



**THE DATASHEET OF  
TMR 3-4811E**



- Wide 2:1 input voltage range
- Compact SIP-8 package
- Cost optimized design
- Temperature range  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- I/O isolation 1500 VDC
- Remote On/Off control
- 3-year product warranty



The TMR 3E series is a 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 small footprint occupying only 2.0 cm<sup>2</sup> (0.3 square inch) of board space. An excellent efficiency allows  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  operation temperature. Further features include remote On/Off control and continuous short circuit protection. The compact dimensions and cost optimized design make this converters an ideal solution for 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 3-0510E | 4.5 - 9 VDC<br>(5 VDC nom.)  | 3.3 VDC  | 700 mA           |          |                  | 71 %            |
| TMR 3-0511E |                              | 5 VDC    | 600 mA           |          |                  | 73 %            |
| TMR 3-0512E |                              | 12 VDC   | 250 mA           |          |                  | 79 %            |
| TMR 3-0513E |                              | 15 VDC   | 200 mA           |          |                  | 79 %            |
| TMR 3-0521E |                              | +5 VDC   | 300 mA           | -5 VDC   | 300 mA           | 74 %            |
| TMR 3-0522E |                              | +12 VDC  | 125 mA           | -12 VDC  | 125 mA           | 79 %            |
| TMR 3-0523E |                              | +15 VDC  | 100 mA           | -15 VDC  | 100 mA           | 79 %            |
| TMR 3-1210E | 9 - 18 VDC<br>(12 VDC nom.)  | 3.3 VDC  | 700 mA           |          |                  | 75 %            |
| TMR 3-1211E |                              | 5 VDC    | 600 mA           |          |                  | 78 %            |
| TMR 3-1212E |                              | 12 VDC   | 250 mA           |          |                  | 83 %            |
| TMR 3-1213E |                              | 15 VDC   | 200 mA           |          |                  | 83 %            |
| TMR 3-1221E |                              | +5 VDC   | 300 mA           | -5 VDC   | 300 mA           | 79 %            |
| TMR 3-1222E |                              | +12 VDC  | 125 mA           | -12 VDC  | 125 mA           | 83 %            |
| TMR 3-1223E |                              | +15 VDC  | 100 mA           | -15 VDC  | 100 mA           | 83 %            |
| TMR 3-2410E | 18 - 36 VDC<br>(24 VDC nom.) | 3.3 VDC  | 700 mA           |          |                  | 75 %            |
| TMR 3-2411E |                              | 5 VDC    | 600 mA           |          |                  | 78 %            |
| TMR 3-2412E |                              | 12 VDC   | 250 mA           |          |                  | 83 %            |
| TMR 3-2413E |                              | 15 VDC   | 200 mA           |          |                  | 83 %            |
| TMR 3-2421E |                              | +5 VDC   | 300 mA           | -5 VDC   | 300 mA           | 80 %            |
| TMR 3-2422E |                              | +12 VDC  | 125 mA           | -12 VDC  | 125 mA           | 83 %            |
| TMR 3-2423E |                              | +15 VDC  | 100 mA           | -15 VDC  | 100 mA           | 83 %            |
| TMR 3-4810E | 36 - 75 VDC<br>(48 VDC nom.) | 3.3 VDC  | 700 mA           |          |                  | 75 %            |
| TMR 3-4811E |                              | 5 VDC    | 600 mA           |          |                  | 78 %            |
| TMR 3-4812E |                              | 12 VDC   | 250 mA           |          |                  | 83 %            |
| TMR 3-4813E |                              | 15 VDC   | 200 mA           |          |                  | 83 %            |
| TMR 3-4821E |                              | +5 VDC   | 300 mA           | -5 VDC   | 300 mA           | 80 %            |
| TMR 3-4822E |                              | +12 VDC  | 125 mA           | -12 VDC  | 125 mA           | 83 %            |
| TMR 3-4823E |                              | +15 VDC  | 100 mA           | -15 VDC  | 100 mA           | 83 %            |

