

## PTH12060 12 Vin

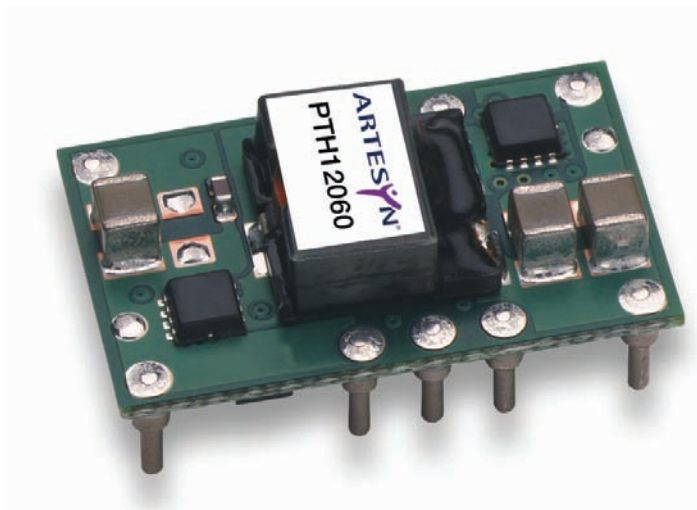
**Total Power:** 55 Watts  
**# of Outputs:** Single

### Special Features

- 10 A output current
- 12 V input voltage
- Wide-output voltage adjust  
1.2 Vdc - 5.5 Vdc for suffix 'W' &  
0.8 Vdc - 1.8 Vdc for suffix 'L'
- Auto-track™ sequencing\*
- Margin up/down controls
- Efficiencies up to 94%
- Output ON/OFF inhibit
- Output voltage sense
- Point-of-Load-Alliance (POLA)  
compatible
- Available RoHS compliant
- 2 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.  
B 04 06 38572 044
- CB Report and Certificate to  
IEC60950, Certificate No.  
US/8292/UL



Rev.3.12.09\_170  
PTH12060  
1 of 6



### Specifications

| Input                 |                            |                  |
|-----------------------|----------------------------|------------------|
| Input voltage range:  | (See Note 3, page 3)       | 10.8 - 13.2 Vdc  |
| Input current:        | No load                    | 10 mA typ.       |
| Remote ON/OFF:        | (See Note 1, page 3)       | Positive logic   |
| Start-up time:        |                            | 1 V/ms           |
| Undervoltage lockout: |                            | 9.0 - 9.5 V typ. |
| Track input voltage:  | Pin 8 (See Note 6, page 3) | ± 0.3 Vin        |

All specifications are typical at nominal input, full load at 25 °C unless otherwise stated.  $C_{in} = 560 \mu F$ ,  
 $C_{out} = 0 \mu F$

