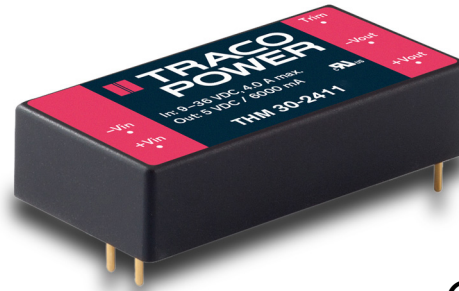


- Wide 2:1 input voltage 30 W DC/DC converter in a 2 × 1 " plastic case
- I/O isolation 5000 VACrms rated for 250 VACrms working voltage
- Certification according to IEC/EN/ES 60601-1 3rd edition for 2×MOPP
- Risk management process according to ISO 14971 including risk management file
- Acceptance criteria 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.
- EMC compliance to IEC 60601-1-2 4th edition and EN55032 class A
- Operating up to 5000m altitude
- 5 year product warranty



The THM-30 series is a range of medical 30 Watt DC/DC converters in 2.0" x 1.0" plastic package and with wide 2:1 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 30-1211	9.0 – 18 VDC (12 VDC nominal)	5.0 VDC	6000 mA	88.5 %
THM 30-1212		12 VDC	2500 mA	88.5 %
THM 30-1213		15 VDC	2000 mA	89.5 %
THM 30-1215		24 VDC	1250 mA	89.0 %
THM 30-1221		±5 VDC	±3000 mA	86.0 %
THM 30-1222		±12 VDC	±1250 mA	88.5 %
THM 30-1223		±15 VDC	±1000 mA	89.0 %
THM 30-2411	18 – 36 VDC (24 VDC nominal)	5.0 VDC	6000 mA	88.5 %
THM 30-2412		12 VDC	2500 mA	89.0 %
THM 30-2413		15 VDC	2000 mA	90.5 %
THM 30-2415		24 VDC	1250 mA	89.5 %
THM 30-2421		±5 VDC	±3000 mA	86.0 %
THM 30-2422		±12 VDC	±1250 mA	90.0 %
THM 30-2423		±15 VDC	±1000 mA	90.0 %
THM 30-4811	36 – 75 VDC (48 VDC nominal)	5.0 VDC	6000 mA	89.0 %
THM 30-4812		12 VDC	2500 mA	89.0 %
THM 30-4813		15 VDC	2000 mA	90.0 %
THM 30-4815		24 VDC	1250 mA	89.0 %
THM 30-4821		±5 VDC	±3000 mA	86.5 %
THM 30-4822		±12 VDC	±1250 mA	90.0 %
THM 30-4823		±15 VDC	±1000 mA	89.5 %

\* suffix -A1 for remote control option with positive logic  
suffix -A2 for remote control option with negative logic

## Input Specifications

Input current no load	12 Vin models: 11 mA typ. 24 Vin models: 9 mA typ. 48 Vin models: 9 mA typ.	
Surge voltage (3 sec. max.)	12 Vin models: 25 V max. 24 Vin models: 50 V max. 48 Vin models: 100 V max.	
Start-up voltage	12 Vin models: 9 VDC (or lower) 24 Vin models: 18 VDC (or lower) 48 Vin models: 36 VDC (or lower)	
Startup time	60 ms max. (30 ms typ.)	
Under voltage shut down (lock-out circuit)	12 Vin models: 7.8 - 8.6 VDC 24 Vin models: 15.8 - 17.4 VDC 48 Vin models: 32 - 34 VDC	
Input filter	Pi-type	
Conducted noise	– Conducted & Radiated input suppression – Filter proposal	EN 55011 limits to IEC 60601-1-2 4th edition EN55032 class A (internal filter) EN55032 class B with external components <a href="http://www.tracopower.com/overview/thm30">www.tracopower.com/overview/thm30</a>
EMC immunity	– Generic for Medical equipment – ESD (electrostatic discharge)  – Radiated immunity – Fast transient / surge (with external input capacitor / diode)	IEC/EN 60601-1-2 4th edition EN 61000-4-2, air ±15 kV, contact ±8 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
	12 Vin models: 24 Vin models: 48 Vin models:	2 pcs. Nippon chemi-con KY 220 µF / 100 V 1 pcs. TVS - SMDJ36A, 36V, 3000 W) 2 pcs. Nippon chemi-con KY 220 µF / 100 V 1 pcs. TVS - SMDJ58A, 58V, 3000 W) 2 pcs. Nippon chemi-con KY 220 µF / 100 V 1 pcs. TVS - SMDJ120A, 120V, 3000 W)
	– Conducted immunity – Magnetic field immunity	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)	12 Vin models: 6.3 A 24 Vin models: 3.15 A 48 Vin models: 1.6 A	

## Output Specifications

Voltage set accuracy		±1 % max.
Output voltage adjustment range (single output models only)	5 & 12 VDC models: 15 & 24 VDC models:	±10 % –10 / +20 %
Regulation	– Input variation – Load variation 0 – 100 % – Cross regulation	single output: 0.2 % max. dual output: 0.5 % max. single output: 0.2 % max. dual output: 1.0 % max. dual output: 5.0 % max. (asymmetrical load 25/100 %)
Temperature coefficient		±0.02 %/K typ.
Minimum load		not required
Ripple and noise (20 MHz Bandwidth)	(±)5.0 VDC models: (±)12 VDC models: ±15 VDC models: 15 VDC models: 24 VDC models:	50 mVp-p typ. with cap. 10 µF/25V X7R MLCC 75 mVp-p typ. with cap. 10 µF/25V X7R MLCC 75 mVp-p typ. with cap. 10 µF/25V X7R MLCC 100 mVp-p typ. with cap. 10 µF/25V X7R MLCC 100 mVp-p typ. with cap. 4.7 µF/50V X7R MLCC
Transient response	– Recovery time (25% load step change)	250 µs typ.

