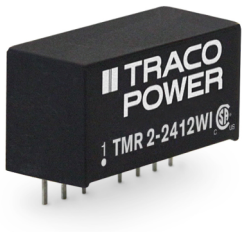
TRACO POWER

DC/DC Converter

TMR 2WI Series, 2 Watt

Not recommended for new designs

- **Ultra-wide 4:1 input range**
- **SIP-9 package**
- **Temperature range –40 to +85°C**
- **High efficiency**
- **Excellent load and line regulation**
- **Indefinite short-circuit protection**
- **I/O isolation 1500 VDC**
- **Remote On/Off control**
- **Fully RoHS compliant**
- **3-year product warranty**



The TMR 2WI series is a new family of isolated 2W DC/DC converter modules with regulated output, featuring ultra-wide 4:1 input voltage ranges of 9-36 VDC or 18-75 VDC. The product comes in a ultra-compact SIP-9 plastic package.
An excellent efficiency up to 84% allows –40°C to +85°C operation temperatures at full load. Further features include remote On/Off control and continuous short circuit protection. Typical applications for these ultra-compact converters are battery operated equipment and distributed power architectures in communication, instrumentation and industrial electronics, everywhere where space on the PCB is critical.

Models

Order Code	Input Voltage Range	Output 1		Output 2		Efficiency
		Vnom	Imax	Vnom	Imax	typ.
TMR 2-2410WI *	9 - 36 VDC (24 VDC nom.)	3.3 VDC	500 mA			71 %
TMR 2-2411WI *		5 VDC	400 mA			76 %
TMR 2-2412WI *		12 VDC	167 mA			79 %
TMR 2-2413WI *		15 VDC	134 mA			80 %
TMR 2-2421WI *		+5 VDC	200 mA	–5 VDC	200 mA	73 %
TMR 2-2422WI *		+12 VDC	83 mA	–12 VDC	83 mA	77 %
TMR 2-2423WI *		+15 VDC	67 mA	–15 VDC	67 mA	79 %
TMR 2-4810WI *	18 - 75 VDC (48 VDC nom.)	3.3 VDC	500 mA			70 %
TMR 2-4811WI *		5 VDC	400 mA			72 %
TMR 2-4812WI *		12 VDC	167 mA			78 %
TMR 2-4813WI *		15 VDC	134 mA			78 %
TMR 2-4821WI *		+5 VDC	200 mA	–5 VDC	200 mA	70 %
TMR 2-4822WI *		+12 VDC	83 mA	–12 VDC	83 mA	76 %
TMR 2-4823WI *		+15 VDC	67 mA	–15 VDC	67 mA	76 %

Note * Not recommended for new designs

Input Specifications

Input Current	- At no load	24 Vin models:	20 mA typ.
		48 Vin models:	15 mA typ.
	- At full load	24 Vin models:	110 mA typ.
		48 Vin models:	55 mA typ.
Surge Voltage		24 Vin models:	50 VDC max. (1 s max.)
		48 Vin models:	100 VDC max. (1 s max.)
Start-up Voltage		24 Vin models:	4.5 VDC min. / 6 VDC typ. / 8.5 VDC max.
		48 Vin models:	8.5 VDC min. / 12 VDC typ. / 17 VDC max.
Under Voltage Lockout		24 Vin models:	8 VDC max.
		48 Vin models:	16 VDC max.
Reflected Ripple Current		24 Vin models:	300 mAp-p typ.
		48 Vin models:	600 mAp-p typ.
Recommended Input Fuse		24 Vin models:	350 mA (slow blow)
		48 Vin models:	135 mA (slow blow)
			(The need of an external fuse has to be assessed in the final application.)
Input Filter			Internal Capacitor
Short Circuit Input Power			1.5 W max.

Output Specifications

Voltage Set Accuracy			±2% 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:	0.75% max.
		dual output models:	0.75% max. (Output 1)
			0.75% max. (Output 2)
	- Voltage Balance (symmetrical load)	dual output models:	2% max.
Ripple and Noise	- 20 MHz Bandwidth		50 mVp-p max.
			30 mVp-p typ.
Capacitive Load	- single output	3.3 Vout models:	2'200 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)
Temperature Coefficient			±0.02 %/K max.
Start-up Time			1 ms max.
Short Circuit Protection			Continuous, Automatic recovery
Transient Response	- Response Deviation		5% max. (75% to 100% Load Step)
	- Response Time		100 µs typ. / 300 µs max. (75% to 100% Load Step)

Safety Specifications

Standards	- IT / Multimedia Equipment	Designed for IEC/EN/UL 62368-1 (not certified)
Over Voltage Category		Not mains connected

All specifications valid at nominal voltage, resistive 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)
	- Radiated Emissions	EN 55032 class A (with external filter)
	External filter proposal:	www.tracopower.com/tmr2wi-emc-filter

