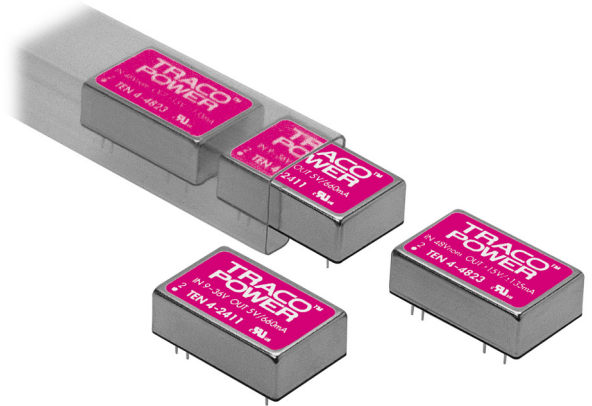


Features

- ◆ Ultra-wide 4:1 input range
9 – 36 VDC or 18 – 75 VDC
- ◆ Full SMD design
- ◆ High efficiency up to 85 %
- ◆ Indefinite short circuit protection
- ◆ I/O isolation 1'500 VDC
- ◆ Input filter meets EN 55022, Class A and FCC, Level A without external components
- ◆ Shielded metal case with insulated baseplate
- ◆ 24-pin DIP with industry standard pinout
- ◆ MTTF >1 Mio. h
- ◆ 3-year product warranty

not recommended for new design in



The TEN 4 series DC/DC converter is designed for applications requiring very wide operating voltage range. Typical applications are tele- and data communication systems, mobile battery powered equipments and industrial process control systems with operation from different input voltages i.e. 12/24 VDC or 24/48 VDC battery voltages. High efficiency allows operation up to +75°C at full load. Input filtering according to EN 55022-A and FCC, level A. Low output ripple minimize design-in time and cost.

Models

| Ordercode | Input voltage range | Output voltage | Output current max. | Efficiency typ. |
|------------|---------------------------------|----------------|---------------------|-----------------|
| TEN 4-2410 | 9 – 36 VDC (24 VDC nominal) | 3.3 VDC | 900 mA | 77 % |
| TEN 4-2411 | | 5 VDC | 660 mA | 81 % |
| TEN 4-2412 | | 12 VDC | 330 mA | 83 % |
| TEN 4-2413 | | 15 VDC | 265 mA | 83 % |
| TEN 4-2421 | | ±5 VDC | ±300 mA | 80 % |
| TEN 4-2422 | | ±12 VDC | ±165 mA | 83 % |
| TEN 4-2423 | | ±15 VDC | ±130 mA | 83 % |
| TEN 4-4810 | 18 – 75 VDC (48 VDC nominal) | 3.3 VDC | 900 mA | 78 % |
| TEN 4-4811 | | 5 VDC | 660 mA | 82 % |
| TEN 4-4812 | | 12 VDC | 330 mA | 85 % |
| TEN 4-4813 | | 15 VDC | 265 mA | 85 % |
| TEN 4-4821 | | ±5 VDC | ±300 mA | 82 % |
| TEN 4-4822 | | ±12 VDC | ±165 mA | 85 % |
| TEN 4-4823 | | ±15 VDC | ±130 mA | 85 % |

Input Specifications

| | | |
|-----------------------------------------------|----------------------------------------|--------------------------------------------------------------------------------------|
| Input current no load / full load | 24 Vin models | 20 mA typ. / 400 mA typ. (at 12 VDC Vin) 20 mA typ. / 200 mA typ. (at 24 VDC Vin) |
| | 48 Vin models | 6 mA typ. / 200 mA typ. (at 24 VDC Vin) 6 mA typ. / 100 mA typ. (at 48 VDC Vin) |
| Start-up voltage / under voltage shut down | 24 Vin models | 8.5 VDC / 8.0 VDC typ. |
| | 48 Vin models | 17 VDC / 16 VDC typ. |
| Surge voltage (1 sec. max.) | 24 Vin models | 50 V max. |
| | 48 Vin models | 100 V max. |
| Conducted noise (input) | EN 55022 level A, FCC part 15, level A | |

