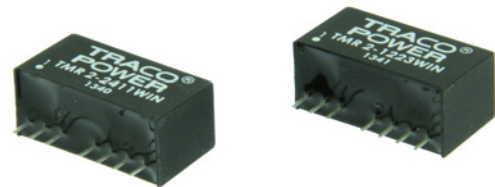


### Features

- ◆ Ultra-wide 4:1 input range
- ◆ Compact SIP-8 package
- ◆ Temperature range  $-40$  to  $+90^{\circ}\text{C}$  (up to  $+75^{\circ}\text{C}$  at full load)
- ◆ High efficiency of 82%
- ◆ Excellent load and line regulation
- ◆ Continuous short-circuit protection
- ◆ Overload protection
- ◆ I/O isolation 1500 VDC
- ◆ Remote On/Off control
- ◆ 3-year product warranty



The TMR-2WIN series is a family of isolated 2 W DC/DC converter modules with accurately regulated output voltages and ultra-wide 4:1 input voltage ranges. They require no minimum load and are protected against overload and short circuit. An excellent efficiency along with the use of high grade components allows a compact construction in SIP-8 package; even the converters can reliably operate in an ambient temperature of  $-40^{\circ}\text{C}$  to  $+75^{\circ}\text{C}$  at full load and up to  $90^{\circ}\text{C}$  with 50% power derating. Typical applications for these converters are distributed power architectures in communication, instrumentation and industrial electronics, everywhere where space on the PCB is critical.

### Models

Ordercode	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TMR 2-1210WIN	4.5 – 18 VDC (12 VDC nominal)	3.3 VDC	500 mA	75 %
TMR 2-1211WIN		5 VDC	400 mA	80 %
TMR 2-1212WIN		12 VDC	167 mA	82 %
TMR 2-1213WIN		15 VDC	134 mA	82 %
TMR 2-1221WIN		$\pm 5$ VDC	$\pm 200$ mA	80 %
TMR 2-1222WIN		$\pm 12$ VDC	$\pm 83$ mA	82 %
TMR 2-1223WIN		$\pm 15$ VDC	$\pm 67$ mA	82 %
TMR 2-2410WIN	9 – 36 VDC (24 VDC nominal)	3.3 VDC	500 mA	75 %
TMR 2-2411WIN		5 VDC	400 mA	80 %
TMR 2-2412WIN		12 VDC	167 mA	82 %
TMR 2-2413WIN		15 VDC	134 mA	82 %
TMR 2-2421WIN		$\pm 5$ VDC	$\pm 200$ mA	80 %
TMR 2-2422WIN		$\pm 12$ VDC	$\pm 83$ mA	82 %
TMR 2-2423WIN		$\pm 15$ VDC	$\pm 67$ mA	82 %
TMR 2-4810WIN	18 – 75 VDC (48 VDC nominal)	3.3 VDC	500 mA	74 %
TMR 2-4811WIN		5 VDC	400 mA	80 %
TMR 2-4812WIN		12 VDC	167 mA	82 %
TMR 2-4813WIN		15 VDC	134 mA	82 %
TMR 2-4821WIN		$\pm 5$ VDC	$\pm 200$ mA	80 %
TMR 2-4822WIN		$\pm 12$ VDC	$\pm 83$ mA	82 %
TMR 2-4823WIN		$\pm 15$ VDC	$\pm 67$ mA	82 %

### Input Specifications

Input current at no load (nominal input)	12 Vin models: 60 mA typ. 24 Vin models: 30 mA typ. 48 Vin models: 20 mA typ.
Surge voltage (1 sec. max.)	12 Vin models: 25 V max. 24 Vin models: 50 V max. 48 Vin models: 100 V max.
Short circuit input power	1500 mW
Input Filter	capacitor type
Recommended input fuse (DC slow blow)	12 Vin models: 1000 mA 24 Vin models: 500 mA 48 Vin models: 250 mA
Start up voltage / under voltage shutdown (hysteresis) long term operation with under-voltage may cause damage	12 Vin models: 4.5 / 4.0 V (or lower) 24 Vin models: 9.0 / 8.0 V (or lower) 48 Vin models: 18 / 16 V (or lower)
Recommended input fuse (DC slow blow)	12 Vin models: 1000 mA 24 Vin models: 500 mA 48 Vin models: 250 mA

