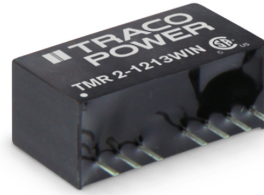


- Ultra-wide 4:1 input range
- Compact SIP-8 package
- Temperature range -40 to $+90^{\circ}\text{C}$ (up to $+75^{\circ}\text{C}$ at full load)
- High efficiency of 82%
- Excellent load and line regulation
- Continuous short-circuit protection
- Overload protection
- I/O isolation 1500 VDC
- Remote On/Off control
- 3-year product warranty



The TMR 2WIN series is a family of isolated 2 W DC/DC converter modules with accurately regulated output voltages and ultra-wide 4:1 input voltage ranges. They require no minimum load and are protected against overload and short circuit.

An excellent efficiency along with the use of high grade components allows a compact construction in SIP-8 package; even the converters can reliably operate in an ambient temperature of -40°C to $+75^{\circ}\text{C}$ at full load and up to 90°C with 50% power derating. Typical applications for these converters are distributed power architectures in communication, instrumentation and industrial electronics, everywhere where space on the PCB is critical.

Models

| Order Code | Input Voltage Range | Output 1 | | Output 2 | | Efficiency typ. |
|---------------|-------------------------------|----------|------------------|----------|------------------|-----------------|
| | | Vnom | I _{max} | Vnom | I _{max} | |
| TMR 2-1210WIN | 4.5 - 18 VDC (12 VDC nom.) | 3.3 VDC | 500 mA | | | 75 % |
| TMR 2-1211WIN | | 5 VDC | 400 mA | | | 80 % |
| TMR 2-1212WIN | | 12 VDC | 167 mA | | | 82 % |
| TMR 2-1213WIN | | 15 VDC | 134 mA | | | 82 % |
| TMR 2-1221WIN | | +5 VDC | 200 mA | -5 VDC | 200 mA | 80 % |
| TMR 2-1222WIN | | +12 VDC | 83 mA | -12 VDC | 83 mA | 82 % |
| TMR 2-1223WIN | | +15 VDC | 67 mA | -15 VDC | 67 mA | 82 % |
| TMR 2-2410WIN | 9 - 36 VDC (24 VDC nom.) | 3.3 VDC | 500 mA | | | 75 % |
| TMR 2-2411WIN | | 5 VDC | 400 mA | | | 80 % |
| TMR 2-2412WIN | | 12 VDC | 167 mA | | | 82 % |
| TMR 2-2413WIN | | 15 VDC | 134 mA | | | 82 % |
| TMR 2-2421WIN | | +5 VDC | 200 mA | -5 VDC | 200 mA | 80 % |
| TMR 2-2422WIN | | +12 VDC | 83 mA | -12 VDC | 83 mA | 82 % |
| TMR 2-2423WIN | | +15 VDC | 67 mA | -15 VDC | 67 mA | 82 % |
| TMR 2-4810WIN | 18 - 75 VDC (48 VDC nom.) | 3.3 VDC | 500 mA | | | 74 % |
| TMR 2-4811WIN | | 5 VDC | 400 mA | | | 80 % |
| TMR 2-4812WIN | | 12 VDC | 167 mA | | | 82 % |
| TMR 2-4813WIN | | 15 VDC | 134 mA | | | 82 % |
| TMR 2-4821WIN | | +5 VDC | 200 mA | -5 VDC | 200 mA | 80 % |
| TMR 2-4822WIN | | +12 VDC | 83 mA | -12 VDC | 83 mA | 82 % |
| TMR 2-4823WIN | | +15 VDC | 67 mA | -15 VDC | 67 mA | 82 % |

