



### Features

- Ultrawide 4 : 1 Input Range  
9 – 36 VDC and 18 – 75 VDC
- Full SMD-Design
- Input Filter meets EN 55022, Class A and FCC, Level A without external Components
- Indefinite Short-Circuit Protection
- Overvoltage Protection
- I/O-Isolation 1500 VDC
- 2" x 1" Metal Package
- Insulated Baseplate
- Industry Standard Pinout
- 3 Year Product Warranty



The TEN 12 series of DC/DC converters has been designed for a wide range of applications including communications, industrial systems and battery powered mobile equipments. Key features are high power density (12W in a 2" x 1" x 0.4" package) and ultrawide input ranges of 9–36 VDC and 18–75 VDC. Other features of this converter are internal filtering according to EN 55022, level A, safety approval to EN 60950 and UL 1950, wide operating temperature range and remote on/off (opt.).

### Models

| Ordercode   | Input voltage range | Output voltage | Output current max. | Efficiency typ. |
|-------------|---------------------|----------------|---------------------|-----------------|
| TEN 12-2410 | 9 – 36 VDC          | 3,3 VDC        | 2'400 mA            | 78 %            |
| TEN 12-2411 |                     | 5 VDC          | 2'000 mA            | 82 %            |
| TEN 12-2412 |                     | 12 VDC         | 1'000 mA            | 84 %            |
| TEN 12-2413 |                     | 15 VDC         | 800 mA              | 84 %            |
| TEN 12-2421 |                     | ± 5 VDC        | ± 1'000 mA          | 82 %            |
| TEN 12-2422 |                     | ± 12 VDC       | ± 500 mA            | 84 %            |
| TEN 12-2423 |                     | ± 15 VDC       | ± 400 mA            | 84 %            |
| TEN 12-4810 | 18 – 75 VDC         | 3,3 VDC        | 2'400 mA            | 78 %            |
| TEN 12-4811 |                     | 5 VDC          | 2'000 mA            | 82 %            |
| TEN 12-4812 |                     | 12 VDC         | 1'000 mA            | 84 %            |
| TEN 12-4813 |                     | 15 VDC         | 800 mA              | 84 %            |
| TEN 12-4821 |                     | ± 5 VDC        | ± 1'000 mA          | 82 %            |
| TEN 12-4822 |                     | ± 12 VDC       | ± 500 mA            | 84 %            |
| TEN 12-4823 |                     | ± 15 VDC       | ± 400 mA            | 84 %            |

### Input Specifications

|                                |  |  |
|--------------------------------|--|--|
| Input current (no load)        | 24 Vin models<br>48 Vin models   | 40 mA typ.<br>20 mA typ.   |
| Input current (full load)      | 24 Vin; 3.3 Vout models:<br>24 Vin; 5 & ±5 Vout models:<br>24 Vin; other output models:<br>48 Vin; 3.3 Vout models:<br>48 Vin; 5 & ±5 Vout models:<br>48 Vin; other output models: | 425 mA typ.<br>510 mA typ.<br>600 mA typ.<br>215 mA typ.<br>255 mA typ.<br>300 mA typ. |
| Surge voltage<br>(1 sec. max.) | 24 Vin models<br>48 Vin models   | 42 V max..<br>84 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                |  | ± 1 %                           |
| Regulation                          | – Input variation Vin min. to Vin max.<br>– Load variation 10 – 90 % | ± 0.5 % max.<br>± 0.5 % max.    |
| Ripple and noise (20 MHz Bandwidth) |  | 50 mVpk-pk typ.                 |
| Temperature coefficient             |  | ± 0.02 % / K                    |
| Output current limitation           |  | >110% of Iout max. foldback     |
| Short circuit protection            |  | indefinite (automatic recovery) |
| Capacitive load                     | – single output models<br>– dual output models                       | 470 µF max.<br>100 µF max.      |

