PTH12050

12 Vin single output

DC-DC CONVERTERS | POLA Non-isolated | 1

NEW Product

- **6 A output current**
- **12 V input voltage**
- **Wide-output voltage adjust**
  - **1.2 Vdc to 5.5 Vdc for suffix 'W' and 0.8 Vdc to 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**
- **Available RoHS compliant**

The PTH12050 is a next generation series of non-isolated dc-dc converters offering some of the most advanced POL features available in the industry. The primary new feature provides for sequencing between multiple modules, a function, which is becoming a necessity for powering advanced silicon including DSP's, FPGA's and ASIC's requiring controlled power-up and power-down Other industry leading features include efficiencies up to 93%. The PTH12050 has an input voltage of 10.8 Vdc to 13.2 Vdc and offers a wide output voltage range adjustable with external trim resistor, allowing for maximum design flexibility and a pathway for future upgrades.

2 YEAR WARRANTY

All specifications are typical at nominal input, full load at 25 °C unless otherwise stated
C_{in} = 100 µF, C_{out} = 0 µF

SPECIFICATIONS

OUTPUT SPECIFICATIONS

Voltage adjustability (See Note 4)	Suffix 'W' Suffix 'L'		1.2-5.5 Vdc 0.8-1.8 Vdc
Setpoint accuracy			±2.0% Vo
Line regulation			±5 mV typ.
Load regulation			±5 mV typ.
Total regulation			±3.0% Vo
Minimum load			0 A
Ripple and noise 20 MHz bandwidth	Suffix 'W' Suffix 'L'	$V_o \le 2.5$ V $V_o > 2.5$ V $V_o \le 1.0$ V $V_o > 1.0$ V	25 mV pk-pk 1% V_o 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

INPUT SPECIFICATIONS

Input voltage range	(See Note 3)	10.8-13.2 Vdc
Input current	No load	10 mA typ.
Remote ON/OFF	(See Note 1)	Positive logic
Start-up time		1 V/ms
Undervoltage lockout		8.8-0.4 V typ.
Track input voltage	Pin 8 (See Note 6)	±0.3 Vin

EMC CHARACTERISTICS

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

GENERAL SPECIFICATIONS

Efficiency		See Tables on Page 2
Insulation voltage		Non-isolated
Switching frequency Over V_{in} and I_o ranges	Suffix 'W' Suffix 'L'	320 kHz typ. 250 kHz typ.
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

ENVIRONMENTAL SPECIFICATIONS

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

PROTECTION

Short-circuit	Auto reset	14 A typ.

International Safety Standard Approvals

UL/cUL CAN/CSA-C22.2 No. 60950-1-03/UL 60950-1, File No. E174104

*Auto-track™ is a trade mark of Texas Instruments

PTH12050

12 Vin single output

For the most current data and application support visit www.artesyn.com/powergroup/products.htm

NEW Product

OUTPUT POWER (MAX.)	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT (MIN.)	OUTPUT CURRENT (MAX.)	EFFICIENCY (MAX.)	REGULATION		MODEL NUMBER (9,10)
						LINE	LOAD	
33 W	10.8-13.2 Vdc	0.8-1.8 Vdc	0 A	6 A	88%	±5 mV	±5 mV	PTH12050L
33 W	10.8-13.2 Vdc	1.2-5.5 Vdc	0 A	6 A	93%	±5 mV	±5 mV	PTH12050W

Part Number System with Options

P T H 1 2 0 5 0 W A S T

Product Family
Point of Load Alliance Compatible

Input Voltage
12 = 12 V

Output Current
05 = 6 A

Mechanical Package
Always 0

Packaging Options
No Suffix = Trays
T = Tape and Reel (7)

Mounting Option (9)
D = Horizontal Through-Hole (Matte Sn)
H = Horizontal Through-Hole (Sn/Pb)
S = Surface-Mount (63/37 Sn/Pb pin solder material)
Z = Surface-Mount (96.5/3.0/0.5 Sn/Ag/Cu pin solder material)

Pin Option
A = Through-Hole Std. Pin Length (0.140")
A = Surface-Mount Tin/Lead Solder Ball

Output Voltage Code
W = Wide. L = Low Voltage

Output Voltage Adjustment of the PTH12050 Series

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 V to 5.5 V for suffix '-W' and 0.8 V to 1.8 V 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 0.8V for the PTH12050L.

