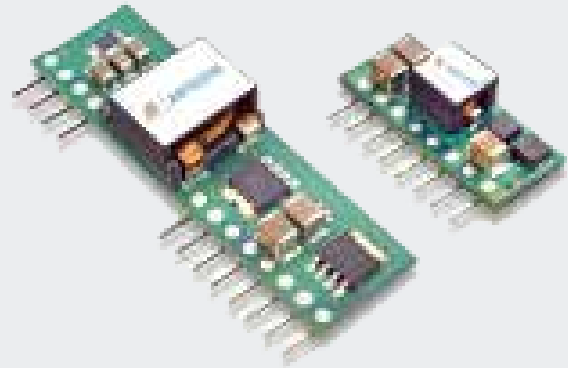


ARTESYN PTH03020

3.3 Vin Single Output



Advanced Energy's Artesyn PTH03020 series non-isolated DC-DC converter complies with the Point-of-Load Alliance (POLA) standard. It offers some of the most advanced POL functions in the industry, including Auto-Track™ sequencing for controlled power-up/power-down of complex semiconductor devices such as DSPs, FPGAs and ASICs, and voltage margining. Standard features include pre-bias startup, input undervoltage lockout, remote sense, remote On/Off and auto resetting short-circuit protection. PTH03020 series converters have an input voltage range of 2.95 to 3.65 Vdc and an output voltage that can be trimmed from 0.8 to 2.5 Vdc to meet a wide variety of semiconductor power needs. Rated at 55 watts, the converters offer up to 95% efficiency and can deliver up to 22 amps. Available in through-hole horizontal mount and surface-mount versions, they have a small 0.87 x 1.5 inch (22.1 x 38 mm) footprint and an installed height of just 0.35 inch (9 mm).

SPECIAL FEATURES

- 22 A output current
- 3.3 V input voltage
- Wide-output voltage adjust (0.8 V - 2.5 V)
- 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
- RoHS compliant
- Two year warranty

SAFETY

- UL/cUL CAN/CSA-C22.2 No. 60950-1-03
- UL 60950-1 File No. E174104
- TÜV Product Service (EN60950) Certificate No. B04 06 38572 044
- CB report and certificate to IEC60950, Certificate No. US/8292/UL

DATA SHEET

Total Power:

55 Watts

Input Voltage:

2.95 - 3.65 Vdc

of Outputs:

Single



*Auto-track is a trademark of Texas Instruments.

ELECTRICAL SPECIFICATIONS

Input		
Input voltage range	(See Note 3)	2.95 - 3.65 V
Input current	No load	10 mA typical
Remote ON/OFF	(See Note 1)	Positive logic
Start-up time		1 V/ms
Undervoltage lockout		2.7 - 2.8 V typical
Track input voltage	Pin 8 (See Note 6, 7)	±0.3 V _{in}
Output		
Voltage adjustability	(See Note 4)	0.8 - 2.5 V _{dc}
Setpoint accuracy		±2.0% V _o
Line regulation		±5 mV typical
Load regulation		±5 mV typical
Total regulation		±3.0% V _o
Minimum load		0 A
Ripple and noise	20 MHz bandwidth	20 mV pk-pk
Temperature co-efficient	-40 °C to +85 °C	±0.5% V _o
Transient response	(See Note 5)	50 μs recovery time Overshoot/undershoot 100 mV
Margin adjustment		±5.0% V _o

All specifications are typical at nominal input, full load at 25 °C unless otherwise stated. C_{in} = 1000 μF, C_{out} = 0 μF.

