

- Compact SIP-8 metal case
- EN 50155 railway approval
- Ultra wide 4:1 Input: 9–36, 18–75 and 43–160 VDC
- I/O-isolation 3'000 VDC
- Fully regulated outputs
- Operating temperature range –40°C to +90°C
- Short circuit protection and current limitation
- Remote On/Off
- 3-year product warranty



The TMR 3WIR series is a set of 3 Watt DC/DC converters in a SIP-8 metal case. They operate up to 78°C environment temperature at full load and up to 90°C with a 50% load derating. With EN 50155 and UL 60950-1 certification, 3'000 VDC I/O-isolation voltage, external On/Off, current limitation and short circuit 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.

| Models | | | | | | |
|---------------|--------------------------------|----------|------------------|----------|------------------|-----------------|
| Order Code | Input Voltage Range | Output 1 | | Output 2 | | Efficiency typ. |
| | | Vnom | I _{max} | Vnom | I _{max} | |
| TMR 3-2410WIR | 9 - 36 VDC (24 VDC nom.) | 3.3 VDC | 700 mA | | | 76 % |
| TMR 3-2411WIR | | 5 VDC | 600 mA | | | 81 % |
| TMR 3-2419WIR | | 9 VDC | 333 mA | | | 81 % |
| TMR 3-2412WIR | | 12 VDC | 250 mA | | | 83 % |
| TMR 3-2413WIR | | 15 VDC | 200 mA | | | 83 % |
| TMR 3-2415WIR | | 24 VDC | 125 mA | | | 82 % |
| TMR 3-2421WIR | | +5 VDC | 300 mA | -5 VDC | 300 mA | 80 % |
| TMR 3-2422WIR | | +12 VDC | 125 mA | -12 VDC | 125 mA | 82 % |
| TMR 3-2423WIR | | +15 VDC | 100 mA | -15 VDC | 100 mA | 82 % |
| TMR 3-4810WIR | 18 - 75 VDC (48 VDC nom.) | 3.3 VDC | 700 mA | | | 75 % |
| TMR 3-4811WIR | | 5 VDC | 600 mA | | | 81 % |
| TMR 3-4819WIR | | 9 VDC | 333 mA | | | 81 % |
| TMR 3-4812WIR | | 12 VDC | 250 mA | | | 82 % |
| TMR 3-4813WIR | | 15 VDC | 200 mA | | | 82 % |
| TMR 3-4815WIR | | 24 VDC | 125 mA | | | 82 % |
| TMR 3-4821WIR | | +5 VDC | 300 mA | -5 VDC | 300 mA | 80 % |
| TMR 3-4822WIR | | +12 VDC | 125 mA | -12 VDC | 125 mA | 82 % |
| TMR 3-4823WIR | | +15 VDC | 100 mA | -15 VDC | 100 mA | 82 % |
| TMR 3-7210WIR | 43 - 160 VDC (110 VDC nom.) | 3.3 VDC | 700 mA | | | 76 % |
| TMR 3-7211WIR | | 5 VDC | 600 mA | | | 80 % |
| TMR 3-7219WIR | | 9 VDC | 333 mA | | | 81 % |
| TMR 3-7212WIR | | 12 VDC | 250 mA | | | 82 % |
| TMR 3-7213WIR | | 15 VDC | 200 mA | | | 83 % |
| TMR 3-7215WIR | | 24 VDC | 125 mA | | | 83 % |
| TMR 3-7221WIR | | +5 VDC | 300 mA | -5 VDC | 300 mA | 80 % |
| TMR 3-7222WIR | | +12 VDC | 125 mA | -12 VDC | 125 mA | 83 % |
| TMR 3-7223WIR | | +15 VDC | 100 mA | -15 VDC | 100 mA | 81 % |