## Output Specifications

Over current limitation		at 150 % typ. of I <sub>out</sub> rated (hiccup mode) at 185 % max. of I <sub>out</sub> rated (hiccup mode)
Short-circuit protection		Continuous, automatic recovery
Overvoltage protection	(±)5.0 VDC models: (±)12 VDC models: (±)15 VDC models: 24 VDC models:	6.2 VDC typ. 15 VDC typ. 20 VDC typ. 30 VDC typ.
Capacitive load	– Single output	5.0 VDC models: 7'200 µF max. 12 VDC models: 1'200 µF max. 15 VDC models: 1'000 µF max. 24 VDC models: 375 µF max.
	– Dual output	±5 VDC models: 3'600 µF max. (each output) ±12 VDC models: 750 µF max. (each output) ±15 VDC models: 500 µF max. (each output)

## General Specifications

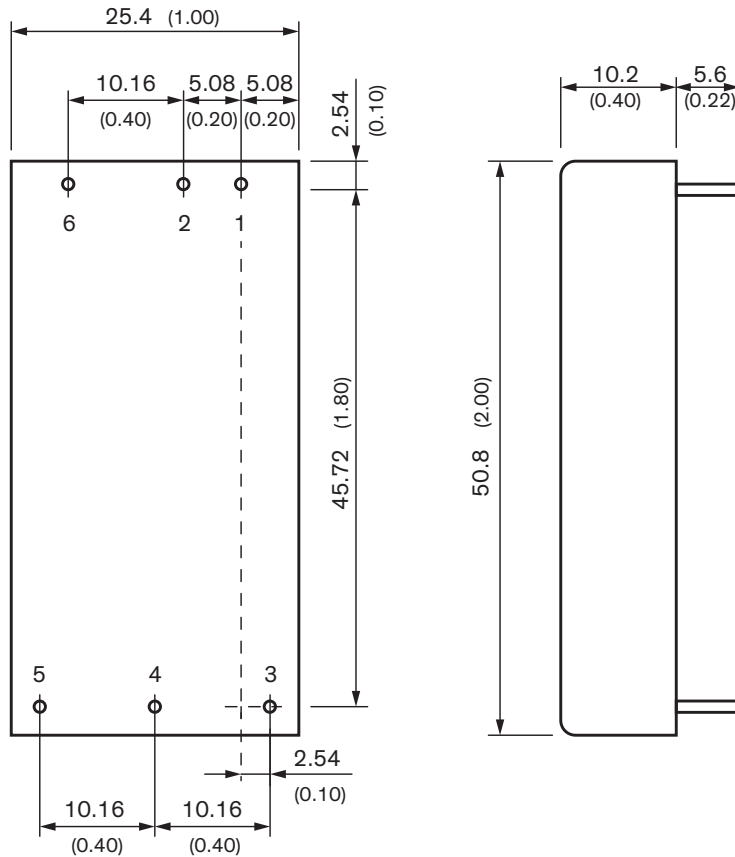
Temperature ranges	– Operating – Case temperature – Storage temperature	–40°C to +80°C +105°C max. –55°C to +125°C
Derating	(±)5 VDC models: other models:	1.67%/K above 45°C 2%/K above 55°C
Overtemperature protection		at 115°C typ.
Thermal impedance		12.9 K/W typ.
Humidity (non condensing)		5 % to 95 % rel H max.
Isolation voltage (50Hz, 60s)		5000 VACrms reinforced
Clearance/creepage		8 mm min.
Leakage current (at 240VAC, 60Hz)		2.5 µA max.
Isolation capacitance (input/output)		20 pF typ.
Altitude during operation		5000 m
Temperature coefficient		±0.02 %/K typ.
Reliability, calculated MTBF (MIL-HDBK-217F at +25°C, ground benign)		1'137'000 h
Switching frequency		225 – 285 kHz (pulse width modulation)
Vibration and thermal shock resistance		according to MIL-STD-810F
Remote On/Off (for THM 30 -A1 / -A2 option models only)	– Positive logic (-A1 models)  – Negative logic (-A2 models)  – Off idle current – Remote pin input current	Off: short circuit or 0 – 1.2 VDC (referred to -Vin pin) On: open circuit or 3.5 – 12 VDC (referred to -Vin pin) Off: open circuit or 3.5 – 12 VDC (referred to -Vin pin) On: short circuit or 0 – 1.2 VDC (referred to -Vin pin) 2.5 mA typ. –0.5 mA min. 1 mA max.
Safety standards/approvals	– Medical equipment  – Certification documents	ANSI/AAMI ES 60601-1:2005/(R)2012, IEC/EN 60601-1 3rd edition <a href="http://www.tracopower.com/overview/thm30">www.tracopower.com/overview/thm30</a>
Environmental compliance	– Reach – RoHS	<a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a> RoHS directive 2011/65/EU

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

### 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

### Outline Dimensions



Pinout		
Pin	Single	Dual
1	+Vin (Vcc)	+Vin (Vcc)
2	-Vin (GND)	-Vin (GND)
3	+Vout	+Vout
4	-Vout	Common
5	Trim	-Vout
6	No pin* / Remote	No pin* / Remote

\*If remote is not selected there will be no pin

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  $\pm 0.004$ )

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