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TRACO POWER

DC/DC Converter

THR 3WI Series, 3 Watt

- **Reinforced I/O-isolation 3000 VAC**
- **Shock and vibration resistance according to EN 61373**
- **Wide 4:1 input voltage range: 9-36, 18-75, 40-160 VDC**
- **Operating temperature range -40 to +92°C**
- **Internal EN 55032 class A filter**
- **High efficiency up to 85%**
- **Protection against overload, overvoltage and short circuit**
- **3-year product warranty**



UL 62368-1 IEC 62368-1

The THR 3WI is 3 Watt DC/DC converters series with reinforced isolation (3000 VAC). These regulated DC/DC converters come in either a DIP-24 package and also feature increased resistance against shock and vibration according to EN 61373. The THR 3WI offers an internal input filter to comply with EN 55032 class A. High efficiencies up to 85% allow safe operation from –40°C to +92°C (with derating). All models have a wide 4:1 input voltage range and precisely regulated, isolated output voltages. With the latest IT safety certifications (IEC/EN/UL 62368-1) the THR 3WI series is the perfect choice for many demanding applications in the industrial, transportation and instrumentation sectors.

Models

Order Code	Input Voltage Range	Output 1		Output 2		Efficiency
		Vnom	Imax	Vnom	Imax	typ.
THR 3-2411WI	9 - 36 VDC (24 VDC nom.)	5 VDC	600 mA			80 %
THR 3-2412WI		12 VDC	250 mA			84 %
THR 3-2413WI		15 VDC	200 mA			85 %
THR 3-2422WI		+12 VDC	125 mA	–12 VDC	125 mA	83 %
THR 3-2423WI		+15 VDC	100 mA	–15 VDC	100 mA	84 %
THR 3-4811WI	18 - 75 VDC (48 VDC nom.)	5 VDC	600 mA			80 %
THR 3-4812WI		12 VDC	250 mA			83 %
THR 3-4813WI		15 VDC	200 mA			84 %
THR 3-4822WI		+12 VDC	125 mA	–12 VDC	125 mA	83 %
THR 3-4823WI		+15 VDC	100 mA	–15 VDC	100 mA	83 %
THR 3-7211WI	40 - 160 VDC (110 VDC nom.)	5 VDC	600 mA			80 %
THR 3-7212WI		12 VDC	250 mA			84 %
THR 3-7213WI		15 VDC	200 mA			84 %
THR 3-7222WI		+12 VDC	125 mA	–12 VDC	125 mA	83 %
THR 3-7223WI		+15 VDC	100 mA	–15 VDC	100 mA	85 %

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Input Specifications

Input Current	- At no load	24 Vin models:	9 mA typ.
		48 Vin models:	5 mA typ.
		110 Vin models:	3 mA typ.
	- At full load	24 Vin models:	150 mA typ.
		48 Vin models:	75 mA typ.
		110 Vin models:	33 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:	170 VDC max. (1 s max.)
Under Voltage Lockout		24 Vin models:	7.5 VDC typ.
		48 Vin models:	16 VDC typ.
		110 Vin models:	37 VDC typ.
Recommended Input Fuse		24 Vin models:	500 mA (slow blow)
		48 Vin models:	250 mA (slow blow)
		110 Vin models:	100 mA (slow blow)
			(The need of an external fuse has to be assessed in the final application.)
Input Filter			Internal Pi-Type

Output Specifications

Voltage Set Accuracy			±1% 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.
	- Cross Regulation (25% / 100% asym. load)	dual output models:	5% max.
Ripple and Noise (20 MHz Bandwidth)	- single output	5 Vout models:	50 mVp-p typ. (w/ 10 µF, 25 V MLCC)
		12 Vout models:	75 mVp-p typ. (w/ 10 µF, 25 V MLCC)
		15 Vout models:	75 mVp-p typ. (w/ 10 µF, 25 V MLCC)
	- dual output	12 / -12 Vout models:	75 / 75 mVp-p typ. (w/ 10 µF, 25 V MLCC)
		15 / -15 Vout models:	75 / 75 mVp-p typ. (w/ 10 µF, 25 V MLCC)
Capacitive Load	- single output	5 Vout models:	680 µF max.
		12 Vout models:	330 µF max.
		15 Vout models:	220 µF max.
	- dual output	12 / -12 Vout models:	220 / 220 µF max.
		15 / -15 Vout models:	220 / 220 µF max.
Minimum Load			Not required
Temperature Coefficient			±0.02 %/K max.
Start-up Time			60 ms max.
Short Circuit Protection			Continuous, Automatic recovery
Output Current Limitation			150% typ. of Iout max.
Transient Response	- Response Deviation		3% typ. / 5% max. (75% to 100% Load Step)
	- Response Time		500 µs max. (75% to 100% Load Step)

Safety Specifications

Safety Standards	- IT / Multimedia Equipment	EN 62368-1 IEC 62368-1 UL 62368-1
	- Certification Documents	www.tracopower.com/overview/thr3wi
Pollution Degree		PD 2

