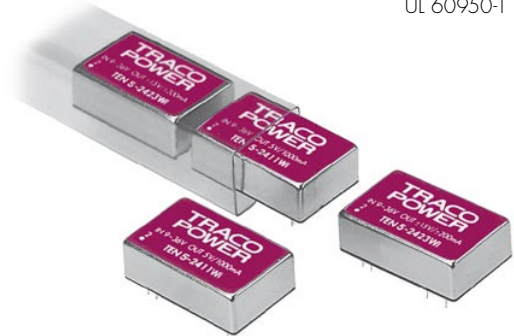




UL 60950-1

#### Features

- ◆ Ultra-wide 4:1 Input Range
- ◆ DIP-24 Package with Standard Pinout
- ◆ Full SMD Design
- ◆ Ext.ended Operating Temperature Range  
-40 to +85°C max.
- ◆ High Efficiency
- ◆ Excellent Load and Line Regulation
- ◆ Indefinite Short-circuit Protection
- ◆ I/O-Isolation 1500VDC
- ◆ Built-inFilter meets 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 5W output power, featuring ultra wide input voltage ranges of 9-36VDC or 18-75VDC. 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. Standard features include over voltage protection and continuous short circuit protection. 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.

| Models       |                                 |                |                     |                 |
|--------------|---------------------------------|----------------|---------------------|-----------------|
| Ordercode    | Input voltage range             | Output voltage | Output current max. | Efficiency typ. |
| TEN 5-2410WI | 9 – 36 VDC<br>(24 VDC nominal)  | 3.3 VDC        | 1200 mA             | 76 %            |
| TEN 5-2411WI |                                 | 5 VDC          | 1000 mA             | 79 %            |
| TEN 5-2412WI |                                 | 12 VDC         | 500 mA              | 84 %            |
| TEN 5-2413WI |                                 | 15 VDC         | 400 mA              | 83 %            |
| TEN 5-2421WI |                                 | ± 5 VDC        | ± 500 mA            | 79 %            |
| TEN 5-2422WI |                                 | ± 12 VDC       | ± 250 mA            | 84 %            |
| TEN 5-2423WI |                                 | ± 15 VDC       | ± 200 mA            | 83 %            |
| TEN 5-4810WI | 18 – 75 VDC<br>(48 VDC nominal) | 3.3 VDC        | 1200 mA             | 76 %            |
| TEN 5-4811WI |                                 | 5 VDC          | 1000 mA             | 79 %            |
| TEN 5-4812WI |                                 | 12 VDC         | 500 mA              | 84 %            |
| TEN 5-4813WI |                                 | 15 VDC         | 400 mA              | 83 %            |
| TEN 5-4821WI |                                 | ± 5 VDC        | ± 500 mA            | 79 %            |
| TEN 5-4822WI |                                 | ± 12 VDC       | ± 250 mA            | 84 %            |
| TEN 5-4823WI |                                 | ± 15 VDC       | ± 200 mA            | 83 %            |

### Input Specifications

|   |                                |  |
|---|--------------------------------|--|
| Input current no load /full load              | 24 Vin models<br>48 Vin models | 20 mA typ. / 300 mA typ.<br>10 mA typ. / 150 mA typ. |
| Start-up voltage /<br>under voltage shut down | 24 Vin models<br>48 Vin models | 9 VDC / 8.5 VDC typ.<br>18 VDC / 16 VDC typ.         |
| Surge voltage (1 sec. max.)                   | 24 Vin models<br>48 Vin models | 50 V max.<br>100 V max.                              |
| Reverse voltage protection                    |                                | 1.0 A max.   |
| Conducted noise (input)                       |                                | EN 55022 level A, FCC part 15, level A               |

### Output Specifications

|                                     |  |   |
|-------------------------------------|--|---|
| Voltage set accuracy                |  | ± 2.0 % max.  |
| Regulation                          | – Input variation Vin min. to Vin max.<br>– Load variation 10 – 100 %          | 0.3 % max.  |
|                                     | single output models<br>dual output models                                     | 2.0 % max.<br>2.0 % max. balanced load<br>3.0 % max. unbalanced load                          |
| Ripple and noise (20 MHz Bandwidth) |  | 75 mVpk-pk max  |
| Temperature coefficient             |  | ± 0.02 % / K  |
| Current limitation                  |  | > 110% of Iout max., constant current   |
| Short circuit protection            |  | indefinite (automatic recovery)   |
| Capacitive load                     | 3.3 /5 VDC models<br>12 /15 VDC models<br>±5 VDC models<br>±12 /±15 VDC models | 1000 µF max.<br>470 µF max.<br>220 µF max. (for each output)<br>100 µF max. (for each output) |

