TRACO POWER

DC/DC Converter

THN 15WIR Series, 15 Watt

- **Compact 1”x1”x0.4” standard package**
- **Ultra-wide 4:1 input voltage range 9–36, 18–75, 36–160 VDC**
- **EN 50155 and EN 61373 approval for railway applications**
- **Qualification for fire behaviour according to EN 45545-2**
- **3000 VDC I/O-isolation**
- **High efficiency up to 91%**
- **Operating temperature range –40°C to +90°C**
- **Under-voltage lock out circuit**
- **Adjustable output voltage & Remote On/Off**



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The THN 15WIR series is a family of ruggedized 15 Watt DC/DC converters for highest reliability in harsh environments. The converters have an increased resistance against electromagnetic interference, shock/vibration and thermal shock. The approvals according to standards EN 50155 and EN 61373 qualify them for railway and transportation systems. The qualification for the fire behaviour of components according to EN 45545-2 and the safety approval according IEC/EN 60950-1, UL60950-1 support a potential compliance test of the application. Built-in EMI 55032 class A filter, input under-voltage-lockout, short circuit protection, remote On/Off and output voltage trim are further features which facilitate the design in.

Models

Order code	Input voltage	Output voltage	Output current max.	Efficiency typ.
THN 15-2410WIR	**9 - 36 VDC** (nominal 24 VDC)	3.3 VDC	4500 mA	88 %
THN 15-2411WIR		5.0 VDC	3000 mA	89 %
THN 15-2412WIR		12 VDC	1300 mA	89 %
THN 15-2413WIR		15 VDC	1000 mA	89 %
THN 15-2415WIR		24 VDC	625 mA	90 %
THN 15-2421WIR		±5 VDC	±1500 mA	86 %
THN 15-2422WIR		±12 VDC	±625 mA	89 %
THN 15-2423WIR		±15 VDC	±500 mA	89 %
THN 15-2425WIR		±24 VDC	±315 mA	91 %
THN 15-4810WIR	**18 - 75 VDC** (nominal 48 VDC)	3.3 VDC	4500 mA	88 %
THN 15-4811WIR		5.0 VDC	3000 mA	89 %
THN 15-4812WIR		12 VDC	1300 mA	89 %
THN 15-4813WIR		15 VDC	1000 mA	89 %
THN 15-4815WIR		24 VDC	625 mA	91 %
THN 15-4821WIR		±5 VDC	±1500 mA	86 %
THN 15-4822WIR		±12 VDC	±625 mA	90 %
THN 15-4823WIR		±15 VDC	±500 mA	89 %
THN 15-4825WIR		±24 VDC	±315 mA	90 %
THN 15-7210WIR	**36 - 160 VDC** (nominal 72 VDC)	3.3 VDC	4500 mA	88 %
THN 15-7211WIR		5.0 VDC	3000 mA	89 %
THN 15-7212WIR		12 VDC	1300 mA	89 %
THN 15-7213WIR		15 VDC	1000 mA	89 %
THN 15-7215WIR		24 VDC	625 mA	90 %
THN 15-7221WIR		±5 VDC	±1500 mA	85 %
THN 15-7222WIR		±12 VDC	±625 mA	89 %
THN 15-7223WIR		±15 VDC	±500 mA	89 %
THN 15-7225WIR		±24 VDC	±315 mA	90 %

Input Specifications

Input current no load		24 Vin models:	12 mA typ.
		48 Vin models:	10 mA typ.
		72 Vin models:	8 mA typ.
Surge voltage (1 s max.)		24 Vin models:	50 V max.
		48 Vin models:	100 V max.
		72 Vin models:	185 V max.
Start-up voltage		24 Vin models:	9 VDC (or lower)
		48 Vin models:	18 VDC (or lower)
		72 Vin models:	38 VDC (or lower)
Start-up time			40 ms max.
Under voltage shut down		24 Vin models:	8 VDC typ.
		48 Vin models:	16 VDC typ.
		72 Vin models:	35 VDC typ.
Input filter			Pi-type
Reflected input ripple current			30 mAp-p typ.
Electromagnetic compatibility (EMC), Emissions			
	– Conducted RI suppression on input		EN 55011, EN 55032 class A (internal), class B (with external components)
Electromagnetic compatibility (EMC), Immunity			
	– Electrostatic discharge (ESD)		EN 61000-4-2, ±8 kV/±6 kV, perf. criteria A
	– Radiated RF field immunity		EN 61000-4-3, 10 V/m, perf. criteria A
	– Electrical fast transient / Surge immunity		EN 61000-4-4, ±2 kV, perf. criteria A EN 61000-4-5, ±2 kV, perf. criteria A
	– with external components:	24 Vin models:	capacitor 220µF/100V and TVS (58V, 3kW)
		48 Vin models:	Nippon chemi-con KY capacitor 220µF/100V
		72 Vin models:	capacitor 150µF/200V and TVS (300V, 600W)
	– Immunity to conducted RF disturbances		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 1s, perf. criteria A