Input Specifications

| | | |
|---------------------------|----------------|---|
| Input Current | - at no load | 12 Vin models: 60 mA typ. 24 Vin models: 30 mA typ. 48 Vin models: 20 mA typ. |
| | - at full load | 12 Vin models: 183 mA max. 24 Vin models: 92 mA max. 48 Vin models: 46 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: VDC4 VDC typ. 24 Vin models: VDC6 VDC typ. 48 Vin models: VDC12 VDC typ. |
| Under Voltage Lockout | | 12 Vin models: 4 VDC max. 24 Vin models: 8 VDC max. 48 Vin models: 16 VDC max. |
| Recommended Input Fuse | | 12 Vin models: 1000 mA (slow blow) 24 Vin models: 500 mA (slow blow) 48 Vin models: 250 mA (slow blow) |
| Input Filter | | Internal Capacitor |
| Short Circuit Input Power | | 1.5 W max. |

Output Specifications

| | | |
|---------------------------|--|--|
| Voltage Set Accuracy | | ±2% max. |
| Regulation | - Input Variation (Vmin - Vmax) | single output models: 0.5% max. dual output models: 0.5% max. |
| | - Load Variation (0 - 100%) | single output models: 1% max. dual output models: 1% max. (Output 1) 1% max. (Output 2) |
| | - Cross Regulation (symmetrical load) | dual output models: 2% max. |
| Ripple and Noise | - 20 MHz Bandwidth | 100 mVp-p max. |
| Capacitive Load | - single output | 3.3 Vout models: 1'000 µF max. |
| | | 5 Vout models: 1'000 µF max. |
| | | 12 Vout models: 170 µF max. |
| | | 15 Vout models: 110 µF max. |
| | | 5 / -5 Vout models: 470 / 470 µF max. |
| - dual output | 12 / -12 Vout models: 100 / 100 µF max. | |
| | 15 / -15 Vout models: 47 / 47 µF max. | |
| | | |
| Minimum Load | | Not required |
| Temperature Coefficient | | ±0.02 %/K max. |
| Short Circuit Protection | | Automatic recovery |
| Overload Protection | | Foldback Mode |
| Output Current Limitation | | 110% min. of Iout max. |
| | | 140% typ. of Iout max. |
| Transient Response | - Response Deviation | 5% max. (75% to 100% Load Step) |
| | - Response Time | 300 µs typ. / 500 µs max. (75% to 100% Load Step) |

Safety Specifications

| | | |
|------------------|-----------------------------|--|
| Safety Standards | - IT / Multimedia Equipment | IEC 60950-1 EN 60950-1 UL 60950-1 CSA-C22.2, No 60950-1 |
| | - Certification Documents | www.tracopower.com/overview/tmr2win |
| Pollution Degree | | PD 2 |

