

# PTH12050

## 12 Vin Single Output

### Data Sheet

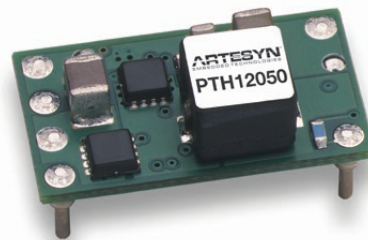
**Total Power:** 33 Watts  
**# of Outputs:** Single

### SPECIAL FEATURES

- 6 A output current
- 12 V input voltage
- Wide-output voltage adjust:  
1.2 - 5.5 Vdc for suffix 'W'  
0.8 - 1.8 Vdc for suffix 'L'
- Auto-track™ sequencing\*
- Pre-bias start-up
- Efficiencies up to 93%
- Output ON/OFF inhibit
- Output voltage sense
- Point-of-Load-Alliance (POLA) compatible
- RoHS compliant
- Two year warranty

### SAFETY

- UL/cUL CAN/CSA-C22.2 No. 60950-1-03/UL 60950-1, File No. E174104
- TÜV Product Service (EN60950) Certificate No B 04 06 38572 044
- CB Report and Certificate to IEC60950, Certificate No. US/8292/UL



### Electrical Specifications

Input		
Input voltage range	(See Note 3)	10.8 - 13.2 Vdc
Input current	No load	10 mA typical
Remote ON/OFF	(See Note 1)	Positive logic
Start-up time		1 V/ms
Undervoltage lockout		8.8 - 10.4 V typical
Track input voltage	Pin 8 (See Notes 6 )	±0.3 Vin
Output		
Voltage adjustability	(See Note 4)	1.2 - 5.5 Vdc (Suffix 'W') 0.8 - 1.8 Vdc (Suffix 'L')
Setpoint accuracy		±2.0% Vo
Line regulation		±5 mV typical
Load regulation		±5 mV typical
Total regulation		±3.0% Vo
Minimum load		0 A
Ripple and noise 20 MHz bandwidth	Suffix 'W': Vo 2.5 V Vo > 2.5 V Suffix 'L': Vo 1.0 V Vo > 1.0 V	25 mV pk-pk 1% Vo 20 mV pk-pk 30 mV pk-pk
Temperature co-efficient	-40 °C to +85 °C	±0.5% Vo
Transient response	(See Note 5)	70 µs recovery time Overshoot/undershoot 100 mV
Margin adjustment		±5.0% Vo

All specifications are typical at nominal input, full load at 25 °C unless otherwise stated.  
 Cin = 100 µF, Cout = 0 µF.

\*Auto-track is a trademark of Texas Instruments.

### General Specifications

Efficiency		See Efficiency Table
Insulation voltage		Non-isolated
Switching frequency	Over $V_{in}$ and $I_o$ ranges	Suffix 'W': 320 kHz typical Suffix 'L': 250 kHz typical
Approvals and standards		EN60950, UL/cUL60950
Material flammability		UL94V-0
Dimensions	L x W x H	22.10 x 12.57 x 8.50 mm 0.870 x 0.495 x 0.335 in
Weight		2.9 g (0.10 oz)
MTBF	Telcordia SR-332	7,092,000 hours

### EMC Characteristics

Electrostatic discharge	EN61000-4-2, IEC801-2
Conducted immunity	EN61000-4-6
Radiated immunity	EN61000-4-3

### Environmental Specifications

Thermal performance (See Note 2)	Operating ambient temperature	-40 °C to +85 °C
	Non-operating temperature	-40 °C to +125 °C
MSL ('Z' suffix only)	JEDEC J-STD-020C	Level 3

#### Protection

Short-circuit	Auto reset	14 A typical
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### Ordering Information

Model Number <sup>(9)</sup>	Output Power (Max.)	Input Voltage	Output Voltage	Output Current (Min.)	Output Current (Max.)	Efficiency (Typical)	Regulation	
							Line	Load
PTH12050L	33 W	10.8 - 13.2 Vdc	0.8 - 1.8 Vdc	0 A	6 A	88%	±5 mV	±5 mV
PTH12050W	33 W	10.8 - 13.2 Vdc	1.2 - 5.5 Vdc	0 A	6 A	93%	±5 mV	±5 mV

### Part Number System with Options

Product Family	Input Voltage	Output Current	Mechanical Package	Output Voltage Code	Pin Option <sup>(9)</sup>	Mounting Options	Pin Option
<b>PTH</b>	<b>12</b>	<b>05</b>	<b>0</b>	<b>W</b>	<b>A</b>	<b>S</b>	<b>T</b>
Point-of-Load Alliance compatible	12 = 12 V	05 = 6 A	Always 0	W = Wide L = Low Voltage		D = Horizontal through-hole (RoHS 6/6) Z = Surface-mount solder ball (RoHS 6/6)	No Suffix = Trays T = Tape and Reel <sup>(9)</sup>

### Output Voltage Adjustment

The ultra-wide output voltage trim range offers major advantages to users who select the PTH12050. It is no longer necessary to purchase a variety of modules in order to cover different output voltages. The output voltage can be trimmed in a range of 1.2 Vdc to 5.5 Vdc for suffix 'W' and 0.8 Vdc to 1.8 Vdc for suffix 'L'. When the PTH12050 converter leaves the factory the output has been adjusted to the default voltage of 1.2 V for the PTH12050W and 0.8 V for the PTH12050L.