\*Auto-track™ is a trade mark of  
Texas Instruments



## Specifications Continued

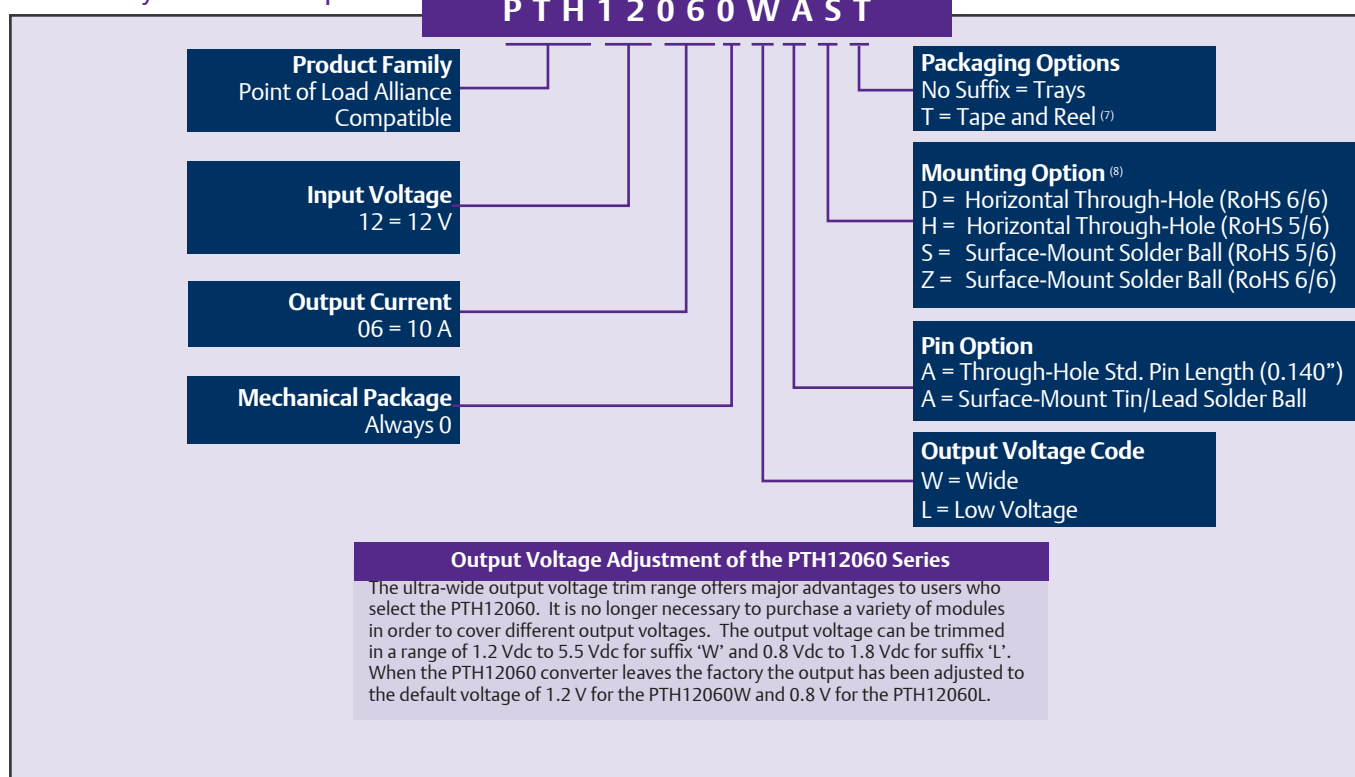
| Output                                                        |                                                                              |                                                    |
|---------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------|
| Voltage adjustability:<br>(See Note 4, page 3)                | Suffix 'W'<br>Suffix 'L'                                                     | 1.2 - 5.5 Vdc<br>0.8 - 1.8 Vdc                     |
| Setpoint accuracy:                                            |                                                                              | ± 2.0% Vo                                          |
| Line regulation:                                              |                                                                              | ± 10 mV typ.                                       |
| Load regulation:                                              |                                                                              | ± 12 mV typ.                                       |
| Total regulation:                                             |                                                                              | ± 3.0% Vo                                          |
| Minimum load:                                                 |                                                                              | 0 A                                                |
| Ripple and noise:<br>20 MHz bandwidth<br>(See Note 8, page 3) | Suffix 'W'    Vo 2.5 V<br>Vo > 2.5 V<br>Suffix 'L'    Vo 1.0 V<br>Vo > 1.0 V | 25 mV pk-pk<br>1% Vo<br>20 mV pk-pk<br>30 mV pk-pk |
| Temperature co-efficient:                                     | -40 °C to +85 °C                                                             | ± 0.5% Vo                                          |
| Transient response:                                           | (See Note 5, page 3)                                                         | 70 µs recovery time<br>Overshoot/undershoot 100 mV |
| Margin adjustment:                                            |                                                                              | ± 5.0% Vo                                          |

| EMC Characteristics                                    |                                                 |                                                     |
|--------------------------------------------------------|-------------------------------------------------|-----------------------------------------------------|
| Electrostatic discharge:                               | EN61000-4-2, IEC801-2                           |                                                     |
| Conducted immunity:                                    | EN61000-4-6                                     |                                                     |
| Radiated immunity:                                     | EN61000-4-3                                     |                                                     |
| General Specifications                                 |                                                 |                                                     |
| Efficiency:                                            |                                                 | See tables on page 3                                |
| Insulation voltage:                                    |                                                 | Non-isolated                                        |
| Switching frequency:<br>Over $V_{in}$ and $I_o$ ranges | Suffix 'W'<br>Suffix 'L'                        | 350 kHz typ.<br>250 kHz typ.                        |
| Approvals and standards:                               |                                                 | EN60950<br>UL/cUL60950                              |
| Material flammability:                                 |                                                 | UL94V-0                                             |
| Dimensions:                                            | (L x W x H)                                     | 25.27 x 15.75 x 9.00 mm<br>0.995 x 0.620 x 0.354 in |
| Weight:                                                |                                                 | 5 g (0.18 oz)                                       |
| MTBF:                                                  | Telcordia SR-332                                | 7,092,000 hours                                     |
| Environmental Specifications                           |                                                 |                                                     |
| Thermal Performance:<br>(See Note 2, page 3)           | Operating ambient, temperature<br>Non-operating | -40 °C to +85 °C<br>-40 °C to +125 °C               |
| MSL ('Z' suffix only):                                 | JEDEC J-STD-020C                                | Level 3                                             |
| Protection                                             |                                                 |                                                     |
| Short-circuit:                                         | Auto reset                                      | 20 A typ.                                           |

