



Wide Range Input

High Density

Output Adjustment Capability

Simple Or Full Function Modules

Remote On/off

Fixed Switching Frequency

Low Cost

International Safety Approvals

Parallel Operation

Remote Sense

Full Function Modules. Lambda's Full Function PH Series modules achieve 5 million hours MTBF. Active single wire current sharing coupled with a module good signal enables these low cost converters to easily accommodate N+1 and scalable power systems. They feature an auxiliary power supply output designed to power external monitoring signals, +20%/-60% output adjustability and up to 90% efficiency-ideal for all computer and leading edge communications applications.

Simple Function Modules. The PH Series Simple Function modules are the highest density converters on the market today, achieving 62W/in³. They demonstrated 5 million hours MTBF and are designed for non-redundant applications-yet they can operate in a brute force parallel mode. The high density and low cost of the PH Series Simple Function modules makes distributed power viable in virtually any application. Additional features include remote on/off and a $\pm 10\%$ output adjustment.

Similar products

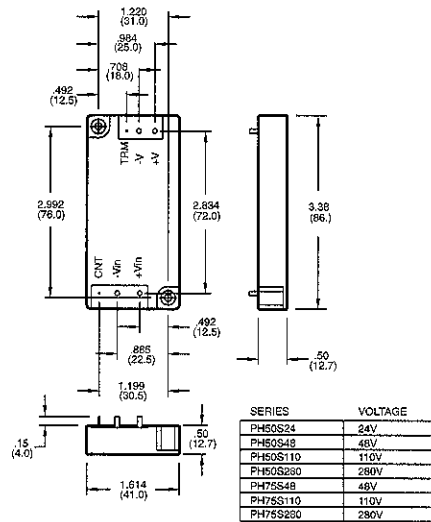
		Page
RM	High Efficiency	80
PM	Low Power DC-DC	76
KW	Board Mount AC-DC	10
SM	Surface Mount, Low Power	78

DC Input	200 - 400VDC for 280V PH Module. 88 - 185VDC for 110V PH Module. 36 - 76VDC for 48V PH Module. 18 - 36VDC for 24V PH Module.
Output Voltage Adj Range ..	The output voltage on all PH Series modules can be programmed by an external potentiometer or voltage source ($\pm 10\%$ on Simple Function Modules, $\pm 20\%$ on Full Function Modules). Adjustment below the -60% range is possible with the appropriate preload. Consult the P Series Application Notes for further details.
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	2V & 5V, 100mV pk-pk; 12V & 15V, 150mV pk-pk; 24V, 240mV pk-pk; 28V, 280mV pk-pk.
Auxiliary Bias Supply	Full Function PH Series modules have an auxiliary bias supply (8V @10mA) which can be used to power interface circuits(i.e., optocouplers).
Parallel Operation	Full Function PH Series modules have a single star point connection of PC terminal which enables modules to current share. Current sharing guaranteed within 5% when connected per the application notes (typically within 2%).
Series Operation	All modules can be operated in series. Refer to the PH Series Application Notes for detailed requirements.
Overvoltage Protection	150%-180% on 2V and 3V models 125%-145% on 5V through 28V models. Inverter shutdown. Input power must be recycled to restore operation.
Overload Protection	Overcurrent protection will protect the module and load from overload with automatic recovery. Limit is set at $\sim 105\%$ to 140%.
Cooling	PH Series modules are conduction cooled. Contact the factory for cooling recommendations.
Operating Temperature Range	-20°C to +85°C base plate. -20°C to +100°C on PH300S, PH600S. Consult the factory for -40°C startup on all models.
Storage Temperature	-40°C to +85°C. -40°C to +100°C on the PH300S and PH600S.
Temperature Coefficient	0.02% per °C.
Isolation	Input to Output - 3kVAC. Input to Baseplate - 2.5kVAC.
Isolation Resistance	Output to Baseplate - 100M Ω @ 500VDC @ 70% RH.
Inverter Good Signal	Full Function PH Series modules provide an inverter good status at the IOG terminal when the module is operating within limits.
Remote On/Off	Short terminal CNT to SG to turn on. Open circuit to turn OFF.
Remote Sensing	Sensing connections are provided to the regulation caused by the resistive drops in the output trace/leads. (Not available on PH50S, PH75S modules).
Safety Agency Approval	UL1950, CSA234, EN60950 and CE Mark.
Warranty	2 years.

