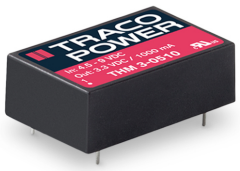
TRACO POWER

DC/DC Medical Converter

THM 3 Series, 3 Watt

- **Compact DIP-24 plastic case**
- **I/O isolation 5000 VAC rated for 250 VAC working voltage**
- **IEC 60601-1 certification for 2 x MOPP**
- **Risk management process according to ISO 14971 incl. risk management file**
- **Acceptance criteria for electronic assemblies acc. to IPC-A-610 Level 3**
- **Low leakage current <2 µA**
- **Operating temperature –40°C to 90°C**
- **EMC compliance to IEC 60601-1-2 4th edition and EN55032 class A**
- **5-year product warranty**



2MOPP c UL us CB Scheme

ES 60601-1 IEC 60601-1

The THM 3 series is a range of medical 3 Watt DC/DC converters in DIP-24 plastic package with wide 2:1 input voltage range. They provide a reinforced isolation system for 5000 VAC and a very low leakage current of less than 2 µA. The units are approved to IEC/EN/ES 60601-1 3rd ed. for 2 x MOPP 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 88% 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 1		Output 2		Efficiency
		Vnom	Imax	Vnom	Imax	typ.
THM 3-0510	4.5 - 9 VDC (5 VDC nom.)	3.3 VDC	1'000 mA			81 %
THM 3-0511		5 VDC	600 mA			85 %
THM 3-0512		12 VDC	250 mA			86 %
THM 3-0513		15 VDC	200 mA			88 %
THM 3-0515		24 VDC	125 mA			86 %
THM 3-0521		+5 VDC	300 mA	–5 VDC	300 mA	83 %
THM 3-0522		+12 VDC	125 mA	–12 VDC	125 mA	86 %
THM 3-0523		+15 VDC	100 mA	–15 VDC	100 mA	86 %
THM 3-1210	9 - 18 VDC (12 VDC nom.)	3.3 VDC	1'000 mA			82 %
THM 3-1211		5 VDC	600 mA			85 %
THM 3-1212		12 VDC	250 mA			87 %
THM 3-1213		15 VDC	200 mA			87 %
THM 3-1215		24 VDC	125 mA			87 %
THM 3-1221		+5 VDC	300 mA	–5 VDC	300 mA	84 %
THM 3-1222		+12 VDC	125 mA	–12 VDC	125 mA	88 %
THM 3-1223		+15 VDC	100 mA	–15 VDC	100 mA	87 %
THM 3-2410	18 - 36 VDC (24 VDC nom.)	3.3 VDC	1'000 mA			82 %
THM 3-2411		5 VDC	600 mA			85 %
THM 3-2412		12 VDC	250 mA			87 %
THM 3-2413		15 VDC	200 mA			87 %
THM 3-2415		24 VDC	125 mA			87 %
THM 3-2421		+5 VDC	300 mA	–5 VDC	300 mA	83 %
THM 3-2422		+12 VDC	125 mA	–12 VDC	125 mA	87 %
THM 3-2423		+15 VDC	100 mA	–15 VDC	100 mA	86 %
THM 3-4810	36 - 75 VDC (48 VDC nom.)	3.3 VDC	1'000 mA			81 %
THM 3-4811		5 VDC	600 mA			84 %
THM 3-4812		12 VDC	250 mA			87 %
THM 3-4813		15 VDC	200 mA			87 %
THM 3-4815		24 VDC	125 mA			87 %
THM 3-4821		+5 VDC	300 mA	–5 VDC	300 mA	83 %
THM 3-4822		+12 VDC	125 mA	–12 VDC	125 mA	86 %
THM 3-4823		+15 VDC	100 mA	–15 VDC	100 mA	86 %

Options

on demand (backorder with MOQ non stocking item)	- Optional models with alternative pinning - Optional models with adjustable output - Optional models with remote-control function - Optional models with adjustable output and remote-control function