## Ordering Information

| Output Power<br>(max) | Input<br>Voltage | Output<br>Voltage | Output Currents |      | Efficiency<br>(max) | Regulation |        | Model Numbers |
|-----------------------|------------------|-------------------|-----------------|------|---------------------|------------|--------|---------------|
|                       |                  |                   | Min             | Max  |                     | Line       | Load   |               |
| 55 W                  | 10.8 - 13.2 Vdc  | 0.8 - 1.8 Vdc     | 0 A             | 10 A | 88%                 | ±10 mV     | ±12 mV | PTH12060L     |
| 55 W                  | 10.8 - 13.2 Vdc  | 1.2 - 5.5 Vdc     | 0 A             | 10 A | 94%                 | ±10 mV     | ±12 mV | PTH12060W     |

## Part Number System with Options



## Notes

- Remote ON/OFF. Active High  
ON: Pin 3 open; or  $V > V_{in} - 0.5 V$   
OFF: Pin 3 GND; or  $V < 0.8 V$  (min - 0.2 V).
- See Figures 1, 2 and 3 for safe operating curves of PTH12060W and Figures 6, 7 and 8 for safe operating curves of PTH12060L.
- A 560  $\mu F$  electrolytic input capacitor is required for proper operation. The capacitor must be rated for a minimum of 800 mA rms of ripple current.
- An external output capacitor is not required for basic operation. Adding 330  $\mu F$  of distributed capacitance at the load will improve the transient response.
- 1 A/ $\mu s$  load step, 50 to 100%  $I_{Omax}$ ,  $C_{out} = 330 \mu F$ .
- If utilized  $V_{out}$  will track applied voltage by  $\pm 0.3 V$  (up to  $V_o$  set point).
- Tape and reel packaging only available on the surface-mount versions.
- The pk-pk output ripple voltage is measured with an external 10  $\mu F$  ceramic capacitor. See Figures 5 and 8 for Standard application schematic.
- To order Pb-free (RoHS compatible) surface-mount parts replace the mounting option 'S' with 'Z', e.g. PTH12060WAZ. To order Pb-free (RoHS compatible) through-hole parts replace the mounting option 'H' with 'D', e.g. PTH12060WAD.

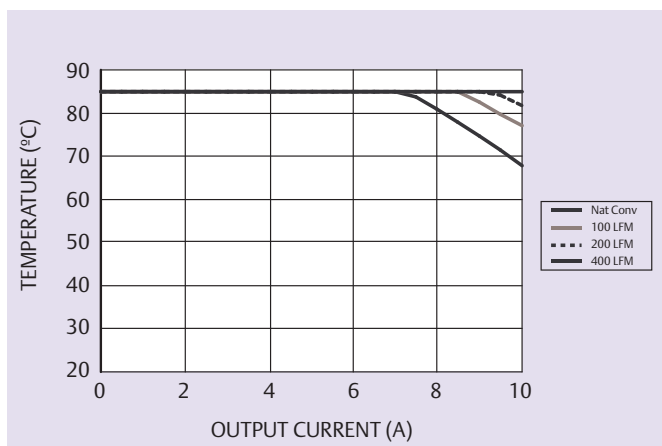
Efficiency Table - PTH12060W ( $I_O = 8 A$ )

| Output Voltage | Efficiency |
|----------------|------------|
| $V_o = 5.0 V$  | 94%        |
| $V_o = 3.3 V$  | 92%        |
| $V_o = 2.5 V$  | 90%        |
| $V_o = 2.0 V$  | 88%        |
| $V_o = 1.8 V$  | 87%        |
| $V_o = 1.5 V$  | 85%        |
| $V_o = 1.2 V$  | 83%        |

