

- Ultra-compact SIP-8 package
- Wide 2:1 input voltage range
- Continuous short-circuit protection
- Temperature range -40° to $+78^{\circ}\text{C}$
- High efficiency up to 86%
- I/O isolation 1600 VDC
- Remote On/Off control
- 3-year product warranty



The TMR-6 series is a new family of isolated 6W DC/DC converter modules with regulated output, featuring wide 2:1 input voltage ranges. The product comes in a ultra-compact SIP-8 plastic package with a small footprint occupying only 2.0 cm² of board space. Further features include remote On/Off control and continuous short circuit protection. The very compact dimensions of these converters make them an ideal solution for space critical applications.

| Models | | | | | | |
|------------|------------------------------|----------|------------------|----------|------------------|-----------------|
| Order Code | Input Voltage Range | Output 1 | | Output 2 | | Efficiency typ. |
| | | Vnom | I _{max} | Vnom | I _{max} | |
| TMR 6-0510 | 4.5 - 9 VDC (5 VDC nom.) | 3.3 VDC | 1'300 mA | | | 77 % |
| TMR 6-0511 | | 5 VDC | 1'200 mA | | | 81 % |
| TMR 6-0519 | | 9 VDC | 666 mA | | | 83 % |
| TMR 6-0512 | | 12 VDC | 500 mA | | | 84 % |
| TMR 6-0513 | | 15 VDC | 400 mA | | | 84 % |
| TMR 6-0515 | | 24 VDC | 250 mA | | | 84 % |
| TMR 6-0521 | | +5 VDC | 600 mA | -5 VDC | 600 mA | 81 % |
| TMR 6-0522 | | +12 VDC | 250 mA | -12 VDC | 250 mA | 84 % |
| TMR 6-0523 | | +15 VDC | 200 mA | -15 VDC | 200 mA | 84 % |
| TMR 6-1210 | 9 - 18 VDC (12 VDC nom.) | 3.3 VDC | 1'300 mA | | | 78 % |
| TMR 6-1211 | | 5 VDC | 1'200 mA | | | 83 % |
| TMR 6-1219 | | 9 VDC | 666 mA | | | 85 % |
| TMR 6-1212 | | 12 VDC | 500 mA | | | 85 % |
| TMR 6-1213 | | 15 VDC | 400 mA | | | 85 % |
| TMR 6-1215 | | 24 VDC | 250 mA | | | 84 % |
| TMR 6-1221 | | +5 VDC | 600 mA | -5 VDC | 600 mA | 82 % |
| TMR 6-1222 | | +12 VDC | 250 mA | -12 VDC | 250 mA | 84 % |
| TMR 6-1223 | | +15 VDC | 200 mA | -15 VDC | 200 mA | 85 % |
| TMR 6-2410 | 18 - 36 VDC (24 VDC nom.) | 3.3 VDC | 1'300 mA | | | 78 % |
| TMR 6-2411 | | 5 VDC | 1'200 mA | | | 83 % |
| TMR 6-2419 | | 9 VDC | 666 mA | | | 85 % |
| TMR 6-2412 | | 12 VDC | 500 mA | | | 86 % |
| TMR 6-2413 | | 15 VDC | 400 mA | | | 86 % |
| TMR 6-2415 | | 24 VDC | 250 mA | | | 85 % |
| TMR 6-2421 | | +5 VDC | 600 mA | -5 VDC | 600 mA | 82 % |
| TMR 6-2422 | | +12 VDC | 250 mA | -12 VDC | 250 mA | 85 % |
| TMR 6-2423 | | +15 VDC | 200 mA | -15 VDC | 200 mA | 85 % |
| TMR 6-4810 | 36 - 75 VDC (48 VDC nom.) | 3.3 VDC | 1'300 mA | | | 78 % |
| TMR 6-4811 | | 5 VDC | 1'200 mA | | | 82 % |
| TMR 6-4819 | | 9 VDC | 666 mA | | | 84 % |
| TMR 6-4812 | | 12 VDC | 500 mA | | | 85 % |
| TMR 6-4813 | | 15 VDC | 400 mA | | | 86 % |
| TMR 6-4815 | | 24 VDC | 250 mA | | | 84 % |
| TMR 6-4821 | | +5 VDC | 600 mA | -5 VDC | 600 mA | 82 % |
| TMR 6-4822 | | +12 VDC | 250 mA | -12 VDC | 250 mA | 84 % |
| TMR 6-4823 | | +15 VDC | 200 mA | -15 VDC | 200 mA | 85 % |

