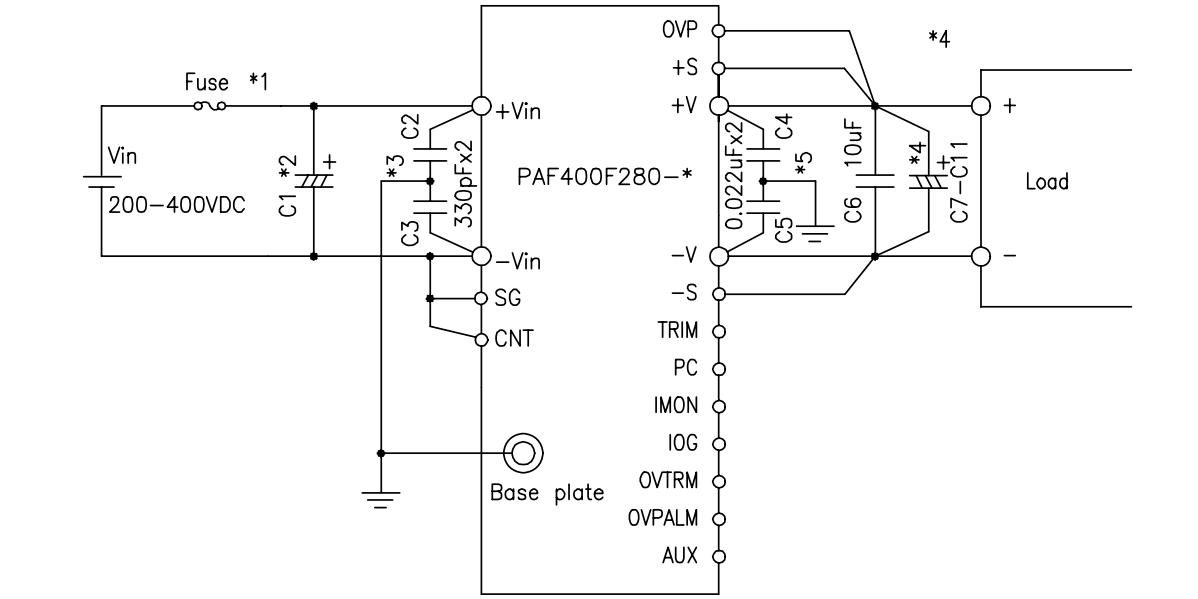
ITEMS / MODEL		PAF400F280-1.8	PAF400F280-3.3	PAF400F280-5
Nominal Output Voltage	VDC	1.8	3.3	5.0
Output Current (Max)	A	100	100	80
Max Output Power	W	240	390	450
Efficiency (Typ)	%	76	83	85
Input Voltage range	VDC		200-400VDC	
Output Voltage Accuracy	%		±2	
Output Voltage Adjustment	VDC	1.0 - 2.6	2.2 - 4.2	2.9 - 6.0
Max Ripple & Noise	mV		200 (0 - 85°C)	
Max Line Regulation	mV	6	10	15
Max Load Regulation	mV	6	10	15
Temperature Coefficient	°C		0.01%/°C	
Overcurrent Protection	A		115 - 130%	
Overvoltage Protection	VDC	1.0 - 2.8	2.5 - 4.5	3.3 - 6.3
Signals & Control	-	Remote sense, remote On/Off, Parallel Pin, Inverter Good, 11-14V Auxiliary voltage		
BaseplateTemperature	°C	-20°C to +85°C Baseplate: 100% load		
Humidity (non condensing)	-	20 - 95% RH Operating, 10 - 95% RH Non Operating		
Cooling	-	Conduction (See Installation Manual for heatsink selection)		
Isolation Voltage	-	Input to Baseplate: 2500VAC (20mA); Input to Output 3000VAC (20mA) for I min.; Output to Baseplate: 500VDC for 1 min		
Shock	-	196.1m/s²		
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.) Amplitude 0.825mm constant (Max 49 m/s²) X,Y,Z 1 hour each		
Safety Agency Approvals	-	UL1950, CSA950, EN60950, CE LVD		
Weight (Typ)	g	250		
Size (WxHxD)	mm	(61x12.7x116.8) See outline drawing		
Warranty	yr	2 Years		

Note: See Installation Manual for full details, test methods of parameters and application notes.

PAF Outline Drawing



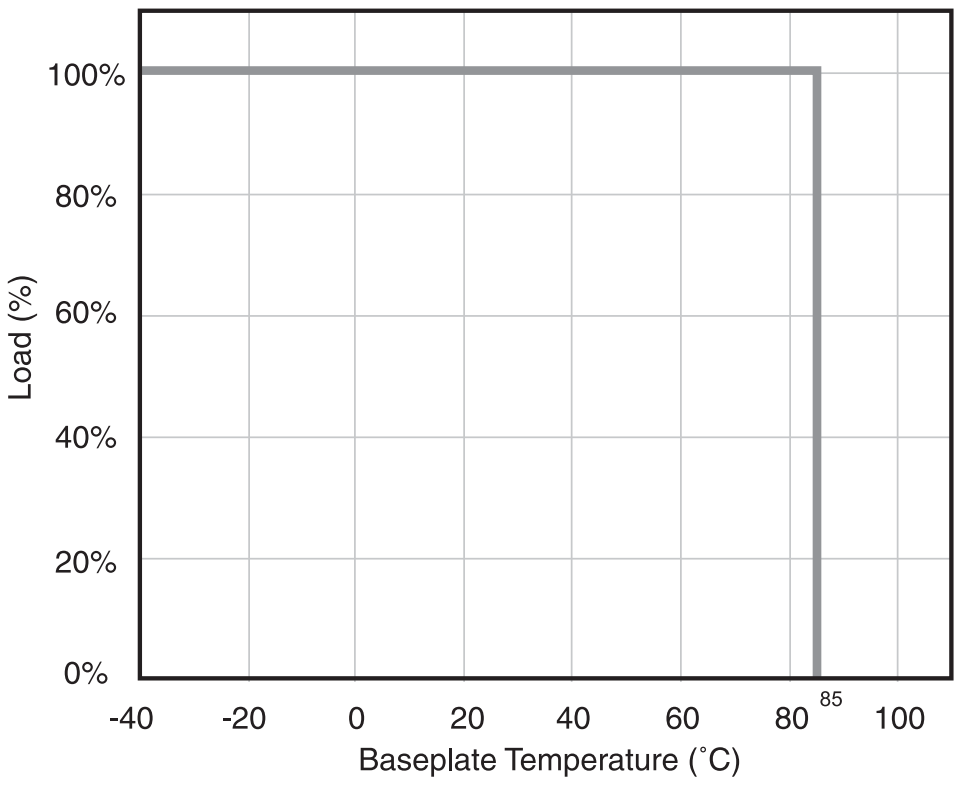
Connection Example



Pinout

Pin Description	Function
Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
CNT	Remote On/Off terminal
+V	Positive Output Terminal
-V	Negative Output Terminal
AUX	11-14V Aux Voltage
PC	Parallel Control Connection
TRIM	Output Adjustment Trim Pin
+S	Positive Remote Sense
-S	Negative Remote Sense
SG	Remote ON/OFF Return
IMON	Current Monitor
OVTRM	Overvoltage Trim
OVPALM	Overvoltage Alarm Signal
OVP	Overvoltage Sense Point

Derating Curve



LAMBDA

- Output Voltages from 7.2V to 57V
- Current Share
- Operation to 100°C Baseplate
- Wide Adjustable Output Range

Key Market Segments & Applications

Servers & Rail Systems
High End Computers
Customer Power Supplies

PAF450F280 & PAF600F280 Series

200V to 400VDC Input Full Brick DC-DC Converters

PAF450F280 & PAF600F280 Features and Benefits

Features	*Benefits*
• Wide Adjustment Range	• Reduces Need for Custom Modules
• Parallel Pin	• Modules Can Be Connected Together For Higher Current
• High Efficiency - up to 91%	• Reduces Heat Loss

Specifications

ITEMS \ MODEL		PAF600F280-12 /PAF450F280-12	PAF600F280-24 /PAF450F280-24	PAF600F280-28 /PAF450F280-28	PAF600F280-48 /PAF450F280-48
Nominal Output Voltage	VDC	12	24	28	48
Output Current (Max)	A	50/38	25/19	21.5/16.5	12.5/9.5
Max Output Power	W	600/456	600/456	602/462	600/456
Efficiency (Typ)	%	89/90	91	91	91
Input Voltage Range	VDC	200-400VDC			
Output Voltage Accuracy	%	±1			
Output Voltage Adjustment	VDC	7.2 - 14.4	14.4 - 28.8	16.8 - 33.6	28.8 - 57.6
Max Ripple & Noise	mV	120	240	280	480
Max Line Regulation	mV	48	56	56	96
Max Load Regulation	mV	48	56	56	96
Temperature Coefficient	°C	0.02%/°C			
Overcurrent Protection	%	105 - 140%			
Overvoltage Protection	%	125 - 145%			
Signals & Control	-	Remote sense, remote On/Off, Parallel Pin, Inverter Good, 11-14V Auxiliary voltage			
Baseplate Temperature	-	-40°C to +100°C Baseplate: (See derating chart)			
Humidity (non condensing)	-	5 - 95% RH Operating, 5 - 95% RH Non Operating			
Cooling	-	Conduction (See Installation Manual for heatsink selection)			
Isolation Voltage	-	Input to Baseplate: 2500VAC (20mA); Input to Output 3000VAC for 1 min.; Output to Baseplate: 500VDC for 1 min			
Shock	-	196.1m/s^2			
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.) Amplitude 0.825mm constant (Max 49 m/s^2) X,Y,Z 1 hour each			
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE LVD			
Weight (Typ)	g	200			
Size (WxHxD)	mm	61 x 12.7 x 116.8			
Warranty	yr	2 years			

Note: See Installation Manual for full details, test methods of parameters and application notes.

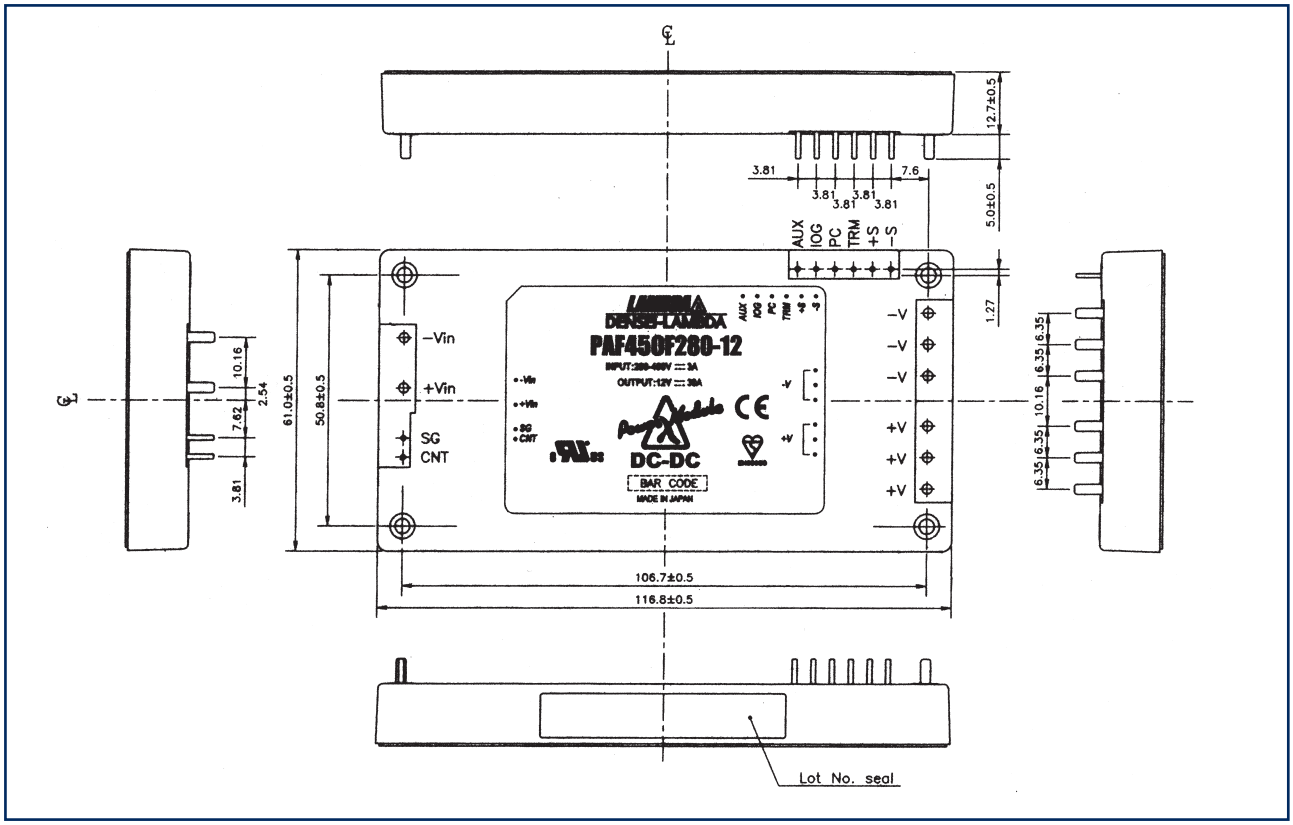
Pinout

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
CNT	Remote On/Off Negative Terminal
+V	Positive Output Terminal
-V	Negative Output Terminal
AUX	11-14V Aux Voltage
PC	Parallel Control Connection
TRIM	Output Adjustment Trim Pin
+S	Positive Remote Sense
-S	Negative Remote Sense
SG	Remote ON/OFF Return

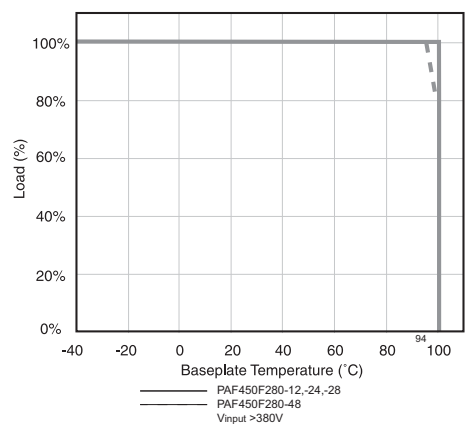
Options

Suffix	Description
Blank	M3 tapped mounting inserts (4)
/T	3.3mm non-threaded inserts (4)

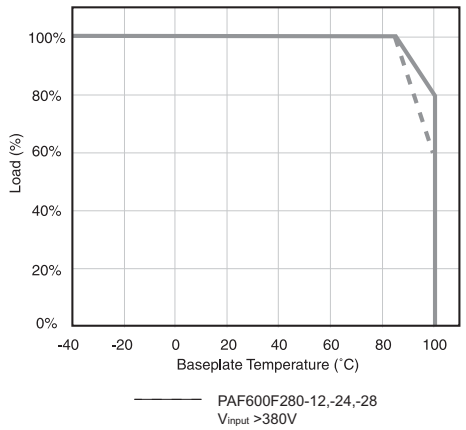
PAF450F 280 Outline Drawing



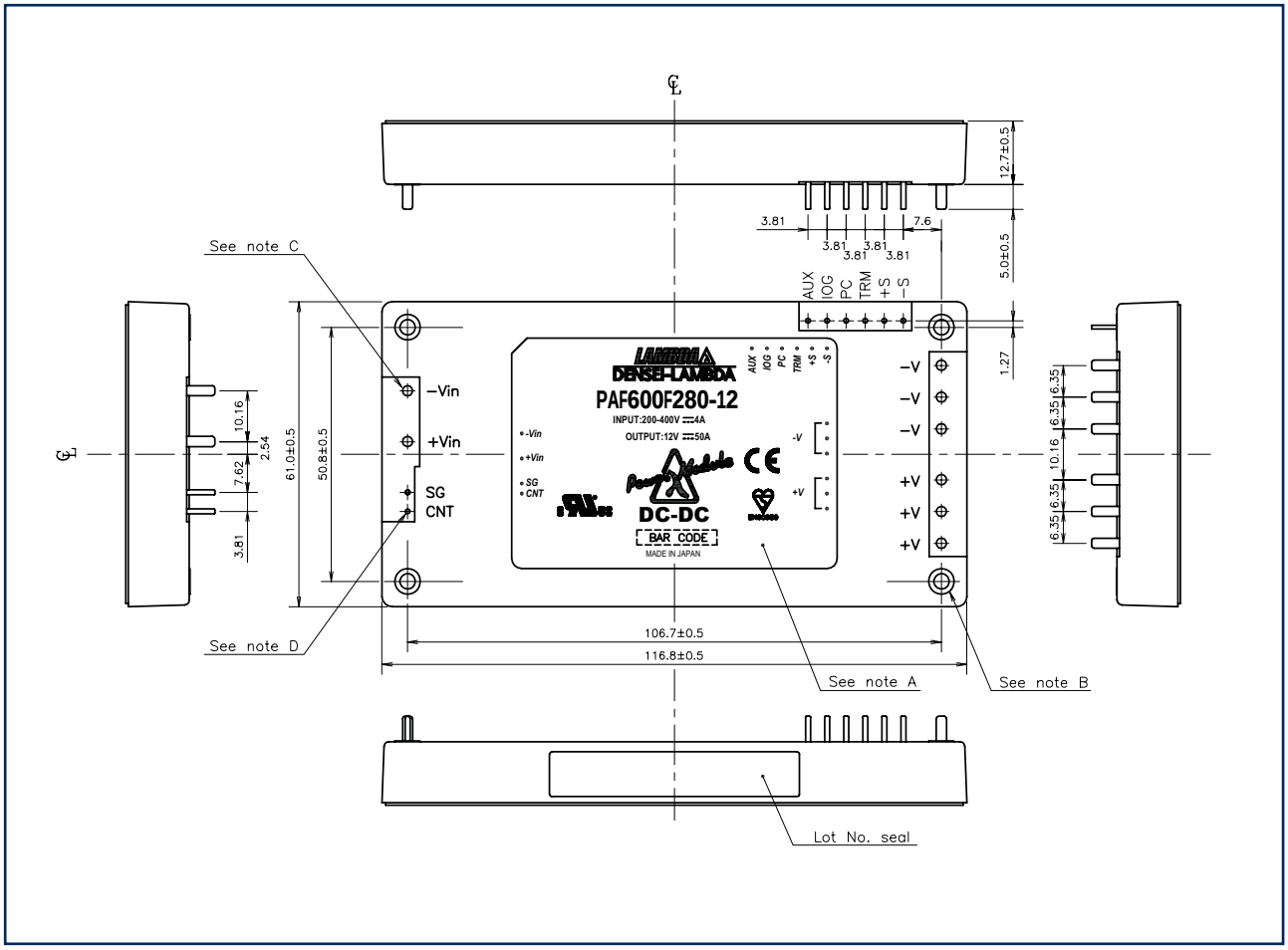
PAF450F280 Derating Graph



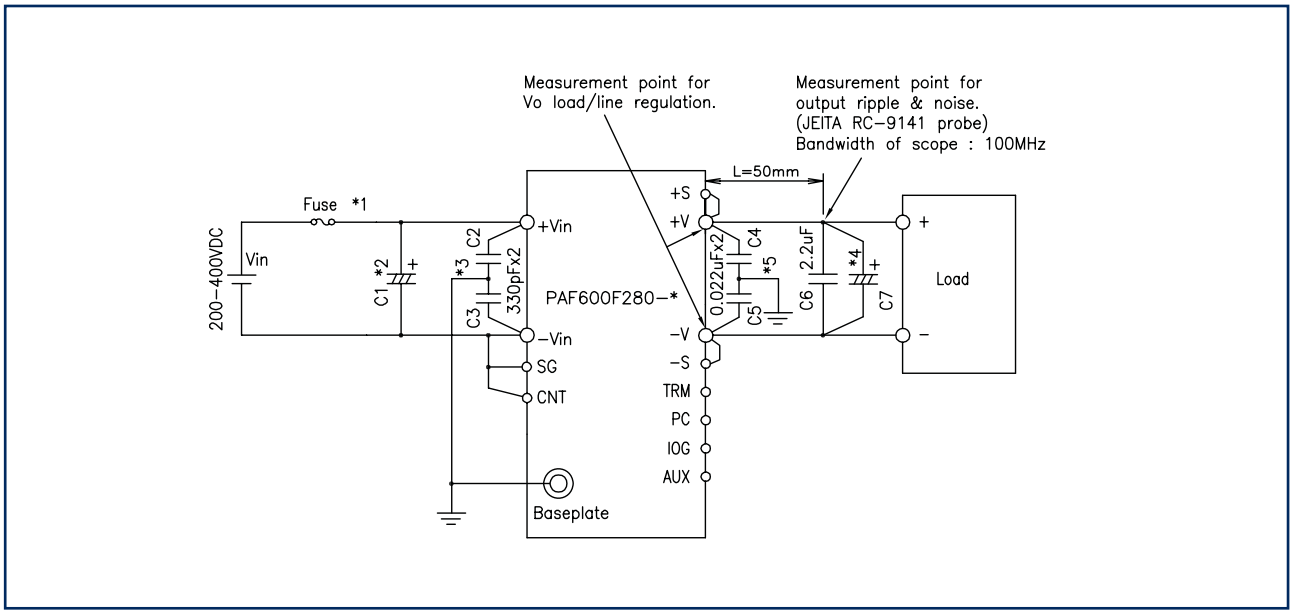
PAF600F280 Derating Graph



PAF600F 280 Outline Drawing



Connection Example



LAMBDA

PAF700F Series

700W 48V Input
Full Brick DC-DC Converters

- 12V output for driving non-isolated converters
- 12V, 28V output for BTS amps
- Full power at 85°C baseplate, operation to 100°C
- Opto Isolated Remote On / Off
- Wide Adjustable Output Range

Key Market Segments & Applications

Central Office:	ATM, Sonet, DSL, ISDN, Frame Relay
Broadband:	Switching Equipment, Routers
Wireless/Cellular:	Micro Cells (larger in size/10 sq. mi.) Pico Cells (smaller in size/1 to 2 sq. mi.)
Remote Electronics:	Fixed Local Loop, Fiber Optic Transmission, Microwave Transmission, Wireless Local Loop

Base Station Power Amplifiers
Intermediate Bus Architectures

PAF 700F Features and Benefits

Features	*Benefits*
◆ Wide adjustment range	◆ Reduces need for custom modules
◆ Parallel Pin	◆ Modules can be connected togetherr for higher current
◆ ASIC Design	◆ Reduced component count, increased MTBF

Specifications

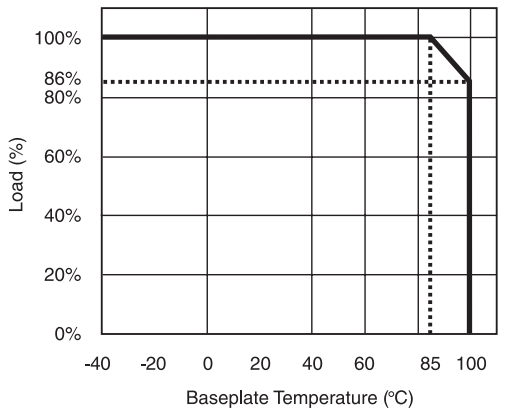
ITEMS / MODEL		PAF700F48-12	PAF700F48-28
Nominal Output Voltage	VDC	12	28
Output Current (Max)	A	58.5	25
Output Power (Max)	W	702	700
Efficiency (Typ)	%	90%	91%
Input Voltage Range	VDC	36-76	
Input Current (Typ)	A	16.5	16.4
Output Voltage Accuracy	%	±1	
Output Voltage Adjustment	VDC	7.2 - 13.8	16.8 - 32.2
Ripple & Noise (Max)	mV	200	280
Line Regulation (Max)	mV	24	56
Load Regulation (Max)	mV	24	56
Temperature Coefficient	-	0.02%/°C	
Overcurrent Protection	%	105 - 140%	
Overvoltage Protection	%	120 - 135%	
Parallel Operation		Yes	
Series Operation		Yes	
Signals & Control	-	Remote sense, remote On/Off, Parallel Pin, DC Good, 7-10V Auxiliary voltage	
Operating Temperature	-	-40°C to +100°C baseplate	
Humidity (operating)	-	20-95% RH Non condensing	
Humidity (storage)	-	10-95% RH Non condensing	
Cooling	-	Conduction (See Installation Manual for heatsink selection)	
Isolation Voltage	VDC	Input - Baseplate 1500V, Input - Output 1500V, Output-Baseplate 500V (for 1 min.)	
Shock	-	196.1m/s²	
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.) Amplitude 0.825mm constant (Max 49 m/s²) X,Y,Z 1 hour each	
Safety Agency Approvals	-	UL1950, CSA950, EN60950, CE LVD	
Weight (Typ)	g	200	
Size (WxHxD)	mm (in)	61 x 12.7 x 116.8 (2.4 x 0.5 x 4.6) See outline drawing	
Warranty	-	2 years	

Note: See Installation Manual for full details, test methods of parameters and application notes.

Pinout

PIN	Description	Function
	-Vin	Negative Input Terminal
	+Vin	Positive Input Terminal
	- ON/OFF	Remote On/Off Negative Terminal
	+ON/OFF	Remote On/Off Positive Terminal
	+V	Positive Output Terminal
	-V	Negative Output Terminal
	AUX	7-10V Aux Voltage
	IOG	DC Good
	PC	Parallel Control Connection
	TRIM	Output Adjustment Trim Pin
	+S	Positive Remote Sense
	-S	Negative Remote Sense

Derating Curve



Part Number Scheme

Full Brick	*Max Power Watts*	*Full Function*	*Nominal Input Voltage*	*Output Voltage*	*Option Suffix*
PAF	*700*	*F*	*48*	*12 or 28*	*Blank = M3 Tapped inserts* *T = 3.3mm Non-threaded through hole*

Connection Example

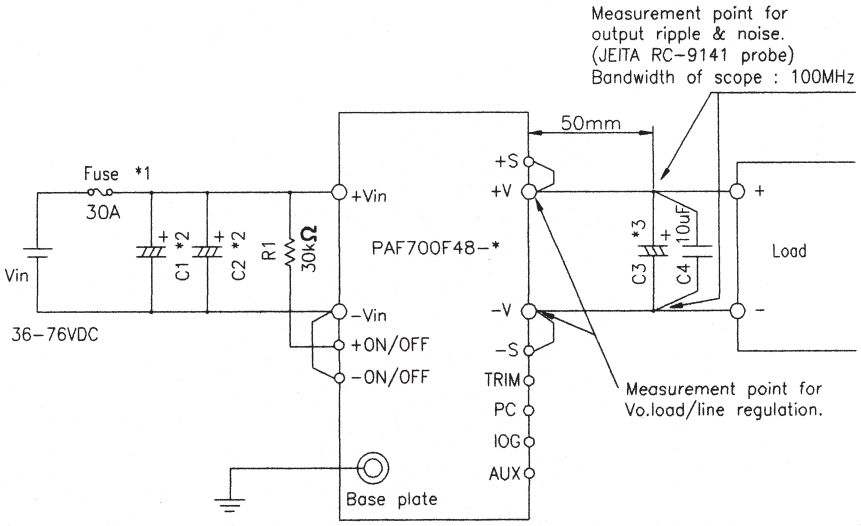
Note

1 Use external fuse of fast blow type, for each unit

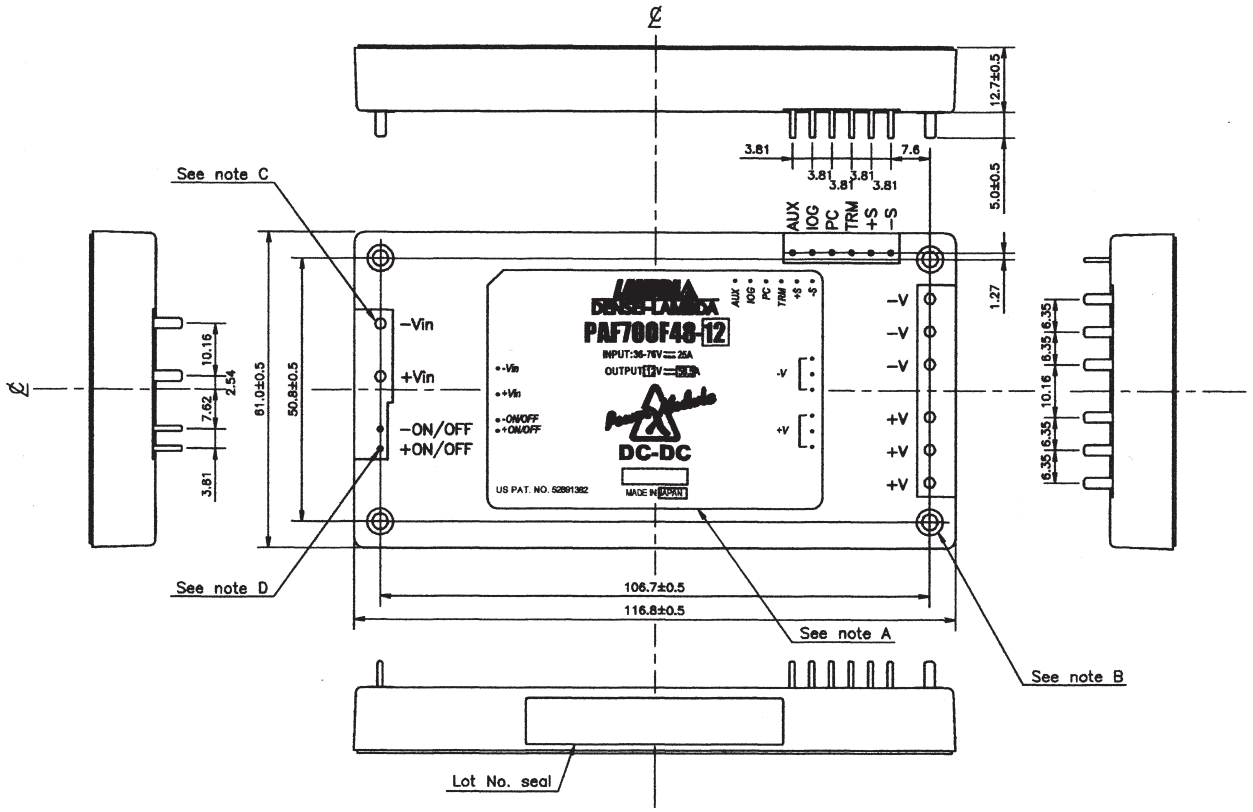
2 Put input capacitor, C1 and C2, greater than 220uf for each. If the impedance of input line is high, C1 and C2 capacitance must be greater than above.

