

- Rugged, compact metal case
- Screw terminal adaptor available for easy connection
- Wide 2:1 input voltage range
- Full load operation up to 60°C with convection cooling
- Soft start
- Under voltage lock-out circuit
- Reverse input voltage protection
- Input protection filter
- 3-year product warranty



The TEP 100 Series is a family of isolated high performance DC/DC converter modules with ultra-wide 2:1 input voltage ranges which come in a rugged, sealed metal case. These converters are suitable for a wide range of applications. For easy connection there is also a unique adaptor available with screw terminals. A very high efficiency allows an operating temperature up to +60°C with natural convection cooling without power derating. Further features include output voltage trimming, Remote On/Off and under voltage lockout. The very wide input voltage range and reverse input voltage protection make these converters also an interesting solution for battery operated systems.

### Models

| Order Code   | Input Voltage Range          | Output Voltage nom. | Output Current max. | Efficiency typ. |
|--------------|------------------------------|---------------------|---------------------|-----------------|
| TEP 100-1210 | 9 - 18 VDC<br>(12 VDC nom.)  | 3.3 VDC             | 25'000 mA           | 90 %            |
| TEP 100-1211 |                              | 5 VDC               | 20'000 mA           | 91 %            |
| TEP 100-1212 |                              | 12 VDC              | 8'400 mA            | 91 %            |
| TEP 100-1213 |                              | 15 VDC              | 6'700 mA            | 91 %            |
| TEP 100-1215 |                              | 24 VDC              | 4'200 mA            | 90 %            |
| TEP 100-1216 |                              | 28 VDC              | 3'600 mA            | 90 %            |
| TEP 100-1218 |                              | 48 VDC              | 2'100 mA            | 90 %            |
| TEP 100-2410 | 18 - 36 VDC<br>(24 VDC nom.) | 3.3 VDC             | 25'000 mA           | 91 %            |
| TEP 100-2411 |                              | 5 VDC               | 20'000 mA           | 93 %            |
| TEP 100-2412 |                              | 12 VDC              | 8'400 mA            | 93 %            |
| TEP 100-2413 |                              | 15 VDC              | 6'700 mA            | 93 %            |
| TEP 100-2415 |                              | 24 VDC              | 4'200 mA            | 92 %            |
| TEP 100-2416 |                              | 28 VDC              | 3'600 mA            | 92 %            |
| TEP 100-2418 |                              | 48 VDC              | 2'100 mA            | 92 %            |
| TEP 100-4810 | 36 - 75 VDC<br>(48 VDC nom.) | 3.3 VDC             | 25'000 mA           | 91 %            |
| TEP 100-4811 |                              | 5 VDC               | 20'000 mA           | 93 %            |
| TEP 100-4812 |                              | 12 VDC              | 8'400 mA            | 93 %            |
| TEP 100-4813 |                              | 15 VDC              | 6'700 mA            | 93 %            |
| TEP 100-4815 |                              | 24 VDC              | 4'200 mA            | 92 %            |
| TEP 100-4816 |                              | 28 VDC              | 3'600 mA            | 92 %            |
| TEP 100-4818 |                              | 48 VDC              | 2'100 mA            | 92 %            |

## Options

|                                                            |                                                                                                                                                                       |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Suffix -CM</b>                                          | - Chassis mount models without filter: <a href="http://www.tracopower.com/products/tep100cm.pdf">www.tracopower.com/products/tep100cm.pdf</a>                         |
| <b>Suffix -CMF</b>                                         | - Chassis mount models with filter to meet EN 55032 class A: <a href="http://www.tracopower.com/products/tep100cmf.pdf">www.tracopower.com/products/tep100cmf.pdf</a> |
| <b>TEP-HS1</b>                                             | - Optional Heat Sink: <a href="http://www.tracopower.com/products/tep-hs1.pdf">www.tracopower.com/products/tep-hs1.pdf</a>                                            |
| <b>on demand</b><br>(backorder with MOQ non stocking item) | - Inverse Remote On/Off function (passive = off)                                                                                                                      |