Output Specifications

Voltage set accuracy			±1 % max.
Voltage adjustability (by connecting external resistor)		12, 15 VDC models:	–10 % / +20 %
		other models:	±10 %
Regulation	– Input variation	single output:	0.2 % max.
		dual output:	0.5 % max.
	– Load variation 0 – 100 %	single output:	0.2 % max.
		dual output	1 % max.
	– cross regulation (asymmetrical load 25%/100 %)		5 % max.
Minimum load			not required
Ripple and noise (20 MHz Bandwidth)	–Single output	3.3 & 5.0 VDC models:	75 mVp-p typ. (with 10 µF / 6.3 V X7R MLCC)
		12 & 15 VDC models:	100 mVp-p typ. (with 1 µF / 25 V X7R MLCC)
		24 VDC model:	125 mVp-p typ. (with 2.2 µF / 50 V X7R MLCC)
	–Dual output	5 VDC model:	75 mVp-p typ. (each 10 µF / 6.3 V X7R MLCC)
		12 & 15 VDC models:	100 mVp-p typ. (each 1 µF / 25 V X7R MLCC)
		24 VDC model:	125 mVp-p typ. (each 2.2 µF / 50 V X7R MLCC)
Transient Response (25% load step change)			
	– Recovery time		250 µs typ.

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

Output Specifications (continued)

Current limitation			at 170% typ. of Iout max.
Short circuit protection			continuous, automatic recovery
Overvoltage protection		3.3 VDC model:	3.7 – 5.4 VDC
		5.0 VDC model:	5.6 – 7.0 VDC
		12 VDC model:	13.5 – 19.6 VDC
		15VDC model:	18.3 – 22.0 VDC
		24 VDC model:	29.1 – 32.5 VDC
Capacitive load	–Single output	3.3 VDC models:	5‘200 µF max.
		5.0 VDC models:	3‘600 µF max.
		12 VDC models:	600 µF max.
		15 VDC models:	500 µF max.
		24 VDC models:	200 µF max.
	–Dual output	±5 VDC models:	±1‘500 µF max. (each output)
		±12 VDC models:	±360 µF max. (each output)
		±15 VDC models:	±250 µF max. (each output)
		±24VDC models:	±100 µF max. (each output)

General Specifications

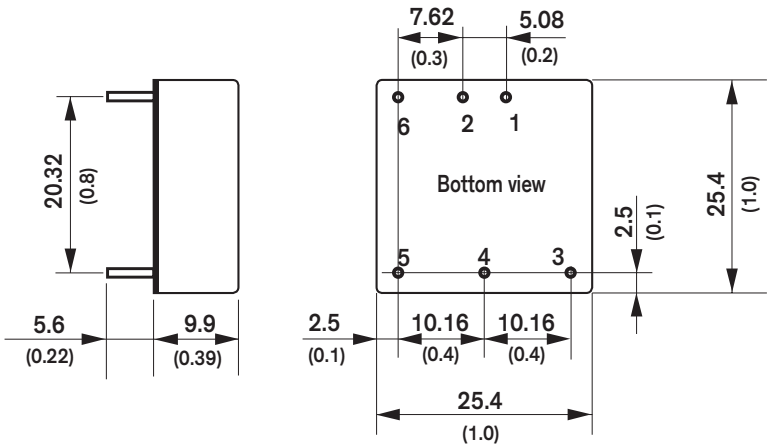
Temperature ranges	– Operating (convection cooling 20LFM, 0,1m/s)	–40°C to +90°C (with derating)
	– Case temperature	+105°C max.
	– Storage temperature	–55°C to +125°C
Derating		3.3 %/K above 75°C
Humidity (non condensing)		5 – 95 % rel H max.
Temperature coefficient		±0.02 %/K max.
Thermal shock		acc. MIL-STD-810F
Shock & Vibration		acc. MIL-STD-810F, EN61373
Isolation voltage	– I/O isolation voltage (60 sec.)	3’000 VDC
	– Input to Case isolation voltage (60 sec.)	1’600 VDC
Isolation capacitance (input/output)		3‘000 pF max.
Isolation resistance (input/output)		>1 Gohm
Reliability, calculated MTBF (MIL-HDBK-217F at +25°C, ground benign)		1‘600‘000 h
Switching frequency	3.3 & 5.0 VDC models:	245 kHz typ. (±25 kHz)
	other models:	300 kHz typ. (±30 kHz)
Remote On/Off	– On:	3.0 ... 15 VDC or open circuit
	– Off:	0 ... 1.2 VDC or short circuit pin 6 and pin 2
	– Off idle current:	2.5 mA typ.
Safety standards /approvals		IEC/EN 60950-1 UL 60950-1
	– Certification documents	www.tracopower.com/overview/thn15wir
Environmental compliance	– Reach	www.tracopower.com/products/reach-declaration.pdf
	– RoHS	RoHS directive 2011/65/EU
	– Flammability identified acc. EN 45545-2	www.tracopower.com/info/en45545-declaration.pdf

Physical Specifications

Casing material	copper
Base material	FR4 PCB
Potting material	Silicone (UL94 V-0 rated)
Package weight	16.5 g (0,58 oz)
Soldering temperature	260°C / 10 s max.

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

Outline Dimensions



Pin-Out		
Pin	**Single**	**Dual**
1	+Vin	+Vin
2	–Vin	–Vin
3	+Vout	+Vout
4	Trim	Common
5	–Vout	–Vout
6	On/Off	On/Off

Dimensions in [mm], () = Inch
Tolerances: ±0.5 (0.02)
Pin pitch tolearnce: ±0.25 (0.01)
Pin diameter: 1.0 (0.04) ±0.1 (0.004)

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