

### Features

- ◆ Highest power density in SIP package
- ◆ Ultra wide 4:1 input voltage range
- ◆ Ultra-compact SIP-8 package
- ◆ Smallest footprint 9W converter
- ◆ Full SMD design
- ◆ Temperature range  $-40^{\circ}$  to  $+85^{\circ}\text{C}$
- ◆ High efficiency up to 89%
- ◆ Indefinite short-circuit protection
- ◆ I/O isolation 1500 VDC
- ◆ Remote On/Off control
- ◆ Fully RoHS compliant
- ◆ 3-year product warranty



The TMR-9WI series is a new family of isolated 9W dc-dc converter modules with regulated output, featuring ultra wide 4:1 input voltage ranges. The product comes in a ultra-compact SIP-8 metal package with a small footprint occupying only 2.0 cm<sup>2</sup> (0.3 square in.) of board space.

An excellent efficiency allows  $-40^{\circ}$  to  $+60^{\circ}\text{C}$  operation temperatures without derating. Further features include remote On/Off control and continuous short circuit protection. The very 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 voltage	Output current max.	Efficiency typ.
TMR 9-2410WI	9 – 36 VDC (24 VDC nominal)	3.3 VDC	2000 mA	82 %
TMR 9-2411WI		5 VDC	1600 mA	85 %
TMR 9-2419WI		9 VDC	1000 mA	86 %
TMR 9-2412WI		12 VDC	750 mA	88 %
TMR 9-2413WI		15 VDC	600 mA	89 %
TMR 9-2415WI		24 VDC	375 mA	89 %
TMR 9-2421WI		$\pm 5$ VDC	$\pm 800$ mA	85 %
TMR 9-2422WI		$\pm 12$ VDC	$\pm 375$ mA	88 %
TMR 9-2423WI		$\pm 15$ VDC	$\pm 300$ mA	88 %
TMR 9-4810WI		18 – 75 VDC (48 VDC nominal)	3.3 VDC	2000 mA
TMR 9-4811WI	5 VDC		1600 mA	85 %
TMR 9-4819WI	9 VDC		1000 mA	86 %
TMR 9-4812WI	12 VDC		750 mA	89 %
TMR 9-4813WI	15 VDC		600 mA	88 %
TMR 9-4815WI	24 VDC		375 mA	88 %
TMR 9-4821WI	$\pm 5$ VDC		$\pm 800$ mA	85 %
TMR 9-4822WI	$\pm 12$ VDC		$\pm 375$ mA	87 %
TMR 9-4823WI	$\pm 15$ VDC		$\pm 300$ mA	87 %

### Input Specifications

Input current at no load (nominal input voltage)	24 V models: 9 mA typ. 48 V models: 5 mA typ.
Surge voltage (1 sec. max.)	24 V models: 50 V max. 48 V models: 100 V max.
Conducted noise	EN 55022 class A internal filter
ESD (electrostatic discharge)	EN 61000-4-2, air ±8 kV, contact ±6 kV, perf. criteria A
Radiated immunity	EN 61000-4-3, 20 V/m, perf. criteria A
Fast transient / surge (with external input capacitor)	EN 61000-4-4, ±2 kV, perf. criteria A EN 61000-4-5, ±2 kV perf. criteria A
<ul style="list-style-type: none"> <li>- external input capacitor</li> <li>- external TVS</li> </ul>	all models: Nippon chemi-con KY 220 µF, 100 V 24 V models: SMDJ70A, 70 V, 3000 W peak pulse power 48 V models: SMDJ120A, 120 V, 3000 W peak pulse power
Conducted immunity	EN 61000-4-6, 10 Vrms, perf. criteria A

### Output Specifications

Voltage set accuracy	±1 % max
Regulation	<ul style="list-style-type: none"> <li>- Input variation Vin min. to Vin max. 0.2 % max.</li> <li>- Load variation 0 – 100%               <ul style="list-style-type: none"> <li>single output models: 1.0 % max.</li> <li>dual output models: 1.0 % max. balanced load</li> </ul> </li> <li>- Load cross regulation 25/100% 5.0 % max. (dual output models)</li> </ul>
Minimum load	not required
Ripple and noise (20 MHz Bandwidth)	3.3, 5 & 9 VDC models: 50 mVpk-pk typ. 12, 15 & 24 VDC models: 75 mVpk-pk typ.
Transient response setting time (25% load step change)	250 µs typ.
Short circuit protection	indefinite, automatic recovery
Over load protection	180 % of nom. Iout typ. (hiccup)
Start up time	<ul style="list-style-type: none"> <li>- Power On 50 ms typ.</li> <li>- Remote On 50 ms typ.</li> </ul>
Capacitive load	3.3 VDC / 5 VDC output models: 2600 µF max. / 1300 µF max. 9 VDC output models: 800 µF max. 12 VDC & 15 VDC output models: 560 µF max. 24 VDC output models: 200 µF max. ±5 VDC / ±12 VDC output models: ±800 µF max. / ± 390 µF max. ±15 VDC output models: ±200 µF max.

