

PTH04040

3.3 / 5.0 Vin Single Output

Data Sheet

Total Power: 150 Watts
Input Voltage: 2.95 - 5.5 Vdc
of Outputs: Single

SPECIAL FEATURES

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

SAFETY

- UL/cUL CAN/CSA-C22.2 No. 60950
- File No. E174104
- TÜV Product Service (EN60950) Certificate No. B04 06 38572 044
- CB report and certificate to IEC60950, Certificate No. US/8292/UL



Electrical Specifications

| Input | | |
|-----------------------------------|--|---|
| Input voltage range | (See Note 3, 5) | 2.95 - 5.5 V |
| Input standby current | | 60 mA typical |
| Remote ON/OFF | (See Note 5) | Negative logic |
| Undervoltage lockout (Pin 8 open) | (See Note 6) On threshold Hysteresis | 6.6 - 7.5 Vdc typical 2.60 V 0.6 V |
| Track input voltage | Pin 18 (See Note 2) | -0.11 mA |
| Output | | |
| Voltage adjustability | $2.95 \leq V_i \leq 4.5 \text{ V}$ $4.50 \leq V_i \leq 5.5 \text{ V}$ | 0.8 - 1.65 Vdc 0.8 - 2.5 Vdc |
| Setpoint accuracy | (See Note 1) | ±2.0% Vo |
| Line regulation | | ±5 mV typical |
| Load regulation | | ±5 mV typical |
| Total regulation | (See Note 1) | ±3.0% Vo |
| Minimum load | | 0 A |
| Ripple and noise | 20 MHz bandwidth | 15 mV typical |
| Transient response | (See Note 4) | 100 μs recovery time Overshoot/undershoot 200 mV |
| Margin adjustment | (See Note 8) | ±5.0% Vo |

All specifications are typical at nominal input, full load at 25 °C unless otherwise stated.
 Cin = 1000 μF, Cout = 660 μF.

*Auto-track is a trademark of Texas Instruments.

General Specifications

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

EMC Characteristics

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

Environmental Specifications

| | | |
|-----------------------|--|---------------------------------------|
| Thermal performance | 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 | 90 A typical |
| Thermal | | Auto recovery |

Ordering Information

| Model Number ⁽⁹⁾ | Output Power (Max.) | Input Voltage | Output Voltage | Output Current (Min.) | Output Current (Max.) | Efficiency (Typical) | Regulation | |
|-----------------------------|---------------------|---------------|----------------|-----------------------|-----------------------|----------------------|------------|-------|
| | | | | | | | Line | Load |
| PTH04040W | 150 W | 2.95 - 5.5 V | 0.8 - 2.5 V | 0 A | 60 A | 93% | ±5 mV | ±5 mV |

Part Number System with Options

| Product Family | Input Voltage | Output Current | Mechanical Package | Output Voltage Code | Pin Option | Mounting Options |
|-----------------------------------|---------------------|----------------|--------------------|---------------------|------------|---|
| PTH | 04 | 04 | 0 | W | A | S |
| Point-of-Load Alliance compatible | 04 = 2.95 - 5.5 Vdc | 04 = 60 A | Always 0 | W = Wide | | D = Horizontal through-hole (Matte Sn) Z = Surface-mount (96.5/3.0/0.5 Sn/Ag/Cu pin solder material) |

Output Voltage Adjustment

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.

Efficiency Table (I_o = 45 A; V_{in} = 5 V)

| Output Voltage | Efficiency |
|------------------------|------------|
| V _o = 1.2 V | 86% |
| V _o = 1.5 V | 88% |
| V _o = 1.8 V | 90% |
| V _o = 2.5 V | 93% |

Notes:

- The set-point voltage tolerance is affected by the tolerance and stability of RSET. The stated limit is unconditionally met if RSET has a tolerance of 1% with 100 ppm/°C or better temperature stability.
- This control pin has an internal pull-up to V_{in} nominal. If it is left open-circuit the module will operate when input power is applied. A small low-leakage (<100 nA) MOSFET is recommended for control. For further information, consult Application Note 192.
- 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.
- This is with a 1 A/µs loadstep, 50 to 100% I_{omax}. Co = 660 µF.
- The minimum input voltage is 2.95 V or 1.34 x V_o, whichever is greater.
- These are default voltages. They may be adjusted using the 'UVLO Prog.' control input. Consult Application Note 192 for further details.
- See Figures 1 and 2 for safe operating curves. All power pins must be used.
- A small low-leakage (<100 nA) MOSFET is recommended to control this pin. The open-circuit voltage is less than 1 Vdc.
- 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.