#### Notes:

- Remote ON/OFF, Positive Logic  
ON: Pin 3 open; or  $V > V_{in} - 0.5 V$   
OFF: Pin 3 GND; or  $V < 0.8 V$  (min - 0.2 V).
- See Figure 1 for safe operating curve.
- A 100  $\mu F$  electrolytic input capacitor is required for proper operation. The capacitor must be rated for a minimum of 750 mA rms of ripple current. C2 = 10  $\mu F$  ceramic capacitor, required for output voltages of 3.3 V and higher.
- An external output capacitor is not required for basic operation. Adding 100  $\mu F$  of distributed capacitance at the load will improve the transient response.
- 1 A/ $\mu s$  load step, 50 to 100%  $I_{omax}$ ,  $C_{out} = 100 \mu F$ .
- If utilized  $V_{out}$  will track applied voltage by  $\pm 0.3 V$  (up to  $V_o$  set point).
- Tape and reel packaging only available on the surface-mount versions.
- The pk-pk output ripple voltage is measured with an external 10  $\mu F$  ceramic capacitor. See Figure 3 for Standard application schematic.
- NOTICE: Some models do not support all options. Please contact your local Artesyn representative or use the on-line model number search tool at <http://www.artesyn.com/power> to find a suitable alternative.

Efficiency Table: PTH12050W  
( $I_o = 5 A$ )

Output Voltage	Efficiency
$V_o = 5.0 V$	93%
$V_o = 3.3 V$	91%
$V_o = 2.5 V$	89%
$V_o = 2.0 V$	88%
$V_o = 1.8 V$	87%
$V_o = 1.5 V$	86%
$V_o = 1.2 V$	84%

Efficiency Table: PTH12050L  
( $I_o = 5 A$ )

Output Voltage	Efficiency
$V_o = 1.8 V$	88%
$V_o = 1.5 V$	87%
$V_o = 1.2 V$	85%
$V_o = 1.0 V$	83%
$V_o = 0.8 V$	81%

Characteristic Data

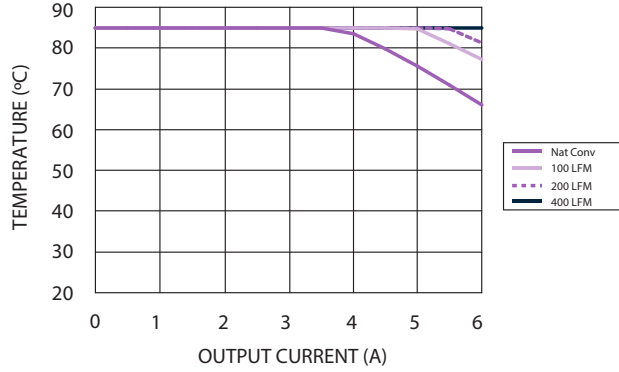


Figure 1 - Safe Operating Area for PTH12050W  
 Vin = 12 V, Output Voltage = 3.3 V (See Note A)

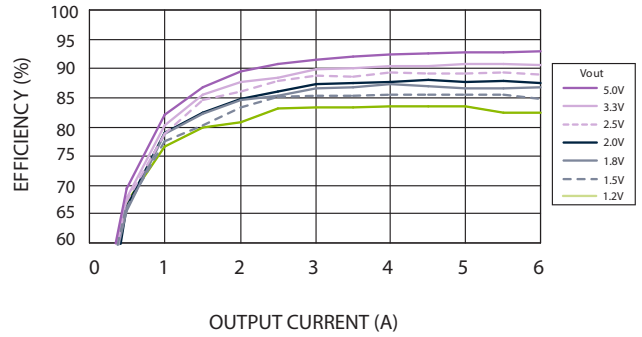


Figure 2 - Efficiency vs Load Current for PTH12050W  
 Vin = 12 V (See Note B)

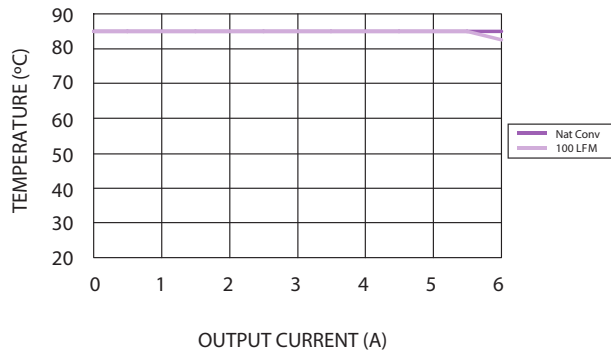


Figure 3 - Safe Operating Area for PTH12050L  
 Vin = 12 V, Output Voltage = 1.8 V (See Note A)

