

ARTESYN PTH05050

5 Vin Single Output



Advanced Energy's Artesyn PTH05050 series non-isolated DC-DC converter complies with the Point-of-Load Alliance (POLA) standard. It offers some of the most advanced POL functions in the industry, including Auto-Track™ sequencing for controlled power-up/power-down of complex semiconductor devices such as DSPs, FPGAs and ASICs. Standard features include pre-bias startup, input undervoltage lockout, remote sense, remote On/Off and auto resetting short-circuit protection.

PTH05050 series converters have an input voltage range of 4.5 to 5.5 Vdc and an output voltage that can be trimmed from 0.8 to 3.6 Vdc to meet a wide variety of semiconductor power needs. Rated at 21.6 watts, the converters offer up to 95% efficiency and can deliver up to 6 amps. Available in through-hole horizontal mount and surface-mount versions, they have a small 0.5 x 0.87 inch (12.7 x 22.1 mm) footprint and an installed height of just 0.33 inch (8.5 mm).

DATA SHEET

Total Power:

21.6 Watts

Input Voltage:

4.5 - 5.5 Vdc

of Outputs:

Single



*Auto-track is a trademark of Texas Instruments.

SPECIAL FEATURES

- 6 A output current
- 5 V input voltage
- Wide-output voltage adjust (0.8 V - 3.6 V)
- Auto-track™ sequencing*
- Pre-bias start-up capability
- Efficiencies up to 95%
- 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. E186249
- TÜV Product Service (EN60950) Certificate No. B 06 07 38572 068

ELECTRICAL SPECIFICATIONS

Input		
Input voltage range	(See Note 3)	4.5 - 5.5 Vdc
Input current	No load	10 mA typical
Remote ON/OFF	(See Note 1)	Positive logic
Start-up time		1 V/ms
Undervoltage lockout		3.7 - 4.3 Vdc typical
Track input voltage	Pin 2 (See Notes 6 & 7)	$\pm 0.3 V_{in}$
Output		
Voltage adjustability	(See Note 4)	0.8 - 3.6 Vdc
Setpoint accuracy		$\pm 2.0\% V_o$
Line regulation		± 10 mV typical
Load regulation		± 12 mV typical
Total regulation		$\pm 3.0\% V_o$
Minimum load		0 A
Ripple and noise	20 MHz bandwidth	20 mV pk-pk
Temperature co-efficient	-40 °C to +85 °C	$\pm 0.5\% V_o$
Transient response	(See Note 5)	70 μ s recovery time Overshoot/undershoot 100 mV

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

GENERAL SPECIFICATIONS

Efficiency	(See Efficiency Table)	95% max.
Insulation voltage		Non-isolated
Switching frequency		550 - 650 kHz
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-332F	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 Non-operating temperature	-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	12 A typical

ORDERING INFORMATION

Model Number ⁽⁹⁾	Output Power (Max.)	Input Voltage	Output Voltage	Output Current (Min.)	Output Current (Max.)	Efficiency (Typical)	Regulation ⁽²⁾	
							Line	Load
PTH05050	21.6 W	4.5 - 5.5 Vdc	0.8 - 3.6 V	0 A	6 A	95%	±10 mV	±12 mV

PART NUMBER SYSTEM WITH OPTIONS

Product Family	Input Voltage	Output Current	Mechanical Package	Output Voltage Code	Pin Option ⁽⁸⁾	Mounting Options	Pin Option
PTH	05	05	0	W	A	S	T
Point-of-Load Alliance compatible	05 = 5 V	05 = 6 A	Always 0	W = Wide		D = Horizontal throughhole (RoHS 6/6) Z = Surface-mount solder ball (RoHS 6/6)	No Suffix = Trays T = Tape and Reel ⁽⁸⁾

OUTPUT VOLTAGE ADJUSTMENT

The ultra-wide output voltage trim range offers major advantages to users who select the PTH05050. 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 0.8 Vdc to 3.6 Vdc. When the PTH05050 converter leaves the factory the output has been adjusted to the default voltage of 0.8 V.

