

Features

- ◆ Wide 2:1 input range
- ◆ High efficiency up to 89 %
- ◆ Extended operating temperature range
-40°C to +85°C
- ◆ Indefinite short circuit protection
- ◆ I/O isolation 1500VDC
- ◆ Remote On/Off
- ◆ Input filter meets EN 55022, Class A and FCC, level A without external components
- ◆ Industry standard pinout
- ◆ Shielded metal case with insulated baseplate
- ◆ 3-year product warranty



The TEN 20 series of DC/DC converters, comprising 18 different models, has been designed for a wide range of applications including communications, industrial systems and battery powered equipments. Full SMD-design with use of ceramic chip capacitors guarantees a high reliability and a long lifetime. Other features of this converters are internal filter to meet EN 55022, class A and FCC, level A and an extended temperature range of -40°C to +85°C.

Models

| Order code | Input voltage range | Output voltage | Output current max. | Efficiency typ. |
|-------------|--|----------------|---------------------|-----------------|
| TEN 20-1210 | 9 – 18 VDC (12 VDC nominal) | 3,3 VDC | 4'000 mA | 81 % |
| TEN 20-1211 | | 5 VDC | 4'000 mA | 84 % |
| TEN 20-1212 | | 12 VDC | 1'670 mA | 88 % |
| TEN 20-1213 | | 15 VDC | 1'340 mA | 88 % |
| TEN 20-1222 | | ±12 VDC | ±835 mA | 88 % |
| TEN 20-1223 | | ±15 VDC | ±670 mA | 88 % |
| TEN 20-2410 | 18 – 36 VDC (24 VDC nominal) | 3,3 VDC | 4'000 mA | 82 % |
| TEN 20-2411 | | 5 VDC | 4'000 mA | 85 % |
| TEN 20-2412 | | 12 VDC | 1'670 mA | 89 % |
| TEN 20-2413 | | 15 VDC | 1'340 mA | 89 % |
| TEN 20-2422 | | ±12 VDC | ±835 mA | 89 % |
| TEN 20-2423 | | ±15 VDC | ±670 mA | 89 % |
| TEN 20-4810 | 36 – 75 VDC (48 VDC nominal) | 3,3 VDC | 4'000 mA | 82 % |
| TEN 20-4811 | | 5 VDC | 4'000 mA | 85 % |
| TEN 20-4812 | | 12 VDC | 1'670 mA | 89 % |
| TEN 20-4813 | | 15 VDC | 1'340 mA | 89 % |
| TEN 20-4822 | | ±12 VDC | ±835 mA | 89 % |
| TEN 20-4823 | | ±15 VDC | ±670 mA | 89 % |

Input Specifications

| | | |
|-----------------------------------|------------------------------|-------------------------|
| Input current no load/full load | 12 Vin, 3.3 VDC models: | 30 mA typ./1360 mA typ. |
| | 12 Vin, 5 VDC models: | 30 mA typ./1985 mA typ. |
| | 12 Vin, other output models: | 30 mA typ./1900 mA typ. |
| | 24 Vin, 3.3 VDC models: | 17 mA typ./670 mA typ. |
| | 24 Vin, 5 VDC models: | 17 mA typ./980 mA typ. |
| | 24 Vin, other output models: | 17 mA typ./935 mA typ. |
| | 48 Vin, 3.3 VDC models: | 10 mA typ./335 mA typ. |
| 48 Vin, 5 VDC models: | 10 mA typ./490 mA typ. | |
| 48 Vin, other output models: | 10 mA typ./420 mA typ. | |
| Surge voltage (100 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 % |
| Regulation | – Input variation Vin min. to Vin max. | 0.3 % max. |
| | – Load variation 10 – 100 % | 0.5 % max. |
| | | 1.0 % max. for 3.3 VDC output models |
| Ripple and noise (20 MHz Bandwidth) | | 80 mVpk-pk max. |
| Temperature coefficient | | ±0.02 %/K |
| Output current limitation | | 110–160 % of I _{out} max., constant current |
| Short circuit protection | | indefinite (automatic recovery) |
| Minimum load | | 10 % of rated max. current (operation at lower load condition is safe but output ripple will increase) |
| Capacitive load | 3.3 / 5 VDC models: | 6'800 µF max. |
| | 12 / 15 VDC models: | 680 µF max. |
| | ±12 / ±15 VDC models: | 270 µF max. |