GENERAL SPECIFICATIONS

Efficiency	(See Efficiency Table)	95% max.
Insulation voltage		Non-isolated
Switching frequency	Fixed	250 - 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

EMC CHARACTERISTICS

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

ENVIRONMENTAL SPECIFICATIONS

Thermal performance (See Note 2)	Operating ambient temperature	-40 °C to +85 °C
	Non-operating temperature	-40 °C to +125 °C
MSL ('Z' suffix only)	JEDEC J-STD-020C	Level 3
Protection		
Short-circuit	Auto reset	41 A typical
Thermal		Auto recovery

ORDERING INFORMATION

Model Number [®]	Output Power (Max.)	Input Voltage	Output Voltage	Output Current (Min.)	Output Current (Max.)	Efficiency (Typical)	Regulation	
							Line	Load
PTH03020	55 W	2.95 - 3.65 V	0.8 - 2.5 V	0 A	22 A	95%	±5 mV	±5 mV

PART NUMBER SYSTEM WITH OPTIONS

Product Family	Input Voltage	Output Current	Mechanical Package	Output Voltage Code	Pin Option	Mounting Options	Pin Option
PTH	03	02	0	W	A	S	T
Point-of-Load Alliance compatible	03 = 3.3 V	02 = 22 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)	No Suffix = Trays T = Tape and Reel [®]

OUTPUT VOLTAGE ADJUSTMENT

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.

Efficiency Table (Io = 10A)	
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%

Notes:

- 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).
- See Figures 1 for safe operating curves.
- A 1000 µF 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 µF of distributed capacitance at the load will improve the transient response.
- 1 A/µs load step, 50 to 100% Iomax, Cout = 330 µF.
- If utilized Vout will track applied voltage by ±0.3 V (up to Vo 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 151 for more details.
- Tape and reel packaging only available on the surface-mount versions.
- 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> to find a suitable alternative.

OUTPUT VOLTAGE ADJUSTMENT (CONTINUED)

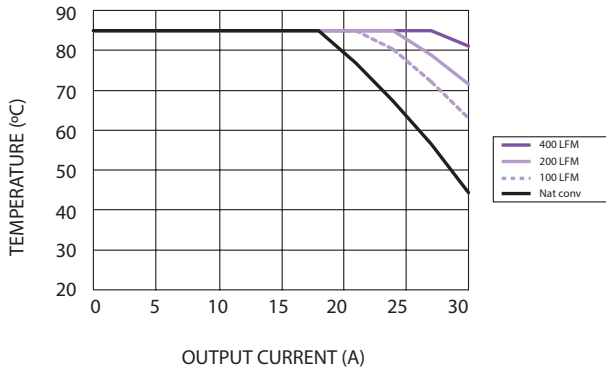


Figure 1 - Safe Operating Area
 Vin = 3.3 V, Output Voltage = 2.5 V (See Note A)

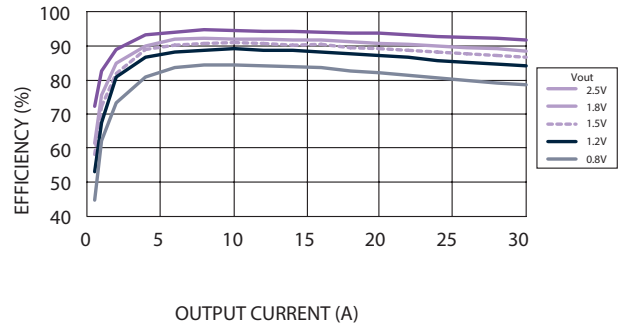


Figure 2 - Efficiency vs Load Current
 Vin = 3.3 V (See Note B)