### General Specifications

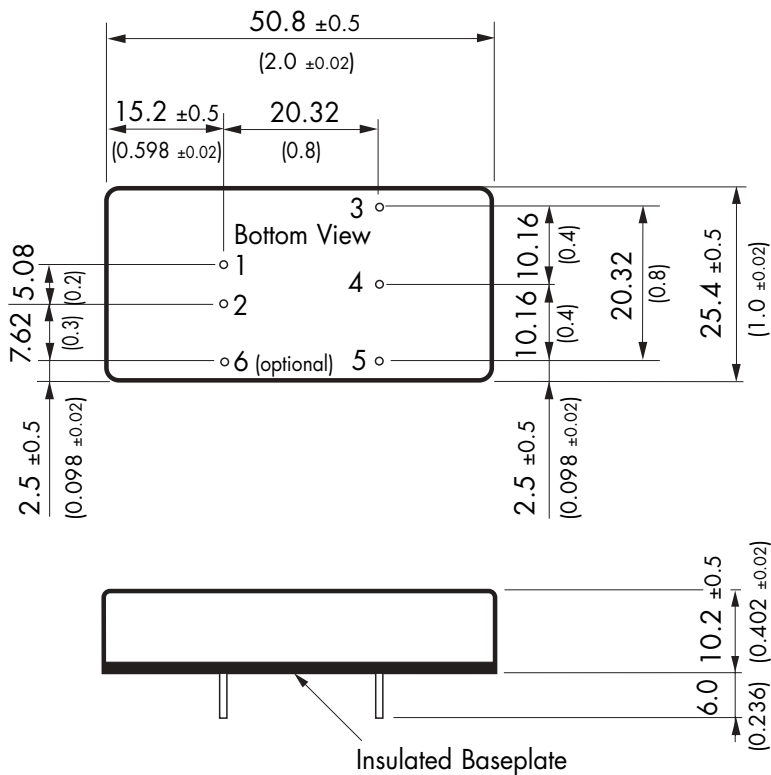
|   |  |  |
|---|--|--|
| Temperature ranges                            | – Operating<br>– Case temperature<br>– Storage | – 40 °C ... + 71 °C<br>+ 95 °C max.<br>– 40 °C ... + 125 °C                                      |
| Derating above 60°C                           |  | 3% / K   |
| Humidity (non condensing)                     |  | 95 % rel H max.  |
| Reliability, calculated MTBF (MIL-HDBK-217 E) |  | > 700'000 h @ +25 °C   |
| Isolation voltage                             | Input/Output                                   | 1'500 VDC  |
| Isolation capacity                            | Input/Output                                   | 200 pF typ   |
| Isolation resistance                          | Input/Output (500 VDC)                         | > 1'000 M Ohm  |
| Switching frequency (fixed)                   |  | 400 kHz typ. (Pulse width modulation PWM)  |
| Remote ON/OFF (optional):                     | ON:<br>OFF:<br>OFF idle current:               | 2.5 ... 5.5 VDC or open circuit.<br>0 ... 0.8 VDC or short circuit pin 2 and pin 6<br>10 mA max. |
| Safety standards:                             |  | UL 1950, EN 60950, IEC 60950<br>Compliance up to 60 VDC input voltage (SELV limit)               |
| Safety approvals:                             |  | cUL/UL File E188913  |

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

**Physical Specifications**

|                       |                                  |
|-----------------------|----------------------------------|
| Case material         | Steel chrome-nickel plated       |
| Baseplate             | Epoxy                            |
| Potting material      | Silicon rubber (UL 94 V-0 rated) |
| Weight                | 30 g (1.2 oz)                    |
| Soldering temperature | max. 250 °C / 10 sec.            |

**Outline Dimensions mm (inches)**



Pin diameter  $\varnothing$  1.0 ±0.05 (0.039) ±0.002

| Pin-Out |                        |                        |
|---------|------------------------|------------------------|
| Pin     | Single                 | Dual                   |
| 1       | +Vin (Vcc)             | +Vin (Vcc)             |
| 2       | -Vin (GND)             | -Vin (GND)             |
| 3       | +Vout                  | +Vout                  |
| 4       | No pin                 | Common                 |
| 5       | -Vout                  | -Vout                  |
| 6       | Remote on/off (option) | Remote on/off (option) |

Specifications can be changed without notice