## Input Specifications

|                            |                |                                                                                                                                                                                                                             |
|----------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Current              | - At no load   | 12 Vin models: <b>130 mA typ.</b><br>24 Vin models: <b>120 mA typ.</b><br>48 Vin models: <b>70 mA typ.</b>                                                                                                                  |
|                            | - At full load | 12 Vin models: <b>9'400 mA max.</b><br>24 Vin models: <b>4'600 mA max.</b><br>48 Vin models: <b>2'300 mA max.</b>                                                                                                           |
| Surge Voltage              |                | 12 Vin models: <b>36 VDC max.</b> (1 s max.)<br>24 Vin models: <b>50 VDC max.</b> (1 s max.)<br>48 Vin models: <b>100 VDC max.</b> (1 s max.)                                                                               |
| Under Voltage Lockout      |                | 12 Vin models: <b>7.5 VDC typ.</b><br>24 Vin models: <b>16 VDC typ.</b><br>48 Vin models: <b>34 VDC typ.</b>                                                                                                                |
| Recommended Input Fuse     |                | 12 Vin models: <b>20'000 mA</b> (fast acting)<br>24 Vin models: <b>10'000 mA</b> (fast acting)<br>48 Vin models: <b>5'000 mA</b> (slow blow)<br>(The need of an external fuse has to be assessed in the final application.) |
| Reverse Voltage Protection |                | <b>Parallel diode</b> (external input fuse required)                                                                                                                                                                        |
| Input Filter               |                | <b>Internal Pi-Type</b>                                                                                                                                                                                                     |

## Output Specifications

|                                        |                                 |                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output Voltage Adjustment              |                                 | <b>-20% to +10%</b> (By external trim resistor)<br>See application note: <a href="http://www.tracopower.com/overview/tep100">www.tracopower.com/overview/tep100</a><br>Output power must not exceed rated power!                                                                                                                                                                                          |
| Voltage Set Accuracy                   |                                 | <b>±1% max.</b>                                                                                                                                                                                                                                                                                                                                                                                           |
| Regulation                             | - Input Variation (Vmin - Vmax) | <b>0.1% max.</b>                                                                                                                                                                                                                                                                                                                                                                                          |
|                                        | - Load Variation (0 - 100%)     | <b>0.1% max.</b>                                                                                                                                                                                                                                                                                                                                                                                          |
| Ripple and Noise<br>(20 MHz Bandwidth) |                                 | 3.3 Vout models: <b>75 mVp-p max.</b> (w/ 4.7 µF X7R)<br>5 Vout models: <b>75 mVp-p max.</b> (w/ 4.7 µF X7R)<br>12 Vout models: <b>100 mVp-p max.</b> (w/ 4.7 µF X7R)<br>15 Vout models: <b>100 mVp-p max.</b> (w/ 4.7 µF X7R)<br>24 Vout models: <b>200 mVp-p max.</b> (w/ 4.7 µF X7R)<br>28 Vout models: <b>200 mVp-p max.</b> (w/ 4.7 µF X7R)<br>48 Vout models: <b>300 mVp-p max.</b> (w/ 2.2 µF X7R) |
| Capacitive Load                        |                                 | 3.3 Vout models: <b>75'700 µF max.</b><br>5 Vout models: <b>40'000 µF max.</b><br>12 Vout models: <b>7'000 µF max.</b><br>15 Vout models: <b>4'460 µF max.</b><br>24 Vout models: <b>1'750 µF max.</b><br>28 Vout models: <b>1'280 µF max.</b><br>48 Vout models: <b>430 µF max.</b>                                                                                                                      |
| Minimum Load                           |                                 | <b>Not required</b>                                                                                                                                                                                                                                                                                                                                                                                       |
| Temperature Coefficient                |                                 | <b>±0.02 %/K max.</b>                                                                                                                                                                                                                                                                                                                                                                                     |
| Start-up Time                          |                                 | <b>25 ms typ.</b>                                                                                                                                                                                                                                                                                                                                                                                         |
| Short Circuit Protection               |                                 | <b>Continuous, Automatic recovery</b>                                                                                                                                                                                                                                                                                                                                                                     |
| Output Current Limitation              |                                 | <b>110 - 140% of Iout max.</b>                                                                                                                                                                                                                                                                                                                                                                            |

