

- Wide 4:1 input voltage
- I/O isolation 5000 VACrms rated for 250 VACrms working voltage
- Certification according to IEC/EN/ES 60601-1 3rd edition for 2xMOPP
- Risk management process according to ISO 14971 including risk management file
- Acceptance criteria for electronic assemblies according to IPC-A-610 Level 3
- Low leakage current
- Extended operating temperature range -40°C to 90°C.
- Input filter to meet EN55022 class A
- Operating up to 5000m altitude
- 5 year product warranty A



The THM-3WI series is a range of medical 3 Watt DC/DC converters in DIP-24 plastic package and with ultra-wide 4:1 input voltage range. They provide a reinforced isolation system for 5000 VACrms isolation and a very low leakage current of less than 2 μ A. The units are approved to IEC/EN/ES 60601-1 3rd edition for 2 $\times$ MOPP (Means Of Patient Protection) and come along with an ISO 14971 risk management file. Design and production conform to the quality management system ISO 13485. With a high efficiency of up to 87% and highest grade components the converters can reliably operate in an ambient temperature range of -40°C up to +90°C. They constitute a reliable solution not only for medical equipment but also for demanding ranges of application such as transportation, control & measurement or IGBT drivers.

Models

Order code	Input voltage range	Output voltage	Output current max.	Efficiency typ.
THM 3-0510WI	4.5 – 9 VDC (5 VDC nominal)	3.3 VDC	1000 mA	81.0 %
THM 3-0511WI		5.0 VDC	600 mA	84.5 %
THM 3-0512WI		12 VDC	250 mA	85.5 %
THM 3-0513WI		15 VDC	200 mA	87.5 %
THM 3-0515WI		24 VDC	125 mA	85.5 %
THM 3-0521WI		± 5.0 VDC	± 300 mA	83.0 %
THM 3-0522WI		± 12 VDC	± 125 mA	86.0 %
THM 3-0523WI		± 15 VDC	± 100 mA	86.0 %
THM 3-2410WI	9.0 – 36 VDC (24 VDC nominal)	3.3 VDC	1000 mA	82.0 %
THM 3-2411WI		5.0 VDC	600 mA	84.5 %
THM 3-2412WI		12 VDC	250 mA	87.0 %
THM 3-2413WI		15 VDC	200 mA	87.0 %
THM 3-2415WI		24 VDC	125 mA	87.0 %
THM 3-2421WI		± 5.0 VDC	± 300 mA	83.0 %
THM 3-2422WI		± 12 VDC	± 125 mA	87.5 %
THM 3-2423WI		± 15 VDC	± 100 mA	86.0 %
THM 3-4810WI	18 – 75 VDC (48 VDC nominal)	3.3 VDC	1000 mA	81.0 %
THM 3-4811WI		5.0 VDC	600 mA	84.0 %
THM 3-4812WI		12 VDC	250 mA	87.0 %
THM 3-4813WI		15 VDC	200 mA	86.5 %
THM 3-4815WI		24 VDC	125 mA	86.5 %
THM 3-4821WI		± 5.0 VDC	± 300 mA	83.0 %
THM 3-4822WI		± 12 VDC	± 125 mA	86.0 %
THM 3-4823WI		± 15 VDC	± 100 mA	86.0 %

Input Specifications

Input current no load		5 Vin models: 20 mA typ. 24 Vin models: 6 mA typ. 48 Vin models: 4 mA typ.
Surge voltage (3 sec. max.)		5 Vin models: 16 V max. 24 Vin models: 50 V max. 48 Vin models: 100 V max.
Start-up voltage		5 Vin models: 4.5 VDC (or lower) 24 Vin models: 9 VDC (or lower) 48 Vin models: 18 VDC (or lower)
Startup time		30 ms
Under voltage shut down		5 Vin models: 4 VDC typ. 24 Vin models: 8 VDC typ. 48 Vin models: 16 VDC typ.
Conducted noise		EN55022 class A (internal 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, 10 V/m, perf. criteria A
	– Fast transient / surge (with external input capacitor / diode)	EN 61000-4-4, ± 2 kV, perf. criteria A EN 61000-4-5, ± 2 kV perf. criteria A
	– Conducted immunity – Magnetic field immunity	5 Vin models: Nippon chemi-con KY 1000 μ F/ 25 V and reverse diode (Vishay V10P45) in parallel 24 Vin models: Nippon chemi-con KY 470 μ F/ 50 V 48 Vin models: Nippon chemi-con KY 330 μ F/ 100 V EN 61000-4-6, 10 Vrms, perf. criteria A EN 61000-4-8 100 A/m, continuous, perf. criteria A 1000 A/m, 1 sec., perf. criteria A
External input fuse required (recommended values, slow blow type)		5 Vin models: 2.5 A 24 Vin models: 1.5 A 48 Vin models: 1 A