### General Specifications

Temperature ranges	<ul style="list-style-type: none"> <li>- Operating -40°C to +85°C</li> <li>- Case temperature +100°C max.</li> <li>- Storage -55°C to +125°C</li> </ul>
Load derating	3.3 VDC model: 2.0 %/K above 50°C other models: 2.5 %/K above 60°C
Thermal shock, mechanical shock & vibration	EN 61373, MIL-STD-810F
<ul style="list-style-type: none"> <li>- Test conditions</li> </ul>	<a href="http://www.tracopower.com/products/mil810.pdf">www.tracopower.com/products/mil810.pdf</a>
Humidity (non condensing)	5–95 % rel. H max.
Temperature coefficient	±0.02 %/K

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

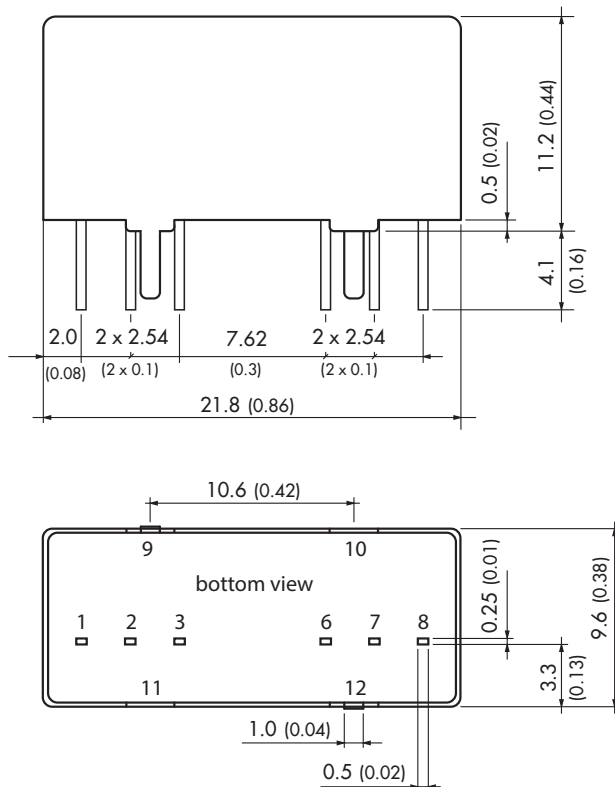
**General Specifications**

Reliability, calculated MTBF (MIL-HDBK217F)		>2.9 Mio h
Isolation voltage (60sec.)	- Input/Output	1500 VDC
Isolation capacitance	- Input/Output	50 pF max.
Isolation resistance	- Input/Output (500 VDC)	>1 GOhm
Switching frequency	single output models: dual output models:	400 kHz typ. 500 kHz typ.
Remote On/Off	- On: - Off: - Off stand by input current	open or high impedance 2...4 mA current applied via 1KOhm resistor 2.5 mA max.
Safety standards		IEC/EN 60950-1, UL 60950-1
Altitude during operation		tbd
Environmental compliance	- Reach - RoHS	<a href="http://www.tracopower.com/overview/tmr9wi">www.tracopower.com/overview/tmr9wi</a> RoHS directive 2011/65/EU

**Physical Specifications**

Casing material		copper
Potting material		silicone, (UL 94V-0 rated)
Weight		5.9 g (0.21oz)

**Outline Dimensions**



Pin-Out		
Pin	Single	Dual
1	-Vin (GND)	-Vin (GND)
2	+Vin (Vcc)	+Vin (Vcc)
3	Remote On/Off	Remote On/Off
6	+Vout	+Vout
7	-Vout	Common
8	No function	-Vout
9	Case	Case
10	Stand off	Stand off
11	Stand off	Stand off
12	Case	Case

Dimensions in [mm], ( ) = Inch  
Tolerances: ±0.5 (±0.02)  
Pin pitch tolerances: ±0.25 (±0.01)

Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at [www.tracopower.com](http://www.tracopower.com)