PTH05060

5 Vin single output

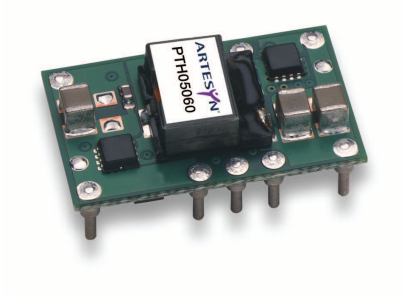
POLA Point-of-Load Alliance

ARTESYN TECHNOLOGIES

DC-DC CONVERTERS | POLA Non-isolated | 1

NEW Product

- **10 A output current**
- **5 V input voltage**
- **Wide-output voltage adjust (0.8 Vdc to 3.6 Vdc)**
- **Auto-track™ sequencing***
- **Margin up/down controls**
- **Pre-bias start-up capability**
- **Efficiencies up to 94%**
- **Output ON/OFF inhibit**
- **Output voltage sense**
- **Point-of-Load-Alliance (POLA) compatible**
- **Available RoHS compliant**



The PTH05060 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 margin up/down controls, pre-bias start-up capability and efficiencies up to 94%. The PTH05060 has an input voltage of 4.5 Vdc to 5.5 Vdc and offers a wide 0.8 Vdc to 3.6 Vdc output voltage range with up to 10 A output current, which allows 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} = 330 µF, C_{out} = 0 µF

SPECIFICATIONS

OUTPUT SPECIFICATIONS

Voltage adjustability	(See Note 4)	0.8-3.6 Vdc
Setpoint accuracy		±2.0% Vo
Line regulation		±10 mV typ.
Load regulation		±12 mV typ.
Total regulation		±3.0% Vo
Minimum load		0 A
Ripple and noise	20 MHz bandwidth	25 mV pk-pk
Temperature co-efficient	-40 ºC to +85 ºC	±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)	4.5-5.5 Vdc
Input current	No load	10 mA typ.
Remote ON/OFF	(See Note 1)	Positive logic
Start-up time		1 V/ms
Undervoltage lockout		3.7-4.3 V typ.
Track input voltage	Pin 8 (See Note 6, 7)	±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 Efficiency Table)	94% max.
Insulation voltage		Non-isolated
Switching frequency		300 kHz typ. ±25 kHz
Approvals and standards		EN60950 UL/cUL60950
Material flammability		UL94V-0
Dimensions	(L x W x H)	25.27 x 15.75 x 9.00 mm 0.995 x 0.620 x 0.354 in
Weight		3.7 g (0.13 oz)
MTBF	Telcordia SR-332	7,092,000 hours

ENVIRONMENTAL SPECIFICATIONS

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

PROTECTION

Short-circuit	Auto reset	20 A typ.

International Safety Standard Approvals

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

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

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ARTESYN TECHNOLOGIES

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	
36 W	4.5-5.5 Vdc	0.8-3.6 Vdc	0 A	10 A	94%	±10 mV	±12 mV	PTH05060

Part Number System with Options

P T H 0 5 0 6 0 W A S T

Product Family
Point of Load Alliance Compatible

Input Voltage
05 = 5 V

Output Current
06 = 10 A

Mechanical Package
Always 0

Packaging Options
No Suffix = Trays
T = Tape and Reel (8)

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 (95.5/3.8/0.7 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

Output Voltage Adjustment of the PTH05060 Series

The ultra-wide output voltage trim range offers major advantages to users who select the PTH05060. 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 PTH05060 converter leaves the factory the output has been adjusted to the default voltage of 0.8 V.

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 Figures 1 and 2 for safe operating curves.
3. A 330 µF electrolytic input capacitor is required for proper operation. The capacitor must be rated for a minimum of 500 mA rms of ripple current.
4. An external output capacitor is not required for basic operation. Adding 330 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} = 330 µF.
6. If utilized Vout will track applied voltage by ±0.3 V (up to Vo set point).
7. 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 159 for more details.
8. Tape and reel packaging only available on the surface-mount versions.
9. To order Pb-free (RoHS compatible) surface-mount parts replace the mounting option 'S' with 'Z', e.g. PTH05060WAZ. To order Pb-free (RoHS compatible) through-hole parts replace the mounting option 'H' with 'D', e.g. PTH05060WAD.
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 (I_O = 7 A)	
OUTPUT VOLTAGE	EFFICIENCY
Vo = 1.0 V	85%
Vo = 1.2 V	86%
Vo = 1.5 V	89%
Vo = 1.8 V	90%
Vo = 2.0 V	91%
Vo = 2.5 V	92%
Vo = 3.3 V	94%