## Input Specifications

|                        |                |  |
|------------------------|----------------|--|
| Input Current          | - At no load   | 5 Vin models: <b>70 mA typ.</b><br>12 Vin models: <b>20 mA typ.</b><br>24 Vin models: <b>10 mA typ.</b><br>48 Vin models: <b>8 mA typ.</b>   |
|                        | - At full load | 5 Vin models: <b>760 mA typ.</b><br>12 Vin models: <b>300 mA typ.</b><br>24 Vin models: <b>150 mA typ.</b><br>48 Vin models: <b>75 mA typ.</b>   |
| Surge Voltage          |                | 5 Vin models: <b>11 VDC max.</b> (1 s max.)<br>12 Vin models: <b>25 VDC max.</b> (1 s max.)<br>24 Vin models: <b>50 VDC max.</b> (1 s max.)<br>48 Vin models: <b>100 VDC max.</b> (1 s max.)   |
| Under Voltage Lockout  |                | 5 Vin models: <b>3.5 VDC typ. / 4 VDC max.</b><br>12 Vin models: <b>6.5 VDC typ. / 8.5 VDC max.</b><br>24 Vin models: <b>11 VDC typ. / 17 VDC max.</b><br>48 Vin models: <b>22 VDC typ. / 34 VDC max.</b><br>(Long term operation at undervoltage will damage the converter) |
| Recommended Input Fuse |                | 5 Vin models: <b>2'000 mA</b> (slow blow)<br>12 Vin models: <b>1'000 mA</b> (slow blow)<br>24 Vin models: <b>500 mA</b> (slow blow)<br>48 Vin models: <b>250 mA</b> (slow blow)<br>(The need of an external fuse has to be assessed in the final application.)               |
| Input Filter           |                | <b>Internal Capacitor</b>  |

## Output Specifications

|                           |                                      |  |
|---------------------------|--------------------------------------|--|
| Voltage Set Accuracy      |                                      | <b>±1% max.</b>  |
| Regulation                | - Input Variation (Vmin - Vmax)      | single output models: <b>0.5% max.</b><br>dual output models: <b>0.5% max.</b>   |
|                           | - Load Variation (25 - 100%)         | single output models: <b>1% max.</b><br>dual output models: <b>1% max.</b> (Output 1)<br><b>1% max.</b> (Output 2)                                       |
|                           | - Voltage Balance (symmetrical load) | dual output models: <b>2% max.</b>   |
| Ripple and Noise          | - 20 MHz Bandwidth                   | <b>75 mVp-p max.</b><br><b>50 mVp-p typ.</b>   |
| Capacitive Load           | - single output                      | 3.3 Vout models: <b>1'760 µF max.</b><br>5 Vout models: <b>1'000 µF max.</b><br>12 Vout models: <b>170 µF max.</b><br>15 Vout models: <b>110 µF max.</b> |
|                           | - dual output                        | 5 / -5 Vout models: <b>470 / 470 µF max.</b><br>12 / -12 Vout models: <b>100 / 100 µF max.</b><br>15 / -15 Vout models: <b>47 / 47 µF max.</b>           |
| Minimum Load              |                                      | <b>25 % of Iout max.</b><br>(Operation at lower load will not damage the converter, but it may not meet all specifications)                              |
| Temperature Coefficient   |                                      | <b>±0.02 %/K max.</b>  |
| Short Circuit Protection  |                                      | <b>Continuous, Automatic recovery</b>  |
| Overload Protection       |                                      | <b>Foldback Mode</b>   |
| Output Current Limitation |                                      | <b>110% min. of Iout max.</b><br><b>140% typ. of Iout max.</b>   |
| Transient Response        | - Response Deviation                 | <b>5% max.</b> (25% Load Step)   |
|                           | - Response Time                      | <b>300 µs typ.</b> (25% Load Step)   |

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

### Safety Specifications

|           |                             |  |
|-----------|-----------------------------|--|
| Standards | - IT / Multimedia Equipment | EN 60950-1<br>EN 62368-1<br>IEC 60950-1<br>IEC 62368-1<br>UL 60950-1<br>UL 62368-1       |
|           | - Certification Documents   | <a href="http://www.tracopower.com/overview/tmr3e">www.tracopower.com/overview/tmr3e</a> |

