DC/DC Converters
TEN 25WI Series, 25/30 Watt

Features
◆ Ultra wide 4:1 input voltage range
◆ Adjustable output voltage
◆ Remote On/Off
◆ Continuous short circuit protection
◆ Over voltage protection
◆ Over temperature protection
◆ I/O isolation 1500 VDC
◆ Input filter meets EN 55032, class A and FCC, level A without external components
◆ Fully RoHS compliant
◆ 3-year product warranty

The TEN 25WI series is a family of high performance dc-dc converter modules up to 30 Watt featuring ultra wide 4:1 input voltage ranges in a compact low profile case with industry standard footprint. Standard features include remote On/Off, output voltage trimming, over voltage protection, under voltage lockout, over temperature and short circuit protection.

An other features is the internal EMI-filter to meet EN 55032, class A. Typical applications for these converter modules are industrial electronics, communication systems, battery operated equipment and distributed power systems.

Models

<table>
<thead>
<tr>
<th>Order code</th>
<th>Input voltage range</th>
<th>Output voltage</th>
<th>Output current max.</th>
<th>Efficiency typ.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEN 25-2410WI</td>
<td>3.3 VDC</td>
<td>5'500 mA</td>
<td>82 %</td>
<td></td>
</tr>
<tr>
<td>TEN 25-2411WI</td>
<td>5 VDC</td>
<td>5'000 mA</td>
<td>85 %</td>
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<tr>
<td>TEN 25-2412WI</td>
<td>12 VDC</td>
<td>2'500 mA</td>
<td>89 %</td>
<td></td>
</tr>
<tr>
<td>TEN 25-2413WI</td>
<td>15 VDC</td>
<td>2'000 mA</td>
<td>89 %</td>
<td></td>
</tr>
<tr>
<td>TEN 25-2422WI</td>
<td>±12 VDC</td>
<td>±1'250 mA</td>
<td>89 %</td>
<td></td>
</tr>
<tr>
<td>TEN 25-2423WI</td>
<td>±15 VDC</td>
<td>±1’000 mA</td>
<td>89 %</td>
<td></td>
</tr>
<tr>
<td>TEN 25-4810WI</td>
<td>3.3 VDC</td>
<td>5'500 mA</td>
<td>82 %</td>
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http://www.tracopower.com
Input Specifications

**Input current no load**
- 24 V models: 20 mA max.
- 48 V models: 10 mA max.

**Input current full load**
- 24 V, 3.3 VDC models: 920 mA typ.
- 24 V, 5.0 VDC models: 1220 mA typ.
- 24 V, other output models: 1400 mA typ.
- 48 V, 3.3 VDC models: 460 mA typ.
- 48 V, 5.0 VDC models: 610 mA typ.
- 48 V, other output models: 700 mA typ.

**Surge voltage** (100 ms max.)
- 24 V models: 50 V max.
- 48 V models: 100 V max.

**Reverse polarity**
- 2 A max.

**Reflected input ripple current**
- 24 V models: 50 mA typ.
- 48 V models: 25 mA typ.

**Conducted noise (input)**
- EN 55032 level A, FCC part 15, level A

**Start-up voltage / under voltage shut down**
- 48 V models: 17.5 VDC / 16.5 VDC typ.

Output Specifications

**Voltage set accuracy**
- ±1 %

**Output voltage adj. range**
- ±10 % with external resistor (see page 4)

**Regulation**
- Input variation: Vin min. to Vin max.: 0.5 % max.
- Load variation: 10 – 100 %: single output models: 1.0 % max.
  dual output models, balanced load: 2.0 % max.

