The TEN 50WI Series is a range of isolated high performance DC/DC converter modules. With a very high efficiency of up to 92% and the use of highest reliable components these 50 W converters can be packed into the standard 1.0" x 2.0” casing. The 10 models have a wide 4:1 input voltage range and a tight output voltage regulation. They do not need a minimum load and offer a high efficiency also at low load conditions. The output voltage is adjustable by external resistor. Remote On/Off and protection against overload and short circuit are standard features of these converters. Typical applications are in mobile equipment, instrumentation, distributed power architectures in communication and industrial electronics and everywhere where space on the PCB is critical.

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>TEN 50-2410WI</td>
<td></td>
<td>9 - 36 VDC (24 VDC nom.)</td>
<td>3.3 VDC</td>
<td>10'000 mA</td>
<td>90 %</td>
</tr>
<tr>
<td>TEN 50-2411WI</td>
<td></td>
<td>9 - 36 VDC (24 VDC nom.)</td>
<td>5 VDC</td>
<td>10'000 mA</td>
<td>91 %</td>
</tr>
<tr>
<td>TEN 50-2412WI</td>
<td></td>
<td>9 - 36 VDC (24 VDC nom.)</td>
<td>12 VDC</td>
<td>4'170 mA</td>
<td>92 %</td>
</tr>
<tr>
<td>TEN 50-2413WI</td>
<td></td>
<td>9 - 36 VDC (24 VDC nom.)</td>
<td>15 VDC</td>
<td>3'330 mA</td>
<td>92 %</td>
</tr>
<tr>
<td>TEN 50-2415WI</td>
<td></td>
<td>9 - 36 VDC (24 VDC nom.)</td>
<td>24 VDC</td>
<td>2'080 mA</td>
<td>91 %</td>
</tr>
<tr>
<td>TEN 50-4810WI</td>
<td></td>
<td>18 - 75 VDC (48 VDC nom.)</td>
<td>3.3 VDC</td>
<td>10'000 mA</td>
<td>90 %</td>
</tr>
<tr>
<td>TEN 50-4811WI</td>
<td></td>
<td>18 - 75 VDC (48 VDC nom.)</td>
<td>5 VDC</td>
<td>10'000 mA</td>
<td>91 %</td>
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<td>24 VDC</td>
<td>2'080 mA</td>
<td>91 %</td>
</tr>
</tbody>
</table>

Options

### Input Specifications

**Input Current**
- **At no load**
  - 24 Vin models: 80 mA typ. (3.3 Vout model)
  - 60 mA typ. (5 Vout model)
  - 80 mA typ. (12 Vout model)
  - 80 mA typ. (15 Vout model)
  - 80 mA typ. (24 Vout model)
- **At full load**
  - 24 Vin models: 1'528 mA typ. (3.3 Vout model)
  - 2'290 mA typ. (5 Vout model)
  - 2'287 mA typ. (12 Vout model)
  - 2'263 mA typ. (15 Vout model)
  - 2'286 mA typ. (24 Vout model)
- 48 Vin models: 30 mA typ. (3.3 Vout model)
  - 60 mA typ. (5 Vout model)
  - 60 mA typ. (12 Vout model)
  - 60 mA typ. (15 Vout model)
  - 50 mA typ. (24 Vout model)

**Surge Voltage**
- 24 Vin models: 50 VDC max. (100 ms max.)
- 48 Vin models: 100 VDC max. (100 ms max.)

**Under Voltage Lockout**
- 24 Vin models: 7.5 VDC typ.
- 48 Vin models: 16 VDC typ.

**Reflected Ripple Current**
- 48 Vin models: 30 mAp-p typ.

**Recommended Input Fuse**
- 24 Vin models: 1'000 mA (Slow blow)
- 48 Vin models: 500 mA (Slow blow)
  (The need of an external fuse has to be assessed in the final application)

**Input Filter**
Internal LC-Type

### Output Specifications

**Output Voltage Adjustment**
- −10% to +20% (24 Vout models)
- ±10% (other single models)
  (By external trim resistor)

**Voltage Set Accuracy**
- Input Variations (Vmin - Vmax)
  - 0.5% max.
- Load Variations (0 - 100%)
  - 0.5% max.

**Ripple and Noise**
(20 MHz Bandwidth)
- 3.3 Vout models: 100 mVp-p max. (w/ 1 µF MLCC // 10 µF TC)
- 5 Vout models: 100 mVp-p max. (w/ 1 µF MLCC // 10 µF TC)
- 12 Vout models: 150 mVp-p max. (w/ 1 µF MLCC // 10 µF TC)
- 15 Vout models: 150 mVp-p max. (w/ 1 µF MLCC // 10 µF TC)
- 24 Vout models: 150 mVp-p max. (w/ 1 µF MLCC // 10 µF TC)

**Capacitive Load**
- 3.3 Vout models: 26'000 µF max.
- 5 Vout models: 17'000 µF max.
- 12 Vout models: 3'000 µF max.
- 15 Vout models: 2'000 µF max.
- 24 Vout models: 750 µF max.