### EMC Specifications

|               |                           |  |
|---------------|---------------------------|--|
| EMI Emissions | - Conducted 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/tmr3e">www.tracopower.com/overview/tmr3e</a> |

### General Specifications

|                           |  |   |
|---------------------------|--|---|
| Relative Humidity         |  | 95% max. (non condensing)   |
| Temperature Ranges        | - Operating Temperature<br>- Case Temperature<br>- Storage Temperature                                   | -40°C to +85°C<br>+105°C max.<br>-55°C to +125°C  |
| Power Derating            | - High Temperature   | 3.3 %/K above 70°C  |
|                           | See application note:  | <a href="http://www.tracopower.com/overview/tmr3e">www.tracopower.com/overview/tmr3e</a>  |
| Cooling System            |  | Natural convection (20 LFM)   |
| Remote Control            | - Voltage Controlled Remote (passive = on)<br><br>- Off Idle Input Current<br>- Remote Pin Input Current | On: < 0.6 VDC or open circuit<br>Off: 2.7 to 15 VDC<br>Refers to 'Remote' and '-Vin' Pin<br>2.5 mA max.<br>-1.0 to 1.0 mA         |
| Altitude During Operation |  | 5'000 m max.  |
| Switching Frequency       |  | 300 kHz typ. (PFM)  |
| Insulation System         |  | Functional Insulation   |
| Isolation Test Voltage    | - Input to Output, 60 s<br>- Input to Output, 1 s  | 1'600 VDC<br>1'920 VDC  |
| Isolation Resistance      | - Input to Output, 500 VDC   | 1'000 MΩ min.   |
| Isolation Capacitance     | - Input to Output, 100 kHz, 1 V  | 200 pF max.   |
| Reliability               | - Calculated MTBF  | 1'200'000 h (MIL-HDBK-217F, ground benign)  |
| Washing Process           |  | According to Cleaning Guideline<br><a href="http://www.tracopower.com/info/cleaning.pdf">www.tracopower.com/info/cleaning.pdf</a> |
| Housing Material          |  | Non-conductive Plastic (UL 94 V-0 rated)  |
| Potting Material          |  | Epoxy (UL 94 V-0 rated)   |
| Pin Material              |  | Nickel-Iron (Alloy 42)  |
| Pin Foundation Plating    |  | Nickel (1 μm min.)  |
| 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  |
| Soldering Profile         |  | Lead-Free Wave Soldering<br>260°C / 10 s max.   |
| 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](http://www.tracopower.com/info/reach-declaration.pdf)

- RoHS Declaration

REACH SVHC list compliant

REACH Annex XVII compliant

[www.tracopower.com/info/rohs-declaration.pdf](http://www.tracopower.com/info/rohs-declaration.pdf)

Exemptions: 7a

(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule))

- SCIP Reference Number

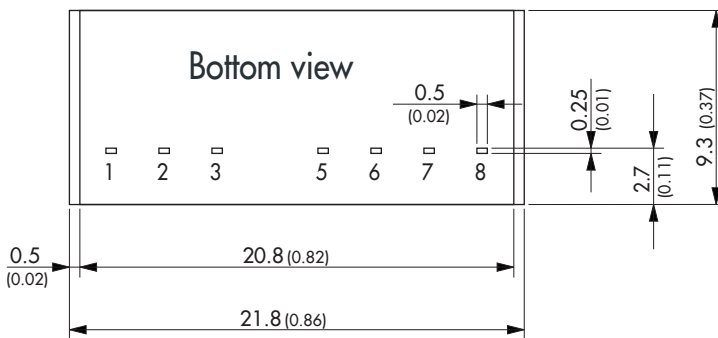
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### Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tmr3e](http://www.tracopower.com/overview/tmr3e)

### 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: x.x ±0.5 (±0.02)  
 x.xx ±0.25 (±0.01)  
 Pin dimension tolerance ±0.1 (±0.004)

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