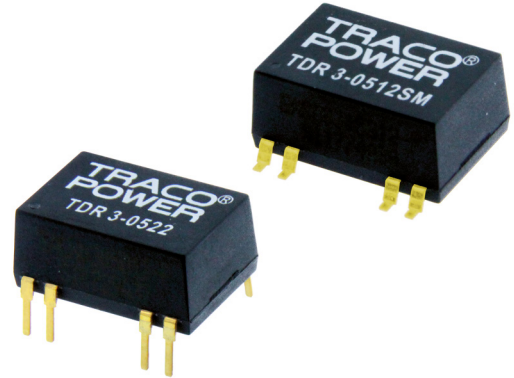


Features

- ◆ Compact design in SMD or DIP package
- ◆ Wide 2:1 input voltage range
- ◆ Fully regulated outputs
- ◆ Low ripple and noise
- ◆ No minimum load required
- ◆ Temperature range -40°C to $+85^{\circ}\text{C}$
- ◆ I/O isolation 1600 VDC
- ◆ Continuous short-circuit protection
- ◆ Remote On/Off control
- ◆ Fully RoHS compliant
- ◆ 3-year product warranty



The TDR-3 series is a family of compact 3 W DC/DC converters with 2:1 input voltage ranges and tightly regulated output voltages even under no load conditions. The product is available in SMD-package or in DIP-package. They work with high efficiency over the full load range and come with a remote On/Off input.

The usability in temperature ranges of up to 85°C , continuous short circuit protection and excellent immunity against environmental influences make these converters very reliable.

A TDR-3 converter is the ideal solution for space critical high end applications in communication equipment, instrumentation and industrial electronics.

Models

| Order code DIP models | Order code SMD models | Input voltage range | Output voltage | Output current max. | Efficiency typ. |
|--------------------------|--------------------------|----------------------------------|----------------|------------------------|-----------------|
| TDR 3-0511 | TDR 3-0511SM | 4.5 – 9.0 VDC (5 VDC nominal) | 5.0 VDC | 600 mA | 79 % |
| TDR 3-0512 | TDR 3-0512SM | | 12 VDC | 250 mA | 80 % |
| TDR 3-0513 | TDR 3-0513SM | | 15 VDC | 200 mA | 81 % |
| TDR 3-0522 | TDR 3-0522SM | | ± 12 VDC | ± 125 mA | 80 % |
| TDR 3-0523 | TDR 3-0523SM | | ± 15 VDC | ± 100 mA | 81 % |
| TDR 3-1211 | TDR 3-1211SM | 9 – 18 VDC (12 VDC nominal) | 5.0 VDC | 600 mA | 81 % |
| TDR 3-1212 | TDR 3-1212SM | | 12 VDC | 250 mA | 82 % |
| TDR 3-1213 | TDR 3-1213SM | | 15 VDC | 200 mA | 82 % |
| TDR 3-1222 | TDR 3-1222SM | | ± 12 VDC | ± 125 mA | 82 % |
| TDR 3-1223 | TDR 3-1223SM | | ± 15 VDC | ± 100 mA | 83 % |
| TDR 3-2411 | TDR 3-2411SM | 18 – 36 VDC (24 VDC nominal) | 5.0 VDC | 600 mA | 81 % |
| TDR 3-2412 | TDR 3-2412SM | | 12 VDC | 250 mA | 82 % |
| TDR 3-2413 | TDR 3-2413SM | | 15 VDC | 200 mA | 83 % |
| TDR 3-2422 | TDR 3-2422SM | | ± 12 VDC | ± 125 mA | 83 % |
| TDR 3-2423 | TDR 3-2423SM | | ± 15 VDC | ± 100 mA | 83 % |
| TDR 3-4811 | TDR 3-4811SM | 36 – 75 VDC (48 VDC nominal) | 5.0 VDC | 600 mA | 81 % |
| TDR 3-4812 | TDR 3-4812SM | | 12 VDC | 250 mA | 82 % |
| TDR 3-4813 | TDR 3-4813SM | | 15 VDC | 200 mA | 82 % |
| TDR 3-4822 | TDR 3-4822SM | | ± 12 VDC | ± 125 mA | 83 % |
| TDR 3-4823 | TDR 3-4823SM | | ± 15 VDC | ± 100 mA | 83 % |

