

DC/DC Converter

TMR 3WIR Series, 3 Watt

- 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 current 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	Output voltage	Output current max.	Efficiency typ.
TMR 3-2410WIR	9 – 36 VDC (24 VDC nominal)	3.3 VDC	700 mA	76 %
TMR 3-2411WIR		5.0 VDC	600 mA	81 %
TMR 3-2419WIR		9.0 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	80 %
TMR 3-2422WIR		±12 VDC	±125 mA	82 %
TMR 3-2423WIR		±15 VDC	±100 mA	82 %
TMR 3-4810WIR	18 – 75 VDC (48 VDC nominal)	3.3 VDC	700 mA	75 %
TMR 3-4811WIR		5.0 VDC	600 mA	81 %
TMR 3-4819WIR		9.0 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	80 %
TMR 3-4822WIR		±12 VDC	±125 mA	82 %
TMR 3-4823WIR		±15 VDC	±100 mA	82 %
TMR 3-7210WIR	43 – 160 VDC (110 VDC nominal)	3.3 VDC	700 mA	76 %
TMR 3-7211WIR		5.0 VDC	600 mA	80 %
TMR 3-7219WIR		9.0 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	80 %
TMR 3-7222WIR		±12 VDC	±125 mA	83 %
TMR 3-7223WIR		±15 VDC	±100 mA	81 %

Input Specifications

Input current no load	24 Vin models: 4 mA typ 48 Vin models: 4 mA typ. 110 Vin models: 2 mA typ.
Surge voltage (1 s max.)	24 Vin models: 50 V max. 48 Vin models: 100 V max. 110 Vin models: 185 V max.
EMC emissions	– Conducted & Radiated input suppression EN 55011, EN 55032 class A or B (with ext. filter)
EMC immunity	– ESD (electrostatic discharge) EN 61000-4-2, air ± 8 kV, contact ± 6 kV, perf. criteria A – Radiated immunity EN 61000-4-3, 20 V/m, perf. criteria A – Fast transient / surge EN 61000-4-4, ± 2 kV, perf. criteria A (with external input capacitor / diode) EN 61000-4-5, ± 2 kV perf. criteria A 24 Vin models: Nippon chemi-con KY 220 μ F / 100 V and TVS (SMDJ70A, 70 V, 3000 W) in parallel 48 Vin models: Nippon chemi-con KY 220 μ F / 100 V and TVS (SMDJ120A, 120 V, 3000 W) in parallel 110 Vin models: Nippon chemi-con KY 150 μ F / 200 V and TVS (SMBJ250A, 250 V, 600 W) in parallel – Conducted immunity EN 61000-4-6, 10 Vrms, perf. criteria A – Magnetic field immunity EN 61000-4-8 100 A/m, continuous, perf. criteria A 1000 A/m, 1 sec., perf. criteria A
Input filter	capacitor type
Recommended input fuse	24 Vin models: 0.8 A (slow blow) 48 Vin models: 0.5 A (slow blow) 110 Vin models: 0.16 A (slow blow)

Output Specifications

Voltage set accuracy	± 1 % max.
Regulation	– Input variation (Vin min. to Vin max.) 0.2 % max. – Load variation (0 – 100 %) single output: 0.5 % max. dual output: 1 % max. – Cross regulation dual output: 5 % max. (asymmetrical load 25 % / 100 %)
Temperature coefficient	± 0.02 %/K max.
Minimum load	not required
Ripple and noise (20 MHz Bandwidth with 1 μ F / 50 V)	75 mVp-p max.
Start up time (constant resistive load)	75 ms max.
Transient response	– Recovery time (25% load step change) 250 μ s typ.
Current limitation	180% of Iout nom. typ. (hiccup)
Short circuit protection	continuous, automatic recovery
Capacitive load	– Single output 3.3 VDC models: 1100 μ F max. 5.0 VDC models: 550 μ F max. 9.0 VDC models: 340 μ F max. 12 & 15 VDC models: 240 μ F max. 24 VDC models: 90 μ F max. – Dual output ± 5 VDC models: 340 μ F max. (each output) ± 12 VDC models: 170 μ F max. (each output) $+15$ VDC models: 90 μ F max. (each output)

General Specifications

Temperature ranges	– Operating (natural convection: 20 LFM, 0.1m/s) – Case temperature – Storage temperature	–40°C to +90°C +100°C max. –55°C to +125°C
Derating		4.5%/K above 78°C
Humidity (non condensing)		5 – 95 % rel H max.

