# PTH04040

## 3.3/5 Vin single output

POLA Point-of-Load Alliance

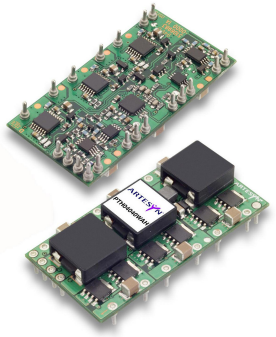
ARTESYN TECHNOLOGIES



NEW Product

- **60 A output current (7)**
- **3.3/5 V input voltage (2.95 Vdc to 5.5 Vdc)**
- **Wide-output voltage adjust (0.8 Vdc to 2.5 Vdc)**
- **Auto-track™ sequencing***
- **Margin up/down controls**
- **Efficiencies up 93%**
- **Output ON/OFF inhibit**
- **Differential remote sense**
- **Programmable input Under-Voltage Lockout (UVLO)**
- **Point-of-Load-Alliance (POLA) compatible**
- **Available RoHS compliant**

The PTH04040 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 and efficiencies up to 96%. The PTH04040 has an input voltage of 2.95 Vdc to 5.5 Vdc and offers a wide 0.8 Vdc to 2.5 Vdc output voltage range with up to 60 A output current, which allows for maximum design flexibility and a pathway for future upgrades.



2 YEAR WARRANTY

## SPECIFICATIONS

***All specifications are typical at nominal input, full load at 25 °C unless otherwise stated***
***$C_{in}$ = 1000 µF, $C_{out}$ = 660 µF***

### OUTPUT SPECIFICATIONS

| | | |
|---|---|---|
| Voltage adjustability | 2.95 ≤ $V_i$ ≤ 4.5 V<br>4.50 ≤ $V_i$ ≤ 5.5 V | 0.8-1.65 Vdc<br>0.8-2.5 Vdc |
| Setpoint accuracy | (See Note 1) | ±2.0% Vo |
| Line regulation | | ±5 mV typ. |
| Load regulation | | ±5 mV typ. |
| Total regulation | (See Note 1) | ±3.0% Vo |
| Minimum load | | 0 A |
| Ripple and noise | 20 MHz bandwidth | 15 mV typ. |
| Transient response<br>(See Note 4) | | 100 µs recovery time<br>Overshoot/undershoot 200 mV |
| Margin adjustment | (See Note 8) | ±5.0% Vo |

### INPUT SPECIFICATIONS

| | | |
|---|---|---|
| Input voltage range | (See Notes 3, 5) | 2.95-5.5 Vdc |
| Input standby current | | 60 mA typ. |
| Remote ON/OFF | (See Note 5) | Negative logic |
| Undervoltage lockout<br>(Pin 8 open) | (See Note 6)<br>On threshold<br>Hysteresis | 6.6-7.5 Vdc typ.<br>2.60 V<br>0.6 V |
| Track input current | Pin 18 (See Note 2) | -0.11 mA |

### EMC CHARACTERISTICS

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

### GENERAL SPECIFICATIONS

| | | |
|---|---|---|
| Efficiency | See Table on page 2 | 93% max. |
| Insulation voltage | | Non-isolated |
| Switching frequency | | 825 MHz |
| Approvals and standards | | EN60950<br>UL/cUL60950 |
| Material flammability | | UL94V-0 |
| Dimensions | (L x W x H) | 51.94 x 26.54 x 9.07 mm<br>2.045 x 1.045 x 0.357 in |
| Weight | | 22.5 g (79 oz) |
| MTBF | Telcordia SR-332 | 2,100,000 hours |

### ENVIRONMENTAL SPECIFICATIONS

| | | |
|---|---|---|
| Thermal performance | Operating ambient, temperature<br>Non-operating | -40 ºC to +85 ºC<br>-40 ºC to +125 ºC |
| MSL ('Z' suffix only) | JEDEC J-STD-020C | Level 3 |

### PROTECTION

| | | |
|---|---|---|
| Overcurrent | Auto reset | 90 A |
| Thermal | | Auto recovery |

**International Safety Standard Approvals**

UL/cUL CAN/CSA-C22.2 No. 60950
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

