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## PTH12020 12 Vin

**Total Power:** 99 Watts  
**# of Outputs:** Single



### Special Features

- 18 A output current
- 12 V input voltage
- Wide-output voltage adjust
  - 1.2 Vdc to 5.5 Vdc for suffix 'W' and 0.8 Vdc to 1.8 Vdc for suffix 'L'
- Auto-track™ sequencing\*
- Margin up/down controls
- Efficiencies up to 95%
- 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
- TÜV Product Service (EN60950)
- CB Report and Certificate to IEC60950

## 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:                          |                            | 9.2 - 9.7 V typ.                                   |
| Track input voltage:                           | Pin 8 (See Note 6, page 3) | ± 0.3 Vin  |
| 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:                               |                            | ± 5 mV typ.  |
| Load regulation:                               |                            | ± 5 mV typ.  |
| Total regulation:                              |                            | ± 3.0% Vo  |
| Minimum load:                                  |                            | 0 A  |
| Ripple and noise:<br>20 MHz bandwidth          | Suffix '-W'<br>Suffix '-L' | 32 mV pk-pk<br>1% Vo                               |
| Temperature co-efficient:                      | -40 °C to +85 °C           | ± 0.5% Vo  |
| Transient response:<br>(See Note 5, page 3)    |                            | 70 μs recovery time<br>Overshoot/undershoot 130 mV |
| Margin adjustment:                             |                            | ± 5.0% Vo  |

All specifications are typical at nominal input, full load at 25 °C unless otherwise stated  
Cin = 560 μF, Cout = 0 μF

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



## Specifications Continued

| EMC Characteristics      |                       |  |
|--------------------------|-----------------------|--|
| Electrostatic discharge: | EN61000-4-2, IEC801-2 |  |
| Conducted immunity:      | EN61000-4-6           |  |
| Radiated immunity:       | EN61000-4-3           |  |

| General Specifications   |                            |   |
|--------------------------|----------------------------|---|
| Efficiency:              |                            | See efficiency table on page 3                      |
| Insulation voltage:      |                            | Non-Isolated  |
| Switching frequency:     | Suffix '-W'<br>Suffix '-L' | 260 kHz to 380 kHz<br>200 kHz to 300 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<br>1.495 x 0.870 x 0.354 in |
| Weight:                  |                            | 7g (0.25 oz)  |
| MTBF:                    | Telcordia SR-332           | 5,236,000 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                               |

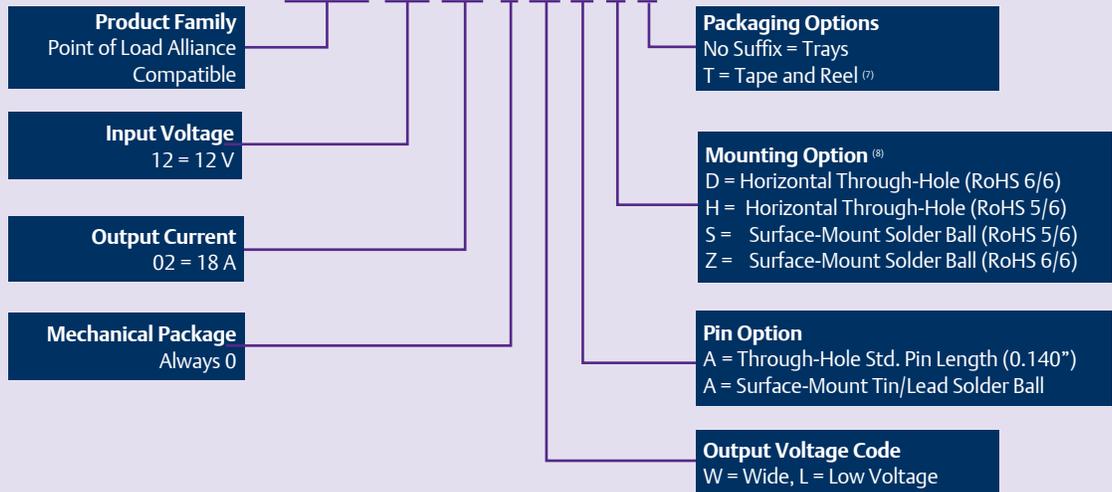
| Protection     |            |               |
|----------------|------------|---------------|
| Short circuit: | Auto reset | 30 A typ.     |
| Thermal:       |            | Auto recovery |