Input Specifications

| | | |
|------------------------|--------------|--|
| Input Current | - At no load | 5 Vin models: 105 mA typ. 12 Vin models: 55 mA typ. 24 Vin models: 28 mA typ. 48 Vin models: 14 mA typ. |
| Surge Voltage | | 5 Vin models: 15 VDC max. (1 s max.) 12 Vin models: 36 VDC max. (1 s max.) 24 Vin models: 50 VDC max. (1 s max.) 48 Vin models: 100 VDC max. (1 s max.) |
| Under Voltage Lockout | | 5 Vin models: 2 VDC min. / 3.5 VDC typ. / 4 VDC max. 12 Vin models: 5 VDC min. / 7 VDC typ. / 8 VDC max. 24 Vin models: 12 VDC min. / 15 VDC typ. / 17 VDC max. 48 Vin models: 26 VDC min. / 33 VDC typ. / 35 VDC max. |
| Recommended Input Fuse | | 5 Vin models: 3'000 mA (slow blow) 12 Vin models: 1'600 mA (slow blow) 24 Vin models: 1'000 mA (slow blow) 48 Vin models: 500 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: 0.2% max. dual output models: 0.2% max. |
| | - Load Variation (0 - 100%) | single output models: 1% max. dual output models: 1% max. (Output 1) 1% max. (Output 2) |
| | - Cross Regulation (25% / 100% asym. load) | dual output models: 5% max. |
| Ripple and Noise | - 20 MHz Bandwidth | 50 mVp-p typ. |
| Capacitive Load | - single output | 3.3 Vout models: 6'600 µF max. 5 Vout models: 3'300 µF max. 9 Vout models: 2'000 µF max. 12 Vout models: 1'600 µF max. 15 Vout models: 1'400 µF max. 24 Vout models: 680 µF max. |
| | - dual output | 5 / -5 Vout models: 2'000 / 2'000 µF max. 12 / -12 Vout models: 900 / 900 µF max. 15 / -15 Vout models: 600 / 600 µF max. |
| Minimum Load | | Not required |
| Temperature Coefficient | | ±0.02 %/K max. |
| Start-up Time | | 5 ms typ. / 10 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 | EN 60950-1 EN 62368-1 IEC 60950-1 IEC 62368-1 UL 60950-1 UL 62368-1 |
| | - Certification Documents | www.tracopower.com/overview/tmr6 |
| Pollution Degree | | PD 2 |

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

EMC Specifications

| | | |
|---------------|-----------------------------|---|
| EMI Emissions | - Conducted Emissions | EN 55032 class A (with external filter) EN 55032 class B (with external filter) |
| | - Radiated Emissions | EN 55032 class A (with external filter) EN 55032 class B (with external filter) |
| | | External filter proposal: www.tracopower.com/overview/tmr6 |
| EMS Immunity | - 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 EN 61000-4-5, ±1 kV, perf. criteria A |
| | - Conducted RF Disturbances | Ext. input component: 5 Vin models: Nippon chemi-con KY 330 µF Other models: Nippon chemi-con KY 220 µF EN 61000-4-6, 10 Vrms, perf. criteria A |
| | - PF Magnetic Field | Continuous: EN 61000-4-8, 100 A/m, perf. criteria A |