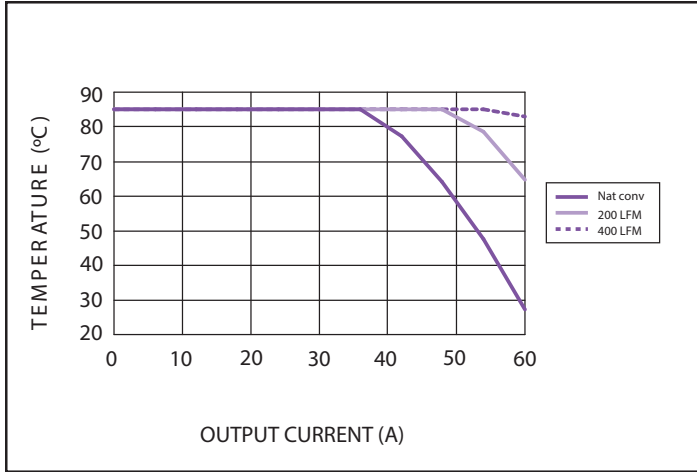


Figure 1 - Safe Operating Area
Vin = 3.3 V (See Note A)

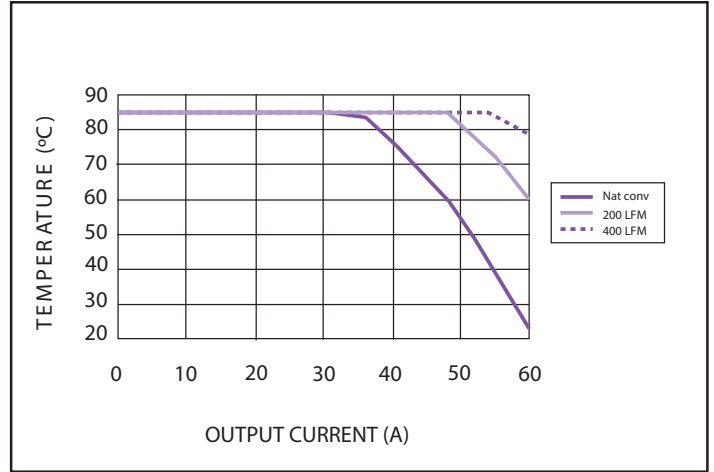


Figure 2 - Safe Operating Area
Vin = 5 V (See Note A)

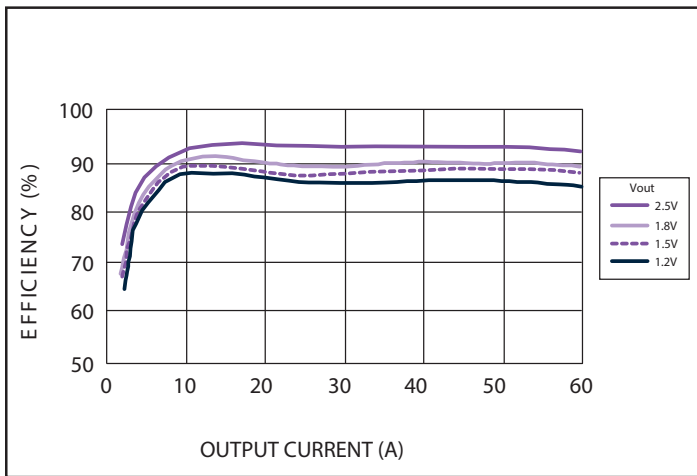


Figure 3 - Efficiency vs Load Current
Vin = 5 V (See Note B)

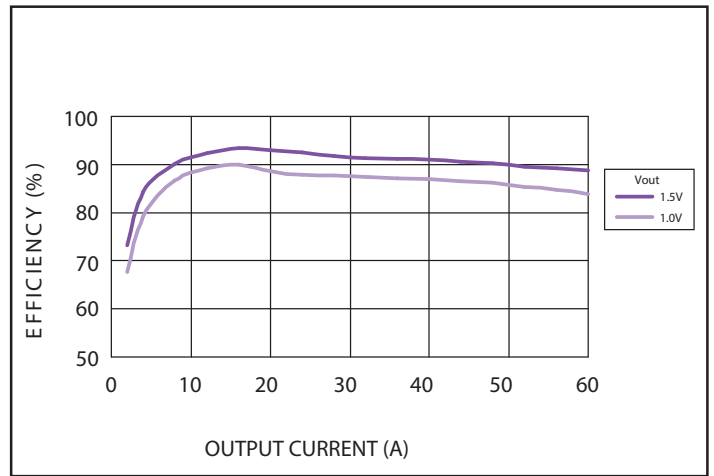


Figure 4 - Efficiency vs Load Current
Vin = 3.3 V (See Note B)

