

**NEW Product**



- 22 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 96%
- Output ON/OFF inhibit
- Output voltage sense
- Point-of-Load-Alliance (POLA) compatible
- Available RoHS compliant



The PTH05020 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 96%. The PTH05020 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 22 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<sub>in</sub> = 1000 µF, C<sub>out</sub> = 0 µF

## SPECIFICATIONS

### OUTPUT SPECIFICATIONS

|                                    |  |             |
|------------------------------------|--|-------------|
| Voltage adjustability              | (See Note 4)                                       | 0.8-3.6 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                                   | 20 mV pk-pk |
| Temperature co-efficient           | -40 °C to +85 °C                                   | ±0.5% Vo    |
| Transient response<br>(See Note 5) | 70 µs recovery time<br>Overshoot/undershoot 120 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 Vdc 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) | 96% max.  |
| Insulation voltage      |                        | Non-isolated  |
| Switching frequency     |                        | 250 kHz to 340 kHz                                  |
| Approvals and standards |                        | EN60950<br>UL/cUL60950                              |
| Material flammability   |                        | UL94V-0   |
| Dimensions              | (L x W x H)            | 37.97 x 22.10 x 9.00 mm<br>1.495 x 0.870 x 0.354 in |
| Weight                  |                        | 7 g (0.25 oz)                                       |
| MTBF                    | Telcordia SR-332       | 5,236,000 hours                                     |

### ENVIRONMENTAL SPECIFICATIONS

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

### PROTECTION

|               |            |               |
|---------------|------------|---------------|
| Short-circuit | Auto reset | 41 A typ.     |
| Thermal       |            | Auto recovery |

### 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

| OUTPUT POWER (MAX.) | INPUT VOLTAGE | OUTPUT VOLTAGE | OUTPUT CURRENT (MIN.) | OUTPUT CURRENT (MAX.) | EFFICIENCY (MAX.) | REGULATION |       | MODEL NUMBER <sup>(9,10)</sup> |
|---------------------|---------------|----------------|-----------------------|-----------------------|-------------------|------------|-------|--------------------------------|
|                     |               |                |                       |                       |                   | LINE       | LOAD  |                                |
| 79.2 W              | 4.5-5.5 Vdc   | 0.8-3.6 Vdc    | 0 A                   | 22 A                  | 96%               | ±5 mV      | ±5 mV | PTH05020                       |

Part Number System with Options

**PTH05020WAST**

**Product Family**  
Point of Load Alliance  
Compatible

**Input Voltage**  
05 = 5 V

**Output Current**  
02 = 22 A

**Mechanical Package**  
Always 0

**Packaging Options**  
No Suffix = Trays  
T = Tape and Reel <sup>(8)</sup>

**Mounting Option <sup>(9)</sup>**  
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 PTH05020 Series**

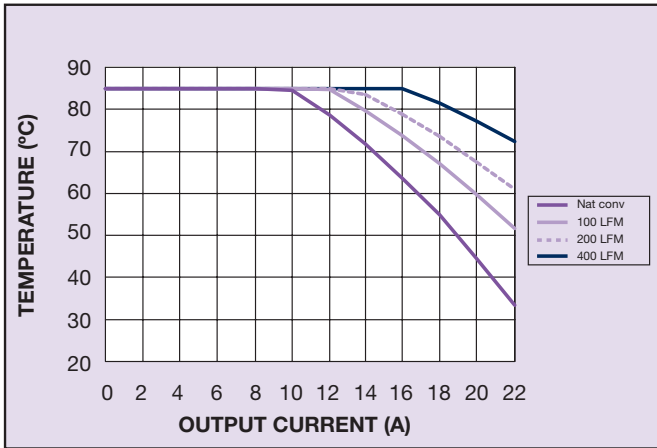
The ultra-wide output voltage trim range offers major advantages to users who select the PTH05020. It is no longer necessary to purchase a variety of modules in order to cover different output voltages. The output voltage can be trimmed in a range of 0.8 Vdc to 3.6 Vdc. When the PTH05020 converter leaves the factory the output has been adjusted to the default voltage of 0.8 V.

