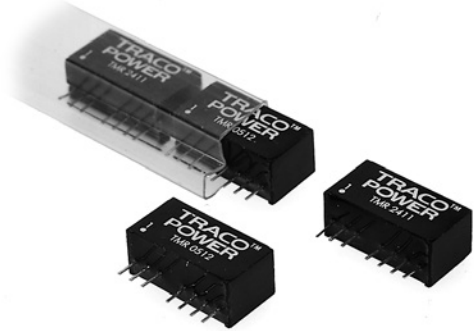


### Features

- ◆ Wide 2:1 input voltage range
- ◆ Compact SIP-8 package
- ◆ Small footprint
- ◆ Full SMD design
- ◆ Temperature range  $-40^{\circ}$  to  $+85^{\circ}\text{C}$
- ◆ High efficiency
- ◆ Excellent load and line regulation
- ◆ Indefinite short-circuit protection
- ◆ I/O isolation 1000VDC
- ◆ Remote On/Off control
- ◆ Fully RoHS compliant
- ◆ 3-year product warranty



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

An excellent efficiency allows  $-40^{\circ}$  to  $+85^{\circ}\text{C}$  operation temperatures. Further features include remote On/Off control and continuous short circuit protection. The ultra-compact dimensions of these converters make them an ideal solution for many space critical applications in communication equipment, instrumentation and industrial electronics.

### Models

Ordercode	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TMR 0510	4.5 – 9.0 VDC (5 VDC nominal)	3.3 VDC	500 mA	76 %
TMR 0511		5 VDC	400 mA	80 %
TMR 0512		12 VDC	165 mA	81 %
TMR 0521		$\pm 5$ VDC	$\pm 200$ mA	79 %
TMR 0522		$\pm 12$ VDC	$\pm 85$ mA	82 %
TMR 0523		$\pm 15$ VDC	$\pm 65$ mA	81 %
TMR 1210	9 – 18 VDC (12 VDC nominal)	3.3 VDC	500 mA	77 %
TMR 1211		5 VDC	400 mA	81 %
TMR 1212		12 VDC	165 mA	83 %
TMR 1221		$\pm 5$ VDC	$\pm 200$ mA	81 %
TMR 1222		$\pm 12$ VDC	$\pm 85$ mA	83 %
TMR 1223		$\pm 15$ VDC	$\pm 65$ mA	84 %
TMR 2410	18 – 36 VDC (24 VDC nominal)	3.3 VDC	500 mA	78 %
TMR 2411		5 VDC	400 mA	81 %
TMR 2412		12 VDC	165 mA	83 %
TMR 2421		$\pm 5$ VDC	$\pm 200$ mA	80 %
TMR 2422		$\pm 12$ VDC	$\pm 85$ mA	83 %
TMR 2423		$\pm 15$ VDC	$\pm 65$ mA	82 %
TMR 4810	36 – 75 VDC (48 VDC nominal)	3.3 VDC	500 mA	76 %
TMR 4811		5 VDC	400 mA	78 %
TMR 4812		12 VDC	165 mA	83 %
TMR 4821		$\pm 5$ VDC	$\pm 200$ mA	80 %
TMR 4822		$\pm 12$ VDC	$\pm 85$ mA	81 %
TMR 4823		$\pm 15$ VDC	$\pm 65$ mA	81 %

### Input Specifications

Input current at full load (nominal input)	5 Vin models: 645 mA max. 12 Vin models: 242 mA max. 24 Vin models: 117 mA max. 48 Vin models: 62 mA max.
Surge voltage (100 msec. max.)	5 Vin models: 15 V max. 12 Vin models: 36 V max. 24 Vin models: 50 V max. 48 Vin models: 100 V max.
Input voltage variation (dv/dt)	5 V/ms, max. (complies to ETS 300 132 part. 4.4)
Input Filter	capacitor type
Start up time	5 ms typ. (at nominal input and resistive load)
ESD (electrostatic discharge)	EN 61000-4-2, air $\pm 8$ kV, contact $\pm 6$ kV, perf. criteria A
Radiated immunity	EN 61000-4-3, 10 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, $\pm 1$ kV perf. criteria A Nippon chemi-con KY 220 $\mu$ F, 100 V, ESR 48 mOhm
	– external input capacitor
Conducted immunity	EN 61000-4-6, 10 Vrms, perf. criteria A