# PTH04040

## 3.3/5 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.) (7) | EFFICIENCY (MAX.) | REGULATION | | MODEL NUMBER (9,10) |
|---|---|---|---|---|---|---|---|---|
| | | | | | | LINE | LOAD | |
| 150 W | 2.95-5.5 Vdc | 0.8-2.5 Vdc | 0 A | 60 A | 93% | ±5 mV | ±5 mV | PTH04040W |

### Part Number System with Options

**P T H 0 4 0 4 0 W A S**

**Product Family**
Point of Load Alliance Compatible

**Input Voltage**
04 = 2.95 Vdc to 5.5 Vdc

**Output Current**
04 = 60 A

**Mechanical Package**
Always 0

**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

### Output Voltage Adjustment of the PTH04040W Series

The ultra-wide output voltage trim range offers major advantages to users who select the PTH04040W. 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 2.5 Vdc. When the PTH04040W converter leaves the factory the output has been adjusted to the default voltage of 0.8 V.

### Notes

1. The set-point voltage tolerance is affected by the tolerance and stability of $R_{SET}$. The stated limit is unconditionally met if $R_{SET}$ has a tolerance of 1% with 100 ppm/ºC or better temperature stability.
2. This control pin has an internal pull-up to Vin nominal. If it is left open-circuit the module will operate when input power is applied. A small low-leakage (<100 nA) MOSFET is recommend for control. For further information, consult Application Note 192.
3. A 1000 µF input capacitor is required for proper operation. The capacitor must be rated for a minimum of 400 mA rms of ripple current.
4. This is with a 1 A/µs loadstep, 50 to 100% $I_{omax}$. $C_o$ = 660 µF.
5. The minimum input voltage is 2.95 V or 1.34 x $V_o$, whichever is greater.
6. These are default voltages. They may be adjusted using the 'UVLO Prog.' control input. Consult Application Note 192 for further details.
7. See Figures 1 and 2 for safe operating curves. All power pins must be used.
8. A small low-leakage (<100 nA) MOSFET is recommended to control this pin. The opencircuit voltage is less than 1 Vdc.
9. To order Pb-free (RoHS compatible) surface-mount parts replace the mounting option 'S' with 'Z', e.g. PTH04040WAZ. To order Pb-free (RoHS compatible) through-hole parts replace the mounting option 'H' with 'D', e.g. PTH04040WAD.
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 ($I_o$ = 45A) $V_{in}$ = 5 V | |
|---|---|
| OUTPUT VOLTAGE | EFFICIENCY |
| Vo = 2.5 V | 93% |
| Vo = 1.8 V | 90% |
| Vo = 1.5 V | 88% |
| Vo = 1.2 V | 86% |

