PTHxx050Y

3.3/5/12 Vin Single Output

DC-DC CONVERTERS | Non-isolated DDR/QDR Memory Bus Termination Module | 1

NEW Product

- **V_{TT} bus termination output (output tracks the system V_{REF})**
- **6 A output current (8 A Peak)**
- **3.3 Vdc, 5 Vdc or 12 Vdc input voltage**
- **DDR and QDR compatible**
- **ON/OFF inhibit (for V_{TT} standby)**
- **Under-voltage lockout**
- **Operating temperature range: -40 ºC to +85 ºC**
- **Efficiencies up to 88%**
- **Output overcurrent protection (non-latching, auto-reset)**
- **Point-of-Load-Alliance (POLA) compatible**
- **Available RoHS compliant**

The PTHxx050Y are a new series of non-isolated dc-dc converters designed specifically for bus termination in DDR and QDR memory applications. Operating from either a 3.3 Vdc, 5 Vdc or 12 Vdc input, the modules generate a V_{TT} output that will source or sink up to 6 A of current to accurately track their V_{REF} input. V_{TT} is the required bus termination supply voltage, and V_{REF} is the reference voltage for the memory and chipset bus receiver comparators. V_{REF} is usually set to half the V_{DDQ} power supply voltage. The PTHxx050Y series employs an actively switched synchronous rectifier output to provide state of the art stepdown switching conversion. The products are small in size and are an ideal choice where space, performance and high efficiency are desired.

2 YEAR WARRANTY

SPECIFICATIONS

All specifications are typical at nominal input, V_{REF} = 1.25 V, full load at 25 °C unless otherwise stated. C_{in}, C_{o1} and C_{o2} = typical value

OUTPUT SPECIFICATIONS

Output current (over ΔV_{REF} range)	All models Continuous (See Note 1) Repetitive pulse (See Note 2)	 ±6 A ±8 A
Tracking range for V_{REF}		0.55-1.8 V
Tracking tolerance to V_{REF} (V_{TT} - V_{REF}) (over line, load and temperature)		-10 mV to +10mV
Ripple and noise	20 MHz bandwidth	20 mV pk-pk
Load transient response (See Note 5)		80 µs settling time Overshoot/undershoot 25 mV typ.
Output capacitance:		
Non-ceramic values (See Notes 5 and 6)	PTH03050Y PTH05050Y PTH12050Y	470 µF typ., 3,300 µF max. 470 µF typ., 3,300 µF max. 940 µF typ., 3,300 µF max.
Ceramic values (See Note 5)	PTH03050Y PTH05050Y PTH12050Y	200 µF typ., 300 µF max. 200 µF typ., 300 µF max. 400 µF typ., 600 µF max.
(See Note 7)	ESR (non-ceramic)	4 mΩ min

INPUT SPECIFICATIONS

Input current	No load	10 mA
Input voltage range	PTH03050Y PTH05050Y PTH12050Y	2.95-3.65 Vdc 4.5-5.5 Vdc 10.8-13.2 Vdc
Undervoltage lockout:		
PTH03050Y	Vin increasing Vin decreasing	2.45 V typ., 2.80 V max. 2.20 V min., 2.40 V typ.
PTH05050Y	Vin increasing Vin decreasing	4.30 V typ., 4.45 V max. 3.40 V min., 3.70 V typ.
PTH12050Y	Vin increasing Vin decreasing	9.5 V typ., 10.4 V max. 8.80 V min., 9.0 V typ.

INPUT SPECIFICATIONS CONTD.

Input capacitance (See Note 4)	PTH03050Y and PTH05050Y PTH12050Y	470 µF 560 µF
Remote ON/OFF		Active high

GENERAL SPECIFICATIONS

Efficiency Io = 4 A	PTH03050Y PTH05050Y PTH12050Y	88% typ. 87% typ. 84% typ.
Insulation voltage		Non-isolated
Switching frequency	PTH03050Y PTH05050Y PTH12050Y	550- 650 kHz 550-650 kHz 200-300 kHz
Approvals and standards		EN60950 UL/cUL60950
Material flammability		UL94V-0
Dimensions	(L x W x H)	22.10 x 12.57 x 8.50 mm 0.870 x 0.495 x 0.335 in
Weight		2.9 g (0.10 oz)
MTBF	Telcordia SR-332	6,000,000 hours

ENVIRONMENTAL SPECIFICATIONS

Thermal performance (See Note 2)	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 threshold (auto reset)	All models	12 A typ.

