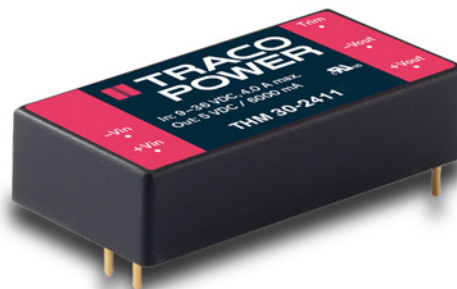


## DC/DC Converter

## THM 30WI Series, 30 Watt

- 2.0 × 1.0 " plastic case
- Ultra wide 4:1 input voltage range
- I/O isolation 5000 VACrms rated for 250 VACrms working voltage
- Certification according to IEC/EN/ES 60601-1 3rd edition for 2×MOPP
- EMC compliance to IEC 60601-1-2 4th edition
- 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 <2.5 µA
- Extended operating temperature range -40°C to 80°C.
- Input filter to meet EN55022 class A
- Operating up to 5000 m altitude
- 5 year product warranty



The THM 30WI series is a range of medical 30 Watt DC/DC converters in 2.0" x 1.0" plastic package and with 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 2.5 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 90% and highest grade components the converters can reliably operate in an ambient temperature range of -40°C up to +80°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 30-2410WI | 9.0 – 36 VDC<br>(24 VDC nominal) | 5.0 VDC        | 6000 mA             | 88.0 %          |
| THM 30-2412WI |                                  | 12 VDC         | 2500 mA             | 89.0 %          |
| THM 30-2413WI |                                  | 15 VDC         | 2000 mA             | 89.0 %          |
| THM 30-2415WI |                                  | 24 VDC         | 1250 mA             | 89.0 %          |
| THM 30-2421WI |                                  | ±5 VDC         | ±3000 mA            | 86.0 %          |
| THM 30-2422WI |                                  | ±12 VDC        | ±1250 mA            | 89.0 %          |
| THM 30-2423WI |                                  | ±15 VDC        | ±1000 mA            | 89.0 %          |
| THM 30-4810WI | 18 – 75 VDC<br>(48 VDC nominal)  | 5.0 VDC        | 6000 mA             | 89.0 %          |
| THM 30-4812WI |                                  | 12 VDC         | 2500 mA             | 89.0 %          |
| THM 30-4813WI |                                  | 15 VDC         | 2000 mA             | 89.0 %          |
| THM 30-4815WI |                                  | 24 VDC         | 1250 mA             | 89.0 %          |
| THM 30-4821WI |                                  | ±5 VDC         | ±3000 mA            | 86.5 %          |
| THM 30-4822WI |                                  | ±12 VDC        | ±1250 mA            | 90.0 %          |
| THM 30-4823WI |                                  | ±15 VDC        | ±1000 mA            | 89.5 %          |

## Input Specifications

|                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input current no load                                                | 24 Vin models: 13 mA typ.<br>48 Vin models: 10 mA typ.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Surge voltage (3 s max.)                                             | 24 Vin models: 50 V max.<br>48 Vin models: 100 V max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Start-up voltage                                                     | 24 Vin models: 9 VDC (or lower)<br>48 Vin models: 18 VDC (or lower)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Startup time                                                         | 60 ms max. (30 ms typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Under voltage shut down (lock-out circuit)                           | 24 Vin models: 7.8 - 8.6 VDC<br>48 Vin models: 15.8 - 17.4 VDC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Input filter                                                         | Pi-type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| EMI emission                                                         | EN 55011 limits to IEC 60601-1-2 4th edition<br>EN55032 class A (internal filter)<br>EN55032 class B with external components<br><a href="http://www.tracopower.com/overview/thm30wi">www.tracopower.com/overview/thm30wi</a><br>– Filter proposal                                                                                                                                                                                                                                                                                                                                                                                   |
| EMC immunity                                                         | – Generic for Medical equipment<br>– ESD (electrostatic discharge)<br><br>– Radiated immunity<br>– Fast transient / surge (with external input capacitor / diode)<br><br>– Conducted immunity<br>– Magnetic field immunity<br><br>24 Vin models: Nippon chemi-con KY 220 µF/ 100 V<br>TVS - SMDJ58A, 58V, 3000 W)<br>48 Vin models: Nippon chemi-con KY 220 µF/ 100 V<br>TVS - SMDJ120A, 120V, 3000 W)<br>EN 61000-4-2, air ±15 kV, contact ±8 kV, perf. criteria A<br>EN 61000-4-3, 10 V/m, perf. criteria A<br>EN 61000-4-4, ±2 kV, perf. criteria A<br>EN 61000-4-5, ±2 kV perf. criteria A<br>1000 A/m, 1 sec., perf. criteria A |
| External input fuse required<br>(recommended values, slow blow type) | 24 Vin models: 6.3 A<br>48 Vin models: 3.15 A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## Output Specifications