3 Put output capacitor, C3 (12v: more than 470uF,28V: greater than 220uF). If the ambient temperature is less than -20C, use 4 pieces of the recommended capacitor above.

4 Refer to instruction manual for further details.



Outline Drawing



Note

A: Model name, input voltage range, nominal output voltage, maximum output current, country of manufacture are shown here in accordance with the specifications

B: M3 tapped holes for customer chassis mounting (FG)

C: Input and output pin: 8-02

D: Signal pin : 8-01

E: Unless otherwise specified dimensional tolerance ± 0.3mm

LAMBDA

- Industry Standard Footprint & Pinouts
- 12V output for driving non-isolated converters
- Safety Approved
- Full power at 100°C baseplate
- Wide Adjustable Output Range

Key Market Segments & Applications

Central Office:	ATM, Sonet, DSL, ISDN, Frame relay
Broadband:	Switching Equipment, Routers
Wireless/Cellular:	Micro Cells (larger in size/10 sq. mi.) Pico Cells (smaller in size/1 to 2 sq. mi.)
Remote Electronics:	Fixed Local Loop, Fiber Optic Transmission, Microwave Transmission, Wireless Local Loop
Customer Premise:	PBX, PABX, Datacomm, Voice Systems, Video Conferencing

PAH Series

48V Input Half brick DC-DC Converters

PAH Features and Benefits

Features	Benefits
◆ Wide adjustment range	◆ Reduces need for custom modules
◆ Zero Pre-load	◆ Eliminates heat dissipation in system
◆ ASIC Design	◆ Reduced component count, increased MTBF
◆ No potting materials	◆ Lower weight

Specifications

ITEMS \ MODELS		2.5V	3.3V	5V	12V	15V	24V	28V	48V
Efficiency (Typ)	%	75-76	79-80	83-84	85-86		86-88		88
Input Voltage range	VDC	36-76							
Output Voltage Accuracy	%	±1.6							
Max Ripple & Noise	mV	150			200		280		250
Max Line Regulation	mV	10			24	30	48	56	96
Max Load Regulation	mV	10			24	30	48	56	96
Overcurrent Protection	A	105 - 150% automatic recovery							
Overvoltage Protection (1)	%	120-160	120-140	125-145					135-155
Remote Sense	-	Yes							
Remote On/Off	-	Standard; Low = ON, Open = OFF /P option; Low = OFF, Open = ON)							
Operating Temperature	-	-40°C to +100°C baseplate							
Overtemperature	-	Shutdown between 105 - 130°C, Auto restart							
Cooling	-	Conduction (See Installation Manual for heatsink selection)							
Isolation Voltage	V	Input - Baseplate 1500VAC, Input - Output 1500VAC, Output-Baseplate 500VDC							
Shock	-	196.1m/s^2							
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.)							
Amplitude	-	0.825mm constant (Max 49 m/s^2) X,Y,Z 1 hour each							
Safety Agency Approvals	-	UL1950, CSA950, EN60950, CE LVD							
Weight (Typ)	g	80							
Size (WxHxD)	in(mm)	2.28x0.5x2.4 (57.9x12.7x61) See outline drawing							
Warranty	-	2 Years							

(1) See options table.
General: See Installation Manual for full details, test methods of parameters and application notes

Model Selector

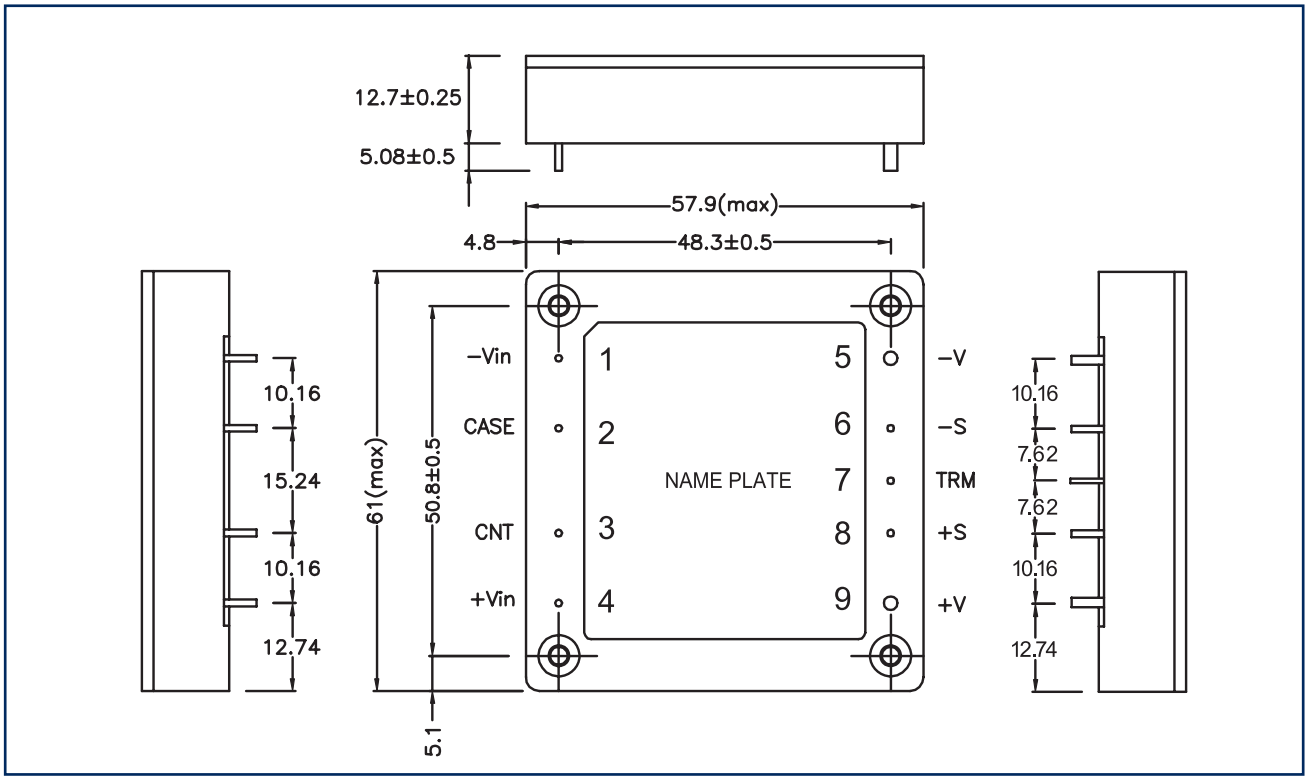
Model Name	Output Voltage	Adjustment	Output Current	Maximum Power
PAH50S48-2.5	2.5	2.25 - 2.75	11.70	29.3
PAH75S48-2.5	2.5	2.25 - 2.75	17.50	43.8
PAH100S48-2.5	2.5	2.25 - 2.75	23.40	58.5
PAH150S48-2.5	2.5	2.25 - 2.75	35.00	87.5
PAH50S48-3.3	3.3	2.97 - 3.63	11.70	38.6
PAH75S48-3.3	3.3	2.97 - 3.63	17.50	57.8
PAH100S48-3.3	3.3	2.97 - 3.63	23.40	77.2
PAH150S48-3.3	3.3	2.97 - 3.63	35.00	115.5
PAH50S48-5	5.0	3.0 - 5.75	10.00	50.0
PAH75S48-5	5.0	3.0 - 5.75	15.00	75.0
PAH100S48-5	5.0	3.0 - 5.75	20.00	100.0
PAH150S48-5	5.0	3.0 - 5.75	30.00	150.0
PAH50S48-12	12.0	7.2 - 13.2	4.20	50.4
PAH75S48-12	12.0	7.2 - 13.2	6.30	75.6
PAH100S48-12	12.0	7.2 - 13.2	8.40	100.8
PAH150S48-12	12.0	7.2 - 13.2	12.50	150.0
PAH200S48-12	12.0	7.2 - 13.2	16.70	200.4
PAH50S48-15	15.0	9.0 - 16.5	3.40	51.0
PAH75S48-15	15.0	9.0 - 16.5	5.00	75.0
PAH100S48-15	15.0	9.0 - 16.5	6.70	100.5
PAH150S48-15	15.0	9.0 - 16.5	10.00	150.0
PAH200S48-15	15.0	9.0 - 16.5	13.40	201.0
PAH50S48-24	24.0	14.4 - 26.4	2.10	50.4
PAH75S48-24	24.0	14.4 - 26.4	3.20	76.8
PAH100S48-24	24.0	14.4 - 26.4	4.20	100.8
PAH150S48-24	24.0	14.4 - 26.4	6.30	151.2
PAH200S48-24	24.0	14.4 - 26.4	8.40	201.6
PAH50S48-28	28.0	16.8 - 30.8	1.80	50.4
PAH75S48-28	28.0	16.8 - 30.8	2.70	75.6
PAH100S48-28	28.0	16.8 - 30.8	3.60	100.8
PAH150S48-28	28.0	16.8 - 30.8	5.40	151.2
PAH200S48-28	28.0	16.8 - 30.8	7.20	201.6
PAH150S48-48	48.0	38.4 - 57.6	3.20	153.6

Options

Suffix	ON/OFF Control	Overvoltage
-	Negative	Manual Reset
/P	Positive	Manual Reset
/V*	Negative	Auto Reset
/PV	Positive	Auto Reset

* Standard US Stock Item.

Outline Drawing



Pinout

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
Case	Baseplate Terminal
CNT	On / Off Control terminal
+V	Positive Output Terminal
-V	Negative Output Terminal
TRIM	Output adjustment Trim pin
+S	Positive Remote sense
-S	Negative Remote sense

LAMBDA

- Industry Standard Package
- Low voltage outputs to 0.96V
- Output Currents up to 70A
- Designed for telecom standards
- Output voltage adjustment
- Remote On / Off

PAH200H Series

High Current Half Brick DC-DC Converters

Key Market Segments & Applications

Central Office:	ATM, Sonet, DSL, ISDN, Frame relay
Broadband:	Switching Equipment, Routers
Remote Electronics:	Fixed Local Loop, Fiber Optic Transmission, Microwave Transmission, Wireless Local Loop
Customer Premise:	PBX, PABX, Datacomm, Voice Systems, Video Conferencing
Industrial	Systems, Video Conferencing, Distributed Power Applications

PAH Features and Benefits

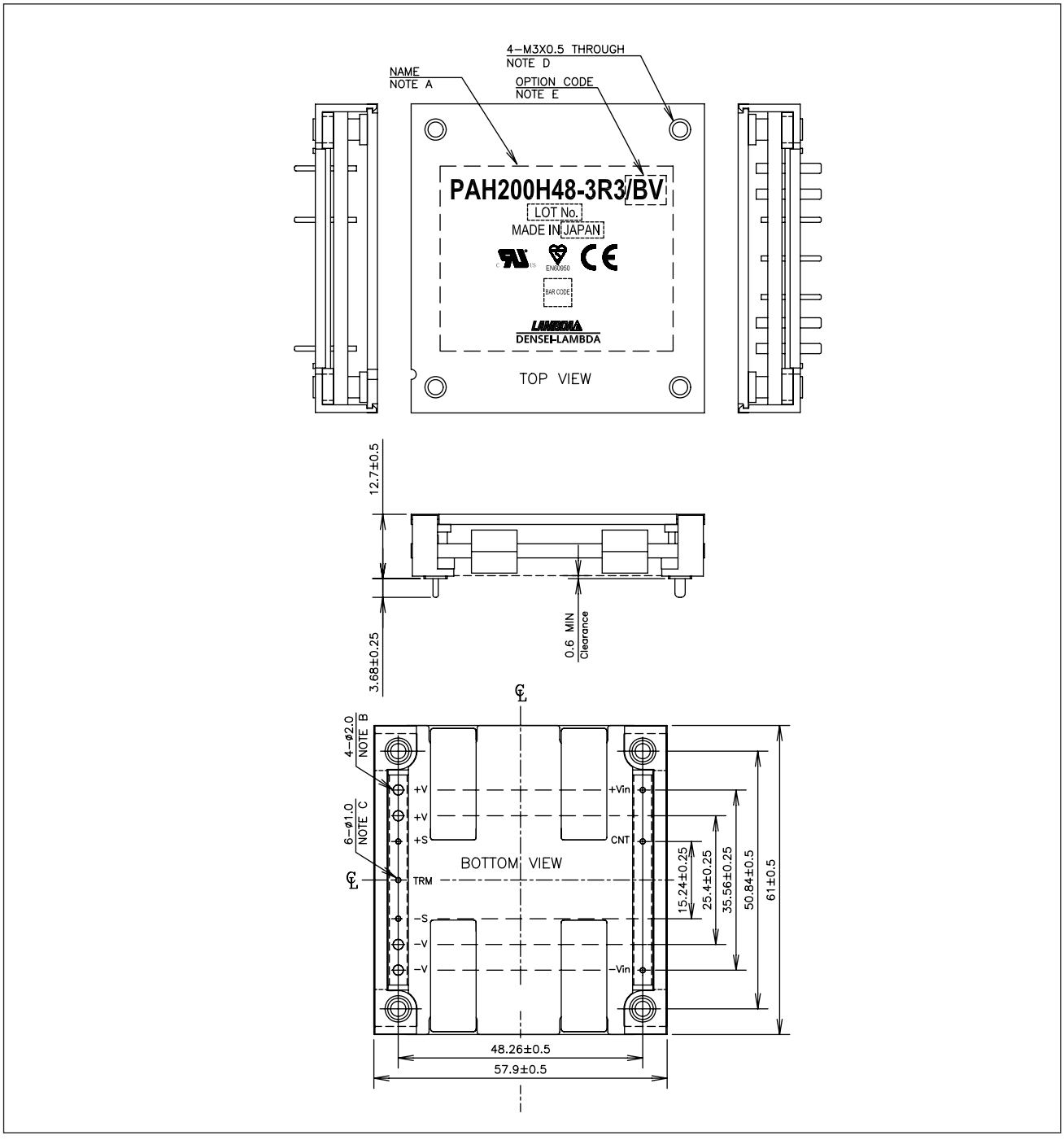
Features	*Benefits*
◆ High Efficiency	◆ Reduces System Heating
◆ Wide adjustment range	◆ Reduces need for custom modules
◆ ASIC Design	◆ Reduced component count, increased MTBF
◆ No potting materials	◆ Lower weight

Specifications

ITEM \ MODELS		PAH200H48-1R2 (/C version)	PAH200H48-1R5 (/C version)	PAH200H48-1R8 (/C version)	PAH200H48-2R5 (/C version)	PAH200H48-3R3 (/C version)
Nominal Output Voltage	VDC	1.2	1.5	1.8	2.5	3.3
Output Current (Max)	A	70 (60)	70 (60)	70 (60)	70 (60)	60 (50)
Max Output Power	W	84(72)	105(90)	126 (108)	175 (150)	198 (165)
Efficiency (Typ)	%	82	84	87	88	90
Input Voltage range	VDC	36-76V (100V for 100ms)				
Input Current (typ)	A	2.18 (1.87)	2.66 (2.28)	3.08 (2.64)	4.23 (3.63)	4.68 (3.90)
Output Voltage Accuracy	%	±1				
Output Voltage Adjustment	V	0.96-1.32	1.2-1.65	1.44 - 1.98	2.0 - 2.75	2.805-3.795
Max Ripple & Noise	mV	100				
Max Line Regulation	mV	10				
Max Load Regulation	mV	10				
Overcurrent Protection	-	105 - 140% (See Options)				
Overvoltage Protection	-	120 - 140% (See Options)				
Remote Sense	-	Yes				
Remote On / Off	-	Yes (See options)				
Operating Temperature	-	-40°C to +85°C (100°C /B option) Baseplate temperature				
Operating Humidity	-	5 - 95% Non condensing				
Storage Temperature	-	-40°C to +100°C				
Cooling	-	Convection, or forced air				
I/O Isolation Voltage	-	Input to Output 1500VAC Output to Case 500VAC				
Vibration (non operating)	-	10~55Hz (1 minute), amplitude 0.825mm (49m/s² max), X, Y, Z 1 hr ea.				
Shock	-	196.1 m/s²				
Safety Agency Approvals	-	UL1950, CSA950, EN60950, & CE				
Weight (Typ)	g	90				
Size (WxHxD)	in(mm)	2.28 x 0.4* x 2.4 (57.9 x 10.2* x 61); * /B version 0.5 (12.7)				
Warranty	-	2 Years				

Note: See Installation Manual for full details, test methods of parameters and application notes.

PAH 200H Outline Drawing



Options

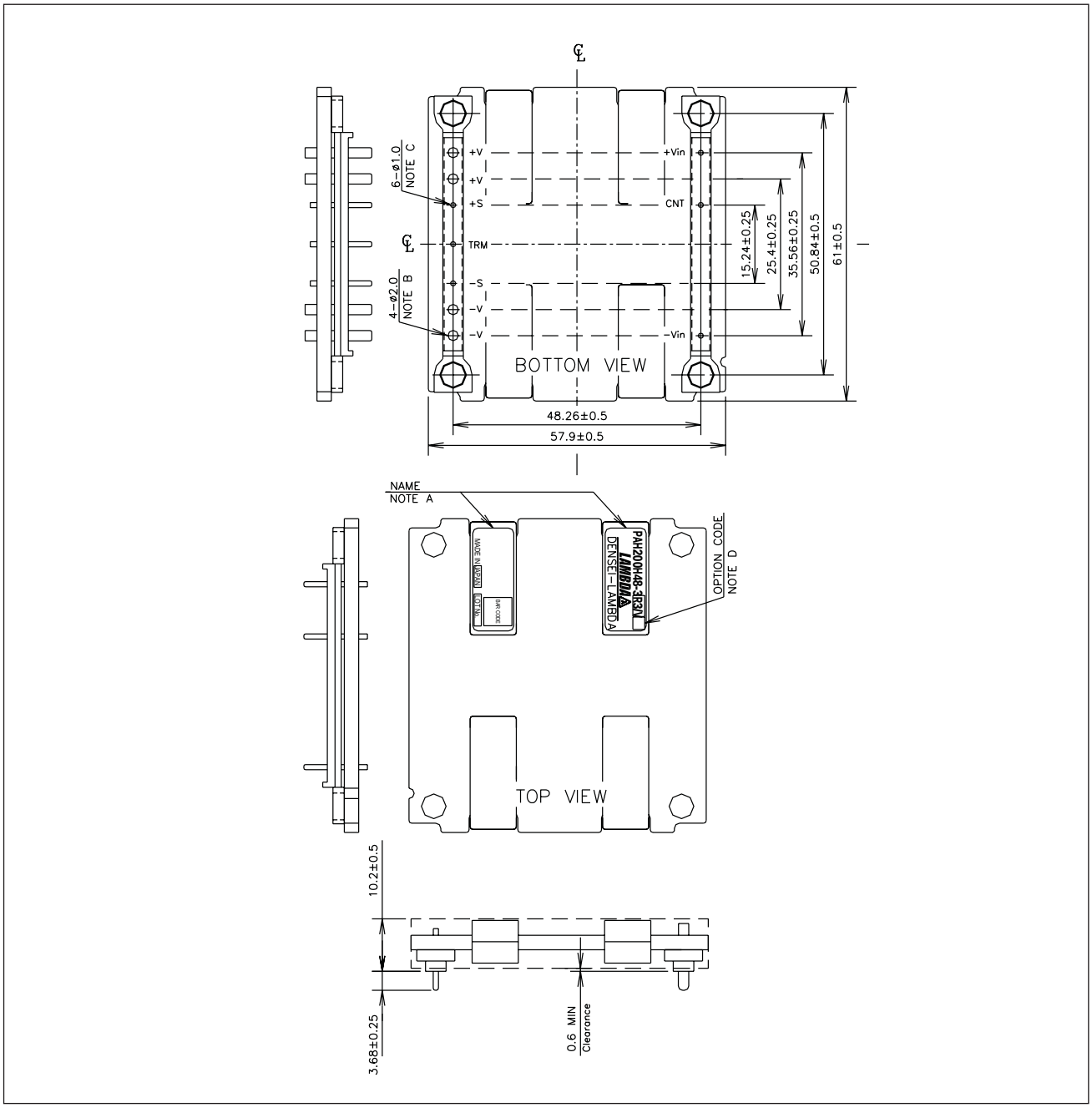
Suffix	OCP / OVP	Remote On / Off
Blank	Manual Reset	Negative, Short = On
/V*	Auto Reset	Negative, Short = On
/P	Manual Reset	Positive, Open = On
/PV*	Auto Reset	Positive, Open = On
/C**	Single set of O/P pins	
/B	Baseplate Fitted	

Note Suffix letter order: /C followed by /P followed by /V
Example: /CPV.

* Standard US Stock Item.

** See website for outline drawing—not available with /B option.

PAH 200H Outline Drawing



Pinout

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
CNT	On / Off Control terminal
+V	Positive Output Terminal
-V	Negative Output Terminal
TRIM	Output adjustment Trim pin
+S	Positive Remote sense
-S	Negative Remote sense

LAMBDA

- 12V output for driving non-isolated converters
- Safety Approved
- Operation at 100C baseplate
- Wide Adjustable Output Range
- Industry Standard Half Brick Package

Key Market Segments & Applications

Base Station Power Amplifiers
Bus converters for Distributed Power Architectures

PAH300/450 Series

300W to 450W 24V & 48V Input Half Brick DC-DC Converters

PAH 300/450 Features and Benefits

Features	*Benefits*
• Wide adjustment range	• Reduces need for custom modules
• Compact size	• Replaces 3/4 or Full Brick Power Modules
• ASIC Design	• Reduced component count, increased MTBF
• 24V & 48V inputs	• Suitable for remote & central office applications

Specifications

ITEM / MODELS		PAH300S, 350S, 450S		
Nominal Output Voltage	VDC	12V	28V	48V
Input Voltage range	VDC	18-36 or 36-76		
Input Current (Max)	A	6.8-17.4A (model dependant)		
Output Voltage Adjustment	VDC	7.2 - 13.2	16.8 - 33	28.8 - 57.6
Ripple & Noise (max) (pk to pk)	mV	200	280(1)	480
Line Regulation (max)	mV	24	56	96
Load Regulation (max)	mV	24	56	96
Overload Protection	%	105 - 140%, constant current with auto recovery		
Overvoltage Protection (3)	%	115-135%	125-140%(2)	125-145%
Remote Sense	-Yes			
Remote On/Off (See options)	-	Standard; Low = ON, Open = OFF /P option; Low = OFF, Open = ON		
Temperature (operating)	°C	-40°C to +100°C baseplate, full power(4)		
Temperature (storage)	°C	-40°C to +100°C		
Temperature Coefficient	-	0.02%/°C		
Humidity (operating)	-	5-95% RH Non condensing		
Humidity (storage)	-	5-95% RH Non condensing		
Cooling	-	Conduction (See Installation Manual for heatsink selection)		
Isolation Voltage	VDC	1500VDC Input to output & baseplate, 500VDC Output to baseplate		
Vibration	-	Non Operating, 10-55Hz (sweep for 1 min.)		
Amplitude	-	0.825mm constant (Max 49 m/s^2) X,Y,Z 1 hour each		
Shock	-	196.1m/s^2		
Safety Agency Approvals	-	UL60950-1, CSA60950-1, EN60950-1, CE LVD (48V input models only)		
Weight (Typ)	g	110		
Size (WxHxD)	mm	61x12.7x57.9 See outline drawing		
Warranty	yrs	2 Years		

Note: See Installation Manual for full details, test methods of parameters and application notes
(1) 240mV for PAH300
(2) 125-145% for PAH450S48-28
(3) Manual reset
(4) PAH350S24-28: derate linearly to 85% load from 90°C to 100°C

Model Selector

Model	Input Voltage (V)	Output Voltage (V)	Max. Curr. (A)	Max. Output Power (W)	Efficiency Typ. (%)
PAH300S24-12	18 - 36	12	25	300	87
PAH300S48-12	36 - 76	12	25	300	90
PAH350S48-12	36 - 76	12	29.2	350	89
PAH300S24-28	18 - 36	28	11	308	88
PAH350S24-28	18 - 36	28	12.5	350	88
PAH300S48-28	36 - 76	28	11	308	90
PAH350S48-28	36 - 76	28	12.5	350	89
PAH450S48-28	36 - 76	28	16	448	92
PAH450S48-48	36 - 76	48	9.4	451	92

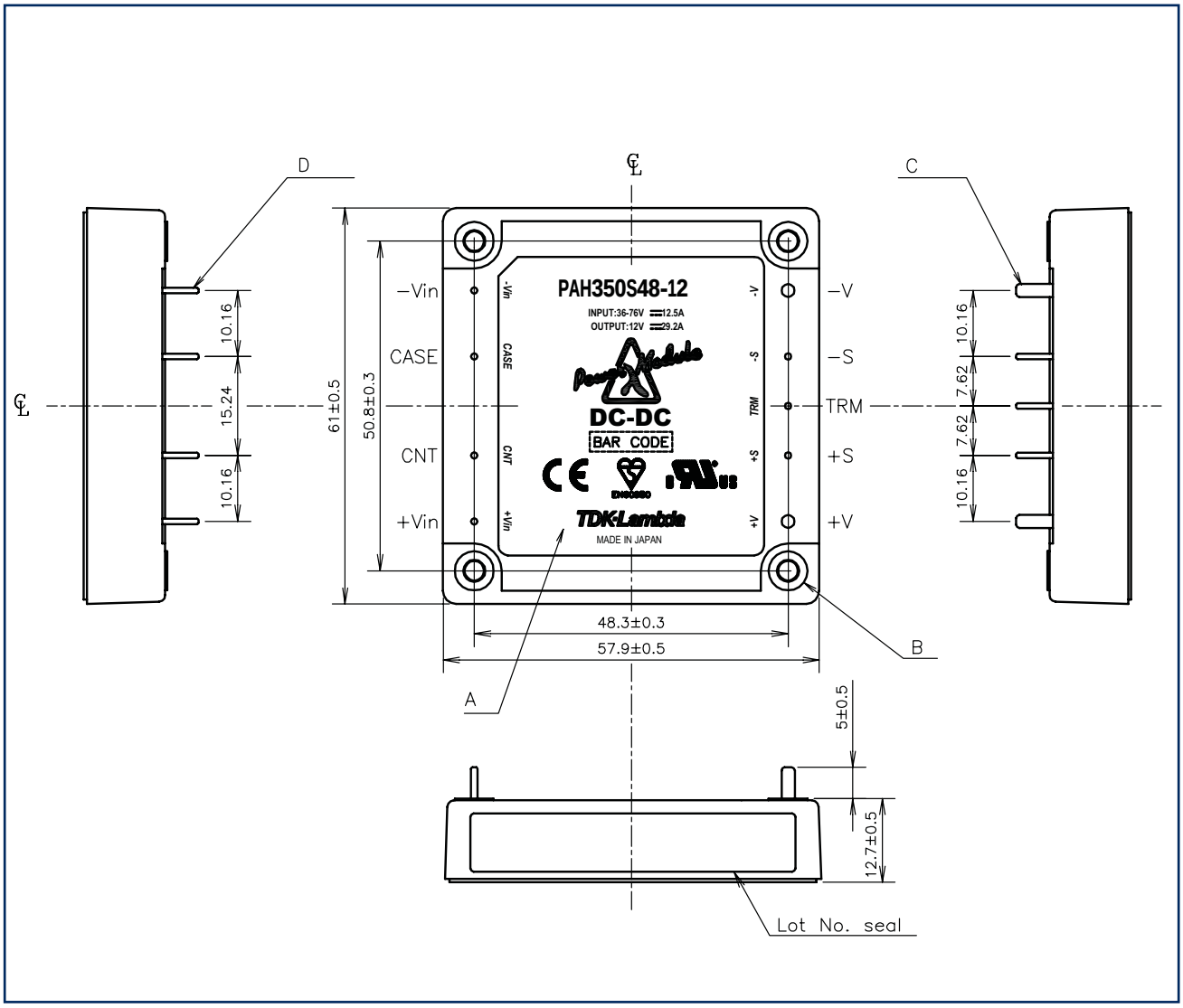
Pinout

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
CNT	On / Off Control terminal
+V	Positive Output Terminal
-V	Negative Output Terminal
TRIM	Output adjustment Trim pin
+S	Positive Remote sense
-S	Negative Remote sense