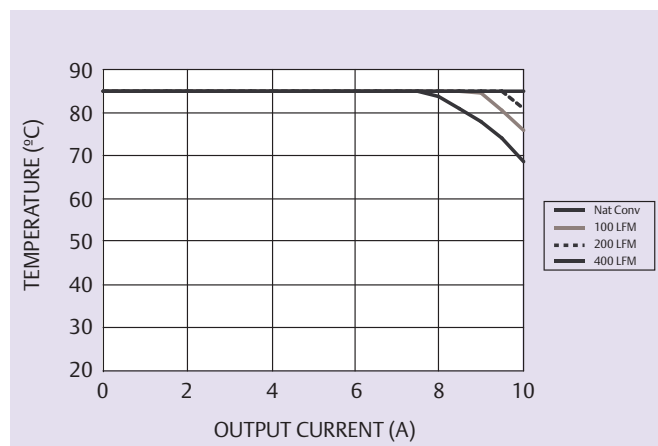
Efficiency Table - PTH12060L ( $I_O = 8 A$ )

| Output Voltage | Efficiency |
|----------------|------------|
| $V_o = 1.8 V$  | 88%        |
| $V_o = 1.5 V$  | 87%        |
| $V_o = 1.2 V$  | 84%        |
| $V_o = 1.0 V$  | 82%        |
| $V_o = 0.8 V$  | 79%        |

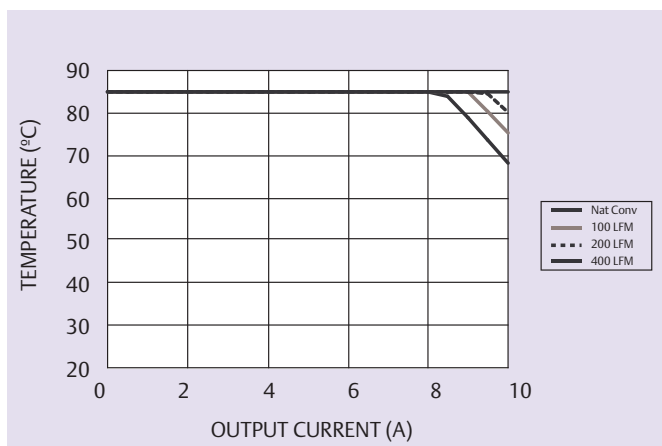
## PTH12060W Characteristic Data



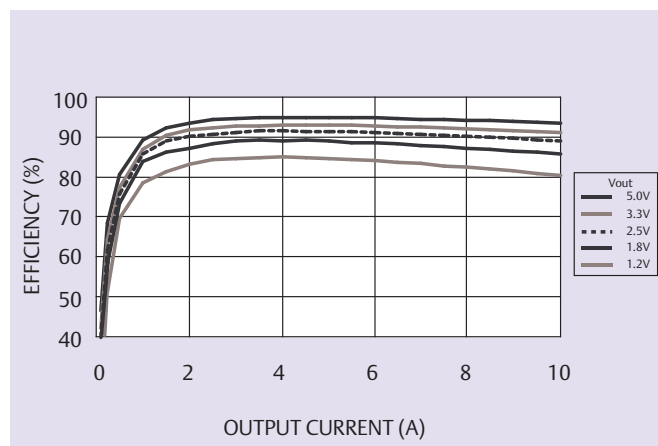
**Figure 1 - Safe Operating Area**  
**Vin = 12 V, Output Voltage = 5 V (See Note A)**



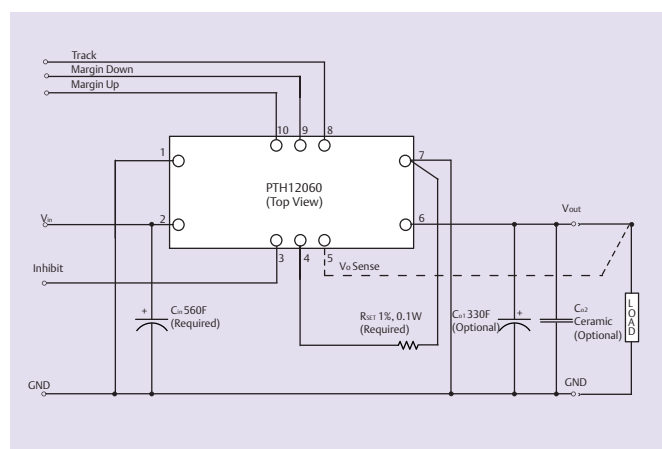
**Figure 2 - Safe Operating Area**  
**Vin = 12 V, Output Voltage = 3.3 V (See Note A)**