Input Specifications

| | |
|---|--|
| Input current at no load (nominal input voltage) | 5 Vin models: 50 mA typ. 12 Vin models: 30 mA typ. 24 Vin models: 13 mA typ. 48 Vin models: 10 mA typ. |
| Input current at full load (nominal input voltage) | 5 Vin models: 790 mA typ. 12 Vin models: 320 mA typ. 24 Vin models: 160 mA typ. 48 Vin models: 80 mA typ. |
| Surge voltage (1 s max.) | 5 Vin models: 15 V max. 12 Vin models: 25 V max. 24 Vin models: 50 V max. 48 Vin models: 100 V max. |
| EMC emissions | EN 55032 class A/B (with external components) – Application note for filter class A/B proposal www.tracopower.com/overview/tdr3 |
| ESD (electrostatic discharge) | EN 61000-4-2, air ±8 kV, contact ±6 kV, perf. criteria A |
| Radiated immunity | EN 61000-4-3 10 V/m, perf. criteria A |
| Fast transient / Surge | EN 61000-4-4, ±2 kV, perf. criteria A EN 61000-4-5, ±1 kV perf. criteria A with external input capacitor e.g. Nippon chemi-con KY 220 µF, 100 V, ESR 48 mOhm |
| Conducted immunity | EN 61000-4-6, 10 Vrms, perf. criteria A |
| Power frequency magnetic field | EN 61000-4-8, 100 A/m, perf. criteria A |
| Reflected ripple current (measured with input filter according class A) | 5 Vin models: 80 mA _{p-p} typ. 12 Vin models: 40 mA _{p-p} typ. 24 Vin models: 30 mA _{p-p} typ. 48 Vin models: 20 mA _{p-p} typ. |

Output Specifications

| | |
|---|---|
| Voltage set accuracy | ±1 % max |
| Regulation | – Input variation (Vin min. to Vin max.) 0.2 % max. – Load variation (0 – 100 %) single output models: 1.0 % max. dual output models: 1.0 % max. balanced load – Load variation (10 – 90 %) single output models: 0.5 % max. dual output models: 0.8 % max. balanced load – Load cross regulation (25 / 100 %) 5.0 % max. (dual output models) |
| Minimum load | 0 % of rated max. load |
| Temperature coefficient | ±0.02 %/K |
| Ripple and noise (20 MHz bandwidth) | 30 mV _{p-p} typ. |
| Start up time (constant resistive load) | – Power On 5 ms typ. – Remote On 5 ms typ. |
| Transient response setting time (25 % load step change) | 250 µs typ. |
| Short circuit protection | continuous, automatic recovery |
| Capacitive load | 5 VDC models: 1680 µF max. 12 VDC models: 820 µF max. 15 VDC models: 680 µF max. ±12 VDC models: 470 µF max. (each output) ±15 VDC models: 330 µF max. (each output) |

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

General Specifications

| | | |
|---|---|--|
| Temperature ranges | <ul style="list-style-type: none"> - Operating - Storage - Case temperature | <ul style="list-style-type: none"> -40°C to +85°C -55°C to +125°C -40°C to +100°C |
| Load derating | | 3.3 %/K above +70°C |
| Humidity (non condensing) | | 5 – 95 % rel. H max. |
| Thermal shock & vibration | | acc. MIL-STD-810F |
| Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign) | | >6.2 Mio h |
| Isolation voltage (60 s) | - Input/Output | 1600 VDC |
| Isolation capacitance | - Input/Output | 50 pF max. |
| Isolation resistance | - Input/Output (500 VDC) | >1 GOhm |
| Safety approvals | <ul style="list-style-type: none"> - UL/cUL 60950-1 - Certification documents | www.ul.com -> certifications -> File e188913 www.tracopower.com/overview/tdr3 |
| Switching frequency | | 100 kHz min. |
| Remote On/Off | <ul style="list-style-type: none"> - On: - Off: - Off stand by input current | <ul style="list-style-type: none"> open or high impedance 2...4 mA current applied via 1KOhm resistor 2.5 mA max. |