Input Specifications

Input Current	- At no load	5 Vin models:	**20 mA typ.**
		12 Vin models:	**10 mA typ.**
		24 Vin models:	**6 mA typ.**
		48 Vin models:	**4 mA typ.**
Surge Voltage		5 Vin models:	**16 VDC max.** (3 s max.)
		12 Vin models:	**25 VDC max.** (3 s max.)
		24 Vin models:	**50 VDC max.** (3 s max.)
		48 Vin models:	**100 VDC max.** (3 s max.)
Under Voltage Lockout		5 Vin models:	**3 VDC min. / 4 VDC typ. / 4.4 VDC max.**
		12 Vin models:	**7 VDC min. / 8 VDC typ. / 8.8 VDC max.**
		24 Vin models:	**15 VDC min. / 16 VDC typ. / 17.5 VDC max.**
		48 Vin models:	**31.5 VDC min. / 33 VDC typ. / 34.5 VDC max.**
Recommended Input Fuse		5 Vin models:	**1'600 mA** (slow blow)
		12 Vin models:	**800 mA** (slow blow)
		24 Vin models:	**500 mA** (slow blow)
		48 Vin models:	**315 mA** (slow blow)
Input Filter			Internal Pi-Type

Output Specifications

Output Voltage Adjustment			**–10% to +20%** (By external trim resistor) (15 & 24 VDC single output models) **±10%** (By external trim resistor) (other models) (Only for optional models with adjustable output)
		See application note:	www.tracopower.com/overview/thm3
			Output power must not exceed rated power!
Voltage Set Accuracy			**±1% max.**
Regulation	- Input Variation (Vmin - Vmax)	single output models:	**0.2% max.**
		dual output models:	**0.5% max.**
	- Load Variation (0 - 100%)	single output models:	**0.2% max.**
		dual output models:	**1% max.** (Output 1)
			1% max. (Output 2)
	- Cross Regulation (25% / 100% asym. load)	dual output models:	**5% max.**
Ripple and Noise (20 MHz Bandwidth)	- single output	3.3 Vout models:	**30 mVp-p typ.** (with 10 µF X7R)
		5 Vout models:	**30 mVp-p typ.** (with 10 µF X7R)
		12 Vout models:	**40 mVp-p typ.** (with 10 µF X7R)
		15 Vout models:	**40 mVp-p typ.** (with 10 µF X7R)
		24 Vout models:	**50 mVp-p typ.** (with 4.7 µF X7R)
	- dual output	5 / -5 Vout models:	**30 / 30 mVp-p typ.** (with 10 µF X7R)
		12 / -12 Vout models:	**40 / 40 mVp-p typ.** (with 10 µF X7R)
		15 / -15 Vout models:	**40 / 40 mVp-p typ.** (with 10 µF X7R)

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

Capacitive Load	- single output	3.3 Vout models:	1'050 µF max.
		5 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 / -5 Vout models:	430 / 430 µF max.
		12 / -12 Vout models:	75 / 75 µF max.
		15 / -15 Vout models:	56 / 56 µF max.
Minimum Load			Not required
Temperature Coefficient			±0.02 %/K max.
Start-up Time			30 ms typ.
Short Circuit Protection			Continuous, Automatic recovery
Output Current Limitation			150% typ. of Iout max.
Overvoltage Protection			112 - 152% of Vout nom. (depending on model) 3.7 - 5 VDC (3.3 VDC model) 5.6 - 7 VDC (5 VDC model) 13.5 - 16 VDC (12 VDC model) 18.3 - 22 VDC (15 VDC model) 29.1 - 34.5 VDC (24 VDC model) 5.6 - 7 VDC (±5 VDC model) 13.5 - 18.2 VDC (±12 VDC model) 17 - 22 VDC (±15 VDC model)
Transient Response	- Response Time		250 µs typ. (25% Load Step)