General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	–40°C to +85°C
	- Case Temperature	+90°C max.
	- Storage Temperature	–55°C to +105°C
Power Derating	- High Temperature	2.86 %/K above 65°C
	See application note:	www.tracopower.com/tmr2wi-cc
Cooling System		Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote (passive = on)	On: < 0.6 VDC or open circuit Off: 2.9 to 15 VDC Refers to 'Remote' and '-Vin' Pin
	- Off Idle Input Current	3 mA max.
	- Remote Pin Input Current	-1.0 to 1.0 mA
Regulator Topology		RCC Converter
Switching Frequency		100 - 650 kHz (PFM) 300 kHz typ. (PFM)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s	1'500 VAC
Isolation Resistance	- Input to Output, 500 VDC	1'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	250 pF typ. 500 pF max.
Reliability	- Calculated MTBF	1'200'000 h (MIL-HDBK-217F, ground benign)
Washing Process		According to 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		Nickel-Iron (Alloy 42)
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		SIP9
Soldering Profile		Lead-Free Wave Soldering 260°C / 10 s max.
Weight		6.5 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	d40a088b-a8a0-486b-86d0-09471abcbbb4

Additional Information

Supporting Documents	www.tracopower.com/overview/tmr2wi
Frequently Asked Questions	www.tracopower.com/glossary-faq
Glossary	www.tracopower.com/info/glossary.pdf

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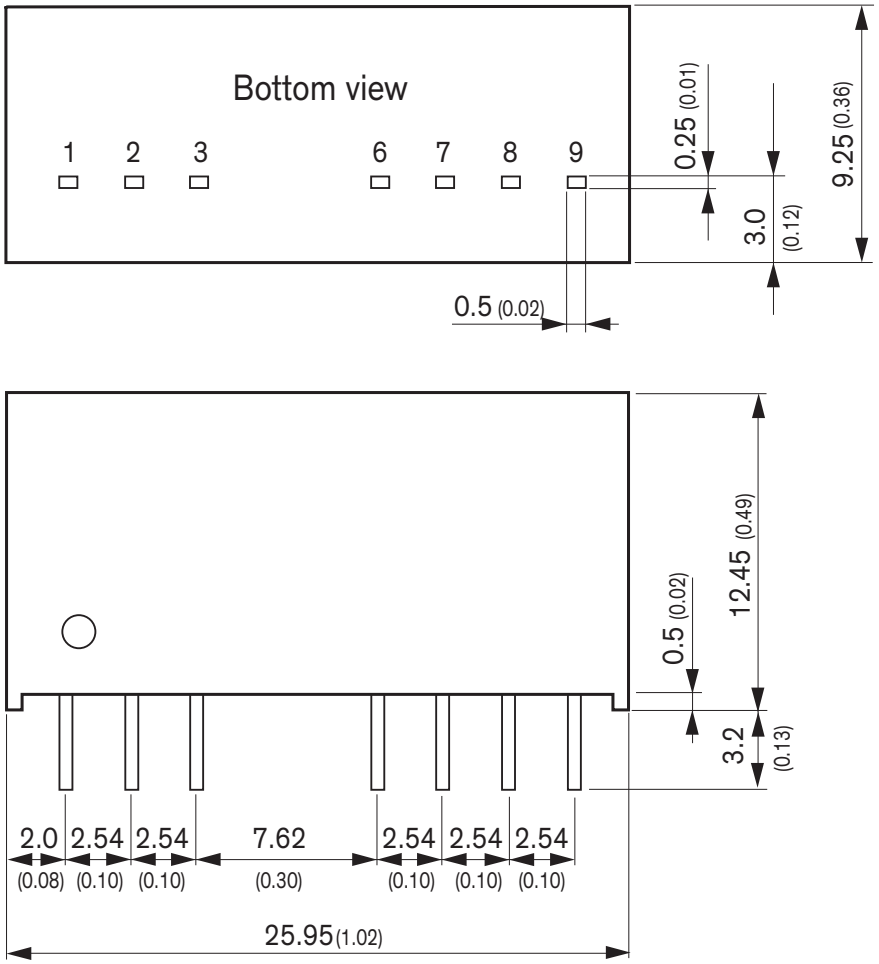
Outline Dimensions



Pinout		
Pin	**Single Output**	**Dual Output**
1	–Vin (GND)	–Vin (GND)
2	+Vin (Vcc)	+Vin (Vcc)
3	Remote	Remote
6	+Vout	+Vout
7	NC	Common
8	NC	NC
9	–Vout	–Vout

NC: Not connected

Dimensions in mm (inch)

Pin diameter	Ø 0.5 ±0.05 (0.02 ±0.002)
Tolerances	±0.5 (±0.02)
Pin pitch tolerance	±0.2 (±0.008)