Output Specifications

Voltage set accuracy		± 1 % max.
Regulation	– Input variation	single output: 0.2 % max. dual output: 0.5 % max.
	– Load variation 0 – 100 %	single output: 0.2 % max. dual output: 1.0 % max.
	– Cross regulation	dual output: 5.0 % max. (asymmetrical load 25/100%)
Minimum load		not required
Ripple and noise (20 MHz Bandwidth)		3.3 & 5.0 VDC models: 30 mVp-p typ. with cap. 10 μ F/25 V X7R MLCC 12 & 15 VDC models: 40 mVp-p typ. with cap. 10 μ F/25 V X7R MLCC 24 VDC models: 50 mVp-p typ. with cap. 4.7 μ F/50 V X7R MLCC
Transient response – Recovery time (25% load step change)		250 μ s typ.
Over load protection		at 150 % typ. of lout rated (hiccup mode)
Short circuit protection		Continuous, automatic recovery
Over voltage protection	–Single output	3.3 VDC models: 3.7 – 5.0 VDC 5.0 VDC models: 5.6 – 7.0 VDC 12 VDC models: 13.5 – 16.0 VDC 15 VDC models: 18.3 – 22.0 VDC
		24 VDC models: 29.1 – 34.5 VDC
	–Dual output	± 5 VDC models: 5.6 – 7.0 VDC ± 12 VDC models: 13.5 – 18.2 VDC ± 15 VDC models: 17.0 – 22.0 VDC

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

General Specifications

Capacitive load	–Single output	3.3 VDC models:	1'050 µF max.
		5.0 VDC models:	750 µF max.
		12 VDC models:	130 µF max.
		15 VDC models:	100 µF max.
		24 VDC models:	39 µF max.
	–Dual output	±5 VDC models:	430 µF max. (each output)
		±12 VDC models:	75 µF max. (each output)
		±15 VDC models:	56 µF max. (each output)
Temperature ranges	– Operating (designed for)	–40°C to +90°C (without derating)	
	– Rated according to IEC/EN 60601-1	–40°C to +80°C (without derating)	
	– Case temperature	+105°C max.	
	– Storage temperature	–55°C to +125°C	
Thermal impedance		18 °C/W	
Humidity (non condensing)		5 % to 95 % rel H max.	
Isolation voltage (50Hz, 60sec)	– to meet ES/IEC/EN 60601-1	5000 VACrms, rated for 250 VACrms working voltage, 2 × MOPP	
Clearance/creepage		8 mm min.	
Leakagecurrent (at 240 VAC, 60 Hz)		2 µA max.	
Isolation capacitance (input/output)		17 pF max.	
Altitude during operation		5000 m	
Temperature coefficient		±0.02 %/K typ.	
Reliability, calculated MTBF (MIL-HDBK-217F at +25°C, ground benign)		6'400'000 h	
Switching frequency		150 kHz ±15 kHz (pulse width modulation)	
Vibration and thermal shock resistance		according to MIL-STD-810F	
Safety standards/approvals	– Medical equipment	ANSI/AAMI ES60601-1:2005/(R)2012, IEC/EN60601-1 3rd edition	
	– Certification documents	www.tracopower.com/products/overview/thm3wi	
Environmental compliance	– Reach	www.tracopower.com/products/reach-declaration.pdf	
	– RoHS	RoHS directive 2011/65/EU	

Physical Specifications

Casing material	non-conductive black plastic
Base material	non-conductive black plastic
Potting material	silicone (UL94 V-0 rated)
Package weight	14 g (0.48oz)
Soldering temperature	max. 265°C / 10 sec