**Minimum load**
- 10 % of rated max current (operation at lower load condition is safe but a higher output ripple will be experienced)

**Temperature coefficient**
- ±0.02 %/°C max.

**Ripple and noise (20 MHz Bandwidth)**
- 80 mVp-pk max.

**Transient response (25 % load step change)**
- 150 µs typ.

**Output current limitation**
- >120 % of Iout max.

**Short circuit protection**
- indefinite, automatic recovery

**Thermal shutdown**
- at 115°C typ.

**Capacitive load**
- 3.3 & 5 VDC models: 10’000 µF
- 12 & 15 VDC models: 1’000 µF
- dual output models: 330 µF

General Specifications

**Temperature ranges**
- Operating: -40°C to +85°C (with derating)
- Casing: +105°C max.
- Storage: -50°C to +125°C

**Load derating**
- without heatsink: 2 %/K above 55°C
- with heatsink: 2.5 %/K above 65°C

**Humidity (non condensing)**
- 95 % rel H max.

**Reliability, calculated MTBF** (MIL-HDBK-217F, at +25°C, ground benign)
- >550'000 h

**Isolation voltage (60 s)**
- Input/Output: 1'500 VDC

**Isolation capacitance**
- Input/Output (100 kHz, 1 V): 1200 pF typ.

**Isolation resistance**
- Input/Output (500 VDC): >1’000 MOhm

**Switching frequency** (fixed)
- 330 kHz typ. (puls width modulation)

http://www.tracopower.com
General Specifications

Remote On/Off:  
- On: 2.5 to 100 VDC or open circuit.  
- Off: -1.0 to +1.0 VDC or short circuit pin 3 and 2  
- Standby current: 5 mA max.

Safety standards: UL/cUL 60950-1, IEC/EN 60950-1

Safety approvals: - UL/cUL  
www.ul.com -> certifications -> File e188913

Physical Specifications

Casing material: copper, nickel plated

Baseplate: non conductive FR4

Potting material: silicon [UL 94 V-0 rated]

Weight: 56 g (1.98 oz)

Soldering temperature: 265°C / 10 s max.

Environmental compliance:  
- Reach  
www.tracopower.com/info/reach-declaration.pdf  
- RoHS  
RoHS directive 2011/65/EU

Output Voltage Adjustments

\[
Rx = \frac{36.667 \times Vo - 33 \times Vn}{Vn - Vo}
\]

Nominal output voltage at open Trim input.

Application note: www.tracopower.com/overview/ten25wi
**DC/DC Converters**

**TEN 25WI Series, 25/30W**

### Outline Dimensions

**Pin-Out**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Single</th>
<th>Dual</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+Vin (Vcc)</td>
<td>+Vin (Vcc)</td>
</tr>
<tr>
<td>2</td>
<td>–Vin (GND)</td>
<td>–Vin (GND)</td>
</tr>
<tr>
<td>3</td>
<td>Remote On/Off</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>No pin</td>
<td>+ Vout</td>
</tr>
<tr>
<td>5</td>
<td>+ Vout</td>
<td>Common</td>
</tr>
<tr>
<td>6</td>
<td>–Vout</td>
<td>–Vout</td>
</tr>
<tr>
<td>7</td>
<td>Trim</td>
<td></td>
</tr>
</tbody>
</table>

Dimensions in [mm], () = Inch

- Pin diameter: 1.0 ±0.05 (±0.02)
- Pin pitch tolerances: ±0.35 (±0.014)
- Case tolerances: ±0.5 (±0.02)

**Heat-Sink (Option)**

Heat-sink TEN-HS5 (optional)

**Order code:** TEN-HS5

- Material: Aluminum
- Finish: Anodic treatment (black)
- Weight: 15 g (0.53oz) (without converter)

**Note:**

The product label on converter has to be removed before mounting the heat-sink.

For volume orders converters will be supplied with heat-sinks already mounted. Please contact factory for quotation.

Separate heat-sinks are only available for prototypes and small quantity orders.

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*Optional versions:
- without remote and trim pins add suffix -B (e.g. TEN 252412WI-B1)
- without remote pin add suffix -B1 (e.g. TEN 252413WI-B1)
- without trim pin add suffix -B2 (e.g. TEN 254811WI-B2)