

#### Features

- ◆ Ultra-wide 4:1 input range
- ◆ Full SMD-Design
- ◆ High efficiency up to 84%
- ◆ Extended operating temperature range -40°C to +85°C
- ◆ Excellent load and line regulation
- ◆ Indefinite short-circuit protection
- ◆ I/O isolation 1'500 VDC
- ◆ Input filter to meet EN 55022, Class A and FCC, level A without external components
- ◆ Shielded metal case with insulated baseplate
- ◆ Lead free design, fully RoHS compliant
- ◆ 3-year product warranty



The TEN 3WI series is a family of dc-dc converter modules with 3W output power, featuring ultra wide 4:1 input voltage ranges of 9-36VDC or 18-75VDC. They come in a DIP-24 plastic package with industry-standard footprint. A high efficiency up to 84% allows operation ambient temperatures of -40°C to +70°C at full load. A built-in EMI input filter complies with EN 55022, class A without need of external components. Further 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 isolated, tightly regulated voltages are required

#### Models

| Ordercode    | Input voltage range             | Output voltage | Output current max. | Efficiency typ. |
|--------------|---------------------------------|----------------|---------------------|-----------------|
| TEN 3-2410WI | 9 – 36 VDC<br>(24 VDC nominal)  | 3.3 VDC        | 750 mA              | 75 %            |
| TEN 3-2411WI |                                 | 5 VDC          | 600 mA              | 79 %            |
| TEN 3-2412WI |                                 | 12 VDC         | 250 mA              | 81 %            |
| TEN 3-2413WI |                                 | 15 VDC         | 200 mA              | 82 %            |
| TEN 3-2422WI |                                 | ±12 VDC        | ±125 mA             | 80 %            |
| TEN 3-2423WI |                                 | ±15 VDC        | ±100 mA             | 80 %            |
| TEN 3-4810WI | 18 – 75 VDC<br>(48 VDC nominal) | 3.3 VDC        | 750 mA              | 76 %            |
| TEN 3-4811WI |                                 | 5 VDC          | 600 mA              | 80 %            |
| TEN 3-4812WI |                                 | 12 VDC         | 250 mA              | 83 %            |
| TEN 3-4813WI |                                 | 15 VDC         | 200 mA              | 84 %            |
| TEN 3-4822WI |                                 | ±12 VDC        | ±125 mA             | 82 %            |
| TEN 3-4823WI |                                 | ±15 VDC        | ±100 mA             | 82 %            |

## Input Specifications

|                                               |                                |                                                     |
|-----------------------------------------------|--------------------------------|-----------------------------------------------------|
| Input current no load /full load              | 24 Vin models<br>48 Vin models | 20 mA typ. / 150 mA typ.<br>10 mA typ. / 75 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                    |                                | 0.5 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 %                                | 1.0 % max.                                                                                                                 |
|                                           | single output models<br>dual output models                                                           | 1.0 % max.<br>3.0 % max. (balanced load)                                                                                   |
| Ripple and noise (20 MHz Bandwidth)       |                                                                                                      | 75 mVpk-pk max                                                                                                             |
| Temperature coefficient                   |                                                                                                      | 0.02 %/K                                                                                                                   |
| Current limitation                        |                                                                                                      | >110 % of Iout max., constant current                                                                                      |
| Transient response (25% load step change) |                                                                                                      | 300 µs typ.                                                                                                                |
| Short circuit protection                  |                                                                                                      | indefinite (automatic recovery)                                                                                            |
| Capacitive load                           | 3.3 VDC models<br>5 VDC models<br>12 VDC models<br>12 VDC models<br>±12 VDC models<br>±15 VDC models | 680 µF max.<br>470 µF max.<br>330 µF max.<br>220 µF max.<br>150 µF max. (for each output)<br>100 µF max. (for each output) |

## General Specifications

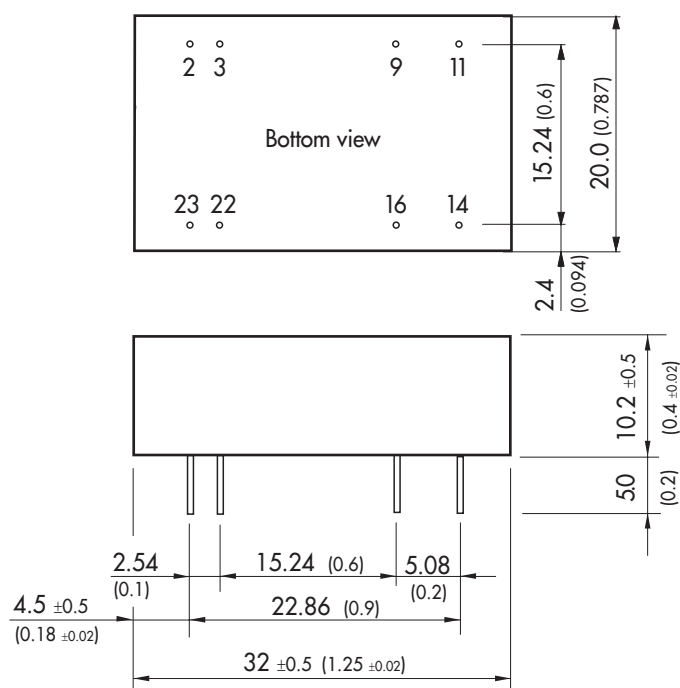
|                                                                       |                                                            |                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature ranges                                                    | – Operating<br>– Case temperature<br>– Storage             | –40°C to +85°C<br>+100°C max.<br>–55°C to +125°C                                                                                                                                                                       |
| Derating                                                              |                                                            | 3.5 %/K above 70°C                                                                                                                                                                                                     |
| Humidity (non condensing)                                             |                                                            | 95 % rel H max.                                                                                                                                                                                                        |
| Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign) |                                                            | >1 Mio. h                                                                                                                                                                                                              |
| Isolation voltage (60 sec.)                                           | – Input/Output                                             | 1'500 VDC                                                                                                                                                                                                              |
| Isolation capacitance                                                 | – Input/Output                                             | 380 pF typ                                                                                                                                                                                                             |
| Isolation resistance                                                  | – Input/Output (500 VDC)                                   | >1'000 M Ohm                                                                                                                                                                                                           |
| Switching frequency                                                   |                                                            | 350 kHz typ. (Pulse width modulation PWM)                                                                                                                                                                              |
| Safety standards                                                      |                                                            | UL 60950-1 , IEC/EN 60950-1                                                                                                                                                                                            |
| Safety approvals                                                      | – CSA certificate according UL 60950-1<br>– CB test report | <a href="http://www.tracopower.com/products/ten3wi-csa.pdf">www.tracopower.com/products/ten3wi-csa.pdf</a><br><a href="http://www.tracopower.com/products/ten3wi-cb.pdf">www.tracopower.com/products/ten3wi-cb.pdf</a> |
| Environmental compliance                                              | – Reach<br>– RoHS                                          | <a href="http://www.tracopower.com/products/ten3wi-reach.pdf">www.tracopower.com/products/ten3wi-reach.pdf</a><br>RoHS directive 2011/65/EU                                                                            |

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

## Physical Specifications

|                       |                              |
|-----------------------|------------------------------|
| Casing material       | non conductive black plastic |
| Potting material      | epoxy (UL94V-0 rated)        |
| Weight                | 12 g (0.42 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  $\pm 0.5$  ( $\pm 0.02$ )

Specifications can be changed any time without notice.