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

General Specifications

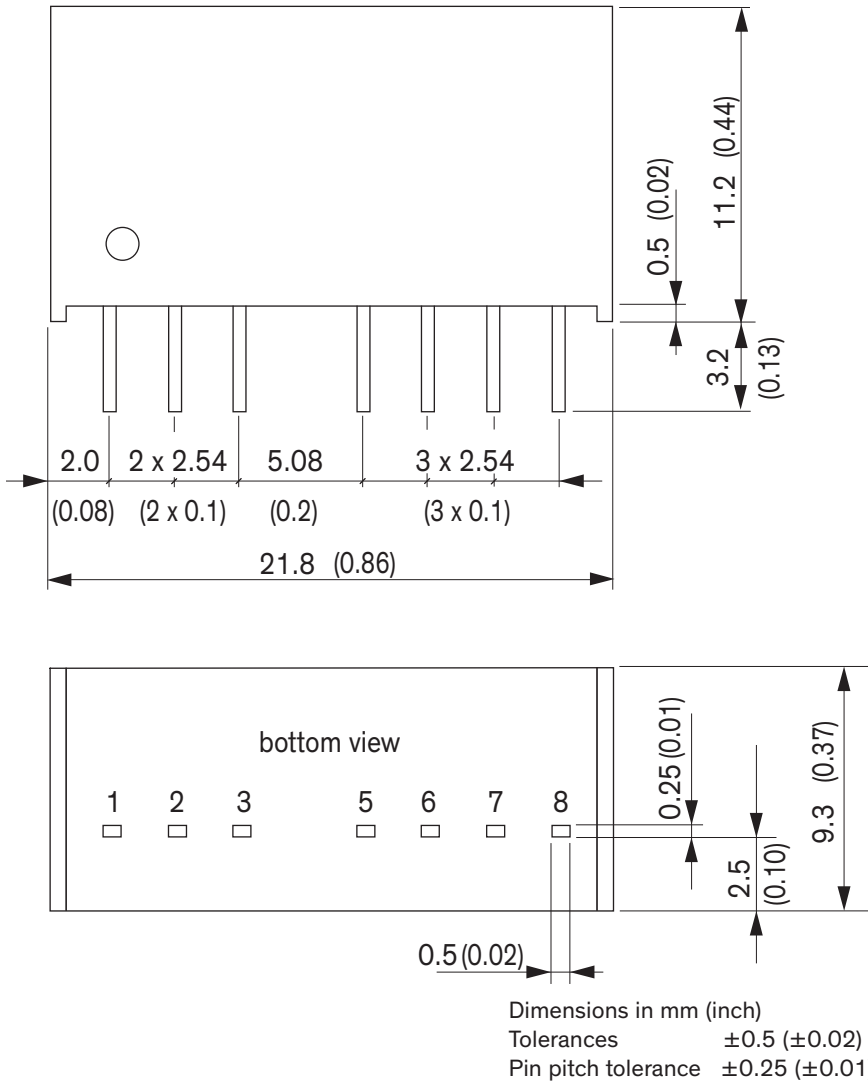
| | | |
|---------------------------|--|--|
| Relative Humidity | | 95% max. (non condensing) |
| Temperature Ranges | - Operating Temperature - Case Temperature - Storage Temperature | -40°C to +90°C +105°C max. -55°C to +125°C |
| Power Derating | - High Temperature | 3.33 %/K above 75°C |
| Cooling System | | Natural convection (20 LFM) |
| Remote Control | - Voltage Controlled Remote - Current Controlled Remote - Off Idle Input Current | On: open circuit Off: 6 to 9 VDC (via 1 kOhm resistor) Refers to 'Remote' and '-Vin' Pin On: open circuit Off: 2 to 4 mA current 3 mA max. |
| Altitude During Operation | | 4'000 m max. |
| Switching Frequency | | 300 kHz typ. (PFM) |
| Insulation System | | Functional Insulation |
| Isolation Test Voltage | - Input to Output, 60 s - Input to Output, 1 s | 1'500 VDC 1'800 VDC |
| Isolation Resistance | - Input to Output, 500 VDC | 1'000 MOhm min. |
| Isolation Capacitance | - Input to Output, 100 kHz, 1 V | 250 pF typ. 500 pF max. |
| Reliability | - Calculated MTBF | 3'430'000 h (MIL-HDBK-217F, ground benign) |
| Housing Material | | Non-conductive Plastic (UL94 V-0 rated) |
| Potting Material | | Silicone (UL94 V-0 rated) |
| Pin Material | | Nickel-Iron (Alloy 42) |
| Soldering Profile | | Wave Soldering (1.5mm from casing) 260°C / 10 s |
| Connection Type | | THD (Through-Hole Device) |
| Weight | | 4.66 g |
| Environmental Compliance | - Reach - RoHS | www.tracopower.com/info/reach-declaration.pdf www.tracopower.com/info/rohs-declaration.pdf |

Supporting Documents

| | |
|--|--|
| Overview Link (for additional Documents) | www.tracopower.com/overview/tmr2win |
|--|--|

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

Outline Dimensions



| Pinout | | |
|--------|---------------|-------------|
| Pin | Single Output | Dual Output |
| 1 | -Vin (GND) | -Vin (GND) |
| 2 | +Vin (Vcc) | +Vin (Vcc) |
| 3 | Remote | Remote |
| 5 | NC | NC |
| 6 | +Vout | +Vout |
| 7 | -Vout | Common |
| 8 | NC | -Vout |

NC: No Connection