

- Compact SIP-8 metal case
- EN 50155 railway approval
- Ultra wide 4:1 Input: 9–36, 18–75 and 43–160 VDC
- I/O-isolation 3'000 VDC
- Fully regulated outputs
- Operating temperature range –40°C to +80°C
- Short circuit protection and current limitation
- Remote On/Off
- 3-year product warranty



The TMR 6WIR series is a set of 6 Watt DC/DC converters in a SIP-8 metal case. They operate up to 60°C environment temperature at full load and up to 80°C with a 50% load derating. With EN 50155 and UL 60950-1 certification, 3'000 VDC I/O-isolation voltage, external On/Off, current limitation and short circuit protection they cover a wide range of application when space is limited. The input of the converters is designed for a wide voltage range (4:1) and minimum load is not required.

Models						
Order Code	Input Voltage Range	Output 1		Output 2		Efficiency typ.
		Vnom	I <sub>max</sub>	Vnom	I <sub>max</sub>	
TMR 6-2410WIR	9 - 36 VDC (24 VDC nom.)	3.3 VDC	1'500 mA			81 %
TMR 6-2411WIR		5 VDC	1'200 mA			84 %
TMR 6-2419WIR		9 VDC	666 mA			86 %
TMR 6-2412WIR		12 VDC	500 mA			87 %
TMR 6-2413WIR		15 VDC	400 mA			88 %
TMR 6-2415WIR		24 VDC	250 mA			87 %
TMR 6-2421WIR		+5 VDC	600 mA	-5 VDC	600 mA	84 %
TMR 6-2422WIR		+12 VDC	250 mA	-12 VDC	250 mA	87 %
TMR 6-2423WIR		+15 VDC	200 mA	-15 VDC	200 mA	87 %
TMR 6-4810WIR		18 - 75 VDC (48 VDC nom.)	3.3 VDC	1'500 mA		
TMR 6-4811WIR	5 VDC		1'200 mA			84 %
TMR 6-4819WIR	9 VDC		666 mA			85 %
TMR 6-4812WIR	12 VDC		500 mA			87 %
TMR 6-4813WIR	15 VDC		400 mA			87 %
TMR 6-4815WIR	24 VDC		250 mA			87 %
TMR 6-4821WIR	+5 VDC		600 mA	-5 VDC	600 mA	84 %
TMR 6-4822WIR	+12 VDC		250 mA	-12 VDC	250 mA	87 %
TMR 6-4823WIR	+15 VDC		200 mA	-15 VDC	200 mA	87 %
TMR 6-7210WIR	43 - 160 VDC (110 VDC nom.)		3.3 VDC	1'500 mA		
TMR 6-7211WIR		5 VDC	1'200 mA			83 %
TMR 6-7219WIR		9 VDC	666 mA			85 %
TMR 6-7212WIR		12 VDC	500 mA			86 %
TMR 6-7213WIR		15 VDC	400 mA			86 %
TMR 6-7215WIR		24 VDC	250 mA			86 %
TMR 6-7221WIR		+5 VDC	600 mA	-5 VDC	600 mA	83 %
TMR 6-7222WIR		+12 VDC	250 mA	-12 VDC	250 mA	86 %
TMR 6-7223WIR		+15 VDC	200 mA	-15 VDC	200 mA	86 %

### Input Specifications

Input Current	- at no load	24 Vin models: <b>6 mA typ.</b> 48 Vin models: <b>6 mA typ.</b> 110 Vin models: <b>2 mA typ.</b>
Surge Voltage		24 Vin models: <b>50 VDC max.</b> (1 s max.) 48 Vin models: <b>100 VDC max.</b> (1 s max.) 110 Vin models: <b>185 VDC max.</b> (1 s max.)
Recommended Input Fuse		24 Vin models: <b>1250 mA</b> (slow blow) 48 Vin models: <b>630 mA</b> (slow blow) 110 Vin models: <b>315 mA</b> (slow blow)
Input Filter		<b>Internal Capacitor</b>