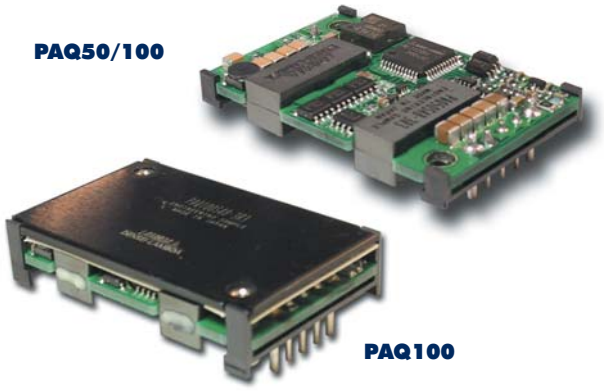
Options

Suffix	Description
-	M3 Tapped inserts for mounting
/T	M3 clearance inserts for mounting
/P	Positive logic remote On/Off

PAH300/450 Outline Drawing



LAMBDA



PAQ Series

Quarter Brick DC DC Converters

- Low Voltage Outputs (1.2-5.0V)
- High Power Density up to 90.4W/in^3
- Industry Standard Footprint & Pinouts
- Safety Agency Approvals (UL1950, CSA22.2, CE, TUV)
- Constant Current Limit (Auto Restarting)
- Remote On / Off (Positive/Negative Logic Available)
- ASIC Design to Reduce Component Count

Key Market Segments & Applications

Central Office:	ATM, Sonet, DSL, ISDN, Frame Relay, WDM
Broadband:	Switching Equipment, Routers
Wireless/Celluar:	Micro Cells (larger in size/10 sq. mi.) Pico Cells (smaller in size/1 to 2 sq. mi.)
Remote Electronics:	Fixed Local Loop, Fiber Optic Transmission, Microwave Transmission, Wireless Local Loop
Customer Premise:	PBX, PABX, Datacomm, Voice Systems, Video Conferencing
Industrial	ATE Test Equipment & Semi-Fab

PAQ Features and Benefits

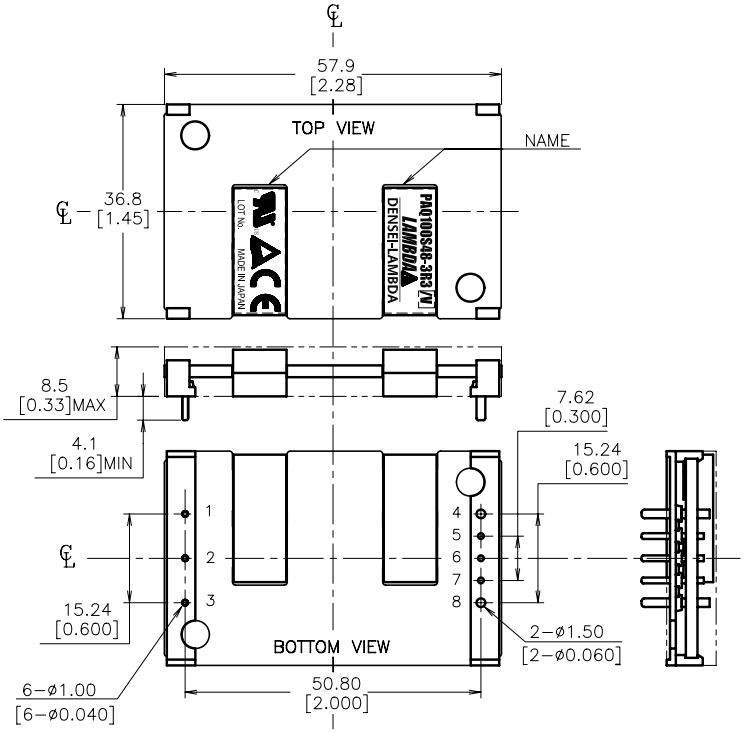
Features	Benefits
◆ Industry Standard footprint/pinout	◆ Allows for multi-sourcing
◆ ASIC Design	◆ Reduces number of components
◆ Wide Range Operating Temperature (-40 to 100°C)	◆ Supports Harsh Wireless Operating Environment
◆ High Efficiency at 3.3V, 88% (PAQ50), 89% (PAQ100)	◆ Reduce footprint area/Operation without heatsink

Specifications

ITEMS / MODEL			PAQ50S48-1R2 PAQ100S48-1R2	PAQ50S48-1R8 PAQ100S48-1R8	PAQ50S48-2R5 PAQ100S48-2R5	PAQ50S48-3R3 PAQ100S48-3R3	PAQ50S48-5 PAQ100S48-5
Nominal Output Voltage		V	1.2	1.8	2.5	3.3	5
Max Output Current		A	12 / 25	12 / 25	12 / 25	12 / 25	10 / 20
Max Output Power		W	14.4 / 30	21.6 / 45	30 / 62.5	39.6 / 82.5	50 / 100
Efficiency (Typ.)	(1)	%	78 / 80	83 / 84	85 / 86	88 / 89	90
Input Voltage Range		-	36-76 VDC				
Input Current (Typ.)	(1)	A	0.39 / 0.8	0.56 / 1.14	0.75 / 1.55	0.96 / 1.98	1.18 / 2.37
Output Voltage Accuracy	(1)	%	± 1%				
Output Voltage Range	(6)	-	-20%, +10%			±15%	
Max Ripple & Noise	(6)	mV	100				
Max Line Regulation	(2)	mV	10				
Max Load Regulation	(3)	mV	10				
Over Current Protection		-	PAQ50: 105-150%; PAQ100 105-140%; (self-Recovering /V option)				
Over Voltage Protection	(4)	-	120% - 140% (Self-Recovering /V option)				
Remote ON/OFF Control		-	Low=On, Open =Off (/P option: Low=Off, Open=On)				
Operating Temperature	(5)	°C	Ta=-40 to +85° (100°C /B Option PAQ100 only)				
Cooling	(5)	-	Convection Cooled / Forced Air Cooled				
Isolation Voltage		-	Input-Output: 1.5kVDC for 1 min.				
Shock		-	196.1m/s^2				
Weight		g	50				
Vibration		-	Non Operating, 10-55Hz (Sweep for 1 min.) Amplitude 0.825mm Constant (Maximum 49.0n/s^2) X, Y, Z 1 hour each				
Size (W x H x D)		in	1.45" x .33" x 2.3"; 0.5" height (/B option PAQ100 only)				
Warranty		-	2 Years				

Notes:
1. At 48VDC, maximum output current, Air Velocity = 2m/s and Ta = +25°C.
2. 36 - 76VDC, constant load.
3. No load - Full load, constant input voltage.
4. Inverter shutdown method, manual reset. Auto restart option available.
5. Refer to installation manual (website).
6. External components are needed for operation.

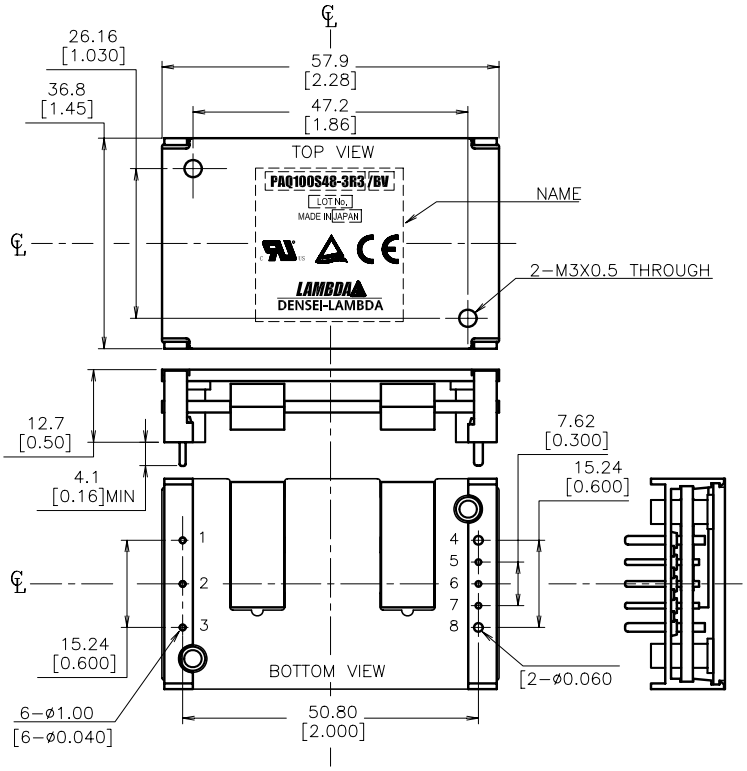
PAQ50/100 Openframe Drawing



= NOTE =

Dimensions are in millimeters and [inches].
Tolerances: *.*mm±0.5mm[*.**in.±0.02in.]
*.**mm±0.25mm[*.***in.±0.010in.]

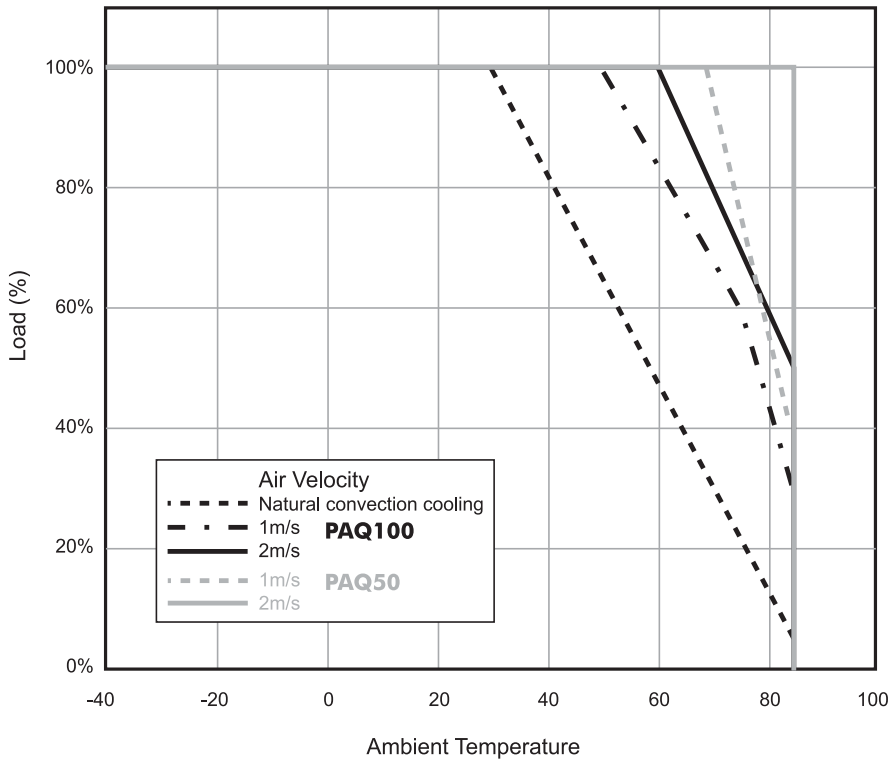
PAQ100 Baseplate Drawing



= NOTE =

Dimensions are in millimeters and [inches].
Tolerances: *.*mm±0.5mm[*.**in.±0.02in.]
*.**mm±0.25mm[*.***in.±0.010in.]

PAQ Derating Curve



Note: Open Frame PAQ100S48-3.3/V unit shown.

PAQ Series Outputs

PIN#	Label	Function
1	-Vin	Negative Input Terminal
2	CNT	ON/OFF Control Terminal
3	+Vin	Positive Input Terminal
4	-V	Negative Output Terminal
5	-S	Negative Remote Sensing
6	TRM	Output Voltage Adjustment Terminal
7	+S	Positive Remote Sensing
8	+V	Positive Output Terminal

PAQ Series Options

Suffix	Description
Blank	Manual Reset after OVP or OCP condition
/V	Auto Reset after OVP or OCP condition
/P	Positive Logic Remote On/Off
/B	Baseplate version

/V, /PV, /BV, /BPV are Standard US stock items.

LAMBDA

- High Density
- Wide Range Input
- Wide output adjustment capability
- Remote On/Off
- Fixed Switching Frequency
- International Safety Approvals
- Parallel Operation

PH-F Series

Full Function 50W to 300W DC-DC Converters

Key Market Segments & Applications

Telecom
Custom Power Supplies
N+1 redundant systems
Scalable systems
Point of Load

PH-F Features and Benefits

Features	*Benefits*
◆ Low component count	◆ High reliability demonstrated 5 million hours MTBF
◆ Wide output adjustment	◆ Avoids the need for custom modules
◆ Signals to support N+1 redundancy	◆ Ease of use in redundant configurations
◆ Variety of input voltages	◆ Systems can operate from different input voltages

Specifications

ITEMS		2V	3.3V	5V	12V	15V	24V	28V
Input range	VDC	24V nom: 18-36, 48V nom: 36-76V, 110V nom: 82-185V, 280V nom: 200-400V						
Output Voltage Adj. Range	VDC	1.6~2.4	2.64~3.96	2~6	4.8~14.4	6~18	9.6~28.8	11.2~33.6
Line Regulation	-	0.4% or 20mV (whichever is greater) over entire input range with constant load						
Load Regulation	-	0.8% or 40mV (whichever is greater) from no load to full load with constant input line						
Ripple and Noise	pk-pk	100mV			150mV		240mV	280mV
Series Operation	-	Possible - Refer to installation manual						
Over Voltage Protection	-	150 - 180%		125 - 145%				
Overload Protection	-	Approximately 105 - 140%, automatic recovery						
Remote On/Off	-	Low = ON, Open = OFF						
Remote Sensing	-	Yes						
Parallel operation	-	Using current share pin (PC). Will share within 5%, see app. notes for connection details						
Inverter Good signal	-	Signal available for status of inverter						
Auxiliary Bias Supply	-	8V 10mA auxiliary voltage to supply power to interface circuits (AUX pin)						
Thermal Protection	-	Internal sensing, self resetting						
Cooling	-	Conduction or forced air. See application notes for cooling and heatsink selection						
Operating Temperature Range	-	Baseplate temperature -20°C to +85°C. -40°C start up possible with 30 minute warm up period						
Storage Temperature	-	-40°C to +85°C						
Temperature Coefficient	-	0.02%/°C						
Isolation	-	Input to output: 3000VAC, Input to Baseplate: 2500VAC(1)						
Isolation Resistance	-	Output to Baseplate -100MOhm at 500VDC and 70%RH						
Safety Agency Approval	-	UL1950, CSA234, EN60950 and CE Mark.						
Warranty	-	Two years						

Note: See Installation Manual for full details, test methods of parameters and application notes
(1) 24V input models input to output: 2kVAC; input to baseplate: 2kVAC

Model Selector

Nominal Output Voltage (V)	Output Current (A)	Output Power (W)	24V input	48V input	110V input	280V input
2.0	15.0	30	-	PH75F48-2	PH75F110-2	PH75F280-2
2.0	20.0	40	PH100F24-2	-	-	-
2.0	30.0	60	-	PH150F48-2	PH150F110-2	PH150F280-2
2.0	60.0	120	-	PH300F48-2	PH300F110-2	PH300F280-2
3.3	15.0	45	-	PH75F48-3	PH75F110-3	PH75F280-3
3.3	20.0	60	PH100F24-3	-	-	-
3.3	30.0	90	-	PH150F48-3	PH150F110-3	PH150F280-3
3.3	60.0	180	-	PH300F48-3	PH300F110-3	PH300F280-3
5.0	15.0	75	-	PH75F48-5	PH75F110-5	PH75F280-5
5.0	20.0	100	PH100F24-5	-	-	-
5.0	30.0	150	-	PH150F48-5	PH150F110-5	PH150F280-5
5.0	60.0	300	-	PH300F48-5	PH300F110-5	PH300F280-5
12.0	6.3	75	-	PH75F48-12	PH75F110-12	PH75F280-12
12.0	8.4	100	PH100F24-12	-	-	-
12.0	12.5	150	-	PH150F48-12	PH150F110-12	PH150F280-12
12.0	20.0	240	PH300F24-12	-	-	-
12.0	25.0	300	-	PH300F48-12	PH300F110-12	PH300F280-12
15.0	5.0	75	-	PH75F48-15	PH75F110-15	PH75F280-15
15.0	6.7	100	PH100F24-15	-	-	-
15.0	10.0	150	-	PH150F48-15	PH150F110-15	PH150F280-15
15.0	20.0	300	-	PH300F48-15	PH300F110-15	PH300F280-15
24.0	3.2	75	-	PH75F48-24	PH75F110-24	PH75F280-24
24.0	4.2	100	PH100F24-24	-	-	-
24.0	6.3	150	-	PH150F48-24	PH150F110-24	PH150F280-24
24.0	12.6	300		PH300F48-24	PH300F110-24	PH300F280-24
28.0	2.7	50	-	PH75F48-28	PH75F110-28	PH75F280-28
28.0	3.6	100	PH100F24-28	-	-	-
28.0	5.4	150	-	PH150F48-28	PH150F110-28	PH150F280-28
28.0	10.8	300	PH300F24-28	PH300F48-28	PH300F110-28	PH300F280-28

Pinout

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
CNT	On / Off Control terminal
+V	Positive Output Terminal
-V	Negative Output Terminal
TRIM	Output adjustment Trim pin
+S	Positive Remote sense
-S	Negative Remote sense

For full data
and drawings please visit
www.lambda-gb.com/ph

Options

Suffix	Description
-	M3 Tapped inserts for mounting
/T	M3 clearance inserts for mounting
/P	Positive logic remote On/Off

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- High Density
- Wide Range Input
- Output adjustment Capability
- Remote On/Off
- Fixed Switching Frequency
- International Safety Approvals

Key Market Segments & Applications

Telecom
Custom Power Supplies
Point of Load

PH-S Series

Simple Function 50W to 600W DC-DC Converters

PH-S Features and Benefits

Features	*Benefits*
◆ High density	◆ Smaller package size
◆ Low component count	◆ High reliability Demonstrated 5 million hours MTBF
◆ Fixed operating frequency	◆ Easier system filtering
◆ Variety of input voltages	◆ Systems can operate from different input voltages

Specifications

ITEMS		3.3V	5V	12V	15V	24V	28V	48V
Input range	VDC	24V nom: 18-36, 48V nom: 36-76V, 110V nom: 82-185V, 280V nom: 200-400V						
Output Voltage Adj. Range	VDC	2.97~3.63	4.5~5.5	10.8~13.2	13.5~16.5	21.6~26.4	25.2~30.8	43.2~52.8
Line Regulation		0.4% or 20mV (whichever is greater) over entire input range with constant load						
Load Regulation		0.8% or 40mV (whichever is greater) from no load to full load with constant input line						
Ripple and Noise	pk-pk	100mV		150mV		240mV	280mV	480mV
Series Operation	-	Possible - Refer to installation manual						
Over Voltage Protection	-	150 - 180%	125 - 145%					
Overload Protection	-	Approximately 105 - 140%, automatic recovery						
Remote On/Off	-	Low = ON, Open = OFF						
Remote Sensing	-	PH100S, PH150S, PH300S, PH600S models						
Parallel operation	-	PH300S & PH600S only: Requires external circuitry						
Inverter Good signal	-	PH300S & PH600S only: Signal available for status of inverter						
Thermal Protection	-	Internal sensing, self resetting						
Cooling	-	Conduction or forced air. See application notes for cooling and heatsink selection						
Operating Temperature Range	-	Baseplate temperature -20°C to +85°C (100°C on PH300 & PH600).						
	-	-40°C start up possible with 30 minute warm up period						
Storage Temperature	-	-40°C to +85°C (+100°C on PH300 & PH600)						
Temperature Coefficient	-	0.02%/°C						
Isolation	-	Input to output: 3000VAC, Input to Baseplate: 2500VAC(1)						
Isolation Resistance	-	Output to Baseplate -100MOhm at 500VDC and 70%RH						
Safety Agency Approval	-	UL1950, CSA234, EN60950 and CE Mark.						
Warranty	-	Two years						

Note: See Installation Manual for full details, test methods of parameters and application notes
(1) PH300S48 models: Input to output 1.5kVAC, input to baseplate 1.5kVAC

Model Selector

Nominal Output Voltage (V)	Output Current (A)	Output Power (W)	24V input	48V input	110V input	280V input
3.3	10.0	33.0	-	PH50S48-3.3	-	PH50S280-3.3
3.3	15.0	49.5	-	PH75S48-3.3	-	PH75S280-3.3
3.3	20.0	66.0	-	PH100S48-3.3	-	PH100S280-3.3
3.3	30.0	99.0	-	PH150S48-3.3	-	PH150S280-3.3
3.3	50.0	165.0	-	PH300S48-3.3	-	PH300S280-3.3
3.3	100.0	330.0	-	-	-	PH600S280-3.3
5.0	10.0	50.0	PH50S24-5	PH50S48-5	PH50S110-5	PH50S280-5
5.0	15.0	75.0	-	PH75S48-5	PH75S110-5	PH75S280-5
5.0	20.0	100.0	-	PH100S48-5	-	PH100S280-5
5.0	30.0	150.0	-	PH150S48-5	PH150S110-5	PH150S280-5
5.0	50.0	250.0	-	PH300S48-5	-	PH300S280-5
5.0	100.0	500.0	-	-	-	PH600S280-5
12.0	4.2	50.0	PH50S24-12	PH50S48-12	PH50S110-12	PH50S280-12
12.0	6.3	75.0	-	PH75S48-12	PH75S110-12	PH75S280-12
12.0	8.4	100.0	-	PH100S48-12	-	PH100S280-12
12.0	12.5	150.0	-	PH150S48-12	PH150S110-12	PH150S280-12
12.0	25.0	300.0	-	PH300S48-12	-	PH300S280-12
12.0	50.0	600.0	-	-	-	PH600S280-12
15.0	3.4	50.0	PH50S24-15	PH50S48-15	PH50S110-15	PH50S280-15
15.0	5.0	75.0	-	PH75S48-15	PH75110-15	PH75S280-15
15.0	6.7	100.0	-	PH100S48-15	-	PH100S280-15
15.0	10.0	150.0	-	PH150S48-15	PH150S110-15	PH150S280-15
15.0	20.0	300.0	-	PH300S48-15	-	PH300S280-15
15.0	40.0	600.0	-	-	-	PH600S280-15
24.0	2.1	50.0	PH50S24-24	PH50S48-24	PH50S110-24	PH50S280-24
24.0	3.2	75.0	-	PH75S48-24	PH75S110-24	PH75S280-24
24.0	4.2	100.0	-	PH100S48-24	-	PH100S280-24
24.0	6.3	150.0	-	PH150S48-24	PH150S110-24	PH150S280-24
24.0	12.5	300.0	-	PH300S48-24	-	PH300S280-24
24.0	25.0	600.0	-	-	-	PH600S280-24
28.0	1.8	50.0	PH50S24-28	PH50S48-28	PH50S110-28	PH50S280-28
28.0	2.7	75.0	-	PH75S48-28	PH75S110-28	PH75S280-28
28.0	3.6	100.0	-	PH100S48-28	-	PH100S280-28
28.0	5.4	150.0	-	PH150S48-28	PH150S110-28	PH150S280-28
28.0	10.8	302.0	-	PH300S48-28	-	PH300S280-28
28.0	21.5	602.0	-	-	-	PH600S280-28
48.0	6.3	302.0	-	PH300S48-48	-	PH300S280-48
48.0	12.5	600.0	-	-	-	PH600S280-48

Pinout

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
+S	Positive Remote sense
-S	Negative Remote sense
+V	Positive Output Terminal
-V	Negative Output Terminal
IOG	Inverter Good Signal
TRIM	Output adjustment trim pin
CNT	On/Off Control Terminal
CS	Current Monitor Signal

For full data
and drawings please visit
www.lambda-gb.com/ph

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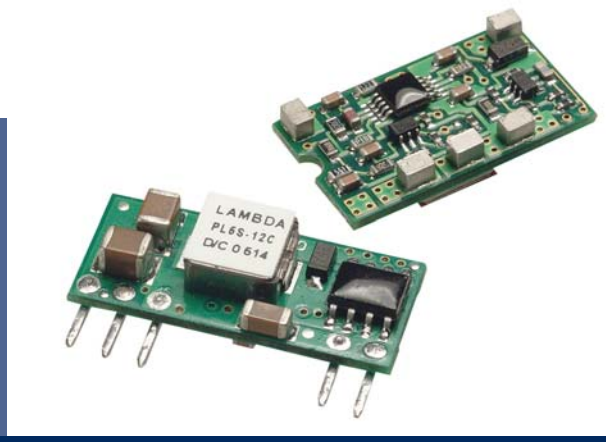


- Industry Standard Package and Pin Out
- DOSA Compatible Models
- Low Voltage Outputs to 0.75V
- Pin and SMT Versions
- Output Voltage Adjustment
- Remote On/Off

PL5 Series

5A Non-Isolated DC-DC Converters

Key Market Segments & Applications

Telecommunications
Data Communications
Networking Equipment
Test Equipment
Industrial Electronics
Distributed Power Architecture

PL5 Features and Benefits

Features	*Benefits*
• High Efficiency up to 94%	• Reduces Input Current Draw
• Wide Output Voltage Adjustment Range	• Stock One Part for all Voltages
• SMT or Through Hole Packages	• Multiple Mounting Methods
• Industry Standard Pin Out	• Second Sourcing

Specifications

MODELS / ITEMS		PL5S-05C	PL5SMS-05C	PL5S-12C	PL5SMS-12C
Output Voltage Range (2)	VDC	0.75 - 3.3VDC		0.75 - 5.0VDC	
Output Current	A	5 Amps			
Output Voltage Accuracy	%	±1.5%			
Turn on/off Threshold (typ)	VDC	On: 2.0V, Off: 1.9V		On: 8.0V, Off: 7.9V	
Ripple & Noise (Typ) (1)	mV	20mV rms, 50mV pk-pkVo=5VDC, 45mV rms, 75mV pk-pk			
Line Regulation (Typ)	%	± 0.4% (Vo=3.3V)		± 0.2% (Vo=3.3V)	
Load Regulation (Typ)	%	± 0.5% (Vo=3.3V)			
Capacitive Load (max)	µF	3000µF			
Transient Response	-	<200µs settling time for 25% load change			
Overcurrent Protection	-	Continuous			
Overvoltage Protection	-	N/A			
Over Temp. Protection	°C	120°C typ.			
Remote Sense	-	N/A			
Remote On / Off	-	On: Vin or open circuit; Off: <0.4VDC			
Operating Temperature	°C	-40°C to +85°C			
Operating Humidity	%	20 - 95% Non condensing			
Storage Temperature	°C	-55°C to +125°C			
Storage Humidity	%	10 - 95% Non condensing			
Cooling	-	Convection, or forced air			
Vibration (non operating)	-	10 - 500 -10 Hz, amplitude 1.524mm, X, Y, Z 6 minutes each			
Shock		half sine wave, 40g, 11ms, 3 times each axis, +X, -X, +Y, -Y, +Z, -Z			
Safety Agency Approvals	-	UL/C-UL60950			
Switching Frequency	kHz	300kHz			
Weight (Typ)	g	2.1	2.4	2.1	2.4
Size (W x L x H)	-	See outline drawing			
Warranty	-	1 Year			

Note: See Installation Manual for full details, test methods of parameters and application notes

(1) The output noise is measured with a 10µF tantalum cap and 1µF ceramic cap across output.

(2) See Application Notes for Trim equations and tables.

