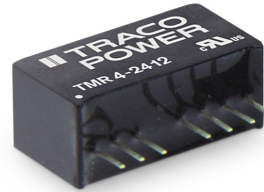


- Compact SIP-8 package
- Wide 2:1 input voltage range
- Temperature range  $-40^{\circ}$  to  $+70^{\circ}\text{C}$  without derating
- High efficiency up to 87%
- I/O isolation 1600 VDC
- Protection against short-circuit and over load
- Fully regulated outputs
- Remote On/Off control
- 3-year product warranty



The TMR 4 is a regulated 4 Watt DC/DC converter series with 2:1 input voltage range. It comes in a compact SIP-8 package featuring single and dual output models, I/O isolation voltage of 1600 VDC and protection against short-circuit and over load. Being a 4 Watt converter this series acts as an excellent gap closer between the more common 3 & 6 Watt converters. It offers a cost-efficient alternative to 5 and 6 Watt converters in applications where a 3 Watt converter would operate at the absolute technical limits (e.g. output power). The intelligent design provides efficiencies up to 87% and a temperature range of  $-40^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$  without derating which enables an unrestricted use of this converter series in applications with demanding temperature requirements. Additionally, the integrated remote On/Off function offers a convenient way to control your application. Certified according to the latest IEC/EN/UL 62368-1 industrial standard the TMR 4 is designed to deliver a high quality, cost efficient and compact solution for many applications.

Models						
Order Code	Input Voltage Range	Output 1		Output 2		Efficiency typ.
		Vnom	I <sub>max</sub>	Vnom	I <sub>max</sub>	
TMR 4-1211	9 - 18 VDC (12 VDC nom.)	5 VDC	800 mA			82 %
TMR 4-1212		12 VDC	333 mA			87 %
TMR 4-1213		15 VDC	266 mA			86 %
TMR 4-1215		24 VDC	166 mA			86 %
TMR 4-1222		+12 VDC	166 mA	-12 VDC	166 mA	85 %
TMR 4-1223		+15 VDC	133 mA	-15 VDC	133 mA	86 %
TMR 4-2411	18 - 36 VDC (24 VDC nom.)	5 VDC	800 mA			81 %
TMR 4-2412		12 VDC	333 mA			86 %
TMR 4-2413		15 VDC	266 mA			86 %
TMR 4-2415		24 VDC	166 mA			86 %
TMR 4-2422		+12 VDC	166 mA	-12 VDC	166 mA	86 %
TMR 4-2423		+15 VDC	133 mA	-15 VDC	133 mA	85 %
TMR 4-4811	36 - 75 VDC (48 VDC nom.)	5 VDC	800 mA			80 %
TMR 4-4812		12 VDC	333 mA			85 %
TMR 4-4813		15 VDC	266 mA			83 %
TMR 4-4815		24 VDC	166 mA			86 %
TMR 4-4822		+12 VDC	166 mA	-12 VDC	166 mA	84 %
TMR 4-4823		+15 VDC	133 mA	-15 VDC	133 mA	85 %

### Input Specifications

Input Current	- At no load	12 Vin models: <b>30 mA typ.</b> 24 Vin models: <b>15 mA typ.</b> 48 Vin models: <b>10 mA typ.</b>
	- At full load	12 Vin models: <b>409 mA typ.</b> 24 Vin models: <b>202 mA typ.</b> 48 Vin models: <b>102 mA typ.</b>
Surge Voltage		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.)
Recommended Input Fuse	(The need of an external fuse has to be assessed in the final application.)	
Input Filter	Internal Capacitor	

### 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 (0 - 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>
	- Cross Regulation (25% / 100% asym. load)	dual output models: <b>5% max.</b>
Ripple and Noise	- 20 MHz Bandwidth	<b>80 mVp-p max.</b>
Capacitive Load	- single output	5 Vout models: <b>1'800 µF max.</b> 12 Vout models: <b>1'000 µF max.</b> 15 Vout models: <b>820 µF max.</b> 24 Vout models: <b>470 µF max.</b>
	- dual output	12 / -12 Vout models: <b>560 / 560 µF max.</b> 15 / -15 Vout models: <b>390 / 390 µF max.</b>
Minimum Load		Not required
Temperature Coefficient		<b>±0.02 %/K max.</b>
Start-up Time		<b>10 ms typ.</b>
Short Circuit Protection		Continuous, Automatic recovery
Overload Protection		Foldback Mode
Output Current Limitation		<b>160% typ. of Iout max.</b>
Transient Response	- Response Deviation	<b>3% typ. / 5% max.</b> (25% Load Step)
	- Response Time	<b>250 µs typ.</b> (25% Load Step)

### Safety Specifications

Safety Standards	- IT / Multimedia Equipment	EN 62368-1 IEC 62368-1 UL 62368-1
	- Certification Documents	<a href="http://www.tracopower.com/overview/tmr4">www.tracopower.com/overview/tmr4</a>