|                                                               |                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Voltage set accuracy                                          | ±1 % max.                                                                                                                                                                                                                                                                                                                     |
| Output voltage adjustment range<br>(single output modes only) | 5 & 12 VDC models: ±10 %<br>15 & 24 VDC models: -10 / +20 %                                                                                                                                                                                                                                                                   |
| Regulation                                                    | – Input variation<br>single output: 0.2 % max.<br>dual output: 0.5 % max.<br>– Load variation 0 – 100 %<br>single output: 0.2 % max.<br>dual output: 1.0 % max.<br>– Cross regulation<br>dual output: 5.0 % max. (asymmetrical load 25/100 %)                                                                                 |
| Temperature coefficient                                       | ±0.02 %/K max.                                                                                                                                                                                                                                                                                                                |
| Minimum load                                                  | not required                                                                                                                                                                                                                                                                                                                  |
| Ripple and noise<br>(20 MHz Bandwidth)                        | (±)5.0 VDC models: 50 mVp-p typ. with cap. 10 µF/25 V X7R MLCC<br>(±)12 VDC models: 75 mVp-p typ. with cap. 10 µF/25 V X7R MLCC<br>±15 VDC models: 75 mVp-p typ. with cap. 10 µF/25 V X7R MLCC<br>15 VDC models: 100 mVp-p typ. with cap. 10 µF/25 V X7R MLCC<br>24 VDC models: 100 mVp-p typ. with cap. 4.7 µF/50 V X7R MLCC |
| Transient response                                            | – Recovery time (25% load step change)<br>250 µs typ.                                                                                                                                                                                                                                                                         |
| Overload protection                                           | at 150 % typ. of I <sub>out</sub> rated (hiccup mode)                                                                                                                                                                                                                                                                         |
| Short-circuit protection                                      | Continuous, automatic recovery                                                                                                                                                                                                                                                                                                |

