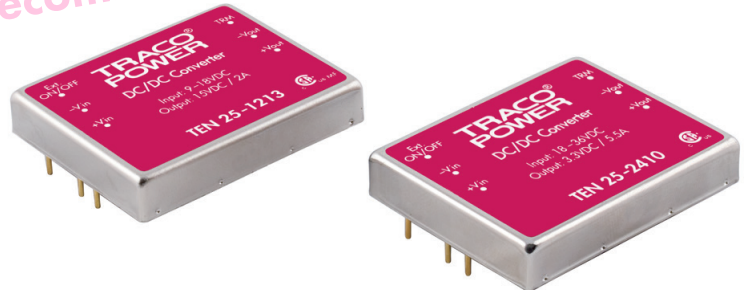


Features

- ◆ Wide 2:1 input range
- ◆ Very high efficiency up to 89%
- ◆ Extended operating temperature range -40°C to $+85^{\circ}\text{C}$
- ◆ Adjustable output voltage
- ◆ Remote On/Off
- ◆ Continuous short circuit protection
- ◆ Over voltage protection
- ◆ I/O isolation 1500 VDC
- ◆ Input filter meets EN 55022, Class A and FCC, Level A without external components
- ◆ Lead free design - RoHS compliant
- ◆ 3-year product warranty

not recommended for new design in



The TEN 25 series is a range of isolated DC/DC converters with high power density in a 51x41x9.5mm shielded metal case. All 18 models have a wide 2:1 input voltage range. The very high efficiency allows a safe operating temperature range of -40°C to $+85^{\circ}\text{C}$. Other features are internal EMI-filter to meet EN55022, class A and remote On/Off. Typical applications for these converter modules are industrial electronics, communication systems, battery operated equipment and distributed power systems.

| Models | | | | |
|-------------|---------------------------------|----------------|---------------------|-----------------|
| Ordercode | Input voltage range | Output voltage | Output current max. | Efficiency typ. |
| TEN 25-1210 | 9 – 18 VDC (12 VDC nominal) | 3.3 VDC | 5'500 mA | 81 % |
| TEN 25-1211 | | 5 VDC | 5'000 mA | 84 % |
| TEN 25-1212 | | 12 VDC | 2'500 mA | 88 % |
| TEN 25-1213 | | 15 VDC | 2'000 mA | 88 % |
| TEN 25-1222 | | ± 12 VDC | $\pm 1'250$ mA | 88 % |
| TEN 25-1223 | | ± 15 VDC | $\pm 1'000$ mA | 88 % |
| TEN 25-2410 | 18 – 36 VDC (24 VDC nominal) | 3.3 VDC | 5'500 mA | 82 % |
| TEN 25-2411 | | 5 VDC | 5'000 mA | 85 % |
| TEN 25-2412 | | 12 VDC | 2'500 mA | 89 % |
| TEN 25-2413 | | 15 VDC | 2'000 mA | 89 % |
| TEN 25-2422 | | ± 12 VDC | $\pm 1'250$ mA | 89 % |
| TEN 25-2423 | | ± 15 VDC | $\pm 1'000$ mA | 89 % |
| TEN 25-4810 | 36 – 75 VDC (48 VDC nominal) | 3,3 VDC | 5'500 mA | 82 % |
| TEN 25-4811 | | 5 VDC | 5'000 mA | 85 % |
| TEN 25-4812 | | 12 VDC | 2'500 mA | 89 % |
| TEN 25-4813 | | 15 VDC | 2'000 mA | 89 % |
| TEN 25-4822 | | ± 12 VDC | $\pm 1'250$ mA | 89 % |
| TEN 25-4823 | | ± 15 VDC | $\pm 1'000$ mA | 89 % |

Input Specifications

| | | |
|--|--|---|
| Input current no load | | 12 Vin models: 40 mA max. 24 Vin models: 20 mA max. 48 Vin models: 10 mA max. |
| Input current (full load) | 12 Vin; 12 Vin; 24 Vin; 24 Vin; 48 Vin; 48 Vin; | 3.3/ 5 VDC models: 1870 mA typ. / 2480 mA typ. other output models: 2840 mA typ. 3.3/ 5 VDC models: 920 mA typ. / 1220 mA typ. other output models: 1400 mA typ. 3.3/ 5 VDC models: 460 mA typ. / 610 mA typ. other output models: 700 mA typ. |
| Start-up voltage / under voltage shut down | | 12 Vin models: 8.8 VDC / 8.3 VDC typ. 24 Vin models: 17.5 VDC / 16.5 VDC typ. 48 Vin models: 35.0 VDC / 33.0 VDC typ. |
| Surge voltage (1000 msec. max.) | | 12 Vin models: 25 V max. 24 Vin models: 50 V max. 48 Vin models: 100 V max. |
| Conducted noise (input) | | EN 55022 class A, FCC part 15, level A |