VOLTAGE (V)	CURRENT (A)	POWER (W)	24V INPUT	48V INPUT	MODEL 110V INPUT	280V INPUT
Full Function Inputs						
2.0	15.00	30	-	PH75F48-2	PH75F110-2	PH75F280-2
2.0	20.00	40	PH100F24-2	-	-	-
2.0	30.00	60	-	PH150F48-2	PH150F110-2	PH150F280-2
2.0	60.00	120	-	PH300F48-2	PH300F110-2	PH300F280-2
3.3	15.00	45	-	PH75F48-3	PH75F110-3	PH75F280-3
3.3	20.00	60	PH100F24-3	-	-	-
3.3	30.00	90	-	PH150F48-3	PH150F110-3	PH150F280-3
3.3	60.00	180	-	PH300F48-3	PH300F110-3	PH300F280-3
5.0	15.00	75	-	PH75F48-5	PH75F110-5	PH75F280-5
5.0	20.00	100	PH100F24-5	-	-	-
5.0	30.00	150	-	PH150F48-5	PH150F110-5	PH150F280-5
5.0	60.00	300	-	PH300F48-5	PH300F110-5	PH300F280-5
12.0	6.30	75	-	PH75F48-12	PH75F110-12	PH75F280-12
12.0	8.40	100	PH100F24-12	-	-	-
12.0	12.50	150	-	PH150F48-12	PH150F110-12	PH150F280-12
12.0	25.00	300	-	PH300F48-12	PH300F110-12	PH300F280-12
15.0	5.00	75	-	PH75F48-15	PH75F110-15	PH75F280-15
15.0	6.70	100	PH100F24-15	-	-	-
15.0	10.00	150	-	PH150F48-15	PH150F110-15	PH150F280-15
15.0	20.00	300	-	PH300F48-15	PH300F110-15	PH300F280-15
24.0	3.20	75	-	PH75F48-24	PH75F110-24	PH75F280-24
24.0	4.20	100	PH100F24-24	-	-	-
24.0	6.30	150	-	PH150F48-24	PH150F110-24	PH150F280-24
24.0	12.60	300	-	PH300F48-24	PH300F110-24	PH300F280-24
28.0	2.70	50	-	PH75F48-28	PH75F110-28	PH75F280-28
28.0	3.60	100	PH100F24-28	-	-	-
28.0	5.40	150	-	PH150F48-28	PH150F110-28	PH150F280-28
28.0	10.80	300	-	PH300F48-28	PH300F110-28	PH300F280-28
Simple Function Inputs						
3.3	50.00	181.5	-	PH300S48-3	-	PH300S280-3
3.3	100.00	330	-	-	-	PH600S280-3
5.0	10.00	50	PH50S24-5	PH50S48-5	PH50S110-5	PH50S280-5
5.0	15.00	75	-	PH75S48-5	PH75S110-5	PH75S280-5
5.0	20.00	100	-	PH100S48-5	-	PH100S280-5
5.0	30.00	150	-	PH150S48-5	PH150S110-5	PH150S280-5
5.0	50.00	275	-	PH300S48-5	-	PH300S280-5
5.0	100.00	500	-	-	-	PH600S280-5
12.0	4.20	50	PH50S24-12	PH50S48-12	PH50S110-12	PH50S280-12
12.0	6.30	75	-	PH75S48-12	PH75S110-12	PH75S280-12
12.0	8.40	100	-	PH100S48-12	-	PH100S280-12
12.0	12.50	150	-	PH150S48-12	PH150S110-12	PH150S280-12
12.0	25.00	300	-	PH300S48-12	-	PH300S280-12
12.0	50.00	600	-	-	-	PH600S280-12
15.0	3.40	50	PH50S24-15	PH50S48-15	PH50S110-15	PH50S280-15
15.0	5.00	75	-	PH75S48-15	PH75S110-15	PH75S280-15
15.0	6.70	100	-	PH100S48-15	-	PH100S280-15
15.0	10.00	150	-	PH150S48-15	PH150S110-15	PH150S280-15
15.0	20.00	300	-	PH300S48-15	-	PH300S280-15
15.0	40.00	600	-	-	-	PH600S280-15
24.0	2.10	50	PH50S24-24	PH50S48-24	PH50S110-24	PH50S280-24
24.0	3.20	75	-	PH75S48-24	PH75S110-24	PH75S280-24
24.0	4.20	100	-	PH100S48-24	-	PH100S280-24
24.0	6.30	150	-	PH150S48-24	PH150S110-24	PH150S280-24
24.0	12.50	300	-	PH300S48-24	-	PH300S280-24
24.0	25.00	600	-	-	-	PH600S280-24
28.0	1.80	50	PH50S24-28	PH50S48-28	PH50S110-28	PH50S280-28
28.0	2.70	75	-	PH75S48-28	PH75S110-28	PH75S280-28
28.0	3.60	100	-	PH100S48-28	-	PH100S280-28
28.0	5.40	150	-	PH150S48-28	PH150S110-28	PH150S280-28
28.0	10.71	300	-	PH300S48-28	-	PH300S280-28
28.0	21.43	600	-	-	-	PH600S280-28
48.0	6.25	300	-	PH300S48-48	-	PH300S280-48
48.0	12.50	600	-	-	-	PH600S280-48