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

## EMC Specifications

EMI Emissions	- Conducted Emissions	EN 55032 class A (with external filter) EN 55032 class B (with external filter) FCC Part 15 class A (with external filter) FCC Part 15 class B (with external filter)
	- Radiated Emissions	EN 55032 class A (with external filter) EN 55032 class B (with external filter) FCC Part 15 class A (with external filter) FCC Part 15 class B (with external filter)
External filter proposal: <a href="http://www.tracopower.com/overview/tmr4">www.tracopower.com/overview/tmr4</a>		
EMS Immunity		EN 55024 (IT Equipment) EN 55035 (Multimedia)
	- Electrostatic Discharge	Air: EN 61000-4-2, $\pm 8$ kV, perf. criteria A Contact: EN 61000-4-2, $\pm 6$ kV, perf. criteria A
	- RF Electromagnetic Field	EN 61000-4-3, 10 V/m, perf. criteria A
	- EFT (Burst) / Surge	EN 61000-4-4, $\pm 2$ kV, perf. criteria A EN 61000-4-5, $\pm 1$ kV, perf. criteria A
	- Conducted RF Disturbances	External filter proposal: <a href="http://www.tracopower.com/overview/tmr4">www.tracopower.com/overview/tmr4</a> EN 61000-4-6, 10 Vrms, perf. criteria A
- PF Magnetic Field	Continuous: EN 61000-4-8, 100 A/m, perf. criteria A 1 s: EN 61000-4-8, 1000 A/m, perf. criteria A	

## General Specifications

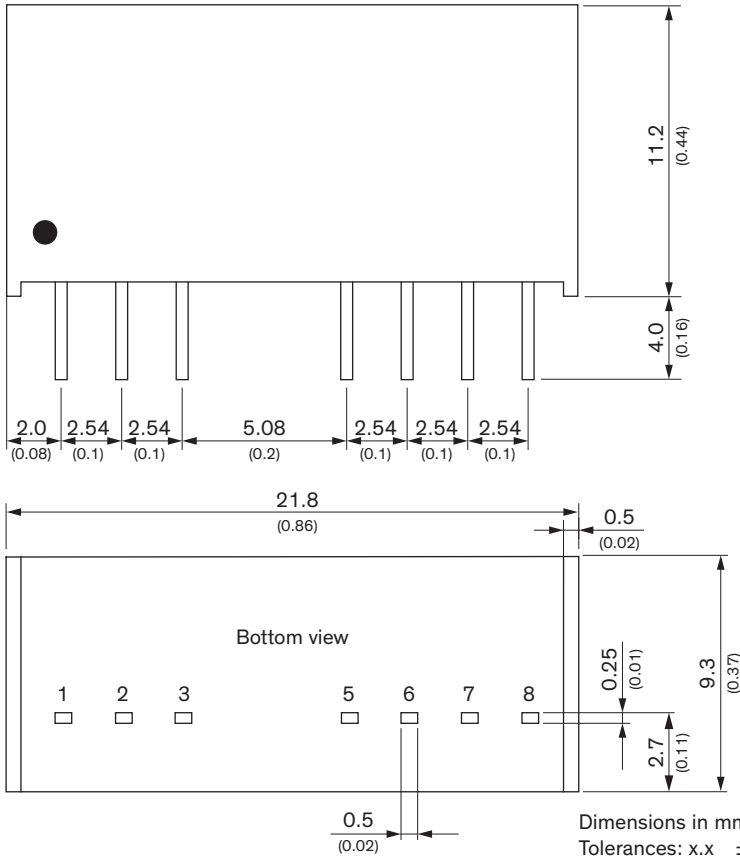
Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-40°C to +85°C
	- Case Temperature	+100°C max.
	- Storage Temperature	-55°C to +125°C
Power Derating	- High Temperature	3.33 %/K above 70°C
Cooling System		Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote	On: < 0.6 VDC or open circuit Off: 6 to 15 VDC
	- Off Idle Input Current	2.5 mA typ.
Altitude During Operation		6'000 m max.
Switching Frequency		100 kHz min. (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 M $\Omega$ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	200 pF typ.
Reliability	- Calculated MTBF	3'390'000 h (MIL-HDBK-217F, ground benign)
Housing Material		Non-conductive Plastic (UL94 V-0 rated)
Pin Material		Phosphor Bronze (C5191)
Pin Foundation Plating		Nickel (1 $\mu$ m min.)
Pin Surface Plating		Tin (3 - 5 $\mu$ m), matte
Connection Type		THD (Through-Hole Device)
Weight		4.8 g
Environmental Compliance	- REACH 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
	- RoHS Declaration	<a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a> Exemptions: 7a

## Supporting Documents

Overview Link (for additional Documents)	<a href="http://www.tracopower.com/overview/tmr4">www.tracopower.com/overview/tmr4</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)  
 Pins: ±0.1 (±0.004)

Pinout		
Pin	Single	Dual
1	-Vin (GND)	-Vin (GND)
2	+Vin (Vcc)	+Vin (Vcc)
3	Remote On/Off	Remote On/Off
5	NC	NC
6	+Vout	+Vout
7	-Vout	Common
8	NC	-Vout

NC: Not connected

# Mouser Electronics

Authorized Distributor

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[TMR 4-2423](#)