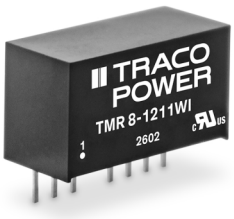
# TRACO POWER

## DC/DC Converter

## TMR 8WI Series, 8 Watt

- **Ultra compact 8 Watt converter in SIP-8 casing**
- **High power density of 3,12W/cm³**
- **Wide 4:1 input voltage ranges**
- **I/O-isolation 1500 VDC**
- **High efficiency (up to 88%) for low thermal loss**
- **Operating temperature range -40°C to +75°C (without derating)**
- **Fully regulated outputs**
- **Remote On/Off control**
- **Indefinite short circuit protection**
- **3-year product warranty**




UL 62368-1 IEC 62368-1

The TMR 8WI series is a family of isolated 8W DC/DC converter modules with regulated output, featuring wide 4:1 input voltage ranges. The product offers a very high power density of 3.19W/cm³ in an ultra-compact SIP-8 package occupying only 2.0 cm² (0.3 square inch) of board space. An excellent efficiency of up to 88% allows for an extended operating temperature range of −40° to +70°C without derating under natural convection conditions. Further features include remote On/Off control, continuous short circuit protection and an I/O isolation voltage of 1500 VDC. The very compact dimensions of these converters make them an ideal solution for many space critical applications in communication equipment, instrumentation and industrial electronics.

## Models

| Order Code | Input Voltage Range | Output 1 | | Output 2 | | Efficiency |
|---|---|---|---|---|---|---|
| | | Vnom | Imax | Vnom | Imax | typ. |
| **TMR 8-1211WI** | 4.5 - 18 VDC (12 VDC nom.) | 5 VDC | 1'600 mA | | | 88 % |
| **TMR 8-1212WI** | | 12 VDC | 665 mA | | | 88 % |
| **TMR 8-1213WI** | | 15 VDC | 535 mA | | | 88 % |
| **TMR 8-1215WI** | | 24 VDC | 335 mA | | | 88 % |
| **TMR 8-1222WI** | | +12 VDC | 335 mA | −12 VDC | 335 mA | 88 % |
| **TMR 8-1223WI** | | +15 VDC | 265 mA | −15 VDC | 265 mA | 88 % |
| **TMR 8-2411WI** | 9 - 36 VDC (24 VDC nom.) | 5 VDC | 1'600 mA | | | 88 % |
| **TMR 8-2412WI** | | 12 VDC | 665 mA | | | 88 % |
| **TMR 8-2413WI** | | 15 VDC | 535 mA | | | 88 % |
| **TMR 8-2415WI** | | 24 VDC | 335 mA | | | 88 % |
| **TMR 8-2422WI** | | +12 VDC | 335 mA | −12 VDC | 335 mA | 88 % |
| **TMR 8-2423WI** | | +15 VDC | 265 mA | −15 VDC | 265 mA | 88 % |
| **TMR 8-4811WI** | 18 - 75 VDC (48 VDC nom.) | 5 VDC | 1'600 mA | | | 88 % |
| **TMR 8-4812WI** | | 12 VDC | 665 mA | | | 88 % |
| **TMR 8-4813WI** | | 15 VDC | 535 mA | | | 88 % |
| **TMR 8-4815WI** | | 24 VDC | 335 mA | | | 88 % |
| **TMR 8-4822WI** | | +12 VDC | 335 mA | −12 VDC | 335 mA | 88 % |
| **TMR 8-4823WI** | | +15 VDC | 265 mA | −15 VDC | 265 mA | 88 % |

Note - If the input will be switched electromechanically, use an external 68 µF / 100 V / KZE capacitor to reduce voltage transient.

