

- Ultra wide 4:1 input voltage 3 W DC/DC converter in a compact DIP-24 plastic case
- 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 < 2µA
- Extended operating temperature range -40°C to 90°C.
- EMC compliance to IEC 60601-1-2 4th edition and EN55032 class A
- Operating up to 5000m altitude
- 5 year product warranty



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 µA. The units are approved to IEC/EN/ES 60601-1 3rd edition for 2 × 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 % |

* Suffix -B2 for trim option with adjustable output
 Suffix -B3 for remote control option
 Suffix -B4 for trim + remote-control option

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 s 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. | |
| EMC emissions | <ul style="list-style-type: none"> – Conducted & Radiated input suppression – Application note for filter class B proposal | EN 55011 limits to IEC 60601-1-2 4th edition EN 55032 class A (internal filter) www.tracopower.com/overview/thm3wi |
| EMC immunity | <ul style="list-style-type: none"> – Generic for Medical equipment – ESD (electrostatic discharge) – Radiated immunity – Fast transient / surge (with external input capacitor / diode) – Conducted immunity – Magnetic field immunity | IEC/EN 60601-1-2 4th edition EN 61000-4-2, air ±8 kV, contact ±6 kV, perf. criteria A EN 61000-4-3, 10 V/m, perf. criteria A EN 61000-4-4, ±2 kV, perf. criteria A EN 61000-4-5, ±2 kV perf. criteria A 5 Vin models: Nippon chemi-con KY 1000 µF/ 25 V and reverse diode (Vishay V10P45) in parallel 24 Vin models: Nippon chemi-con KY 470 µF/ 50 V 48 Vin models: Nippon chemi-con KY 330 µF/ 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: 1.6 A 24 Vin models: 0.8 A 48 Vin models: 0.5 A | |

Output Specifications

| | | |
|--|--|--|
| Voltage set accuracy | | $\pm 1\%$ max. |
| Output voltage adjustment (for THM 3WI -B2 / -B4 option models only) | | |
| – Single output | 15 & 24 Vout models: | $-10 / +20\%$ other models: $\pm 10\%$ |
| – Dual output | 5, 12 & 15 Vout models: | $\pm 10\%$ |
| Regulation | | |
| – Input variation | single output: | 0.2% max. dual output: 0.5% max. |
| – Load variation (0 – 100 %) | single output: | 0.2% max. dual output: 1.0% 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 Vout models: | 30 mVp-p typ. with cap. 10 μ F/25 V X7R MLCC |
| | 12 & 15 Vout models: | 40 mVp-p typ. with cap. 10 μ F/25 V X7R MLCC |
| | 24 Vout models: | 50 mVp-p typ. with cap. 4.7 μ F/50 V X7R MLCC |
| Transient response | – Recovery time (25% load step change) | 250 μs typ. |
| Over load protection | | at 150 % typ. of Iout rated (hiccup mode) |
| Short circuit protection | | Continuous, automatic recovery |
| Over voltage protection | | |
| – Single output | 3.3 Vout models: | 3.7 – 5.0 VDC |
| | 5.0 Vout models: | 5.6 – 7.0 VDC |
| | 12 Vout models: | 13.5 – 16.0 VDC |
| | 15 Vout models: | 18.3 – 22.0 VDC |
| | 24 Vout models: | 29.1 – 34.5 VDC |
| – Dual output | ± 5 Vout models: | 5.6 – 7.0 VDC |
| | ± 12 Vout models: | 13.5 – 18.2 VDC |
| | ± 15 Vout 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 Vout models: 1'050 µF max. 5.0 Vout models: 750 µF max. 12 Vout models: 130 µF max. 15 Vout models: 100 µF max. 24 Vout models: 39 µF max. |
| | – Dual output | ±5 Vout models: 430 µF max. (each output) ±12 Vout models: 75 µF max. (each output) ±15 Vout 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 (50 Hz, 60 s) | – 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 |
| Remote On/Off (for THM 3WI -B3 / -B4 option models only) | – Off | 2.2 – 12 VDC (referred to -Vin pin) |
| | – On | open circuit or 0 – 1.2 VDC (referred to -Vin pin) |
| | – Off idle current | 2.5 mA typ. |
| | – Remote pin input current | –0.5 mA min. 1 mA max. |
| | | |
| Safety standards/approvals | – Medical equipment | ANSI/AAMI ES60601-1:2005/(R)2012, IEC/EN60601-1 3rd edition www.tracopower.com/overview/thm3wi |
| | – Certification documents | |
| Environmental compliance | – Reach | www.tracopower.com/info/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 (0.48 oz) |
| Soldering temperature | 265°C / 10 s max. |

