# PTH03020

## 3.3 Vin single output

DC-DC CONVERTERS | POLA Non-isolated | 1

**NEW Product**

- **22 A output current**
- **3.3 V input voltage**
- **Wide-output voltage adjust (0.8 Vdc to 2.5 Vdc)**
- **Auto-track™ sequencing***
- **Margin up/down controls**
- **Pre-bias start-up capability**
- **Efficiencies up to 95%**
- **Output ON/OFF inhibit**
- **Output voltage sense**
- **Point-of-Load-Alliance (POLA) compatible**
- **Available RoHS compliant**




The PTH03020 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 95%. The PTH03020 has an input voltage of 2.95 Vdc to 3.65 Vdc and offers a wide 0.8 Vdc to 2.5 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***
***$C_{in}$ = 1000 µF, $C_{out}$ = 0 µF***

## SPECIFICATIONS

### OUTPUT SPECIFICATIONS

| | | |
|---|---|---|
| Voltage adjustability | (See Note 4) | 0.8-2.5 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 (See Note 5) | | 50 µs recovery time Overshoot/undershoot 100 mV |
| Margin adjustment | | ±5.0% Vo |

### INPUT SPECIFICATIONS

| | | |
|---|---|---|
| Input voltage range | (See Note 3) | 2.95-3.65 Vdc |
| Input current | No load | 10 mA typ. |
| Remote ON/OFF | (See Note 1) | Positive logic |
| Start-up time | | 1 V/ms |
| Undervoltage lockout | | 2.7-2.8 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) | 95% max. |
| Insulation voltage | | Non-isolated |
| Switching frequency | | 250 kHz to 340 kHz |
| Approvals and standards | | EN60950 UL/cUL60950 |
| Material flammability | | UL94V-0 |
| Dimensions | (L x W x H) | 37.97 x 22.10 x 9.00 mm 1.495 x 0.870 x 0.354 in |
| Weight | | 5 g (0.18 oz) |
| MTBF | Telcordia SR-332 | 5,236,000 hours |

### ENVIRONMENTAL SPECIFICATIONS

| | | |
|---|---|---|
| Thermal performance (See Note 2) | Operating ambient, temperature | -40 °C to +85 °C |
| | Non-operating | -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

# PTH03020

## 3.3 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.) | EFFICIENCY (MAX.) | REGULATION | | MODEL NUMBER (9) |
|---|---|---|---|---|---|---|---|---|
| | | | | | | LINE | LOAD | |
| 55 W | 2.95-3.65 Vdc | 0.8-2.5 Vdc | 0 A | 22 A | 95% | ±5 mV | ±5 mV | PTH03020 |

### Part Number System with Options

**P T H 0 3 0 2 0 W A S T**

**Product Family**
Point of Load Alliance Compatible

**Input Voltage**
03 = 3.3 V

**Output Current**
02 = 22 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 (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 Balll

**Output Voltage Code**
W = Wide

### Output Voltage Adjustment of the PTH03020 Series

The ultra-wide output voltage trim range offers major advantages to users who select the PTH03020. 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 PTH03020 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 Figure 1 for safe operating curve.
3 A 1,000 µF electrolytic input capacitor is required for proper operation. The capacitor must be rated for a minimum of 700 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 151 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. PTH03020WAZ. To order Pb-free (RoHS compatible) through-hole parts replace the mounting option 'H' with 'D', e.g. PTH03020WAD.
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 ($I_O$ = 10 A) | |
|---|---|
| OUTPUT VOLTAGE | EFFICIENCY |
| Vo = 1.0 V | 88% |
| Vo = 1.2 V | 90% |
| Vo = 1.5 V | 91% |
| Vo = 1.8 V | 93% |
| Vo = 2.0 V | 95% |
| Vo = 2.5 V | 95% |

