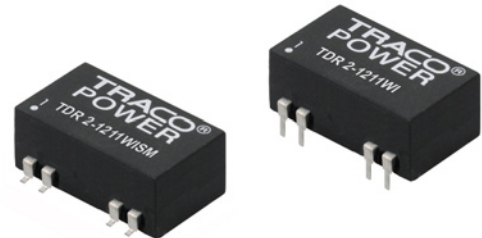


Features

- ◆ Compact design in SMD or DIP package
- ◆ Ultra wide 4:1 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-2WI series is a family of compact 2 W dc/dc-converters with 4:1 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-2WI 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 2-1211WI | TDR 2-1211WISM | 4.5 – 18 VDC (12 VDC nominal) | 5.0 VDC | 400 mA | 79 % |
| TDR 2-1212WI | TDR 2-1212WISM | | 12 VDC | 167 mA | 80 % |
| TDR 2-1213WI | TDR 2-1213WISM | | 15 VDC | 134 mA | 81 % |
| TDR 2-1222WI | TDR 2-1222WISM | | ± 12 VDC | ± 83 mA | 81 % |
| TDR 2-1223WI | TDR 2-1223WISM | | ± 15 VDC | ± 67 mA | 81 % |
| TDR 2-2411WI | TDR 2-2411WISM | 9 – 36 VDC (24 VDC nominal) | 5.0 VDC | 400 mA | 79 % |
| TDR 2-2412WI | TDR 2-2412WISM | | 12 VDC | 167 mA | 80 % |
| TDR 2-2413WI | TDR 2-2413WISM | | 15 VDC | 134 mA | 82 % |
| TDR 2-2422WI | TDR 2-2422WISM | | ± 12 VDC | ± 83 mA | 80 % |
| TDR 2-2423WI | TDR 2-2423WISM | | ± 15 VDC | ± 67 mA | 81 % |
| TDR 2-4811WI | TDR 2-4811WISM | 18 – 75 VDC (48 VDC nominal) | 5.0 VDC | 400 mA | 78 % |
| TDR 2-4812WI | TDR 2-4812WISM | | 12 VDC | 167 mA | 81 % |
| TDR 2-4813WI | TDR 2-4813WISM | | 15 VDC | 134 mA | 82 % |
| TDR 2-4822WI | TDR 2-4822WISM | | ± 12 VDC | ± 83 mA | 81 % |
| TDR 2-4823WI | TDR 2-4823WISM | | ± 15 VDC | ± 67 mA | 81 % |

Input Specifications

| | |
|---|--|
| Input current at no load (nominal input voltage) | 12 Vin models: 35 mA typ. 24 Vin models: 20 mA typ. 48 Vin models: 10 mA typ. |
| Input current at full load (nominal input voltage) | 12 Vin models: 215 mA typ. 24 Vin models: 110 mA typ. 48 Vin models: 55 mA typ. |
| Surge voltage (1 sec. 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. criteriy 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 |
| Reflected ripple current (measured with input filter according class A) | 12 Vin models: 80 mA _{p-p} typ. 24 Vin models: 40 mA _{p-p} typ. 48 Vin models: 30 mA _{p-p} typ. |

Output Specifications

| | |
|---|---|
| Voltage set accuracy | ±1 % max |
| Regulation | <ul style="list-style-type: none"> – Input variation Vin min. to Vin max. 0.2 % max. – Load variation 0 – 100 % <ul style="list-style-type: none"> single output models: 1.0 % max. dual output models: 1.0 % max. balanced load – Load variation 10 – 90 % <ul style="list-style-type: none"> 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) | <ul style="list-style-type: none"> – 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 | <ul style="list-style-type: none"> 5 VDC models: 1680 µF max. 12 VDC models: 820 µF max. 15 VDC models: 680 µF max. ±12 VDC models: ±470 µF max. ±15 VDC models: ±330 µF max. |

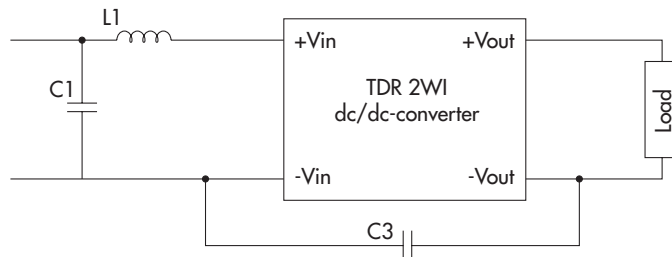
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

General Specifications

| | | |
|--|---|--|
| Temperature ranges | - Operating - Storage | -40°C to +85°C (with no derating) -55°C to +125°C |
| Humidity (non condensing) | | 5 % to 90 % rel. H max. |
| Thermal shock | | acc. MIL-STD-810F |
| Vibration | | acc. MIL-STD-810F |
| Reliability, calculated MTTF (MIL-HDBK-217F, @ +25°C, ground benign) | | >2.0 Mio h |
| Isolation voltage (60 sec) | - Input/Output | 1'500 VDC |
| Isolation capacity | - Input/Output | 50 pF max. |
| Isolation resistance | - Input/Output (500 VDC) | >10 GOhm |
| Safety standard (designed to meet) | | IEC/EN 60950-1, UL 60950-1 |
| 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. |