### General Specifications

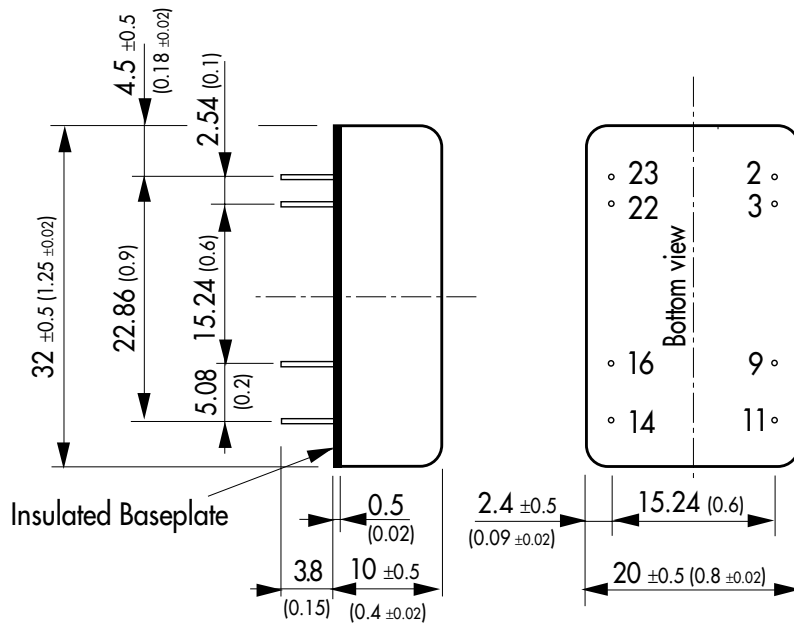
|  |  |  |
|--|--|--|
| Temperature ranges   | – Operating<br>– Case temperature<br>– Storage | – 40 °C ... + 85 °C<br>+ 100 °C max.<br>– 55 °C ... + 125 °C |
| Derating   |  | 3.5% /K above 70°C   |
| Humidity (non condensing)                                  |  | 95 % rel H max.  |
| Reliability, calculated MTBF (MIL-HDBK-217E ground benign) |  | >1 Mio. h @ + 25 °C  |
| Isolation voltage (60 sec)                                 | – Input/Output                                 | 1'500 VDC  |
| Isolation capacity   | – Input/Output                                 | 350 pF typ   |
| Isolation resistance                                       | – Input/Output (500 VDC)                       | > 1'000 M Ohm  |
| Switching frequency  |  | 300 kHz typ. (Pulse frequency modulation PFM)                |
| Safety standards   |  | UL 60950-1 , IEC 60950-1, EN 60950-1                         |
| Safety approvals   |  | CSA File No. 226037  |

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

**Physical Specifications**

|                       |                        |
|-----------------------|------------------------|
| Case material         | Steel, Nickel plated   |
| Baseplate material    | non conductive FR4     |
| Potting material      | Epoxy (UL 94V-0 rated) |
| Weight                | 17 g (0.49 oz)         |
| Soldering temperature | max. 265 °C / 10 sec.  |

**Outline Dimensions mm (inches)**



| Pin-Out |             |            |
|---------|-------------|------------|
| Pin     | Single      | Dual       |
| 2       | -Vin (GND)  | -Vin (GND) |
| 3       | -Vin (GND)  | -Vin (GND) |
| 9       | No pin      | Common     |
| 11      | No function | -Vout      |
| 14      | +Vout       | +Vout      |
| 16      | -Vout       | Common     |
| 22      | +Vin (Vcc)  | +Vin (Vcc) |
| 23      | +Vin (Vcc)  | +Vin (Vcc) |

Pin diameter  $\varnothing 0.5 \pm 0.05$  (0.02  $\pm$  0.002)  
Tolerances  $\pm 0.5$  (0.02)

Specifications can be changed any time without notice