PTH04040

3.3/5 Vin single output

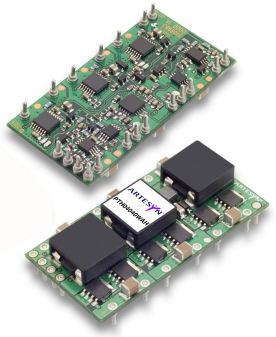
Point-of-Load Alliance

ARTESYN TECHNOLOGIES

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**

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.



2 YEAR WARRANTY

SPECIFICATIONS

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

OUTPUT SPECIFICATIONS

Voltage adjustability	2.95 ≤ V_i ≤ 4.5 V 4.50 ≤ V_i ≤ 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 ºC to +85 ºC -40 ºC to +125 ºC
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

P T H 0 4 0 4 0 W A S

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

1. 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/ºC or better temperature stability.
2. This control pin has an internal pull-up to Vin nominal. If it is left open-circuit the module will operate when input power is applied. A small low-leakage (<100 nA) MOSFET is recommend for control. For further information, consult Application Note 192.
3. 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.
4. This is with a 1 A/µs loadstep, 50 to 100% I_{omax}. C_O = 660 µF.
5. The minimum input voltage is 2.95 V or 1.34 x V_o, whichever is greater.
6. These are default voltages. They may be adjusted using the 'UVLO Prog.' control input. Consult Application Note 192 for further details.
7. See Figures 1 and 2 for safe operating curves. All power pins must be used.
8. A small low-leakage (<100 nA) MOSFET is recommended to control this pin. The opencircuit voltage is less than 1 Vdc.
9. 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.
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 = 45A) V_{in} = 5 V	
OUTPUT VOLTAGE	EFFICIENCY
Vo = 2.5 V	93%
Vo = 1.8 V	90%
Vo = 1.5 V	88%
Vo = 1.2 V	86%

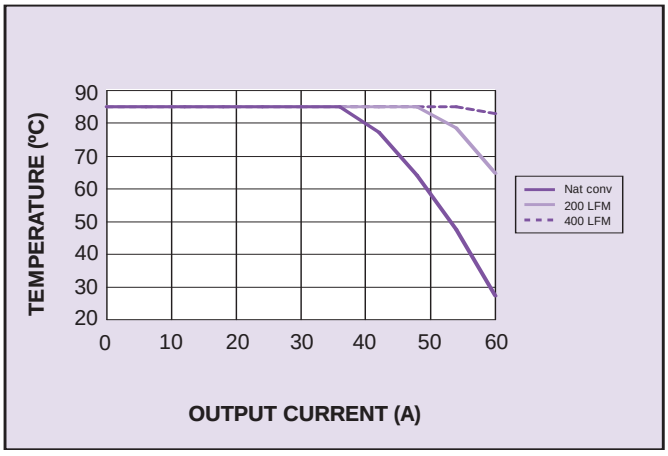


Figure 1 - Safe Operating Area
Vin = 3.3 V (See Note A)

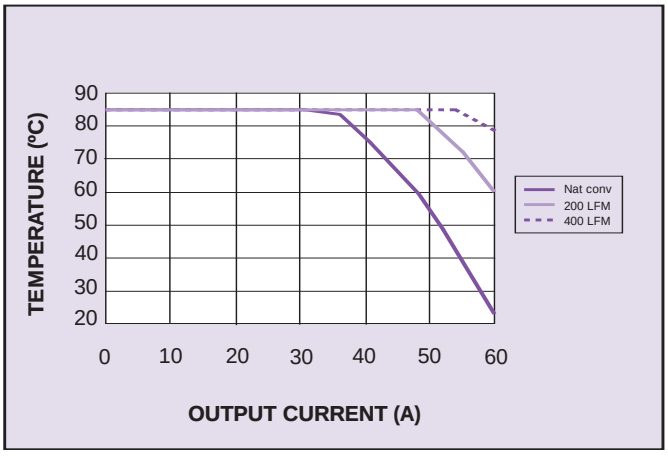


Figure 2 - Safe Operating Area
Vin = 5 V (See Note A)

