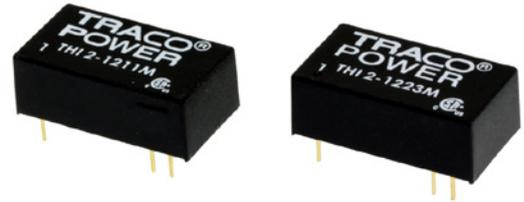


### Features

- ◆ Ultracompact DIP 16 package
- ◆ I/O isolation 3000 VACrms rated for 300 Vrms working voltage
- ◆ Medical safety to UL 60601-1 and IEC/EN 60601-1 3rd edition, 2 x MOOP
- ◆ Industrial safety to IEC/EN/UL 60950-1
- ◆ Operating temp. range  $-40^{\circ}\text{C}$  to  $+71^{\circ}\text{C}$
- ◆ 3-years product warranty



The THI 2M series is a new range of ultra-compact 2W DC/DC-converters providing a high I/O-isolation voltage of 3000 VAC. With a reinforced I/O-isolation system this product is an economical solution for many applications in instrumentation, industrial controls, medical equipment and everywhere where supplementary- or reinforced insulation is required to meet requested safety standards.

Full SMD-design with exclusive use of ceramic capacitors ensure a very high reliability and a long product lifetime.

### Models

Order code	Input voltage range	Output voltage	Output current max.	Efficiency typ.
THI 2-0511M	<b>5.0 VDC <math>\pm</math> 10%</b> (nominal 5 VDC)	5 VDC	400 mA	66 %
THI 2-0512M		12 VDC	165 mA	66 %
THI 2-0513M		15 VDC	133 mA	66 %
THI 2-0522M		$\pm$ 12 VDC	$\pm$ 83 mA	72 %
THI 2-0523M		$\pm$ 15 VDC	$\pm$ 66 mA	73 %
THI 2-1211M	<b>12.0 VDC <math>\pm</math> 10%</b> (nominal 12 VDC)	5 VDC	400 mA	66 %
THI 2-1212M		12 VDC	165 mA	66 %
THI 2-1213M		15 VDC	133 mA	66 %
THI 2-1222M		$\pm$ 12 VDC	$\pm$ 83 mA	74 %
THI 2-1223M		$\pm$ 15 VDC	$\pm$ 66 mA	75 %
THI 2-2411M	<b>24 VDC <math>\pm</math> 10%</b> (nominal 24 VDC)	5 VDC	400 mA	66 %
THI 2-2412M		12 VDC	165 mA	66 %
THI 2-2413M		15 VDC	133 mA	66 %
THI 2-2422M		$\pm$ 12 VDC	$\pm$ 83 mA	74 %
THI 2-2423M		$\pm$ 15 VDC	$\pm$ 66 mA	75 %

### Input Specifications

Input current no load / full load	5 Vin models: 60 mA / 600 mA typ. 12 Vin models: 30 mA / 250 mA typ. 24 Vin models: 15 mA / 135 mA typ.
Reverse voltage protection	0.3 A max.
Recommended external input fuse (slow blow)	5 Vin models: 1.0 A 12 Vin models: 0.5 A 24 Vin models: 0.2 A
Surge voltage (1 sec. max.)	5 Vin models: 9 V max. 12 Vin models: 18 V max. 24 Vin models: 30 V max.
Input filter	internal capacitors

### Output Specifications

Voltage set accuracy	±4 %
Voltage balance (dual output models)	1 % max.
Regulation	– Input variation      1.2 % / 1 % change of Vin – Load variation 20 – 100 %      10 % max. 12 % max. for 5 Vout models.
Ripple and noise (0–20 MHz Bandwidth)	150 mVpk-pk max
Temperature coefficient	±0.02 %/K
Short circuit protection	0.5 sec. max. (automatic recovery)
Minimum load	2 % of rated max. current
Capacitive load	single output models: 330 µF max. dual output models: 100 µF max. (each output)

