

### Features

- ◆ Supplementary and reinforced insulation for working voltages up to 300 VAC
- ◆ I/O isolation 4000 VACrms
- ◆ Isolation test voltage 6000 Vpk
- ◆ Wide 2:1 input voltage ranges
- ◆ Extended operating temperature range -40°C to 85°C max.
- ◆ Input filter meets EN55022, class A
- ◆ Continuous short-circuit protection
- ◆ High reliability
- ◆ Industrial & medical safety approvals
- ◆ 3-year product warranty



The THB-3 series is a range of high performance, regulated DC/DC converters in a DIP-24 plastic package. A reinforced I/O-isolation system and a wide 2:1 input voltage range make this product the best choice for many demanding applications like transportation systems, industrial controls, medical equipments, instrumentations, everywhere where high basic-, supplementary- or reinforced insulation is required to meet requested safety standards.

A high efficiency allows safe operation in a temperature range of -40°C to +85°C. Other features of this product are over voltage protection and internal EMI-input filter to meet EN 55022, class A without additional components. 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.
THB 3-0511	4.5 – 9 VDC (5 VDC nominal)	5 VDC	600 mA	70 %
THB 3-0512		12 VDC	250 mA	75 %
THB 3-0515		24 VDC	125 mA	76 %
THB 3-0522		±12 VDC	±125 mA	75 %
THB 3-0523		±15 VDC	±100 mA	75 %
THB 3-1211	9 – 18 VDC (12 VDC nominal)	5 VDC	600 mA	74 %
THB 3-1212		12 VDC	250 mA	80 %
THB 3-1215		24 VDC	125 mA	81 %
THB 3-1222		±12 VDC	±125 mA	80 %
THB 3-1223		±15 VDC	±100 mA	80 %
THB 3-2411	18 – 36 VDC (24 VDC nominal)	5 VDC	600 mA	78 %
THB 3-2412		12 VDC	250 mA	83 %
THB 3-2415		24 VDC	125 mA	84 %
THB 3-2422		±12 VDC	±125 mA	83 %
THB 3-2423		±15 VDC	±100 mA	83 %
THB 3-4811	36 – 75 VDC (48 VDC nominal)	5 VDC	600 mA	78 %
THB 3-4812		12 VDC	250 mA	83 %
THB 3-4815		24 VDC	125 mA	84 %
THB 3-4822		±12 VDC	±125 mA	83 %
THB 3-4823		±15 VDC	±100 mA	83 %

### Input Specifications

Input current at no load / full load	5 Vin models: 40 mA typ. / 820 mA typ. 12 Vin models: 30 mA typ. / 320 mA typ. 24 Vin models: 20 mA typ. / 155 mA typ. 48 Vin models: 10 mA typ. / 80 mA typ.
Start-up voltage / under voltage shut down	5 Vin models: 4.5 VDC / 4.0 VDC 12 Vin models: 9 VDC / 8.5 VDC 24 Vin models: 18 VDC / 17 VDC 48 Vin models: 36 VDC / 34 VDC
Recommended input fuse (slow blow)	5 Vin models: 2.0 A 12 Vin models: 1.0 A 24 Vin models: 0.5 A 48 Vin models: 0.25 A
Surge voltage (1 sec. max.)	5 Vin models: 11 VDC max. 12 Vin models: 25 VDC max. 24 Vin models: 50 VDC max. 48 Vin models: 100 VDC max.
Reverse voltage protection	0.3 A max.
Input filter	EN 55022 class A, FCC part 15, class A

### Output Specifications

Voltage set accuracy	±1 %
Regulation	– Input variation Vin min. to Vin max. 0.5 % max. – Load variation 25 – 100 %: single output models: 1.0 % max.. dual output models: 2.0 % max. balanced load
Minimum load	15 % of rated max. output current. (Operation at lower load is safe but major deviations to specified data may occur)
Ripple and noise (20 MHz Bandwidth)	5 VDC models: 100 mVpk-pk max. other models: 150 mVpk-pk max.
Transient Response (25% load step change)	150 µs typ.
Current limitation	>120 % Iout max.
Short circuit protection	indefinite (automatic recovery)
Capacitive load	5 VDC output models: 1000 µF max. other single output models: 470 µF max. dual output models: 220 µF max. (each output)