## Ordering Information

| Output Power (max) | Input Voltage   | Output Voltage | Output Currents |      | Efficiency (max) | Regulation |        | Model Numbers (8, 9) |
|--------------------|-----------------|----------------|-----------------|------|------------------|------------|--------|----------------------|
|                    |                 |                | Min             | Max  |                  | Line       | Load   |                      |
| 99 W               | 10.8 - 13.2 Vdc | 0.8 - 1.8 Vdc  | 0 A             | 18 A | 89%              | ± 5 mV     | ± 5 mV | PTH12020L            |
| 99 W               | 10.8 - 13.2 Vdc | 1.2 - 5.5 Vdc  | 0 A             | 18 A | 95%              | ± 5 mV     | ± 5 mV | PTH12020W            |

### Part Number System with Options

**PTH12020WAST**



### Output Voltage Adjustment of the PTH12020 Series

The ultra-wide output voltage trim range offers major advantages to users who select the PTH12020. 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 1.2 Vdc to 5.5 Vdc. When the PTH12020 converter leaves the factory the output has been adjusted to the default voltage of 1.2 V.

Efficiency Table - PTH12020W (I<sub>O</sub> = 18 A)

| Output Voltage         | Efficiency |
|------------------------|------------|
| V <sub>O</sub> = 5.0 V | 95%        |
| V <sub>O</sub> = 3.3 V | 93%        |
| V <sub>O</sub> = 2.5 V | 92%        |
| V <sub>O</sub> = 1.8 V | 90%        |
| V <sub>O</sub> = 1.5 V | 88%        |
| V <sub>O</sub> = 1.2 V | 86%        |

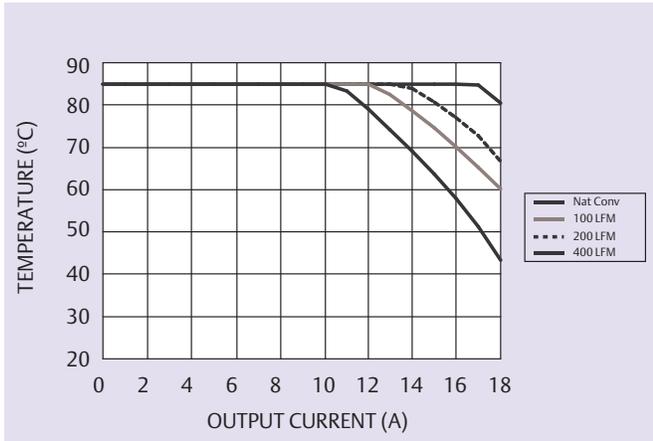
Efficiency Table - PTH12020L (I<sub>O</sub> = 18 A)

| Output Voltage         | Efficiency |
|------------------------|------------|
| V <sub>O</sub> = 1.8 V | 89%        |
| V <sub>O</sub> = 1.5 V | 87%        |
| V <sub>O</sub> = 1.2 V | 85%        |
| V <sub>O</sub> = 1.0 V | 83%        |
| V <sub>O</sub> = 0.8 V | 80%        |

