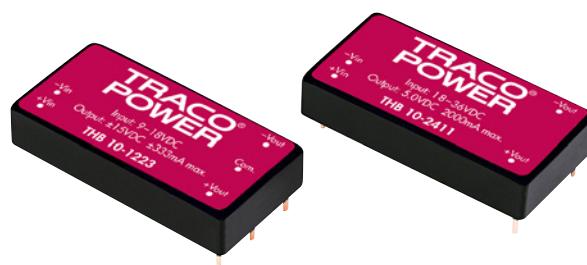


### Features

- ◆ Supplementary and reinforced insulation
- ◆ I/O isolation 4000 VACrms rated for 300 Vrms working voltage
- ◆ 2 x MOOP Medical safety according to AAMI/ANSI ES 60601-1:2005(R) and IEC/EN 60601-1 3rd edition
- ◆ Industrial safety to UL/IEC/EN 60950-1
- ◆ Wide 2:1 input voltage ranges
- ◆ Extended operating temperature range -40°C to 75°C max.
- ◆ Input filter meets EN55022, class A
- ◆ Continuous short-circuit protection
- ◆ High reliability
- ◆ 3-year product warranty



The THB 10 series is a range of high performance DC/DC converter modules with double reinforced insulation system. It complies to latest medical safety standard IEC 60950-1 3rd edition for MOOP (Means of Operator Protection). The product comes in a 2"x1" industry standard package. All 12 models features wide 2:1 input voltage range and fully regulated output voltage. The converters offer an economical solution for demanding applications in industrial and medical instrumentation.

### Models

Order code	Input voltage range	Output voltage	Output current max.	Efficiency typ.
THB 10-1211		5.1 VDC	1600 mA	75 %
THB 10-1212	9 - 18 VDC	12.0 VDC	835 mA	80 %
THB 10-1222	(12 VDC nominal)	±12.0 VDC	±417 mA	80 %
THB 10-1223		±15.0 VDC	±333 mA	81 %
THB 10-2411		5.1 VDC	2000 mA	76 %
THB 10-2412	18 - 36 VDC	12.0 VDC	835 mA	81 %
THB 10-2422	(24 VDC nominal)	±12.0 VDC	±417 mA	81 %
THB 10-2423		±15.0 VDC	±333 mA	82 %
THB 10-4811		5.1 VDC	2000 mA	76 %
THB 10-4812	36 - 75 VDC	12.0 VDC	835 mA	81 %
THB 10-4822	(48 VDC nominal)	±12.0 VDC	±417 mA	81 %
THB 10-4823		±15.0 VDC	±333 mA	82 %

## Input Specifications

<b>Input current at no load</b>	12 V models: 30 mA typ. 24 V models: 20 mA typ. 48 V models: 10 mA typ.
<b>Start up voltage / under voltage shutdown (hysteresis)</b> long term operation with under-voltage may cause damage	12 Vin models: 9.0 / 8.5 VDC (or lower) 24 Vin models: 18 / 16 VDC (or lower) 48 Vin models: 36 / 34 VDC (or lower)
<b>Recommended external input fuse (slow blow)</b>	12 Vin models: 3 A 24 Vin models: 1.5 A 48 Vin models: 0.75 A
<b>Surge voltage (1 sec. max.)</b>	12 Vin models: 25 VDC max. 24 Vin models: 50 VDC max. 48 Vin models: 100 VDC max.

EN 55022 class A and FCC, level A

## Output Specifications

<b>Voltage set accuracy</b>	<b>±1.0 %</b>	
<b>Regulation</b>	– Input variation Vin min. to Vin max.	<b>0.5 % max.</b>
	– Load variation 15 – 100 %: single output models:	<b>1.0 % max.</b>
	dual output models:	<b>2.0 % max.</b> balanced load
<b>Minimum load</b>	<b>no minimum load required</b>	
<b>Ripple and noise</b> (20 MHz bandwidth)	5 VDC models: other models:	<b>100 mVp-p max. 150 mVp-p max.</b>
<b>Transient Response</b> (25% load step change)	<b>600 µs max.</b>	
<b>Current limitation</b>	<b>&gt;120 % Iout max.</b>	
<b>Short circuit protection</b>	<b>continuous</b>	
<b>Capacitive load</b>	5 VDC output models: 12 VDC output models: dual output models:	<b>1000 µF max. 470 µF max. 220 µF max. (each output)</b>

