Features

- Ultra wide 4:1 input range
- DIP-24 Package with standard pinout
- Full SMD design
- Extended operating temperature range –40°C to +85°C max.
- High efficiency
- Excellent load and line regulation
- Indefinite short circuit protection
- I/O isolation 1500VDC
- Built-in Filter to meet EN 55022, Class A and FCC, level A
- Lead-free design, fully RoHS compliant
- 3-year product warranty

The TEN 5WI series is a family of high performance dc-dc converter modules with 5 W output power, featuring ultra wide input voltage ranges of 9 - 36 VDC or 18 - 75 VDC. They come in a shielded DIP-24 metal package with industry-standard footprint.

A high efficiency allows –40°C to +70°C operation ambient temperatures at full load. Typical applications for these converters are battery operated equipment and distributed power architectures in communication, instrumentation and industrial electronics, everywhere where a wide input voltage range is required.

<table>
<thead>
<tr>
<th>Models</th>
<th>Ordercode</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 5-2410WI</td>
<td>9 - 36 VDC</td>
<td>3.3 VDC</td>
<td>1200 mA</td>
<td>75 %</td>
<td></td>
</tr>
<tr>
<td>TEN 5-2411WI</td>
<td>9 - 36 VDC</td>
<td>5 VDC</td>
<td>1000 mA</td>
<td>78 %</td>
<td></td>
</tr>
<tr>
<td>TEN 5-2412WI</td>
<td>9 - 36 VDC</td>
<td>12 VDC</td>
<td>500 mA</td>
<td>83 %</td>
<td></td>
</tr>
<tr>
<td>TEN 5-2413WI</td>
<td>9 - 36 VDC</td>
<td>15 VDC</td>
<td>400 mA</td>
<td>82 %</td>
<td></td>
</tr>
<tr>
<td>TEN 5-2421WI</td>
<td>±5 VDC</td>
<td>±500 mA</td>
<td>78 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEN 5-2422WI</td>
<td>±12 VDC</td>
<td>±250 mA</td>
<td>83 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEN 5-2423WI</td>
<td>±15 VDC</td>
<td>±200 mA</td>
<td>82 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEN 5-4810WI</td>
<td>18 – 75 VDC</td>
<td>3.3 VDC</td>
<td>1200 mA</td>
<td>75 %</td>
<td></td>
</tr>
<tr>
<td>TEN 5-4811WI</td>
<td>18 – 75 VDC</td>
<td>5 VDC</td>
<td>1000 mA</td>
<td>78 %</td>
<td></td>
</tr>
<tr>
<td>TEN 5-4812WI</td>
<td>18 – 75 VDC</td>
<td>12 VDC</td>
<td>500 mA</td>
<td>83 %</td>
<td></td>
</tr>
<tr>
<td>TEN 5-4813WI</td>
<td>18 – 75 VDC</td>
<td>15 VDC</td>
<td>400 mA</td>
<td>82 %</td>
<td></td>
</tr>
<tr>
<td>TEN 5-4821WI</td>
<td>±5 VDC</td>
<td>±500 mA</td>
<td>78 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEN 5-4822WI</td>
<td>±12 VDC</td>
<td>±250 mA</td>
<td>83 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEN 5-4823WI</td>
<td>±15 VDC</td>
<td>±200 mA</td>
<td>82 %</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Input Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>24 Vin models</th>
<th>48 Vin models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input current no load</td>
<td>20 mA typ.</td>
<td>10 mA typ.</td>
</tr>
</tbody>
</table>

### Start-up voltage / under voltage shut down

<table>
<thead>
<tr>
<th>Specification</th>
<th>24 Vin models</th>
<th>48 Vin models</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 Vin models</td>
<td>9 VDC / 8.5 VDC typ.</td>
<td>18 VDC / 16 VDC typ.</td>
</tr>
</tbody>
</table>

### Surge voltage (1 sec. max.)

<table>
<thead>
<tr>
<th>Specification</th>
<th>24 Vin models</th>
<th>48 Vin models</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 Vin models</td>
<td>50 V max.</td>
<td>100 V max.</td>
</tr>
</tbody>
</table>

## Conducted noise (input)

<table>
<thead>
<tr>
<th>Specification</th>
<th>EN 55022 level A, FCC part 15, level A</th>
</tr>
</thead>
</table>

## Output Specifications

### Voltage set accuracy

<table>
<thead>
<tr>
<th>Specification</th>
<th>±2.0 % max.</th>
</tr>
</thead>
</table>

### Regulation

- Input variation Vin min. to Vin max.
- Load variation 10 – 100 %

#### Single output models

- 1.0 % max.