**Notes**

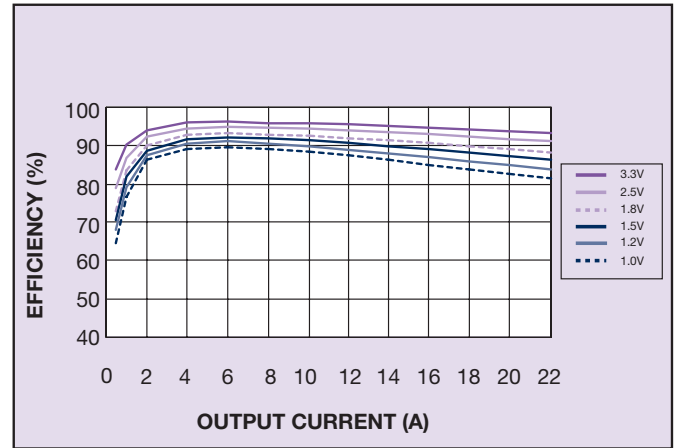
- Remote ON/OFF. Positive Logic  
ON: Pin 3 open; or  $V > V_{in} - 0.5 V$   
OFF: Pin 3 GND; or  $V < 0.8 V$  (min - 0.2 V).
- See Figure 1 for safe operating curve.
- A 1,000  $\mu F$  electrolytic input capacitor is required for proper operation. The capacitor must be rated for a minimum of 700 mA rms of ripple current.
- An external output capacitor is not required for basic operation. Adding 330  $\mu F$  of distributed capacitance at the load will improve the transient response.
- 1 A/ $\mu s$  load step, 50 to 100%  $I_{o,max}$ ;  $C_{out} = 330 \mu F$ .
- If utilized  $V_{out}$  will track applied voltage by  $\pm 0.3 V$  (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 156 for more details.
- Tape and reel packaging only available on the surface-mount versions.
- To order Pb-free (RoHS compatible) surface-mount parts replace the mounting option 'S' with 'Z', e.g. PTH05020WAZ. To order Pb-free (RoHS compatible) through-hole parts replace the mounting option 'H' with 'D', e.g. PTH05020WAD.
- 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 ( $I_o = 10 A$ )**

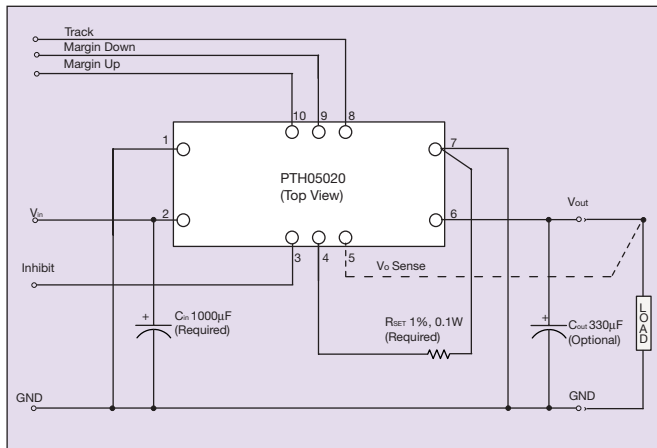
| OUTPUT VOLTAGE | EFFICIENCY |
|----------------|------------|
| $V_o = 1.0 V$  | 88%        |
| $V_o = 1.2 V$  | 90%        |
| $V_o = 1.5 V$  | 91%        |
| $V_o = 1.8 V$  | 92%        |
| $V_o = 2.0 V$  | 93%        |
| $V_o = 2.5 V$  | 94%        |
| $V_o = 3.3 V$  | 96%        |



