

- Compact DIP package
13.2 x 9.1 x 10.2 mm
- I/O-isolation 1'600 VDC
- Fully regulated outputs
- Operating temperature range
-40°C to +90°C without derating
- Short circuit protection
- Remote On/Off
- Designed to meet UL 62368-1
(UL 60950-1)
- 3-year product warranty



The TDN 1WI Series comprises 1 Watt fully regulated, high performance DC/DC converters. They come in a compact cubical package of only 1.23 cm³. Full load operation is reliable up to 90°C environment temperature. With 1'600 VDC I/O-isolation voltage, external On/Off, and short current protection they cover a wide range of application when space is limited. The input of the converters is designed for a wide voltage range (4:1) and minimum load is not required.

The functional I/O-isolation system is designed to meet IEC/EN 62368-1 with a test voltage (60 s) of 1'600 VDC.

Models

| Order Code | Input Voltage Range | Output 1 | | Output 2 | | Efficiency typ. |
|--------------|-------------------------------|----------|------------------|----------|------------------|-----------------|
| | | Vnom | I _{max} | Vnom | I _{max} | |
| TDN 1-1210WI | 4.5 - 18 VDC (12 VDC nom.) | 3.3 VDC | 300 mA | | | 77 % |
| TDN 1-1211WI | | 5 VDC | 200 mA | | | 79 % |
| TDN 1-1219WI | | 9 VDC | 112 mA | | | 79 % |
| TDN 1-1212WI | | 12 VDC | 90 mA | | | 81 % |
| TDN 1-1213WI | | 15 VDC | 70 mA | | | 81 % |
| TDN 1-1215WI | | 24 VDC | 45 mA | | | 80 % |
| TDN 1-1221WI | | +5 VDC | 100 mA | -5 VDC | 100 mA | 77 % |
| TDN 1-1222WI | | +12 VDC | 45 mA | -12 VDC | 45 mA | 80 % |
| TDN 1-1223WI | | +15 VDC | 35 mA | -15 VDC | 35 mA | 81 % |
| TDN 1-2410WI | 9 - 36 VDC (24 VDC nom.) | 3.3 VDC | 300 mA | | | 76 % |
| TDN 1-2411WI | | 5 VDC | 200 mA | | | 78 % |
| TDN 1-2419WI | | 9 VDC | 112 mA | | | 79 % |
| TDN 1-2412WI | | 12 VDC | 90 mA | | | 81 % |
| TDN 1-2413WI | | 15 VDC | 70 mA | | | 81 % |
| TDN 1-2415WI | | 24 VDC | 45 mA | | | 80 % |
| TDN 1-2421WI | | +5 VDC | 100 mA | -5 VDC | 100 mA | 77 % |
| TDN 1-2422WI | | +12 VDC | 45 mA | -12 VDC | 45 mA | 80 % |
| TDN 1-2423WI | | +15 VDC | 35 mA | -15 VDC | 35 mA | 81 % |
| TDN 1-4810WI | 18 - 75 VDC (48 VDC nom.) | 3.3 VDC | 300 mA | | | 75 % |
| TDN 1-4811WI | | 5 VDC | 200 mA | | | 78 % |
| TDN 1-4819WI | | 9 VDC | 112 mA | | | 79 % |
| TDN 1-4812WI | | 12 VDC | 90 mA | | | 81 % |
| TDN 1-4813WI | | 15 VDC | 70 mA | | | 81 % |
| TDN 1-4815WI | | 24 VDC | 45 mA | | | 80 % |
| TDN 1-4821WI | | +5 VDC | 100 mA | -5 VDC | 100 mA | 77 % |
| TDN 1-4822WI | | +12 VDC | 45 mA | -12 VDC | 45 mA | 80 % |
| TDN 1-4823WI | | +15 VDC | 35 mA | -15 VDC | 35 mA | 81 % |

