

- 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 +90°C
- Short circuit protection and current limitation
- Remote On/Off
- 3-year product warranty



The TMR 3WIR series is a set of 3 Watt DC/DC converters in a SIP-8 metal case. They operate up to 78°C environment temperature at full load and up to 90°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 _{max}	Vnom	I _{max}	
TMR 3-2410WIR	9 - 36 VDC (24 VDC nom.)	3.3 VDC	700 mA			76 %
TMR 3-2411WIR		5 VDC	600 mA			81 %
TMR 3-2419WIR		9 VDC	333 mA			81 %
TMR 3-2412WIR		12 VDC	250 mA			83 %
TMR 3-2413WIR		15 VDC	200 mA			83 %
TMR 3-2415WIR		24 VDC	125 mA			82 %
TMR 3-2421WIR		+5 VDC	300 mA	–5 VDC	300 mA	80 %
TMR 3-2422WIR		+12 VDC	125 mA	–12 VDC	125 mA	82 %
TMR 3-2423WIR		+15 VDC	100 mA	–15 VDC	100 mA	82 %
TMR 3-4810WIR	18 - 75 VDC (48 VDC nom.)	3.3 VDC	700 mA			75 %
TMR 3-4811WIR		5 VDC	600 mA			81 %
TMR 3-4819WIR		9 VDC	333 mA			81 %
TMR 3-4812WIR		12 VDC	250 mA			82 %
TMR 3-4813WIR		15 VDC	200 mA			82 %
TMR 3-4815WIR		24 VDC	125 mA			82 %
TMR 3-4821WIR		+5 VDC	300 mA	–5 VDC	300 mA	80 %
TMR 3-4822WIR		+12 VDC	125 mA	–12 VDC	125 mA	82 %
TMR 3-4823WIR		+15 VDC	100 mA	–15 VDC	100 mA	82 %
TMR 3-7210WIR	43 - 160 VDC (110 VDC nom.)	3.3 VDC	700 mA			76 %
TMR 3-7211WIR		5 VDC	600 mA			80 %
TMR 3-7219WIR		9 VDC	333 mA			81 %
TMR 3-7212WIR		12 VDC	250 mA			82 %
TMR 3-7213WIR		15 VDC	200 mA			83 %
TMR 3-7215WIR		24 VDC	125 mA			83 %
TMR 3-7221WIR		+5 VDC	300 mA	–5 VDC	300 mA	80 %
TMR 3-7222WIR		+12 VDC	125 mA	–12 VDC	125 mA	83 %
TMR 3-7223WIR		+15 VDC	100 mA	–15 VDC	100 mA	81 %

Input Specifications

Input Current	- At no load	24 Vin models: 4 mA typ. 48 Vin models: 4 mA typ. 110 Vin models: 2 mA typ.
Surge Voltage		24 Vin models: 50 VDC max. (1 s max.) 48 Vin models: 100 VDC max. (1 s max.) 110 Vin models: 185 VDC max. (1 s max.)
Recommended Input Fuse		24 Vin models: 800 mA (slow blow) 48 Vin models: 500 mA (slow blow) 110 Vin models: 160 mA (slow blow) (The need of an external fuse has to be assessed in the final application.)
Input Filter		Internal Capacitor

Output Specifications

Voltage Set Accuracy		±1% max.
Regulation	- Input Variation (Vmin - Vmax) - Load Variation (0 - 100%) - Cross Regulation (25% / 100% asym. load)	single output models: 0.2% max. dual output models: 0.2% max. single output models: 0.5% max. dual output models: 1% max. (Output 1) 1% max. (Output 2) dual output models: 5% max.
Ripple and Noise	- 20 MHz Bandwidth	75 mVp-p max. (w/ 1 μ F) 50 mVp-p typ. (w/ 1 μ F)
Capacitive Load	- single output - dual output	3.3 Vout models: 1'100 μF max. 5 Vout models: 550 μF max. 9 Vout models: 340 μF max. 12 Vout models: 240 μF max. 15 Vout models: 240 μF max. 24 Vout models: 90 μF max. 5 / -5 Vout models: 340 / 340 μF max. 12 / -12 Vout models: 170 / 170 μF max. 15 / -15 Vout models: 90 / 90 μF max.
Minimum Load		Not required
Temperature Coefficient		±0.02 %/K max.
Hold-up Time		10 ms min. (acc. to EN 50155 Class S2, see application note for ext. capacitor calculation: www.tracopower.com/info/holdup_en50155.pdf)
Start-up Time		75 ms max.
Short Circuit Protection		Continuous, Automatic recovery
Output Current Limitation		180% typ. of Iout max.
Transient Response	- Response Time	250 μs typ. (25% Load Step)

Safety Specifications

Standards	- IT / Multimedia Equipment - Railway Applications - Certification Documents	EN 62368-1 IEC 62368-1 UL 62368-1 EN 50155 www.tracopower.com/tmr3wir-safety-cert
Energy Source	- Output, acc. to 62368-1	ES1
Power Source	- Output, acc. to 62368-1	PS1
Pollution Degree		PD 2
Over Voltage Category		Not mains connected