### Output Specifications

Voltage set accuracy	±2 %
Regulation	– Input variation Vin min. to Vin max. 0.5 % max. – Load variation 0 – 100 % single output models: 1.0 % max. dual output models: 2.0 % max. (balanced load)
Minimum load	no minimum load required
Temperature coefficient	±0.02 %/°C
Ripple and noise (20 MHz Bandwidth)	100 mVp-p max
Transient response (25 % load step change)	500 µs max.
Short circuit protection	continuous (automatic recovery)
Capacitive load	3.3 VDC / 5 VDC models: 1'000 µF max. 12 VDC models: 170 µF max. 15VDC models: 110 µF max. ±5 VDC models: 470 µF max. ±12 VDC models: 100 µF max. (each output) ±15 VDC models: 47 µF max. (each output)

### General Specifications

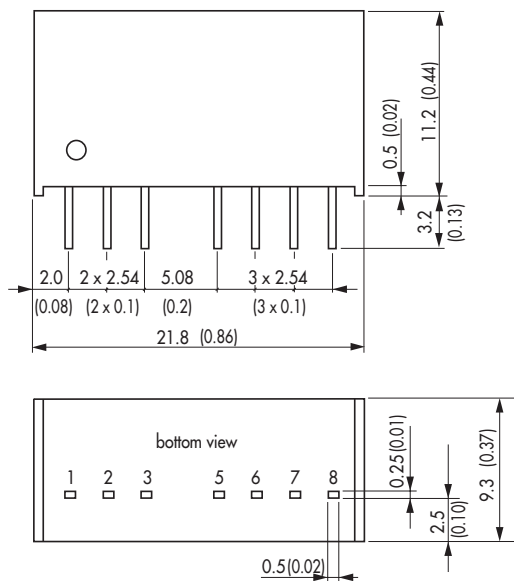
Temperature ranges	– Operating (natural convection 20 LFM) –40°C to +90°C – Case temperature +105°C max. – Storage –55°C to +125°C
Derating (convection cooling)	3.3 %/K above 75°C
Humidity (non condensing)	95 % rel. H max.
Reliability, calculated MTBF (MIL-HDBK-217F at +25°C, ground benign)	>1 Mio h
Isolation voltage (60 sec.) – Input/Output	1'500 VDC
Isolation capacitance – Input/Output	500 pF max.
Isolation resistance – Input/Output (500 VDC)	>1'000 M Ohm
Switching frequency	300 kHz (PFM)
Safety standards	CAN/CSA-C22.2 No 60950-1-07, 2nd ed; A1:2011 ANSI/UL No. 60950-1, 2nd ed.; A1:2011 IEC 60950-1:2005 (2nd edition); Am 1:2009 EN 60950-1:2006/A11:2009/A1:2010/A12:2011 – Certification documents <a href="http://www.tracopower.com/overview/tmr2win">www.tracopower.com/overview/tmr2win</a>

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

**Physical Specifications**

Remote On/Off	<ul style="list-style-type: none"> <li>- On:</li> <li>- Off:</li> </ul>	<ul style="list-style-type: none"> <li>open or high impedance</li> <li>2...4 mA input current (constant)</li> </ul>
	<ul style="list-style-type: none"> <li>- Off stand by input current</li> </ul>	<ul style="list-style-type: none"> <li>or: 6...9 VDC via 1 kΩ resistor (Referenced to -Vin)</li> <li>max. 2.5 mA</li> </ul>
Casing material		non-conductive plastic
Potting material		epoxy (UL 94V-0 rated)
Weight		4.65 g (0.16 oz)
Soldering temperature		max. 260°C / 10 sec.
Environmental compliance	<ul style="list-style-type: none"> <li>- Reach</li> <li>- RoHS</li> </ul>	<a href="http://www.tracopower.com/overview/tmr2win">www.tracopower.com/overview/tmr2win</a> directive 2011/65/EU

**Outline Dimensions**



Pin-Out		
Pin	Single	Dual
1	-Vin (GND)	-Vin (GND)
2	+Vin (Vcc)	+Vin (Vcc)
3	Remote On/Off	Remote On/Off
5	ntc	ntc
6	+Vout	+Vout
7	-Vout	Common
8	ntc	-Vout

(ntc = not to connect)

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)