### Isolation / Safety Standards

Isolation test voltage (flash tested 1 sec.)	6000 Vpk
I/O isolation voltage (50Hz, 60sec.)	4000 VACrms
Leakage current	2 µA (at 240VAC, 60Hz)
Isolation capacity – Input/Output	13 pF max.. (at 100KHz, 1V)
Isolation resistance – Input/Output	>1000 Mohm (at 500VDC)
Safety standards	IEC/EN 60950-1, UL 60950-1 CSA C22.2 No. 60950-1-03 IEC/EN 60601-1, EN 50124-1&2 UL 60601-1, CSA C22.2 No. 601.1
Safety approvals	– CB test report according IEC 60950-1 <a href="http://www.tracopower.com/products/thb3-cb60950.pdf">www.tracopower.com/products/thb3-cb60950.pdf</a> – CB test report according IEC 60601-1 <a href="http://www.tracopower.com/products/thb3-cb60601.pdf">www.tracopower.com/products/thb3-cb60601.pdf</a> – CSA certificate according UL 60950-1 <a href="http://www.tracopower.com/products/thb3-csa60950.pdf">www.tracopower.com/products/thb3-csa60950.pdf</a> – CSA certificate according UL 60601-1 <a href="http://www.tracopower.com/products/thb3-csa60601.pdf">www.tracopower.com/products/thb3-csa60601.pdf</a>

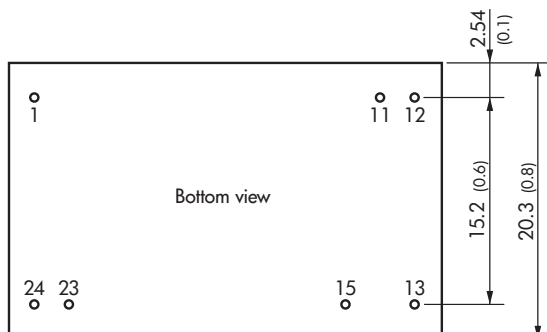
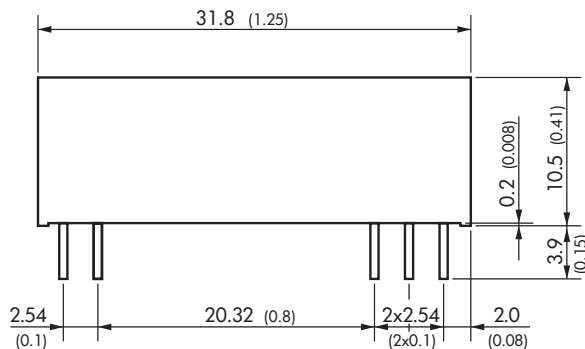
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

**General Specifications**

Temperature ranges	- Operating - Casing - Storage	-40°C to +85°C +95°C max. -40°C to +125°C
Derating		3.3 %/K above 70°C
Humidity (non condensing)		95 % rel H max.
Temperature coefficient		±0.02 %/K typ.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)		>1 Mio. h
Switching frequency		150 kHz typ. (puls width modulation)
Casing material		non conductive plastic (UL 94V-0-rated)
Potting material		Silicon TSE 3331 (UL 94V-0-rated)
Weight		16.2 g (0.57 oz)
Soldering temperature		max. 265°C / 10 sec.
Environmental compliance	- Reach - RoHS	<a href="http://www.tracopower.com/products/thb3-reach.pdf">www.tracopower.com/products/thb3-reach.pdf</a> according RoHS directive 2002/95/EC

**Application note :** [www.tracopower.com/products/thb3-application.pdf](http://www.tracopower.com/products/thb3-application.pdf)

**Outline Dimensions**



Pin-Out		
Pin	Single	Dual
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  
Pin diameter  $\varnothing 0.6 \pm 0.05$  ( $0.024 \pm 0.002$ )  
Tolerances  $\pm 0.25$  ( $\pm 0.001$ )  
Pin pitch tolerances  $\pm 0.13$  ( $\pm 0.005$ )

Specifications can be changed any time without notice.