Model Selector

Models	Input Voltage (VDC)	Output Voltage (VDC)	Output Curr. (A)	Input Current* No Load (mA)	Input Current* Full Load (mA)	Eff. (%)
PL5S-05C	3.0 - 5.5	0.75	5	25	949	79
PL5SMS-05C	3.0 - 5.5	1.2	5	30	1412	85
	3.0 - 5.5	1.5	5	30	1724	87
	3.0 - 5.5	1.8	5	35	2022	89
	3.0 - 5.5	2	5	35	2222	90
	3.0 - 5.5	2.5	5	35	2217	92
	4.5 - 5.5	3.3	5	35	3511	94
PL5S-12C	8.3 - 14	0.75	5	20	428	73
PL5SMS-12C	8.3 - 14	1.2	5	25	625	80
	8.3 - 14	1.5	5	25	762	82
	8.3 - 14	1.8	5	30	893	84
	8.3 - 14	2	5	30	980	85
	8.3 - 14	2.5	5	35	1197	87
	8.3 - 14	3.3	5	45	1545	89
	8.3 - 14	5.0	5	50	2264	92

* At nominal input voltage (5V or 12V depending on model)

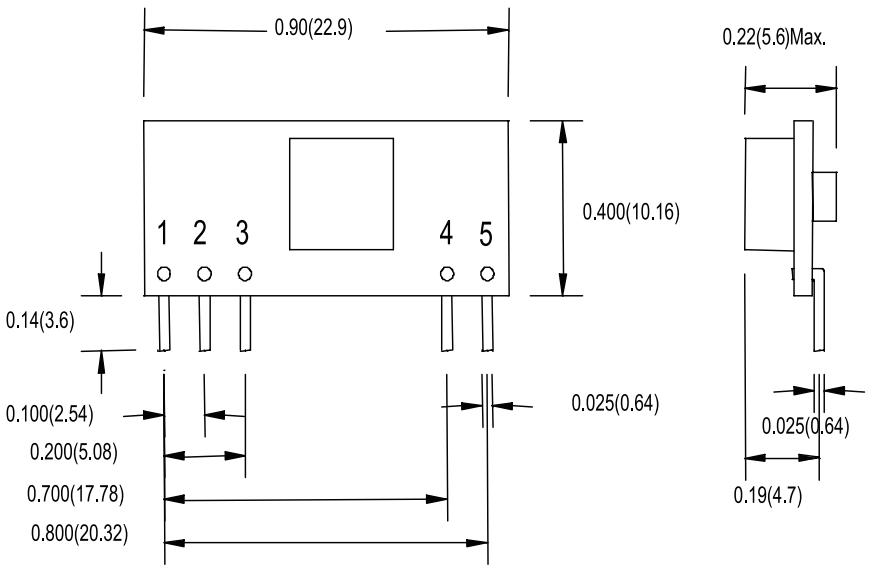
Remote On/Off Option

Suffix	Function
Blank	On: Vin or open circuit; Off<0.4DC
N	On: open circuit or <0.4VDC; Off: >2.8VDC to Vin

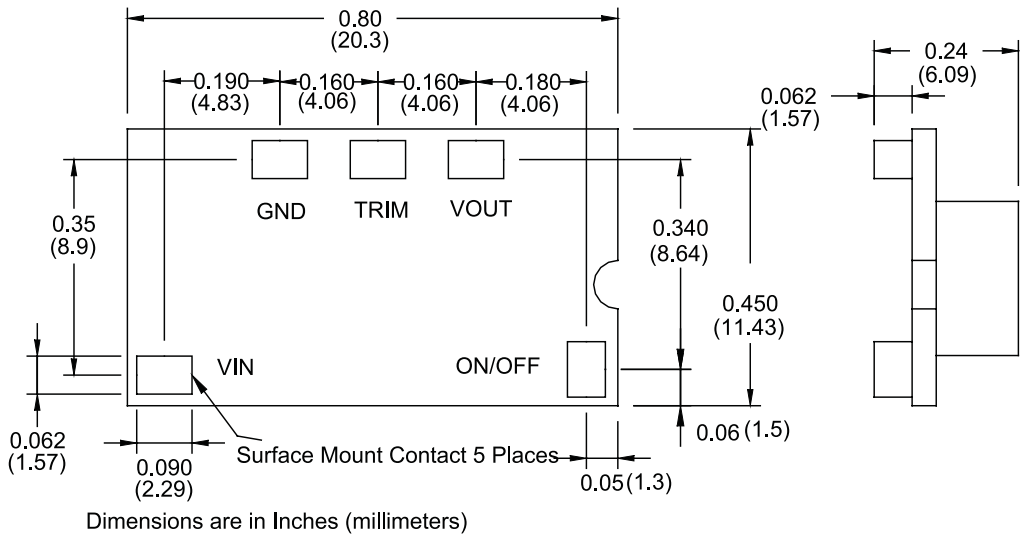
Pinout

PIN	Function	PIN	Function
1	+ Output	2	Trim
3	Common	4	+V Input
5	On/Off		

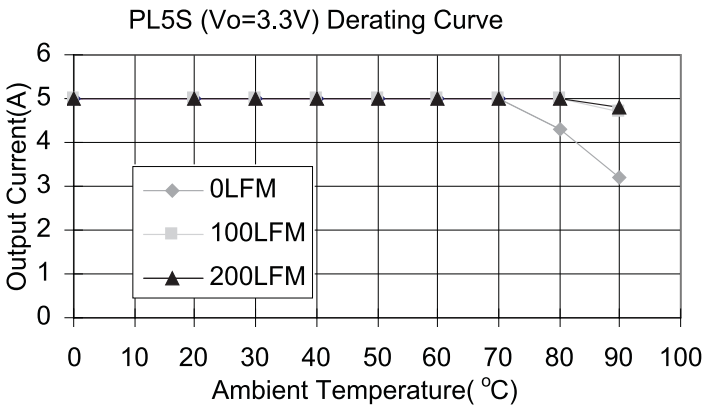
PL5S Outline Drawing

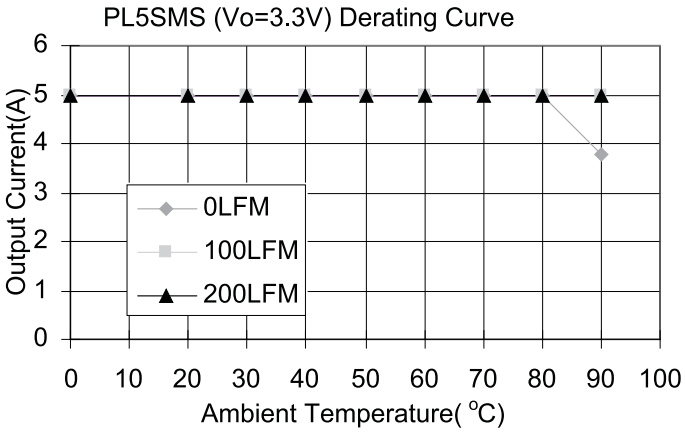


PL5SMS Outline Drawing



Derating Curve





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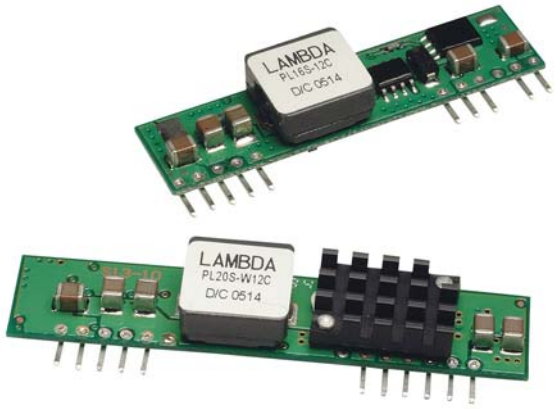


- Industry Standard Package and Pin Out
- DOSA Compatible Models
- Low Voltage Outputs to 0.75V
- Wide Input Range 6 to 14V ('W' Models)
- Output Voltage Adjustment
- Remote On/Off and Sequencing ('W' Models)

PL10-20S Series

10-20A Non-Isolated DC-DC Converters

Key Market Segments & Applications

Distributed Power Architecture
Telecommunications
Data Communications
Networking Equipment
Test Equipment
Industrial Electronics

PL10-20S Features and Benefits

Features	*Benefits*
• High Efficiency up to 95%	• Reduces Input Current Draw
• Wide Output Voltage Adjustment Range	• Stock One Part for all Voltages
• Through Hole Packages	• Less PCB Space Used
• Industry Standard Pin Out	• Second Sourcing

Specifications

MODELS		PL10S-W12C	PL16S-12C	PL16S-W12C	PL20S-W12C
ITEMS					
Output Voltage Range (2)	VDC	0.75 - 5.0VDC			
Output Current	A	10	16		20
Output Voltage Accuracy	%	±1.5% max.			
Turn on/off Threshold (typ)	VDC	On: 5.0V, Off: 4.0V	On: 8.0V, Off: 7.7V	On: 5.0V, Off: 4.0V	
Ripple & Noise (Typ) (2)	mV	30mV rms, 75mV pk-pk			
Line Regulation (Typ)	%	± 0.2% (Vo=3.3V)			
Load Regulation (Typ)	%	±0.5% (Vo=3.3V)			
Capacitive Load (max)	µF	8000µF			
Transient Response	-	<200µs settling time for 25% load change			
Overcurrent Protection	-	Continuous			
Overvoltage Protection	-	N/A			
Over Temp. Protection	°C	130°C typ.			
Remote Sense	-	Yes			
Remote On / Off	-	On: Vin or open circuit; Off: <0.4VDC			
Power Good Signal (logic high)	%	Optional	N/A	Optional	
Operating Temperature	°C	-40°C to +85°C			
Operating Humidity	%	20 - 95% Non condensing			
Storage Temperature	°C	-55°C to +125°C			
Storage Humidity	-	10 - 95% Non condensing			
Cooling	-	Convection, or forced air			
Vibration (non operating)	-	10 - 500 - 10Hz, amplitude 1.524mm, X, Y, Z 6 minutes each			
Shock	-	Half sine wave, 40g, 11ms, 3 times each axis, +X, -X, +Y, -Y, +Z, -Z			
Safety Agency Approvals	-	UL/C-UL60950			
Sequencing/Tracking	-	Yes	-	Yes	Yes
Switching Frequency	kHz	300kHz			
Weight (Typ)	g	8.0	8.0	8.5	10.1
Size (WxHxD)	-	See outline drawing			
Warranty	-	1 Year			

Note: See Installation Manual for full details, test methods of parameters and application notes
(1) The output noise is measured with a 10µF tantalum cap and 1µF ceramic cap across output
(2) See application notes for Trim equations and tables

Models

Model	Input Voltage (VDC)	Output Voltage (VDC)	Output Curr. (A)	No Load (mA)	Full Load (mA)	Eff. (%)
PL10S-W12C	6.0 - 14	0.75	10	40	762	82
	6.0 - 14	1.2	10	40	1149	87
	6.0 - 14	1.5	10	50	1404	89
	6.0 - 14	1.8	10	40	1666	90
	6.0 - 14	2.0	10	60	1832	91
	6.0 - 14	2.5	10	65	2264	92
	6.0 - 14	3.3	10	75	2956	93
	6.5 - 14	5.0	10	95	4386	95
PL16S-12C	9.0 -14	0.75	16	40	1299	77
	9.0 -14	1.2	16	50	1928	83
	9.0 -14	1.5	16	50	2326	86
	9.0 -14	1.8	16	60	2727	88
	9.0 -14	2.0	16	60	2996	89
	9.0 -14	2.5	16	65	3704	90
	9.0 -14	3.3	16	75	4783	92
	9.0 -14	5.0	16	75	7092	94
PL16S-W12C	6.0 - 14	0.75	16	40	1250	80
	6.0 - 14	1.2	16	40	1882	85
	6.0 - 14	1.5	16	50	2273	88
	6.0 - 14	1.8	16	60	2697	89
	6.0 - 14	2.0	16	60	2963	90
	6.0 - 14	2.5	16	65	3663	91
	6.0 - 14	3.3	16	75	4731	93
	6.5 - 14	5.0	16	95	7092	94
PL20S-W12C	6.0 - 14	0.75	20	40	1603	78
	6.0 - 14	1.2	20	50	2381	84
	6.0 - 14	1.5	20	50	2874	87
	6.0 - 14	1.8	20	50	3409	88
	6.0 - 14	2.0	20	60	3745	89
	6.0 - 14	2.5	20	65	4630	90
	6.0 - 14	3.3	20	75	5978	92
	6.5 - 14	5.0	20	95	8865	94

Options

Remote On / Off Option

Blank	On: Vin or open circuit; Off: <0.4VDC
N	On: open circuit or <0.4VDC; Off: >2.8VDC to Vin

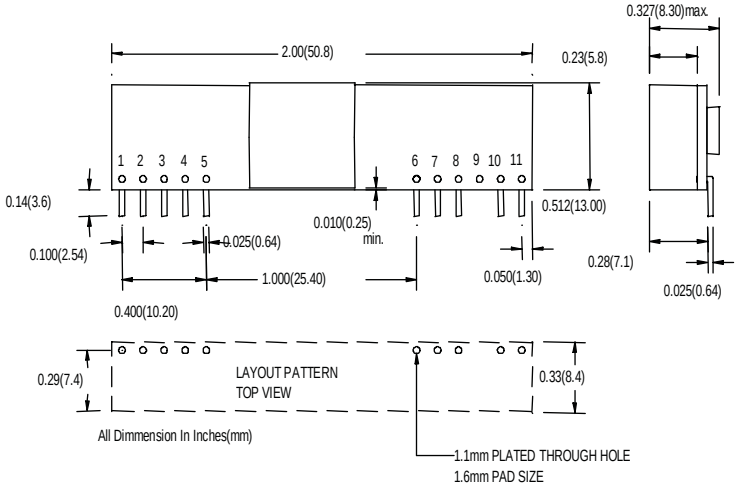
Power Good Option

P	(available on W12C models)

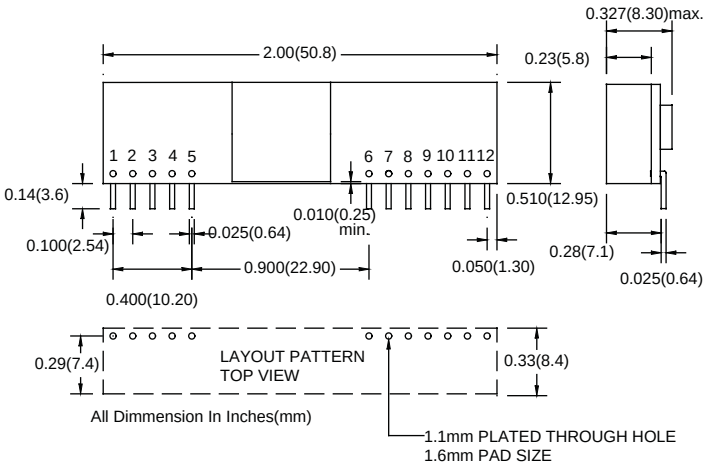
Pinout

PIN	PL10S-W, 16S-W, 20S-W Function	PIN	PL16S-12C Function
1	+Output	1	+Output
2	+Output	2	+Output
3	+Sense	3	+Sense
4	+Output	4	+Output
5	Common	5	Common
6	No Pin/PGood option	6	Common
7	Common	7	+V Input
8	+V Input	8	+V Input
9	+V Input	9	No Pin
10	Sequencing	10	Trim
11	Trim	11	On/Off Control
12	On/Off Control		

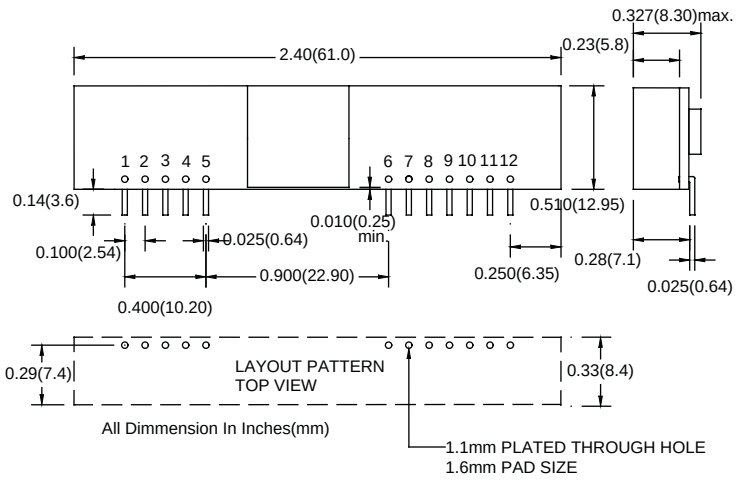
Outline Drawing - PL16S-12C



Outline Drawing - PL10S-W12C & PL16S-W12C



Outline Drawing - PL20S-W12C



LAMBDA

PL10-20SMS Series

10A - 20A Surface Mount
Non-Isolated DC-DC Converters

- Industry Standard Package and Footprint
- DOSA Compatible Models
- Low Voltage Outputs to 0.75V
- Wide Input Range 6 to 14V (on 'W' models)
- Output Voltage Adjustment
- Remote On/Off and Sequencing ('W' models)

Key Market Segments & Applications

Telecommunications
Data Communications
Networking Equipment
Test Equipment
Industrial Electronics
Distributed Power Architecture

PL10-20SMS Features and Benefits

Features	*Benefits*
• High Efficiency up to 95%	• Reduces Input Current Draw
• Wide Output Voltage Adjustment Range	• Stock One Part for all Voltages
• SMT Packages	• Low Assembly Cost
• Industry Standard Pin Out	• Second Sourcing

Specifications

ITEMS	MODELS		PL10SMS-12C	PL10SMS-W12C	PL15SMS-05C	PL16SMS-12C	PL16SMS-W12C	PL20SMS-W12C
Output Voltage Range	(2)	VDC	0.75-5.0		0.75-3.3		0.75-5.0	
Output Current		A	10		15		16	20
Output Voltage Accuracy		%	±1.5%					
Turn On/Off Threshold	ON	VDC	8.0V	5.0V	2.8V	8.0V	5.0V	5.0V
	OFF	VDC	7.7V	4.0V	2.7V	7.7V	4.0V	4.0V
Ripple & Noise (Typ)	(1)	m	V		30mV rms, 75mV pk-pk			
Line Regulation (Typ)		%	±0.2% (Vo=3.3V)					
Load Regulation (Typ)		%	±0.5% (Vo=3.3V)					
Capacitive Load (max)		µF	8000µF		10000µF	8000µF		
Transient Response		-	<200µs settling time for 25% load change					
Overcurrent Protection		-	Continuous					
Overvoltage Protection		-	N/A					
Over Temp. Protection		°C	120°C typ.	130°C typ.	120°C typ.	130°C typ.		
Remote Sense		-	Yes					
Remote On / Off		-	On: Vin or open circuit; Off: <0.4VDC					
Sequencing/Tracking		-	-	Yes	-	-	Yes	Yes
Power Good Signal (logic high)		-	-	Optional	-	-	Optional	
Operating Temperature		°C	-40°C to +85°C					
Operating Humidity		%	20 - 95% Non condensing					
Storage Temperature		°C	-55°C to +125°C					
Storage Humidity		%	10 - 95% Non condensing					
Cooling		-	Convection, or forced air					
Vibration (non operating)		-	10 - 500 - 10Hz, amplitude 1.524mm, X, Y, Z 6 minutes each					
Shock		-	Half sine wave, 40g, 11ms, 3 times each axis, +X, -X, +Y, -Y, +Z, -Z axis					
Safety Agency Approvals		-	UL/C-UL60950					
Switching Frequency		kHz	300kHz					
Weight (Typ)		g	6.5	7.7	6.5	6.8	7.7	10.7
Size (WxHxD)		-	See outline drawing					
Warranty		-	1 Year					

Note: See Installation Manual for full details, test methods of parameters and application notes
(1) The output noise is measured with a 10µF tantalum cap and 1µF ceramic cap across output.
(2) See Application Notes for Trim equations and tables.

Models

Model	Input Voltage (VDC)	Output Voltage (VDC)	Output Curr. (A)	No Load (mA)	Full Load (mA)	Eff. (%)
PL10SMS-12C	8.3 - 14	0.75	10	50	762	82
	8.3 - 14	1.2	10	50	1163	86
	8.3 - 14	1.5	10	50	1404	89
	8.3 - 14	1.8	10	60	1666	90
	8.3 - 14	2.0	10	60	1832	91
	8.3 - 14	2.5	10	60	2264	92
	8.3 - 14	3.3	10	70	2956	93
	8.3 - 14	5.0	10	70	4385	94
PL10SMS-W12C	6.0 - 14	0.75	10	40	762	82
	6.0 - 14	1.2	10	40	1149	87
	6.0 - 14	1.5	10	50	1404	89
	6.0 - 14	1.8	10	40	1666	90
	6.0 - 14	2.0	10	60	1832	91
	6.0 - 14	2.5	10	65	2264	92
	6.0 - 14	3.3	10	75	2956	93
	6.5 - 14	5.0	10	95	4386	95
PL15SMS-05C	3.0 -5.5	0.75	15	60	3658	82
	3.0 -5.5	1.2	15	60	4286	84
	3.0 -5.5	1.5	15	60	5172	87
	3.0 -5.5	1.8	15	70	6136	88
	3.0 -5.5	2.0	15	70	6742	89
	3.0 -5.5	2.5	15	70	8152	92
	4.5 - 5.5	3.3	15	70	10532	94
PL16SMS-12C	9.0 -14	0.75	16	40	1299	77
	9.0 -14	1.2	16	50	1928	83
	9.0 -14	1.5	16	50	2326	86
	9.0 -14	1.8	16	60	2727	88
	9.0 -14	2.0	16	60	2996	89
	9.0 -14	2.5	16	65	3704	90
	9.0 -14	3.3	16	75	4783	92
	9.0 -14	5.0	16	75	7092	94
PL16SMS-W12C	6.0 - 14	0.75	16	40	1250	80
	6.0 - 14	1.2	16	40	1882	85
	6.0 - 14	1.5	16	50	2273	88
	6.0 - 14	1.8	16	60	2697	89
	6.0 - 14	2.0	16	60	2963	90
	6.0 - 14	2.5	16	65	3663	91
	6.0 - 14	3.3	16	75	4731	93
	6.5 - 14	5.0	16	95	7092	94
PL20SMS-W12C	6.0 - 14	0.75	20	40	1603	78
	6.0 - 14	1.2	20	50	2381	84
	6.0 - 14	1.5	20	50	2874	87
	6.0 - 14	1.8	20	50	3409	88
	6.0 - 14	2.0	20	60	3745	89
	6.0 - 14	2.5	20	65	4630	90
	6.0 - 14	3.3	20	75	5978	92
	6.5 - 14	5.0	20	95	8865	94

Options

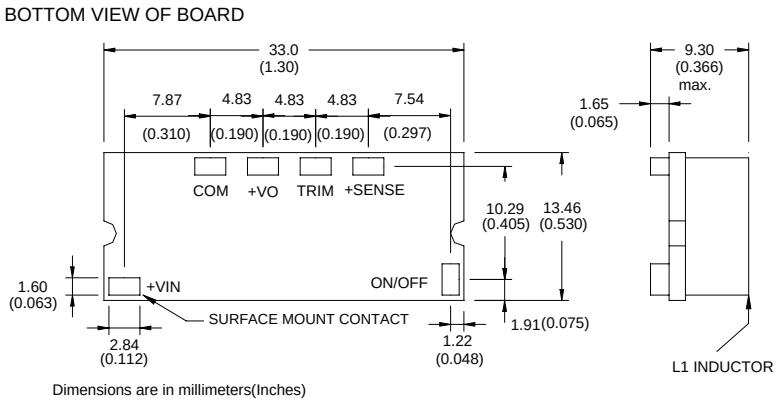
Remote on/Off Option

Blank	On: Vin or open circuit; Off<0.4DC
N	On: open circuit or <0.4VDC; Off: >2.8VDC to Vin

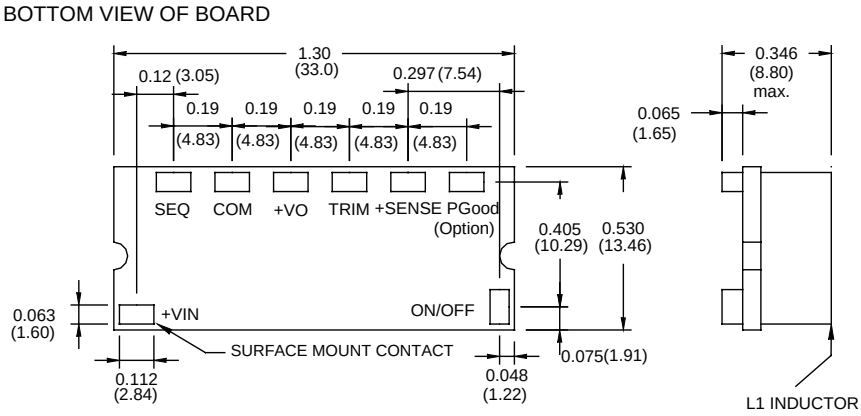
Power Good Option

P	(available on W12C models)

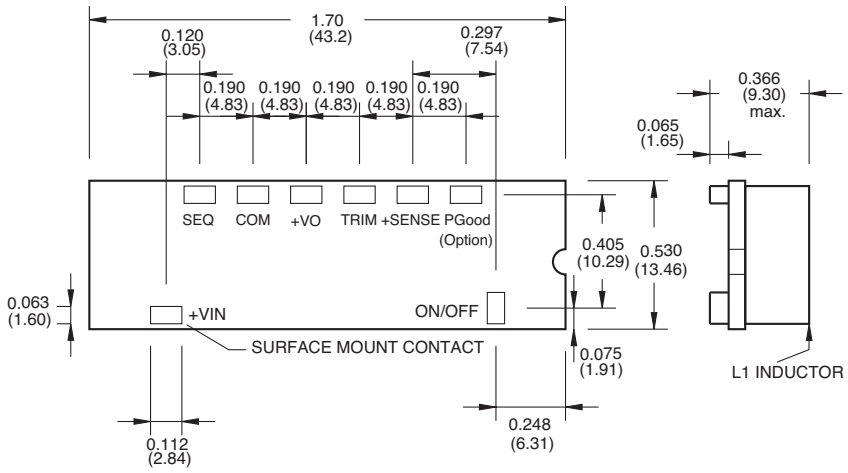
Outline Drawing - PL10SMS-12C, PL15SMS-05C & PL16SMS-12C



Outline Drawing - PL10SMS-W12C & PL16SMS-W12C



Outline Drawing - PL20SMS-W12C



LAMBDA

- Compact Footprint/Low Profile
- 5,12,24 & 48V Inputs
- 3.3 to 30V* Single, ± 12 to 15V Dual Outputs
- Output Voltage Adjustment
- -40 to +85C Operating Temperature
- RoHS Compliant Design
- Through Hole and SMT Design

PSS/PSD Series

Ultra Compact, 1.5W to 12W Single and Dual Isolated DC-DC Converters

Key Market Segments & Applications

Telecommunications
Datacom
Instrumentation

PSS/PSD Features and Benefits

Features	*Benefits*
• Compact	• Less PCB area used
• Input Fuse Protection Built In	• Requires no external components
• Multiple Input Voltage configurations	• Easier system configuration
• Open Frame (no potting)	• Lighter in weight

Specifications

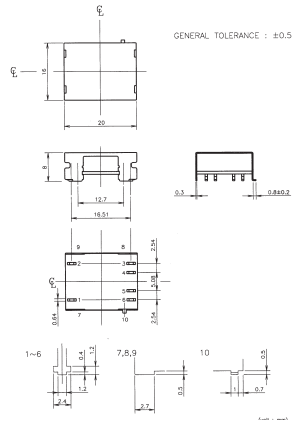
Nominal Output Voltage	V	3.3V	5V	12/15V (24/30V)*
DC Input	V	5V: 4.5-9.0V, 12V: 9-18V, 24V: 18-36V, 48V: 36-76V		
Efficiency	-	73 to 84% model dependant		
Output Voltage Accuracy	%	±5%		
Output Adjustment	V	2.84V-3.67V	4.3V-6V	12V-15V (24-30V)*
Line Regulation	mV	PSS 20mV, PSD 40mV		
Load Regulation	mV	40		
Temperature Coefficient	%	<0.02%/°C		
Preload		No preload required		
Output Ripple	mV	100	100	120
Overcurrent Protection	-	Output current limiting with automatic recovery.		
Overvoltage protection	-	No		
Remote On/Off (1)	-	Logic low (open to shutdown)		
Cooling	-	Convection/Forced Air Cooled		
Operating Temp. Range	-	-40 to 85°C with 1m/s air (full load)		
Storage Temperature	°C	-40°C to 85°C		
Humidity (Non condensing)	-	5 - 95% RH		
Isolation Voltage	-	500VAC 1 min. Input-Output, Input-Chassis		
Isolation Resistance	-	>100M at 25°C and 70%RH, 500VDC Output-Chassis		
Shock	m/s^2	196.1m/s^2		
Vibration (non operating)	-	10-55-10Hz (sweep for 1 min.) 0.825mm constant (Max 147m/s^2) 1 hour X, Y, Z		
Weight	-	PS1R5: 4g, PS3: 5g, PS6: 8g, PS10:14g		
Size (L"x W"x H")	mm	PSS/PSD1R5: 20x16x8; PSS/PSD3: 28x16x8 PSS/PSD6: 28.5x20.5x8, PSS10: 41x26x8.5		
Warranty		5 years		

