DC/DC Converter TMR 3WI Series, 3 Watt

- Highest power density in SIP package
- Ultra wide 4:1 input range
- Small footprint: 21.8 x 9.2 mm
- Temperature range: -40° to +85°C
- High efficiency up to 82%
- Excellent load and line regulation
- Short-circuit protection
- I/O isolation 1600 VDC
- Remote On/Off control
- 3-year product warranty

The TMR 3Wi series is a new family of isolated 3W DC/DC converters with regulated output, featuring ultra-wide 4:1 input voltage range. The product comes in a ultra-compact SIP plastic package with a small footprint occupying only 2.0 cm² (0.3 square inch) of board space. An excellent efficiency allows -40° to +85°C operation temperatures.

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 many space critical applications in battery-powered equipment and instrumentation.

Models

<table>
<thead>
<tr>
<th>Order Code</th>
<th>Input Voltage Range</th>
<th>Output 1</th>
<th>Output 2</th>
<th>Efficiency typ.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vnom</td>
<td>Imax</td>
<td>Vnom</td>
<td>Imax</td>
</tr>
<tr>
<td>TMR 3-1210WI</td>
<td>4.5 - 18 VDC (12 VDC nom.)</td>
<td>3.3 VDC</td>
<td>700 mA</td>
<td>-5 VDC</td>
</tr>
<tr>
<td>TMR 3-1211WI</td>
<td></td>
<td>5 VDC</td>
<td>600 mA</td>
<td></td>
</tr>
<tr>
<td>TMR 3-1212WI</td>
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<td>12 VDC</td>
<td>250 mA</td>
<td>-5 VDC</td>
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<tr>
<td>TMR 3-1213WI</td>
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<td>15 VDC</td>
<td>200 mA</td>
<td>-12 VDC</td>
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<tr>
<td>TMR 3-1221WI</td>
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<td>+5 VDC</td>
<td>300 mA</td>
<td>-12 VDC</td>
</tr>
<tr>
<td>TMR 3-1222WI</td>
<td></td>
<td>+12 VDC</td>
<td>125 mA</td>
<td>-15 VDC</td>
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<tr>
<td>TMR 3-1223WI</td>
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<td>+15 VDC</td>
<td>100 mA</td>
<td>-15 VDC</td>
</tr>
<tr>
<td>TMR 3-2410WI</td>
<td>9 - 36 VDC (24 VDC nom.)</td>
<td>3.3 VDC</td>
<td>700 mA</td>
<td>-5 VDC</td>
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<tr>
<td>TMR 3-2411WI</td>
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<td>5 VDC</td>
<td>600 mA</td>
<td></td>
</tr>
<tr>
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<td>125 mA</td>
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<tr>
<td>TMR 3-2423WI</td>
<td></td>
<td>+15 VDC</td>
<td>100 mA</td>
<td>-15 VDC</td>
</tr>
<tr>
<td>TMR 3-4810WI</td>
<td>18 - 75 VDC (48 VDC nom.)</td>
<td>3.3 VDC</td>
<td>700 mA</td>
<td>-5 VDC</td>
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<tr>
<td>TMR 3-4811WI</td>
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<td>5 VDC</td>
<td>600 mA</td>
<td></td>
</tr>
<tr>
<td>TMR 3-4812WI</td>
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<td>12 VDC</td>
<td>250 mA</td>
<td>-5 VDC</td>
</tr>
<tr>
<td>TMR 3-4813WI</td>
<td></td>
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<td>200 mA</td>
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<td></td>
<td>+15 VDC</td>
<td>100 mA</td>
<td>-15 VDC</td>
</tr>
</tbody>
</table>
## Input Specifications

<table>
<thead>
<tr>
<th>Input Current</th>
<th>At no load</th>
<th>12 Vin models: 40 mA typ.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24 Vin models: 25 mA typ.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>48 Vin models: 15 mA typ.</td>
<td></td>
</tr>
<tr>
<td>At full load</td>
<td>12 Vin models: 340 mA max.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24 Vin models: 170 mA max.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>48 Vin models: 85 mA max.</td>
<td></td>
</tr>
</tbody>
</table>