Notes

1. Remote ON/OFF. Positive Logic
   ON: Pin 3 open; or V > Vin - 0.5 V
   OFF: Pin 3 GND; or V < 0.8 V (min - 0.2 V).
2. See Figure 1 for safe operating curve.
3. A 100 µF 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 µF ceramic capacitor, required for output voltages of 3.3 V and higher.
4. An external output capacitor is not required for basic operation. Adding 100 µF of distributed capacitance at the load will improve the transient response.
5. 1 A/µs load step, 50 to 100% I_{omax}, C_{out} = 100 µF.
6. If utilized Vout will track applied voltage by ±0.3 V (up to Vo set point).
7. Tape and reel packaging only available on the surface-mount versions.
8. The pk-pk output ripple voltage is measured with an external 10µF ceramic capacitor. See Figure 3 Standard application schematic.
9. To order Pb-free (RoHS compatible) surface-mount parts replace the mounting option 'S' with 'Z', e.g. PTH12050WAZ. To order Pb-free (RoHS compatible) through-hole parts replace the mounting option 'H' with 'D', e.g. PTH12050WAD.
10. 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/powergroup/products.htm to find a suitable alternative.

EFFICIENCY TABLE - PTH12050W (I_O = 5 A)

OUTPUT VOLTAGE	EFFICIENCY
Vo = 5.0 V	93%
Vo = 3.3 V	91%
Vo = 2.5 V	89%
Vo = 2.0 V	88%
Vo = 1.8 V	87%
Vo = 1.5 V	86%
Vo = 1.2 V	84%

EFFICIENCY TABLE - PTH12050L (I_O = 5 A)

OUTPUT VOLTAGE	EFFICIENCY
Vo = 1.8 V	88%
Vo = 1.5 V	87%
Vo = 1.2 V	85%
Vo = 1.0 V	83%
Vo = 0.8 V	81%

PTH12050W Characteristic Data

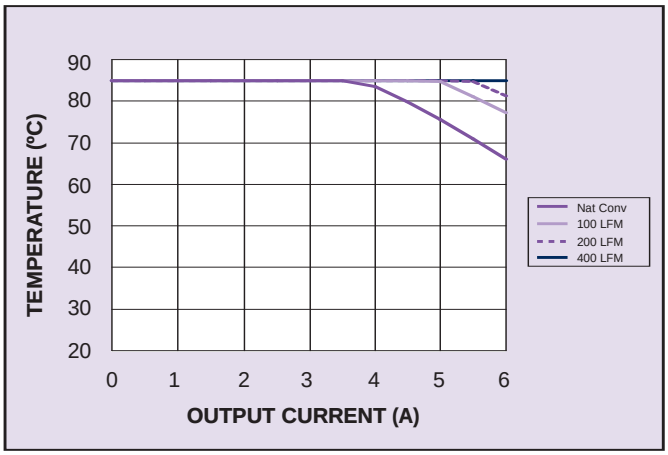


Figure 1 - Safe Operating Area for PTH12050W
Vin = 12 V, Output Voltage = 3.3 V (See Note A)

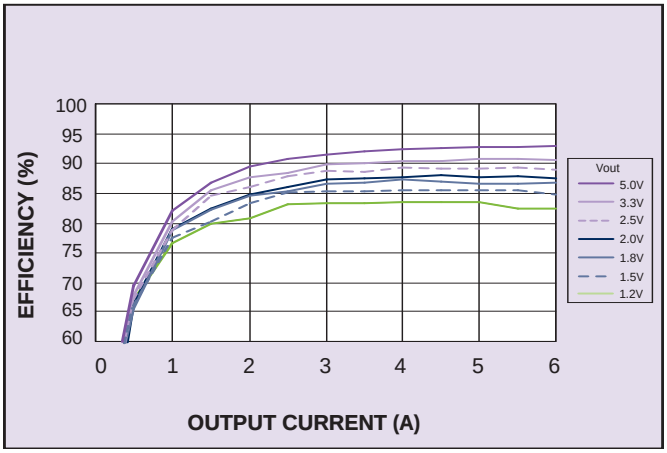


Figure 2 - Efficiency vs Load Current for PTH12050W
Vin = 12 V (See Note B)