Output Specifications

| | | |
|-------------------------------------|----------------------------------------------|--------------------------------------------------------|
| Voltage set accuracy | ±1.0 % | |
| Regulation | – Input variation Vin min. to Vin max. | 0.3 % max. |
| | – Load variation 10 – 100 % | |
| | single output models | 1.0 % max. |
| | dual output models | 1.0 % max. balanced load 3.0 % max. unbalanced load |
| Ripple and noise (20 MHz Bandwidth) | 50 mVpk-pk max. | |
| Temperature coefficient | ±0.02 %/K | |
| Current limitation | >110 % of Iout max., constant current | |
| Short circuit protection | Hiccup mode, indefinite (automatic recovery) | |
| Capacitive load | – Single output models | 3000 µF max. |
| | – Dual output models | 680 µF max. |

General Specifications

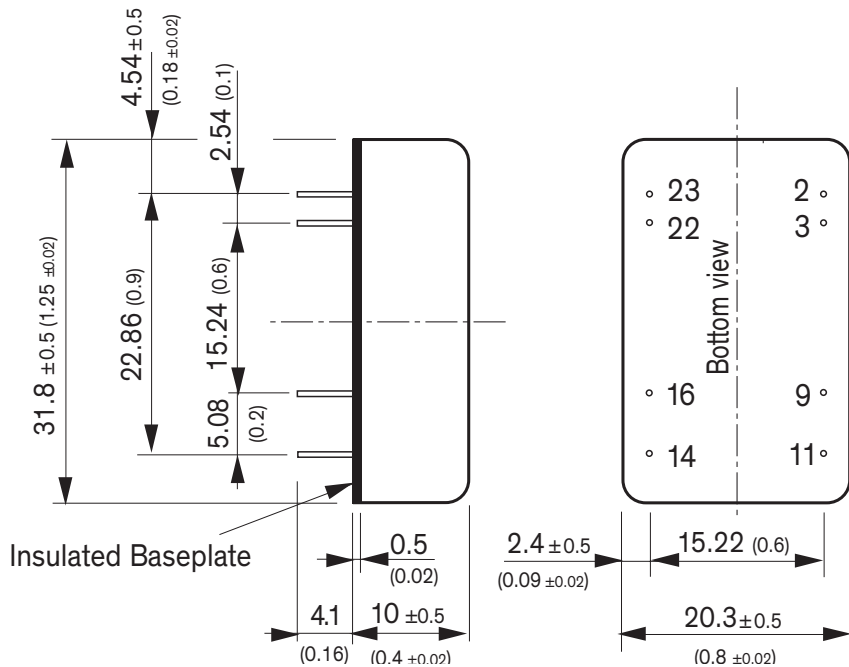
| | | |
|---------------------------------------------------------------------|------------------------------------------------------------------------------|-------------------------------------------------------------------|
| Temperature ranges | – Operating | –40°C to +75°C |
| | – Casing temperature | +95°C max. |
| | – Storage | –40°C to +125°C |
| Humidity (non condensing) | 95 % rel H max. | |
| Reliability, calculated MTTF (MIL-HDBK-217F @ +25°C, ground benign) | >1 Mio. h | |
| Isolation voltage (60 sec.) | – Input/Output | 1'500 VDC |
| Isolation capacity | – Input/Output | 380 pF typ. |
| Isolation resistance | – Input/Output (500 VDC) | >1'000 M Ohm |
| Switching frequency | 350 kHz typ. (Pulse frequency modulation PFM) | |
| Safety standards | UL 1950 , IEC/EN 60950 Compliance up to 60 VDC input voltage (SELV limit) | |
| Safety approvals | – UL/cUL | www.ul.com > UL File no.: E188913 |

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

Physical Specifications

| | |
|-----------------------|----------------------------|
| Casing material | Steel chrome-nickel plated |
| Baseplate material | Epoxy |
| Potting material | Epoxy (UL 94 V-0 rated) |
| Weight | 16.2 g (0.57 oz) |
| Soldering temperature | max. 265°C / 10 sec. |

Outline Dimensions



| 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) |

Dimensions in [mm], () = Inch
 Pin diameter $\varnothing 0.5 \pm 0.05$ (0.02 ±0.002)
 Tolerances ± 0.5 (±0.02)
 Pin pitch tolerances ± 0.35 (±0.014)