### Output Specifications

Voltage set accuracy	$\pm 1$ %
Regulation	– Input variation Vin min. to Vin max. 0.2 % max. – No load to full load single output models: $\pm 1.0$ % max. dual output models: $\pm 1.0$ % max. – Load variation 10 – 90 % single output models: $\pm 0.5$ % max. dual output models: $\pm 0.8$ % max. dual output models asymmetric load: 5.0 % max. (25% / 100%)
Minimum load	0 %
Ripple and noise (20 MHz Bandwidth)	50 mVpk-pk max.
Temperature coefficient	$\pm 0.02$ %/°C
Transient response (25% load step change)	500 $\mu$ s typ.
Short circuit protection	continuous, automatic recovery
Capacitive load	3.3 VDC / 5 VDC output models: 2'200 $\mu$ F max. / 1'000 $\mu$ F max. 12 VDC / $\pm 5$ VDC output models: 170 $\mu$ F max. / $\pm 470$ $\mu$ F max. $\pm 12$ VDC / $\pm 15$ VDC output models: 100 $\mu$ F max. / $\pm 47$ $\mu$ F max.

### General Specifications

Temperature ranges	– Operating –40°C to +85°C (without derating) – Storage –55°C to +125°C
Humidity (non condensing)	95 % rel. H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)	4.9 Mio. h
Isolation voltage (60 sec.) – Input/Output	1'600 VDC
Isolation capacitance – Input/Output	200 pF max.
Isolation resistance – Input/Output (500 VDC)	>1'000 MOhm
Switching frequency	100 to 650 kHz (PFM)

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

**General Specifications**

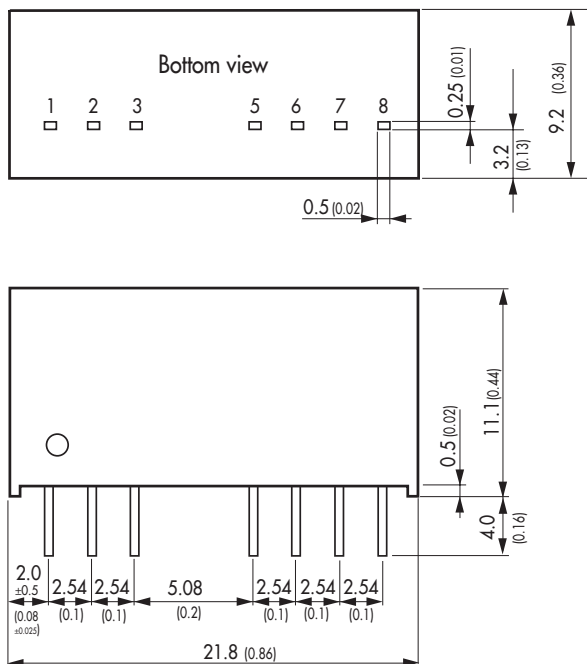
Remote On/Off	- On: - Off: - Off stand by input current	open or high impedance 2...4 mA input current applied via 1KW resistor max. 2.5 mA
Safety standards		UL/cUL 60950-1, IEC/EN 60950-1
Safety approvals	- UL/cUL	<a href="http://www.ul.com">www.ul.com</a> -> certifications -> File e188913
Thermal shock, mechanical shock & vibration	- Test conditions	MIL-STD-810F <a href="http://www.tracopower.com/products/mil810.pdf">www.tracopower.com/products/mil810.pdf</a>
Environmental compliance	- Reach - RoHS	<a href="http://www.tracopower.com/products/reach-declaration.pdf">www.tracopower.com/products/reach-declaration.pdf</a> RoHS Directive 2011/65/EU
Altitude	- operation - non operation - test report	< 40'000ft (12'000m) < 50'000ft (15'000m) <a href="http://www.tracopower.com/products/tmr-altitude.pdf">www.tracopower.com/products/tmr-altitude.pdf</a>

**Physical Specifications**

Casing material	non-conductive plastic
Potting material	silicone (UL 94V-0-rated)
Weight	4.8 g (0.17oz)

**Application note:** [www.tracopower.com/products/tmr2-application.pdf](http://www.tracopower.com/products/tmr2-application.pdf)

**Outline Dimensions mm (inches)**



Pin-Out		
Pin	Single	Dual
1	-Vin (GND)	-Vin (GND)
2	+Vin (Vcc)	+Vin (Vcc)
3	Remote On/Off	Remote On/Off
5	No function	No function
6	+Vout	+Vout
7	-Vout	Common
8	No function	-Vout

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

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