General Specifications

| | | |
|---------------------------|---------------------------------|--|
| Relative Humidity | | 95% max. (non condensing) |
| Temperature Ranges | - Operating Temperature | -40°C to +78°C |
| | - Case Temperature | +105°C max. |
| | - Storage Temperature | -55°C to +125°C |
| Power Derating | - High Temperature | Depending on model |
| | | See application note: www.tracopower.com/overview/tmr6 |
| Cooling System | | Natural convection (20 LFM) |
| Remote Control | - Current Controlled Remote | On: open circuit Off: 2 to 4 mA current (internal 1 kΩ resistor) |
| | - Off Idle Input Current | External circuit proposal: www.tracopower.com/info/current-remote.pdf 2.5 mA max. |
| Altitude During Operation | | 5'000 m max. |
| Switching Frequency | | 100 kHz min. (RCC) |
| 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 | 2'135'000 h (MIL-HDBK-217F, ground benign) |
| Washing Process | | Allowed (hermetical product) |
| | | See 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) |
| 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 | | SIP8 |
| Weight | | 4.8 g |

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

Environmental Compliance - REACH Declaration

www.tracopower.com/info/reach-declaration.pdf

- RoHS Declaration

REACH SVHC list compliant

REACH Annex XVII compliant

www.tracopower.com/info/rohs-declaration.pdf

Exemptions: 7a, 7c-I

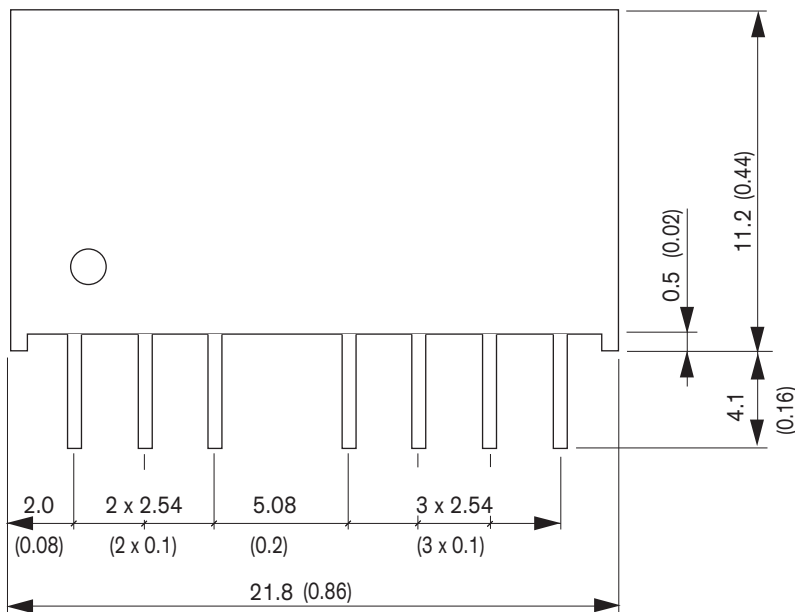
(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).
The SCIP number is provided on request.)

Supporting Documents

[Overview Link](#) (for additional Documents)

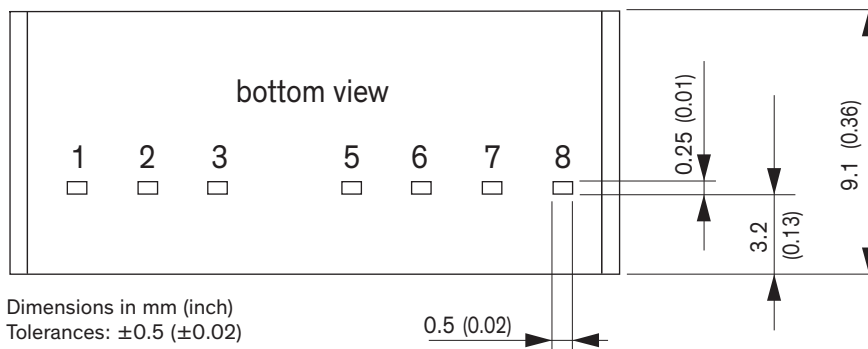
www.tracopower.com/overview/tmr6

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: Not connected



Dimensions in mm (inch)
Tolerances: ± 0.5 (± 0.02)
Pin pitch Tolerance: ± 0.25 (± 0.01)