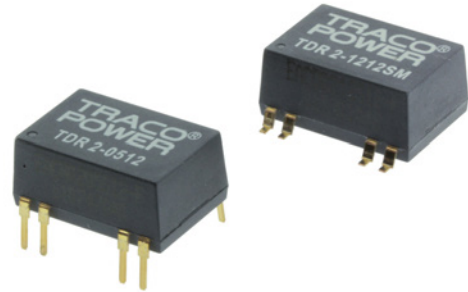


Features

- ◆ 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 $+85^{\circ}\text{C}$ without derating
- ◆ I/O isolation 1500 VDC
- ◆ Continuous short-circuit protection
- ◆ Remote On/Off control
- ◆ Fully RoHS compliant
- ◆ 3-year product warranty



The TDR-2 series is a family of compact 2 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 without power derating, continuous short circuit protection and excellent immunity against environmental influences make these converters very reliable.

A TDR-2 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 2-0511 | TDR 2-0511SM | 4.5 – 9.0 VDC (5 VDC nominal) | 5.0 VDC | 400 mA | 80 % |
| TDR 2-0512 | TDR 2-0512SM | | 12 VDC | 167 mA | 81 % |
| TDR 2-0513 | TDR 2-0513SM | | 15 VDC | 134 mA | 83 % |
| TDR 2-0522 | TDR 2-0522SM | | ± 12 VDC | ± 83 mA | 81 % |
| TDR 2-0523 | TDR 2-0523SM | | ± 15 VDC | ± 67 mA | 82 % |
| TDR 2-1211 | TDR 2-1211SM | 9 – 18 VDC (12 VDC nominal) | 5.0 VDC | 400 mA | 81 % |
| TDR 2-1212 | TDR 2-1212SM | | 12 VDC | 167 mA | 81 % |
| TDR 2-1213 | TDR 2-1213SM | | 15 VDC | 134 mA | 84 % |
| TDR 2-1222 | TDR 2-1222SM | | ± 12 VDC | ± 83 mA | 83 % |
| TDR 2-1223 | TDR 2-1223SM | | ± 15 VDC | ± 67 mA | 82 % |
| TDR 2-2411 | TDR 2-2411SM | 18 – 36 VDC (24 VDC nominal) | 5.0 VDC | 400 mA | 81 % |
| TDR 2-2412 | TDR 2-2412SM | | 12 VDC | 167 mA | 84 % |
| TDR 2-2413 | TDR 2-2413SM | | 15 VDC | 134 mA | 84 % |
| TDR 2-2422 | TDR 2-2422SM | | ± 12 VDC | ± 83 mA | 84 % |
| TDR 2-2423 | TDR 2-2423SM | | ± 15 VDC | ± 67 mA | 84 % |
| TDR 2-4811 | TDR 2-4811SM | 36 – 75 VDC (48 VDC nominal) | 5.0 VDC | 400 mA | 81 % |
| TDR 2-4812 | TDR 2-4812SM | | 12 VDC | 167 mA | 82 % |
| TDR 2-4813 | TDR 2-4813SM | | 15 VDC | 134 mA | 82 % |
| TDR 2-4822 | TDR 2-4822SM | | ± 12 VDC | ± 83 mA | 83 % |
| TDR 2-4823 | TDR 2-4823SM | | ± 15 VDC | ± 67 mA | 83 % |

Input Specifications

| | |
|--|---|
| Input current at no load (nominal input voltage) | 5 Vin models: 40 mA typ. 12 Vin models: 20 mA typ. 24 Vin models: 10 mA typ. 48 Vin models: 7 mA typ. |
| Input current at full load (nominal input voltage) | 5 Vin models: 520 mA typ. 12 Vin models: 215 mA typ. 24 Vin models: 105 mA typ. 48 Vin models: 55 mA typ. |
| Surge voltage (1 sec. 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. |
| Input filter | capacitor type (see EMC considerations page 3 for compliance to EN 55022 class A/B) |
| 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 μ F, 100 V, ESR 48 mOhm |
| Conducted immunity | EN 61000-4-6, 10 Vrms, 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 | – Power On 5 ms typ. (constant resistive load) – Remote On 5 ms typ. |
| Transient response setting time (25 % load step change) | 250 μ s typ. |
| Short circuit protection | indefinite, automatic recovery |
| Capacitive load | 5 VDC models: 1680 μ F max. 12 VDC models: 820 μ F max. 15 VDC models: 680 μ F max. ± 12 VDC models: ± 470 μ F max. ± 15 VDC models: ± 330 μ F max. |