PTH12050L Characteristic Data

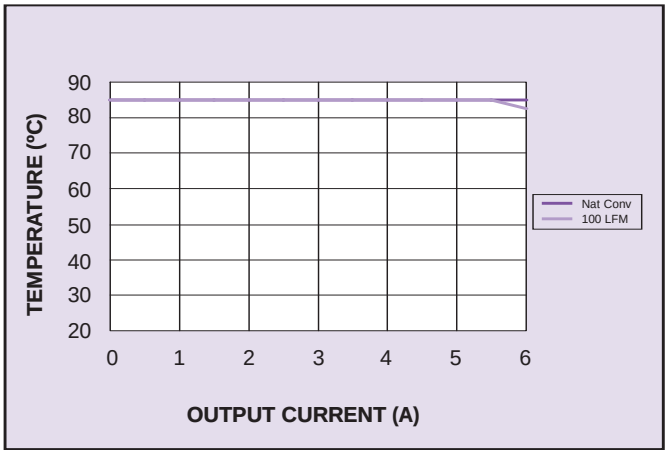


Figure 3 - Safe Operating Area for PTH12050L
Vin = 12 V, Output Voltage ≤ 1.8 V (See Note A)

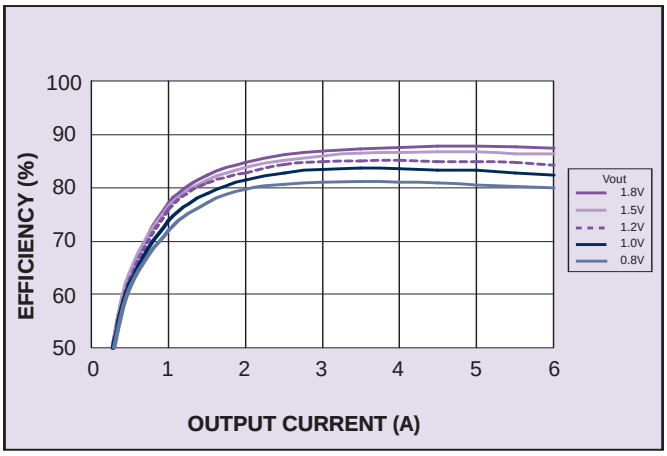
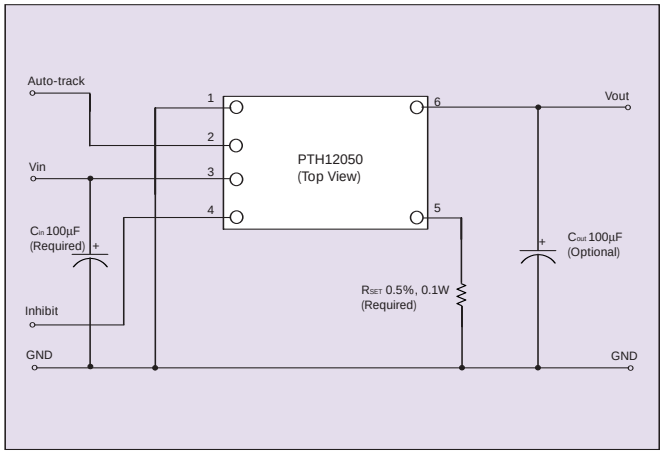


Figure 4 - Efficiency vs Load Current for PTH12050L
Vin = 12 V (See Note B)



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.