### General Specifications

Temperature ranges	– Operating      –40°C to +71°C – Storage      –40°C to +125°C – Case temperature      +90°C max.
Thermal impedance	22.5 K/W
Derating	2.5 %/K above 60°C
Humidity (non condensing)	95 % rel. H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at 25°C, ground benign)	>2.0 Mio h
Isolation voltage – Input/Output (50Hz, 60sec)	Reinforced, rated for 300 Vrms working voltage 3000 VAC, 2 x MOOP Medical applications in accordance to IEC/EN 60601-1: IT applications in accordance to IEC/EN 60950-1: 4000 VAC
Isolation test voltage (1 sec.)	6'000 Vpk
Leakage current (at 240VAC, 60Hz)	2 µA max.
Isolation capacitance	– Input/Output      20 pF max. (at 100KHz, 1V)
Isolation resistance	– Input/Output      >10 Gohm (at 500VDC)
Switching frequency	50 – 100 kHz (PFM)
Safety standards	IEC/EN 60950-1, UL 60950-1 CSA C22.2 No. 60950-1-03 IEC/EN 60601-1 3rd edition, 2 x MOOP, UL 60601-1, CSA C22.2 No. 601.1
Safety approvals	– CSA certificate      for medical electrical equipment <a href="http://www.tracopower.com/products/thi2m-csa60601.pdf">www.tracopower.com/products/thi2m-csa60601.pdf</a> for information technology equipment <a href="http://www.tracopower.com/products/thi2m-csa60950.pdf">www.tracopower.com/products/thi2m-csa60950.pdf</a> – CB test certificate      for medical electrical equipment <a href="http://www.tracopower.com/products/thi2m-cb60601.pdf">www.tracopower.com/products/thi2m-cb60601.pdf</a> for information technology equipment <a href="http://www.tracopower.com/products/thi2m-cb60950.pdf">www.tracopower.com/products/thi2m-cb60950.pdf</a>

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

**General Specifications**

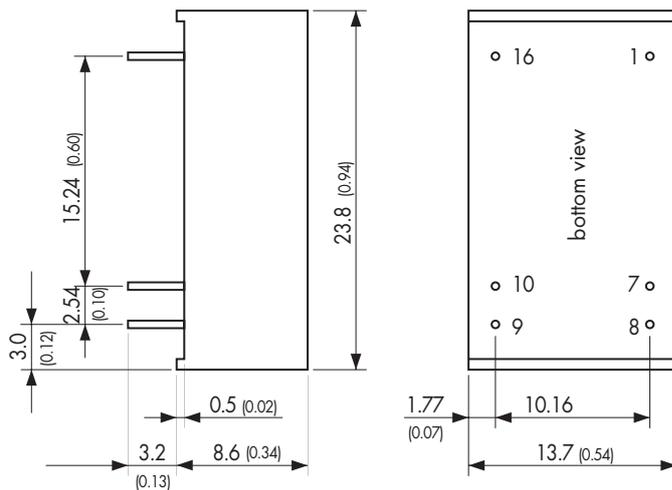
Casing material	non conductive plastic (UL 94V-0 rated)
Pin material	copper alloy with gold plated nickel subplate
Weight	5.1 g (0.18oz)
Soldering temperature	max. 265°C / 10 sec

**Application note:** [www.tracopower.com/products/thi2m-application.pdf](http://www.tracopower.com/products/thi2m-application.pdf)



- 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.

**Outline Dimensions**



Pin-Out		
Pin	Single	Dual
1	-Vin (GND)	-Vin (GND)
7	No con.	No con.
8	No con.	Common
9	+Vout	+Vout
10	-Vout	-Vout
16	+Vin	+Vin

Dimensions in [mm], ( ) = Inch  
 Pin diameter: 0.5 ±0.05 (0.024 ±0.002)  
 Tolerances: ±0.25 (±0.01)  
 Pin pitch tolerances: ±0.05 (±0.002)

Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at [www.tracopower.com](http://www.tracopower.com)