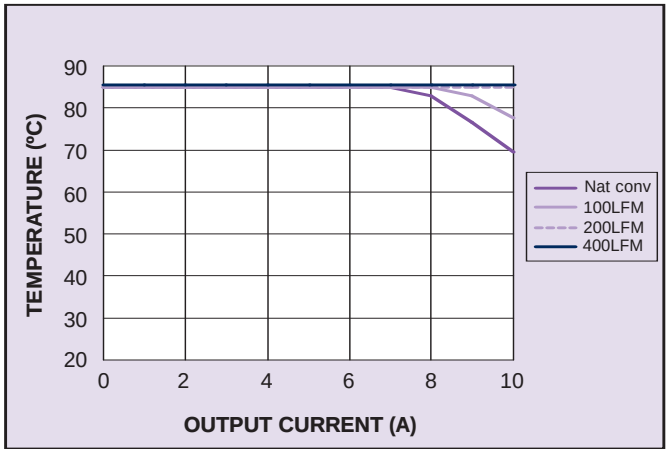

Figure 1 - Safe Operating Area
Vin = 5 V, Output Voltage = 3.3 V (See Note A)

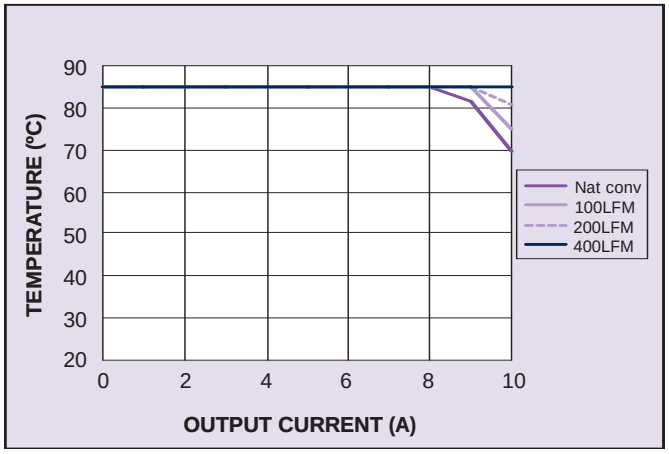

Figure 2 - Safe Operating Area
Vin = 5 V, Output Voltage = 1.0 V (See Note A)

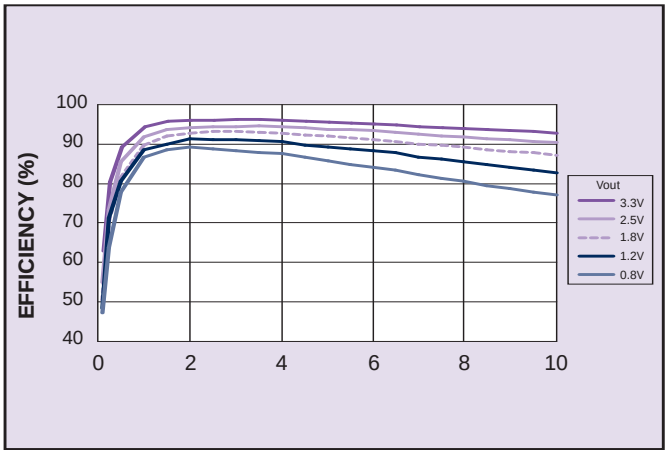

Figure 3 - Efficiency vs Load Current
Vin = 5 V (See Note B)

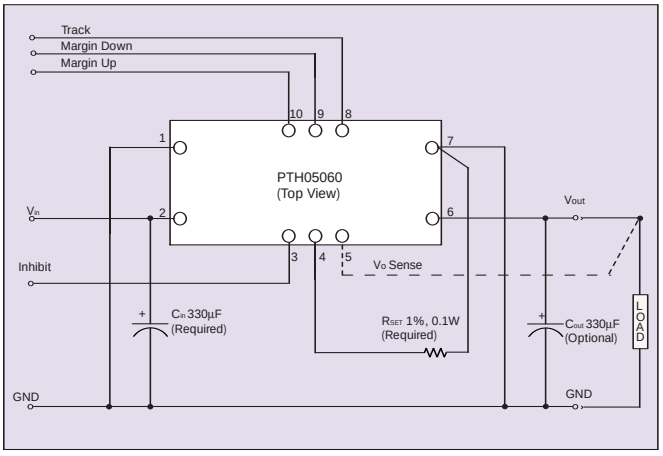

Figure 4 - Standard Application

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.

