

- DIP-24 Package
- Regulated output
- I/O isolation voltage 6000 VDC
- Supplementary insulation rated for working voltage up to 1000 VAC
- Operating temp. range -40°C to $+75^{\circ}\text{C}$



The THI 2 series is a family of DC/DC converter with very high I/O isolation specification. They offer a cost effective solution for all industrial and telecom where a supplementary insulation is required. SMD technology and a 100 % production test of the safety barrier ensure a very high reliability of this product.

Models

Order Code	Input Voltage Range	Output 1		Output 2		Efficiency typ.
		Vnom	I _{max}	Vnom	I _{max}	
THI 0511	4.5 - 5.5 VDC (5 VDC nom.)	5 VDC	400 mA			62 %
THI 0512		12 VDC	165 mA			63 %
THI 0513		15 VDC	133 mA			64 %
THI 0520		+5 VDC	100 mA	-5 VDC	100 mA	42 %
THI 0521		+12 VDC	83 mA	-12 VDC	83 mA	57 %
THI 0522		+15 VDC	66 mA	-15 VDC	66 mA	57 %
THI 1211	10.8 - 13.2 VDC (12 VDC nom.)	5 VDC	400 mA			62 %
THI 1212		12 VDC	165 mA			63 %
THI 1213		15 VDC	133 mA			64 %
THI 1220		+5 VDC	100 mA	-5 VDC	100 mA	45 %
THI 1221		+12 VDC	83 mA	-12 VDC	83 mA	59 %
THI 1222		+15 VDC	66 mA	-15 VDC	66 mA	59 %
THI 2411	21.6 - 26.4 VDC (24 VDC nom.)	5 VDC	400 mA			62 %
THI 2412		12 VDC	165 mA			63 %
THI 2413		15 VDC	133 mA			64 %
THI 2420		+5 VDC	100 mA	-5 VDC	100 mA	45 %
THI 2421		+12 VDC	83 mA	-12 VDC	83 mA	58 %
THI 2422		+15 VDC	66 mA	-15 VDC	66 mA	58 %

Input Specifications

Input Current	- At no load	5 Vin models: 100 mA typ. 12 Vin models: 50 mA typ. 24 Vin models: 30 mA typ.
	- At full load	5 Vin models: 645 mA typ. (5 Vout model) 629 mA typ. (12 Vout model) 623 mA typ. (15 Vout model) 476 mA typ. (5 / -5 Vout model) 699 mA typ. (12 / -12 Vout model) 695 mA typ. (15 / -15 Vout model) 12 Vin models: 269 mA typ. (5 Vout model) 262 mA typ. (12 Vout model) 260 mA typ. (15 Vout model) 185 mA typ. (5 / -5 Vout model) 281 mA typ. (12 / -12 Vout model) 280 mA typ. (15 / -15 Vout model) 24 Vin models: 134 mA typ. (5 Vout model) 131 mA typ. (12 Vout model) 130 mA typ. (15 Vout model) 93 mA typ. (5 / -5 Vout model) 143 mA typ. (12 / -12 Vout model) 142 mA typ. (15 / -15 Vout model)
Surge Voltage		5 Vin models: 7.5 VDC max. (1 s max.) 12 Vin models: 15 VDC max. (1 s max.) 24 Vin models: 30 VDC max. (1 s max.)
Reflected Ripple Current		5 Vin models: 15 mA typ. 12 Vin models: 8 mA typ. 24 Vin models: 3 mA typ.
Recommended Input Fuse		5 Vin models: 1'000 mA (slow blow) 12 Vin models: 500 mA (slow blow) 24 Vin models: 250 mA (slow blow) (The need of an external fuse has to be assessed in the final application.)
Input Filter		Internal Pi-Type
Short Circuit Input Power		2 W max.

Output Specifications

Voltage Set Accuracy		±4% max. (at 50% load)
Regulation	- Input Variation (Vmin - Vmax)	single output models: 0.5% max. dual output models: 0.5% max.
	- Load Variation (10 - 100%)	single output models: 1% max. dual output models: 1% max. (Output 1) 1% max. (Output 2)
	- Voltage Balance (symmetrical load)	dual output models: 4% max.
Ripple and Noise	- 20 MHz Bandwidth	30 mVp-p typ. 50 mVp-p max.
Capacitive Load	- single output	5 Vout models: 680 µF max. 12 Vout models: 680 µF max. 15 Vout models: 680 µF max.
	- dual output	5 / -5 Vout models: 270 / 270 µF max. 12 / -12 Vout models: 270 / 270 µF max. 15 / -15 Vout models: 270 / 270 µF max.
Minimum Load		Not required
Temperature Coefficient		±0.02 %/K max.