Efficiency Table ($I_o = 10\text{ A}$)	
Output Voltage	Efficiency
$V_o = 1.0\text{ V}$	85%
$V_o = 1.2\text{ V}$	87%
$V_o = 1.5\text{ V}$	89%
$V_o = 1.8\text{ V}$	90%
$V_o = 2.0\text{ V}$	91%
$V_o = 2.5\text{ V}$	93%
$V_o = 3.3\text{ V}$	95%

Notes:

- Remote ON/OFF, Positive Logic
ON: Pin 3 open; or $V > V_{in} - 0.5\text{ V}$
OFF: Pin 3 GND; or $V < 0.8\text{ V}$ (min - 0.2 V).
- See Figures 1 for safe operating curves.
- A $100\text{ }\mu\text{F}$ electrolytic input capacitor is required for proper operation. The capacitor must be rated for a minimum of 300 mA rms of ripple current.
- An external output capacitor is not required for basic operation. Adding $100\text{ }\mu\text{F}$ of distributed capacitance at the load will improve the transient response.
- 1 A/ μs load step, 50 to 100% I_{omax} , $C_{out} = 100\text{ }\mu\text{F}$.
- If utilized V_{out} will track applied voltage by $\pm 0.3\text{ V}$ (up to V_o set point).
- The pre-bias start-up feature is not compatible with Auto-Track™. This is because when the module is under Auto-Track™ control, it is fully active and will sink current if the output voltage is below that of a back-feeding source. Therefore to ensure a pre-bias hold-off, one of the following two techniques must be followed when input power is first applied to the module. The Auto-Track™ function must either be disabled, or the module's output held off using the Inhibit pin. Refer to Application Note 158 for more details.
- Tape and reel packaging only available on the surface-mount versions.
- 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> to find a suitable alternative.

OUTPUT VOLTAGE ADJUSTMENT (CONTINUED)

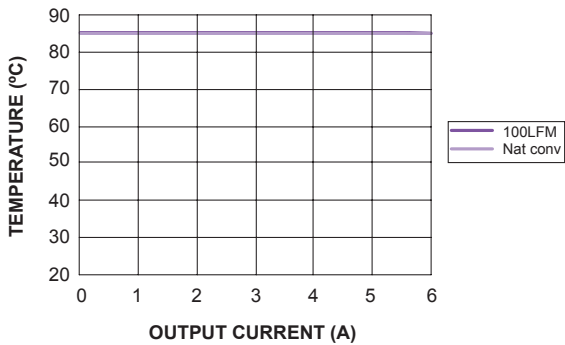


Figure 1 - Safe Operating Area
Vin = 5 V, Output Voltage = 3.3 V (See Note A)

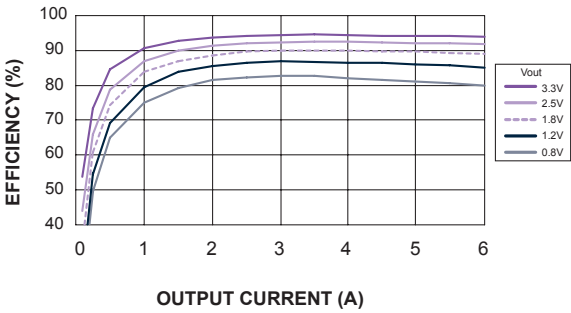


Figure 2 - Efficiency vs Load Current
Vin = 5 V (See Note B)

