TRACO POWER

DC/DC Converter

TMR 3 Series, 3 Watt

- **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° to +85°C**
- **High efficiency up to 85%**
- **Short-circuit protection**
- **Remote On/Off control**
- **3-year product warranty**



UL 62368-1 IEC 62368-1

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 cm² (0.3 square inch) of board space. An excellent efficiency allows –40° to +85°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
		Vnom	Imax	Vnom	Imax	typ.
TMR 3-0510	4.5 - 9 VDC (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 (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 (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 (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.** (3.3 Vout model)
			45 mA typ. (5 Vout model)
			55 mA typ. (12 Vout model)
			55 mA typ. (15 Vout model)
			55 mA typ. (5 / -5 Vout model)
			60 mA typ. (12 / -12 Vout model)
			60 mA typ. (15 / -15 Vout model)
		12 Vin models:	**25 mA typ.** (3.3 Vout model)
			25 mA typ. (5 Vout model)
			30 mA typ. (12 Vout model)
			30 mA typ. (15 Vout model)
			30 mA typ. (5 / -5 Vout model)
			30 mA typ. (12 / -12 Vout model)
			30 mA typ. (15 / -15 Vout model)
		24 Vin models:	**16 mA typ.** (3.3 Vout model)
			16 mA typ. (5 Vout model)
			18 mA typ. (12 Vout model)
			18 mA typ. (15 Vout model)
			17 mA typ. (5 / -5 Vout model)
			18 mA typ. (12 / -12 Vout model)
			18 mA typ. (15 / -15 Vout model)
		48 Vin models:	**10 mA typ.** (3.3 Vout model)
			10 mA typ. (5 Vout model)
			12 mA typ. (12 Vout model)
			12 mA typ. (15 Vout model)
			12 mA typ. (5 / -5 Vout model)
			12 mA typ. (12 / -12 Vout model)
			12 mA typ. (15 / -15 Vout model)
	- At full load	5 Vin models:	**810 mA max.**
		12 Vin models:	**330 mA max.**
		24 Vin models:	**160 mA max.**
		48 Vin models:	**85 mA max.**
Surge Voltage		5 Vin models:	**15 VDC max.** (100 ms max.)
		12 Vin models:	**36 VDC max.** (100 ms max.)
		24 Vin models:	**50 VDC max.** (100 ms max.)
		48 Vin models:	**100 VDC max.** (100 ms max.)
Recommended Input Fuse		5 Vin models:	**2'000 mA** (slow blow)
		12 Vin models:	**1'600 mA** (slow blow)
		24 Vin models:	**1'000 mA** (slow blow)
		48 Vin models:	**1'000 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:	**0.2% max.**
		dual output models:	**0.2% max.**
	- Load Variation (5 - 100%)	single output models:	**0.5% max.**
		dual output models:	**1% max.** (Output 1)
			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.

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

Capacitive Load	- single output	3.3 Vout models:	3'300 µF max.
		5 Vout models:	1'680 µF max.
		12 Vout models:	820 µF max.
		15 Vout models:	680 µF max.
	- dual output	5 / -5 Vout models:	1'000 / 1'000 µF max.
		12 / -12 Vout models:	470 / 470 µF max.
		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

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/tmr3-safety-cert
Energy Source	- Output, acc. to 62368-1		ES1
Power Source	- Output, acc. to 62368-1		PS3
Over Voltage Category			Not mains connected