General Specifications

| | | |
|---|------------------------------|--|
| Temperature ranges | – Operating | –40°C to +85°C |
| | – Case temperature | +100°C max. |
| | – Storage | –55°C to +125°C |
| Load derating | – without heatsink | 2.3 %/K above 60°C |
| | – with heatsink | 2.9 %/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 | 1'200 pF typ. |
| Isolation resistance | – Input/Output (500 VDC) | >1'000 MOhm |
| Switching frequency (fixed) | | 330 kHz typ. (pulse width modulation PWM) |
| Remote On/Off: | – On: | 2.5 ... 100 VDC or open circuit. |
| | – Off: | –1 ... 1.0 VDC or short circuit pin 2 and pin 6 |
| | – Off standby input current: | 5 mA max. |
| | – Control common: | referenced to negativ input |
| Safety standards | | UL 60950-1, IEC/EN 60950-1 Compliance up to 60 VDC input voltage (SELV limit) |
| Safety approvals | | CSA File No. 226037 http://directories.csa-international.org |

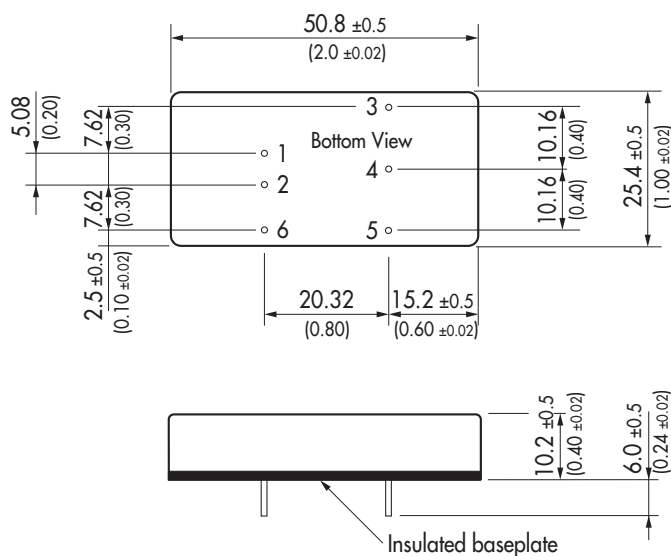
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

Physical Specifications

| | |
|--------------------------|---|
| Casing material | copper, nickel plated |
| Baseplate material | non conductive FR4 |
| Potting material | silicon rubber TSE (UL 94V-0 rated) |
| Weight | 30 g (1.05 oz) |
| Soldering temperature | max. 260°C / 10 sec. |
| Environmental compliance | - Reach - RoHS |
| | www.tracopower.com/products/ten20-reach.pdf RoHS directive 2002/95/EC |

Application note: www.tracopower.com/products/ten20-application.pdf

Outline Dimensions

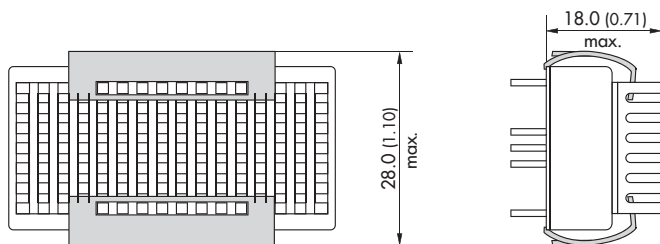
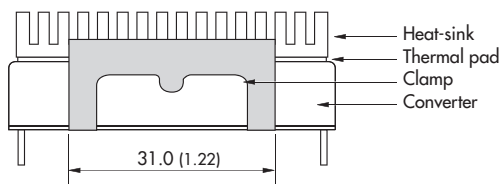


| Pin-Out | | |
|---------|---------------|------------|
| Pin | Single | Dual |
| 1 | +Vin (Vcc) | +Vin (Vcc) |
| 2 | -Vin (GND) | -Vin (GND) |
| 3 | +Vout | +Vout |
| 4 | No pin | Common |
| 5 | -Vout | -Vout |
| 6 | Remote On/Off | |

Dimensions in [mm], (I) = Inch
Pin diameter: 1.0 ± 0.05 (0.02 ± 0.002)
Pin pitch tolerances: ± 0.25 (± 0.01)
Case tolerances: ± 0.5 (± 0.02)

Heat-Sink (Option)

Heat-sink TEN-HS4 (optional)



Order code: TEN-HS4

(cont.: heat-sink, thermal pad, 2 clamps)

Material: Aluminum

Finish: Anodic treatment (black)

Weight: 17 g (0.60oz) without converter

Thermal impedance after assembling: 10 K/W

Note:

Before attaching the heatsink, the product label on converter has to be removed for optimal performance.

For volume orders we can supply the converters with heatsink already mounted. Please contact us for a relative quotation.

Specifications can be changed any time without notice.