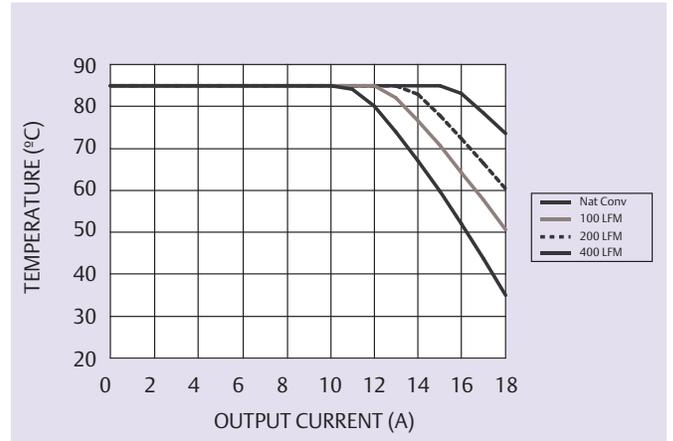
### Notes

- Remote ON/OFF. Positive Logic  
ON: Pin 3 open; or V > V<sub>in</sub> - 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.
- A 560 μF 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 μF of distributed capacitance at the load will improve the transient response.
- 1 A/μs load step, 50 to 100% I<sub>Omax</sub>, C<sub>out</sub> = 330 μF.
- If utilized V<sub>out</sub> will track applied voltage by ±0.3 V (up to V<sub>O</sub> set point).
- Tape and reel packaging only available on the surface-mount versions.
- To order Pb-free (RoHS compatible) surface-mount parts replace the mounting option 'S' with 'Z', e.g. PTH12020WAZ. To order Pb-free (RoHS compatible) through-hole parts replace the mounting option 'H' with 'D', e.g. PTH12020WAD.
- NOTICE: Some models do not support all options. Please contact your local Emerson Network Power representative or use the on-line model number search tool at <http://www.Emerson.com/EmbeddedPower> to find a suitable alternative.

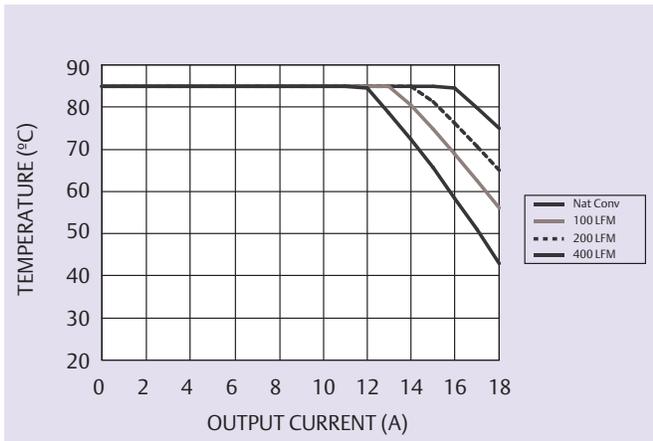
# PTH12020W Characteristic Data



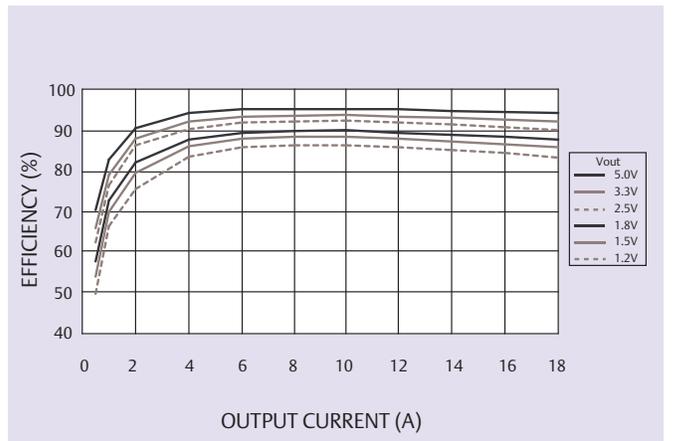
**Figure 1 - Safe Operating Area**  
Vin = 12 V, Output Voltage = 5 V (See Note A)



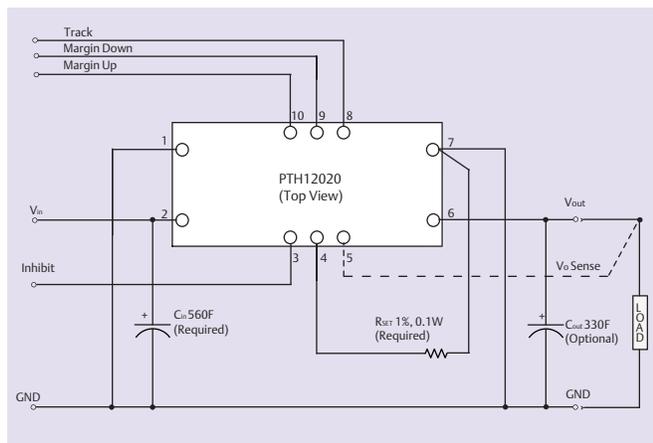
**Figure 2 - Safe Operating Area**  
Vin = 12 V, Output Voltage = 3.3 V (See Note A)