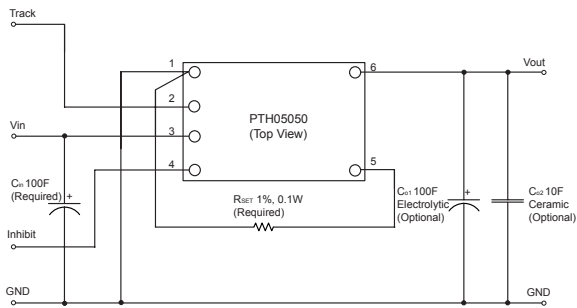
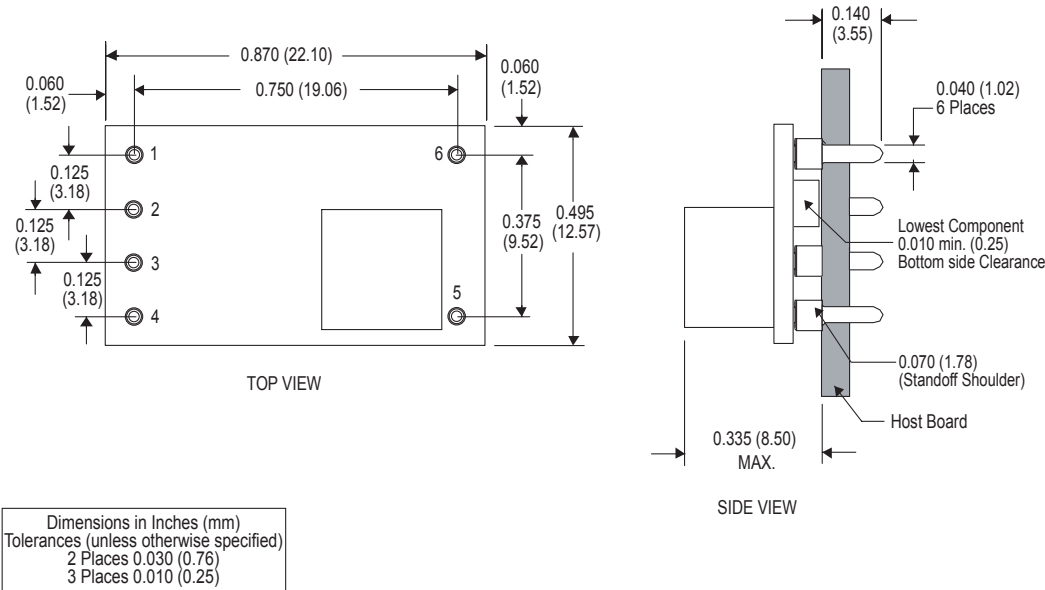


Figure 3 - Standard Application

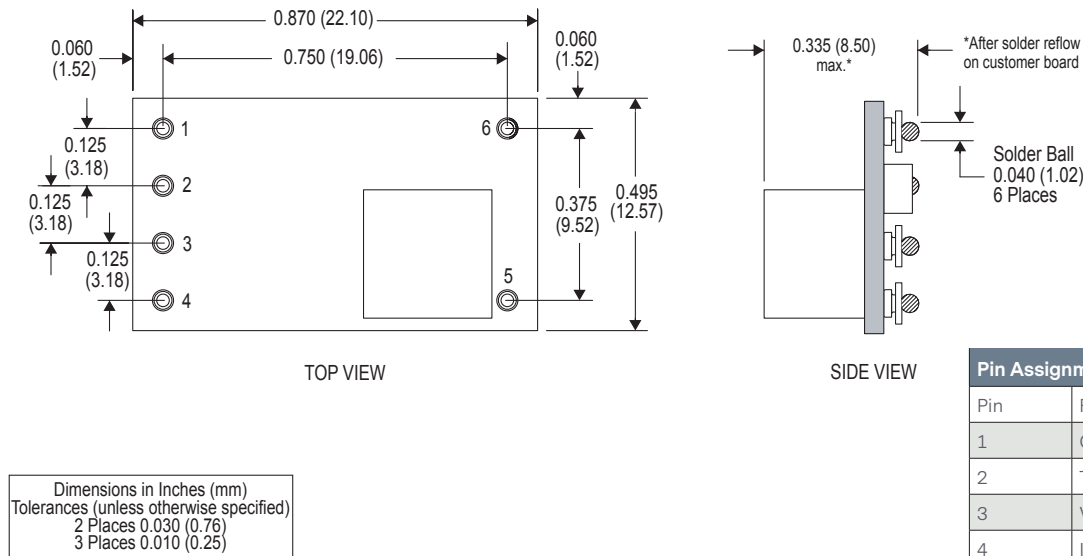
Notes:
A. SOA curves represent the conditions at which internal components are within the Artesyn derating guidelines.
B. Characteristic data has been developed from actual products tested at 25 °C. This data is considered typical data for the converter.

MECHANICAL DRAWINGS

Plated through-hole



Surface-mount



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	



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Our products enable customer innovation in complex applications for a wide range of industries including semiconductor equipment, industrial, manufacturing, telecommunications, data center computing, and medical. With deep applications know-how and responsive service and support across the globe, we build collaborative partnerships to meet rapid technological developments, propel growth for our customers, and innovate the future of power.

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