#### Dual output models

- 1.0 % max.
  - Balanced load
  - Unbalanced load

### Ripple and noise (20 MHz Bandwidth)

<table>
<thead>
<tr>
<th>Specification</th>
<th>80 mVpk-pk max</th>
</tr>
</thead>
</table>

### Temperature coefficient

<table>
<thead>
<tr>
<th>Specification</th>
<th>±0.02 %/K</th>
</tr>
</thead>
</table>

### Current limitation

<table>
<thead>
<tr>
<th>Specification</th>
<th>&gt;110 % of Iout max., constant current</th>
</tr>
</thead>
</table>

### Short circuit protection

<table>
<thead>
<tr>
<th>Specification</th>
<th>Indefinite (automatic recovery)</th>
</tr>
</thead>
</table>

### Capacitive load

<table>
<thead>
<tr>
<th>Specification</th>
<th>3.3 / 5 VDC models</th>
<th>12 / 15 VDC models</th>
</tr>
</thead>
<tbody>
<tr>
<td>470 µF max.</td>
<td>100 µF max.</td>
<td>100 µF max.</td>
</tr>
</tbody>
</table>

## General Specifications

### Temperature ranges

<table>
<thead>
<tr>
<th>Specification</th>
<th>Operating</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Operating</td>
<td>–40°C to +85°C</td>
</tr>
<tr>
<td>- Case temperature</td>
<td>+100°C max.</td>
</tr>
<tr>
<td>- Storage</td>
<td>–40°C to +125°C</td>
</tr>
</tbody>
</table>

### Derating

<table>
<thead>
<tr>
<th>Specification</th>
<th>3.5 %/K above +70°C</th>
</tr>
</thead>
</table>

### Humidity (non condensing)

<table>
<thead>
<tr>
<th>Specification</th>
<th>95 % rel H max.</th>
</tr>
</thead>
</table>

### Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)

<table>
<thead>
<tr>
<th>Specification</th>
<th>&gt;800’000 h</th>
</tr>
</thead>
</table>

### Isolation voltage [60 sec.]

<table>
<thead>
<tr>
<th>Specification</th>
<th>1'500 VDC</th>
</tr>
</thead>
</table>

### Isolation capacitance

<table>
<thead>
<tr>
<th>Specification</th>
<th>1000 pF typ</th>
</tr>
</thead>
</table>

### Isolation resistance

<table>
<thead>
<tr>
<th>Specification</th>
<th>&gt;1'000 M Ohm</th>
</tr>
</thead>
</table>

### Switching frequency

<table>
<thead>
<tr>
<th>Specification</th>
<th>290 - 450 kHz (PFM)</th>
</tr>
</thead>
</table>

### Safety standards

<table>
<thead>
<tr>
<th>Specification</th>
<th>cUL/UL 60950-1, IEC/EN 60950-1</th>
</tr>
</thead>
</table>

### Environmental compliance

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Reach</td>
<td>directive 2011/65/EU</td>
</tr>
<tr>
<td>- RoHS</td>
<td></td>
</tr>
</tbody>
</table>

---

All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.
DC/DC Converters
TEN 5WI Series 6 Watt

Physical Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casing material</td>
<td>black anodized aluminium</td>
</tr>
<tr>
<td>Baseplate material</td>
<td>non conductive FR4</td>
</tr>
<tr>
<td>Potting material</td>
<td>epoxy (UL 94V-0 rated)</td>
</tr>
<tr>
<td>Weight</td>
<td>17 g (0.49 oz)</td>
</tr>
<tr>
<td>Soldering temperature</td>
<td>max. 260°C / 10 sec.</td>
</tr>
</tbody>
</table>

Supporting documents: www.tracopower.com/overview/ten5wi

Outline Dimensions

![Outline Dimensions Diagram]

Pin-Out

<table>
<thead>
<tr>
<th>Pin</th>
<th>Single</th>
<th>Dual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>–Vin (GND)</td>
<td>–Vin (GND)</td>
</tr>
<tr>
<td>3</td>
<td>–Vin (GND)</td>
<td>–Vin (GND)</td>
</tr>
<tr>
<td>9</td>
<td>No pin</td>
<td>Common</td>
</tr>
<tr>
<td>11</td>
<td>NC</td>
<td>–Vout</td>
</tr>
<tr>
<td>14</td>
<td>+Vout</td>
<td>+Vout</td>
</tr>
<tr>
<td>16</td>
<td>–Vout</td>
<td>Common</td>
</tr>
<tr>
<td>22</td>
<td>+Vin (Vcc)</td>
<td>+Vin (Vcc)</td>
</tr>
<tr>
<td>23</td>
<td>+Vin (Vcc)</td>
<td>+Vin (Vcc)</td>
</tr>
</tbody>
</table>

NC = Not connected

All dimensions in mm (inch)
Tolerances: x.x ±0.25 (x.xx ±0.01)
  x.xx ±0.13 (x.xxx ±0.005)
Pin diameter tolerances: x.x ±0.05 (x.xx ±0.002)