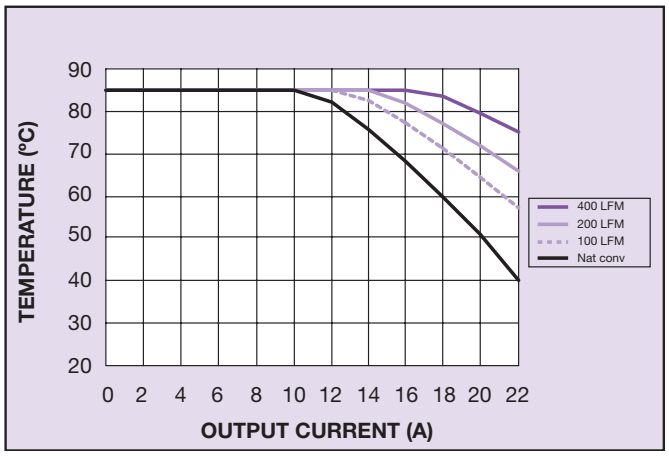



**Figure 1 - Safe Operating Area**
**Vin = 3.3 V, Output Voltage = 2.5 V (See Note A)**

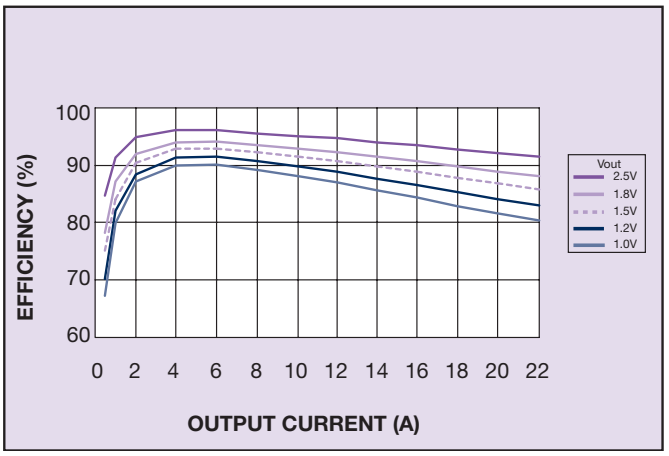



**Figure 2 - Efficiency vs Load Current**
**Vin = 3.3 V (See Note B)**

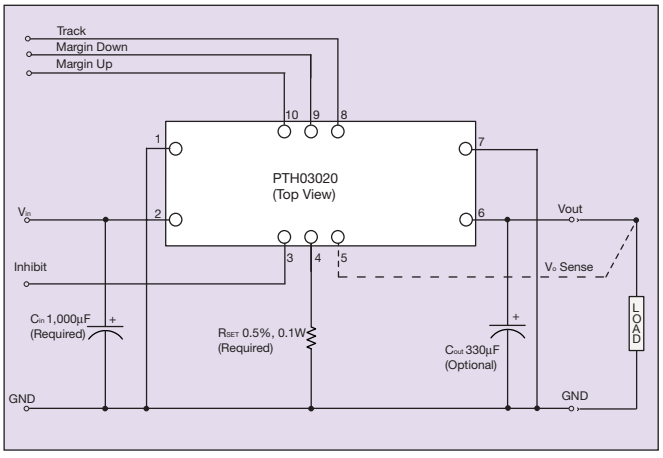



**Figure 3 - Standard Application**

## 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.