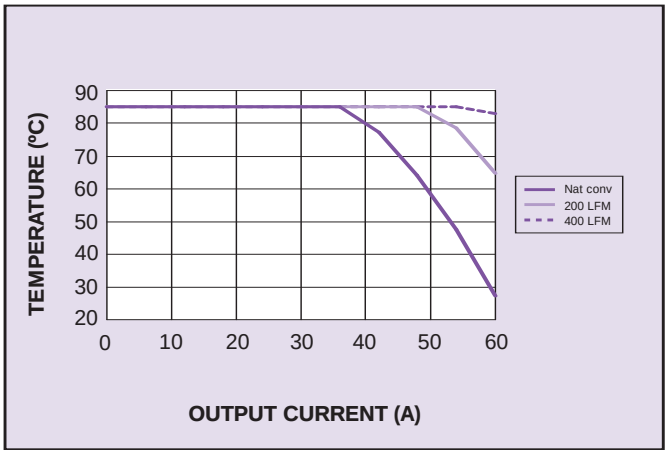



**Figure 1 - Safe Operating Area**
**Vin = 3.3 V (See Note A)**

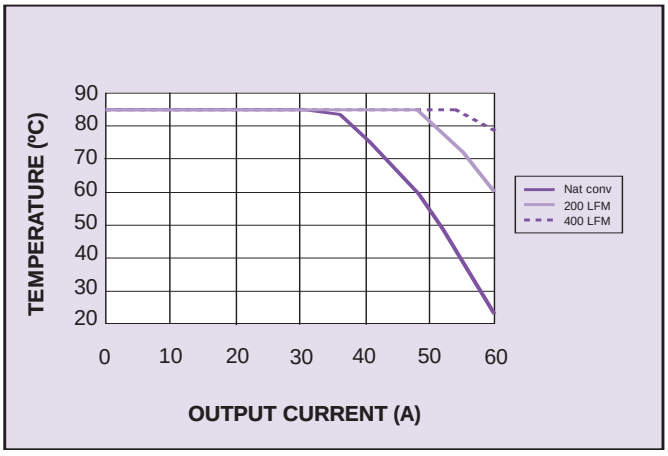



**Figure 2 - Safe Operating Area**
**Vin = 5 V (See Note A)**

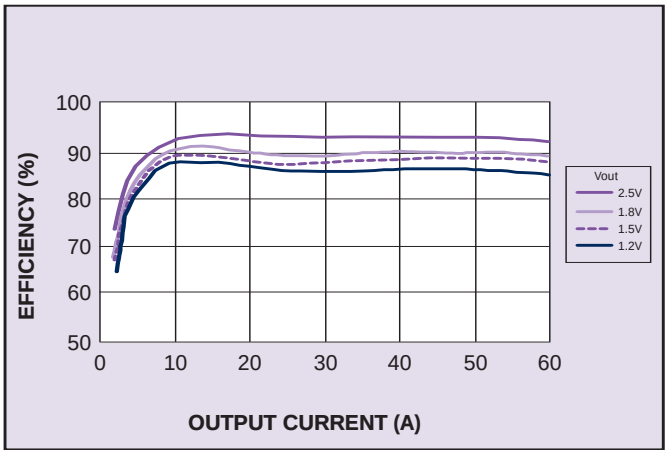



**Figure 3 - Efficiency vs Load Current**
**Vin = 5 V (See Note B)**

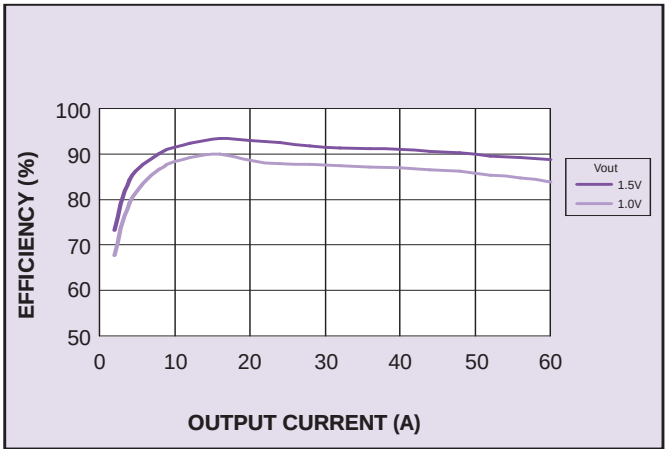



**Figure 4 - Efficiency vs Load Current**
**Vin = 3.3 V (See Note B)**

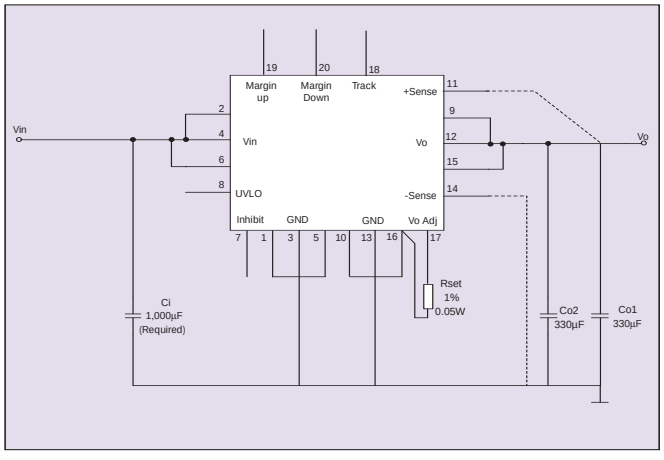



**Figure 5 - Standard Application**

## 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.

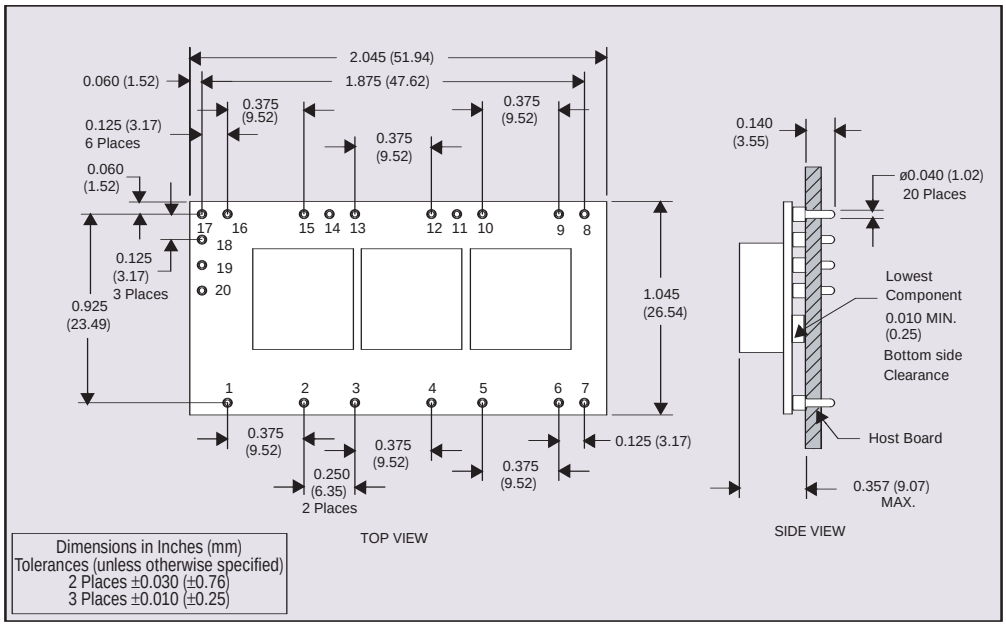