Safety Specifications

Safety Standards	- Medical Equipment	EN 60601-1 IEC 60601-1 ANSI/AAMI ES 60601-1 2 x MOPP (Means Of Patient Protection)
	- Certification Documents	www.tracopower.com/overview/thm3
Pollution Degree		PD 2
Over Voltage Category		OVC II

EMC Specifications

EMI Emissions		EN 60601-1-2 edition 4 (Medical Devices)
	- Conducted Emissions	EN 55011 class A (internal filter) EN 55011 class B (with external filter) EN 55032 class A (internal filter) EN 55032 class B (with external filter) FCC Part 18, class A FCC Part 18, class B
	- Radiated Emissions	EN 55011 class A (internal filter) EN 55011 class B (with external filter) EN 55032 class A (internal filter) EN 55032 class B (with external filter) FCC Part 18, class A FCC Part 18, class B
	External filter proposal:	www.tracopower.com/overview/thm3

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EMS Immunity			EN 60601-1-2 edition 4 (Medical Devices)
	- Electrostatic Discharge	Air:	EN 61000-4-2, ±15 kV, perf. criteria A
		Contact:	EN 61000-4-2, ±8 kV, perf. criteria A
	- RF Electromagnetic Field		EN 61000-4-3, 10 V/m, perf. criteria A
	- EFT (Burst) / Surge		EN 61000-4-4, ±2 kV, perf. criteria A
			EN 61000-4-5, ±2 kV, perf. criteria A
		Ext. input component:	5 Vin models: KY 1000 µF // Vishay V10P45 12 Vin models: KY 470 µF 24 Vin models: KY 470 µF 48 Vin models: KY 330 µF
	- Conducted RF Disturbances		EN 61000-4-6, 10 Vrms, perf. criteria A
	- PF Magnetic Field	Continuous:	EN 61000-4-8, 100 A/m, perf. criteria A
		1 s:	EN 61000-4-8, 1000 A/m, perf. criteria A

General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	–40°C to +100°C
	- Approved Ambient Temp.	+80°C max. (to comply with EN60601-1)
	- Storage Temperature	–55°C to +125°C
Power Derating	- High Temperature	10 %/K above 95°C
	See application note:	www.tracopower.com/overview/thm3
Cooling System		Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote	On: 0 to 1.2 VDC or open circuit Off: 2.2 to 12 VDC Refers to 'Remote' and '-Vin' Pin
	- Off Idle Input Current	2.5 mA typ.
	- Remote Pin Input Current	-0.5 to 1.0 mA
		(Only for optional models with remote-control)
Altitude During Operation		5'000 m max.
Switching Frequency		135 - 165 kHz (PWM) 150 kHz typ. (PWM)
Insulation System		Reinforced Insulation
Isolation Test Voltage	- Input to Output, 60 s	5'000 VAC
Creepage	- Input to Output	8 mm min.
Clearance	- Input to Output	8 mm min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	12 pF typ. 17 pF max.
Leakage Current	- Earth Leakage Current	2 µA max. (240 VAC, 60 Hz)
Reliability	- Calculated MTBF	6'400'000 h (MIL-HDBK-217F, ground benign)
Environment	- Vibration	MIL-STD-810F
	- Thermal Shock	MIL-STD-810F
Housing Material		Non-conductive Plastic (UL94 V-0 rated)
Base Material		Non-conductive Plastic (UL 94 V-0 rated)
Potting Material		Silicone (UL 94 V-0 rated)
Soldering Profile		265°C / 10 s max.
Connection Type		THD (Through-Hole Device)
Weight		14 g
Thermal Impedance		18 K/W
Environmental Compliance	- Reach	www.tracopower.com/info/reach-declaration.pdf
	- RoHS	www.tracopower.com/info/rohs-declaration.pdf