EMC Specifications

EMI (Emissions)	- Conducted Emissions		EN 55032 class A (with external filter)
			EN 55032 class B (with external filter)
	- Radiated Emissions		EN 55032 class A (with external filter)
			EN 55032 class B (with external filter)
		External filter proposal:	www.tracopower.com/tmr3-emc-filter
EMS (Immunity)	- Electrostatic Discharge	Air:	EN 61000-4-2, ±8 kV, perf. criteria A
		Contact:	EN 61000-4-2, ±6 kV, perf. criteria A
	- RF Electromagnetic Field		EN 61000-4-3, 10 V/m, perf. criteria A
	- EFT (Burst) / Surge		EN 61000-4-4, ±2 kV, perf. criteria A
			EN 61000-4-5, ±1 kV, perf. criteria A
		Ext. input component:	Nippon chemi-con KY series, 220 µF / 100 V
	- Conducted RF Disturbances		EN 61000-4-6, 10 Vrms, perf. criteria A
	- PF Magnetic Field	Continuous:	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
		See application note:	www.tracopower.com/tmr3-cc
Cooling System			Natural convection (20 LFM)
Remote Control	- Current Controlled Remote (passive = on)		On: open circuit
			Off: 2 to 4 mA current (internal 1 kΩ resistor)
			Refers to 'Remote' and '-Vin' Pin
		External circuit proposal:	www.tracopower.com/info/current-remote.pdf
	- Off Idle Input Current		2.5 mA max.
Altitude During Operation			5'000 m max.
Switching Frequency			100 kHz min. (RCC)
Insulation System			Functional Insulation

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

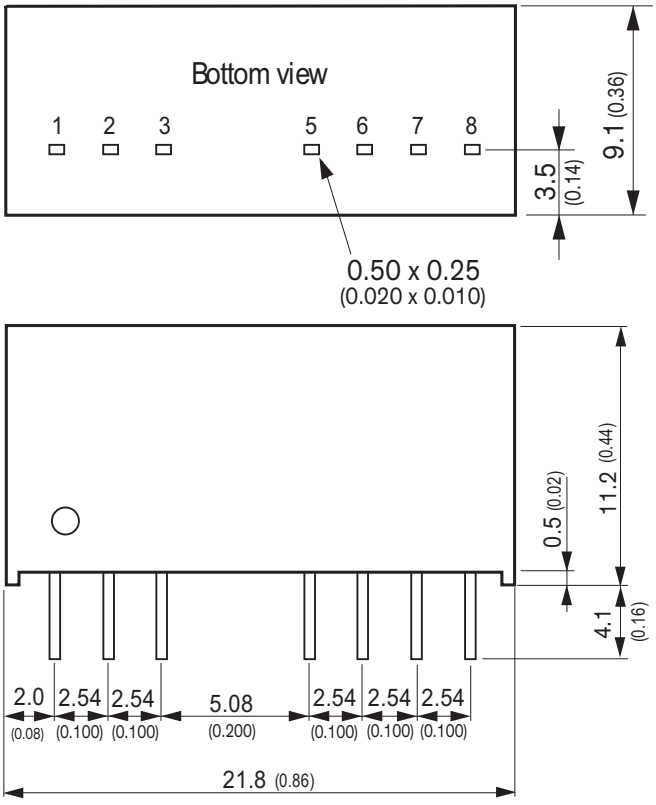
Isolation Test Voltage	- Input to Output, 60 s	1'600 VDC
Isolation Resistance	- Input to Output, 500 VDC	1'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	200 pF max.
Reliability	- Calculated MTBF	4'870'000 h (MIL-HDBK-217F, ground benign)
Washing Process		According to Cleaning Guideline www.tracopower.com/info/cleaning.pdf
Environment	- Vibration	MIL-STD-810F
	- Thermal Shock	MIL-STD-810F
Housing Material		Non-conductive Plastic (UL 94 V-0 rated)
Potting Material		Silicone (UL 94 V-0 rated)
Pin Material		Copper
Pin Foundation Plating		Nickel (2 - 3 µm)
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 / 6 s max.
Weight		4.8 g
Environmental Compliance	- REACH Declaration	www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant
	- RoHS Declaration	www.tracopower.com/info/rohs-declaration.pdf Exemptions: 7(a), 7(c)-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number	fef9586c-d5b5-4a53-a8ca-30f32363e83c

Additional Information

Supporting Documents	www.tracopower.com/overview/tmr3
Frequently Asked Questions	www.tracopower.com/glossary-faq
Glossary	www.tracopower.com/info/glossary.pdf

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Outline Dimensions



Dimensions in mm (inch)
Tolerances: x.x ±0.5 (x.xx ±0.02)
x.xx ±0.25 (x.xxx ±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: Not connected

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