**Figure 3 - Safe Operating Area**  
**Vin = 12 V, Output Voltage = 1.8 V (See Note A)**



**Figure 4 - Efficiency vs Load Current**  
**Vin = 12 V (See Note B)**

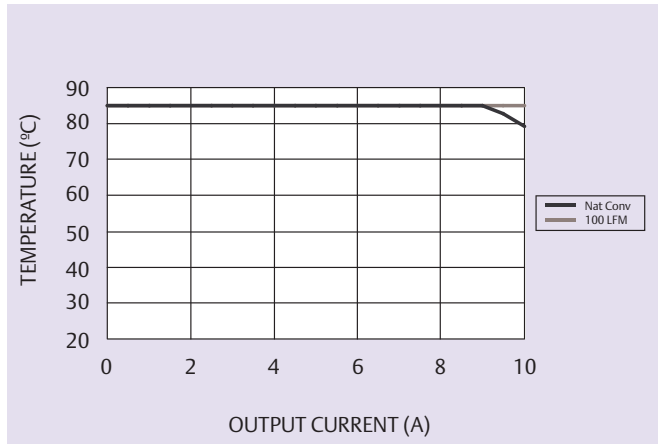


**Figure 5 - Standard Application - All Models**

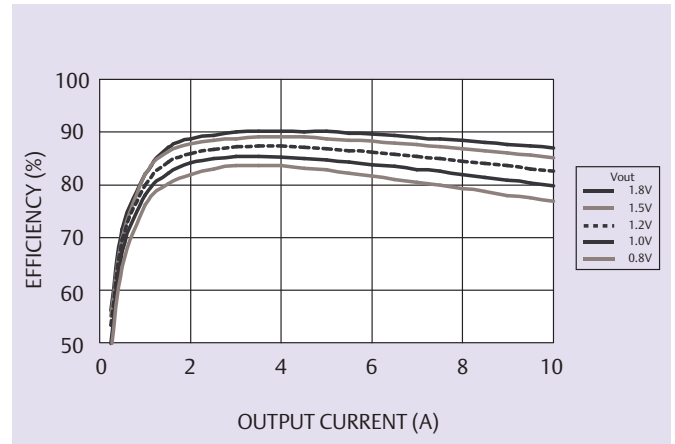
### Notes

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

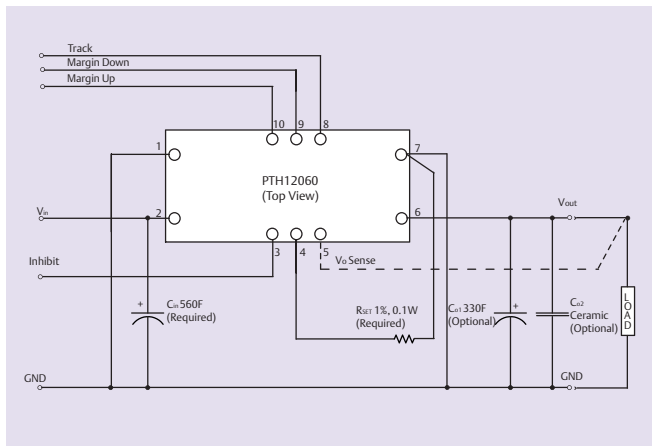
## PTH12060L Characteristic Data



**Figure 6 - Safe Operating Area**  
 $V_{in} = 12\text{ V}$ , Output Voltage = 1.8 V (See Note A)



**Figure 7 - Efficiency vs Load Current**  
 $V_{in} = 12\text{ V}$  (See Note B)



**Figure 8 - Standard Application - All Models**

### Notes

- A SOA curves represent the conditions at which internal components are within the Emerson Network Power 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