PTHxx050Y

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For the most current data and application support visit www.artesyn.com/powergroup/products.htm

NEW Product

OUTPUT POWER (MAX.)	INPUT VOLTAGE	V_{TT} RANGE	OUTPUT CURRENT (MIN.)	OUTPUT CURRENT (MAX.)	EFFICIENCY (TYP.)	MODEL NUMBER (9,10)
10.8 W	2.95-3.65 Vdc	0.55-1.8Vdc	0 A	±6 A	88%	PTH03050Y
10.8 W	4.5-5.5 Vdc	0.55-1.8Vdc	0 A	±6 A	87%	PTH05050Y
10.8 W	10.8-13.2 Vdc	0.55-1.8Vdc	0 A	±6 A	84%	PTH12050Y

Part Number System with Options

P T H 0 5 0 5 0 Y A S T

Product Family
Point of Load Alliance Compatible

Input Voltage
03 = 3.3 V, 05 = 5 V and 12 = 12 V

Output Current
05 = 6 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 Ball

Output Voltage Code
Y = DDR Module

Notes

1. Rating is conditional on the module being directly soldered to a 4 layer PCB with 1 oz. copper. See the SOA curves or contact the factory for appropriate derating. The PTH03050Y and PTH05050Y require no derating up to 85 °C operating temperature and natural convection airflow.
2. Up to 10 ms pulse period at 10% maximum duty.
3. This control pin has an internal pull-up to the input voltage Vin. 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 178.
4. An input capacitor is required for proper operation. The capacitor must be rated for a minimum of 300 mA rms (750 mA rms for 12 V input) of ripple current.
5. The typical value of external output capacitance value ensures that V_{TT} meets the specified transient performance requirements for the memory bus terminations. Lower values of capacitance may be possible when the measured peak change in output current is consistently less than 3 A. Test conditions were 15 A/µs load step, -1.5 A to +1.5 A.
6. This is the calculated maximum. The minimum ESR limitation will often result in a lower value. Consult Application Note 178 for further details.
7. This is the typical ESR for all the electrolytic (non-ceramic) output capacitance. Use 7 mΩ as the minimum when using max ESR values to calculate.
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. PTHxx050YAZ. To order Pb-free (RoHS compatible) through-hole parts replace the mounting option 'H' with 'D', e.g. PTHxx050YAD.
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.

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

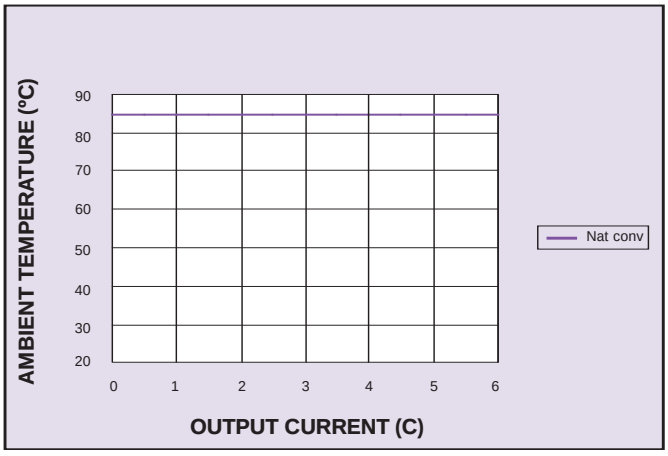

Figure 1 - Safe Operating Area
Vin = 3.3 V, V_{REF} = 1.25 V, Iout = 6 A (See Note A)