### Output Specifications

Voltage Set Accuracy		<b>±1% max.</b>
Regulation	- Input Variation (Vmin - Vmax)	single output models: <b>0.2% max.</b> dual output models: <b>0.2% max.</b>
	- Load Variation (0 - 100%)	single output models: <b>0.5% max.</b> dual output models: <b>1% max.</b> (Output 1) <b>1% max.</b> (Output 2)
	- Cross Regulation (25% / 100% asym. load)	dual output models: <b>5% max.</b>
Ripple and Noise	- 20 MHz Bandwidth	<b>75 mVp-p max.</b> <b>50 mVp-p typ.</b>
Capacitive Load	- single output	3.3 Vout models: <b>2'200 µF max.</b> 5 Vout models: <b>1'100 µF max.</b> 9 Vout models: <b>680 µF max.</b> 12 Vout models: <b>470 µF max.</b> 15 Vout models: <b>470 µF max.</b> 24 Vout models: <b>180 µF max.</b>
	- dual output	5 / -5 Vout models: <b>680 / 680 µF max.</b> 12 / -12 Vout models: <b>330 / 330 µF max.</b> 15 / -15 Vout models: <b>180 / 180 µF max.</b>
Minimum Load		<b>Not required</b>
Temperature Coefficient		<b>±0.02 %/K max.</b>
Start-up Time		<b>50 ms typ. / 75 ms max.</b>
Short Circuit Protection		<b>Continuous, Automatic recovery</b>
Output Current Limitation		<b>180% typ. of Iout max.</b>
Transient Response	- Response Time	<b>250 µs typ.</b> (25% Load Step)

### Safety Specifications

Safety Standards	- IT / Multimedia Equipment	<b>EN 62368-1</b> <b>IEC 62368-1</b> <b>UL 62368-1</b>
	- Railway Applications	<b>EN 50155</b>
	- Certification Documents	<a href="http://www.tracopower.com/overview/tmr6wir">www.tracopower.com/overview/tmr6wir</a>
Pollution Degree		<b>PD 2</b>

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

## EMC Specifications

EMC Emissions	- Conducted Emissions	EN 55011 class A (with external filter) EN 55011 class B (with external filter) EN 55032 class A (with external filter) EN 55032 class B (with external filter)
	- Radiated Emissions	EN 55011 class A (with external filter) EN 55011 class B (with external filter) EN 55032 class A (with external filter) EN 55032 class B (with external filter) <a href="http://www.tracopower.com/overview/tmr6wir">www.tracopower.com/overview/tmr6wir</a>
	- External Filter Proposal	
EMC Immunity	- Electrostatic Discharge	EN 50155 (Railway Applications) Air: EN 61000-4-2, $\pm 8$ kV, perf. criteria A Contact: EN 61000-4-2, $\pm 6$ kV, perf. criteria A
	- RF Electromagnetic Field	EN 61000-4-3, 20 V/m, perf. criteria A
	- EFT (Burst)	EN 61000-4-4, $\pm 2$ kV, perf. criteria A
	- Surge	EN 61000-4-5, $\pm 2$ kV, perf. criteria A
	- Conducted RF Disturbances - PF Magnetic Field	Ext. Input Component: 24 Vin models: KY 220 $\mu$ F //TVS (SMDJ70A) 48 Vin models: KY 220 $\mu$ F // TVS (SMDJ120A) 110 Vin models: KY 150 $\mu$ F // TVS (SMB250A) EN 61000-4-6, 10 Vrms, perf. criteria A EN 61000-4-8, 100 A/m, perf. criteria A