Note: See Installation Manual for full specifications, test methods of parameters and application notes
* For 24/30V output use PSD models - connect across +Vout & -Vout and leave "common" pin not connected
(1) Not available on PS1R5

Model Selector

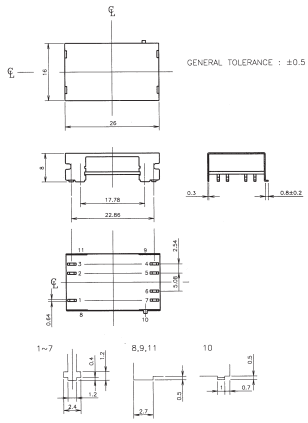
Output Voltage (V)	Output Current (A)	Max Output Power (W)	5V Input	12V Input	24V Input	48V Input
Single Outputs						
3.3	0.4	1.32	PSS1R5-5-3R3	PSS1R5-12-3R3	PSS1R5-24-3R3	PSS1R5-48-3R3
3.3	0.6	1.98	PSS3-5-3R3	PSS3-12-3R3	PSS3-24-3R3	PSS3-48-3R3
3.3	1.2	3.96	PSS6-5-3R3			
3.3	1.5	4.95		PSS6-12-3R3	PSS6-24-3R3	PSS6-48-3R3
3.3	2.0	6.6	PSS10-5-3R3	PSS10-12-3R3		
3.3	2.5	8.25			PSS10-24-3R3	PSS10-48-3R3
5.0	0.3	1.5	PSS1R5-5-5	PSS1R5-12-5	PSSIR5-24-5	PSS1R5-48-5
5.0	0.6	3.0	PSS3-5-5	PSS3-12-5	PSS3-24-5	PSS3-48-5
5.0	1.0	5.0	PSS6-5-5	-	-	-
5.0	1.2	6.0	-	PSS6-12-5	PSS6-24-5	PSS6-48-5
5.0	1.6	8.0	PSS10-5-5			
5.0	2.0	10.0	-	PSS10-12-5	PSS10-24-5	PSS10-48-5
12 (15)	0.125 (0.1)	1.5	PSS1R5-5-12	PSS1R5-12-12	PSS1R5-24-12	PSS1R5-48-12
12 (15)	0.25 (0.2)	3.0	PSS3-5-12	PSS3-12-12	PSS3-24-12	PSS3-48-12
12 (15)	0.5 (0.4)	6.0	PSS6-5-12	PSS6-12-12	PSS6-24-12	PSS6-48-12
12 (15)	0.7 (0.56)	8.4	PSS10-5-12			
12 (15)	1.0 (0.8)	12.0		PSS10-12-12	PSS10-24-12	PSS10-48-12
Dual Outputs						
±12(15)*	±0.065 (0.05)	1.56	PSD1R5-5-1212	PSD1R5-12-1212	PSD1R5-24-1212	PSD1R5-48-1212
±12(15)*	±0.13 (0.1)	3.12	PSD3-5-1212	PSD3-12-1212	PSD3-24-1212	PSD3-48-1212
±12(15)*	±0.25 (0.2)	6.0	PSD6-5-1212	PSD6-12-1212	PSD6-24-1212	PSD6-48-1212
±12(15)*	±0.35 (0.28)	8.4	PSD10-5-1212			
±12(15)*	±0.5 (0.4)	12		PSD10-12-1212	PSD10-24-1212	PSD10-48-1212

PSS1R5/S Outline Drawing



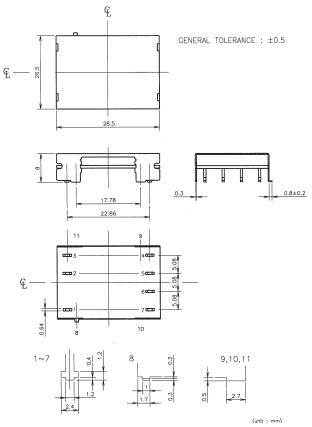
TERMINAL ASSIGNMENTS	PSS	PSD
1	+Vin	+Vin
2	-Vin	-Vin
3	NC	-Vout
4	-Vout	COM
5	TRM	TRM
6	+Vout	+Vout

PSS3/S Outline Drawing



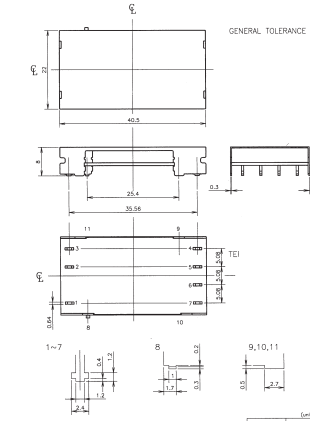
TERMINAL ASSIGNMENTS	PSS	PSD
1	+Vin	+Vin
2	CNT	CNT
3	-Vin	-Vin
4	NC	-Vout
5	-Vout	COM
6	TRM	TRM
7	+Vout	+Vout

PSS6/S Outline Drawing



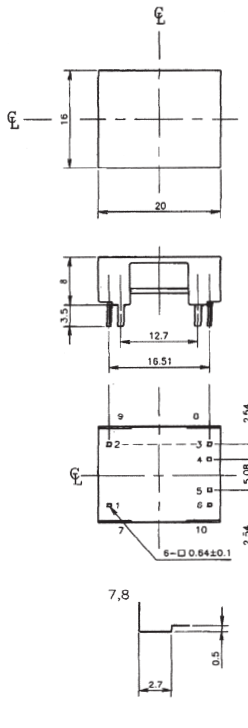
TERMINAL ASSIGNMENTS	PSS	PSD
1	+Vin	+Vin
2	CNT	CNT
3	-Vin	-Vin
4	NC	-Vout
5	-Vout	COM
6	TRM	TRM
7	+Vout	+Vout

PSS10/S Outline Drawing



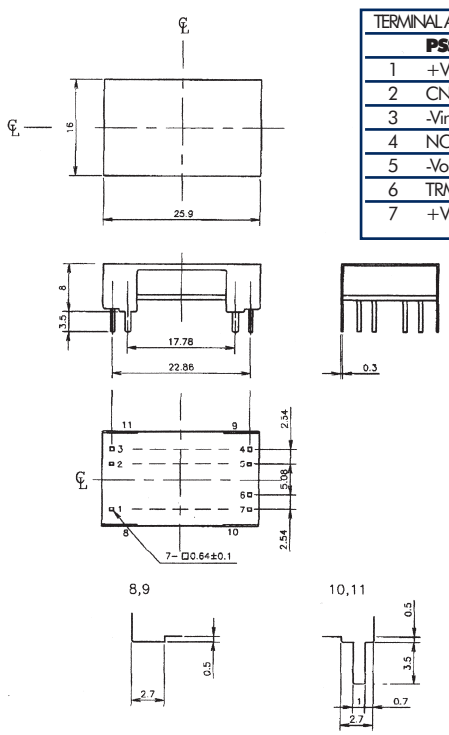
TERMINAL ASSIGNMENTS	PSS	PSD
1	+Vin	+Vin
2	CNT	CNT
3	-Vin	-Vin
4	NC	-Vout
5	-Vout	COM
6	TRM	TRM
7	+Vout	+Vout

PSS1R5 Outline Drawing



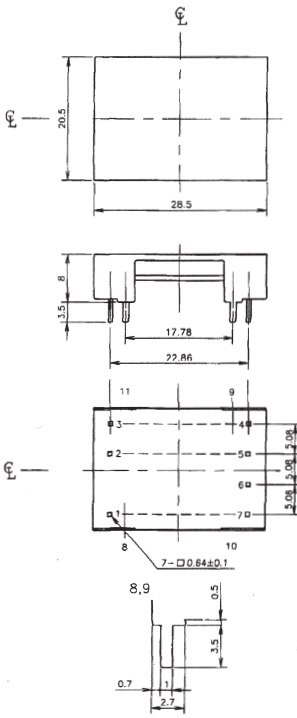
TERMINAL ASSIGNMENTS	PSS	PSD
1	+Vin	+Vin
2	-Vin	-Vin
3	NC	-Vout
4	-Vout	COM
5	TRM	TRM
6	+Vout	+Vout

PSS3 Outline Drawing



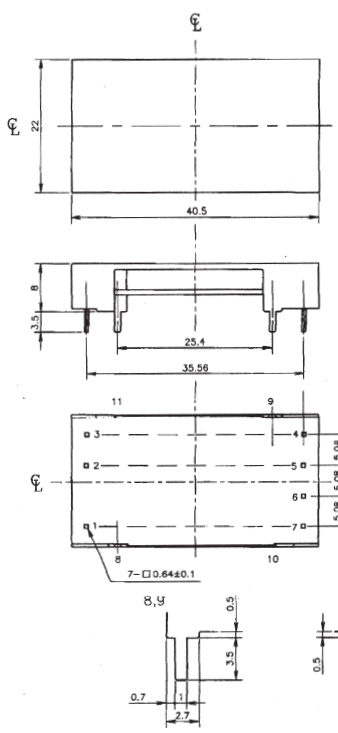
TERMINAL ASSIGNMENTS	PSS	PSD
1	+Vin	+Vin
2	CNT	CNT
3	-Vin	-Vin
4	NC	-Vout
5	-Vout	COM
6	TRM	TRM
7	+Vout	+Vout

PSS6 Outline Drawing



TERMINAL ASSIGNMENTS	PSS	PSD
1	+Vin	+Vin
2	CNT	CNT
3	-Vin	-Vin
4	NC	-Vout
5	-Vout	COM
6	TRM	TRM
7	+Vout	+Vout

PSS10 Outline Drawing



TERMINAL ASSIGNMENTS	PSS	PSD
1	+Vin	+Vin
2	CNT	CNT
3	-Vin	-Vin
4	NC	-Vout
5	-Vout	COM
6	TRM	TRM
7	+Vout	+Vout

Options

Suffix	Description
Blank	Through hole mounting
/S	Surface Mount

Full size drawings and more information available at www.lambda-europe.com/pss

LAMBDA

- Industry Standard 24 Pin Dip Package
- Five Sided Shielding
- Wide Range 4:1 Input
- 3.3, 5, 12, 15 Volt Outputs
- Pin & Surface Mount Models

PXC05 Series

Single and Dual Output 5W DC-DC Converters

Key Market Segments & Applications

Telecom
Datacom
Factory Automation & Process Control

PXC05 Features and Benefits

Features	*Benefits*
• UL, C-UL, TUV, CE approvals	• Easier system approvals
• Wide range input	• Less parts to inventory
• Five sided shielding	• Reduced radiated noise

Specifications

ITEMS	PXC05
Max Output Power	5W
Voltage Accuracy	+/-2%
Voltage Adjustment	None
Minimum Load (1)	10%
Line Regulation	+/-0.2%
Load Regulation (25% to 100%)	Single Output: +/-0.5%,Dual Output: +/-1%
Cross Regulation (25% to 100%)	Dual +/-5%
Ripple and Noise	50mVp-p (20MHz bandwidth)
Start up time	600ms
Temperature Coefficient	<+/-0.02%/°C
Operating Temperature	See derating curves
Maximum Case Temperature	100°C
Storage Temperature	-55 to 105°C
Thermal Shock	MIL-STD-810D
Relative Humidity (non condensing)	5 to 95%
Transient Response	200us recovery (25% step load change)
Overvoltage Protection	None
Overcurrent Protection	Typically at 170%, self recovery
Input Surge Voltage (Max for 100ms)	12V input: 36V, 24V input: 50V, 48V input: 100V
Reflected input ripple (peak to peak) (2)	20mA
Isolation Voltage	1600VDC min.
Isolation Resistance	10^9 Ohms min.
Isolation Capacitance (max)	300pF
Typical Switching Frequency (Fixed)	300kHz
MTBF (BELLCORE TR-NWT-000332)	3,165,000 hours
Vibration	10 - 55Hz, 2G, 30 minutes each X, Y, Z axis
Conducted and Radiated Emissions	EN55022 Level A
Immunity	EN61000-4-2, -3, -4, -5, -6 Pref Criteria 2
Safety Agency Approval	IEC60950-1, UL/CSA60950-1, EN60950-1, CE Mark
Size (L x W x H)	32 x 21 x 11 mm
Weight	DIP 16g SMD 18g
Warranty	One Year

Notes: (1) To meet regulation & noise specifications. Operation at zero load will not damage the device
(2) 12uH source impedance in series with + input
(3) SMD package: Add suffix "/SMD" to model number.

Output Ratings

Model	OutputVoltage (V)	Output Current (mA)	Output Power (W)	Input Voltage (V)	Nominal Inpu tCurrent (mA)	Efficiency (%)	Max Load Capacity (uF)
Single Outputs							
PXC05-24WS3P3	3.3	1000	3.3	9 - 36VDC	191	76	2200
PXC05-48WS3P3	3.3	1000	3.3	18 - 75VDC	100	73	2200
PXC05-24WS05	5	1000	5	9 - 36VDC	285	77	1000
PXC05-48WS05	5	1000	5	18 - 75VDC	145	76	1000
PXC05-24WS12	12	470	5.64	9 - 36VDC	309	80	220
PXC05-48WS12	12	470	5.64	18 - 75VDC	155	80	220
PXC05-24WS15	15	400	6	9 - 36VDC	329	80	150
PXC05-48WS15	15	400	6	18 - 75VDC	167	79	150
Dual Outputs							
PXC05-24WD05	+/-5	+/-500	5	9 - 36VDC	282	78	+/-680
PXC05-48WD05	+/-5	+/-500	5	18 - 75VDC	145	76	+/-680
PXC05-24WD12	+/-12	+/-230	5.52	9 - 36VDC	295	82	+/-100
PXC05-48WD12	+/-12	+/-230	5.52	18 - 75VDC	151	80	+/-100
PXC05-24WD15	+/-15	+/-190	5.7	9 - 36VDC	313	80	+/-68
PXC05-48WD15	+/-15	+/-190	5.7	18 - 75VDC	159	79	+/-68

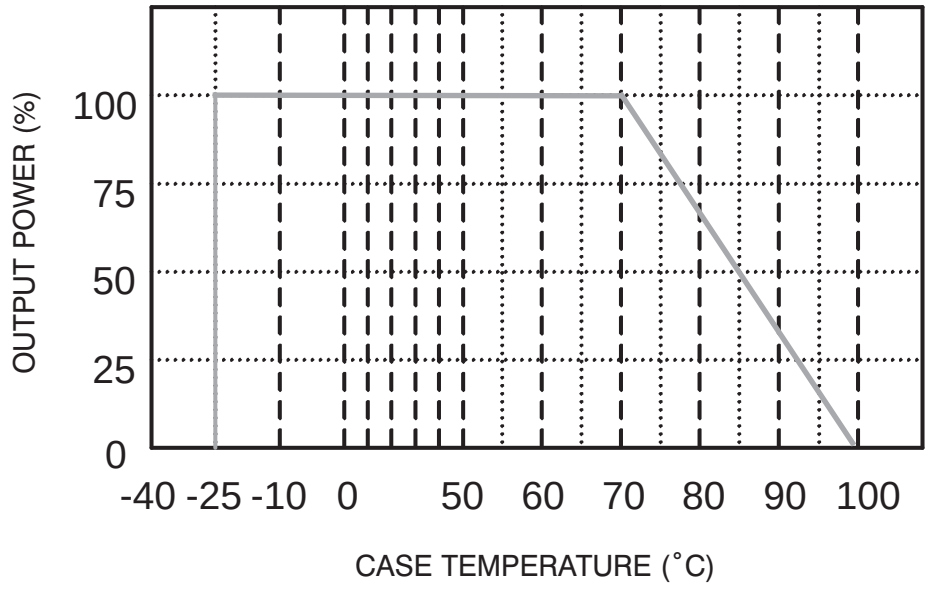
DIP Pin Connection

Pin #	Function	
	Single	Dual
2	- Input	- Input
3	- Input	- Input
9	NC	Common
10	no pin	no pin
11	NC	- Output
23	+ Input	+ Input
22	+ Input	+ Input
16	- Output	Common
15	no pin	no pin
14	+ Output	+ Output

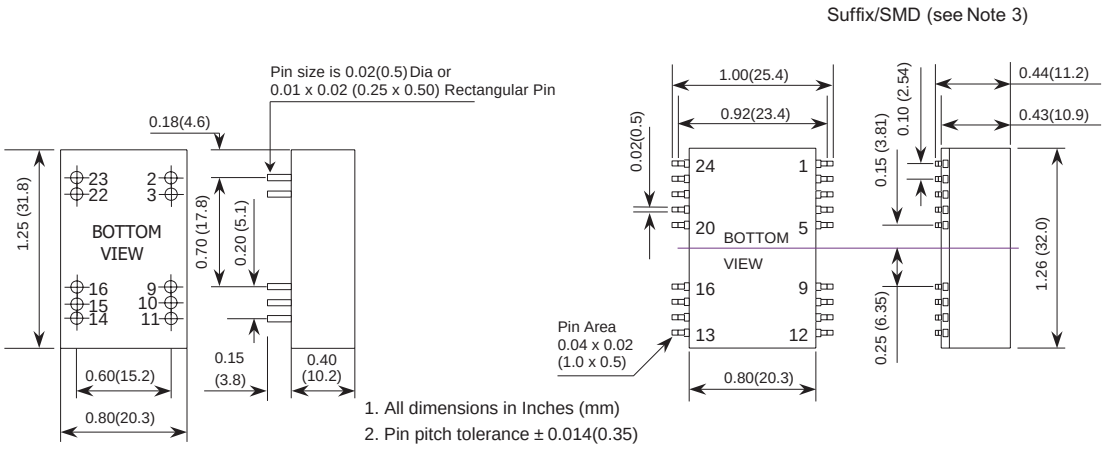
SMD Pin Connection

Pin #	Function	
	Single	Dual
2	- Input	- Input
3	- Input	- Input
9	NC	Common
10	NC	NC
11	NC	- Output
23	+ Input	+ Input
22	+ Input	+ Input
16	- Output	Common
15	NC	NC
14	+ Output	+ Output
Others	NC	NC

Derating Curve



PXC05 Outline Drawing



LAMBDA

- Industry Standard 2" x 1" Footprint
- Six Sided Shielding
- Agency Approved
- 12V, 24V and 48V Inputs

Key Market Segments & Applications

Telecom
Datacom
Point of Load

PXD Series

Single and Dual Output 10 to 20W DC-DC Converters

PXD Features and Benefits

Features	*Benefits*
• UL, CSA, EN, CE Approvals	• Easier System Approvals
• Wide Range Input	• Less Parts to Inventory
• Six Sided Shielding	• Reduced Radiated Noise

Specifications

ITEMS		PXD10	PXD15	PXD20
Max Output Power		10W	15W	20W
Voltage Accuracy		±2%	±1%	±1%
Voltage Adjustment (Single O/P Only)		None	None	±10%
Minimum Load, each output	(1)	10%	10%	Single 0%; Dual 10%
Line Regulation		±1%	±1%	±0.2%
Load Regulation (10% to 100%)		Single Output: ±1% Dual Output: ±2%	Single Output: ±1% Dual Output: ±2%	±0.5%
Cross Regulation (25% to 100%)		±5%		
Ripple and Noise		Single 50mV, Dual 75mV		Single 75mV, Dual 100mV
Start up time		20ms		10ms
Remote on/off	(3)	Positive Logic: ON: Open or 3.5-12V, OFF Short or <1.2V Negative Logic: ON: Short or <1.2V, OFF: Open or 3.5-12V		
Temperature Coefficient		<±0.02%/°C		
Operating Temperature		-40°C to +85°C (model dependent - see derating curves)		
Maximum Case Temperature		100°C		
Storage Temperature		-55 to 105°C		
Thermal Shock		MIL-STD-810D		
Relative Humidity		5 to 95% (non condensing)		
Transient Response (25% step load chg.)		500us recovery	500us recovery	300us recovery
Overvoltage Protection (Zener clamp)		1.5-3.3V: 3.9V, 5V: 6.2V, 12V: 15V, 15V: 18V		
Overcurrent & Short Circuit Protection		Typically at 150%, hiccup with self recovery		
Input Surge Voltage (Max. for 100ms)		12V input: 36V, 24V input: 50V, 48V input: 100V		
Reflected input ripple (peak to peak)	(2)	30mA	20mA	20mA
Isolation Voltage		1600VDC minimum		
Isolation Resistance		109 Ohms minimum		
Isolation Capacitance (max)		300pF		1000pF
Typical Switching Frequency (Fixed)		300kHz	Single: 500kHz Dual: 300kHz	500kHz
MTBF (BELLCORE TR-NWT-000332)		1,976,000 hours	2,041,000 hours	1,791,000 hours
Vibration		10 - 55Hz, 2G, 30 minutes each X, Y, Z axis		
Conducted and Radiated Emissions		EN55022 Level A		
Immunity		EN61000-4-2, -3, -4, -5, -6 Pref Criteria 2		
Safety Agency Approval		IEC606950, UL1950, EN60950, CE Mark (48V input only)		
Size (L x W x H) mm		50.8 x 25.4 x 10.2		
Weight		27g		
Warranty		One Year		

Notes:
(1) To meet regulation & noise specifications. Operation at zero load will not damage the device
(2) 12uH source impedance in series with + input
(3) Positive logic standard on 20W (see options table). Input current 2.5mA

* See website for detailed specifications

Model Selector

Output Volt (V)	Output Curr (A)	Output Power (W)	Input Volt (V)	Model	Eff.(%)
3.3	2.0	6.6	9 - 18VDC	PXD10-12S3P3	80
3.3	2.0	6.6	18 - 36VDC	PXD10-24S3P3	80
3.3	2.0	6.6	36 - 75VDC	PXD10-48S3P3	79
3.3	5.0	16.5	9 - 18VDC	PXD20-12S3P3	84
3.3	5.0	16.5	18 - 36VDC	PXD20-24S3P3	86
3.3	5.0	16.5	36 - 75VDC	PXD20-48S3P3	87
5	2.0	10	9 - 36VDC	PXD10-24WS05	80
5	2.0	10	18 - 75VDC	PXD10-48WS05	80
5	4.0	20	9 - 18VDC	PXD20-12S05	87
5	4.0	20	18 - 36VDC	PXD20-24S05	89
5	4.0	20	36 - 75VDC	PXD20-48S05	89
12	0.83	10	9 - 36VDC	PXD10-24WS12	82
12	0.83	10	18 - 75VDC	PXD10-48WS12	84
12	1.67	20	9 - 18VDC	PXD20-12S12	85
12	1.67	20	18 - 36VDC	PXD20-24S12	87
12	1.67	20	36 - 75VDC	PXD20-48S12	88
15	0.67	10	9 - 36VDC	PXD10-24WS15	80
15	0.67	10	18 - 75VDC	PXD10-48WS15	84
15	1.33	20	9 - 18VDC	PXD20-12S15	85
15	1.33	20	18 - 36VDC	PXD20-24S15	87
15	1.33	20	36 - 75VDC	PXD20-48S15	87
Dual Outputs					
±5	±1.5	15	9 - 18VDC	PXD15-12D05	83
±5	±1.5	15	18 - 36VDC	PXD15-24D05	84
±5	±1.5	15	36 - 75VDC	PXD15-48D05	85
±12	±0.416	10	9 - 36VDC	PXD10-24WD12	80
±12	±0.416	10	18 - 75VDC	PXD10-48WD12	78
±12	±0.833	20	9 - 18VDC	PXD20-12D12	86
±12	±0.833	20	18 - 36VDC	PXD20-24D12	87
±12	±0.833	20	36 - 75VDC	PXD20-48D12	88
±15	±0.333	10	9 - 36VDC	PXD10-24WD15	80
±15	±0.333	10	18 - 75VDC	PXD10-48WD15	81
±15	±0.667	20	9 - 18VDC	PXD20-12D15	86
±15	±0.667	20	18 - 36VDC	PXD20-24D15	87
±15	±0.667	20	36 - 75VDC	PXD20-48D15	87

* OTHER MODELS AVAILABLE ON REQUEST *

Pinout

PIN #	Function	
	Single Output	Dual Output
1	+ Input	+ Input
2	- Input	- Input
3	+ Output	+ Output
4	Trim (20W only)	Common
5	- Output	- Output
6	Remote On/Off	Remote On/Off

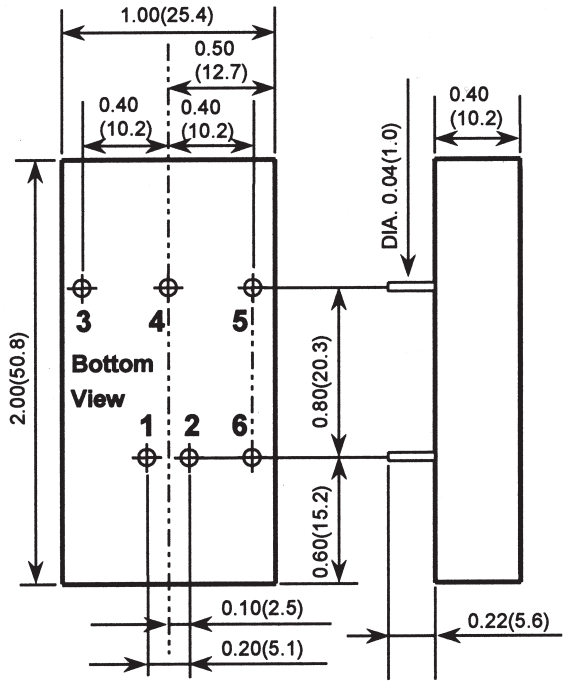
Remote On/Off Option

Suffix	Function
-P*	Positive Logic
-N	Negative Logic

Example: PXD1548S12-N
* Included in PXD20 models

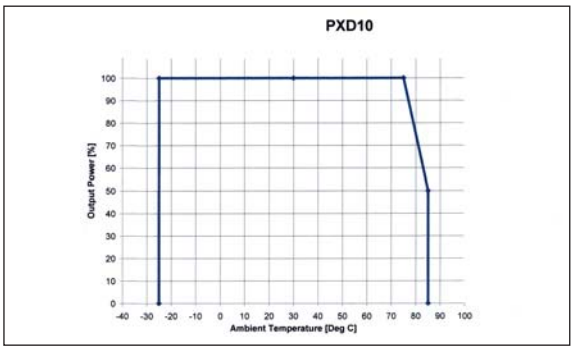
Notes:
Remote On/Off is optional on PXD-10 and PXD-15 (add suffix -P or -N if required)
Remote On/Off positive Logic is standard on PXD-20 (add suffix -N if negative logic required)

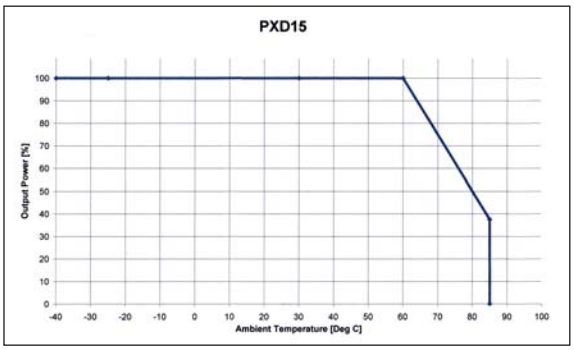
Outline Drawing

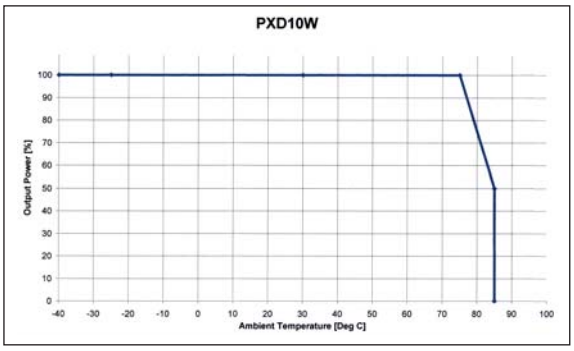


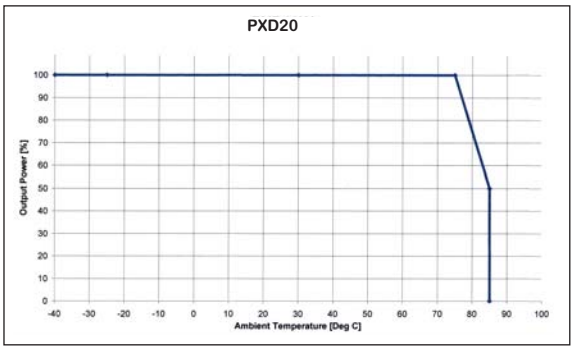
1. All dimensions in Inches (mm)
2. Pin Pitch tolerance ±0.014(0.35)