**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.

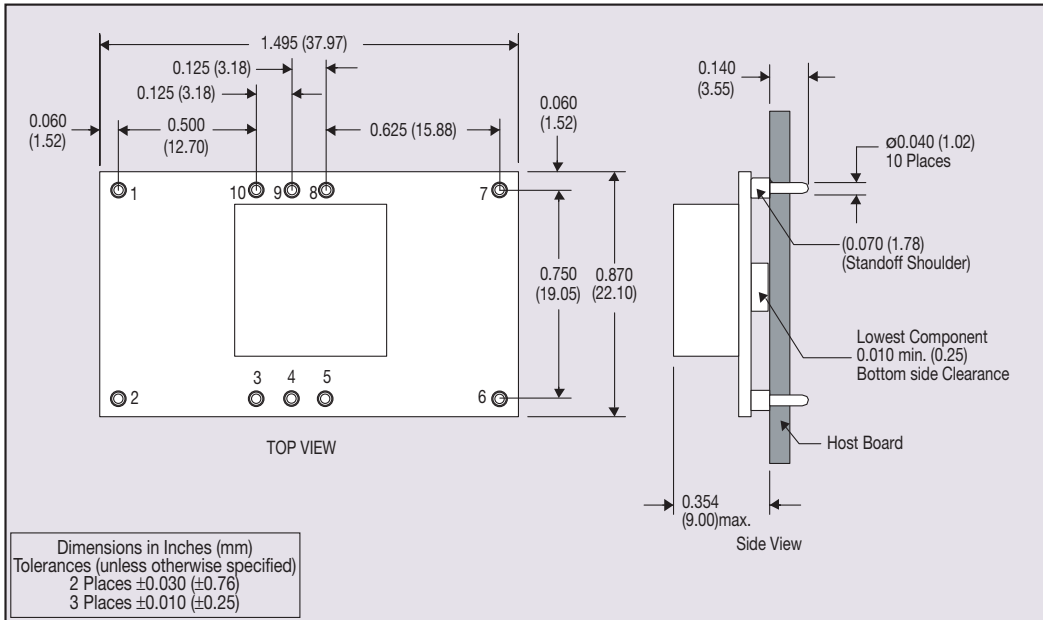


Figure 4 - Plated Through-Hole Mechanical Drawing

| 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*   |

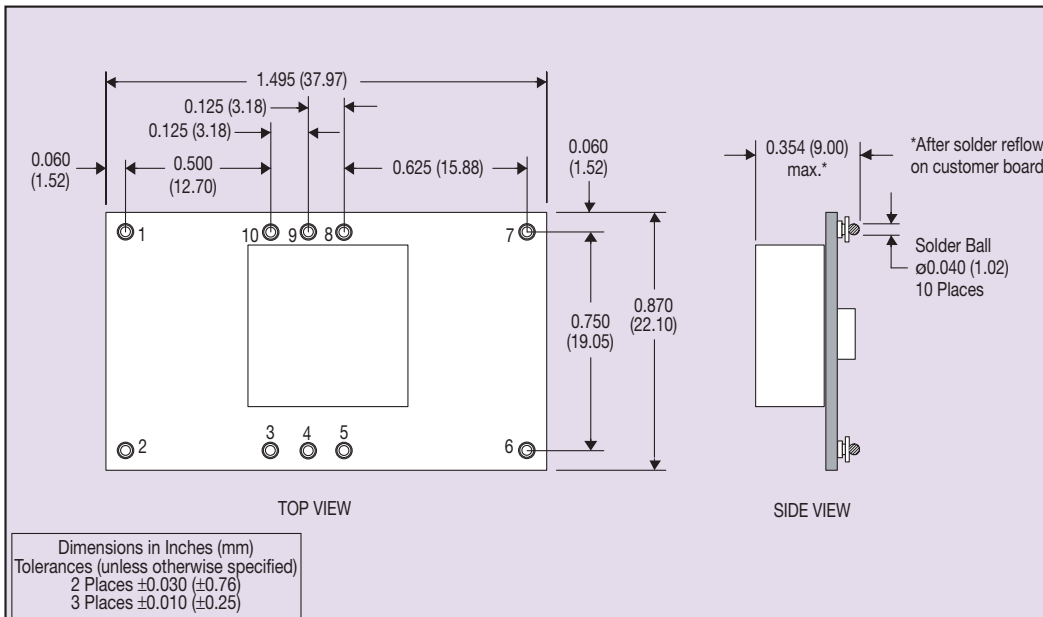


Figure 5 - Surface-Mount Mechanical Drawing

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