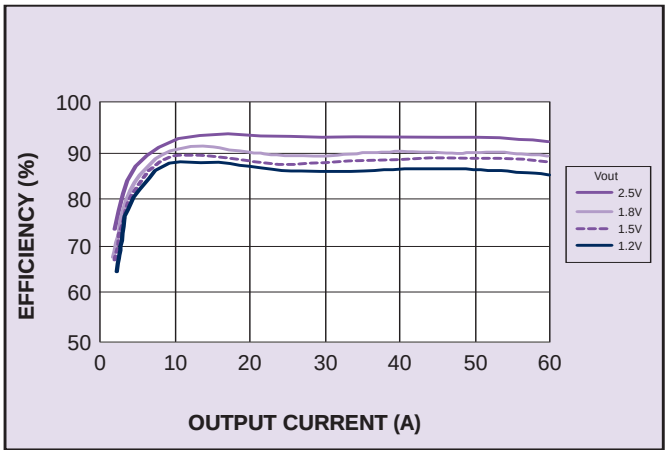


Figure 3 - Efficiency vs Load Current
Vin = 5 V (See Note B)

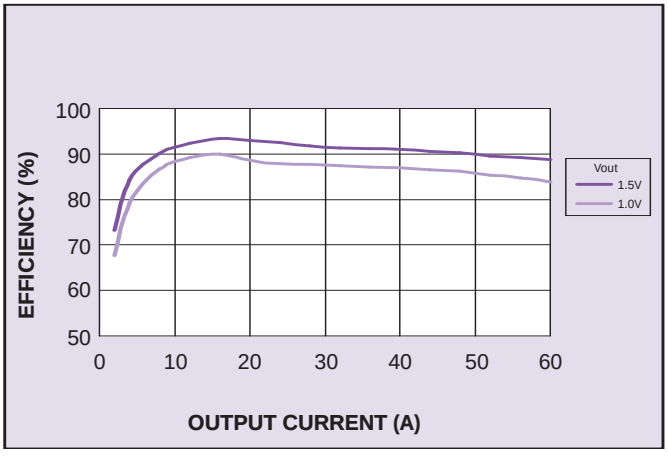


Figure 4 - Efficiency vs Load Current
Vin = 3.3 V (See Note B)

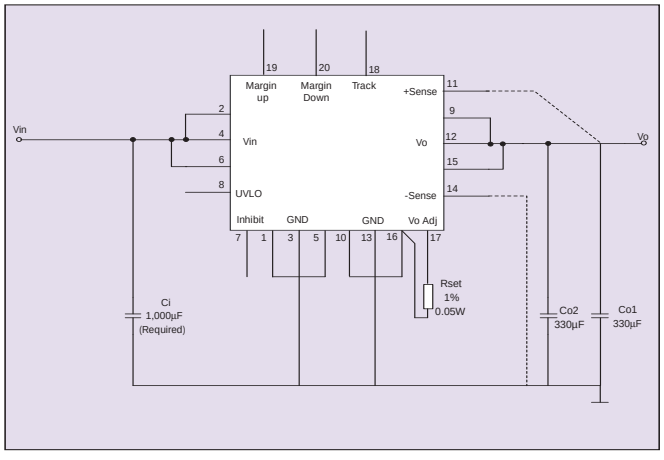


Figure 5 - Standard Application

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.