Derating Curves









LAMBDA

- Industry Standard 2" x 1.6" Footprint
- Six Sided Shielding
- Agency Approved
- 12V, 24V and 48V Inputs

PXE Series

Single and Dual 20W to 30W DC-DC Converters

Key Market Segments & Applications

Telecom
Datacom
Point of Load

PXE Features and Benefits

Features	*Benefits*
• UL, CSA, EN, CE Approvals	• Easier System Approvals
• Wide Range Input	• Less Parts to Inventory
• Six Sided Shielding	• Reduced Radiated Noise

Specifications

ITEMS		PXE20	PXE30
Max Output Power		20W	30W
Voltage Accuracy		±2%	±1%
Voltage Adjustment (Single Output Only)		±10%	
Minimum Load, each output	(1)	10%	None
Line Regulation		±0.2% for single, ±0.5% for dual	
Load Regulation (25% to 100%)		Single ±0.5%, Dual ±3%	Single ±0.5%, Dual ±1%
Cross Regulation (25% to 100%)		Dual ±5%	
Ripple and Noise (P-P)		Single: 75mV; Dual: 100mV	
Start up time		20ms typ.	25ms typ.
Remote on/off	(3)	Positive Logic: ON: Open or 3.5-12V, OFF Short or <1.2V	
Temperature Coefficient		<±0.02%/°C	
Operating Temperature		-40°C to +85°C	
Maximum Case Temperature		100°C	
Storage Temperature		-55 to 105°C	
Thermal Shock		MIL-STD-810D	
Relative Humidity (non condensing)		5 to 95%	
Transient Response (25% step load change)		500us recovery	300us recovery
Overvoltage Protection (Zener clamp)		3.3V: 3.9V, 5V: 6.2V, 12V: 15V, 15V: 18V	
Overcurrent and Short Circuit Protection		Typically at 150%, hiccup with self recovery	
Input Surge Voltage (Maximum for 100ms)		12V input: 36V, 24V input: 50V, 48V input: 100V	
Reflected input ripple (peak to peak)	(2)	25mA	30mA
Isolation Voltage		1600VDC minimum (Input-Output, Input-Case)	
Isolation Resistance		10^9 Ohms minimum	
Isolation Capacitance (max)		300pF	1000pF
Typical Switching Frequency (Fixed)		300kHz	
MTBF (BELLCORE TR-NWT-000332)		1,976,000 hours	1,535,000 hours
Vibration		10 - 55Hz, 2G, 30 minutes each X, Y, Z axis	
Conducted and Radiated Emissions		EN55022 Level A	
Immunity		EN61000-4-2, -3, -4, -5, -6 Pref Criteria 2	
Safety Agency Approval		IEC606950, UL1950, EN60950, CE Mark (48V input only)	
Size (L x W x H) mm		50.8 x 40.6 x 10.2	
Weight		48g	
Warranty		One Year	

Notes: (1) To meet regulation & noise specifications. Operation at zero load will not damage the device (2) 12uH source impedance in series with + input
(3) Max sink current 20mA (PXE20), 2.5mA (PXE30); The on/off pin is referenced to the negative input

Model Selector

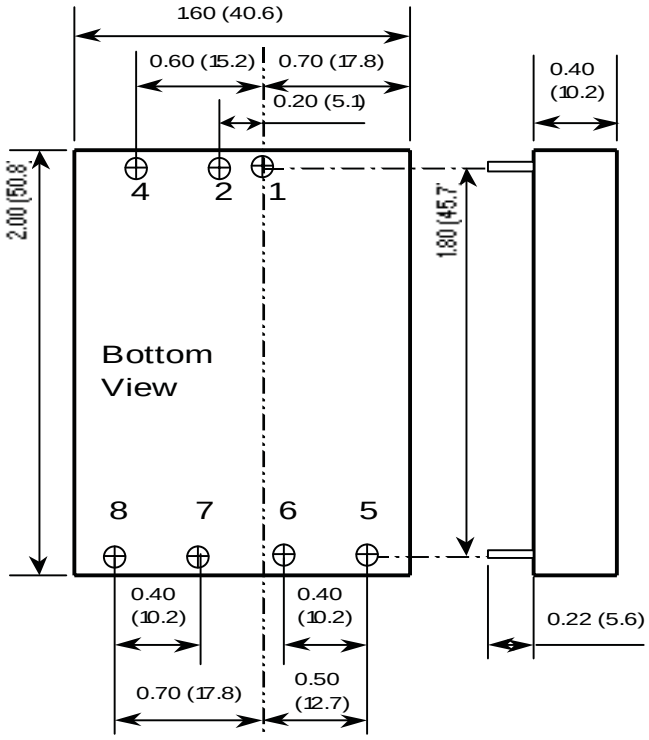
Output Volt (V)	Output Curr (A)	Output Power (W)	Input Volt (VDC)	Model	Eff.(%)
Single Outputs					
1.5	8.0	30	10 - 40	PXE30-24WS1P5	80
1.5	8.0	30	18 - 75	PXE30-48WS1P5	80
1.8	8.0	30	10 - 40	PXE30-24WS1P8	83
1.8	8.0	30	18 - 75	PXE30-48WS1P8	83
2.5	8.0	30	10 - 40	PXE30-24WS2P5	85
2.5	8.0	30	18 - 75	PXE30-48WS2P5	86
3.3	6.0	18	9 - 18	PXE30-12S3P3	85
3.3	6.0	18	18 - 36	PXE30-24S3P3	88
3.3	6.0	18	36 - 75	PXE30-48S3P3	87
3.3	6.0	30	10 - 40	PXE30-24WS2P3	87
3.3	6.0	30	18 - 75	PXE30-48WS3P3	87
3.3	6.0	30	10 - 40	PXE30-24WS2P3	87
5	4.0	20	9 - 36	PXE20-24WS05	79
5	4.0	20	18 - 75	PXE20-48WS05	80
5	6.0	30	9 - 18	PXE30-12S05	87
5	6.0	30	18 - 36	PXE30-24S05	88
5	6.0	30	36 - 75	PXE30-48S05	89
5	6.0	30	10 - 40	PXE30-24WS05	87
5	6.0	30	18 - 75	PXE30-48WS05	88
12	1.67	20	9 - 36	PXE20-24WS12	81
12	1.67	20	18 - 75	PXE20-48WS12	81
12	2.5	30	9 - 18	PXE30-12S12	88
12	2.5	30	18 - 36	PXE30-24S12	89
12	2.5	30	36 - 75	PXE30-48S12	90
12	2.5	30	10 - 40	PXE30-24WS12	87
12	2.5	30	18 - 75	PXE30-48WS12	87
15	1.33	20	9 - 36	PXE20-24WS15	81
15	1.33	20	18 - 75	PXE20-48WS15	81
15	2.0	30	9 - 18	PXE30-12S15	88
15	2.0	30	18 - 36	PXE30-24S15	89
15	2.0	30	36 - 75	PXE30-48S15	90
15	2.0	30	10 - 40	PXE30-24WS15	88
15	2.0	30	18 - 75	PXE30-48WS15	88
Dual Outputs					
±5	±2.0	20	9 - 36	PXE20-24WD05	79
±5	±2.0	20	18 - 75	PXE20-48WD05	79
±12	±0.833	20	9 - 36	PXE20-24WD12	81
±12	±0.833	20	18 - 75	PXE20-48WD12	83
±12	±1.25	30	9 - 18	PXE30-12D12	87
±12	±1.25	30	18 - 36	PXE30-24D12	88
±12	±1.25	30	36 - 75	PXE30-48D12	88
±12	±1.25	30	10 - 40	PXE30-24WD12	84
±12	±1.25	30	18 - 75	PXE30-48WD12	85
±15	±0.666	20	9 - 36	PXE20-24WD15	82
±15	±0.666	20	18 - 75	PXE20-48WD15	84
±15	±1.0	30	9 - 18	PXE30-12D15	87
±15	±1.0	30	18 - 36	PXE30-24D15	88
±15	±1.0	30	36 - 75	PXE30-48D15	88
±15	±1.0	30	10 - 40	PXE30-24WD15	85
±15	±1.0	30	18 - 75	PXE30-48WD15	86

Pinout

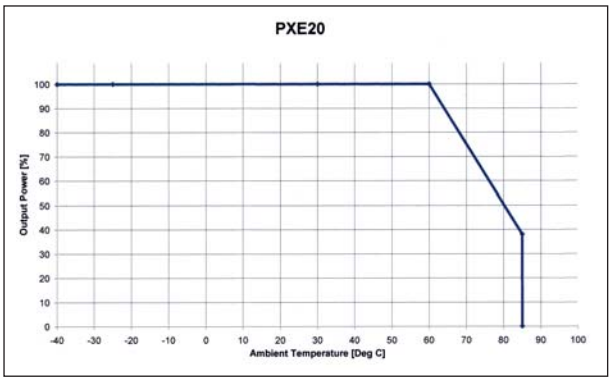
PIN #	Function	
	Single Output	Dual Output
1	+ Input	+ Input
2	- Input	- Input
4	Remote on/off	Remote on/off
5	No Pin	+ Output
6	+ Output	Common
7	- Output	- Output
8	Trim	Trim

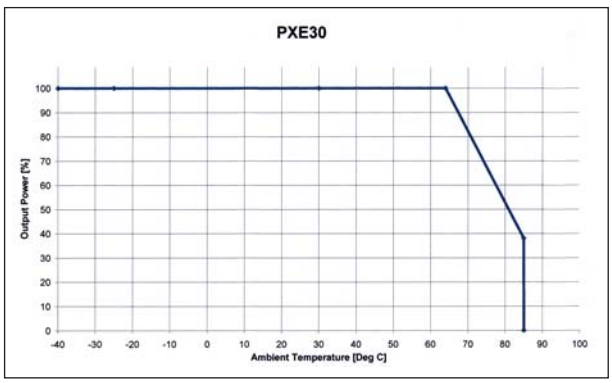
Outline Drawing

1. All dimensions in inches: (mm)
2. Pin pitch tolerance: ±0.014 (0.35)
3. Pin diameter: 1mm (0.04")



Derating Curves





LAMBDA

- Industry Standard 2” x 2” Footprint
- Six Sided Shielding
- Agency Approved
- 12, 24 and 48V Inputs
- 4:1 Wide Range Input Models

PXF Series

Single, Dual, Triple Output 40W DC-DC Converters

Key Market Segments & Applications

Telecom
Datacom
Point of Load

PXF Features and Benefits

Features	*Benefits*
• UL, CSA, EN, CE Approvals	• Easier System Approvals
• Wide Range Input	• Less Parts to Inventory
• Six Sided Shielding	• Reduced Radiated Noise

Specifications

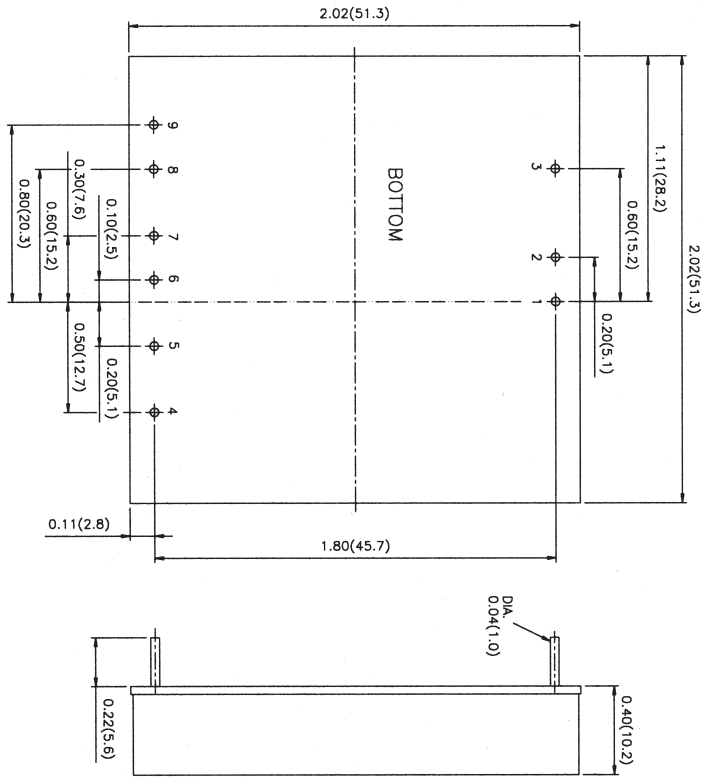
ITEMS	
Max Output Power	40W
Voltage Accuracy (Full Load, Nom. Vin)	Single, / Dual ±1%, Triple Main ±1%, Triple Auxiliary ±5%
Voltage Adjustment (Single Output Only) (1)	±10%
Minimum Load, each output (2)	Single Output 0%, Dual and Triple 10% of full load
Line Regulation	Single / Dual ±0.5%, Triple (main) ±1%, Triple (auxiliary) ±5%
Load Regulation (10% to 100%) (3)	Single ±0.5%, Dual ±1%, Triple (main) ±2%, Triple (auxiliary) ±5%
Cross Regulation (25% to 100%) (4)	Triple (main) ±1%, Dual/Triple (auxiliary) ±5%
Start up time	25ms typ.
Remote on/off (referenced to negative input)	Positive Logic: ON: Open or 3.0-12V, OFF Short or <1.2V
Temperature Coefficient	<±0.02%/°C
Operating Temperature	-40°C to +85°C
Maximum Case Temperature	100°C
Storage Temperature	-55 to 105°C
Thermal Shock	MIL-STD-810D
Relative Humidity (non condensing)	5 to 95%
Transient Response (25% step load change)	300us recovery
Overvoltage Protection (Zener clamp)	3.3V: 3.9V, 5V: 6.2V, 12V: 15V, 15V: 18V
Overcurrent and Short Circuit Protection	Typically at 150%, hiccup with self recovery
Input Surge Voltage (Maximum for 100ms)	12V input: 36V, 24V input: 50V, 48V input: 100V
Reflected input ripple (peak to peak) (6)	40mA
Isolation Voltage	1600VDC minimum
Isolation Resistance	10^9 Ohms minimum
Isolation Capacitance (max)	1000pF
Switching Frequency (Fixed)	300kHz (typ.)
MTBF (BELLCORE TR-NWT-000332)	1,398,000 hours
Vibration	10 - 55Hz, 2G, 30 minutes each X, Y, Z axis
Conducted and Radiated Emissions	EN55022 Level A
Immunity	EN61000-4-2, -3, -4, -5, -6 Pref Criteria 2
Safety Agency Approval	IEC606950, UL1950, EN60950, CE Mark (48V input only)
Size (L x W x H) mm	51.3 x 51.3 x 10.2
Weight	60g
Warranty	One Year

(1) Maximum output deviation is 10% inclusive of remote sense and trim. If remote sense is not being used, the +Sense and - Sense should be connected to their corresponding outputs; + output, -output.
(2) Dual and Triple output models require a minimum load of 10% on the output to maintain specified regulation. No load operation will not damage the device.
(3) Load regulation for triple output: Main output:10-100%, with 10-100% balanced load on auxiliaries. Auxiliary outputs: 10% to 100% balanced on all outputs.
(4) Cross regulation for dual output: asymmetrical load 25% / 100% full load. Cross regulation for triple output: Main output 100% load, auxiliary 100%, other auxiliary 25% to 100%. Auxiliary outputs: main output 100% load, auxiliary 100%, other auxiliary 25% to 100% or main output 25%, auxiliary 25%, other auxiliary 25% to 100%.
(5) An external filter capacitor is required for normal operation. The capacitor should be capable of handling a 1A ripple current for 48V and 24V models.
(6) Simulated Source impedence of 12uH placed in series with + input.

Model Selector

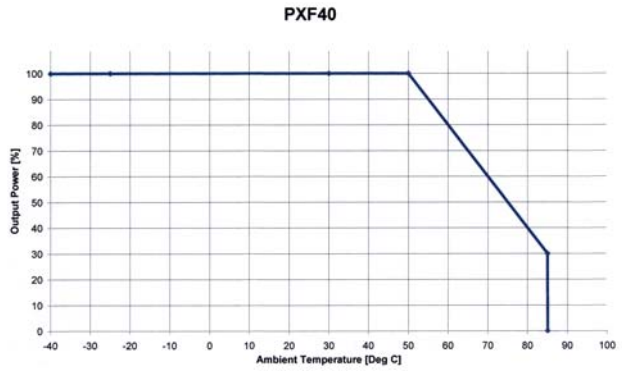
Output Volt(V)	Output Curr(A)	Input Volt(VDC)	Model	Ripple/Noise (mV)	Eff.(%)	Max Load Cap(uF)
Single Outputs						
3	8	9 - 18	PXF40-12S3P3	50	84	21000
3	8	18 - 36	PXF40-24S3P3	50	87	21000
3	8	36 - 75	PXF40-48S3P3	50	88	21000
5	8	9 - 18	PXF40-12S05	50	86	13600
5	8	18 - 36	PXF40-24S05	50	89	13600
5	8	36 - 75	PXF40-48S05	50	90	13600
12	3.333	9 - 18	PXF40-12S12	75	86	2360
12	3.333	18 - 36	PXF40-24S12	75	88	2360
12	3.333	36 - 75	PXF40-48S12	75	89	2360
15	2.666	9 - 18	PXF40-12S15	75	87	1510
15	2.666	18 - 36	PXF40-24S15	75	89	1510
15	2.666	36 - 75	PXF40-48S15	75	89	1510
3.3	10	9 - 36	PXF40-24WS3P3	50	86	25750
5	8	9 - 36	PXF40-24WS05	50	88	13600
12	3.333	9 - 36	PXF40-24SW12	75	88	2360
15	2.666	9 - 36	PXF40-24WS15	75	88	1510
3.3	10	18 - 75	PXF40-48SW3P3	50	86	25750
5	8	18 - 75	PXF40-48SW05	50	88	13600
12	3.333	18 - 75	PXF40-48WS12	75	88	2360
15	2.666	18 - 75	PXF40-48WS15	75	88	1510
Dual Outputs						
±12	±1.80	9 - 18	PXF40-12D12	120	85	±1200
±12	±1.80	18 - 36	PXF40-24D12	120	87	±1200
±12	±1.80	36 - 75	PXF40-48D12	120	87	±1200
±15	±1.40	9 - 18	PXF40-12D15	150	85	±750
±15	±1.40	18 - 36	PXF40-24D15	150	87	±750
±15	±1.40	36 - 75	PXF40-48D15	150	87	±750
3.3,5	4.0,4.0	9-18	PXF40-12D3305	100/100	85	11000/6800
3.3,5	4.0,4.0	18-36	PXF40-24D3305	100/100	86	11000/6800
3.3,5	4.0,4.0	36-75	PXF40-48D3305	100/100	88	11000/6800
±12	±1.667	9 - 36	PXF40-24WD12	120	88	±1200
±15	±1.333	9 - 36	PXF40-24WD15	150	88	±750
±12	±1.667	18 - 75	PXF40-48WD12	120	88	±1200
±15	±1.333	18 - 75	PXF40-48WD15	150	88	±750
Triple Outputs						
3.3,±12	6.0,±0.40	9 - 18	PXF40-12T3312	50/75	83	13000,±330
3.3,±12	6.0,±0.40	18 - 36	PXF40-24T3312	50/75	85	13000,±330
3.3,±12	6.0,±0.40	36 - 75	PXF40-48T3312	50/75	86	13000,±330
5,±12	6.0,±0.40	9 - 18	PXF40-12T0512	50/75	85	6800,±330
5,±12	6.0,±0.40	18 - 36	PXF40-24T0512	50/75	87	6800,±330
5,±12	6.0,±0.40	36 - 75	PXF40-48T0512	50/75	88	6800,±330
5,±15	6.0,±0.30	18-36	PXF40-24T0515	50/75	87	6800,±110
5,±15	6.0,±0.30	36-79	PXF40-48T0515	50/75	88	6800,±110
3.3,±15	6.0,±0.30	18-36	PXF40-24T3315	50/75	85	13000,±110
3.3,±15	6.0,±0.30	36-75	PXF40-48T3315	50/75	86	13000,±110
3.3,±15	6.0,±0.30	9-18	PXF40-12T3315	50/75	84	13000,±110
5,±15	6.0,±0.30	9-18	PXF40-12T0515	50/75	86	6800,±110

Outline Drawing



ALL DIMENSIONS IN INCHES(mm)
PIN PITCH TOLERANCE ±0.014(0.35)
Tolerance : x.xx±0.02(x.x±0.5)
x.xxx±0.01(x.xx±0.25)

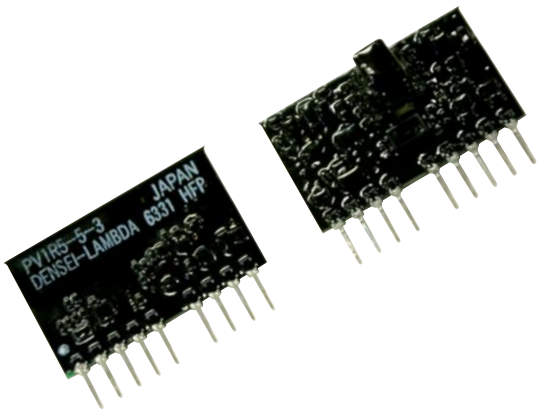
Derating Curves



Pinout

PIN#	Single O/P	Function Dual O/P	Triple O/P
1	+ Input	+ Input	+ Input
2	- Input	- Input	- Input
3	Remote on/off	Remote on/off	Remote on/off
4	NC	NC	+ Aux
5	- Sense (Note 1)	+ VO	Common
6	+ Sense (Note 1)	Common	-Aux
7	+ Output	Common	+ Output
8	- Output	- VO	- Output (Com)
9	Trim	Trim	N/C

LAMBDA



- SIP Style Footprint
- 5V, 12V, 24V, & 48V Inputs
- Single and Dual Outputs
- Adjustable Output Voltages
- Input - Output Isolation

PV Series

Single Inline Package DC-DC Converters (1-3 Watts)

Key Market Segments & Applications

Telecom & Datacom
Test and Measurement
Point of Load

PV Features and Benefits

Features	*Benefits*
• Single Inline Package (SIP)	• Uses Less PCB Area
• Wide Input Voltage Range	• Accepts Unregulated Input Voltages
• Isolated Output	• Can Be Configured for + or - Outputs
• Wide Operating Temperature Range	• Supports Harsh Operating Environments

Specifications

ITEMS \ Output Volt.		3.3V	5V	12V
DC Input ranges	VDC	5V: 4.5V-9V; 12V: 9V-18V, 24V: 18V-36V, 48V: 36V-72		
Efficiency (typical)	-	77%		
Output Voltage Accuracy	-	±5%		
Output Voltage Adjustment	VDC	3.3V-3.67V	5V-6V	12V-15V
Preload	A	0		
Ripple & Noise	mV	100mV	120mV	
Max Line Regulation	mV	20mV		
Max Load Regulation	mV	40mV		
Overcurrent Protection	A	Auto recovery (1)		
Overvoltage Protection	%	None		
Temperature Coefficient	-	0.02%/°C		
Cooling	-	Convection cooled		
Isolation Voltage	VAC	Input-Output: 500VAC 1 min. (5mA)		
Isolation Resistance	Ohm	Greater than 100M		
Shock	-	20G		
Vibration	-	10-55Hz (sweep for 1 min.) 1.5mm constant amplitude max 9G X,Y,Z 2 hours each		
Humidity (non condensing)	-	30%-90% RH (non condensing)		
Storage Humidity	-	10%-95% RH (non condensing)		
Operating Temp. Range		-20 to 70°C, derate linearly to 50% load from 50 to 70°C		
Storage Temperature	°C	-30°C to +85°C		
Weight (Typ)	g	5		
Size (LxWxH)	mm	28.5x18x8.5(PV1R5); 33x18x8.5 (PV3)		
Warranty	-	2 years		

Note: See Installation Manual for full details, test methods of parameters and application notes
1) Avoid operation in short circuit or overload for more than 30 seconds

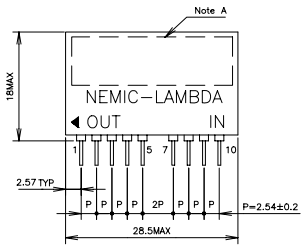
Model Selector

Model	Output Voltage (V)	Output Current (A)	Output Power (V)	Input Voltage (V)
Single Output				
PV1R5-5-3.3	3.3	0.4	1.3	5.0
PV1R5-48-3.3	3.3	0.4	1.3	48.0
PV3-5-3.3	3.3	0.6	2.0	5.0
PV3-48-3.3	3.3	0.6	2.0	48.0
PV1R5-5-5	5.0	0.3	1.5	5.0
PV1R5-12-5	5.0	0.3	1.5	12.0
PV1R5-24-5	5.0	0.3	1.5	24.0
PV1R5-48-5	5.0	0.3	1.5	48.0
PV3-5-5	5.0	0.6	3.0	5.0
PV3-12-5	5.0	0.6	3.0	12.0
PV3-24-5	5.0	0.6	3.0	24.0
PV3-48-5	5.0	0.6	3.0	48.0
PV1R5-5-12	12.0	0.125	1.5	5.0
PV3-5-12	12.0	0.25	3.0	5.0
Dual Outputs				
PVD1R5-5-1212	±12.0	0.06	1.44	5.0
PVD1R5-12-1212	±12.0	0.06	1.44	12.0
PVD1R5-24-1212	±12.0	0.06	1.44	24.0
PVD1R5-48-1212	±12.0	0.06	1.44	48.0
PVD3-5-1212	±12.0	0.125	3.0	5.0
PVD3-12-1212	±12.0	0.125	3.0	12.0
PVD3-24-1212	±12.0	0.125	3.0	24.0
PVD3-48-1212	±12.0	0.125	3.0	48.0

Pinout

Pin Description	Function
-Vin	Negative Input Terminal
+Vin	Positive Input Terminal
+Vout	Positive Output Terminal
-Vout	Negative Output Terminal
NC	No connection
COM	Common
TRM	Trim

Outline Drawing

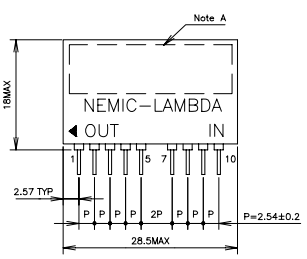


Pin assign

1	: +Vout	5	: TRM
2,3	: NC	7,8	: −Vin
4	: −Vout	9,10	: +Vin

Note A : Indicate of model name, lot No. and country of manufacture.

PV1R5

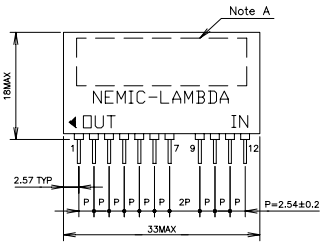


Pin assign

1	: +Vout	5	: TRM
2,3	: COM	7,8	: −Vin
4	: −Vout	9,10	: +Vin

Note A : Indicate of model name, lot No. and country of manufacture.

PVD1R5

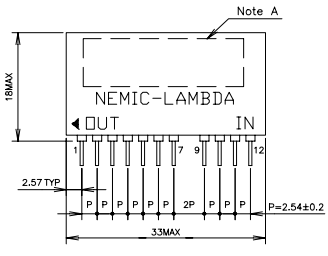


Pin assign

1,2	: +Vout	7	: TRM
3,4	: NC	9,10	: −Vin
5,6	: −Vout	11,12	: +Vin

Note A : Indicate of model name, lot No. and country of manufacture.

PV3



Pin assign

1,2	: +Vout	7	: TRM
3,4	: COM	9,10	: −Vin
5,6	: −Vout	11,12	: +Vin

Note A : Indicate of model name, lot No. and country of manufacture.

PVD3

Genesys™

The Genesys™ family of programmable power supplies sets a new standard for flexible, reliable, AC/DC power systems in Test & Measurement, Industrial and OEM applications

Genesys™ Family

GENH 750W Half Rack
GEN 1U 750/1500W Full Rack
GEN 2U 3.3kW
GEN 3U 10/15kW

Common features for all models include:

- Built in RS-232/RS-485 Interface Standard
- Last Setting Memory; Front Panel Lockout
- Advanced Parallel mode reports total current up to four identical units
- Global Commands for Serial RS-232/RS-485 Interface
- Reliable Encoders for Voltage and Current Adjustment
- Independent Remote ON/OFF and Remote ENABLE/DISABLE
- Reliable Modular and SMT Design
- 19" Rack Mounted for ATE and OEM Applications, zero stack
- Optional Interfaces
  Isolated Analogue Programming and Monitoring
  IEEE Multi-Drop - SCIP
  LXI Compliant LAN Interface
  USB Interface
- Labview™ and LabWindows™ drivers
- Five Year Warranty
  Worldwide Safety Agency Approvals; UL recognised and CE Mark for LVD and EMC Regulation (208VAC and 400AC Input)

c UL us CE

Applications

Genesys™ power supplies are designed for demanding applications

Test and Measurement systems using multiple power supplies and GPIB control save significant costs by incorporating the optional IEEE Multi-drop Interface in the first unit. Then up to 30 other units can be addressed through the first unit via the RS485 interface.

