

- Wide 2:1 input voltage range
- Fully regulated output voltage
- Compact SIP-8 package
- 1600 VDC I/O isolation (functional insulation)
- Small footprint
- Temperature range  $-40^{\circ}$  to  $+85^{\circ}\text{C}$
- High efficiency up to 85%
- Short-circuit protection
- Remote On/Off control
- 3-year product warranty



The TMR 3 series is a new family of isolated 3 W DC/DC converter modules with regulated output, featuring wide 2:1 input voltage ranges. The product comes in a compact SIP-8 plastic package with a small footprint occupying only 2.0 cm<sup>2</sup> (0.3 square inch) of board space. An excellent efficiency allows  $-40^{\circ}$  to  $+85^{\circ}\text{C}$  operation temperatures. Further features include remote On/Off control and continuous short circuit protection. The 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 typ. |
|------------|------------------------------|----------|------------------|----------|------------------|-----------------|
|            |                              | Vnom     | I <sub>max</sub> | Vnom     | I <sub>max</sub> |                 |
| TMR 3-0510 | 4.5 - 9 VDC<br>(5 VDC nom.)  | 3.3 VDC  | 700 mA           |          |                  | 75 %            |
| TMR 3-0511 |                              | 5 VDC    | 600 mA           |          |                  | 79 %            |
| TMR 3-0512 |                              | 12 VDC   | 250 mA           |          |                  | 81 %            |
| TMR 3-0513 |                              | 15 VDC   | 200 mA           |          |                  | 82 %            |
| TMR 3-0521 |                              | +5 VDC   | 300 mA           | -5 VDC   | 300 mA           | 78 %            |
| TMR 3-0522 |                              | +12 VDC  | 125 mA           | -12 VDC  | 125 mA           | 81 %            |
| TMR 3-0523 |                              | +15 VDC  | 100 mA           | -15 VDC  | 100 mA           | 81 %            |
| TMR 3-1210 | 9 - 18 VDC<br>(12 VDC nom.)  | 3.3 VDC  | 700 mA           |          |                  | 77 %            |
| TMR 3-1211 |                              | 5 VDC    | 600 mA           |          |                  | 81 %            |
| TMR 3-1212 |                              | 12 VDC   | 250 mA           |          |                  | 83 %            |
| TMR 3-1213 |                              | 15 VDC   | 200 mA           |          |                  | 83 %            |
| TMR 3-1221 |                              | +5 VDC   | 300 mA           | -5 VDC   | 300 mA           | 82 %            |
| TMR 3-1222 |                              | +12 VDC  | 125 mA           | -12 VDC  | 125 mA           | 83 %            |
| TMR 3-1223 |                              | +15 VDC  | 100 mA           | -15 VDC  | 100 mA           | 83 %            |
| TMR 3-2410 | 18 - 36 VDC<br>(24 VDC nom.) | 3.3 VDC  | 700 mA           |          |                  | 76 %            |
| TMR 3-2411 |                              | 5 VDC    | 600 mA           |          |                  | 82 %            |
| TMR 3-2412 |                              | 12 VDC   | 250 mA           |          |                  | 83 %            |
| TMR 3-2413 |                              | 15 VDC   | 200 mA           |          |                  | 84 %            |
| TMR 3-2421 |                              | +5 VDC   | 300 mA           | -5 VDC   | 300 mA           | 80 %            |
| TMR 3-2422 |                              | +12 VDC  | 125 mA           | -12 VDC  | 125 mA           | 83 %            |
| TMR 3-2423 |                              | +15 VDC  | 100 mA           | -15 VDC  | 100 mA           | 85 %            |
| TMR 3-4810 | 36 - 75 VDC<br>(48 VDC nom.) | 3.3 VDC  | 700 mA           |          |                  | 74 %            |
| TMR 3-4811 |                              | 5 VDC    | 600 mA           |          |                  | 79 %            |
| TMR 3-4812 |                              | 12 VDC   | 250 mA           |          |                  | 81 %            |
| TMR 3-4813 |                              | 15 VDC   | 200 mA           |          |                  | 82 %            |
| TMR 3-4821 |                              | +5 VDC   | 300 mA           | -5 VDC   | 300 mA           | 79 %            |
| TMR 3-4822 |                              | +12 VDC  | 125 mA           | -12 VDC  | 125 mA           | 82 %            |
| TMR 3-4823 |                              | +15 VDC  | 100 mA           | -15 VDC  | 100 mA           | 83 %            |