## Input Specifications

| | | | |
|---|---|---|---|
| Input Current | - At no load | 12 Vin models: | 20 mA typ. / 30 mA max. |
| | | 24 Vin models: | 10 mA typ. / 15 mA max. |
| | | 48 Vin models: | 8 mA typ. / 13 mA max. |
| | - At full load | 12 Vin models: | 758 mA typ. / 779 mA max. |
| | | 24 Vin models: | 379 mA typ. / 390 mA max. |
| | | 48 Vin models: | 189 mA typ. / 195 mA max. |
| 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.) |
| Start-up Voltage | | 12 Vin models: | 4.2 VDC - 4.5 VDC |
| | | 24 Vin models: | 8.4 VDC - 9 VDC |
| | | 48 Vin models: | 16.8 VDC - 18 VDC |
| Under Voltage Lockout | | 12 Vin models: | 3.8 - 4.15 VDC max. |
| | | 24 Vin models: | 7.6 - 8.3 VDC max. |
| | | 48 Vin models: | 15.2 - 16.6 VDC max. |
| Recommended Input Fuse | | 12 Vin models: | 4'000 mA (slow blow) |
| | | 24 Vin models: | 2'000 mA (slow blow) |
| | | 48 Vin models: | 1'000 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 (Vmin - Vmax) | single output models: | 0.8% max. |
| | | dual output models: | 0.8% max. |
| | - Load Variation (0 - 100%) | single output models: | 1% max. |
| | | dual output models: | 1% max. (Output 1) |
| | | | 1% max. (Output 2) |
| | - Voltage Balance (symmetrical load) | dual output models: | 2% max. |
| | - Cross Regulation (25% / 100% asym. load) | dual output models: | 5% max. |
| Ripple and Noise (20 MHz Bandwidth) | - single output | 5 Vout models: | 100 mVp-p max. (w/ 1uF) |
| | | 12 Vout models: | 140 mVp-p max. (w/ 1uF) |
| | | 15 Vout models: | 140 mVp-p max. (w/ 1uF) |
| | | 24 Vout models: | 140 mVp-p max. (w/ 1uF) |
| | - dual output | 12 / -12 Vout models: | 140 / 140 mVp-p max. (w/ 1uF) |
| | | 15 / -15 Vout models: | 140 / 140 mVp-p max. (w/ 1uF) |
| | - single output | 5 Vout models: | 80 mVp-p typ. (w/ 1uF) |
| | | 12 Vout models: | 100 mVp-p typ. (w/ 1uF) |
| | | 15 Vout models: | 100 mVp-p typ. (w/ 1uF) |
| | | 24 Vout models: | 100 mVp-p typ. (w/ 1uF) |
| | - dual output | 12 / -12 Vout models: | 100 / 100 mVp-p typ. (w/ 1uF) |
| | | 15 / -15 Vout models: | 100 / 100 mVp-p typ. (w/ 1uF) |
| Capacitive Load | - single output | 5 Vout models: | 3'300 µF max. |
| | | 12 Vout models: | 560 µF max. |
| | | 15 Vout models: | 390 µF max. |
| | | 24 Vout models: | 150 µF max. |
| | - dual output | 12 / -12 Vout models: | 330 / 330 µF max. |
| | | 15 / -15 Vout models: | 180 / 180 µF max. |
| Minimum Load | | | Not required |
| Temperature Coefficient | | | ±0.02 %/K max. |
| Hold-up Time | | | 3 ms min. (12 Vin models) |
| | | | 10 ms min. (24 Vin models) |
| | | | 30 ms min. (48 Vin models) |

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

| | | | |
|---|---|---|---|
| Start-up Time | | | 30 ms typ. / 50 ms max. |
| Start-up Overshoot Voltage | | | 5% max. |
| Short Circuit Protection | | | Continuous, Automatic recovery |
| Overload Protection | | | Switch off after 4 s delay, automatic restart |
| Output Current Limitation | | | 110 - 180% of Iout max.<br>145% typ. of Iout max. |
| Transient Response | - Response Deviation | | 5% max. (75% to 100% Load Step) |
| | - Response Time | | 500 µs max. (75% to 100% Load Step) |

## Safety Specifications

| | | | |
|---|---|---|---|
| Standards | - IT / Multimedia Equipment | | EN 62368-1<br>IEC 62368-1<br>UL 62368-1 |
| | - Certification Documents | | www.tracopower.com/tmr8wi-safety-cert |
| Pollution Degree | | | PD 3 |
| Over Voltage Category | | | Not mains connected |