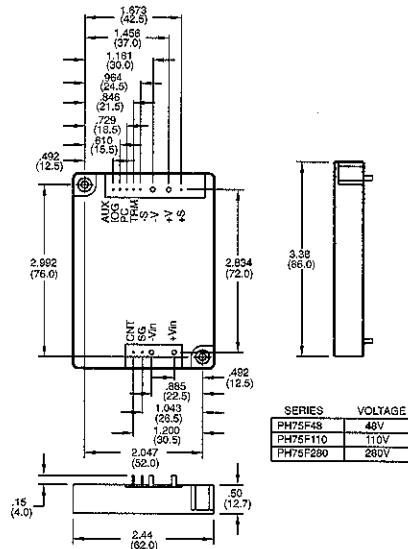


PH 50S/75S



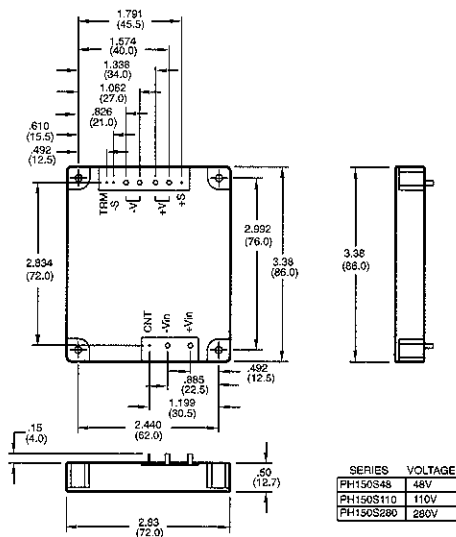
NOTE:
 1. M3 TAPPED HOLES FOR CUSTOMER CHASSIS MOUNTING 2 PLS.
 2. SCREWS MUST NOT PROTRUDE INTO PWR MODULE BY MORE THAN (12.7) MM. (BACK SIDE FOR HEAT SINK).
 3. DIMENSIONS ARE IN INCHES EXCEPT DIMENSIONS () ARE IN MM.
 4. WEIGHT: 100 GRAMS

PH 75F



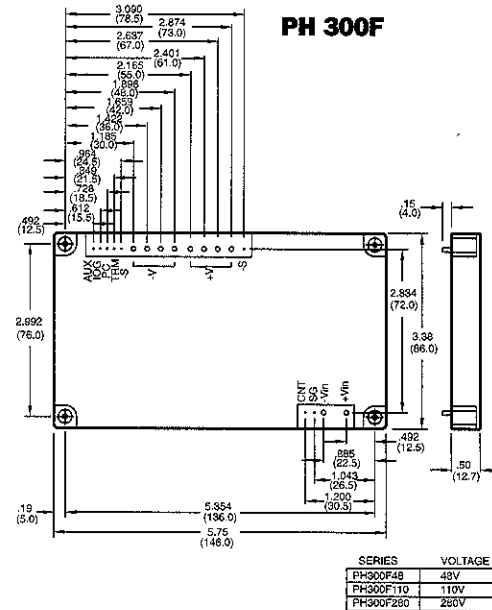
NOTE:
 1. M3 TAPPED HOLES FOR CUSTOMER CHASSIS MOUNTING 2 PLS.
 2. SCREWS MUST NOT PROTRUDE INTO PWR MODULE BY MORE THAN (12.7) MM. (BACK SIDE FOR HEAT SINK).
 3. DIMENSIONS ARE IN INCHES EXCEPT DIMENSIONS () ARE IN MM.
 4. INPUT AND OUTPUT ARE 2. INPUT AND OUTPUT ARE 0.6.
 5. WEIGHT: 150 GRAMS