## Input Specifications

|                        |                |                                                                                                                                                                                                                                        |
|------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Current          | - At no load   | 5 Vin models: 45 mA typ.<br>12 Vin models: 25 mA typ.<br>24 Vin models: 16 mA typ.<br>48 Vin models: 10 mA typ.                                                                                                                        |
|                        | - At full load | 5 Vin models: 810 mA max.<br>12 Vin models: 330 mA max.<br>24 Vin models: 160 mA max.<br>48 Vin models: 85 mA max.                                                                                                                     |
| Surge Voltage          |                | 5 Vin models: 15 VDC max. (100 ms max.)<br>12 Vin models: 36 VDC max. (100 ms max.)<br>24 Vin models: 50 VDC max. (100 ms max.)<br>48 Vin models: 100 VDC max. (100 ms max.)                                                           |
| Recommended Input Fuse |                | 5 Vin models: 2'000 mA (slow blow)<br>12 Vin models: 1'600 mA (slow blow)<br>24 Vin models: 1'000 mA (slow blow)<br>48 Vin models: 1'000 mA (slow blow)<br>(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.<br>dual output models: 0.2% max.                                                                |
|                          | - Load Variation (5 - 100%)                | single output models: 0.5% max.<br>dual output models: 1% max. (Output 1)<br>1% max. (Output 2)                                 |
|                          | - Cross Regulation (25% / 100% asym. load) | dual output models: 5% max.                                                                                                     |
|                          |                                            |                                                                                                                                 |
| Ripple and Noise         | - 20 MHz Bandwidth                         | 50 mVp-p max.                                                                                                                   |
| Capacitive Load          | - single output                            | 3.3 Vout models: 3'300 µF max.<br>5 Vout models: 1'680 µF max.<br>12 Vout models: 820 µF max.<br>15 Vout models: 680 µF max.    |
|                          |                                            | 5 / -5 Vout models: 1'000 / 1'000 µF max.<br>12 / -12 Vout models: 470 / 470 µF max.<br>15 / -15 Vout models: 330 / 330 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                            | 500 µs typ. (25% Load Step)                                                                                                     |

## Safety Specifications

|                  |                             |                                                                                        |
|------------------|-----------------------------|----------------------------------------------------------------------------------------|
| Safety Standards | - IT / Multimedia Equipment | EN 60950-1<br>IEC 60950-1<br>UL 60950-1                                                |
|                  | - Certification Documents   | <a href="http://www.tracopower.com/overview/tmr3">www.tracopower.com/overview/tmr3</a> |

## EMC Specifications

|                           |                       |                                                                                        |
|---------------------------|-----------------------|----------------------------------------------------------------------------------------|
| EMI Emissions             | - Conducted Emissions | EN 55032 class A (with external filter)<br>EN 55032 class B (with external filter)     |
|                           | - Radiated Emissions  | EN 55032 class A (with external filter)<br>EN 55032 class B (with external filter)     |
| External filter proposal: |                       | <a href="http://www.tracopower.com/overview/tmr3">www.tracopower.com/overview/tmr3</a> |

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, $\pm 8$ kV, perf. criteria A      |
|              | - RF Electromagnetic Field  | Contact:              | EN 61000-4-2, $\pm 6$ kV, perf. criteria A      |
|              | - EFT (Burst) / Surge       |                       | EN 61000-4-3, 10 V/m, perf. criteria A          |
|              |                             |                       | EN 61000-4-4, $\pm 2$ kV, perf. criteria A      |
|              |                             |                       | EN 61000-4-5, $\pm 1$ kV, perf. criteria A      |
|              | - Conducted RF Disturbances | Ext. input component: | Nippon chemi-con KY series, 220 $\mu$ F / 100 V |
|              | - PF Magnetic Field         | Continuous:           | EN 61000-4-6, 10 Vrms, perf. criteria A         |
|              |                             |                       | EN 61000-4-8, 100 A/m, perf. criteria A         |