Automated System designers will appreciate new, standard, remote programming features such as Global commands. Also, new high speed status monitoring is available for the RS-485 bus as well as optional LAN (LXI compliant) or USB Interfaces.

Industrial & Military high power systems can be configured with up to four identical units in parallel, up to 60kW. No space is required above or below each power supply (zero stack). The master can be configured by the user to report total current of the combination. Applications include Heaters, Magnets and Laser Diodes.

Aerospace & Satellite testing systems use the complete Genesys™ Family: 1U 750W Half Rack, 1U 750W or 1500W Full Rack, 2U 3,.3kW and 3U 10/15kW. All are identical in Front Panel, rear Panel Analog and Digital Interface Commands. A wide variety of outputs allows testing of many different devices tested.

Medical Imaging and Treatment systems require reliable power. Modular construction, SMT and thoroughly proven design assure continuous performance at full rated power.

Semiconductor processing & Burn-in equipment designers appreciate the wide variety of worldwide inputs and Outputs from which to select depending on application. Selectable Safe and Auto Re-start protects loads and process integrity, Typical applications include Magnets, Filaments and Heaters.

GEN H 750W Half Rack

Model	Output Voltage Vdc	Output Current) (A)	Output Power (W
GEN H6-100	0-6V	0-100	600
GEN H8-90	0-8V	0-90	720
GEN H12.5-60	0-12.5V	0-60	750
GEN H20-33	0-20V	0-38	760
GEN H30-25	0-30V	0-25	750
GEN H40-19	0-40V	0-19	760
GEN H60-12.5	0-60V	0-12.5	750
GEN H80-9.5	0-80V	0-9.5	760
GEN H100-7.5	0-100V	0-7.5	750
GEN H150-5	0-150V	0-5	750
GEN H300-2.5	0-300V	0-2.5	750
GEN H300-2.5	0-300V	0-2.5	750
GEN H600-1.3	0-600V	0-1.3	780

- Wide Range Input (85 - 265 VAC Continuous)
- Active Power Factor Correction (0.99 typical)
- Output Voltage up to 600V, Current up to 100A

GEN 750/1500W in 1U 19” Rack

Model	Output Voltage Vdc	Output Current) (A)	Output Power (W
GEN 6-100	0-6V	0-100	600
GEN 6-200	0-6V	0-200	1200
GEN 8-90	0-8V	0-90	720
GEN 8-180	0-8V	0-180	1440
GEN 12.5-60	0-12.5V	0-60	750
GEN 12.5-120	0-12.5V	0-120	1500
GEN 20-38	0-20V	0-38	760
GEN 20-76	0-20V	0-76	1520
GEN 30-25	0-30V	0-25	750
GEN 30-50	0-30V	0-50	1500
GEN 40-19	0-40V	0-19	760
GEN 40-38	0-40V	0-38	1520
GEN 50-30	0-50V	0-30	1500
GEN 60-12.5	0-60V	0-12.5	750
GEN 60-2.5	0-60V	0-2.5	1500
GEN 80-9.5	0-80V	0-9.5	760
GEN 80-19	0-80V	0-19	1520
GEN 100-7.5	0-100V	0-7.5	750
GEN 100-1.5	0-100V	0-15	1500
GEN 150-5	0-150V	0-5	750
GEN 150-10	0-150V	0-10	1500
GEN 300-2.5	0-300V	0-2.5	750
GEN 300-5	0-300V	0-5	1500
GEN 600-1.3	0-600V	0-1.3	780
GEN 600-2.6	0-600V	0-2.6	1560

- Highest Power Density available: 1500W in 1U
- Wide Range Input (85 - 265 VAC Continuous, single phase, 47/63Hz)
- Active Power Factor Correction (0.99 typical)
- Output Voltage up to 600V, Current up to 200A

GEN 3.3kW in 2U 19" Rack

Model	Output Voltage Vdc	Output Current) (A)	Output Power (W
GEN 8-400	0-8V	0-400	3200
GEN 10-330	0-10V	0-330	3300
GEN 15-220	0-15V	0-220	3300
GEN 20-165	0-20V	0-165	3300
GEN 30-110	0-30V	0-110	3300
GEN 40-85	0-40V	0-85	3400
GEN 60-55	0-60V	0-55	3300
GEN 80-42	0-80V	0-42	3360
GEN 100-33	0-100V	0-33	3300
GEN 150-22	0-150V	0-22	3300
GEN 300-11	0-300V	0-11	3300
GEN 600-5.5	0-600V	0-5.5	3300

- Highest Power Density 3.3kW in 2U
- Wide Range of popular worldwide AC inputs, Single-Phase (230VAC) & Three-Phase (208VAC, 400VAC)
- Active Power Factor Correction (Single-Phase &Three-Phase AC Input)
- Output Voltage up to 600V, Current up to 400A

GEN 10/15kW in 3U 19" Rack

Model	Output Voltage Vdc	Output Current) (A)	Output Power (W
GEN 7.5-1000	0-7.5V	0-1000	7500
GEN 10-1000	0-10V	0-1000	10000
GEN 12.5-8000	0-12.5V	0-800	10000
GEN 20-500	0-20V	0-500	10000
GEN 25-400	0-25V	0-400	10000
GEN 30-333	0-30V	0-333	10000
GEN 40-250	0-40V	0-250	10000
GEN 50-200	0-50V	0-200	10000
GEN 60-167	0-60V	0-167	10000
GEN 60-250	0-60V	0-250	15000
GEN 80-125	0-80V	0-125	10000
GEN 60-187.5	0-80V	0-187.5	15000
GEN 100-100	0-100V	0-100	10000
GEN 100-150	0-100V	0-150	15000
GEN 125-80	0-125V	0-80	10000
GEN 125-120	0-125V	0-120	15000
GEN 150-66	0-150V	0-66	9900
GEN 150-100	0-150V	0-100	15000
GEN 200-50	0-200V	0-50	10000
GEN 250-40	0-250V	0-40	10000
GEN 250-60	0-250V	0-60	15000
GEN 300-33	0-300V	0-33	9900
GEN 300-50	0-300V	0-50	15000
GEN 400-25	0-400V	0-25	10000
GEN 400-37.5	0-400V	0-37.5	15000
GEN 500-20	0-500V	0-20	10000
GEN 500-30	0-500V	0-30	15000
GEN 600-17	0-600V	0-17	10200
GEN 600-25	0-600V	0-25	15000

- Highest Power Density 10/15kW in 3U
- High Current up to 1,000ADC
- Wide Range of popular worldwide Three Phase AC Inputs, (208VAC, 400VAC, 480VAC)
- Power Factor 0.88 (Passive Correction on all Inputs)
- Output Voltage up to 600V, Current up to 1,000A

LAMBDA

- Constant Voltage / Constant Current
- Last Setting Memory
- Digital Meters
- Built-in RS232 & RS485 Interface w/ GPIB optional
- Bench or Rack Mount
- Embedded Microprocessor Controller
- Voltage up to 120V, Current up to 132A

ZUP Series

Zero up programmable Power Supplies

Specifications

ITEMS \ MODELS	Cond.	ZUP6	ZUP10	ZUP20	ZUP36	ZUP60	ZUP80	ZUP120
Load Regulation	CV	2mV + 0.005% over 0 - 100% load change						
Line Regulation	CV	1mV + 0.005% over 85 - 132 or 170 - 265VAC line change						
Recovery Time (1)	CV	1ms	0.5ms	0.2ms				
Temperature Coefficient	CV	30ppm/°C following 30 minute warm up						
Temperature Drift (2)	CV	0.01% + 2mV change in output						
Up programming response time	CV	50 - 60ms					80ms	120ms
Down prog. resp. time (CV)	Full	50ms (70ms ZUP60-14)						
Down prog. resp. time (CV)	Zero	250ms	350ms	400ms	500ms	750ms	600ms	800ms
Load Regulation	CC	0.01% + 5mA on 200W and 400W models, 0.07% + 10mA on 800W models						
Line Regulation	CC	0.01% + 2mA on 200W and 400W models, 0.01% + 5mA on 800W models						
Temperature Coefficient	CC	100ppm/°C from rated current after 30 minute warm up time						
Temperature Drift(2)	CC	0.02% + 5mA, 200W and 400W models, 0.05% + 10mA 800W models						
Prog Voltage resolution	-	Better than 0.028% of rated voltage						
Prog Voltage accuracy	-	.02%+5mV	.02%+8mV	.02%+12mV	.02%+20m	.02%+35mV	.02%+50mV	.02%+70mV
Prog Current resolution	-	Better than 0.03% of rated voltage						
Prog Current accuracy	-	0.4% + 40mA						
Overvoltage Shutdown	V	0 - 7.5	0 - 13	0 - 24	0 - 40	0 - 66	0 - 88	0 - 132
Thermal Protection	-	Over temperature protected						
Display - Voltage	-	3 digits (6, 20, 36, 60, 80V models), 3.5 digits (10, 120V models). Accuracy 0.2% ± 2 digits						
Display - Current	-	3 digits, (3.5 digits 132A model). Accuracy 0.5% ± 3 digits						
Display - Status	-	CV / CC, Alarm, Foldback, Local/Remote, On/Off						
Remote On/Off	-	TTL signal or dry contact relay						
Output Good	-	Open Collector						
Voltage & Current Programming	-	By either Voltage (0-4V) or Resistance (0-4k)						
Remote Sense	-	Up to 0.5V compensation per output cable						
Communication Interface	-	RS232 & RS485 standard, IEEE488 optional						
Series & Parallel Operation	-	Series: Up to two units; Parallel: Up to five units in master-slave configuration						
AC Input Voltage range	-	85-265VAC (47-63Hz)						
Inrush Current (100/200VAC) (3)	-	15/30A, 200W models, 15A, 400W models, 30A, 800W models						
Hold Up Time (Typ) at 100VAC	ms	20						
Power Factor Correction	-	Complies with EN61000-3 Class A (0.99 typ)						
Temperature Range	-	Operating: 0 - 50°C; Storage: -20 to +70°C						
Humidity (non condensing)	-	Operating: 30 - 90% RH, Storage 10 - 95%RH						
Cooling	-	Internal fan						
Withstand Voltage	-	Input to Ground 2kVAC, Input to Output 3kVAC, Output to Ground 500VAC for 1 min.						
Isolation Resistance	-	>100M at 25°C & 70%RH						
Vibration & Shock (non-op.)	-	Vibration:10-55Hz(1 min.) 2G constant X, Y, Z, when correctly mounted; Shock: <20G						
Safety Agency Approvals	-	UL3111-1, EN61010-1, CE Mark						
Conducted & Radiated EMI	-	EN55022-B conducted, A radiated, FCC Class B conducted, A radiated, VCCI-2 conducted, -1 radiated						
Warranty	-	Three Years						

(1) Recovery to within +/-50mV after load change of 50-100% (2) Over 8 hour period following 30 minute warm up time
(3) 25°C ambient (cold start)

Model Selector

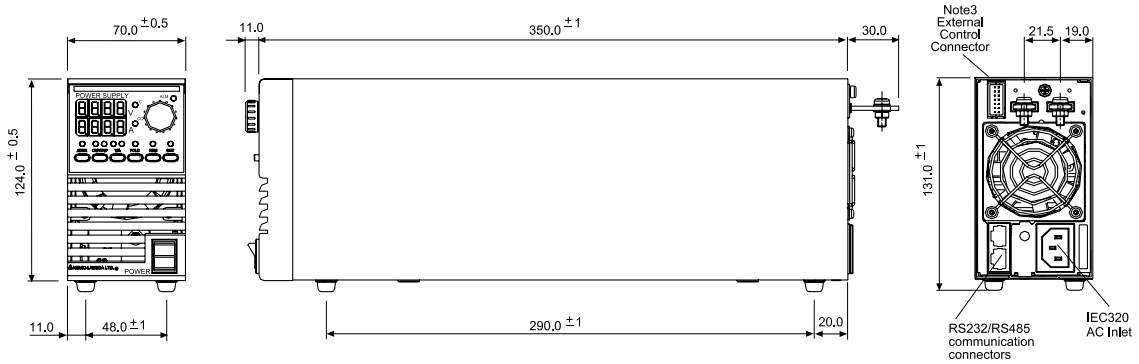
Model	Voltage Adjust Range	Current Adjust Range	Max Power	Ripple 5Hz-1MHz mV	Noise 20MHz BW mV	Ripple 5Hz-1MHz mA	Efficiency % (100/200VAC)	Weight kg
ZUP6-33/U	0-6V	0-33	198	5	50	50	69 / 72	2.9
ZUP6-66/U	0-6V	0-66	396	5	50	100	74 / 77	3.2
ZUP6-132/U	0-6V	0-132	792	8	100	200	74 / 77	5.8
ZUP10-20/U	0-10	0-20	200	5	50	25	73 / 77	2.9
ZUP10-40/U	0-10	0-40	400	5	50	50	79 / 82	3.2
ZUP10-80/U	0-10	0-80	800	8	90	100	77 / 81	5.8
ZUP20-10/U	0-20	0-10	200	5	50	15	74 / 78	2.9
ZUP20-20/U	0-20	0-20	400	5	50	30	79 / 83	3.2
ZUP20-40/U	0-20	0-40	800	5	80	60	79 / 82	5.8
ZUP36-6/U	0-36	0-6	216	5	50	7.5	76 / 80	2.9
ZUP36-12/U	0-36	0-12	432	5	50	15	80 / 84	3.2
ZUP36-24/U	0-36	0-24	864	5	70	30	80 / 84	5.8
ZUP60-3.5/U	0-60	0-3.5	210	5	50	5	75 / 79	2.9
ZUP60-7/U	0-60	0-7	420	5	50	10	80 / 84	3.2
ZUP60-14/U	0-60	0-14	840	5	60	20	80 / 84	5.8
ZUP80-2.5/U	0-80	0-2.5	200	30	80	5	77 / 82	2.9
ZUP80-5/U	0-80	0-5	400	30	80	10	83 / 87	3.2
ZUP120-1.8/U	0-120	0-1.8	216	30	80	5	77 / 82	2.9
ZUP120-3.6/U	0-120	0-3.6	432	30	80	10	83 / 87	3.2

Options & Accessories

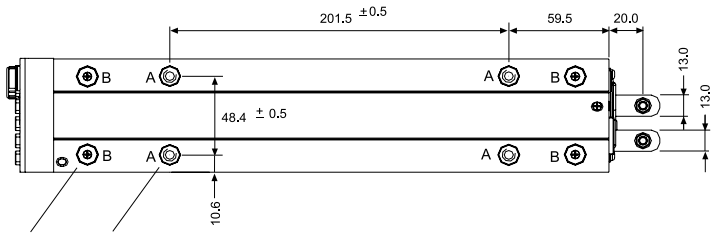
Option	Model Suffix	Part Number
Front panel terminals (20A max)[5]	/L[4]	ZUP200/400/L[4]
Front panel terminals (20A max)[6]	/L[4]	ZUP800/L[4]
IEC320 cable USA plug	/U	ZUP/U
Serial link cable RJ-45	/W	ZUP/W
GPIB Controller		GP485*
Dual Unit Assembly (accepts 200W or 400W models)		NL200*
19" 3U rack (accepts up to 6 200/400W models)		NL100*
Blanking panels for NL100 (19 in. rack)		NL101*
RS232 Communications Cable DB-9		ZUP/NC401
RS232 Communications Cable DB-25		ZUP/NC403
RS485 Communications Cable DB-9		ZUP/NC402
RS485 Communications Cable DB-25		ZUP/NC404
User Manual		NL102

* (See website for more details)
[4] Not available with ZUP80 or ZUP120 models.
[5] 200W and 400W models
[6] 800W models

Outline Drawing 200/400W



Notes:
1. Mounting screws must not protrude more than 6mm into the power supply.
2. Use M6 or 1/4" screw for load wires connection.
3. Housing AMP: 87631-9 with pins AMP: 87523-6.



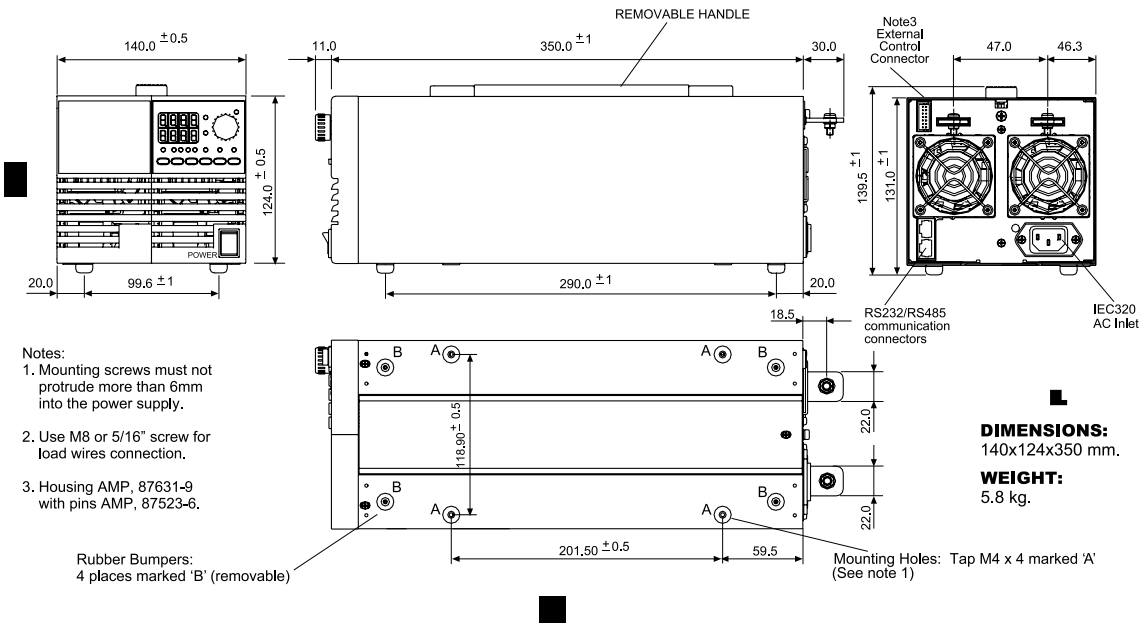
Rubber Bumpers
4 places marked 'B'
(removable)

Mounting Holes
Tap M4 x 4 marked 'A'
(See note 1)

DIMENSIONS: mm
200W /400W units: 70x124x350

WEIGHT: Kg
200W units: 2.9 400W units: 3.2

Outline Drawing 800W



Notes:
1. Mounting screws must not protrude more than 6mm into the power supply.
2. Use M8 or 5/16" screw for load wires connection.
3. Housing AMP, 87631-9 with pins AMP, 87523-6.

Rubber Bumpers:
4 places marked 'B' (removable)

Mounting Holes: Tap M4 x 4 marked 'A'
(See note 1)

DIMENSIONS:
140x124x350 mm.

WEIGHT:
5.8 kg.

Special Assemblies

AC/DC power modules

Front-end module for 48 V telecommunication applications. Compact solution for distributed power architectures.

Rapid time to market for power supplies by using this basic component. Includes all features needed for setting up a charging rectifier for telecommunication applications including EMC-Filter and PFC.

series	PD-800A-230-48
power	808 W
output voltage	24 – 53 V
input voltage	85 – 265 VAC
warranty	1 year

Examples of Customised Products based on power modules

580 W power supply with multiple outputs
for TV transmission systems

Features:
- AC/DC frontend 90 – 265 VAC (PD800A)
- 4 separate outputs: 3 x 5 V (PH150F), 1 x 12 V (PH505)
- AC OK, DC OK, FAN OK
- EN55022B
- EN61000-3-2
- EN61000-4-2, 3, 4, 5
- N+1 redundancy at 5 V “hot swap” possibility

Application:
- digital recorder

550 W AC/DC power supply
with multiple outputs

Features:
- 88 – 265 VAC
- 10 separate outputs
- 2 x 5 V (PH,PP), 2 x 5.5 V (PP), 3 x 12 V (PH,PP)
- 1 x 48 V (PD800A), 2 x 24 V (PH)
- EN55022B
- EN61000-3-2
- EN61000-4-2, 3, 4, 5

Application:
- base station for GSM networks

750 W rectifier power supply
compact design for telecommunication applications

Features:
- 88 – 265 VAC, nominal output 48 V
- EN55022B
- EN61000-3-2
- EN61000-4-2, 3, 4, 5
- N+1 redundancy, "hot plug” possibility

Applications:
- BTS, BSC for GSM networks, PABX, ATM transmission systems, router, radio link systems

Customised solutions

Lambda offers you a Total Power Solution.
We want to offer you the complete solution to power up your application.

Our customers, their specific needs and requirements, take centre stage of all our actions. Our wide range of products of high quality and reliability meet the first part of our customers' needs.

Lambda means "engineering" – support and solutions for any technical problem, whether standard or specific.

Contact your local Lambda Sales Office to discuss your Special Assembly requirements.

50 W customised power supply

Features:
- AC input 85 – 265 VAC/50 Hz
- 1 output 12 V or 24 V, cable junction
- EN60950
- EN55022

Application:
- supply for computer peripherals

250 W power supply with multiple outputs

Features:
- AC input 85 – 265 VAC
- 4 outputs 5 V, 24 V, +15 V, –15 V
- with customised cable loop and top fan
- EN60950
- EN55022
- EN61000-3-2
- EN61000-4-2,3,5,6,8,11

Application:
- industrial applications

350 W power supply in assembling plate

Features:
- AC input 85 – 265 VAC/50 Hz
- 5 outputs 24 V and 2x ± 15 V via sub-D-plug
- EN60950
- EN55022

Application:
- laser application

power supply in customised case

Features:
- AC input 85 – 265 VAC/50 Hz
- 2 outputs 24 V and 12 V with ITT-high current contacts
- EN60950
- EN55022

Application:
- process automation

LAMBDA

- Low Leakage Various Versions
- Chassis or Din Rail Mount
- Safety Agency Approved
- High Pulse or Noise Attenuation Versions
- Easy Connection and Installation
- RoHS Compliant

MC/MZ12 Series

6A to 30A, 250VAC EMI Filters

Specifications

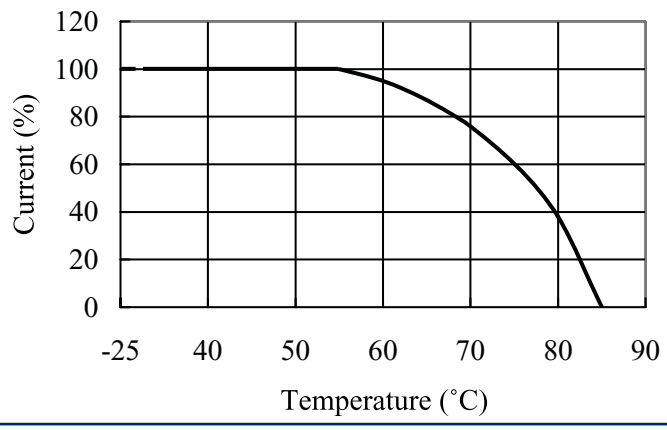
ITEMS \ MODELS		MC1206 MZ1206	MC1210 MZ1210	MC1216 MZ1216	MC1220 MZ1220	MC1230 MZ1230
Rated Current		6A	10A	16A	20A	30A
Rated Voltage	VAC	250				
Test Voltage (For 1 min.)	V	Terminals to Case: 2500VAC				
Isolation Resistance	MΩ	100MΩ minimum (terminals to case, 500VDC)				
DC Resistance (both lines)	mΩ	130	50	24	15	7
Temperature Rise	°C	30				
Operating Temperature	°C	-25 to +85°C (see derating curve)				
Storage Temperature	°C	-40 to +85				
Operating Humidity	-	30 to 95% RH (non condensing)				
Storage Humidity	-	10 to 95% RH (non condensing)				
Vibration	-	10-55-10Hz sweep for 1 minute Amplitude 1.5mm constant (max 88.3m/s², X, Y, Z 2 hours each standard & L versions, 9.8m/s² constant X, Y, Z 1 hour each DIN rail mounted)				
Safety Standards	-	Approved by UL1283, CSA Std C22.2 No.8 (CUL), EN133200 (SEMKO)				
Weight (Typ)	g	300				
Warranty	yr	1 Year				

For our full range of EMI Filters visit
www.lambda-europe.com/filters

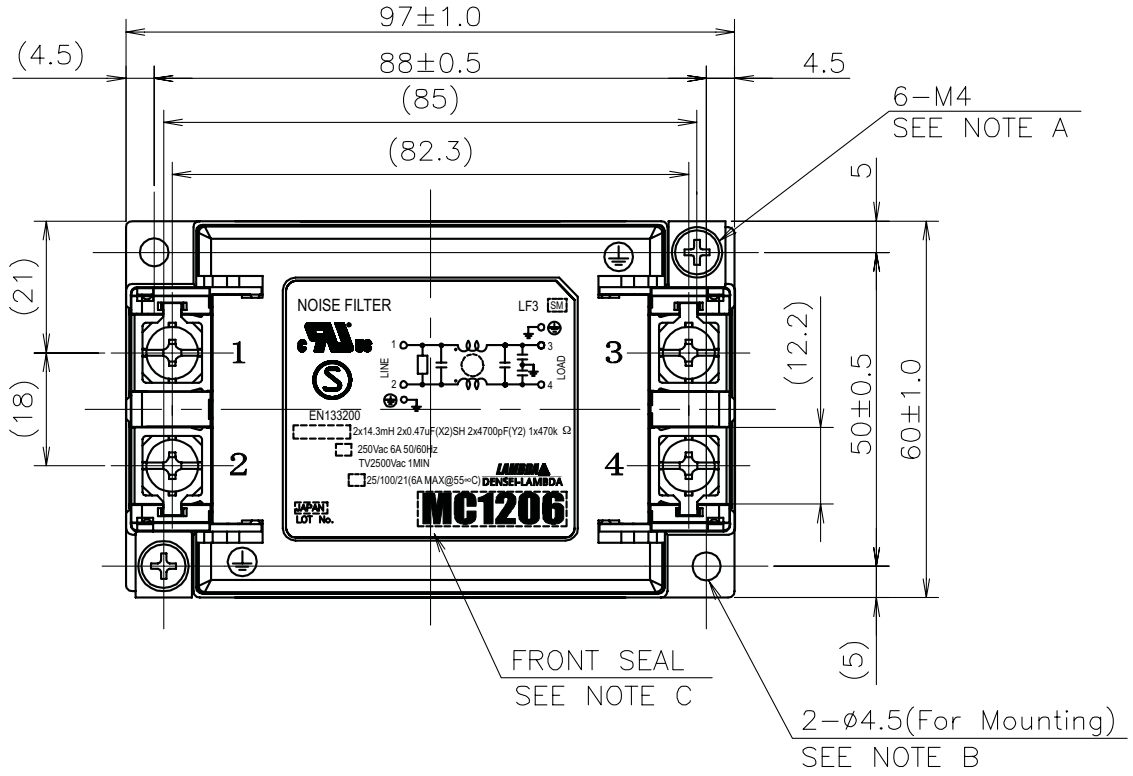
Model Selector

Model	Current Rating	Leakage Current (250VAC 60Hz)	Characteristic	Mounting
MC1206	6A	1mA	High Attenuation in low frequency	Chassis
MC1206DIN	6A	1mA	High Attenuation in low frequency	DIN Rail
MC1206L	6A	0.01mA	High Attenuation in low frequency	Chassis
MZ1206	6A	1mA	High Pulse Attenuation	Chassis
MZ1206DIN	6A	1mA	High Pulse Attenuation	DIN Rail
MZ1206L	6A	0.01mA	High Pulse Attenuation	Chassis
MC1210	10A	1mA	High Attenuation in low frequency	Chassis
MC1210DIN	10A	1mA	High Attenuation in low frequency	DIN Rail
MC1210L	10A	0.01mA	High Attenuation in low frequency	Chassis
MZ1210	10A	1mA	High Pulse Attenuation	Chassis
MZ1210DIN	10A	1mA	High Pulse Attenuation	DIN Rail
MZ1210L	10A	0.01mA	High Pulse Attenuation	Chassis
MC1216	16A	1mA	High Attenuation in low frequency	Chassis
MC1216DIN	16A	1mA	High Attenuation in low frequency	DIN Rail
MC1216L	16A	0.01mA	High Attenuation in low frequency	Chassis
MZ1216	16A	1mA	High Pulse Attenuation	Chassis
MZ1216DIN	16A	1mA	High Pulse Attenuation	DIN Rail
MZ1216L	16A	0.01mA	High Pulse Attenuation	Chassis
MC1220	20A	1mA	High Attenuation in low frequency	Chassis
MC1220DIN	20A	1mA	High Attenuation in low frequency	DIN Rail
MC1220L	20A	0.01mA	High Attenuation in low frequency	Chassis
MZ1220	20A	1mA	High Pulse Attenuation	Chassis
MZ1220DIN	20A	1mA	High Pulse Attenuation	DIN Rail
MZ1220L	20A	0.01mA	High Pulse Attenuation	Chassis
MC1230	30A	1mA	High Attenuation in low frequency	Chassis
MC1230DIN	30A	1mA	High Attenuation in low frequency	DIN Rail
MC1230L	30A	0.01mA	High Attenuation in low frequency	Chassis
MZ1230	30A	1mA	High Pulse Attenuation	Chassis
MZ1230DIN	30A	1mA	High Pulse Attenuation	DIN Rail
MZ1230L	30A	0.01mA	High Pulse Attenuation	Chassis