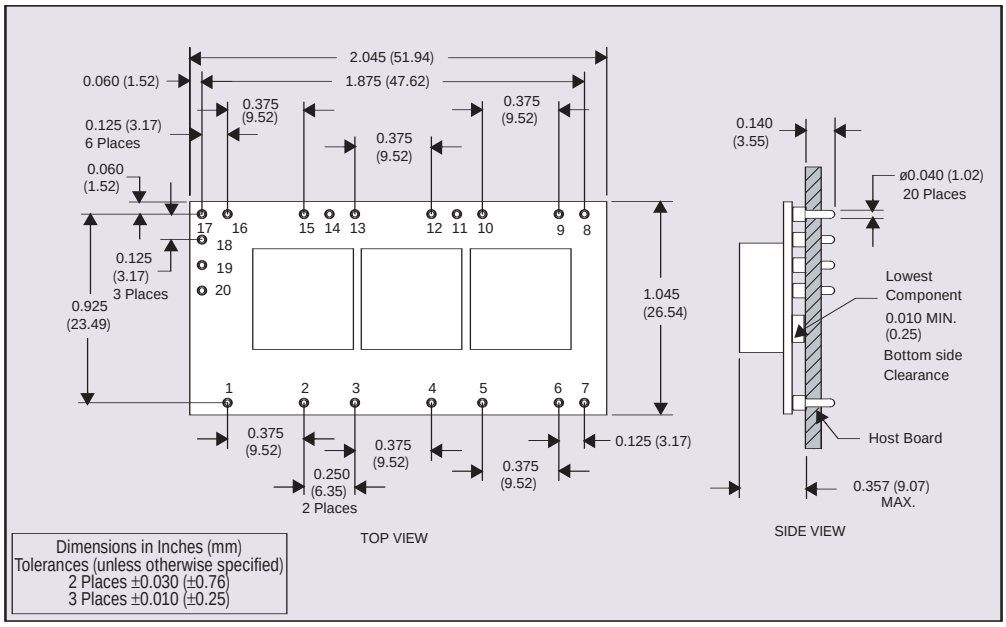


Figure 6 - Plated Through-Hole Mechanical Drawing

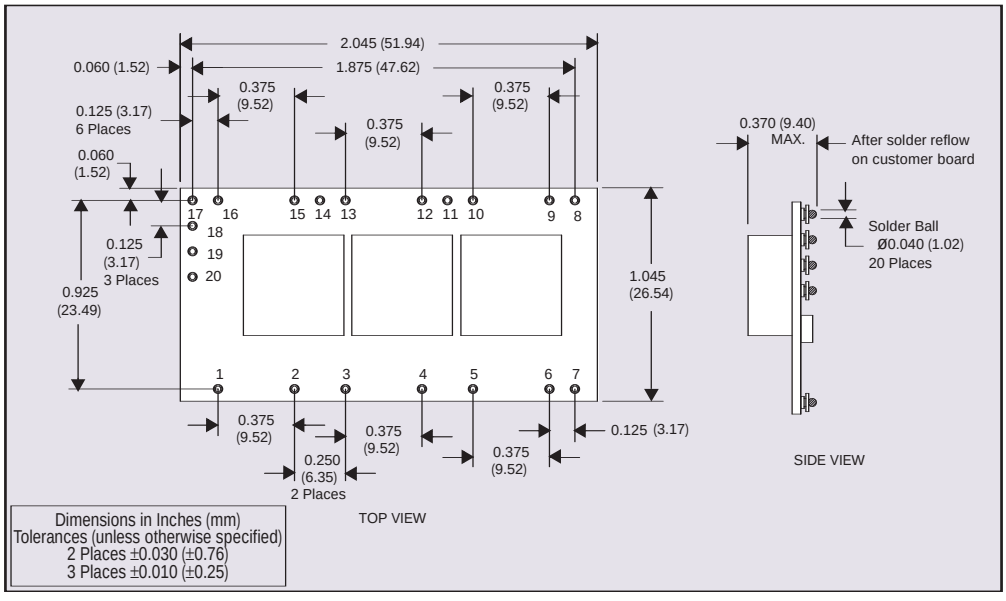


Figure 7 - Surface-Mount Mechanical Drawing

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