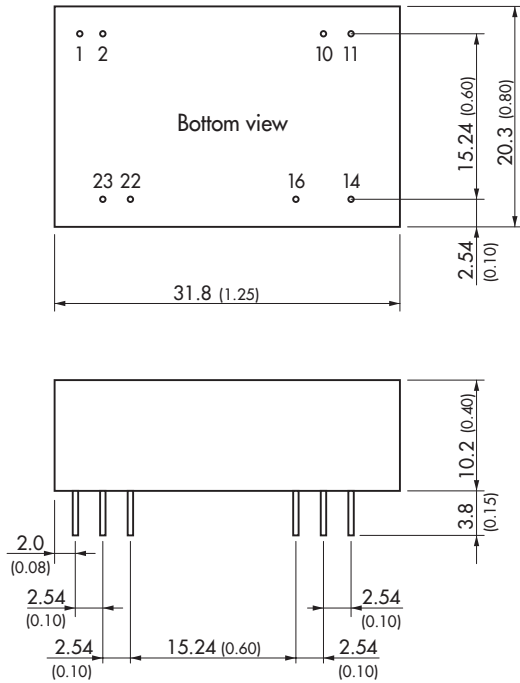


- The component is not be used in an oxygen rich environment.
- The component is not to be used in conjunction with flammable anaesthetics and agents.
- The component has to be disposed appropriately. Please refer to local regulations (Waste Electrical and Electronic Equipment).
- A modification of the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

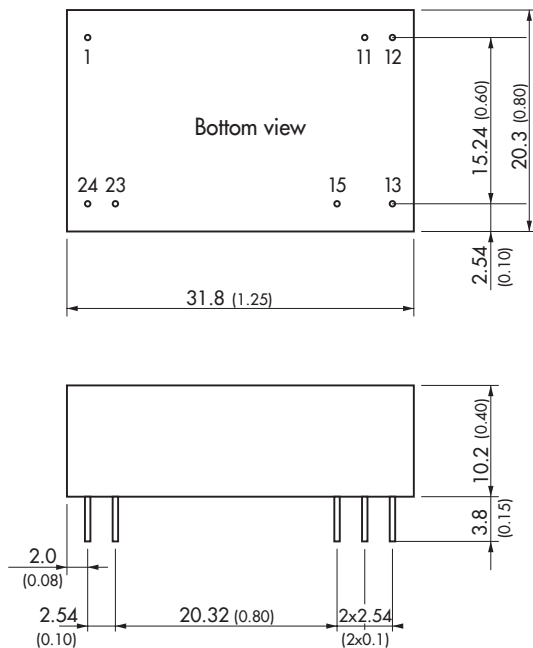
Standard pinning with options: suffix **-B2** (with Trim); **-B3** (with Remote); **-B4** (with Trim and Remote)



| Standard Pinout | | |
|-----------------|----------------|----------------|
| Pin | Single | Dual |
| 1 | No Pin*/Remote | No Pin*/Remote |
| 2 | -Vin (GND) | -Vin (GND) |
| 10 | No Pin*/Trim | No Pin*/Trim |
| 11 | No con. | -Vout |
| 14 | +Vout | +Vout |
| 16 | -Vout | Common |
| 22 | +Vin (Vcc) | +Vin (Vcc) |
| 23 | +Vin (Vcc) | +Vin (Vcc) |

*If Remote or Trim is not selected there is no pin on corresponding number

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)