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

Start-up Time	0.13 ms max.
Short Circuit Protection	Continuous, Automatic recovery

EMC Specifications

EMI Emissions	- Conducted Emissions	EN 55032 class A (internal filter)
	- Radiated Emissions	EN 55032 class A (internal filter)

General Specifications

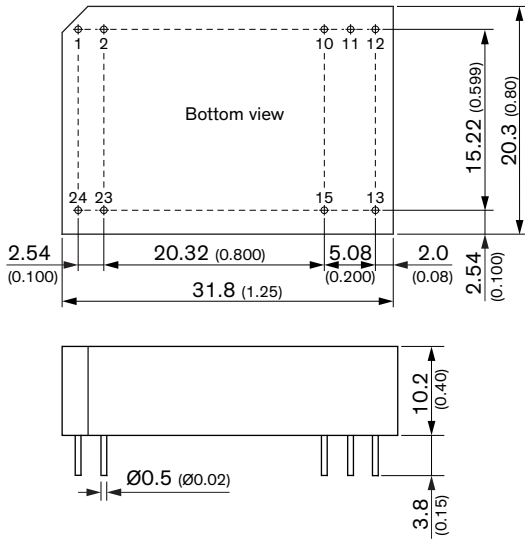
Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-25°C to +75°C
	- Case Temperature	+95°C max.
	- Storage Temperature	-50°C to +125°C
Power Derating	- High Temperature	2.85 %/K above 60°C
	See application note:	www.tracopower.com/overview/thi2
Cooling System		Natural convection (20 LFM)
Switching Frequency		25 - 80 kHz (PFM)
Insulation System		Reinforced Insulation
Working Voltage (rated)		1'000 VAC
Isolation Test Voltage	- Input to Output, 60 s	6'000 VDC
	- Input to Output, 1 s	8'000 VDC
Isolation Resistance	- Input to Output, 500 VDC	10'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	20 pF typ. 30 pF max.
Leakage Current	- Touch Current	2 μA max.
Reliability	- Calculated MTBF	600'000 h (MIL-HDBK-217F, ground benign)
Washing Process		Allowed (hermetical product)
	See Cleaning Guideline:	www.tracopower.com/info/cleaning.pdf
Housing Material		Non-conductive Plastic (UL 94 V-0 rated)
Base Material		Non-conductive Plastic (UL 94 V-0 rated)
Potting Material		Epoxy (UL 94 V-0 rated)
Pin Material		Copper-Clad Steel
Pin Foundation Plating		Nickel (2.5 μm min.)
Pin Surface Plating		Gold (75 - 125 nm), glossy
Housing Type		Plastic Case
Mounting Type		PCB Mount
Connection Type		THD (Through-Hole Device)
Footprint Type		DIP24
Soldering Profile		Wave Soldering 260°C / 10 s max.
Weight		12.4 g
Thermal Impedance	- Case to Ambient	21.53 K/W typ.
Environmental Compliance	- REACH Declaration	www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant
	- RoHS Declaration	www.tracopower.com/info/rohs-declaration.pdf Exemptions: 7a (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule). The SCIP number is provided on request.)

Supporting Documents

Overview Link (for additional Documents)	www.tracopower.com/overview/thi2
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Outline Dimensions



Dimensions in mm (inch)

Tolerance: x.x ± 0.25 (x.xx ± 0.01)

x.xx ± 0.13 (x.xxx ± 0.005)

Pin pitch tolerance: ± 0.25 (± 0.01)

Pin diameter tolerance: x.x ± 0.05 (x.xx ± 0.002)

Pinout		
Pin	Single	Dual
1	+Vin (Vcc)	
2	+Vin (Vcc)	
10	No Pin	Common
11	No Pin	Common
12	-Vout	No Pin
13	+Vout	-Vout
15	No Pin	+Vout
23	-Vin (GND)	
24	-Vin (GND)	