**Figure 6 - Plated Through-Hole Mechanical Drawing**

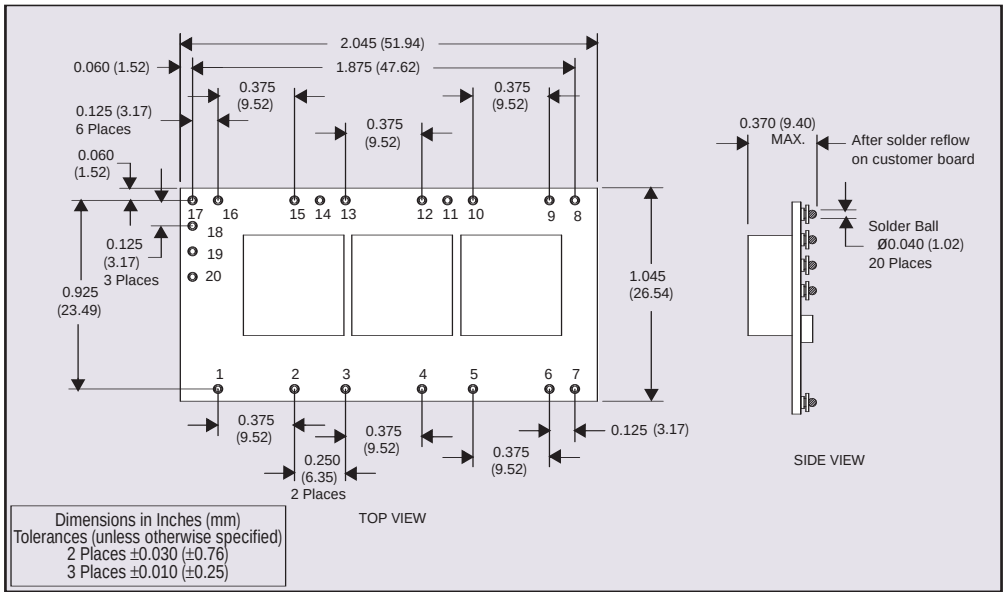



**Figure 7 - Surface-Mount Mechanical Drawing**

| PIN CONNECTIONS | |
|---|---|
| **PIN NO.** | **FUNCTION** |
| 1 | Ground |
| 2 | Vin |
| 3 | Ground |
| 4 | Vin |
| 5 | Ground |
| 6 | Vin |
| 7 | Inhibit* |
| 8 | UVLO Programming |
| 9 | Vout |
| 10 | Ground |
| 11 | Vs+ |
| 12 | Vout |
| 13 | Ground |
| 14 | Vs- |
| 15 | Vout |
| 16 | Ground |
| 17 | Adjust |
| 18 | Track |
| 19 | Margin Up* |
| 20 | Margin Down* |

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

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