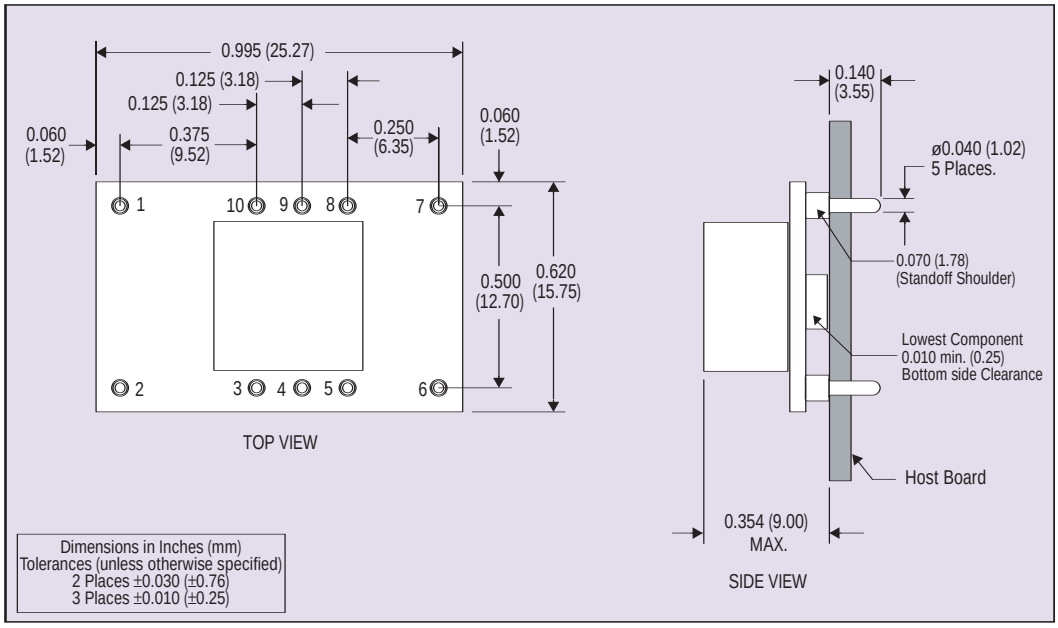

Figure 5 - Plated Through-Hole Mechanical Drawing

PIN CONNECTIONS	
PIN NO.	**FUNCTION**
1	Ground
2	Vin
3	Inhibit*
4	Vo adjust
5	Vo sense
6	Vout
7	Ground
8	Track
9	Margin down*
10	Margin up*

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

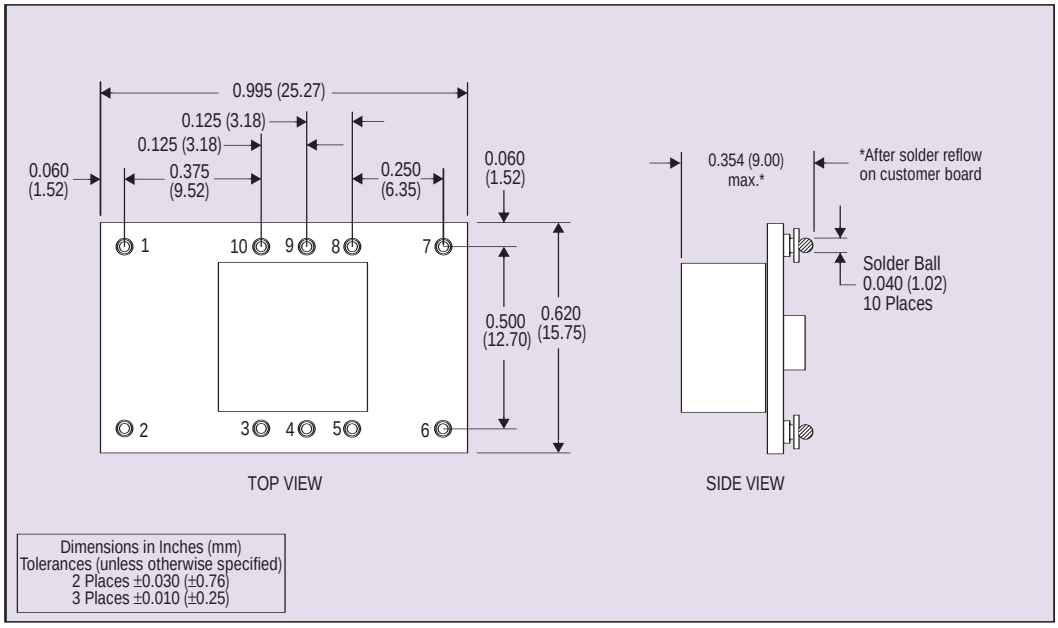

Figure 6 - Surface-Mount Mechanical Drawing