**Minimum Load**
Not required

**Temperature Coefficient**
±0.02 %/K max.

**Start-up Time**
- 30 ms max. (Power On)
- 30 ms max. (Remote On)

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

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

March 10, 2022
### Short Circuit Protection
Continuous, Automatic recovery

### Output Current Limitation
150% typ. of I\textsubscript{out} max.

### Transient Response
- Response Deviation: 3% typ. / 5% max. (75% to 100% Load Step)
- Response Time: 250 µs typ. (75% to 100% Load Step)

### Safety Specifications

<table>
<thead>
<tr>
<th>Safety Standards</th>
<th>EN 60950-1</th>
<th>EN 62368-1</th>
<th>IEC 60950-1</th>
<th>IEC 62368-1</th>
<th>UL 60950-1</th>
<th>UL 62368-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>- IT / Multimedia Equipment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Certification Documents</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

www.tracopower.com/overview/ten50wi

### Pollution Degree
PD 3

### Over Voltage Category
Not mains connected

### EMC Specifications

<table>
<thead>
<tr>
<th>EMI Emissions</th>
<th>EN 55032 class A (with external filter)</th>
<th>EN 55032 class B (with external filter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Conducted Emissions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Radiated Emissions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FCC Part 15 class A (with external filter)

<table>
<thead>
<tr>
<th>Safety Standards</th>
<th>EN 55032 class A (with external filter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Conducted RF Disturbances</td>
<td></td>
</tr>
</tbody>
</table>

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### EMS Immunity

<table>
<thead>
<tr>
<th>Electrostatic Discharge</th>
<th>EN 61000-4-2, ±8 kV, perf. criteria A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact</td>
<td>EN 61000-4-2, ±6 kV, perf. criteria A</td>
</tr>
</tbody>
</table>

- RF Electromagnetic Field
- EFT (Burst) / Surge

<table>
<thead>
<tr>
<th>Ext. input component</th>
<th>KY 220 µF, 100 V, ESR 48 mΩ</th>
</tr>
</thead>
</table>

### General Specifications

<table>
<thead>
<tr>
<th>Relative Humidity</th>
<th>95% max. (non condensing)</th>
</tr>
</thead>
</table>

### Temperature Ranges

- Operating Temperature: -40°C to +80°C
- Case Temperature: -40°C to +85°C (with Heat Sink)
- Storage Temperature: +105°C max.
- -50°C to +125°C

### Power Derating

- High Temperature: See application note: www.tracopower.com/overview/ten50wi

### Over Temperature Protection Switch Off

- Protection Mode: 110°C typ.

### Cooling System

Natural convection (20 LFM)

### Remote Control

- Voltage Controlled Remote: On: 3.5 to 12 VDC or open circuit
- Off: 0 to 1.2 VDC or short circuit
- Off Idle Input Current: 2.5 mA typ.
- Remote Pin Input Current: -0.5 to 0.5 mA

### Altitude During Operation

6’000 m max.

### Switching Frequency

285 KHz typ.

### Insulation System

Functional Insulation

### Isolation Test Voltage

- Input to Output, 60 s: 1'500 VDC
- Input to Output, 1 s: 1'800 VDC

### Isolation Resistance

- Input to Output: 500 VDC: 1’000 MΩ min.

### Isolation Capacitance

- Input to Output, 100 kHz, 1 V: 2'200 pF max.

### Reliability

- Calculated MTBF: 230'000 h (MIL-HDBK-217F; ground benign)

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

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March 10, 2022
**Washing Process**  
Allowed (hermetical product)  

<table>
<thead>
<tr>
<th><strong>Housing Material</strong></th>
<th>Alu alloy, black anodized coating</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Base Material</strong></td>
<td>Non-conductive FR4 (UL 94 V-0 rated)</td>
</tr>
<tr>
<td><strong>Potting Material</strong></td>
<td>Epoxy (UL 94 V-0 rated)</td>
</tr>
<tr>
<td><strong>Pin Material</strong></td>
<td>Copper Alloy (C6801)</td>
</tr>
<tr>
<td><strong>Pin Foundation Plating</strong></td>
<td>Nickel (2.5 µm min.)</td>
</tr>
<tr>
<td><strong>Pin Surface Plating</strong></td>
<td>Gold (75 - 125 nm), glossy</td>
</tr>
<tr>
<td><strong>Housing Type</strong></td>
<td>Metal Case</td>
</tr>
<tr>
<td><strong>Mounting Type</strong></td>
<td>PCB Mount</td>
</tr>
<tr>
<td><strong>Connection Type</strong></td>
<td>THD (Through-Hole Device)</td>
</tr>
<tr>
<td><strong>Footprint Type</strong></td>
<td>2&quot; x 1&quot;</td>
</tr>
<tr>
<td><strong>Soldering Profile</strong></td>
<td>Wave Soldering</td>
</tr>
</tbody>
</table>

**Weight**
- 34 g
- 12 K/W
- 10 K/W (with Heat Sink)

**Environmental Compliance**
- [REACH Declaration](http://www.tracopower.com/info/reach-declaration.pdf)
- [RoHS Declaration](http://www.tracopower.com/info/rohs-declaration.pdf)

Exemptions: 7a  
(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule). The SCIP number is provided on request.)

**Supporting Documents**
- [Overview Link](http://www.tracopower.com/overview/ten50wi) (for additional Documents)

**Outline Dimensions**

![Outline Dimensions Diagram](http://www.tracopower.com/assets/diagrams/ten50wi-outline-dimensions.jpg)

**Pinout**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Single</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+Vin (Vcc)</td>
</tr>
<tr>
<td>2</td>
<td>–Vin (GND)</td>
</tr>
<tr>
<td>3</td>
<td>Remote On/Off</td>
</tr>
<tr>
<td>4</td>
<td>+Vout</td>
</tr>
<tr>
<td>5</td>
<td>–Vout</td>
</tr>
<tr>
<td>6</td>
<td>Trim</td>
</tr>
</tbody>
</table>

Dimensions in mm (inch)  
Pin diameter: 1.0 ±0.05 (0.04 ±0.002)  
Tolerances: x.x ±0.25 (x.xx ±0.01)  
x.xx ±0.13 (x.xxx ±0.005)