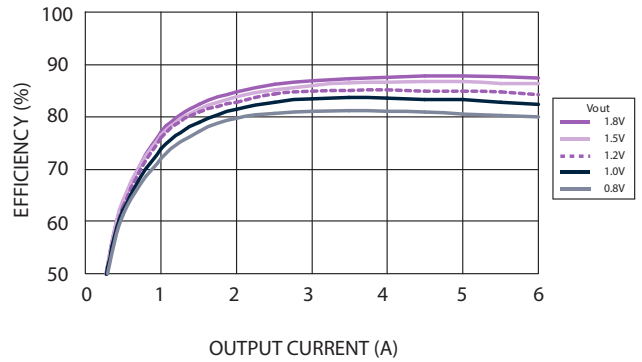


Figure 4 - Efficiency vs Load Current for PTH12050L  
 Vin = 12 V (See Note B)

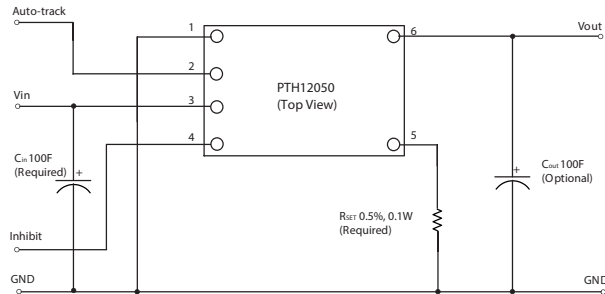


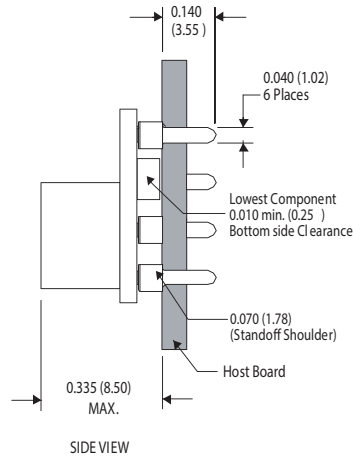
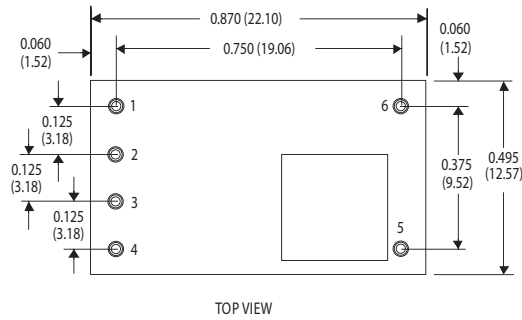
Figure 5 - Standard Application - All Models

Notes:

- A. SOA curves represent the conditions at which internal components are within the Artesyn derating guidelines.
- B. Characteristic data has been developed from actual products tested at 25 °C. This data is considered typical data for the converter.

## Mechanical Drawings

### Plated through-hole

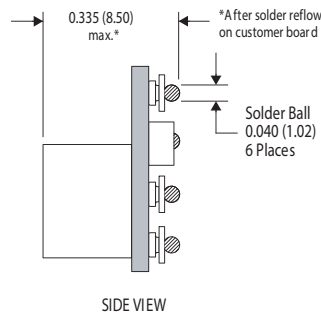
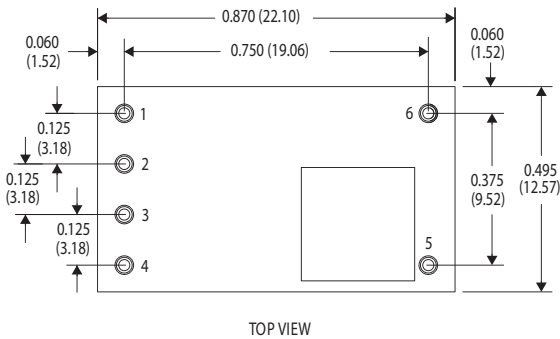


Dimensions in Inches (mm)  
Tolerances (unless otherwise specified)  
2 Places 0.030 (0.76)  
3 Places 0.010 (0.25)

Pin Assignments	
Pin	Function
1	Ground
2	Track
3	Vin
4	Inhibit*
5	Vo adjust
6	Vout

\*Denotes negative logic:  
Open = Normal operation  
Ground = Function active

### Surface-mount



Dimensions in Inches (mm)  
Tolerances (unless otherwise specified)  
2 Places 0.030 (0.76)  
3 Places 0.010 (0.25)

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