### Surge Voltage

| 12 Vin models: | 36 VDC max. (100 ms max.) |
| 24 Vin models: | 50 VDC max. (100 ms max.) |
| 48 Vin models: | 100 VDC max. (100 ms max.) |

## Recommended Input Fuse

(The need of an external fuse has to be assessed in the final application)

## Input Filter

Internal Capacitor

## Output Specifications

<table>
<thead>
<tr>
<th>Voltage Set Accuracy</th>
<th>±1% max.</th>
</tr>
</thead>
</table>

### Regulation

- Input Variation (Vmin - Vmax)
  - Single output models: 0.2% max. (Output 1)
  - Single output models: 0.2% max. (Output 2)

- Load Variation (5 - 100%)
  - Single output models: 0.5% max. (Output 1)
  - Dual output models: 1% max. (Output 1)
  - Dual output models: 1% max. (Output 2)

- Cross Regulation (25% / 100% asym. load)
  - Dual output models: 5% max.

### Ripple and Noise

- 20 MHz Bandwidth
  - 30 mVp-p max.

### Capacitive Load

- Single output
  - 3.3 Vout models: 3'300 µF max.
  - 5 Vout models: 1'680 µF max.
  - 12 Vout models: 820 µF max.
  - 15 Vout models: 680 µF max.

- Dual output
  - 5 / -5 Vout models: 1'000 / 1'000 µF max.
  - 12 / -12 Vout models: 470 / 470 µF max.

### Minimum Load

Not required

### Temperature Coefficient

±0.02 %/K max.

### Start-up Time

30 ms typ.

### Short Circuit Protection

Continuous, Automatic recovery

### Transient Response

- Response Time: 250 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/tmr3wi

## 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/tmr3wi

All specifications valid at nominal voltage, 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
  Contact: EN 61000-4-2, ±6 kV, perf. criteria A
- RF Electromagnetic Field
- EFT (Burst) / Surge
  EN 61000-4-4, ±2 kV, perf. criteria A
- Conducted RF Disturbances
  EX INT component: Nippon chemi-con KY, 100 µF / 110 mΩ
- PF Magnetic Field
  Continuous: EN 61000-4-5, ±1 kV, perf. criteria A

Relative Humidity 95% max. (non condensing)
Temperature Ranges
- Operating Temperature -40°C to +85°C
- Case Temperature +100°C max.
- Storage Temperature -55°C to +125°C
Power Derating
- High Temperature 3.3 %/K above 70°C
Cooling System
- Remote Control Current Controlled Remote
  On: open circuit
  Off: 2 to 4 mA current (internal 1 kΩ resistor)
- Natural convection (20 LFM)
- Off idle Input Current
  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
- Input to Output, 500 VDC 1'000 MΩ min.
Isolation Capacitance
- Input to Output, 100 kHz, 1 V 200 pF max.
Reliability
- Calculated MTBF
  3'400'000 h (MIL-HDBK-217F, ground benign)
Environment
- Vibration
- 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
Connection Type THD (Through-Hole Device)
Weight 4.8 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-l

Supporting Documents
Overview Link (for additional Documents)
  www.tracopower.com/overview/tmr3wi

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

Dimensions in mm (inch)
Pin diameter Ø 0.5 ±0.05 (0.02 ±0.002)
Tolerances ±0.5 (±0.02)
Pin pitch tolerance ±0.2 (±0.008)

Pinout

<table>
<thead>
<tr>
<th>Pin</th>
<th>Single Output</th>
<th>Dual Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>–Vin (GND)</td>
<td>–Vin (GND)</td>
</tr>
<tr>
<td>2</td>
<td>+Vin (Vcc)</td>
<td>+Vin (Vcc)</td>
</tr>
<tr>
<td>3</td>
<td>Remote</td>
<td>Remote</td>
</tr>
<tr>
<td>5</td>
<td>NC</td>
<td>NC</td>
</tr>
<tr>
<td>6</td>
<td>+Vout</td>
<td>+Vout</td>
</tr>
<tr>
<td>7</td>
<td>–Vout</td>
<td>Common</td>
</tr>
<tr>
<td>8</td>
<td>NC</td>
<td>–Vout</td>
</tr>
</tbody>
</table>

NC: No Connection

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