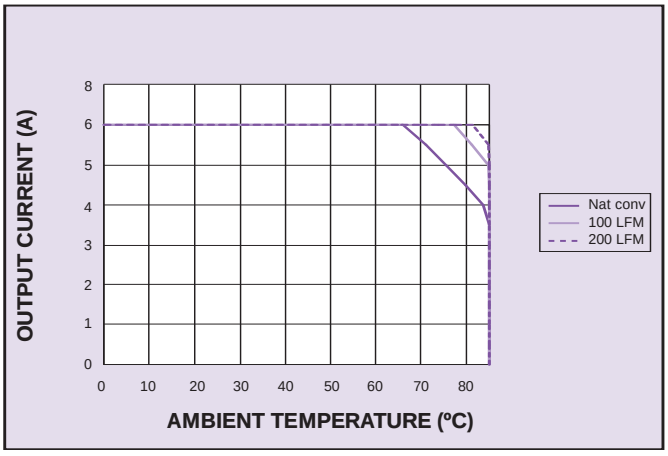

Figure 2 - Safe Operating Area
Vin = 12V, V_{REF} = 1.25 V, Iout = 6 A (See Note A)

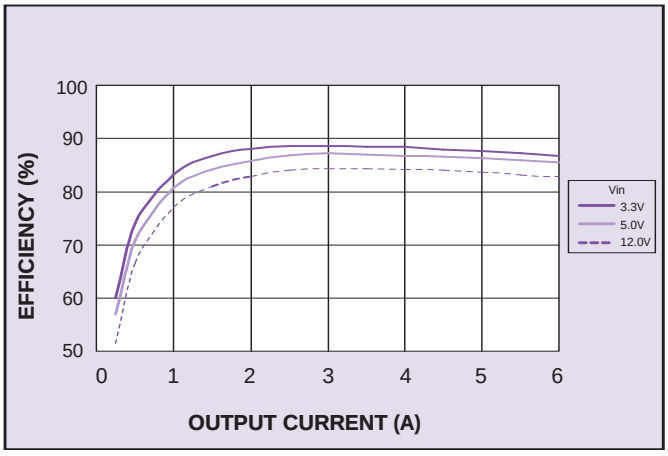

Figure 3 - Efficiency vs Load Current
V_{REF} = 1.25 V (See Note B)

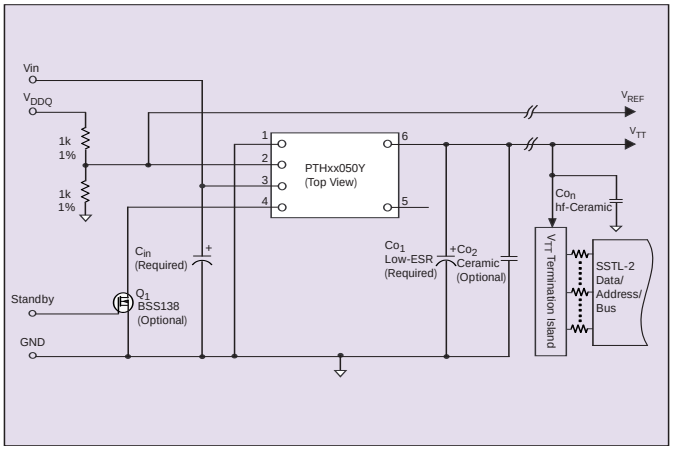

Figure 4 - Standard Application

Notes

A The 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.

