

- 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 (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: <b>70 mA typ.</b> 12 Vin models: <b>20 mA typ.</b> 24 Vin models: <b>10 mA typ.</b> 48 Vin models: <b>8 mA typ.</b>
	- At full load	5 Vin models: <b>760 mA typ.</b> 12 Vin models: <b>300 mA typ.</b> 24 Vin models: <b>150 mA typ.</b> 48 Vin models: <b>75 mA typ.</b>
Surge Voltage		5 Vin models: <b>11 VDC max.</b> (1 s max.) 12 Vin models: <b>25 VDC max.</b> (1 s max.) 24 Vin models: <b>50 VDC max.</b> (1 s max.) 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> 12 Vin models: <b>6.5 VDC typ. / 8.5 VDC max.</b> 24 Vin models: <b>11 VDC typ. / 17 VDC max.</b> 48 Vin models: <b>22 VDC typ. / 34 VDC max.</b> (Long term operation at undervoltage will damage the converter)
Recommended Input Fuse		5 Vin models: <b>2'000 mA</b> (slow blow) 12 Vin models: <b>1'000 mA</b> (slow blow) 24 Vin models: <b>500 mA</b> (slow blow) 48 Vin models: <b>250 mA</b> (slow blow) (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> dual output models: <b>0.5% max.</b>
	- Load Variation (25 - 100%)	single output models: <b>1% max.</b> dual output models: <b>1% max.</b> (Output 1) <b>1% max.</b> (Output 2)
	- Voltage Balance (symmetrical load)	dual output models: <b>2% max.</b>
Ripple and Noise	- 20 MHz Bandwidth	<b>50 mVp-p typ.</b> <b>75 mVp-p max.</b>
Capacitive Load	- single output	3.3 Vout models: <b>1'760 µF max.</b> 5 Vout models: <b>1'000 µF max.</b> 12 Vout models: <b>170 µF max.</b> 15 Vout models: <b>110 µF max.</b>
	- dual output	5 / -5 Vout models: <b>470 / 470 µF max.</b> 12 / -12 Vout models: <b>100 / 100 µF max.</b> 15 / -15 Vout models: <b>47 / 47 µF max.</b>
Minimum Load		<b>25 % of Iout max.</b> (Operation at lower load will not damage the converter, but it may not meet all specifications listed)
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>
		<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, full load and +25°C after warm-up time unless otherwise stated.

## 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	<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) 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

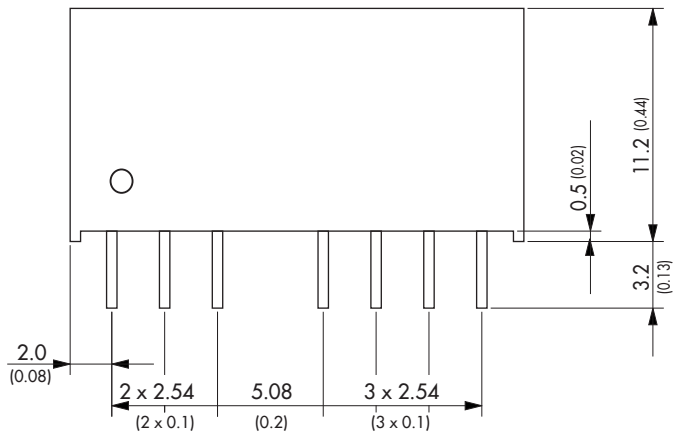
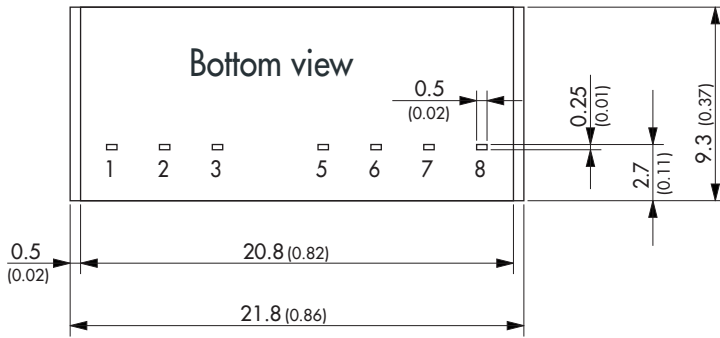
Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature - Case Temperature - Storage Temperature	-40°C to +85°C +105°C max. -55°C to +125°C
Power Derating	- High Temperature	3.3 %/K above 70°C
Cooling System		Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote  - 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	1'000'000 h (MIL-HDBK-217F, ground benign)
Housing Material		Non-conductive Plastic (UL94 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
Soldering Profile		Wave Soldering 260°C / 10 s max.
Connection Type		THD (Through-Hole Device)
Weight		4.8 g
Environmental Compliance	- REACH Declaration  - RoHS Declaration	<a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a> REACH SVHC list compliant REACH Annex XVII compliant <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a> Exemptions: 7a (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule). The SCIP number is provided on request.)

## Supporting Documents

Overview Link (for additional Documents)	<a href="http://www.tracopower.com/overview/tmr3e">www.tracopower.com/overview/tmr3e</a>
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All specifications valid at nominal voltage, full load and +25°C after warm-up time unless otherwise stated.

**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	NTC	NTC
6	+Vout	+Vout
7	-Vout	Common
8	NTC	-Vout

NTC: Not to connect to electrical circuit

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