General Specifications

| | |
|--------------------|--|
| Temperature ranges | – Operating –40°C to +85°C (with no derating) – Storage –55°C to +125°C – Case temperature +100°C max. |
|--------------------|--|

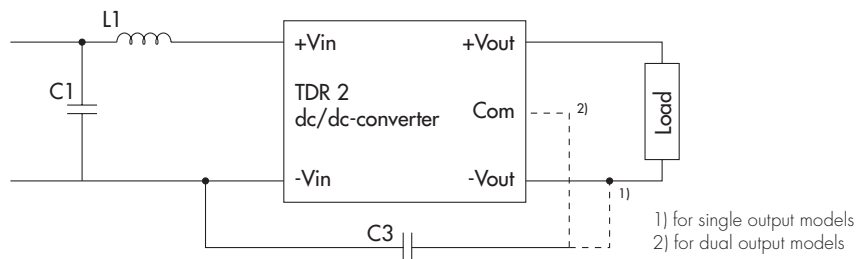
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

General Specifications

| | | |
|---|---|---|
| Humidity (non condensing) | | 5 % to 90 % rel. H max. |
| Thermal shock | | acc. MIL-STD-810F |
| Vibration | | acc. MIL-STD-810F |
| Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign) | | >2.8 Mio h |
| Isolation voltage (60sec.) | - Input/Output | 1500 VDC |
| Isolation capacitance | - Input/Output | 50 pF max. |
| Isolation resistance | - Input/Output (500 VDC) | >10 GOhm |
| Altitude during operation | | tba. |
| Safety standard (designed to meet) | | IEC/EN 60950-1, UL 60950-1 |
| Safety approvals | - UL/cUL | www.ul.com -> certifications -> File: e188913 |
| Switching frequency | | 100 kHz (PWM) |
| Remote On/Off | - On: - Off: - Off stand by input current | open or high impedance 2...4 mA current applied via 1KOhm resistor 2.5 mA max. |
| Environmental compliance | - Reach - RoHS | www.tracopower.com/products/tdr2-reach.pdf RoHS directive 2011/65/EU |

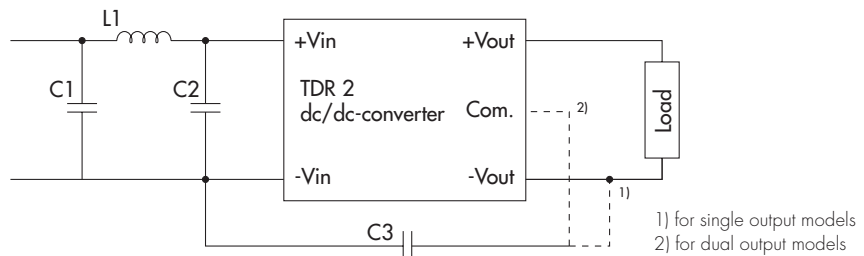
EMC Consideration

Recommended filter for
EN 55022 class A compliance



| Input models | C1 | C3 | L1 value | order code (SMD type) | datasheet |
|--------------|--------------------------|------------------------|----------|-----------------------|--|
| 5 VDC | 10 µF / 25 V 1812 MLCC | 220pF / 3 kV 1808 MLCC | 2.2 µH | TCK-059 | www.tracopower.com/products/tck059.pdf |
| 12 VDC | 6.8 µF / 50 V 1812 MLCC | | 18 µH | TCK-046 | www.tracopower.com/products/tck046.pdf |
| 24 VDC | 4.7 µF / 50 V 1812 MLCC | | | | |
| 48 VDC | 4.7 µF / 100 V 1812 MLCC | | | | |