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

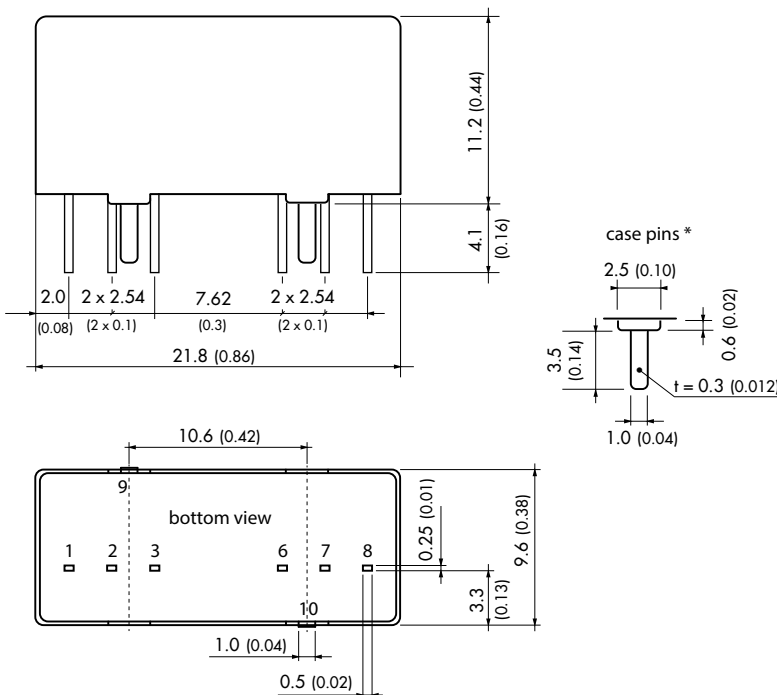
General Specifications

Isolation voltage (60 s)	– Input to output isolation voltage – Input/output to case isolation voltage	3'000 VDC 1'500 VDC
Isolation capacitance		100 pF max.
Isolation resistance (at 500 VDC)		>1 GOhm
Thermal Shock		acc. MIL-STD-810F
Shock & Vibration		acc. EN 61373, MIL-STD-810F
Reliability, calculated MTBF (MIL-HDBK-217F at +25°C, ground benign)		5'535'000 h
Switching frequency	24 & 48 Vin models: 110 Vin models:	400 kHz (±40 kHz) (pulse width modulation) 300 kHz (±30 kHz) (pulse width modulation)
Safety standards		IEC/EN/UL 60950-1, EN 50155
Remote On/Off	– On: – Off: – Off idle current:	open circuit or high impedance 2 – 4 mA current applied via 1kOhm resistor 2.5 mA max.
Environmental compliance	– Reach – RoHS – Flamability identified acc. EN 45545-2	RoHS directive 2011/65/EU

Physical Specifications

Casing material	copper
Potting material	silicone (UL94 V-0 rated)
Package weight	5.9 g (0.21 oz)

Outline Dimensions



Pin-Out		
Pin	Single	Dual
1	-Vin (GND)	-Vin (GND)
2	+Vin (Vcc)	+Vin (Vcc)
3	On/Off	On/Off
6	+Vout	+Vout
7	-Vout	Common
8	NC	-Vout
9, 10	Case	Case

Dimensions in [mm], () = Inch

Tolerances: x.x ±0.5 (±0.02)

x.xx ±0.25 (±0.01)

Pin pitch tolerance ±0.25 (±0.01)

Pin dimension tolerance ±0.1 (±0.004)

* Case pins should not be connected to any circuit