Input Specifications

| | | |
|------------------------|--------------|--|
| Input Current | - At no load | 24 Vin models: 4 mA typ. 48 Vin models: 4 mA typ. 110 Vin models: 2 mA typ. |
| Surge Voltage | | 24 Vin models: 50 VDC max. (1 s max.) 48 Vin models: 100 VDC max. (1 s max.) 110 Vin models: 185 VDC max. (1 s max.) |
| Recommended Input Fuse | | 24 Vin models: 800 mA (slow blow) 48 Vin models: 500 mA (slow blow) 110 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 (Vmin - Vmax) - 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: 0.5% max. dual output models: 1% max. (Output 1) 1% max. (Output 2) dual output models: 5% max. |
| Ripple and Noise | - 20 MHz Bandwidth | 75 mVp-p max. (w/ 1 μ F) 50 mVp-p typ. (w/ 1 μ F) |
| Capacitive Load | - single output - dual output | 3.3 Vout models: 1'100 μF max. 5 Vout models: 550 μF max. 9 Vout models: 340 μF max. 12 Vout models: 240 μF max. 15 Vout models: 240 μF max. 24 Vout models: 90 μF max. 5 / -5 Vout models: 340 / 340 μF max. 12 / -12 Vout models: 170 / 170 μF max. 15 / -15 Vout models: 90 / 90 μF max. |
| Minimum Load | | Not required |
| Temperature Coefficient | | ±0.02 %/K max. |
| Hold-up Time | | 10 ms min. (acc. to EN 50155 Class S2, see application note for ext. capacitor calculation: www.tracopower.com/info/holdup_en50155.pdf) |
| Start-up Time | | 75 ms max. |
| Short Circuit Protection | | Continuous, Automatic recovery |
| Output Current Limitation | | 180% typ. of Iout max. |
| Transient Response | - Response Time | 250 μs typ. (25% Load Step) |

Safety Specifications

| | | |
|------------------|--|---|
| Standards | - IT / Multimedia Equipment - Railway Applications - Certification Documents | EN 62368-1 IEC 62368-1 UL 62368-1 EN 50155 www.tracopower.com/overview/tmr3wir |
| 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) | | EN 50121-3-2 (EMC for Rolling Stock) |
| - Conducted Emissions | | EN 55011 class A (with external filter) EN 55011 class B (with external filter) EN 55032 class A (with external filter) EN 55032 class B (with external filter) |
| - Radiated Emissions | | EN 55011 class A (with external filter) EN 55011 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/tmr3wir |
| EMS (Immunity) | | EN 50121-3-2 (EMC for Rolling Stock) |
| - Electrostatic Discharge | Air: | EN 61000-4-2, ±8 kV, perf. criteria A |
| | Contact: | EN 61000-4-2, ±6 kV, perf. criteria A EN 61000-4-3, 20 V/m, perf. criteria A EN 61000-4-4, ±2 kV, perf. criteria A EN 61000-4-5, ±2 kV, perf. criteria A |
| - RF Electromagnetic Field | Ext. input component: | 24 Vin models: KY 220 µF TVS SMDJ70A 48 Vin models: KY 220 µF TVS SMDJ120A 110 Vin models: KY 150 µF TVS SMDJ250A |
| - EFT (Burst) / Surge | | EN 61000-4-6, 10 Vrms, perf. criteria A |
| | Continuous: | EN 61000-4-8, 100 A/m, perf. criteria A |
| - Conducted RF Disturbances | 1 s: | EN 61000-4-8, 1000 A/m, perf. criteria A |
| - PF Magnetic Field | | |
| EMC / Environmental | - Certification Documents | www.tracopower.com/overview/tmr3wir |

General Specifications

| | | |
|----------------------------------|--|--|
| Relative Humidity | | 95% max. (non condensing) |
| Temperature Ranges | - Operating Temperature | -40°C to +90°C |
| | - Case Temperature | +100°C max. |
| | - Storage Temperature | -55°C to +125°C |
| Power Derating | - High Temperature | 4.55 %/K above 78°C |
| | See application note: | www.tracopower.com/overview/tmr3wir |
| Cooling System | | Natural convection (20 LFM) |
| Remote Control | - Voltage Controlled Remote (passive = on) | On: 0 to 0.5 VDC or open circuit Off: 3 to 12 VDC Refers to 'Remote' and '-Vin' Pin |
| | - Off Idle Input Current | 2.5 mA typ. |
| | - Remote Pin Input Current | 0.5 to 3.5 mA |
| Altitude During Operation | | 5'000 m max. |
| Switching Frequency | | 270 - 330 kHz (PWM) (110 Vin model) 360 - 440 kHz (PWM) (other input models) |
| Insulation System | | Functional Insulation |
| Isolation Test Voltage | - Input to Output, 60 s | 3'000 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 | 100 pF max. |
| Reliability | - Calculated MTBF | 5'535'000 h (MIL-HDBK-217F, ground benign) |
| Washing Process | | According to Cleaning Guideline www.tracopower.com/info/cleaning.pdf |
| Environment | - Vibration | MIL-STD-810F EN 61373 |
| | - Mechanical Shock | MIL-STD-810F EN 61373 |
| | - Thermal Shock | MIL-STD-810F |
| | - Flammability | EN 45545-2 www.tracopower.com/info/en45545-declaration.pdf |