Input Specifications

| | | |
|--------------------------|--------------|---|
| Input Current | - At no load | 12 Vin models: 20 mA typ. 24 Vin models: 10 mA typ. 48 Vin models: 5 mA typ. |
| Surge Voltage | | 12 Vin models: 25 VDC max. (1 s max.) 24 Vin models: 50 VDC max. (1 s max.) 48 Vin models: 100 VDC max. (1 s max.) |
| Reflected Ripple Current | | 12 Vin models: 15 mA_{p-p} typ. 24 Vin models: 10 mA_{p-p} typ. 48 Vin models: 5 mA_{p-p} typ. |
| Recommended Input Fuse | | 12 Vin models: 500 mA (slow blow) 24 Vin models: 315 mA (slow blow) 48 Vin models: 160 mA (slow blow) (The need of an external fuse has to be assessed in the final application.) |
| Input Filter | | Internal Capacitor |

Output Specifications

| | | |
|--------------------------|---|---|
| Voltage Set Accuracy | | ±1% max. |
| Regulation | - Input Variation (V _{min} - V _{max}) - Load Variation (0 - 100%) - Cross Regulation (25% / 100% asym. load) | single output models: 0.2% max. dual output models: 0.2% max. single output models: 1% max. dual output models: 1% max. (Output 1) 1% max. (Output 2) dual output models: 5% max. |
| Ripple and Noise | - 20 MHz Bandwidth | 30 mV_{p-p} typ. |
| Capacitive Load | - single output - dual output | 3.3 V _{out} models: 1'680 µF max. 5 V _{out} models: 820 µF max. 9 V _{out} models: 630 µF max. 12 V _{out} models: 470 µF max. 15 V _{out} models: 330 µF max. 24 V _{out} models: 160 µF max. 5 / -5 V _{out} models: 470 / 470 µF max. 12 / -12 V _{out} models: 330 / 330 µF max. 15 / -15 V _{out} models: 220 / 220 µF max. |
| Minimum Load | | Not required |
| Temperature Coefficient | | ±0.02 %/K max. |
| Start-up Time | | 10 ms typ. / 20 ms max. |
| Short Circuit Protection | | Continuous, Automatic recovery |
| Transient Response | - Response Time | 500 µs typ. (25% Load Step) |

Safety Specifications

| | | |
|------------------|-----------------------------|---|
| Safety Standards | - IT / Multimedia Equipment | Designed for EN 62368-1 (no certification) |
|------------------|-----------------------------|---|

EMC Specifications

| | | |
|---------------|---|--|
| EMI Emissions | - Conducted Emissions - Radiated Emissions | EN 55032 class A (with external filter) EN 55032 class B (with external filter) EN 55032 class A (with external filter) EN 55032 class B (with external filter) |
| | | External filter proposal: www.tracopower.com/overview/tdn1wi |

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

| | | |
|--------------|-----------------------------|---|
| EMS Immunity | - Electrostatic Discharge | Air: EN 61000-4-2, ±8 kV, perf. criteria A |
| | - RF Electromagnetic Field | Contact: EN 61000-4-2, ±6 kV, perf. criteria A |
| | - EFT (Burst) / Surge | EN 61000-4-3, 10 V/m, perf. criteria A |
| | | EN 61000-4-4, ±2 kV, perf. criteria A |
| | | EN 61000-4-5, ±1 kV, perf. criteria A |
| | - Conducted RF Disturbances | Ext. input component: KY 220 µF, 100 V |
| | - PF Magnetic Field | Continuous: EN 61000-4-6, 10 Vrms, perf. criteria A |
| | | 1 s: EN 61000-4-8, 100 A/m, perf. criteria A |
| | | 1 s: EN 61000-4-8, 1000 A/m, perf. criteria A |