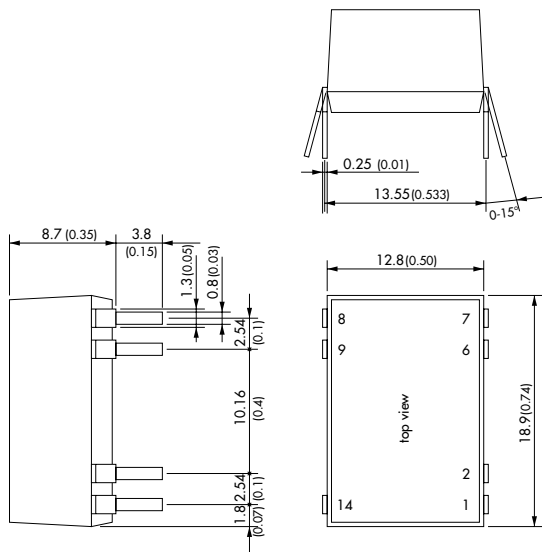
Physical Specifications

| | | |
|--|---|---|
| Casing material | | non-conductive plastic (UL94V-0 rated) |
| Package weight | | 4.5 g (0.16 oz) |
| Soldering profile (for DIP models) | | 265°C / 10 s max. (wave soldering) |
| Lead-free reflow solder process (for SMD models) | | J-STD-020D |
| Moisture sensivity level (for SMD models) | | J-STD-033C level 2a |
| Environmental compliance | <ul style="list-style-type: none"> - Reach - RoHS | www.tracopower.com/products/reach-declaration.pdf RoHS directive 2011/65/EU |
| Packaging | <ul style="list-style-type: none"> - Tube - Tape & Reel (only SMD models, add suffix -TR) | <ul style="list-style-type: none"> 10 pcs packing unit 200 pcs packing unit |

Supporting Documents: www.tracopower.com/overview/tdr3 and www.tracopower.com/overview/tdr3sm

Outline Dimensions

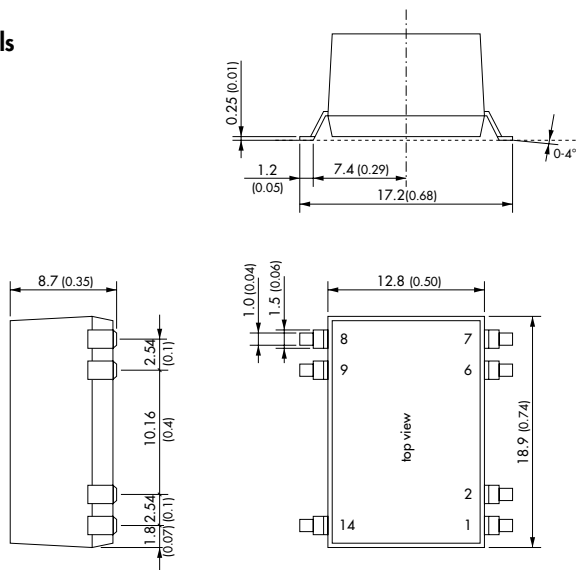
DIP-Models



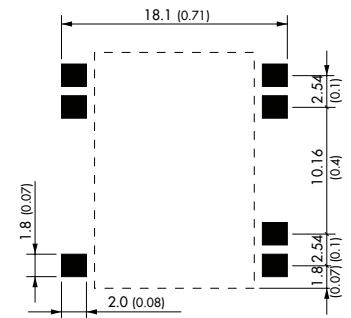
| Pin-Out | | |
|---------|---------------|---------------|
| Pin | Single | Dual |
| 1 | -Vin (GND) | -Vin (GND) |
| 2 | Remote On/Off | Remote On/Off |
| 6 | NC | Common |
| 7 | NC | -Vout |
| 8 | +Vout | +Vout |
| 9 | -Vout | Common |
| 14 | +Vin (Vcc) | +Vin (Vcc) |

NC = not to connect

SMD-Models



Recommended Solder Pad Dimension:



Dimensions in [mm], () = Inch
Tolerances: ±0.5 (±0.02)
Pin pitch tolerances: ±0.25 (±0.01)

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