Supporting Documents

Overview Link (for additional Documents)	www.tracopower.com/overview/thm3

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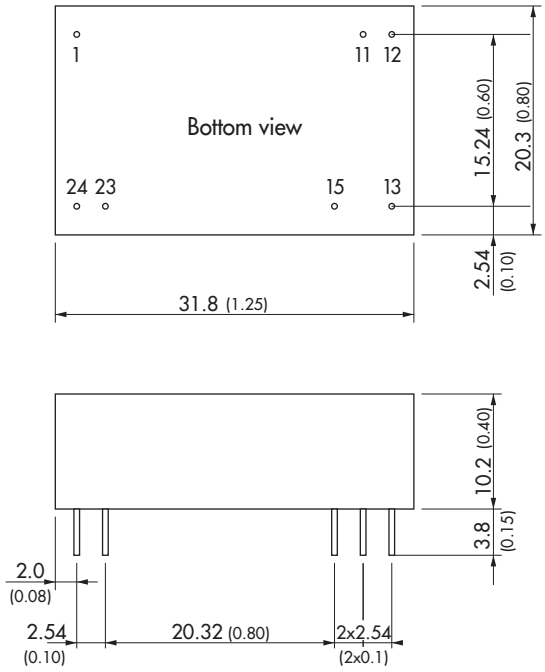
Outline Dimensions

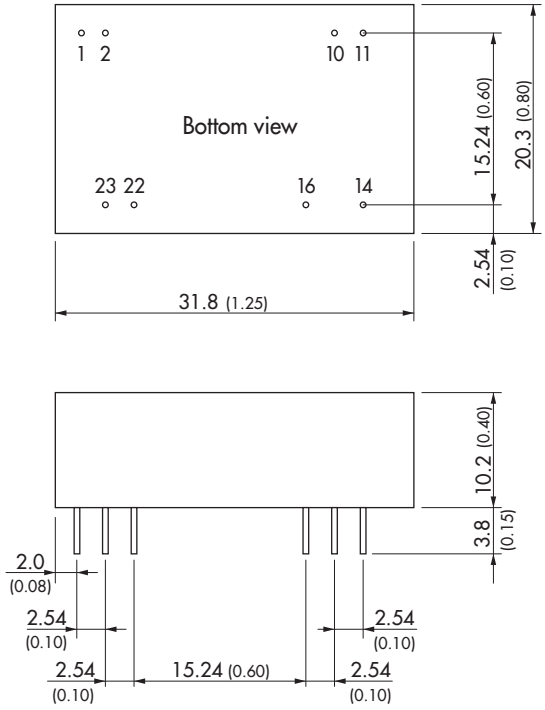
Standard pinning



Pinout		
Pin	**Single Output**	**Dual Output**
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)

Dimensions in mm (inch)
Tolerances ±0.5 (±0.02)
Pin Ø 0.6 ±0.1 (0.024 ±0.004)
Pin pich tolerances ±0.25 (±0.01)

Optional models with alternative pinning, adjustable output and/or remote-control function



Pinout		
Pin	**Single Output**	**Dual Output**
1	No pin*/Remote	No pin*/Remote
2	–Vin (GND)	–Vin (GND)
10	No pin*/Trim	No pin*/Trim
11	No pin/NC **	–Vout
14	+Vout	+Vout
16	–Vout	Common
22	+Vin (Vcc)	+Vin (Vcc)
23	+Vin (Vcc)	+Vin (Vcc)

NC: No connection

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

** If Trim is selected there is no pin on the corresponding pin number.

Remark:
No optional pinning for 5 Vin models. Corresponding parts are with THM 3WI series by default.
see www.tracopower.com/overview/thm3

Dimensions in mm (inch)
Tolerances ±0.5 (±0.02)
Pin Ø 0.6 ±0.1 (0.024 ±0.004)
Pin pich tolerances ±0.25 (±0.01)

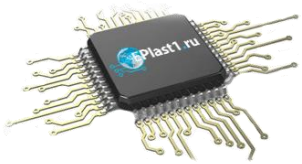
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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