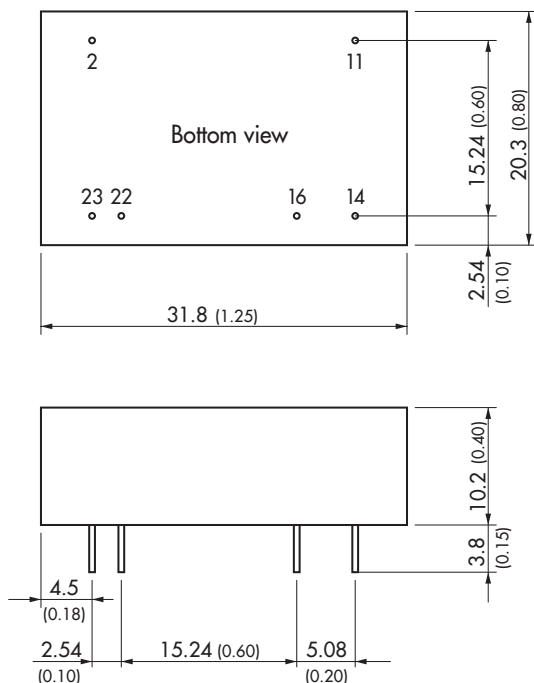


- The component is not be used in an oxygen rich environment.
- The component is not to be used in conjunction with flammable anaesthetics and agents.
- The component has to be disposed appropriately. Please refer to local regulations (Waste Electrical and Electronic Equipment).
- A modification of the component is not allowed.

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

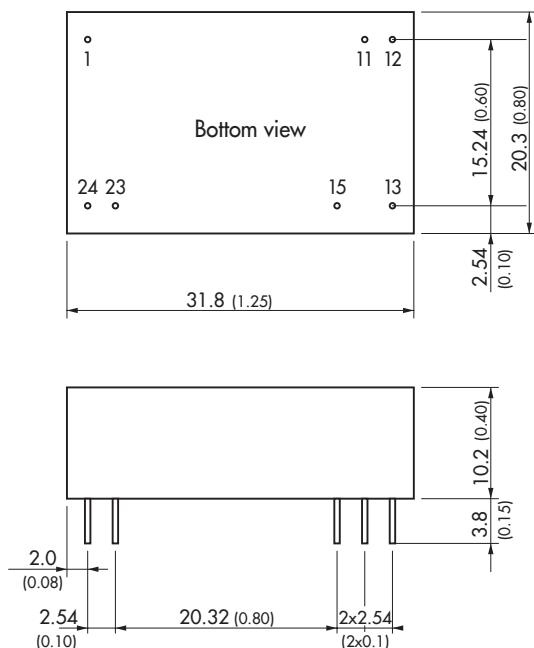
Outline Dimensions

Standard pinning



Standard Pinout		
Pin	Single	Dual
2	-Vin (GND)	-Vin (GND)
11	No con.	-Vout
14	+Vout	+Vout
16	-Vout	Common
22	+Vin (Vcc)	+Vin (Vcc)
23	+Vin (Vcc)	+Vin (Vcc)

Optional pinning: suffix **-A1**



Optional 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)

Remark: No suffix **-A1** for 5 Vin models. Corresponding parts are with THM 3 series by default.
see www.tracopower.com/overview/thm3

Dimensions in [mm], () = Inch
Tolerances ± 0.5 (± 0.02)
Pin $\varnothing 0.6 \pm 0.1$ (0.024 ± 0.004)
Pin pitch tolerances ± 0.25 (± 0.01)

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TRACO Power:

<u>THM 3-4813WI</u>	<u>THM 3-0513WI</u>	<u>THM 3-2412WI</u>	<u>THM 3-0523WI</u>	<u>THM 3-0515WI</u>	<u>THM 3-4812WI</u>	<u>THM 3-4823WI</u>
<u>THM 3-0510WI</u>	<u>THM 3-2423WI</u>	<u>THM 3-0521WI</u>	<u>THM 3-4821WI</u>	<u>THM 3-2410WI</u>	<u>THM 3-4815WI</u>	<u>THM 3-0512WI</u>
<u>THM 3-0522WI</u>	<u>THM 3-2411WI</u>	<u>THM 3-2421WI</u>	<u>THM 3-2422WI</u>	<u>THM 3-0511WI</u>	<u>THM 3-2413WI</u>	