## General Specifications

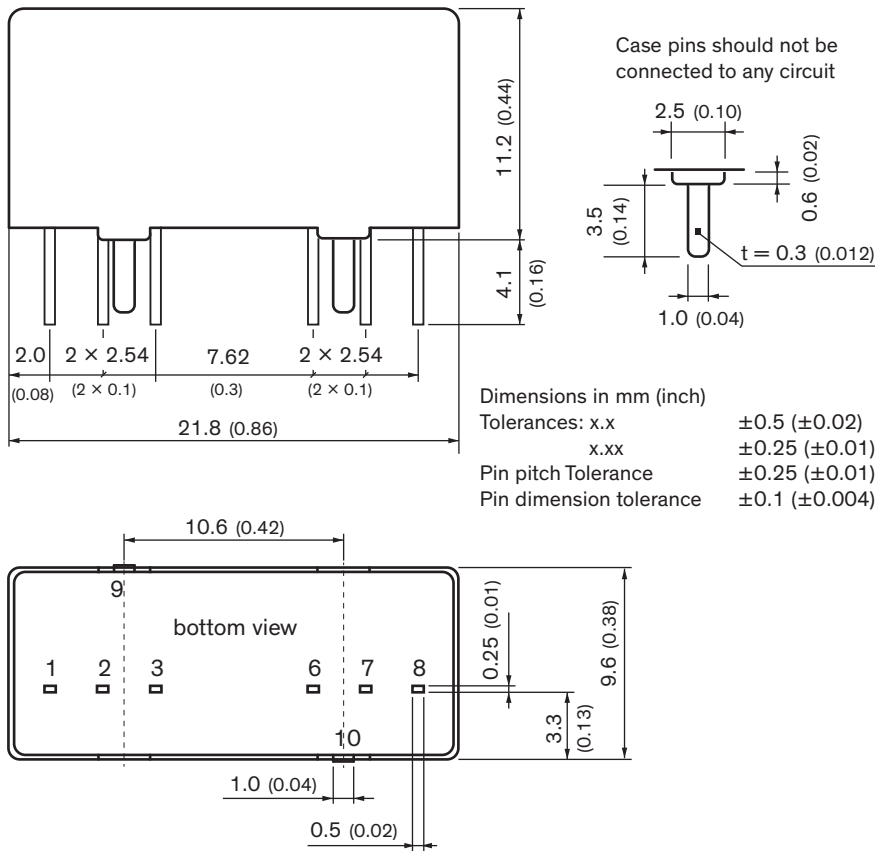
Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-40°C to +80°C
	- Case Temperature	+100°C max.
	- Storage Temperature	-55°C to +125°C
Power Derating	- High Temperature	2.5 %/K above 60°C
Cooling System		Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote	On: 0 to 0.5 VDC or open circuit Off: 3 to 12 VDC
Altitude During Operation		2'000 m max.
Switching Frequency		270 - 330 kHz (PWM) (110 Vin model) 520 - 640 kHz (PWM) (other input models)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s	3'000 VDC
	- Input to Case or PE, 60 s	1'500 VDC
Isolation Resistance	- Input to Output, 500 VDC	1'000 MOhm min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	100 pF max.
Reliability	- Calculated MTBF	2'950'000 h (MIL-HDBK-217F, ground benign)
Environment	- Vibration	MIL-STD-810F EN 61373
	- Mechanical Shock	MIL-STD-810F EN 61373
	- Thermal Shock	MIL-STD-810F
Housing Material		Copper
Potting Material		Silicone (UL94 V-0 rated)
Connection Type		THD (Through-Hole Device)
Weight		5.9 g
Environmental Compliance	- Reach	<a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a>
	- RoHS	<a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a>
	- Flammability (EN 45545-2)	<a href="http://www.tracopower.com/info/en45545-declaration.pdf">www.tracopower.com/info/en45545-declaration.pdf</a>

## Supporting Documents

Overview Link (for additional Documents)	<a href="http://www.tracopower.com/overview/tmr6wir">www.tracopower.com/overview/tmr6wir</a>
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**Outline Dimensions**



Pinout		
Pin	Single Output	Dual Output
1	-Vin (GND)	-Vin (GND)
2	+Vin (Vcc)	+Vin (Vcc)
3	Remote	Remote
6	+Vout	+Vout
7	-Vout	Common
8	NC	-Vout
9, 10	Case	Case

NC: No Connection