## EMC Specifications

| | | | |
|---|---|---|---|
| EMI (Emissions) | | | EN 61000-6-4 (Generic Industrial) |
| | - Conducted Emissions | | EN 55032 class A (with external filter) |
| | - Radiated Emissions | | EN 55032 class A (with external filter) |
| | | External filter proposal: | www.tracopower.com/tmr8wi-emc-filter |
| EMS (Immunity) | | | EN 55035 (Multimedia) |
| | - Electrostatic Discharge | Air: | EN 61000-4-2, ±8 kV, perf. criteria A |
| | | Contact: | EN 61000-4-2, ±6 kV, perf. criteria A |
| | - RF Electromagnetic Field | | EN 61000-4-3, 10 V/m, perf. criteria A |
| | - EFT (Burst) / Surge | | EN 61000-4-4, ±2 kV, perf. criteria A<br>EN 61000-4-5, ±2 kV, perf. criteria A |
| | | External filter proposal: | www.tracopower.com/tmr8wi-emc-filter |
| | - Conducted RF Disturbances | | EN 61000-4-6, 10 Vrms, perf. criteria A |
| | - PF Magnetic Field | Continuous: | EN 61000-4-8, 100 A/m, perf. criteria A |
| | | 1 s: | EN 61000-4-8, 1000 A/m, perf. criteria A |
| EMC / Environmental | - Certification Documents | | www.tracopower.com/tmr8wi-emc-cert |

## General Specifications

| | | | |
|---|---|---|---|
| Relative Humidity | | | 95% max. (non condensing) |
| Temperature Ranges | - Operating Temperature | | –40°C to +90°C |
| | - Approved Ambient Temp. | | +70°C max. (5 Vout models)<br>+75°C max. (other models)<br>(for compliance to 62368-1) |
| | - Case Temperature | | +105°C max. |
| | - Storage Temperature | | –50°C to +125°C |
| Power Derating | - High Temperature | | Depending on model |
| | | See application note: | www.tracopower.com/tmr8wi-cc |
| Cooling System | | | Natural convection (20 LFM) |
| Remote Control | - Voltage Controlled Remote (passive = on) | | On: 3.5 to 12 VDC or open circuit<br>Off: 0 to 1.2 VDC or short circuit<br>Refers to 'Remote' and '-Vin' Pin |
| | - Off Idle Input Current | | 2.5 mA typ. / 5 mA max. |
| | - Remote Pin Input Current | | -0.5 to 0.5 mA |
| Altitude During Operation | | | 6'000 m max. |
| Regulator Topology | | | Flyback Converter |
| Switching Frequency | | | 308 - 392 kHz (PWM)<br>350 kHz typ. (PWM) |
| Insulation System | | | Functional Insulation |

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

| | | |
|---|---|---|
| Isolation Test Voltage | - Input to Output, 60 s | 1'500 VDC |
| | - Input to Output, 1 s | 1'800 VDC |
| | - Input to Case, 60 s | 1'500 VDC |
| | - Output to Case, 60 s | 1'500 VDC |
| Isolation Resistance | - Input to Output, 500 VDC | 1'000 MΩ min. |
| Isolation Capacitance | - Input to Output, 100 kHz, 1 V | 650 pF typ.<br>1'500 pF max. |
| Reliability | - Calculated MTBF | 2'000'000 h (MIL-HDBK-217F, ground benign) |
| Washing Process | | According to Cleaning Guideline<br>www.tracopower.com/info/cleaning.pdf |
| Environment | - Vibration | IPC-9592B<br>2.4 g, 3 axis, random waveform, 30 min |
| | - Mechanical Shock | IPC-9592B<br>30 g, 3 axis, half sine, 11 ms |
| | - Thermal Shock | IPC-9592B<br>-40 to +125°C, 100 cycles, 30 min each |
| Housing Material | | Plastic (UL 94 V-0 rated) |
| Potting Material | | Silicone (UL 94 V-0 rated) |
| Pin Material | | Phosphor Bronze (C5191) |
| Pin Foundation Plating | | Nickel (1 - 3 µm) |
| Pin Surface Plating | | Tin (7.5 µm min.), matte |
| Housing Type | | Plastic Case |
| Mounting Type | | PCB Mount |
| Connection Type | | THD (Through-Hole Device) |
| Footprint Type | | SIP8 |
| Soldering Profile | | Lead-Free Wave Soldering<br>245°C / 10 s max. |
| Weight | | 7 g |
| Thermal Impedance | - Case to Ambient | 28 K/W typ. |
| Environmental Compliance | - REACH Declaration | www.tracopower.com/info/reach-declaration.pdf<br>REACH SVHC list compliant<br>REACH Annex XVII compliant |
| | - RoHS Declaration | www.tracopower.com/info/rohs-declaration.pdf<br>Exemptions: 7(a)<br>(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).) |
| | - SCIP Reference Number | cb3777ca-e557-4b33-b4b1-9f4821ec4dc2 |