**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)

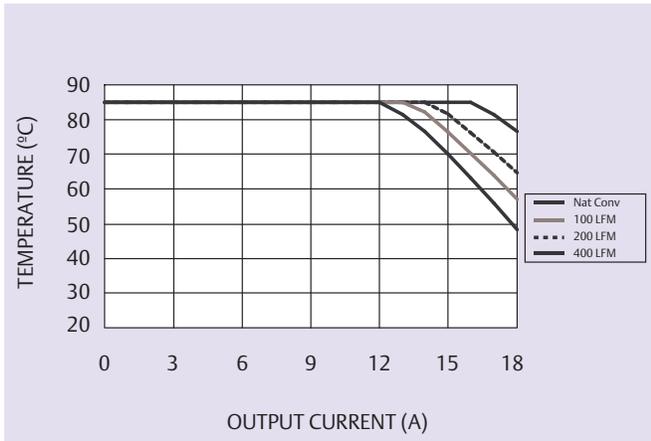


**Figure 5 - Standard Application**

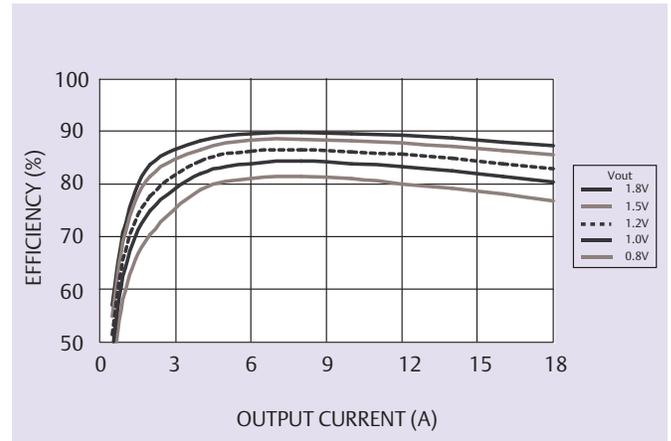
## Notes

- 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.

