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TRACO POWER

DC/DC Converter

TMR 4 Series, 4 Watt

- **Compact SIP-8 package**
- **Wide 2:1 input voltage range**
- **Temperature range –40° to +70°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**



UL 62368-1 IEC 62368-1

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°C to +70°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
		Vnom	Imax	Vnom	Imax	typ.
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 %

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Input Specifications

Input Current	- At no load	12 Vin models:	30 mA typ.
		24 Vin models:	15 mA typ.
		48 Vin models:	10 mA typ.
	- At full load	12 Vin models:	409 mA typ.
		24 Vin models:	202 mA typ.
		48 Vin models:	102 mA typ.
Surge Voltage		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.)
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			±1% max.
Regulation	- Input Variation (Vmin - Vmax)	single output models:	0.5% max.
		dual output models:	0.5% max.
	- Load Variation (0 - 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.
	- Cross Regulation (25% / 100% asym. load)	dual output models:	5% max.
Ripple and Noise	- 20 MHz Bandwidth		80 mVp-p max.
Capacitive Load	- single output	5 Vout models:	1'800 µF max.
		12 Vout models:	1'000 µF max.
		15 Vout models:	820 µF max.
		24 Vout models:	470 µF max.
	- dual output	12 / -12 Vout models:	560 / 560 µF max.
		15 / -15 Vout models:	390 / 390 µF max.
Minimum Load			Not required
Temperature Coefficient			±0.02 %/K max.
Start-up Time			10 ms typ.
Short Circuit Protection			Continuous, Automatic recovery
Overload Protection			Foldback Mode
Output Current Limitation			160% typ. of Iout max.
Transient Response	- Response Deviation		3% typ. / 5% max. (25% Load Step)
	- Response Time		250 µs typ. (25% Load Step)

Safety Specifications

Safety Standards	- IT / Multimedia Equipment	EN 62368-1 IEC 62368-1 UL 62368-1
	- Certification Documents	www.tracopower.com/overview/tmr4
Pollution Degree		PD 3

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

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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:	www.tracopower.com/overview/tmr4
EMS Immunity			EN 55024 (IT Equipment)
			EN 55035 (Multimedia)
	- 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
		External filter proposal:	www.tracopower.com/overview/tmr4
	- 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
		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
		See application note:	www.tracopower.com/overview/tmr4
Cooling System			Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote		On: < 0.6 VDC or open circuit
			Off: 6 to 15 VDC
			Refers to 'Remote' and '-Vin' Pin
	- 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 MΩ 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)
Washing Process			Allowed (hermetical product)
		See 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			Phosphor Bronze (C5191)
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			Wave Soldering
Weight			4.8 g

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

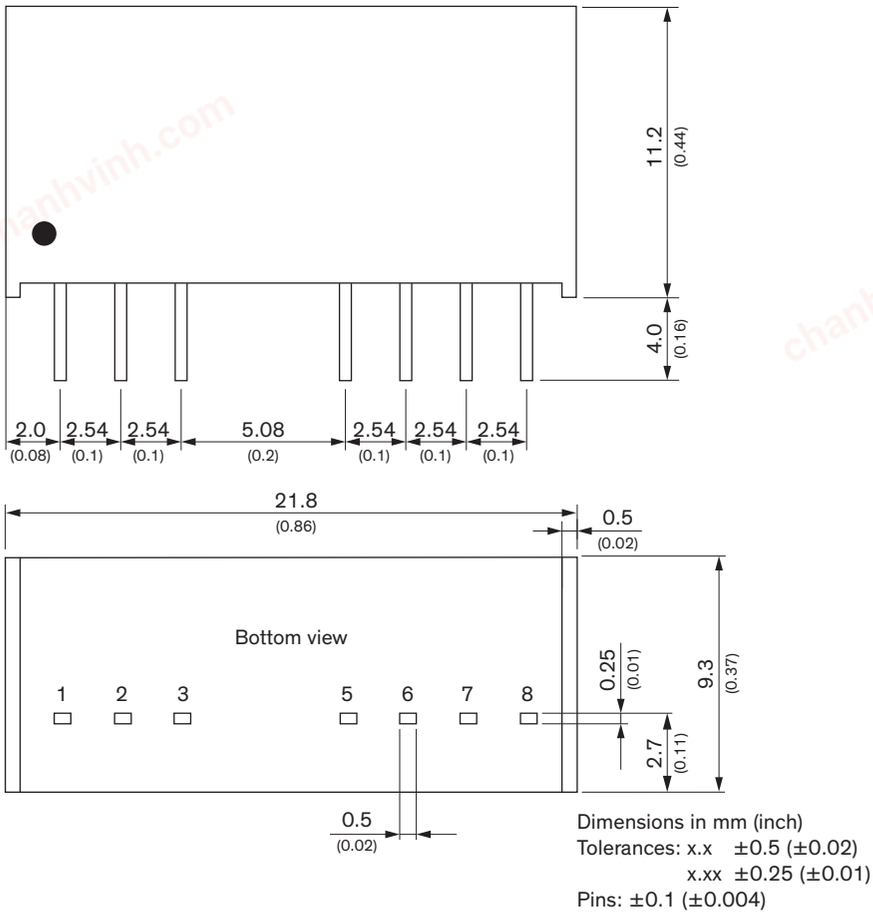
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Environmental Compliance	- REACH Declaration	www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant
	- RoHS Declaration	www.tracopower.com/info/rohs-declaration.pdf Exemptions: 7a (RoHS exemptions refer to 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)	www.tracopower.com/overview/tmr4

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

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