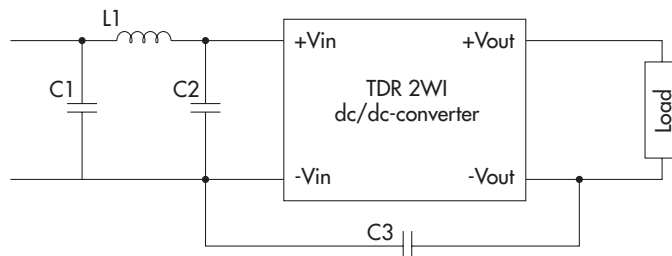
EMC Consideration

Recommended filter for
EN 55022 class A compliance



| Input models | C1 | C3 | L1 value | order code (SMD type) | datasheet: |
|--------------|--------------------------|------------------------|----------|-----------------------|--|
| 12 VDC | 10 µF / 25 V 1812 MLCC | 220pF / 3 kV 1808 MLCC | 2.2 µH | TCK-059 | www.tracopower.com/products/tck059.pdf |
| 24 VDC | 6.8 µF / 50 V 1812 MLCC | | 18 µH | TCK-046 | www.tracopower.com/products/tck046.pdf |
| 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 |
|--------------|--------------------------|------------------------|----------|-----------------------|--|
| 12 VDC | 10 µF / 25 V 1812 MLCC | 220pF / 3 kV 1808 MLCC | 2.2 µH | TCK-059 | www.tracopower.com/products/tck059.pdf |
| 24 VDC | 2.2 µF / 50 V 1812 MLCC | | 18 µH | TCK-046 | www.tracopower.com/products/tck046.pdf |
| 48 VDC | 2.2 µF / 100 V 1812 MLCC | | 27 µH | TCK-063 | www.tracopower.com/products/tck063.pdf |

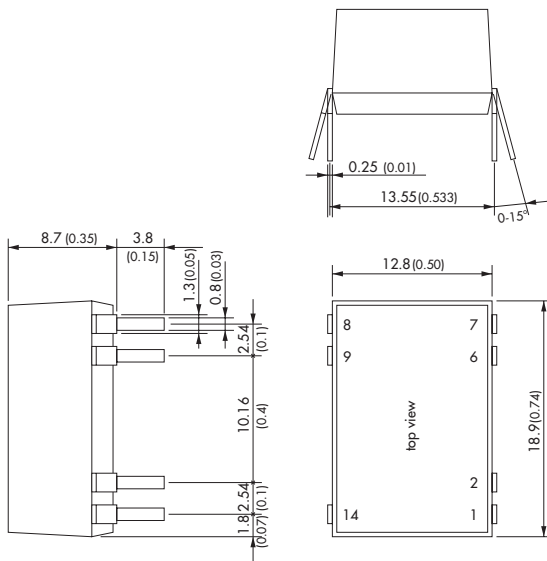
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

Physical Specifications

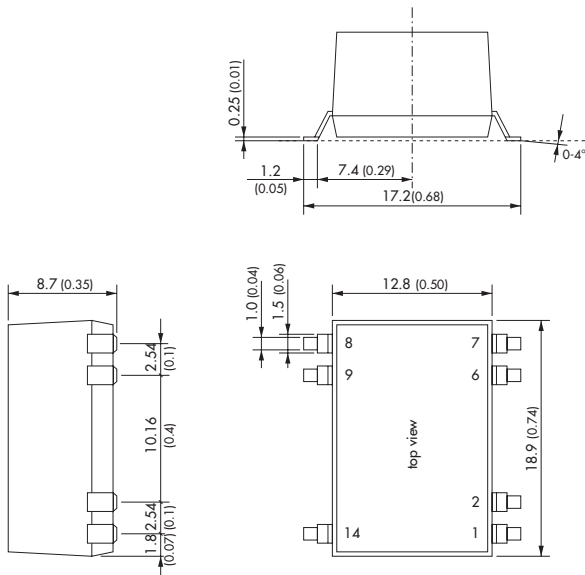
| | |
|--|--|
| Casing material | non-conductive plastic (UL94V-0 rated) |
| Package weight | 4.5 g (0.16 oz) |
| Soldering profile for DIP-package models | max. 265°C / 10 sec. (wave soldering) |
| Lead-free reflow solder process for SMD-package models | as per J-STD-020D.01 (to find at: www.jedec.org - 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) |

Outline Dimensions

DIP-Models



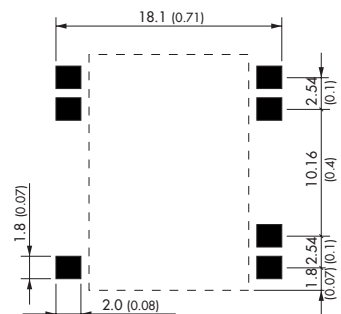
SMD-Models



| 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

Recommended Solder Pad Dimension:



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

Specifications can be changed any time without notice.