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

| | |
|--------------------------|---|
| Housing Material | Copper |
| Potting Material | Silicone (UL 94 V-0 rated) |
| Pin Material | Copper |
| Pin Foundation Plating | Nickel (1 - 2 μm) |
| Pin Surface Plating | Tin (3 - 5 μm), matte |
| Housing Type | Metal Case |
| Mounting Type | PCB Mount |
| Connection Type | THD (Through-Hole Device) |
| Footprint Type | SIP8 |
| Soldering Profile | Lead-Free Wave Soldering 265°C / 10 s max. |
| Weight | 5.9 g |
| Environmental Compliance | <p>- REACH Declaration www.tracopower.com/info/reach-declaration.pdf</p> <p>REACH SVHC list compliant REACH Annex XVII compliant</p> <p>- RoHS Declaration www.tracopower.com/info/rohs-declaration.pdf</p> <p>Exemptions: 7a, 7c-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule))</p> <p>- SCIP Reference Number 09d8ed31-d8a4-4758-985e-946da87f5115</p> |

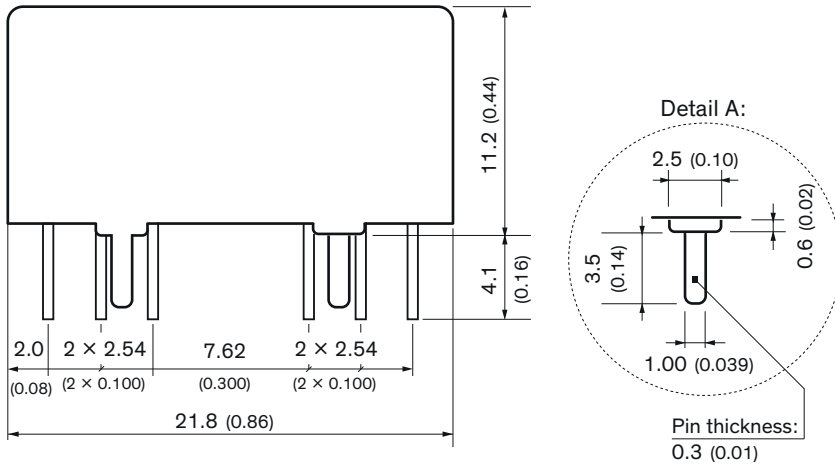
Supporting Documents

Overview Link (for additional Documents)

www.tracopower.com/overview/tmr3wir

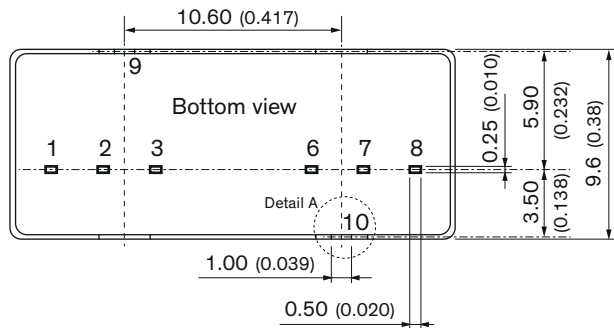
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Outline Dimensions



| Pinout | | |
|--------|---------------|-------------|
| Pin | Single Output | Dual Output |
| 1 | -Vin (GND) | -Vin (GND) |
| 2 | +Vin (Vcc) | +Vin (Vcc) |
| 3 | Remote | Remote |
| 6 | +Vout | +Vout |
| 7 | -Vout | Common |
| 8 | NC | -Vout |
| 9, 10 | Case | Case |

NC: Not connected



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