## General Specifications

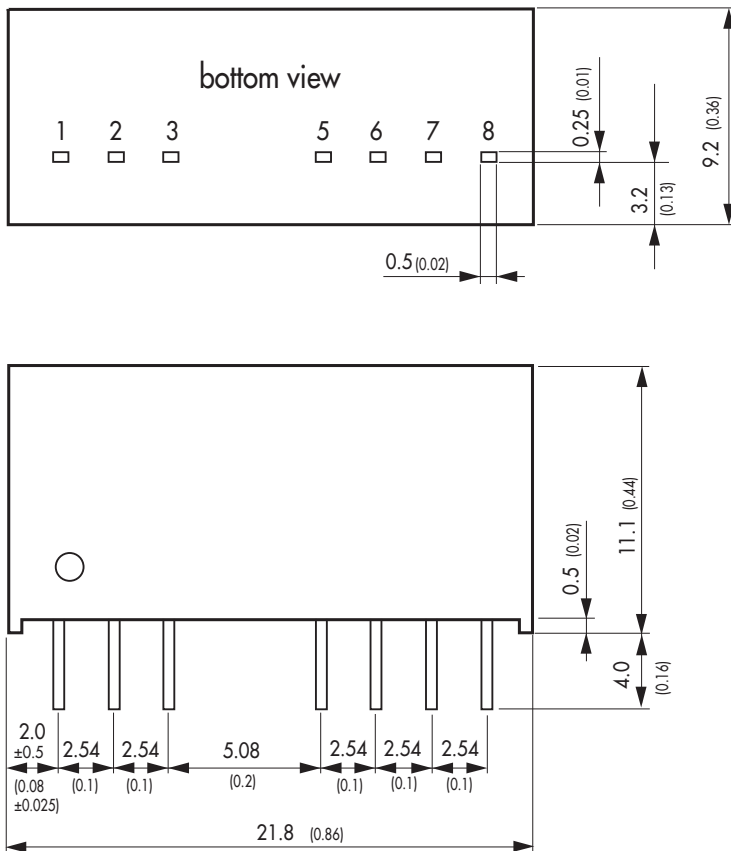
|                          |                                 |                                                                                                                  |
|--------------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------|
| Relative Humidity        |                                 | 95% max. (non condensing)                                                                                        |
| Temperature Ranges       | - Operating Temperature         | -40°C to +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           |                                 | Natural convection (20 LFM)                                                                                      |
| Remote Control           | - Current Controlled Remote     | On: open circuit                                                                                                 |
|                          |                                 | Off: 2 to 4 mA current (internal 1 k $\Omega$ resistor)                                                          |
|                          | External circuit proposal:      | <a href="http://www.tracopower.com/info/current-remote.pdf">www.tracopower.com/info/current-remote.pdf</a>       |
|                          | - Off Idle Input Current        | 2.5 mA 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 M $\Omega$ min.                                                                                            |
| Isolation Capacitance    | - Input to Output, 100 kHz, 1 V | 200 pF max.                                                                                                      |
| Reliability              | - Calculated MTBF               | 4'870'000 h (MIL-HDBK-217F, ground benign)                                                                       |
| Environment              | - Vibration                     | MIL-STD-810F                                                                                                     |
|                          | - Thermal Shock                 | MIL-STD-810F                                                                                                     |
| Housing Material         |                                 | Non-conductive Plastic (UL94 V-0 rated)                                                                          |
| Potting Material         |                                 | Silicone (UL 94 V-0 rated)                                                                                       |
| Pin Material             |                                 | Copper                                                                                                           |
| Pin Foundation Plating   |                                 | Nickel (2 - 3 $\mu$ m)                                                                                           |
| Pin Surface Plating      |                                 | Tin (3 - 5 $\mu$ m), matte                                                                                       |
| Connection Type          |                                 | THD (Through-Hole Device)                                                                                        |
| Weight                   |                                 | 4.8 g                                                                                                            |
| Environmental Compliance | - Reach                         | <a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a> |
|                          | - RoHS                          | <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a>   |

## Supporting Documents

|                                          |                                                                                        |
|------------------------------------------|----------------------------------------------------------------------------------------|
| Overview Link (for additional Documents) | <a href="http://www.tracopower.com/overview/tmr3">www.tracopower.com/overview/tmr3</a> |
|------------------------------------------|----------------------------------------------------------------------------------------|

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## Outline Dimensions



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

## 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

# Mouser Electronics

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