Output Specifications

| | | |
|-------------------------------------|---|--|
| Voltage set accuracy | | ±1 % |
| Output voltage adj. range | | ±10 % |
| Regulation | – Input variation Vin min. to Vin max. – Load variation 10 – 100 % | 0.3 % max. 0.5 % max. 1.0 % max. 2.0 % max. |
| Ripple and noise (20 MHz Bandwidth) | | 80 mVpk-pk max. |
| Temperature coefficient | | ±0.02 %/K |
| Output current limitation | | >110 % of Iout max., constant current |
| Short circuit protection | | indefinite, automatic recovery |
| Capacitive load | single output models: dual output models: | 470 µF 220 µF (for each output) |

General Specifications

| | | |
|---|--|--|
| Temperature ranges | – Operating – Case temperature – Storage | –40°C to +85°C +105°C max. –55°C to +125°C |
| Load derating | – without heatsink – with heatsink | 2.2 %/K above +60°C 3.3 %/K above +70°C |
| Humidity (non condensing) | | 95 % rel H max. |
| Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign) | | >550'000 h |
| Isolation voltage (60 sec.) | – Input/Output | 1'500 VDC |
| Isolation capacitance | – Input/Output | 1200 pF typ. |
| Isolation resistance | – Input/Output (500 VDC) | >1'000 MOhm |
| Switching frequency (fixed) | | 330 kHz typ. (puls width modulation) |
| Remote On/Off: | – On: – Off: – Standby current: | 3.5...12 VDC or open circuit. 0...1.2 VDC or short circuit pin 3 and pin 2 5 mA max. |
| Safety approvals | | UL /cUL 60950, IEC/EN 60950 compliance up to 60 VDC input voltage (SELV limit) |

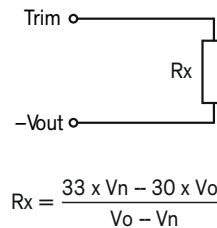
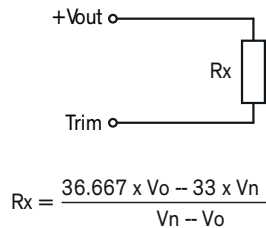
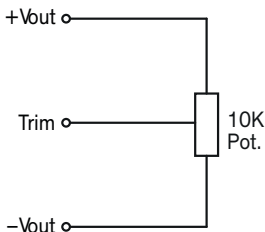
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

Physical Specifications

| | |
|--------------------------|---|
| Casing material | copper, nickel plated |
| Baseplate | non conductive FR4 |
| Potting material | silicon rubber (UL 94 V-0 rated) |
| Weight | 48 g (1.69 oz) |
| Soldering temperature | max. 265°C / 10 sec. |
| Thermal Impedance | 12.5 K/W typ. 10.2 K/W typ. (with Heatsink) |
| Environmental compliance | - Reach - RoHS |
| | www.tracopower.com/info/reach-declaration.pdf RoHS directive 2011/65/EU |

Supporting documents: www.tracopower.com/overview/ten25

Output Voltage Adjustments



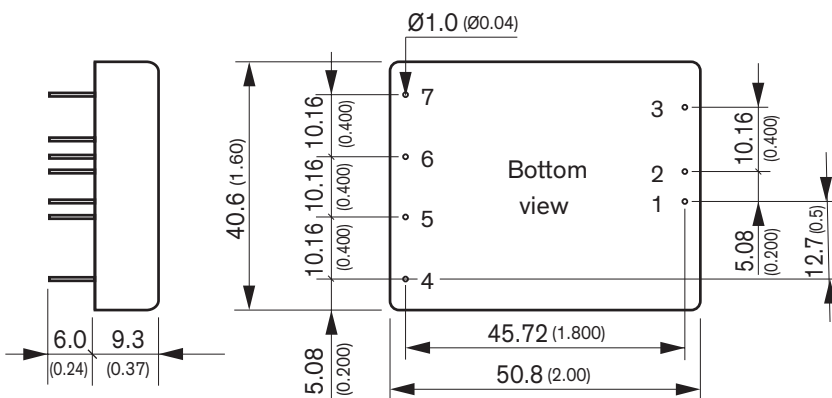
R_x = trim resistor [Kohm]

V_o = adjusted output voltage [VDC]
Dual output: V_o = |V_{o_1}| + |V_{o_2}|

V_n = nominal output voltage [VDC]
Dual output: V_n = |V_{n_1}| + |V_{n_2}|

Note: For dual output models both output voltages as absolute values must be added in the equation. This must be applied to nominal output voltage V_n and adjusted output voltage V_o.

Outline Dimensions



| Pin-Out | | |
|---------|---------------|------------|
| Pin | Single | Dual |
| 1 | +Vin (Vcc) | +Vin (Vcc) |
| 2 | -Vin (GND) | -Vin (GND) |
| 3 | Remote On/Off | |
| 4 | No pin | +Vout |
| 5 | +Vout | Common |
| 6 | -Vout | -Vout |
| 7 | Trim | |

Dimensions in [mm], () = Inch

Pin diameter: 1.0 ±0.05 (0.04 ±0.002)

Pin pitch tolerances: ±0.25 (±0.01)

Case tolerances: ±0.5 (±0.02)

Optional heat-sink see: www.tracopower.com/products/ten-hs5.pdf

Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at www.tracopower.com