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

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EMC Specifications

EMI Emissions	- Conducted Emissions		EN 55011 class A (internal filter)
			EN 55032 class A (internal filter)
			FCC Part 15 class A (internal filter)
	- Radiated Emissions		EN 55011 class A (internal filter)
			EN 55032 class A (internal filter)
			FCC Part 15 class A (internal filter)
EMS Immunity			EN 55024 (IT Equipment)
			EN 55035 (Multimedia)
	- Electrostatic Discharge	Air:	EN 61000-4-2, ±8 kV, perf. criteria A
		Contact:	EN 61000-4-2, ±6 kV, perf. criteria A
	- RF Electromagnetic Field		EN 61000-4-3, 10 V/m, perf. criteria A
	- EFT (Burst) / Surge		EN 61000-4-4, ±2 kV, perf. criteria A
			EN 61000-4-5, ±2 kV, perf. criteria A
		Ext. input component:	24 Vin models: 470 µF chemi-con KY
			48 Vin models: 330 µF chemi-con KY
			110 Vin models: 220 µF chemi-con KY
	- Conducted RF Disturbances		EN 61000-4-6, 10 Vrms, perf. criteria A
	- PF Magnetic Field	Continuous:	EN 61000-4-8, 100 A/m, perf. criteria A
		1 s:	EN 61000-4-8, 1000 A/m, perf. criteria A

General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	–40°C to +92°C
	- Case Temperature	+105°C max.
	- Storage Temperature	–50°C to +125°C
Power Derating	- High Temperature	4 %/K above 80°C
	See application note:	www.tracopower.com/overview/thr3wi
Cooling System		Natural convection (20 LFM)
Altitude During Operation		5'000 m max.
Switching Frequency		150 - 190 kHz (PWM) (110 Vin models)
		260 - 310 kHz (PWM) (other models)
Insulation System		Reinforced Insulation
Working Voltage (rated)		250 VAC
Isolation Test Voltage	- Input to Output, 60 s	3'000 VAC
Isolation Resistance	- Input to Output, 500 VDC	1'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	1'500 pF typ.
Reliability	- Calculated MTBF	3'360'000 h (MIL-HDBK-217F, ground benign)
Washing Process		According to Cleaning Guideline
		www.tracopower.com/info/cleaning.pdf
Environment	- Vibration	EN 61373
	- Mechanical Shock	EN 61373
Housing Material		Non-conductive Plastic (UL 94 V-0 rated)
Base Material		Non-conductive Plastic (UL 94 V-0 rated)
Potting Material		Silicone (UL 94 V-0 rated)
Pin Material		Copper Alloy (C6801)
Pin Foundation Plating		Nickel (2 - 4 µm)
Pin Surface Plating		Tin (3 - 5 µm), matte
Housing Type		Plastic Case
Mounting Type		PCB Mount
Connection Type		THD (Through-Hole Device)
Footprint Type		DIP24
Soldering Profile		Wave Soldering
		260°C / 10 s max.
Weight		15.4 g

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

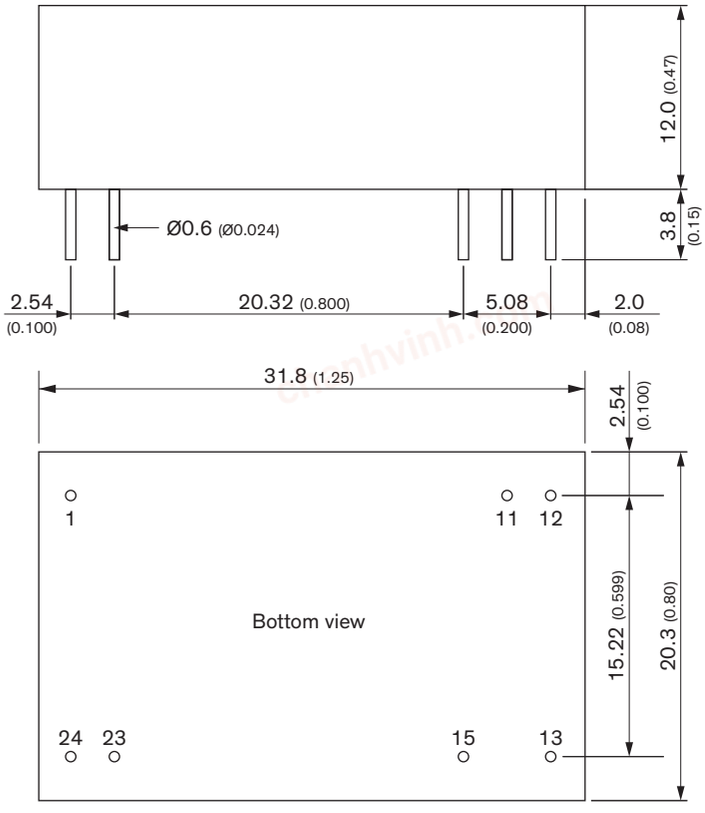
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Environmental Compliance	- REACH Declaration	www.tracopower.com/info/reach-declaration.pdf
		REACH SVHC list compliant
		REACH Annex XVII compliant
	- RoHS Declaration	www.tracopower.com/info/rohs-declaration.pdf
		Exemptions: 7a
		(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number	349433b6-2631-490a-8f38-b235a83230ea

Supporting Documents

Overview Link (for additional Documents)	www.tracopower.com/overview/thr3wi

Outline Dimensions



Dimensions in mm (inch)
Tolerances: x.x ±0.5 (±0.02)
x.xx ±0.25 (±0.01)
Pin diameter tolerances: x.x ±0.05 (x.xx ±0.002)

Pinout		
Pin	**Single**	**Dual**
1	+Vin (Vcc)	+Vin (Vcc)
11	No pin	Common
12	–Vout	No pin
13	+Vout	–Vout
15	No pin	+Vout
23	–Vin (GND)	–Vin (GND)
24	–Vin (GND)	–Vin (GND)

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