## Additional Information

| | |
|---|---|
| Supporting Documents | www.tracopower.com/overview/tmr8wi |
| Frequently Asked Questions | www.tracopower.com/glossary-faq |
| Glossary | www.tracopower.com/info/glossary.pdf |

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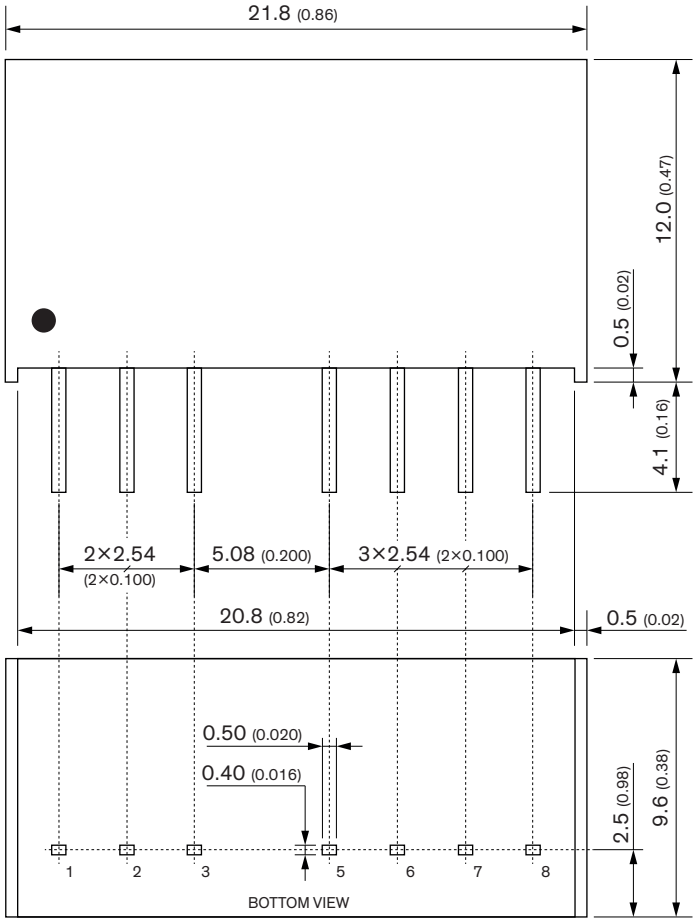
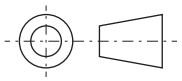
## Outline Dimensions




Dimensions in mm (inch)
Tolerances: x.x ±0.5 (x.xx ±0.02)
x.xx ±0.25 (x.xxx ±0.01)
Pin tolerances: ±0.25 (±0.01)



| Pinout | | |
|---|---|---|
| **Pin** | **Single** | **Dual** |
| **1** | –Vin | |
| **2** | +Vin | |
| **3** | Remote On/Off | |
| **5** | NC | |
| **6** | +Vout | |
| **7** | –Vout | Common |
| **8** | NC | –Vout |

NC: Not connected