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

EMC Specifications

EMI (Emissions)			EN 50121-3-2 (EMC for Rolling Stock) 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) 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)
	- Conducted Emissions		
	- Radiated Emissions		
		External filter proposal:	www.tracopower.com/tmr3wir-emc-filter
EMS (Immunity)			EN 50121-3-2 (EMC for Rolling Stock) Air: EN 61000-4-2, ± 8 kV, perf. criteria A Contact: EN 61000-4-2, ± 6 kV, perf. criteria A EN 61000-4-3, 20 V/m, perf. criteria A EN 61000-4-4, ± 2 kV, perf. criteria A EN 61000-4-5, ± 2 kV, perf. criteria A Ext. input component: 24 Vin models: KY 220 μ F TVS SMDJ70A 48 Vin models: KY 220 μ F TVS SMDJ120A 110 Vin models: KY 150 μ F TVS SMDJ250A EN 61000-4-6, 10 Vrms, perf. criteria A Continuous: EN 61000-4-8, 100 A/m, perf. criteria A 1 s: EN 61000-4-8, 1000 A/m, perf. criteria A
	- Electrostatic Discharge		
	- RF Electromagnetic Field		
	- EFT (Burst) / Surge		
	- Conducted RF Disturbances		
	- PF Magnetic Field		
EMC / Environmental		- Certification Documents	www.tracopower.com/tmr3wir-emc-cert

General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges		-40°C to +90°C +100°C max. -55°C to +125°C
	- Operating Temperature	
	- Case Temperature	
	- Storage Temperature	
Power Derating		4.55 %/K above 78°C
	- High Temperature	
		See application note: www.tracopower.com/tmr3wir-cc
Cooling System		Natural convection (20 LFM)
Remote Control		On: 0 to 0.5 VDC or open circuit Off: 3 to 12 VDC Refers to 'Remote' and '-Vin' Pin 2.5 mA typ. 0.5 to 3.5 mA
	- Voltage Controlled Remote (passive = on)	
	- Off Idle Input Current	
	- Remote Pin Input Current	
Altitude During Operation		5'000 m max.
Switching Frequency		270 - 330 kHz (PWM) (110 Vin model) 360 - 440 kHz (PWM) (other input models)
Insulation System		Functional Insulation
Isolation Test Voltage		3'000 VDC 1'500 VDC 1'500 VDC
	- Input to Output, 60 s	
	- Input to Case, 60 s	
	- Output to Case, 60 s	
Isolation Resistance		1'000 M Ω min.
Isolation Capacitance		100 pF max.
	- Input to Output, 500 VDC	
	- Input to Output, 100 kHz, 1 V	
Reliability		5'535'000 h (MIL-HDBK-217F, ground benign)
	- Calculated MTBF	
Washing Process		According to Cleaning Guideline www.tracopower.com/info/cleaning.pdf
Environment		MIL-STD-810F EN 61373 MIL-STD-810F EN 61373 MIL-STD-810F EN 45545-2 www.tracopower.com/info/en45545-declaration.pdf
	- Vibration	
	- Mechanical Shock	
	- Thermal Shock	
	- Flammability	

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

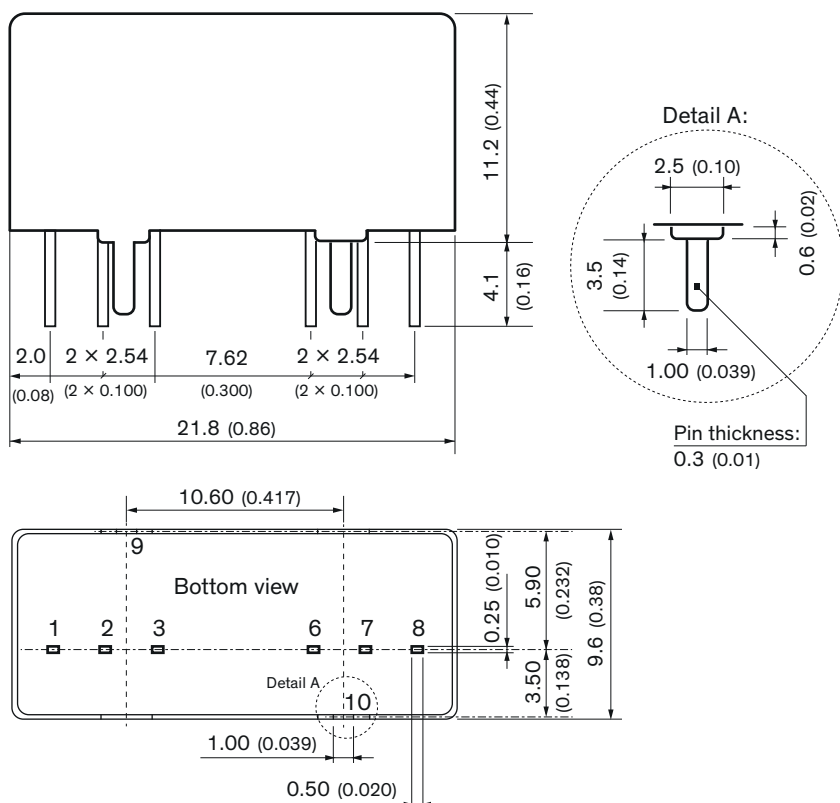
Housing Material	Copper
Potting Material	Silicone (UL 94 V-0 rated)
Pin Material	Copper
Pin Foundation Plating	Nickel (1 - 2 µm)
Pin Surface Plating	Tin (3 - 5 µm), matte
Housing Type	Metal Case
Mounting Type	PCB Mount
Connection Type	THD (Through-Hole Device)
Footprint Type	SIP8
Soldering Profile	Lead-Free Wave Soldering 265°C / 10 s max.
Weight	5.9 g
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: 7(a), 7(c)-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).) - SCIP Reference Number 09d8ed31-d8a4-4758-985e-946da87f5115

Additional Information

Supporting Documents	www.tracopower.com/overview/tmr3wir
Frequently Asked Questions	www.tracopower.com/glossary-faq
Glossary	www.tracopower.com/info/glossary.pdf

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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: Not connected

Dimensions in mm (inch)

Tolerances: x.x ±0.5 (x.xx ±0.02)

x.xx ±0.25 (x.xxx ±0.01)

Pin dimension tolerance ±0.1 (±0.004)