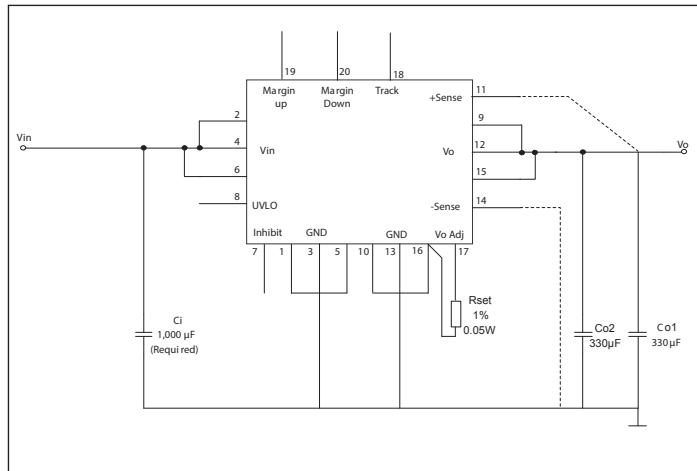


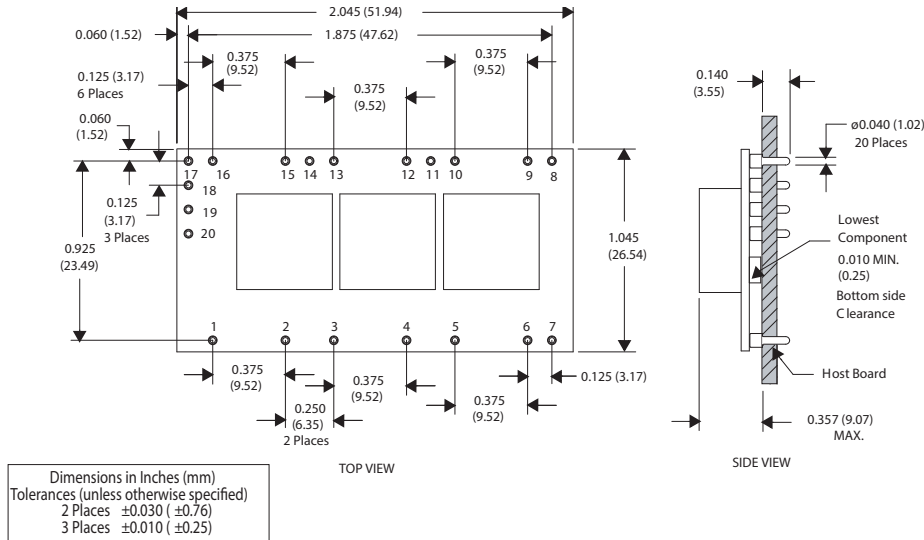
Figure 5 - Standard Application

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.

Mechanical Drawings

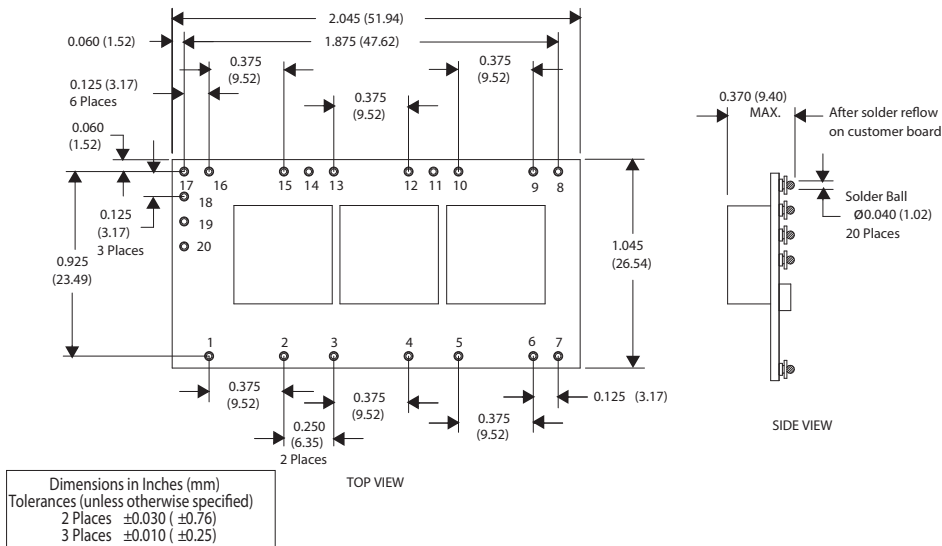
Plated through-hole



| Pin Assignments | |
|-----------------|------------------|
| Pin | 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

Surface-mount



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