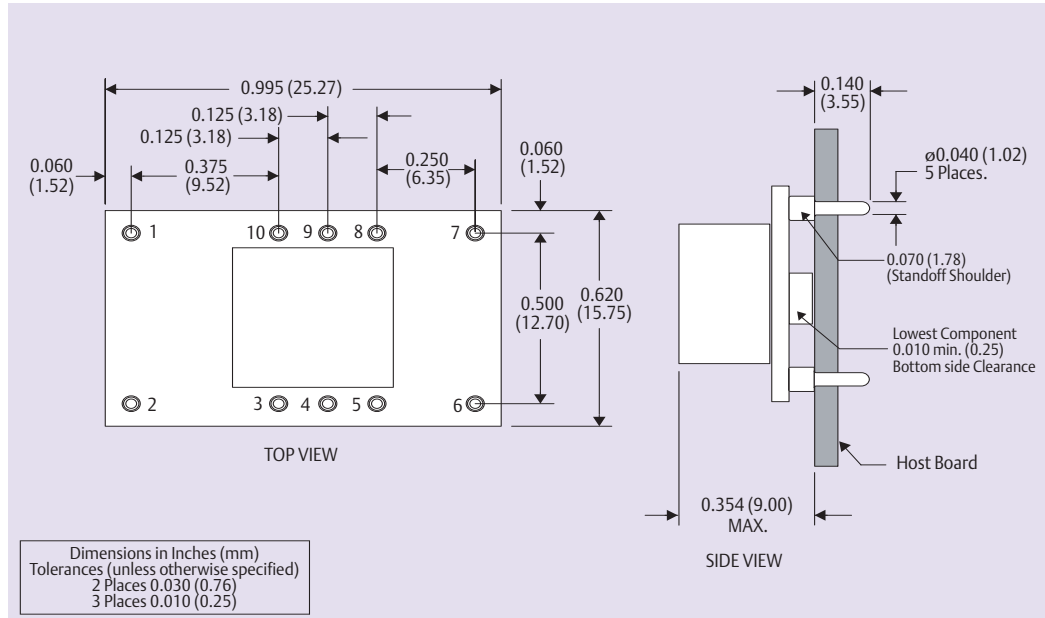


Figure 9 - Plated Through-Hole

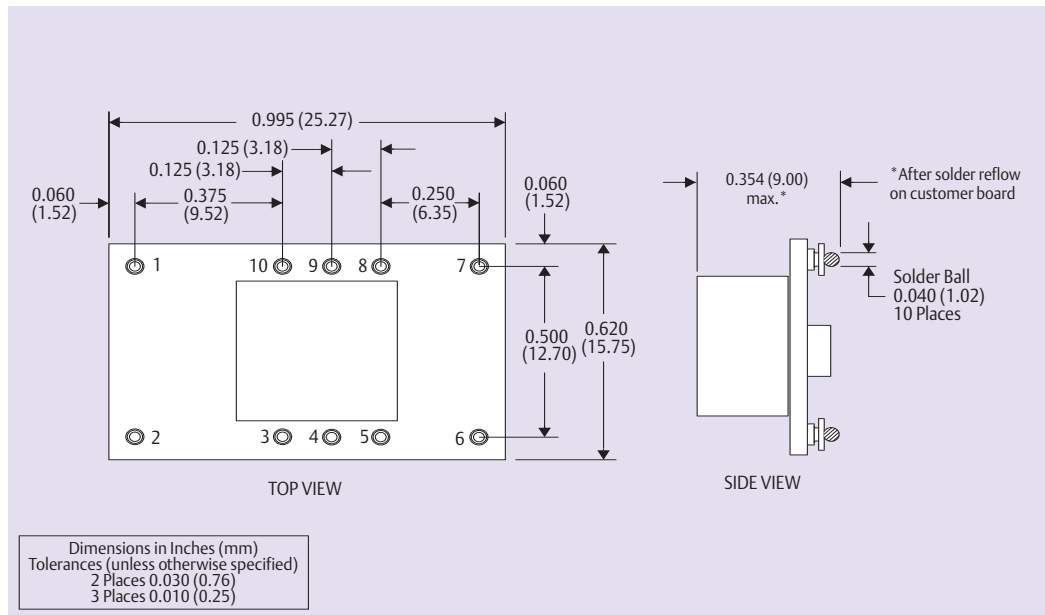


Figure 10 - Surface-Mount

| Pin Connections |           |
|-----------------|-----------|
| Pin No.         | Function  |
| Pin 1           | Ground    |
| Pin 2           | Vin       |
| Pin 3           | Inhibit*  |
| Pin 4           | Vo adjust |
| Pin 5           | Vo sense  |

| Pin Connections cont. |              |
|-----------------------|--------------|
| Pin No.               | Function     |
| Pin 6                 | Vout         |
| Pin 7                 | Ground       |
| Pin 8                 | Track        |
| Pin 9                 | Margin down* |
| Pin 10                | Margin up*   |

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

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