DC/DC Converters

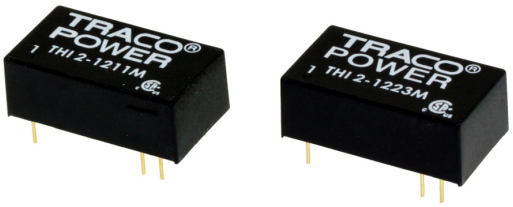
THI 2M Series, 2 Watt

CB Scheme IEC 60950-1 IEC 60601-1

c US UL 60950-1 UL 60601-1

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°C to +71°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	**5.0 VDC ± 10%** (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		±12 VDC	±83 mA	72 %
THI 2-0523M		±15 VDC	±66 mA	73 %
THI 2-1211M	**12.0 VDC ± 10%** (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		±12 VDC	±83 mA	74 %
THI 2-1223M		±15 VDC	±66 mA	75 %
THI 2-2411M	**24 VDC ± 10%** (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		±12 VDC	±83 mA	74 %
THI 2-2423M		±15 VDC	±66 mA	75 %

Input Specifications

Input current no load	5 Vin models:	60 mA
	12 Vin models:	30 mA
	24 Vin models:	15 mA
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 % / 1.5 % 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	–50°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		Reinforced, rated for 300 Vrms working voltage
(50Hz, 60sec)	Medical applications in accordance to IEC/EN 60601-1:	3000 VAC, 2 x MOOP
	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	www.tracopower.com/products/thi2m-csa60601.pdf
	for information technology equipment	www.tracopower.com/products/thi2m-csa60950.pdf
	– CB test certificate for medical electrical equipment	www.tracopower.com/products/thi2m-cb60601.pdf
	for information technology equipment	www.tracopower.com/products/thi2m-cb60950.pdf

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

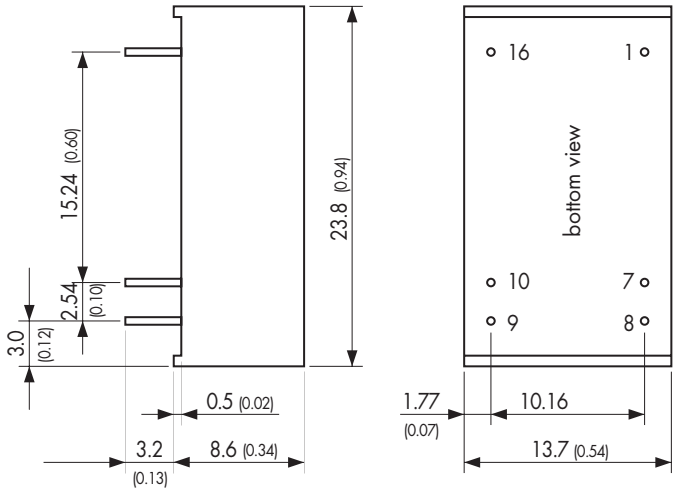
General Specifications

Casing material	non conductive plastic (UL 94V-0 rated)
Pin material	copper alloy with gold plated nickel subplate
Weight	5.1 g (0.18oz)
Altitude during operation	up to 5'000 m approved

Application note: 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)