Recommended filter for
EN 55022 class B compliance



| Input models | C1 & C2 | C3 | L1 value | order code (SMD type) | datasheet |
|--------------|-------------------------|------------------------|----------|-----------------------|--|
| 5 VDC | 10 µF / 25 V 1812 MLCC | 220pF / 3 kV 1808 MLCC | 2.2 µH | TCK-059 | www.tracopower.com/products/tck059.pdf |
| 12 VDC | 2.2 µF / 50 V 1812 MLCC | | 18 µH | TCK-046 | www.tracopower.com/products/tck046.pdf |
| 24 VDC | | | 27 µH | TCK-063 | www.tracopower.com/products/tck063.pdf |
| 48 VDC | | | 18 µH | TCK-046 | www.tracopower.com/products/tck046.pdf |

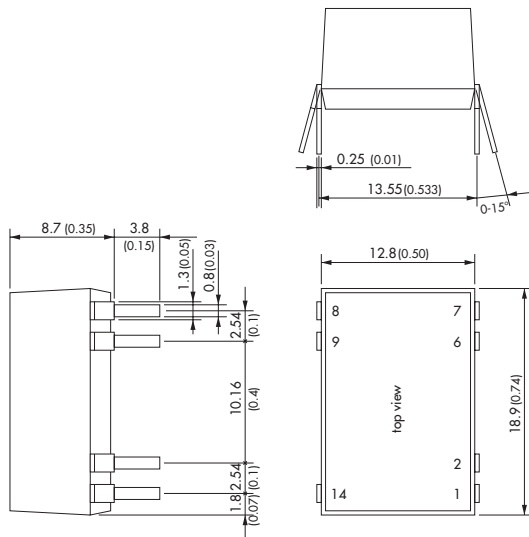
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

Physical Specifications

| | |
|--|--|
| Casing material | non-conductive plastic (UL94V-0 rated) |
| Package weight | 4.5 g (0.16 oz) |
| Soldering profile for DIP-package models | max. 265°C / 10 sec. (wave soldering) |
| Lead-free reflow solder process for SMD-package models | as per J-STD-020D.01 (to find at: www.jedec.org - free registration required) |
| Moisture sensivity level (for SMD-package models) | level 2a as per J-STD-033B.01 (to find at: www.jedec.org - free registration required) |
| Environmental compliance | - Reach - RoHS www.tracopower.com/products/tdr2-reach.pdf RoHS directive 2011/65/EU |
| Packaging | - Tube - Tape & Reel (only SMD models, add suffix -TR) 10 pcs packing unit 200 pcs packing unit |

Outline Dimensions

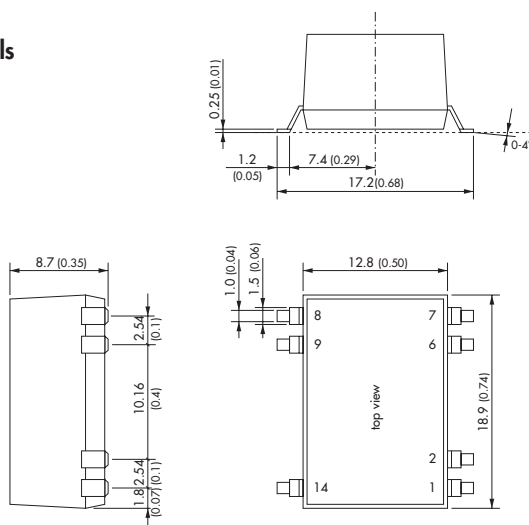
DIP-Models



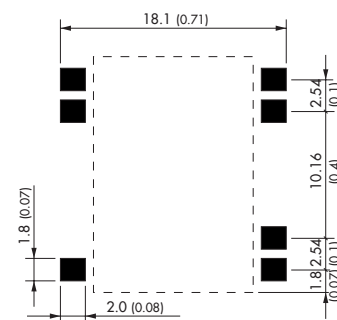
| Pin-Out | | |
|---------|---------------|---------------|
| Pin | Single | Dual |
| 1 | -Vin (GND) | -Vin (GND) |
| 2 | Remote On/Off | Remote On/Off |
| 6 | NC | Common |
| 7 | NC | -Vout |
| 8 | +Vout | +Vout |
| 9 | -Vout | Common |
| 14 | +Vin (Vcc) | +Vin (Vcc) |

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)

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



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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