PH 150S



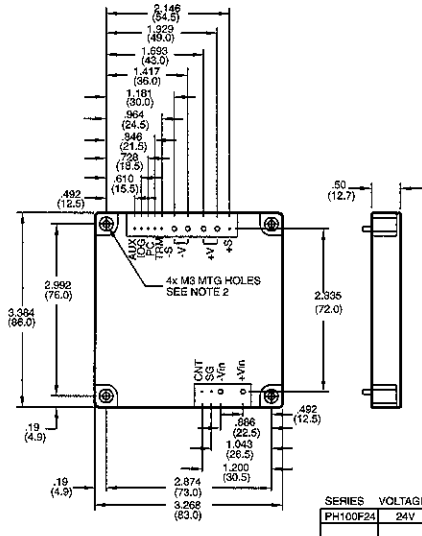
NOTE:
 1. DIMENSIONS ARE IN INCHES EXCEPT DIMENSIONS () ARE IN MM.
 2. 4x M3 TAPPED HOLES FOR CUSTOMER CHASSIS MOUNTING.
 3. SCREWS MUST NOT PROTRUDE INTO PWR MODULE BY MORE THAN (12.7) MM. (BACK SIDE FOR HEAT SINK).
 4. WEIGHT: 150 GRAMS.

PH 300F



NOTE:
 1. M3 TAPPED HOLES FOR CUSTOMER CHASSIS MOUNTING 4 PLS.
 2. SCREWS MUST NOT PROTRUDE INTO PWR MODULE BY MORE THAN (12.7) MM. (BACK SIDE FOR HEAT SINK).
 3. DIMENSIONS ARE IN INCHES EXCEPT DIMENSIONS () ARE IN MM.
 4. INPUT AND OUTPUT ARE 2. INPUT AND OUTPUT ARE 0.6.
 5. WEIGHT: 250 GRAMS.

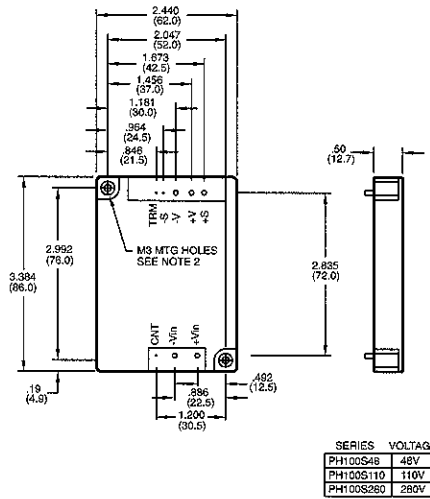
PH 100F/150F



NOTES:

1. DIMENSIONS ARE IN INCHES EXCEPT DIMENSIONS () ARE IN MM.
2. 4x M3 TAPPED HOLES FOR CUSTOMER MOUNTING.
3. SCREWS MUST NOT PROTRUDE INTO P.S. BY MORE THAN 12.7
4. WEIGHT: 180 GRAMS

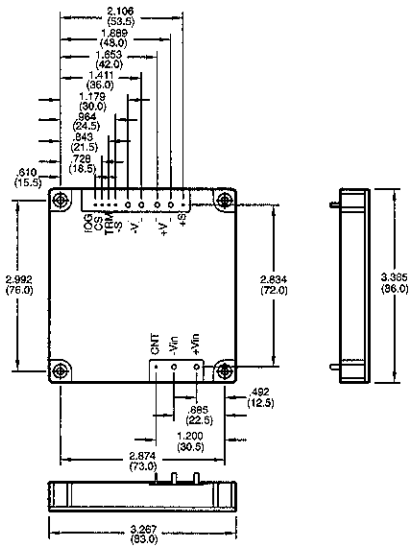
PH 100S



NOTES:

1. DIMENSIONS ARE IN INCHES EXCEPT DIMENSIONS () ARE IN MM.
2. 2x M3 TAPPED HOLES FOR CUSTOMER MOUNTING.
3. SCREWS MUST NOT PROTRUDE INTO P.S. BY MORE THAN 12.7
4. WEIGHT: 150 GRAMS

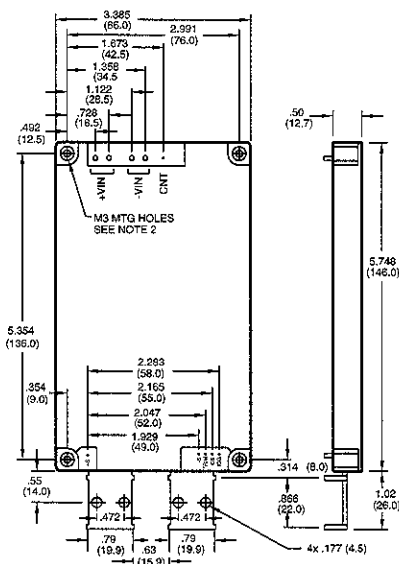
PH 300S



NOTE:

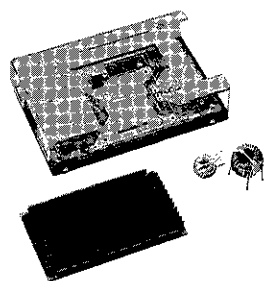
1. M3 TAPPED HOLES FOR CUSTOMER CHASSIS MOUNTING 2 PLS.
2. SCREWS MUST NOT PROTRUDE INTO PWR MODULE BY MORE THAN 12.7 MM. (BACK SIDE FOR HEAT SINK).
3. DIMENSIONS ARE IN INCHES EXCEPT DIMENSIONS () ARE IN MM.
4. INPUT AND OUTPUT PINS ARE (2, INPUT AND OUTPUT PINS ARE (0.6).
5. WEIGHT: 200 GRAMS.

PH 600S



NOTES:

1. DIMENSIONS ARE IN INCHES EXCEPT DIMENSIONS () ARE IN MM.
2. 4x M3 TAPPED HOLES FOR CUSTOMER MOUNTING.
3. SCREWS MUST NOT PROTRUDE INTO P.S. BY MORE THAN 12.7.
4. WEIGHT: 300 GRAMS.



PKT Series Evaluation Kits

Each Kit contains a socketed printed circuit board (including test points), heatsink kits, thermal pads, mounting hardware, line cords, an instruction manual and all the discrete components required to evaluate a power module (power module not included).

PAH Series Heatsink Kits

Heatsink Kits include a heatsink, thermal pad, mounting hardware and instruction manual (these kits are already included in the evaluation kits). Call a Lambda Application Engineer for thermal design and heatsink recommendations.

KIT NUMBER	APPLICATION MODE
PKTPFC	PF500 with PN3207 or PF1000 with PN3215
PKTPR500	PR500 with PN3215
PKT300F	PH300F
PKT150F	PH150F
PKT150S	PH150S
PKT75F/100S	PH75F/PH100S
PKT50S/75S	PH50S/PH75S

KIT NUMBER	APPLICATION MODE	°C/W @600LF/M	FIN HEIGHT (mm)	FIN DIRECTION
PAH41L12	PH50S, PH75S	1.25	12	Length
PAH62L12	PH75F, PH100S, PN3207	1.20	12	Length
PAH72L12	PH150S	0.70	12	Length
PAH83L12	PH100F, PH150F, PF500, PN3215, PR500	0.70	12	Length
PAH83L12A	PH100F, PH150F, PH300S, PF500, PN3215, PR500	0.57	12	Length
PAH146L12	PH300F, PF1000, PT500, PH600S	0.65	12	Length
PAH146L12A	PH300F, PF1000, PT500, PH600S	0.40	12	Length
PAH146W12	PH300F, PF1000, PT500, PH600S	0.65	12	Width
PAH41L23	PH50S, PH75S	0.80	23	Length
PAH62L23	PH75F, PH100S, PN3207	0.60	23	Length
PAH72L23	PH150S	0.40	23	Length
PAH83L23	PH100F, PH150F, PH300S, PF500, PN3215, PR500	0.45	23	Length
PAH146L23	PH300F, PF1000, PT500, PH600S	0.30	23	Length

PATP Series Thermal Pads

The PATP Series is electrically and thermally conductive, typically yielding less than 1°C temperature rise heatsink to baseplate at full power operation.

KIT NUMBER	APPLICABLE MODULE
PATP41	PH50S, PH75S
PATP62	PH75F, PH100S, PN3207
PATP72	PH150S
PATP83	PH150F, PF500, PN3215
PATP146	PH300F, PF1000, PT500

PAL Series Chokes

Input common-mode chokes for use with PH modules are available from stock. Check the application notes for recommendations.

KIT NUMBER	VALUE	APPLICABLE MODULE
PAL03-1	3A 100mH	PH50/75X48-XX
PAL05-1	5A 100 mH	PH100/150X48-XX
PAL10-1	10A 100mH	PH300F48-XX
PAL02-2	2A 200mH	PHXXX280-XX

PAS Series Sockets

Individual sockets for P Series converters are available for each pin size, high and low current. These sockets are ideal for engineering development allowing modules to be plugged in and out without soldering/desoldering.

KIT NUMBER	DESCRIPTION	PIN SIZE
PASHC	High Current Socket (Input/Output)	2.0mm
PASLC	Low Current Socket (Signal)	0.6mm