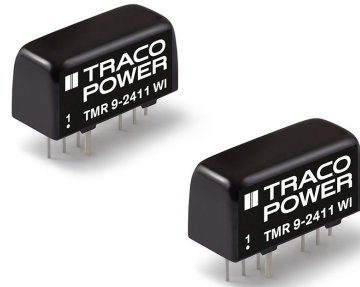


#### Features

- ◆ Highest power density in SIP-8 metal package (optional plastic package)
- ◆ Ultra wide 4:1 input voltage range
- ◆ Temperature range  $-40^{\circ}$  to  $+85^{\circ}\text{C}$
- ◆ High efficiency up to 89%
- ◆ Indefinite short-circuit protection
- ◆ I/O isolation 1600 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	88 %
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	86 %
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	89 %
TMR 9-4812WI	12 VDC		750 mA	89 %
TMR 9-4813WI	15 VDC		600 mA	89 %
TMR 9-4815WI	24 VDC		375 mA	89 %
TMR 9-4821WI	$\pm 5$ VDC		$\pm 800$ mA	85 %
TMR 9-4822WI	$\pm 12$ VDC		$\pm 375$ mA	88 %
TMR 9-4823WI	$\pm 15$ VDC		$\pm 300$ mA	87 %

\* Suffix -P for models with plastic casing

### Input Specifications

Input current at no load (nominal input voltage)	24 V models: 9 mA typ. 48 V models: 3 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 and B with external filter
ESD (electrostatic discharge)	EN 61000-4-2, air $\pm 8$ kV, contact $\pm 6$ 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, $\pm 2$ kV, perf. criteria A EN 61000-4-5, $\pm 2$ 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 $\mu$ F, 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
PF Magnetic Field	EN 61000-4-8, 100 A/m, perf. criteria A

### Output Specifications

Voltage set accuracy	$\pm 1$ % max
Regulation	<ul style="list-style-type: none"> <li>- Input variation <math>V_{in}</math> min. to <math>V_{in}</math> 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.
Temperature coefficient	$\pm 0.02$ %/K
Transient response setting time (25% load step change)	250 $\mu$ s typ.
Short circuit protection	continuous, automatic recovery
Current limitation	180 % of nom. I <sub>out</sub> 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 $\mu$ F max. / 1300 $\mu$ F max. 9 VDC output models: 800 $\mu$ F max. 12 VDC & 15 VDC output models: 560 $\mu$ F max. 24 VDC output models: 200 $\mu$ F max. $\pm 5$ VDC / $\pm 12$ VDC output models: $\pm 800$ $\mu$ F max. / $\pm 390$ $\mu$ F max. $\pm 15$ VDC output models: $\pm 200$ $\mu$ F max.

### General Specifications

Temperature ranges	<ul style="list-style-type: none"> <li>- Operating -40°C to +85°C</li> <li>- Case temperature +105°C max.</li> <li>- Storage -55°C to +125°C</li> </ul>
Load derating	3.3 VDC model: 2.0 %/K above 60°C (50°C for option -P) other models: 2.5 %/K above 70°C (60°C for option -P) - detailed thermal-consideration document <a href="http://www.tracopower.com/overview/tmr9wi">www.tracopower.com/overview/tmr9wi</a>
Thermal shock, mechanical shock & vibration	EN 61373, MIL-STD-810F <a href="http://www.tracopower.com/products/mil810.pdf">www.tracopower.com/products/mil810.pdf</a>
Humidity (non condensing)	5–95 % rel. H max.
Reliability, calculated MTBF (MIL-HDBK-217F)	>2.9 Mio h

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

**General Specifications**

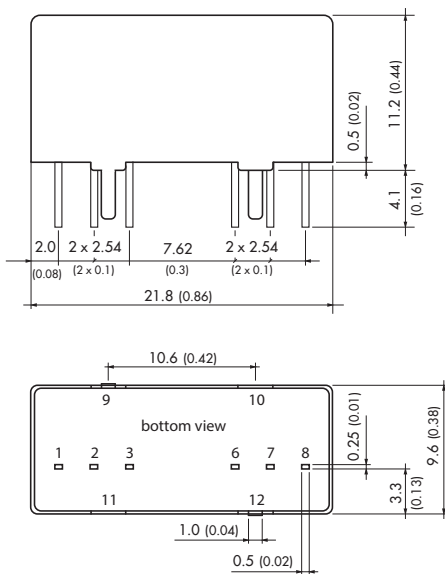
Isolation voltage (60sec.)	- Input/Output	1600 VDC
Isolation capacitance	- Input/Output	50 pF max.
Isolation resistance	- Input/Output (500 VDC)	>1 GOhm
Switching frequency	single output models: dual output models:	400 kHz typ. 500 kHz typ.
Remote On/Off	- On: - Off: - Off stand by input current	open or high impedance 2...4 mA current applied via 1KOhm resistor 2.5 mA max.
Safety standards	- Certification documents	IEC/EN 60950-1, UL 60950-1 <a href="http://www.tracopower.com/overview/tmr9wi">www.tracopower.com/overview/tmr9wi</a>
Altitude during operation		5000 m
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 (plastic for option -P)
Potting material	silicone, (UL 94V-0 rated)
Weight	5.9 g (0.21 oz), (4.8 g / 0.17 oz for option -P)

**Outline Dimensions**

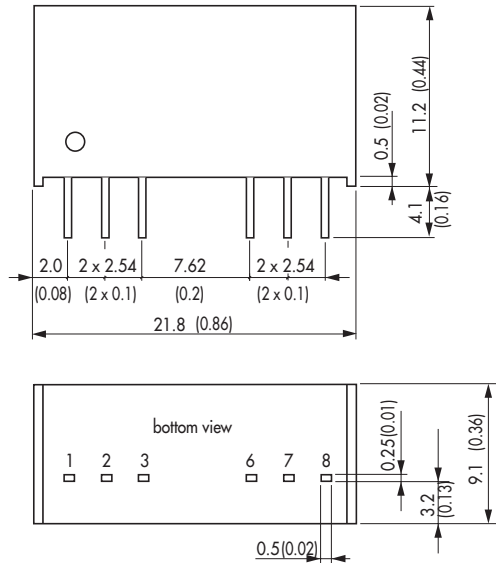
Metal package (standard)



9 & 12 = Case connection  
10 & 11 = Stand off

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

Plastic package (option -P)



**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

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