TRACO POWER

DC/DC Converter

TMR 3E Series, 3 Watt

- **Wide 2:1 input voltage range**
- **Compact SIP-8 package**
- **Cost optimized design**
- **Temperature range –40°C to +85°C**
- **I/O isolation 1500 VDC**
- **Remote On/Off control**
- **3-year product warranty**

IEC 60950-1

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°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
		Vnom	Imax	Vnom	Imax	typ.
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:	2000 mA (slow blow)
		12 Vin models:	1000 mA (slow blow)
		24 Vin models:	500 mA (slow blow)
		48 Vin models:	250 mA (slow blow)
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)
	- Cross Regulation (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 listed)
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 input voltage, full load and +25°C after warm-up time unless otherwise stated.

Safety Specifications

Safety Standards	- IT / Multimedia Equipment	IEC 60950-1 EN 60950-1 UL 60950-1
	- Certification Documents	www.tracopower.com/overview/tmr3e

EMC Specifications

EMC 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

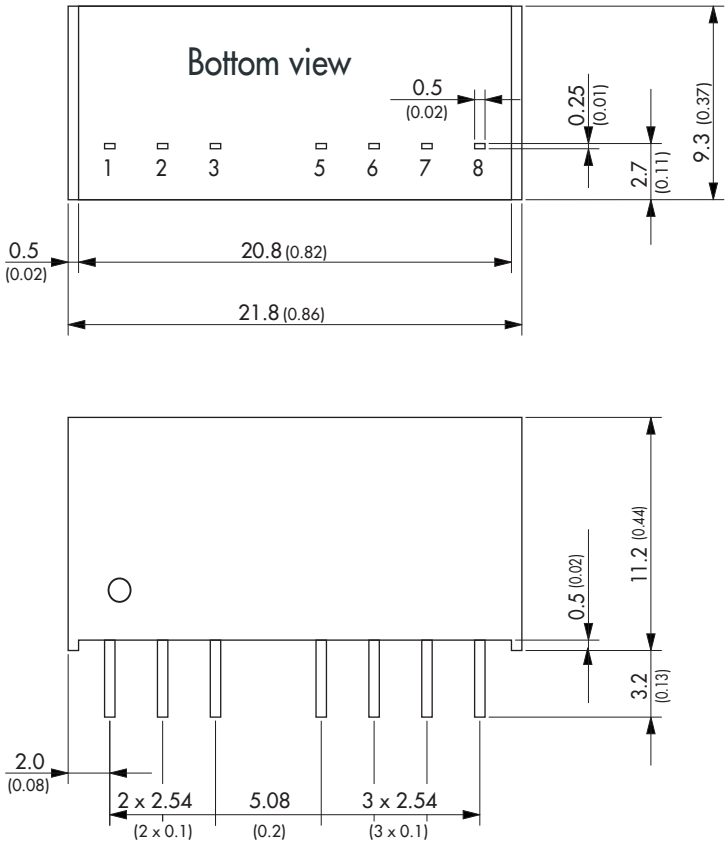
Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	–40°C to +85°C
	- Case Temperature	+105°C max.
	- Storage Temperature	–55°C to +125°C
Power Derating	- High Temperature	3.3 %/K above 70°C
Cooling System		Natural convection (20 LFM)
Altitude During Operation		5'000 m max.
Switching Frequency		300 kHz typ. (PFM)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s	1'600 VDC
	- Input to Output, 1 s	1'920 VDC
Isolation Resistance	- Input to Output, 500 VDC	1'000 MOhm 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 (UL94 V-0 rated)
Pin Material		Nickel-Iron (Alloy 42)
Soldering Profile		Wave Soldering (1.5mm from casing) 260°C / 10 s
Connection Type		THD (Through-Hole Device)
Weight		4.8 g
Remote Control	- Voltage Controlled Remote	On: < 0.6 VDC or open circuit Off: 2.7 to 15 VDC Refers to 'Remote' and '-Vin' Pin
	- Off Idle Input Current	2.5 mA max.
	- Remote Pin Input Current	-1.0 to 1.0 mA
Environmental Compliance	- Reach	www.tracopower.com/info/reach-declaration.pdf
	- RoHS	www.tracopower.com/info/rohs-declaration.pdf

Supporting Documents

Overview Link (for additional Documents)	www.tracopower.com/overview/tmr3e

All specifications valid at nominal input 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