All specifications valid at nominal voltage, full load and +25°C after warm-up time unless otherwise stated.

|                        |                                                              |
|------------------------|--------------------------------------------------------------|
| Overvoltage Protection | 115 - 130% of Vout nom.                                      |
| Transient Response     | - Response Time<br>200 µs typ. / 250 µs max. (25% Load Step) |

## Safety Specifications

|                  |                             |                                                                                            |
|------------------|-----------------------------|--------------------------------------------------------------------------------------------|
| Safety Standards | - IT / Multimedia Equipment | EN 60950-1<br>IEC 60950-1<br>UL 60950-1                                                    |
|                  | - Certification Documents   | <a href="http://www.tracopower.com/overview/tep100">www.tracopower.com/overview/tep100</a> |

## EMC Specifications

|               |                             |                                                                                                                         |
|---------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------|
| EMI Emissions | - Conducted Emissions       | EN 55011 class B (with external filter)<br>EN 55032 class B (with external filter)                                      |
|               | - Radiated Emissions        | EN 55011 class B (with external filter)<br>EN 55032 class B (with external filter)                                      |
|               | External filter proposal:   | <a href="http://www.tracopower.com/overview/tep100">www.tracopower.com/overview/tep100</a>                              |
| EMS Immunity  | - Electrostatic Discharge   | EN 55024 (IT Equipment)<br>Air: EN 61000-4-2, ±8 kV, perf. criteria A<br>Contact: EN 61000-4-2, ±6 kV, perf. criteria A |
|               | - RF Electromagnetic Field  | EN 61000-4-3, 10 V/m, perf. criteria A                                                                                  |
|               | - EFT (Burst) / Surge       | EN 61000-4-4, ±2 kV, perf. criteria A<br>EN 61000-4-5, ±2 kV, perf. criteria A                                          |
|               | Ext. input component:       | 2 x KY 220 µF                                                                                                           |
|               | - Conducted RF Disturbances | EN 61000-4-6, 10 Vrms, perf. criteria A                                                                                 |
|               | - PF Magnetic Field         | Continuous: EN 61000-4-8, 100 A/m, perf. criteria A<br>1 s: EN 61000-4-8, 1000 A/m, perf. criteria A                    |