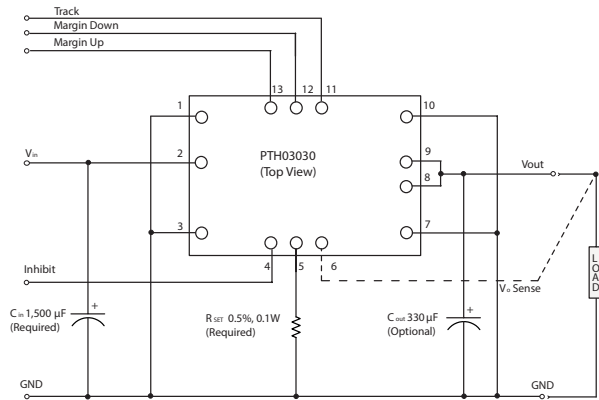


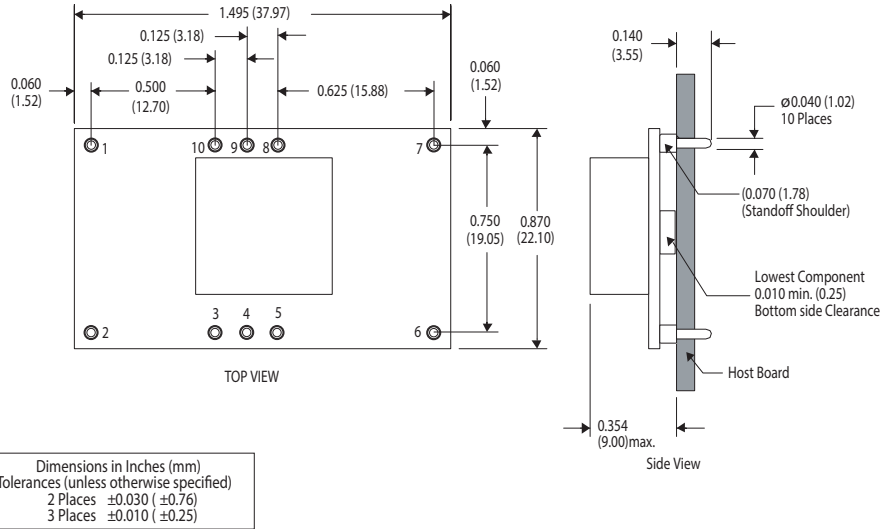
Figure 3 - Standard Application

Notes:

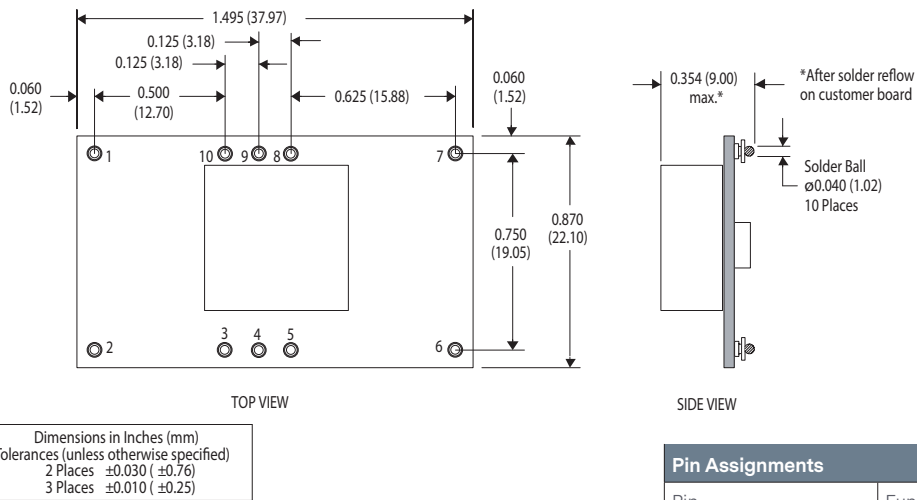
- A. SOA curves represent the conditions at which internal components are within the Artesyn derating guidelines.
- B. Characteristic data has been developed from actual products tested at 25 °C. This data is considered typical data for the converter.

MECHANICAL DRAWINGS

Plated through-hole



Surface-mount



Pin Assignments	
Pin	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



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Our products enable customer innovation in complex applications for a wide range of industries including semiconductor equipment, industrial, manufacturing, telecommunications, data center computing, and medical. With deep applications know-how and responsive service and support across the globe, we build collaborative partnerships to meet rapid technological developments, propel growth for our customers, and innovate the future of power.

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