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

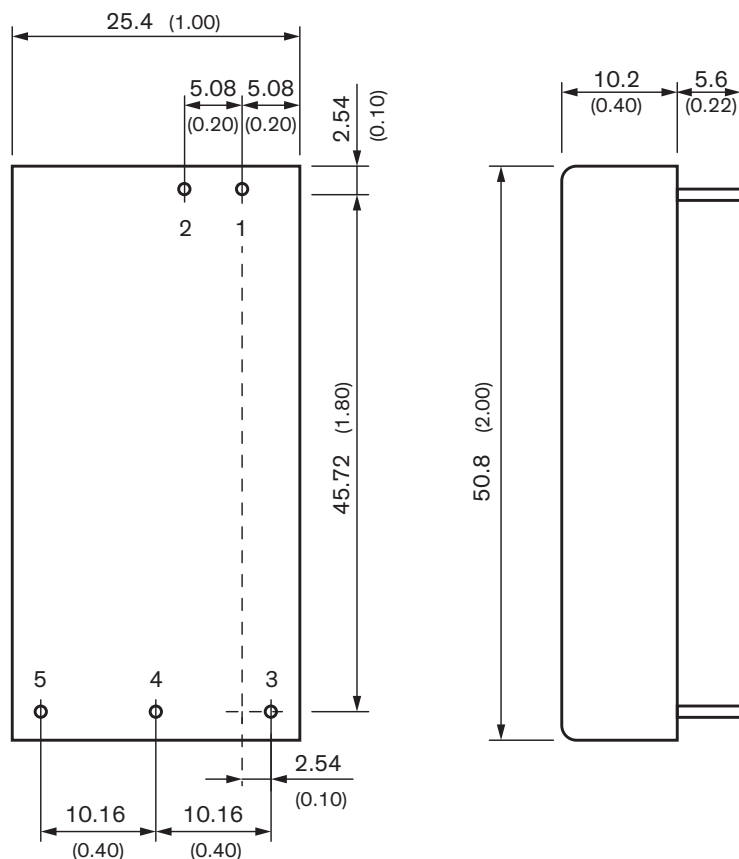
## General Specifications

|                                        |                                                                                |                                                                                                                                                                                                                                                                     |
|----------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Overvoltage protection                 | (±)5.0 VDC models:<br>(±)12 VDC models:<br>(±)15 VDC models:<br>24 VDC models: | 6.2 VDC typ.<br>15 VDC typ.<br>20 VDC typ.<br>30 VDC typ.                                                                                                                                                                                                           |
| Capacitive load                        | –Single output<br><br>–Dual output                                             | 5.0 VDC models: 7'200 µF max.<br>12 VDC models: 1'200 µF max.<br>15 VDC models: 1'000 µF max.<br>24 VDC models: 375 µF max.<br>±5 VDC models: 3'600 µF max. (each output)<br>±12 VDC models: 750 µF max. (each output)<br>±15 VDC models: 500 µF max. (each output) |
| Temperature ranges                     | – Operating<br>– Case temperature<br>– Storage temperature                     | –40°C to +80°C<br>+105°C max.<br>–55°C to +125°C                                                                                                                                                                                                                    |
| Derating                               | (±)5 VDC models:<br>other models:                                              | 1.67 % above 45°C<br>2 % above 55°C                                                                                                                                                                                                                                 |
| Overtemperature protection             |                                                                                | at 115°C typ.                                                                                                                                                                                                                                                       |
| Thermal impedance                      |                                                                                | 12.85 °C/W                                                                                                                                                                                                                                                          |
| Humidity (non condensing)              |                                                                                | 5 % to 95 % rel H max.                                                                                                                                                                                                                                              |
| Isolation voltage (50 Hz, 60 s)        |                                                                                | 5000 VACrms reinforced                                                                                                                                                                                                                                              |
| Clearance/creepage                     |                                                                                | 8 mm min.                                                                                                                                                                                                                                                           |
| Leakage current (at 240 VAC, 60 Hz)    |                                                                                | 2.5 µA max.                                                                                                                                                                                                                                                         |
| Isolation capacitance (input/output)   |                                                                                | 20 pF typ.                                                                                                                                                                                                                                                          |
| Altitude during operation              |                                                                                | 5000 m                                                                                                                                                                                                                                                              |
| Reliability, calculated MTBF           |                                                                                | tbd                                                                                                                                                                                                                                                                 |
| Switching frequency                    |                                                                                | 250 kHz typ. (pulse width modulation)                                                                                                                                                                                                                               |
| Vibration and thermal shock resistance |                                                                                | according to MIL-STD-810F                                                                                                                                                                                                                                           |
| Safety standards/approvals             | – Medical equipment<br><br>– Certification documents                           | ANSI/AAMI ES 60601-1:2005/(R)2012,<br>IEC/EN 60601-1 3rd edition<br><a href="http://www.tracopower.com/overview/thm30wi">www.tracopower.com/overview/thm30wi</a>                                                                                                    |
| Environmental compliance               | – Reach<br>– RoHS                                                              | <a href="http://www.tracopower.com/products/reach-declaration.pdf">www.tracopower.com/products/reach-declaration.pdf</a><br>RoHS directive 2011/65/EU                                                                                                               |

## Physical Specifications

|                       |                           |
|-----------------------|---------------------------|
| Casing material       | non-conductive plastic    |
| Base material         | non-conductive plastic    |
| Potting material      | silicone (UL94 V-0 rated) |
| Package weight        | 32 g (1.13 oz)            |
| Soldering temperature | max. 265°C / 10 s         |

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

**Outline Dimensions**


| Pinout |            |            |
|--------|------------|------------|
| Pin    | Single     | Dual       |
| 1      | +Vin (Vcc) | +Vin (Vcc) |
| 2      | -Vin (GND) | -Vin (GND) |
| 3      | +Vout      | +Vout      |
| 4      | -Vout      | Commom     |
| 5      | Trim       | -Vout      |

Dimensions in [mm], () = Inch

Tolerances  $\pm 0.5$  ( $\pm 0.02$ )

$\pm 0.25$  ( $\pm 0.01$ )

Pin pitch tolerances  $\pm 0.25$  ( $\pm 0.01$ )

Pin  $\varnothing$  1.0  $\pm 0.1$  (0.04  $\pm 0.004$ )