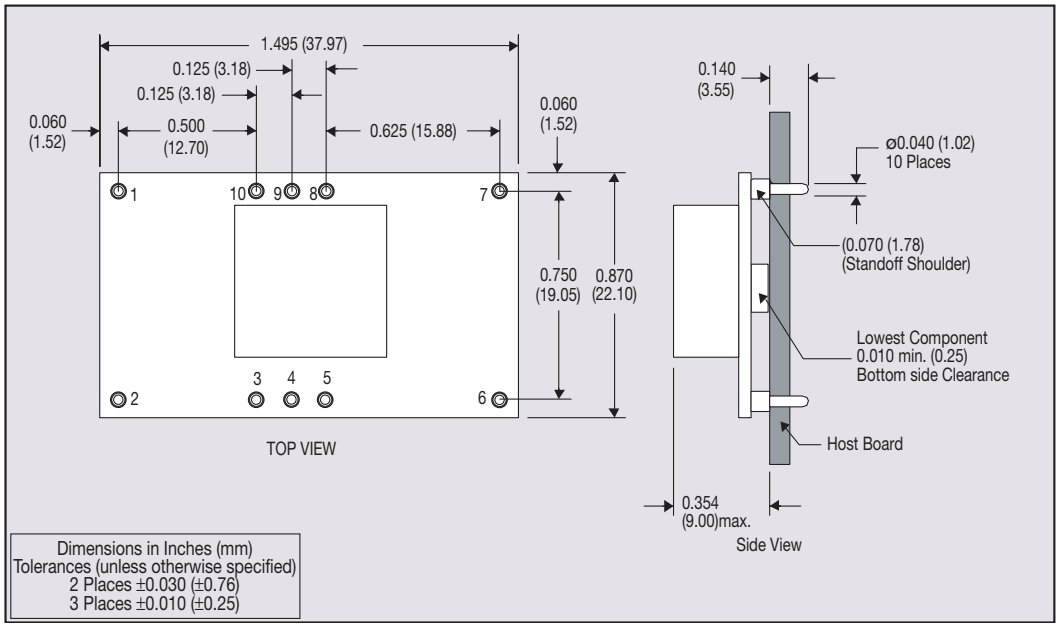



**Figure 4 - Plated Through-Hole Mechanical Drawing**

| 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* |

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

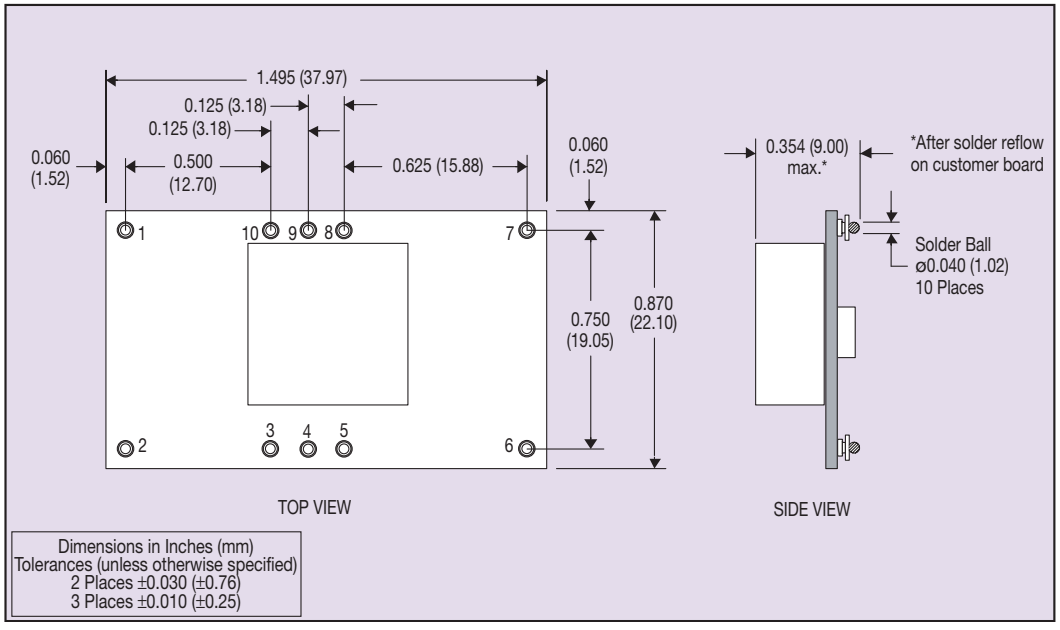



**Figure 5 - Surface-Mount Mechanical Drawing**

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