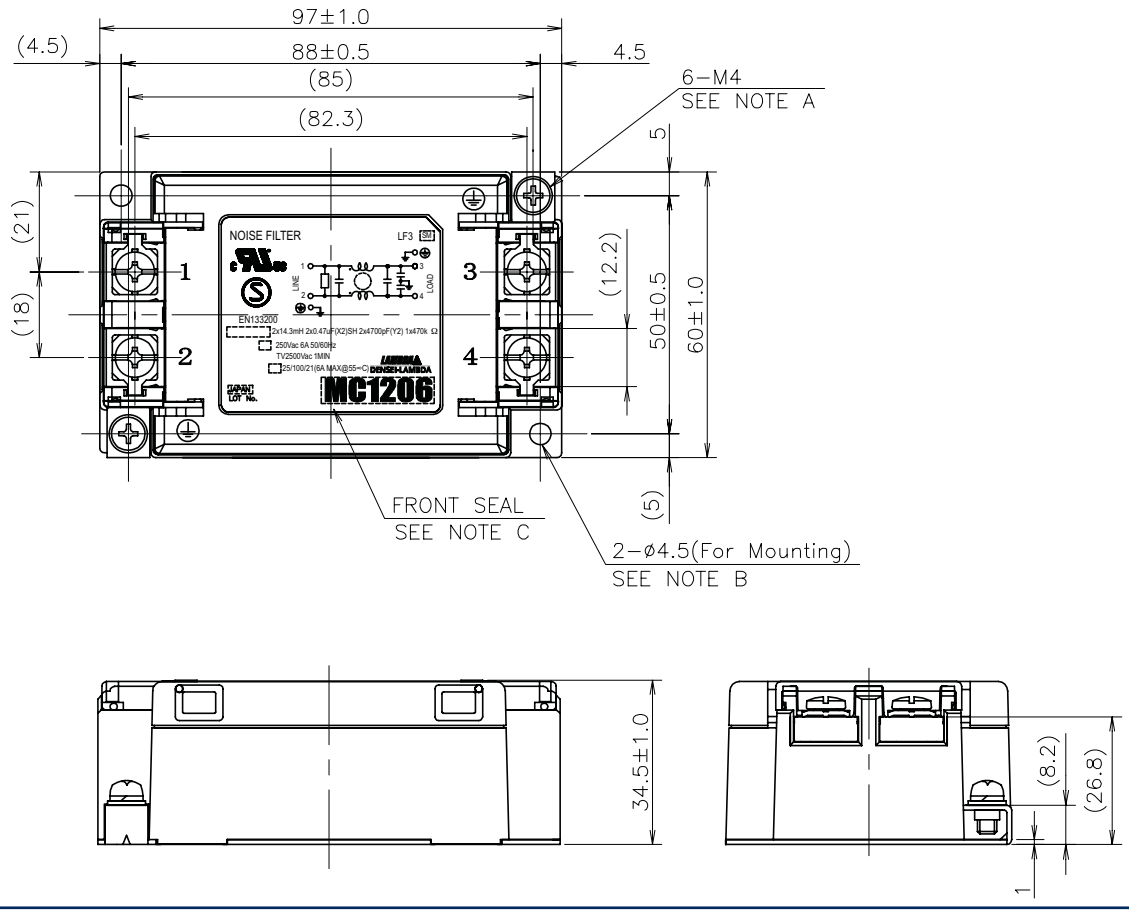
Derating



MC/MZ12 Outline Drawing



MC/MZ12 DIN Outline Drawing



LAMBDA

- Easy Connection and Installation
- Captive screws accepting ring tag terminals
- Chassis or DIN Rail mount
- Safety Agency Approved, RoHS Compliant
- MA series (single stage) Low frequency attentuation
- MX series (two stage) Wide band attentuation

MA/MX12 Series

6A to 30A, 250VAC EMI Filters

Specifications

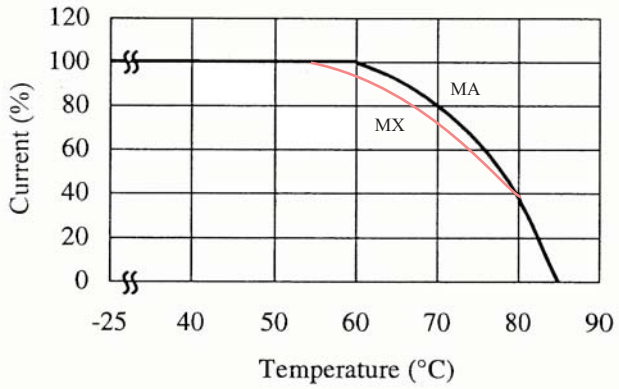
ITEMS \ MODELS		MA1206 MX1206	MA1210 MX1210	MA1216 MX1216	MA1220 MX1220	MA1230 MX1230
Rated Current		6A	10A	16A	20A	30A
Rated Voltage	V	250VAC or VDC				
Test Voltage (For 1 min.)	V	Terminals to Case: 2500VAC at 25C, 70% RH				
Isolation Resistance	MW	100MW minimum at 70% RH (terminals to case, 500VDC)				
Leakage Current	mA	1mA max at 250VAC 60Hz				
DC Resistance (both lines) MA/MX	mW	120/130	50/65	20/20	14/14	6/7
Temperature Rise	°C	30°C Maximum				
Operating Temperature	°C	-40 to +85°C (see derating curve)				
Storage Temperature	°C	-40 to +85				
Operating Humidity	-	30 to 95% RH (non condensing)				
Storage Humidity	-	10 to 95% RH (non condensing)				
Vibration (non operating)	-	10-55-10Hz sweep for 1 min. Amplitude 1.5mm constant (max 88.3m/s^2, X, Y, Z 2 hours each)				
Safety Standards	-	Approved by UL1283, CSA Std C22.2 No.8 (CUL)(1), EN60939 (SEMKO)				
Size WxLxH	mm	50 x 90.5 x 40 (50 x 101.5 x 46.4 with DIN Rail mounting clip)				
Weight (Typ)	g	280 (290 for DIN Rail mount versions)				
Warranty	-	1 Year				

(1) MX12 only

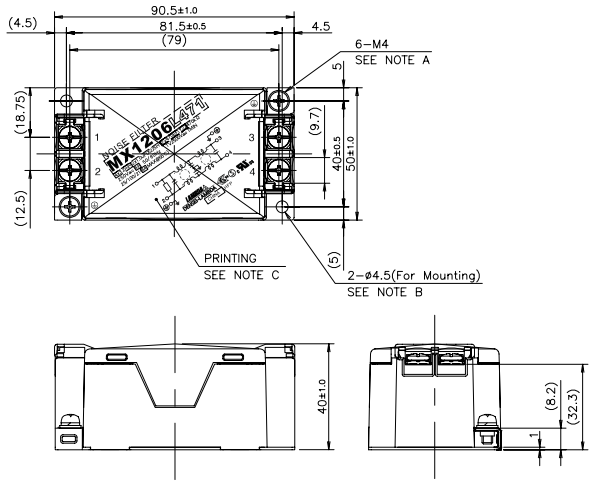
Model Selector

Model	Current Rating	Leakage Current (250VAC 60Hz)	Attenuation Characteristic	Mounting
MA1206	6A		Low Frequency (150 - 500kHz)	Chassis
MA1206DIN	6A		Low Frequency (150 - 500kHz)	DIN Rail
MX1206	6A		Wide band (150kHz - 30MHz)	Chassis
MX1206DIN	6A		Wide band (150kHz - 30MHz)	DIN Rail
MA1210	10A		Low Frequency (150 - 500kHz)	Chassis
MA1210DIN	10A		Low Frequency (150 - 500kHz)	DIN Rail
MX1210	10A		Wide band (150kHz - 30MHz)	Chassis
MX1210DIN	10A		Wide band (150kHz - 30MHz)	DIN Rail
MA1216	16A		Low Frequency (150 - 500kHz)	Chassis
MA1216DIN	16A		Low Frequency (150 - 500kHz)	DIN Rail
MX1216	16A		Wide band (150kHz - 30MHz)	Chassis
MX1216DIN	16A		Wide band (150kHz - 30MHz)	DIN Rail
MA1220	20A		Low Frequency (150 - 500kHz)	Chassis
MA1220DIN	20A		Low Frequency (150 - 500kHz)	DIN Rail
MX1220	20A		Wide band (150kHz - 30MHz)	Chassis
MX1220DIN	20A		Wide band (150kHz - 30MHz)	DIN Rail
MA1230	30A		Low Frequency (150 - 500kHz)	Chassis
MA1230DIN	30A		Low Frequency (150 - 500kHz)	DIN Rail
MX1230	30A		Wide band (150kHz - 30MHz)	Chassis
MX1230DIN	30A		Wide band (150kHz - 30MHz)	DIN Rail

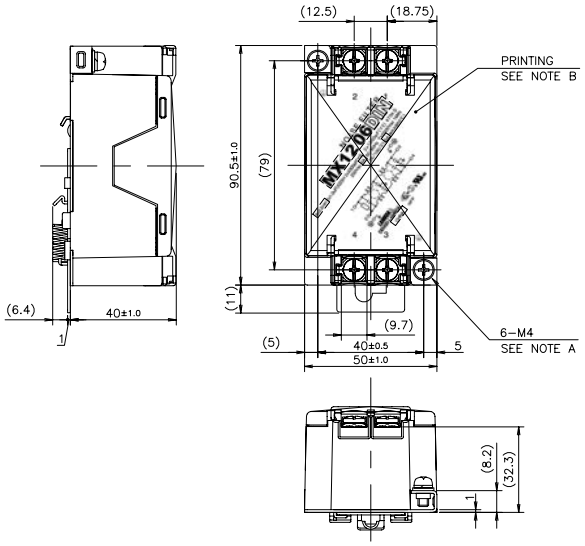
Derating



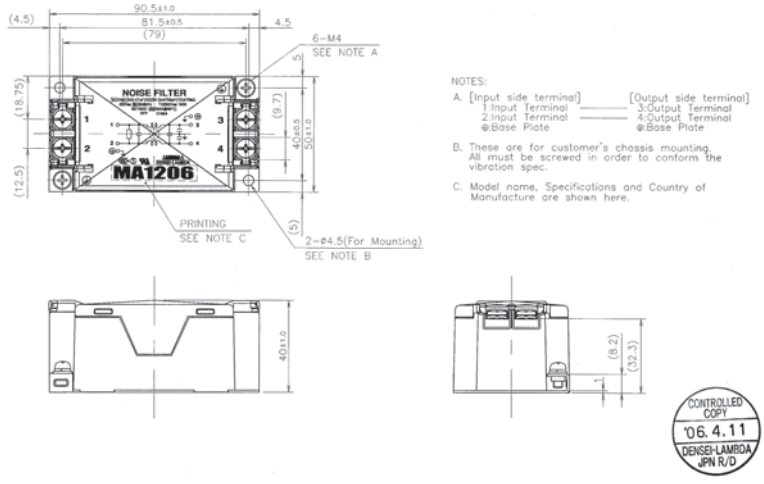
MX Outline Drawing



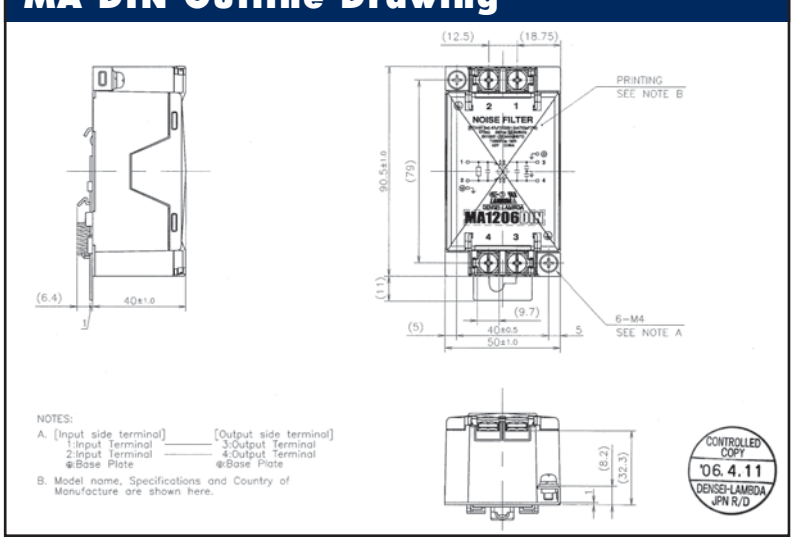
MX DIN Outline Drawing



MA Outline Drawing



MA DIN Outline Drawing



LAMBDA

- Reinforced Input to Output for IEC601
- Low Earth Leakage and Class B EMC
- Medical Approval
- High Efficiency
- High Power Density (9.3W/in^3)
- Up to 3 outputs
- No minimum load
- Fits 1U applications
- 3 Year Warranty
- Temperature controlled Fan Option

NV-Power Medical

180/200 Watts, flexible power solution

Features and Benefits

Feature	Benefit
◆ High Efficiency	◆ Minimises heat in system
◆ Low Profile	◆ Fits 1U applications
◆ High Power Density	◆ Less Space

INPUT

Input Voltage	90 - 264Vac (100 - 240Vac nominal)	Input Frequency	45 - 63Hz
Input Harmonics	EN61000-3-2 compliant	Inrush Current	<40A at 25°C and 264Vac, (cold start)
Input Fuse	Fast acting (not user accessible)	Power Factor	0.97 typical
Earth Leakage Current	123µA max at 120Vac (60Hz), 257µA max at 240Vac (60Hz) Worst case leakage current is less than 300µA at 264Vac, 63Hz (normal condition, 500µA Single Fault Condition)		

ISOLATION

Input to Output	**Reinforced**	**4kV (ac)**	type tested to 4kVac (equivalent to 5.7kVdc), production tested to 4.3kV (dc)	
Input to Earth	Basic	2.3 kV (dc)	Output to Earth	200 V (dc)

QUICK SELECTOR - preferred configurations

Model	CH1	CH2	CH3
NV1-1T000-M	12V / 15A	-	-
NV1-1G000-M	24V / 7.5A	-	-
NV1-4G0TT-M	24V / 7.5A	12V / 5A	-12V / 1A
NV1-4G0FF-M	24V / 7.5A	15V / 5A	-15V / 1A

Above Units available on rapid delivery.

Additional variants available 'Build to Order' - see above

AVAILABLE OUTPUTS

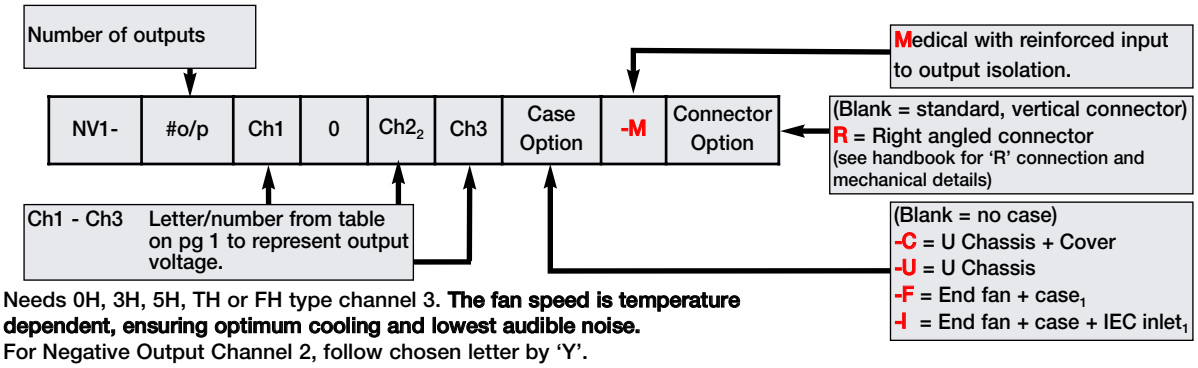
Channel 1	Adjustment Range	Channel 2[1]	Adjustment Range	Channel 3[2]	Adjustment Range
T 12V / 15A	12 - 15V[3]			T -12V / 1A	Fixed
F 15V / 12A	12 - 15V[4]			F -15V / 1A	Fixed
		T 12V / 5A	12 - 15V	3HP +3.3V / 2A[6]	Fixed
		F 15V / 5A	12 - 15V	5HP +5V / 2A[6]	Fixed
		G 24V / 2.5A	18 - 24V	TH -12V / 2A[6]	Fixed
G 24V / 7.5A	24 - 28V[5]	0 Omit		FH -15V / 2A[6]	Fixed
				0H Fan supply only	
				0 Omit	

1. Follow letters in red by 'Y' for negative output channel 2.
2. Follow letters in red by 'P' for positive output channel 3.
3. 12 - 12.5V if 24V channel 2 fitted.
4. 14.5 - 15V if 24V channel 2 fitted.
5. 24 - 26V if 24V channel 2 fitted.
6. 1.5A max if fitted with '-F' option.

Other output options are available, please contact factory with your requirements.

OUTPUT SPECIFICATION		
Remote Sense	Yes	Channel 1 - Max 0.5V total line drop.
Total Regulation	1%	Including Line (for 90-264Vac input change), Load (for 0-100% load change) and Cross (for 0-100% load change on any other output) regulation
Ripple & Noise	1%	(or 50mV if higher) pk-pk, using EIAJ test method & 20MHz bandwidth
Voltage Accuracy	±1%	±4% for Channel 3 with 'T' or 'F' type outputs, +4%/-3% for all other Ch 3
Turn on Time	1.5s max	at 90 Vac & 100% rated output power
Efficiency	up to 90%	configuration dependent
Hold up	16ms min	at 90 Vac
Min Load	None	on any output
Transient Response	<4%	of set voltage for 50% load change (in 50µs within the range 25 - 100% load)
Recovery	<500µs	for recovery to 1% of set voltage
Short circuit protection	Yes	
Over Temperature protection	Yes	
Over Voltage Protection	Yes	See Application Notes for details
Ch1 Good Signal	Yes	Provides a Logic 'Low' signal after Channel 1 output is within 90% (±5%) of nominal.
Peak Output Power	200W	Single output units. Average output power must not exceed 180W over any 5 minute period.

HOW TO CREATE A PRODUCT CODE



1. Needs 0H, 3H, 5H, TH or FH type channel 3. **The fan speed is temperature dependent, ensuring optimum cooling and lowest audible noise.**
2. For Negative Output Channel 2, follow chosen letter by 'Y'. For example, TY channel 2 = -12V / 5A

Confirm availability of created product code with the factory

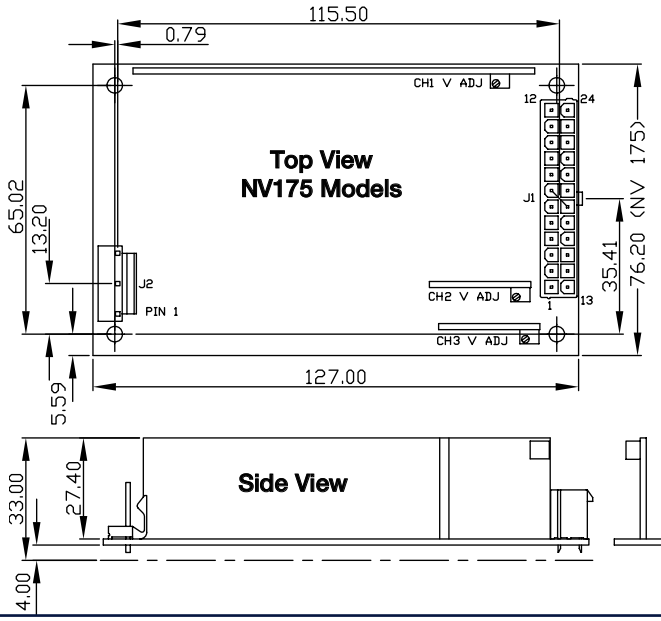
ENVIRONMENT	
Temperature	0 to 50°C operational, -40°C to 85°C storage (max 12 months). Full load, with either '-F' option fitted or 2m/s air blown from input to output
Convection Rating	See Application note for details
Derating	50 to 65°C derate each output by 2.5% per °C
Low Temp Startup	-20°C
Humidity	5 - 95% RH non condensing
Shock	±3 x 30*g* shocks in each plane, total 18 shocks 30*g* shock = 11ms (+/-0.5msec), half sine Conforms to EN60068-2-27, EN60068-2-47, IEC68-2-27, IEC68-2-47, JIS C0041-1987. Conforms to MIL-STD-810E/F, Method 514.4, Pro I, Cat 1,9
Vibration	Single axis 10 - 500 Hz at 2*g* (sweep and endurance at resonance) in all 3 planes Conforms to EN60068-2-6, IEC68-2-6 Conforms to MIL-STD-810E, Method 516.5, Pro I, IV, VI
Altitude	3,000 metres operational
Pollution	Degree 2, Material group IIIb

IMMUNITY EN61000-6-2:2001				Criteria
Electrostatic Discharge	EN61000-4-2	Level 3	Air discharge 8kV Contact discharge 4kV Not applicable to open frame units	A
Electromagnetic Field	EN61000-4-3	Level 3	(12V/m)	A
Fast / Burst Transient	EN61000-4-4	Level 4	(tested to 4.4kV)	A
Surge Immunity	EN61000-4-5	Level 3	Common mode - 2.2kV Differential - 1.1kV	A
Conducted RF Immunity	EN61000-4-6	Level 3	(12V)	A
Power Frequency Magnetic Field	EN61000-4-8	Level 4	(30A/m)	A
Voltage Dips, Variations, Interruptions	EN61000-4-11	Class 3	Criteria B for 5 sec interruption	A

EMISSIONS EN61000-6-3:2001, EN60601-1-2:2001		
Radiated Electric Field	EN55011, EN55022	(as per CISPR.11/22) Class B, FCC47 part 15 subpart B (2005) see application note for details
Conducted Emissions	EN55011, EN55022	(as per CISPR.11/22) Class B, FCC47 part 15 subpart B (2005)
Conducted Harmonics	EN61000-3-2	Class A
Flicker	EN61000-3-3	Compliant - d_{max} only

SAFETY APPROVALS					
	Date	Amendments		Date	Amendments
EN 60950-1	2006		EN 61010-1	2001	
UL 60950-1	2007		IEC 61010-1*	2001	
CSA 22.2 No 60950-1	2003		IEC 60601-1*	1988	A1, A2
IEC 60950-1*	2005		EN 60601-1	1990	A1, A2, A13
CE Mark	LV Directive 2006/95/EC (EN60950-1)		UL 60601-1	2003	with revisions 2006
** CB certificate and Report available on request*			*Check with factory for status of approvals*		

OUTLINE & CONNECTION DRAWINGS



MATING PARTS (MOLEX OR EQUIVALENT)

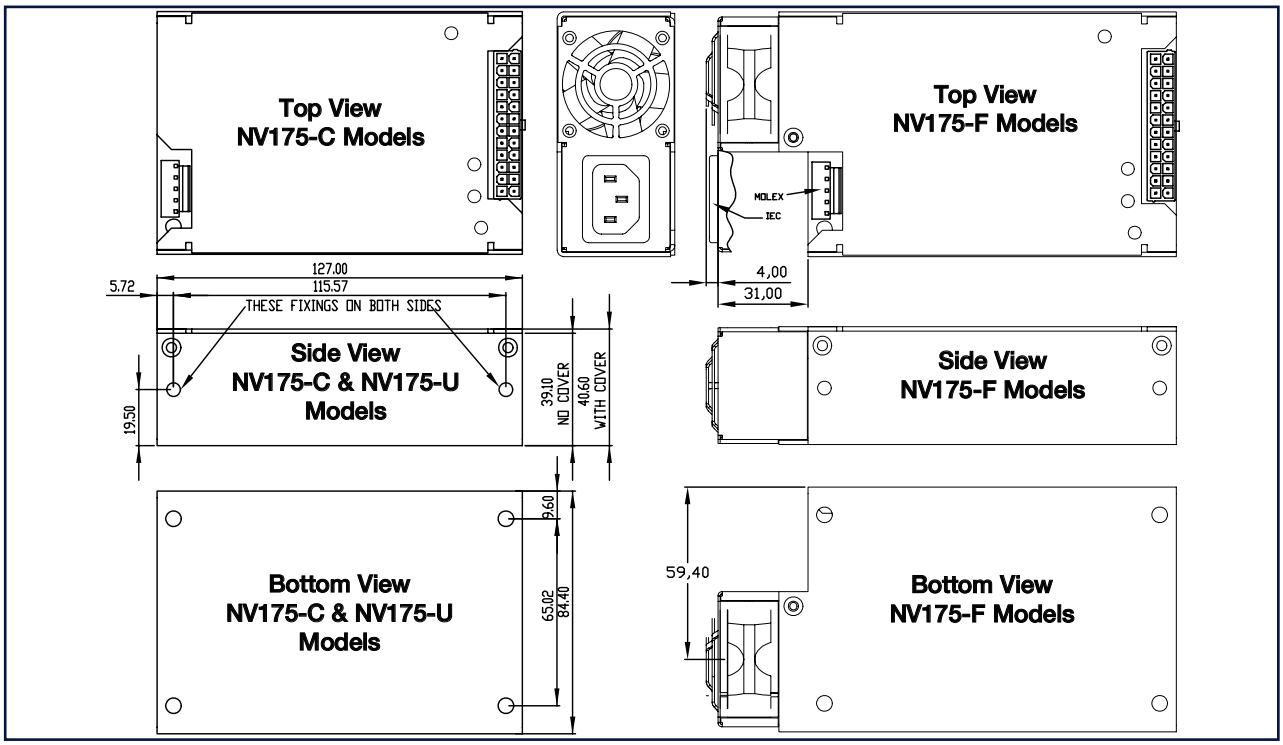
CONN	HOUSING	PINS
J1	39-01-2245	44476-3112
J2	09-50-8051	08-52-0113

J1

PIN	FUNCTION	PIN	FUNCTION
12	STANDBY +Ve	24	Do not connect
11	Do not connect	23	Do not connect
10	CH1 OUTPUT	22	CH1 POWER GOOD
9	CH1 OUTPUT	21	CH1 OUTPUT
8	CH1 OUTPUT	20	CH1 OUTPUT
7	+SENSE CH1	19	-SENSE CH1
6	0V COMMON	18	0V COMMON
5	0V COMMON	17	0V COMMON
4	Do not connect	16	0V COMMON
3	Do not connect	15	Do not connect
2	Do not connect	14	Do not connect
1	CH2 OUTPUT	13	CH3 OUTPUT

J2

PIN	FUNCTION
1	EARTH
2	NOT CONNECTED
3	LIVE
4	NOT CONNECTED
5	NEUTRAL



Notes 1. All customer fixings M3 2. Maximum Penetration 4.5mm 3. Maximum torque 0.9Nm 4. All tolerances +/-0.5mm

LAMBDA

Global Facilities

Ilfracombe Plant (U.K.)

Manufacturing and R&D
Configurable/modular (Alpha, NV, Vega) and
custom products

Nagaoka (Japan)

Manufacturing and R&D
AC-DC, DC-DC and
custom products

Senai Plant (Malaysia)

Manufacturing
AC-DC, DC-DC power modules and
custom products

China Plant

Manufacturing (Wuxi) and R&D (Shanghai)
AC-DC Converters, filters and
custom products

Kuantan Plant (Malaysia)

Manufacturing
AC-DC Converters and custom products

Karmiel Plant (Israel)

Manufacturing and R&D
Front end, Programmable power supplies and
custom products

LAMBDA

Power+ INNOVATION · SOLUTIONS · SUPPORT · RELIABILITY

Please contact your local sales office to find the best solution to your application.

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