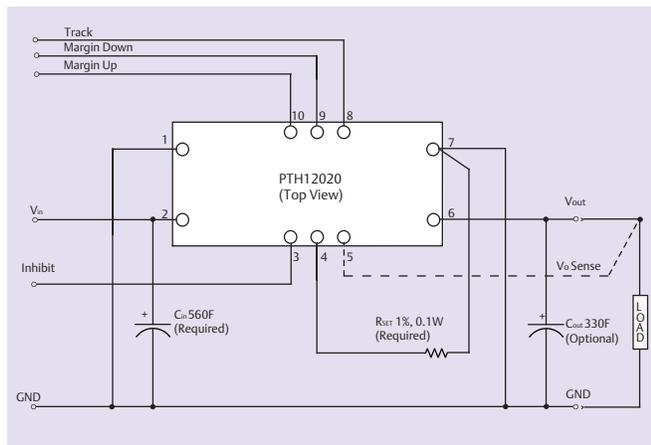
## PTH12020L Characteristic Data



**Figure 6 - Safe Operating Area for PTH12020L**  
Vin = 12 V, Output Voltage = 1.8 V (See Note A)



**Figure 7 - Efficiency vs Load Current for PTH12020L**  
Vin = 12 V (See Note B)



**Figure 8 - Standard Application**

### 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

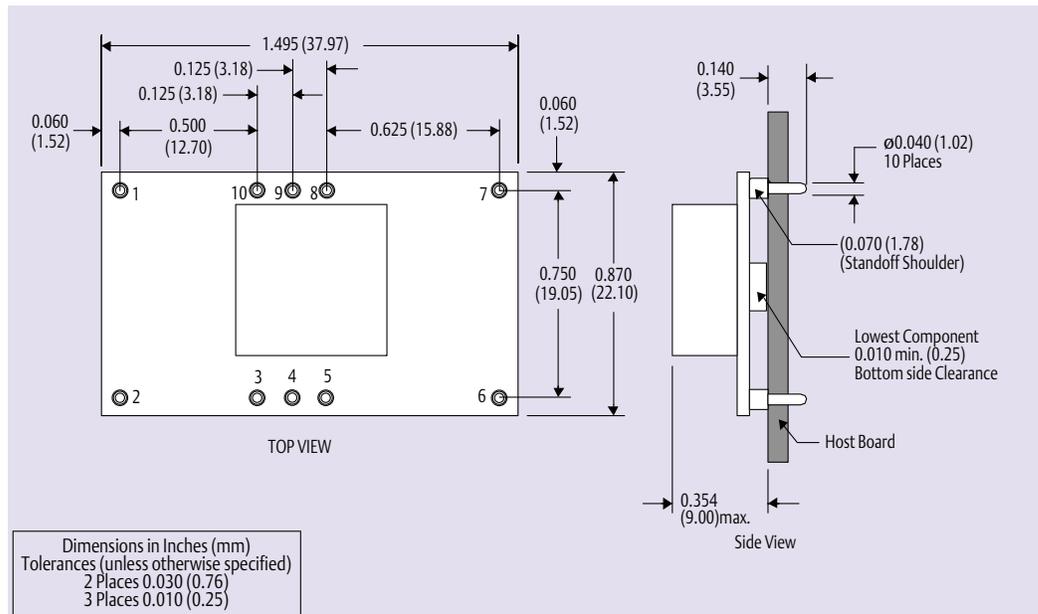


Figure 9 - Plated Through-Hole

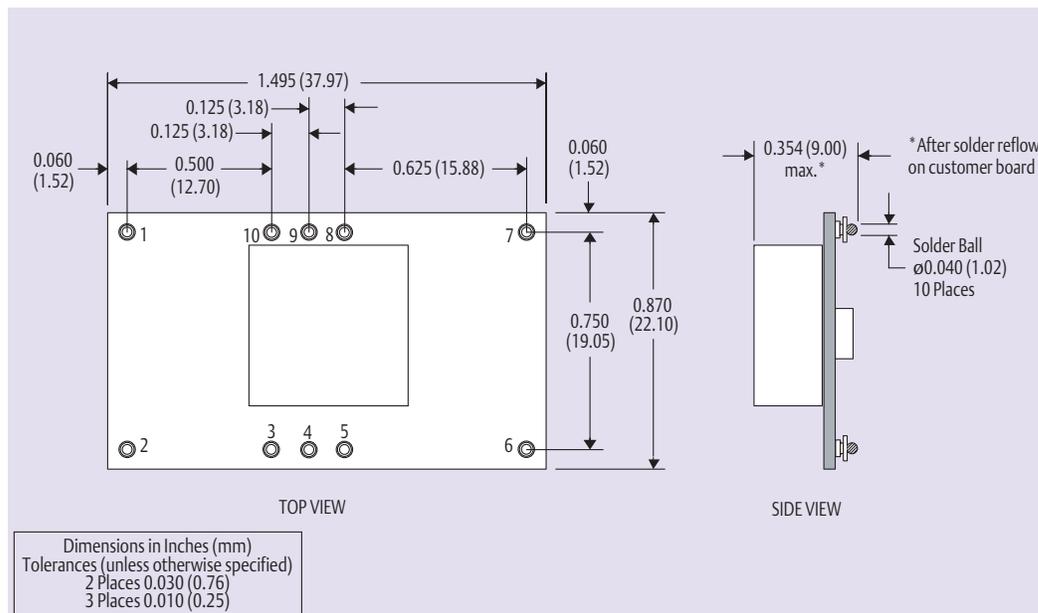


Figure 10 - Surface-Mount

| 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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