TRACO POWER

DC/DC Converter

TMR 2WIN Series, 2 Watt

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

UL 62368-1 IEC 62368-1

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°C to +75°C at full load and up to 90°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

Order Code	Input Voltage Range	Output 1		Output 2		Efficiency
		Vnom	Imax	Vnom	Imax	typ.
TMR 2-1210WIN	4.5 - 18 VDC (12 VDC nom.)	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		+5 VDC	200 mA	–5 VDC	200 mA	80 %
TMR 2-1222WIN		+12 VDC	83 mA	–12 VDC	83 mA	82 %
TMR 2-1223WIN		+15 VDC	67 mA	–15 VDC	67 mA	82 %
TMR 2-2410WIN	9 - 36 VDC (24 VDC nom.)	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		+5 VDC	200 mA	–5 VDC	200 mA	80 %
TMR 2-2422WIN		+12 VDC	83 mA	–12 VDC	83 mA	82 %
TMR 2-2423WIN		+15 VDC	67 mA	–15 VDC	67 mA	82 %
TMR 2-4810WIN	18 - 75 VDC (48 VDC nom.)	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		+5 VDC	200 mA	–5 VDC	200 mA	80 %
TMR 2-4822WIN		+12 VDC	83 mA	–12 VDC	83 mA	82 %
TMR 2-4823WIN		+15 VDC	67 mA	–15 VDC	67 mA	82 %

Input Specifications

Input Current	- At no load	12 Vin models:	60 mA typ.
		24 Vin models:	30 mA typ.
		48 Vin models:	20 mA typ.
	- At full load	12 Vin models:	200 mA typ.
		24 Vin models:	100 mA typ.
		48 Vin models:	50 mA typ.
Surge Voltage		12 Vin models:	25 VDC max. (1 s max.)
		24 Vin models:	50 VDC max. (1 s max.)
		48 Vin models:	100 VDC max. (1 s max.)
Start-up Voltage		12 Vin models:	3 VDC min. / 4 VDC typ. / 4.5 VDC max.
		24 Vin models:	4.5 VDC min. / 6 VDC typ. / 9 VDC max.
		48 Vin models:	8.5 VDC min. / 12 VDC typ. / 18 VDC max.
Under Voltage Lockout		12 Vin models:	4 VDC max.
		24 Vin models:	8 VDC max.
		48 Vin models:	16 VDC max.
Recommended Input Fuse		12 Vin models:	1'000 mA (slow blow)
		24 Vin models:	500 mA (slow blow)
		48 Vin models:	250 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 (0 - 100%)	single output models:	1% max.
		dual output models:	1% max. (Output 1)
			1% max. (Output 2)
	- Voltage Balance (symmetrical load)	dual output models:	2% max.
Ripple and Noise	- 20 MHz Bandwidth		100 mVp-p max.
Capacitive Load	- single output	3.3 Vout models:	1'000 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			Not required
Temperature Coefficient			±0.02 %/K max.
Short Circuit Protection			Automatic recovery
Overload Protection			Foldback Mode
Output Current Limitation			110% min. of Iout max.
			140% typ. of Iout max.
Transient Response	- Response Deviation		5% max. (75% to 100% Load Step)
	- Response Time		300 µs typ. / 500 µs max. (75% to 100% Load Step)

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

Safety Specifications

Safety Standards	- IT / Multimedia Equipment	CSA-C22.2, No. 60950-1 EN 60950-1 EN 62368-1 IEC 60950-1 IEC 62368-1 UL 60950-1 UL 62368-1
	- Certification Documents	www.tracopower.com/overview/tmr2win
Pollution Degree		PD 2

General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	–40°C to +90°C
	- Case Temperature	+105°C max.
	- Storage Temperature	–55°C to +125°C
Power Derating	- High Temperature	3.33 %/K above 75°C
	See application note:	www.tracopower.com/overview/tmr2win
Cooling System		Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote	On: open circuit Off: 6 to 9 VDC (via 1 kOhm resistor) Refers to 'Remote' and '-Vin' Pin
	- Current Controlled Remote	On: open circuit Off: 2 to 4 mA current
	- Off Idle Input Current	3 mA max.
Altitude During Operation		6'000 m max.
Switching Frequency		300 kHz typ. (PFM)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s	1'500 VDC
	- Input to Output, 1 s	1'800 VDC
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	3'430'000 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		SIP8
Soldering Profile		Wave Soldering 260°C / 10 s max.
Weight		4.66 g

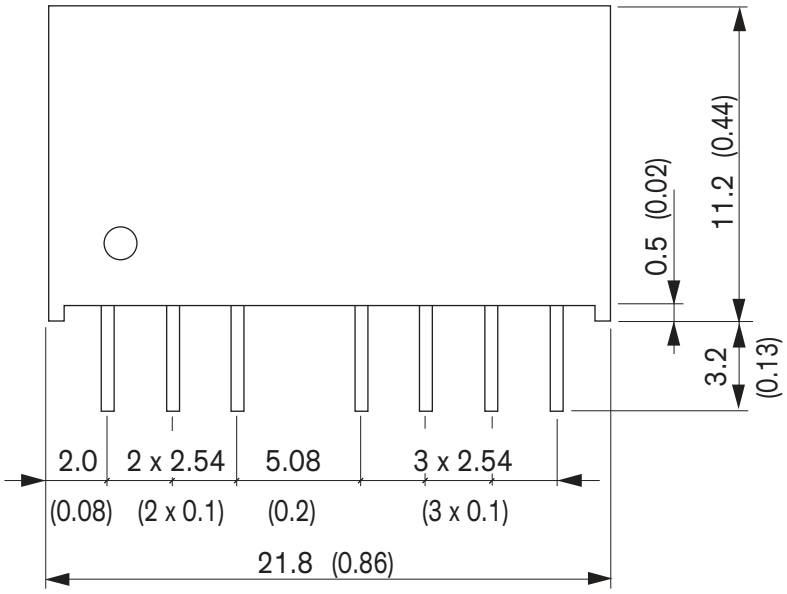
All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

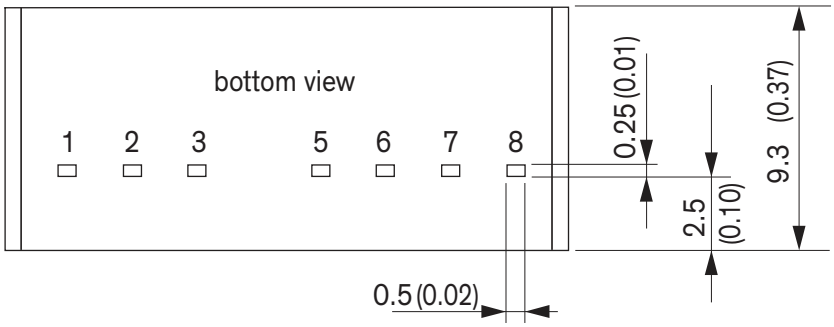
Environmental Compliance	- REACH Declaration	www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant
	- RoHS Declaration	www.tracopower.com/info/rohs-declaration.pdf Exemptions: 7a (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number	d03e2461-f0b1-480d-9580-ce42a4dc9914

Supporting Documents

Overview Link (for additional Documents)	www.tracopower.com/overview/tmr2win

Outline Dimensions





Dimensions in mm (inch)
Tolerances ±0.5 (±0.02)
Pin pitch tolerance ±0.25 (±0.01)

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

NC: Not connected