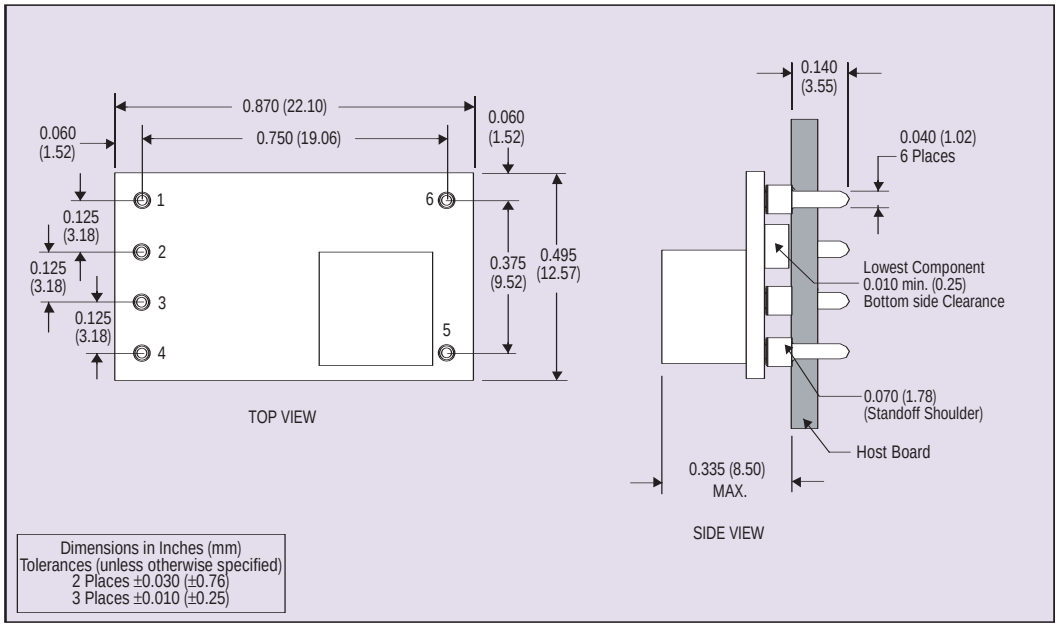


Figure 6 - Plated Through-Hole Mechanical Drawing

PIN CONNECTIONS	
PIN NO.	FUNCTION
1	Ground
2	Track
3	Vin
4	Inhibit*
5	Vo adjust
6	Vout

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

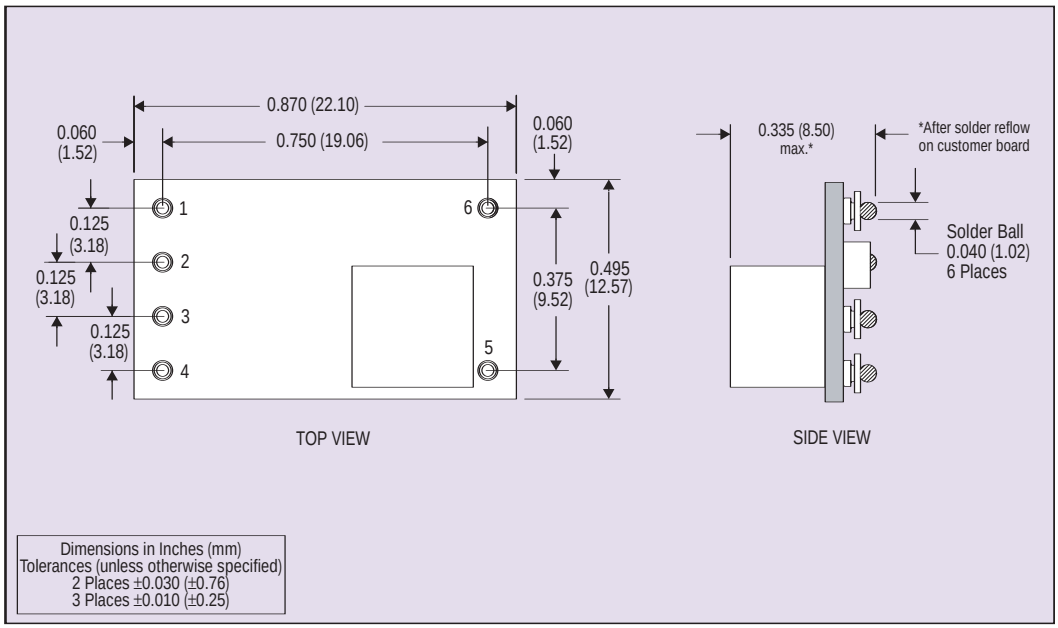


Figure 7 - Surface-Mount Mechanical Drawing