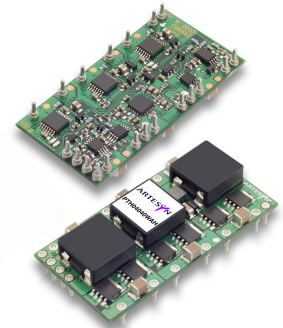


NEW Product

- 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



2 YEAR WARRANTY

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.

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

## SPECIFICATIONS

### OUTPUT SPECIFICATIONS

Voltage adjustability	$2.95 \leq V_i \leq 4.5 V$ $4.50 \leq V_i \leq 5.5 V$	0.8-1.65 Vdc 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 (See Note 4)	100 µs recovery time 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 (Pin 8 open)	(See Note 6) On threshold Hysteresis	6.6-7.5 Vdc typ. 2.60 V 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 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

### ENVIRONMENTAL SPECIFICATIONS

Thermal performance	Operating ambient, temperature Non-operating	-40 °C to +85 °C -40 °C to +125 °C
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

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

**PTH04040WAS**

**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**

- 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/°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  $\mu$ F 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/ $\mu$ s loadstep, 50 to 100%  $I_{Omax}$ .  $C_O = 660 \mu$ F.
- The minimum input voltage is 2.95 V or  $1.34 \times V_O$ , 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.
- 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.
- 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
$V_O = 2.5 V$	93%
$V_O = 1.8 V$	90%
$V_O = 1.5 V$	88%
$V_O = 1.2 V$	86%

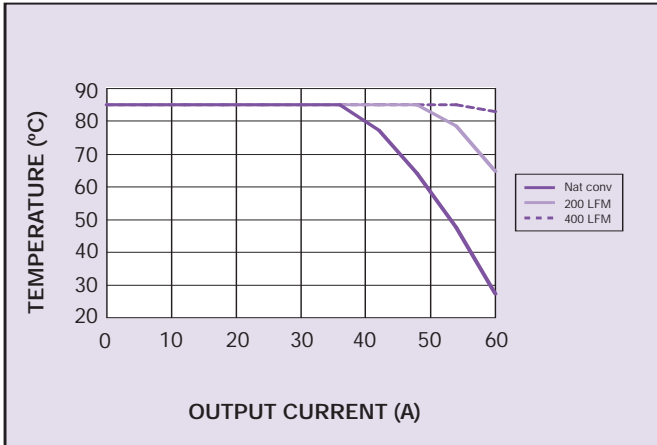


Figure 1 - Safe Operating Area  
Vin = 3.3 V (See Note A)

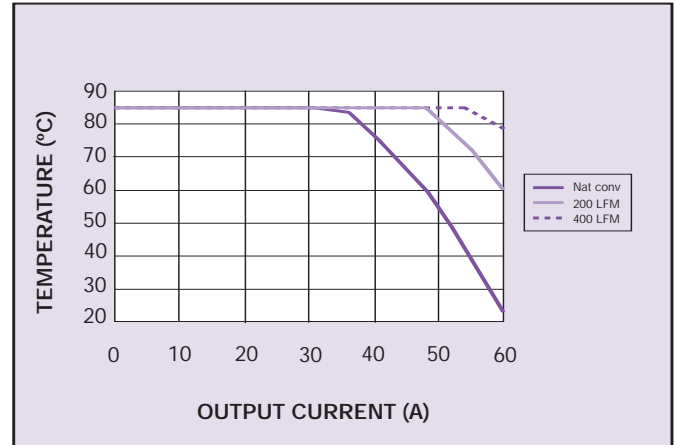


Figure 2 - Safe Operating Area  
Vin = 5 V (See Note A)

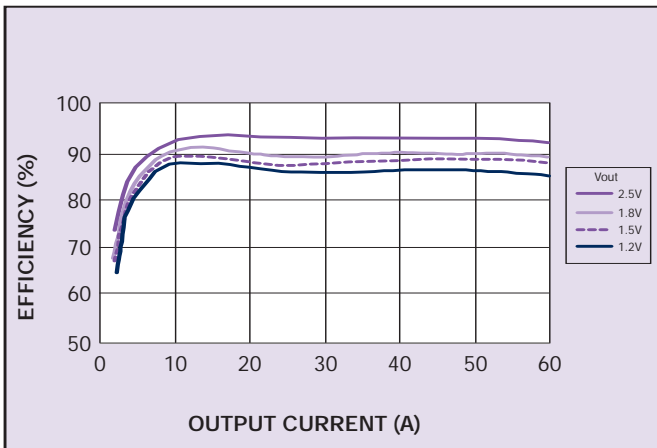


Figure 3 - Efficiency vs Load Current  
Vin = 5 V (See Note B)

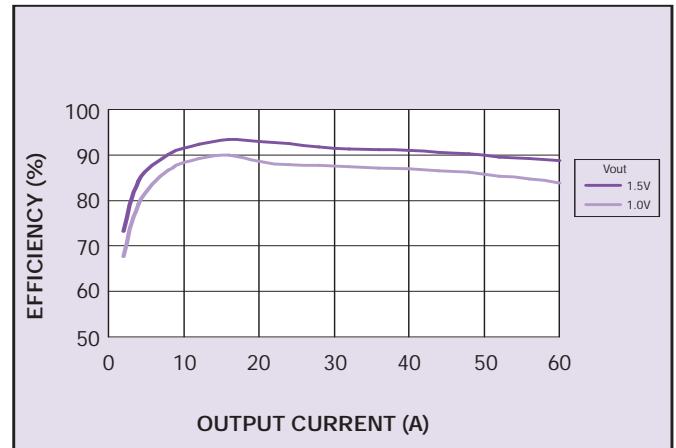


Figure 4 - Efficiency vs Load Current  
Vin = 3.3 V (See Note B)