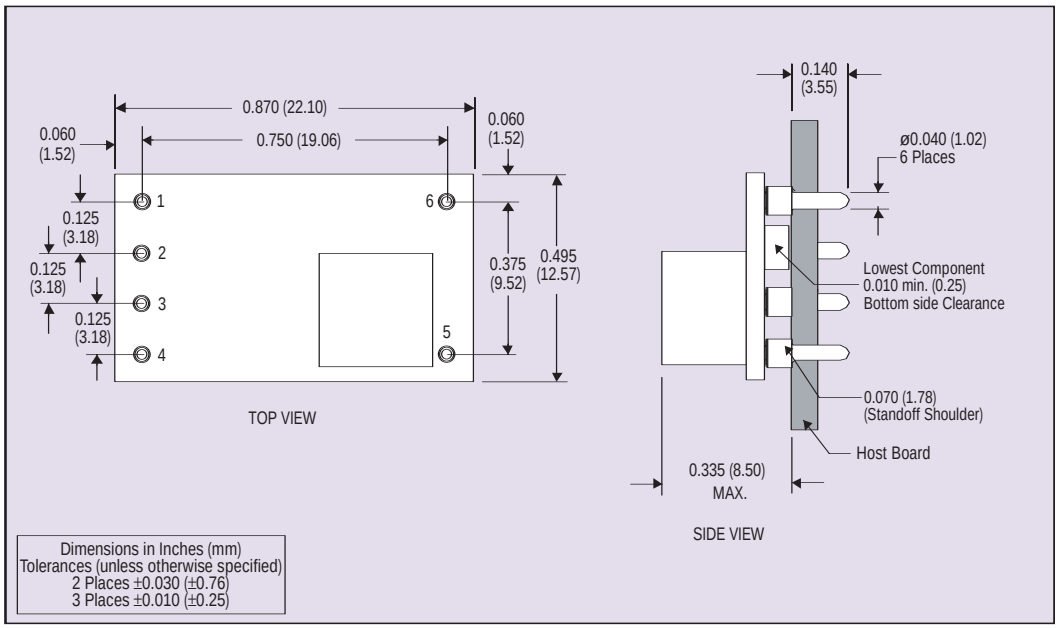

Figure 5 - Plated Through-Hole Mechanical Drawing

PIN CONNECTIONS	
PIN NO.	**FUNCTION**
1	Ground
2	V_{REF}
3	V_{in}
4	Inhibit*
5	N/C
6	V_{TT}

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

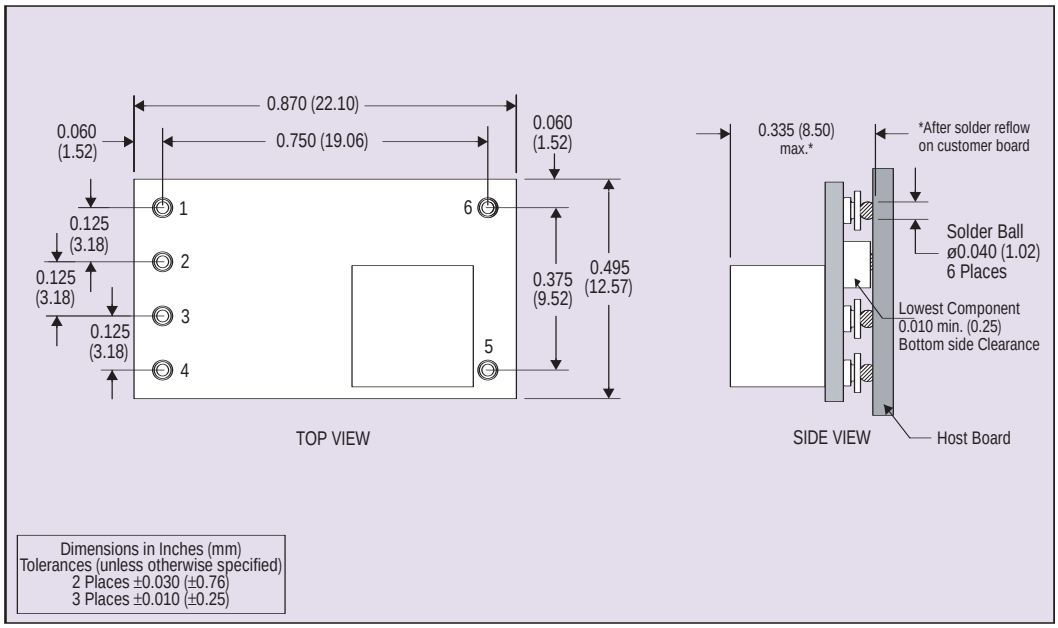

Figure 6 - Surface-Mount Mechanical Drawing