General Specifications

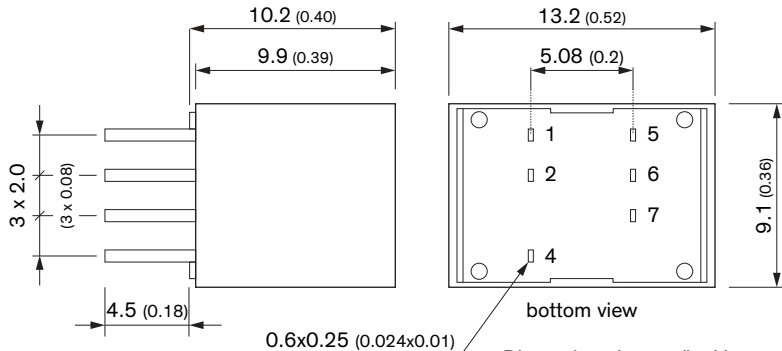
| | | |
|--------------------------|---------------------------------|--|
| Relative Humidity | | 95% max. (non condensing) |
| Temperature Ranges | - Operating Temperature | -40°C to +90°C (without derating) |
| | - Case Temperature | +105°C max. |
| | - Storage Temperature | -55°C to +125°C |
| Power Derating | - High Temperature | 6.67 %/K above 90°C |
| | See application note: | www.tracopower.com/overview/tdn1wi |
| Cooling System | | Natural convection (20 LFM) |
| Remote Control | - Current Controlled Remote | On: open circuit |
| | | Off: 2 to 4 mA current (no internal resistor) |
| | External circuit proposal: | www.tracopower.com/info/current-remote.pdf |
| | - Off Idle Input Current | 2.5 mA max. |
| Switching Frequency | | 100 kHz min. (PFM) |
| Insulation System | | Functional Insulation |
| Isolation Test Voltage | - Input to Output, 60 s | 1'600 VDC |
| Isolation Resistance | - Input to Output, 500 VDC | 1'000 MΩ min. |
| Isolation Capacitance | - Input to Output, 100 kHz, 1 V | 50 pF max. |
| Reliability | - Calculated MTBF | 8'400'000 h (MIL-HDBK-217F, ground benign) |
| Washing Process | | According to Cleaning Guideline www.tracopower.com/info/cleaning.pdf |
| Environment | - Vibration | MIL-STD-810F |
| | - Thermal Shock | MIL-STD-810F |
| Housing Material | | Non-conductive Plastic (UL 94 V-0 rated) |
| Base Material | | Non-conductive Plastic (UL 94 V-0 rated) |
| Potting Material | | Silicone (UL 94 V-0 rated) |
| Pin Material | | Copper |
| Pin Foundation Plating | | Nickel (2 - 3 µm) |
| Pin Surface Plating | | Tin (3 - 5 µm), matte |
| Housing Type | | Plastic Case |
| Mounting Type | | PCB Mount |
| Connection Type | | THD (Through-Hole Device) |
| Footprint Type | | DIP8 |
| Soldering Profile | | 260°C / 6 s max. |
| Weight | | 2.7 g |
| Environmental Compliance | - REACH Declaration | www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant |
| | - RoHS Declaration | www.tracopower.com/info/rohs-declaration.pdf Exemptions: 7a, 7c-1 (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).) |
| | - SCIP Reference Number | f5326c8e-7816-49b5-ae14-a354e8cb08f7 |

Supporting Documents

| | |
|--|--|
| Overview Link (for additional Documents) | www.tracopower.com/overview/tdn1wi |
|--|--|

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

Outline Dimensions



Dimensions in mm (inch)
 Tolerances: x.x: ±0.5 (±0.02)
 Pin pitch tolerances: ±0.25 (±0.01)
 Pin dimension tolerance: ±0.1 (±0.004)

| Pinout | | |
|--------|---------------|---------------|
| Pin | Single | Dual |
| 1 | +Vin (Vcc) | +Vin (Vcc) |
| 2 | -Vin (GND) | -Vin (GND) |
| 4 | Remote On/Off | Remote On/Off |
| 5 | NC | -Vout |
| 6 | -Vout | Common |
| 7 | +Vout | +Vout |

NC: Not connected