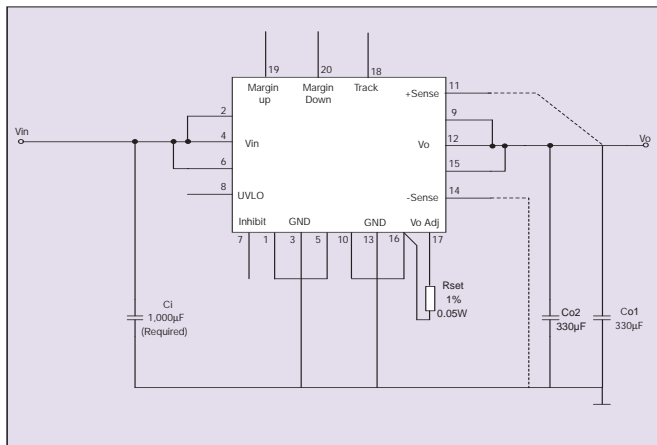


Figure 5 - Standard Application

### 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.

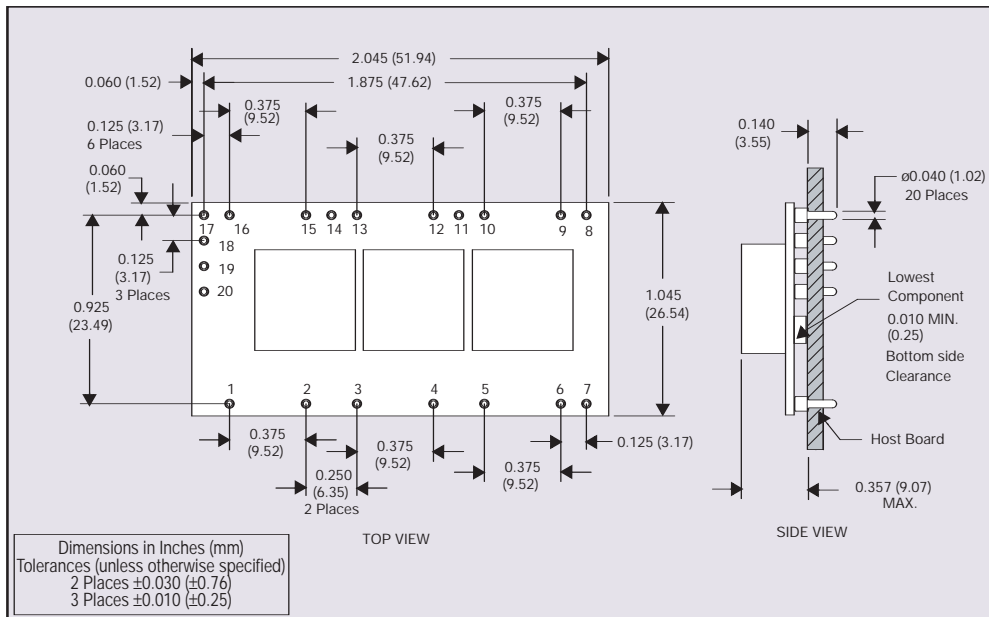


Figure 6 - Plated Through-Hole Mechanical Drawing

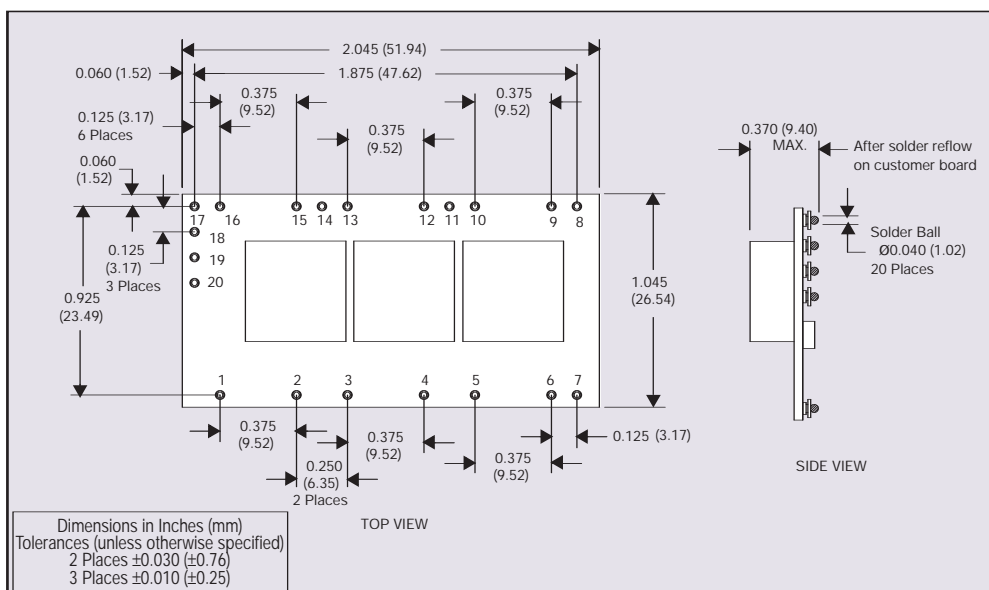


Figure 7 - Surface-Mount Mechanical Drawing

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