



**THE DATASHEET OF
TMR 3-1223E**



- Wide 2:1 input voltage range
- Compact SIP-8 package
- Cost optimized design
- Temperature range -40°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 cm² (0.3 square inch) of board space. An excellent efficiency allows -40°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 _{max} | Vnom | I _{max} | |
| TMR 3-0510E | 4.5 - 9 VDC (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 (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 (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 (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: 70 mA typ. 12 Vin models: 20 mA typ. 24 Vin models: 10 mA typ. 48 Vin models: 8 mA typ. |
| | - At full load | 5 Vin models: 760 mA typ. 12 Vin models: 300 mA typ. 24 Vin models: 150 mA typ. 48 Vin models: 75 mA typ. |
| Surge Voltage | | 5 Vin models: 11 VDC max. (1 s max.) 12 Vin models: 25 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: 3.5 VDC typ. / 4 VDC max. 12 Vin models: 6.5 VDC typ. / 8.5 VDC max. 24 Vin models: 11 VDC typ. / 17 VDC max. 48 Vin models: 22 VDC typ. / 34 VDC max. (Long term operation at undervoltage will damage the converter) |
| Recommended Input Fuse | | 5 Vin models: 2'000 mA (slow blow) 12 Vin models: 1'000 mA (slow blow) 24 Vin models: 500 mA (slow blow) 48 Vin models: 250 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: 0.5% max. dual output models: 0.5% max. |
| | - Load Variation (25 - 100%) | single output models: 1% max. dual output models: 1% max. (Output 1) 1% max. (Output 2) |
| | - Voltage Balance (symmetrical load) | dual output models: 2% max. |
| Ripple and Noise | - 20 MHz Bandwidth | 75 mVp-p max. 50 mVp-p typ. |
| Capacitive Load | - single output | 3.3 Vout models: 1'760 µF max. 5 Vout models: 1'000 µF max. 12 Vout models: 170 µF max. 15 Vout models: 110 µF max. |
| | - dual output | 5 / -5 Vout models: 470 / 470 µF max. 12 / -12 Vout models: 100 / 100 µF max. 15 / -15 Vout models: 47 / 47 µF max. |
| Minimum Load | | 25 % of Iout max. (Operation at lower load will not damage the converter, but it may not meet all specifications) |
| Temperature Coefficient | | ±0.02 %/K max. |
| Short Circuit Protection | | Continuous, Automatic recovery |
| Overload Protection | | Foldback Mode |
| Output Current Limitation | | 110% min. of Iout max. 140% typ. of Iout max. |
| Transient Response | - Response Deviation | 5% max. (25% Load Step) |
| | - Response Time | 300 µs typ. (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 EN 62368-1 IEC 60950-1 IEC 62368-1 UL 60950-1 UL 62368-1 |
| | - Certification Documents | www.tracopower.com/overview/tmr3e |

EMC Specifications

| | | |
|---------------|---------------------------|------------------------------------------------------------------------------------------|
| EMI Emissions | - Conducted Emissions | EN 55032 class A (with external filter) EN 55032 class B (with external filter) |
| | External filter proposal: | www.tracopower.com/overview/tmr3e |



General Specifications

| | | |
|---------------------------|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Relative Humidity | | 95% max. (non condensing) |
| Temperature Ranges | - Operating Temperature - Case Temperature - Storage Temperature | -40°C to +85°C +105°C max. -55°C to +125°C |
| Power Derating | - High Temperature | 3.3 %/K above 70°C |
| | See application note: | www.tracopower.com/overview/tmr3e |
| Cooling System | | Natural convection (20 LFM) |
| Remote Control | - Voltage Controlled Remote (passive = on) - Off Idle Input Current - Remote Pin Input Current | On: < 0.6 VDC or open circuit Off: 2.7 to 15 VDC Refers to 'Remote' and '-Vin' Pin 2.5 mA max. -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 - Input to Output, 1 s | 1'600 VDC 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 www.tracopower.com/info/cleaning.pdf |
| 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 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.

Looking for pricing, stock, or lifecycle information?

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