## General Specifications

|                           |                                                                                           |                                                                                                                                                                                               |
|---------------------------|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Relative Humidity         | 95% max. (non condensing)                                                                 |                                                                                                                                                                                               |
| Temperature Ranges        | - Operating Temperature<br>- Case Temperature<br>- Storage Temperature                    | -40°C to +75°C<br>+105°C max.<br>-55°C to +125°C                                                                                                                                              |
| Power Derating            | - High Temperature                                                                        | See application note: <a href="http://www.tracopower.com/overview/tep100">www.tracopower.com/overview/tep100</a>                                                                              |
| Over Temperature          | - Protection Mode                                                                         | 115°C typ. (Automatic recovery at 105°C typ.)                                                                                                                                                 |
| Protection Switch Off     | - Measurement Point                                                                       | See application note: <a href="http://www.tracopower.com/overview/tep100">www.tracopower.com/overview/tep100</a>                                                                              |
| Cooling System            | Natural convection (20 LFM)                                                               |                                                                                                                                                                                               |
| Sense Function            | 10% max. of Vout nom.                                                                     |                                                                                                                                                                                               |
| Remote Control            | - Voltage Controlled Remote<br><br>- Off Idle Input Current<br>- Remote Pin Input Current | On: 3.0 to 12 VDC or open circuit<br>Off: 0 to 1.2 VDC or short circuit<br>Refers to 'Remote' and '-Vin' Pin<br>3 mA typ.<br>-0.5 to 1.0 mA<br>(Optional models with inverse logic available) |
| Altitude During Operation | 2'000 m max.                                                                              |                                                                                                                                                                                               |
| Switching Frequency       | 270 - 330 kHz (PWM)<br>300 kHz typ. (PWM)                                                 |                                                                                                                                                                                               |
| Insulation System         | Basic Insulation                                                                          |                                                                                                                                                                                               |
| Isolation Test Voltage    | - Input to Output, 60 s<br>- Input to Case, 60 s                                          | 2'250 VDC<br>1'600 VDC                                                                                                                                                                        |
| Isolation Resistance      | - Input to Output, 500 VDC                                                                | 1'000 MΩ min.                                                                                                                                                                                 |
| Isolation Capacitance     | - Input to Output, 100 kHz, 1 V                                                           | 2'500 pF max.                                                                                                                                                                                 |
| Reliability               | - Calculated MTBF                                                                         | 331'000 h (MIL-HDBK-217F, ground benign)                                                                                                                                                      |
| Environment               | - Vibration<br>- Thermal Shock                                                            | MIL-STD-810F<br>MIL-STD-810F                                                                                                                                                                  |
| Housing Material          | Metal                                                                                     |                                                                                                                                                                                               |
| Base Material             | Non-conductive FR4 (UL94 V-0 rated)                                                       |                                                                                                                                                                                               |

All specifications valid at nominal voltage, full load and +25°C after warm-up time unless otherwise stated.

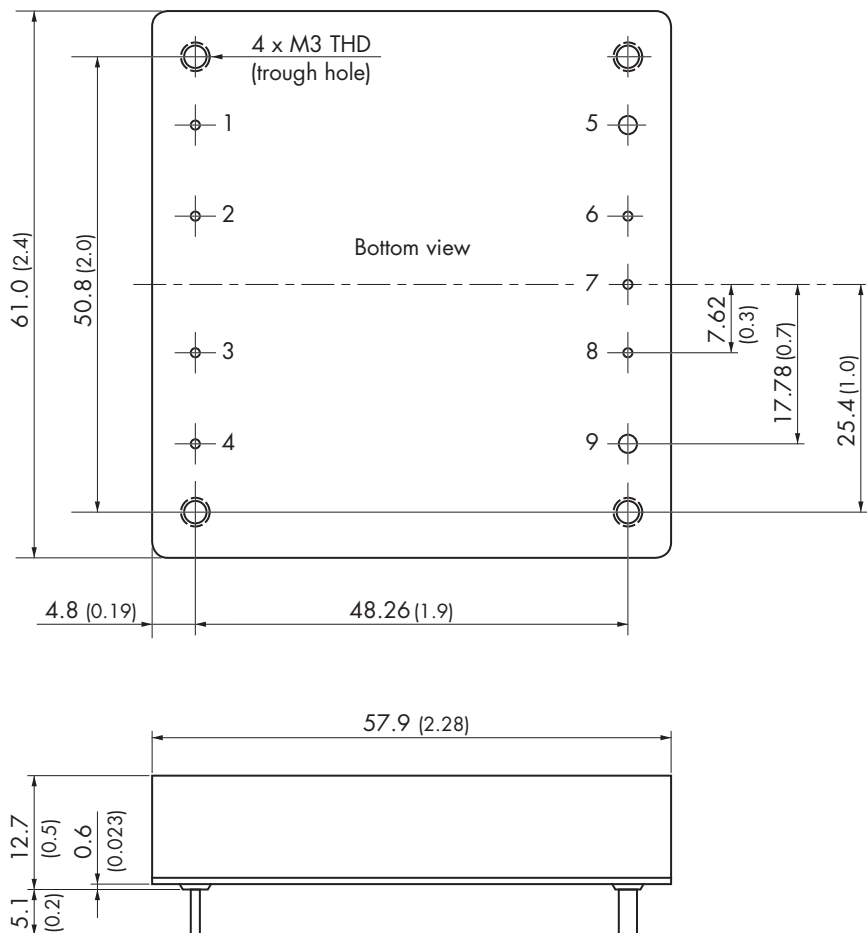
|                          |                                                                                                                                                                                                                                    |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Potting Material         | Silicone (UL 94 V-0 rated)                                                                                                                                                                                                         |
| Pin Material             | Copper                                                                                                                                                                                                                             |
| Pin Foundation Plating   | Nickel (2 - 3 µm)                                                                                                                                                                                                                  |
| Pin Surface Plating      | Tin (3 - 5 µm), matte                                                                                                                                                                                                              |
| Connection Type          | THD (Through-Hole Device)                                                                                                                                                                                                          |
| Weight                   | 97 g                                                                                                                                                                                                                               |
| Thermal Impedance        | 6.7 K/W<br>4.7 K/W (with Heat Sink)                                                                                                                                                                                                |
| Environmental Compliance | - Reach<br>- RoHS                                                                                                                                                                                                                  |
|                          | <a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a><br><a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a> |

### Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tep100](http://www.tracopower.com/overview/tep100)

### Outline Dimensions



| Pinout |            |
|--------|------------|
| Pin    | Function   |
| 1      | -Vin (GND) |
| 2      | Case       |
| 3      | Remote     |
| 4      | +Vin (Vcc) |
| 5      | -Vout      |
| 6      | -Sense     |
| 7      | Trim       |
| 8      | +Sense     |
| 9      | +Vout      |

The screw 1 locked torque  
(24 and 48Vout models):  
MAX 5.0kgf-cm/0.49N-m

Dimensions in mm (inch)  
Tolerances x.xx±0.5 (±0.02)  
Tolerances x.xxx±0.25 (±0.01)  
Pin pitch tolerances ±0.25 (±0.01)  
Pin dimension tolerances ±0.1 (±0.004)

Pin diameter pins 5 & 9: 2.0 (0.08)

Pin diameter other pins: 1.0 (0.04)

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

## TRACO Power:

[TEP 100-2411](#) [TEP 100-2415](#) [TEP 100-2412](#) [TEP 100-1215](#) [TEP 100-4815](#) [TEP 100-2415-CMF](#) [TEP 100-1210](#)  
[TEP 100-1212](#) [TEP 100-4812-CMF](#) [TEP 100-4811](#) [TEP 100-2416](#) [TEP 100-4816](#) [TEP 100-2411-CMF](#) [TEP 100-](#)  
[1213](#) [TEP 100-1211-CMF](#) [TEP 100-4812](#) [TEP 100-1215-CMF](#) [TEP 100-4813](#) [TEP 100-1216-CMF](#) [TEP 100-2413](#)  
[TEP 100-1218-CMF](#) [TEP 100-2410-CMF](#) [TEP 100-2413-CMF](#) [TEP 100-2418](#) [TEP 100-1213-CMF](#) [TEP 100-2416-](#)  
[CMF](#) [TEP 100-4811-CMF](#) [TEP 100-1211](#) [TEP 100-1216](#) [TEP 100-4818-CMF](#) [TEP 100-1218](#) [TEP 100-2410](#) [TEP](#)  
[100-4818](#) [TEP 100-2418-CMF](#) [TEP 100-2412-CMF](#) [TEP 100-1210-CMF](#) [TEP 100-4815-CMF](#) [TEP 100-4810](#) [TEP](#)  
[100-4813-CMF](#) [TEP 100-1212-CMF](#) [TEP 100-4816-CMF](#)