## **Isolation / Safety Standards**

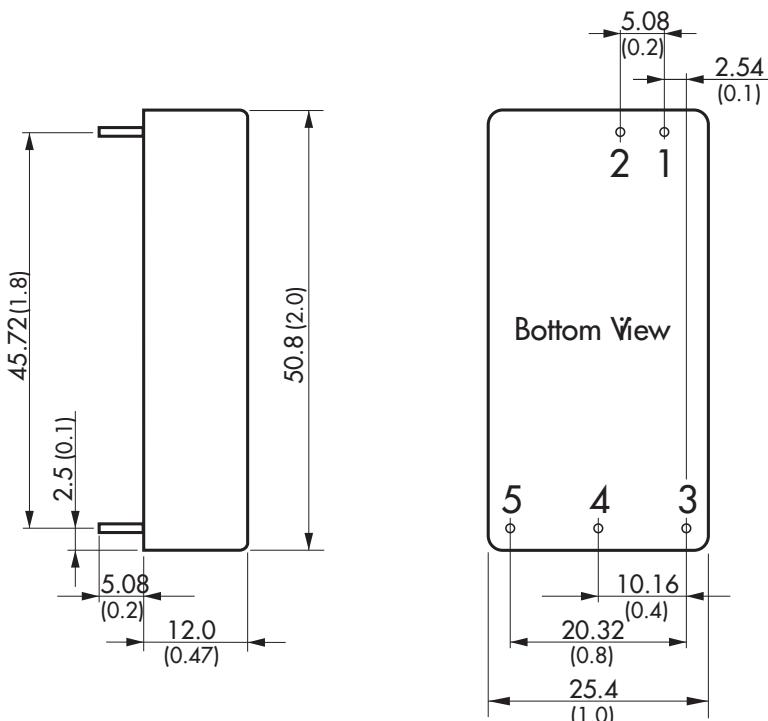
<b>Isolation test voltage</b> (flash tested 1 sec.)	6000 Vpk
<b>I/O isolation voltage</b> (50Hz, 60sec.)	4000 VAC
<b>Leakage current</b> (at 240VAC, 60Hz)	10 µA
<b>I/O isolation capacity</b> (at 100KHz, 1V)	60 pF typ.
<b>I/O isolation resistance</b> (at 500VDC)	>10 Gohm
<b>Safety standards</b>	UL 60950-1, ES 60601-1 (pending) IEC/EN 60950-1, IEC/EN 60601-1 3rd Edition, ANSI/AAMI ES60601-1 and CAN/CSA-C22.2 No. 60601-1, Medical Electrical Equipment - Part 1: General Requirements for Basic Safety and Essential Performance <a href="http://www.tracopower.com/overview/thb10">www.tracopower.com/overview/thb10</a>

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

### General Specifications

Temperature ranges	– Operating	–40°C to +75°C
	– Case	+95°C max.
	– Storage	-50°C to +125°C
Derating		2.5 %/K above 55°C
Humidity (non condensing)		95 % rel H max.
Altitude during operation		4000 m
Temperature coefficient		±0.02 %/K typ.
Reliability, calculated MTBF (MIL-HDBK-217F at +25°C, ground benign)		>1'000'000 h
Switching frequency		150 kHz typ. (puls width modulation)
Casing material		non conductive plastic (UL 94V-0-rated)
Pin Material		copper alloy with gold plate over nickel subplate
Weight		24.5 g (0.86 oz)
Soldering temperature		max. 260°C / 10 sec.

### Outline Dimensions



Pin-Out		
Pin	Single	Dual
1	+Vin (Vcc)	+Vin (Vcc)
2	-Vin(GND)	-Vin(GND)
3	+Vout	+Vout
4	No pin	Common
5	-Vout	-Vout

Dimensions in [mm], () = Inch  
Pin diameter  $\phi$  1.0 ±0.05 (0.04 ±0.002)  
Tolerances ±0.25 (±0.01)  
Pin pitch tolerances ±0.13 (±0.005)

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