

- Standard DIP-24 Package
- I/O isolation 4000 VACrms rated for 300 VACrms 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 IEC/EN/UL 62368-1
- Operating temperature range -40°C to 75°C
- Fully regulated output voltage
- Input filter meets EN 55032, class A
- Short circuit protection
- 3-year product warranty



The THI 3 series is a new range of high isolation DC/DC converters with a reinforced insulation system. The I/O- isolation voltage is specified for 4000 VACrms. The circuit is encapsulated in a DIP-24 package. There are 15 models available for 5, 12 and 24 VDC input voltage and single or dual output voltage. The THI 3 DC/DC converters offer a cost effective solution for applications in industrial controls and medical instrumentation requiring a certified supplementary or reinforced insulation system to comply with industrial or latest medical safety standards.

Models						
Order Code	Input Voltage Range	Output 1		Output 2		Efficiency typ.
		Vnom	I _{max}	Vnom	I _{max}	
THI 3-0511	4.5 - 5.5 VDC (5 VDC nom.)	5 VDC	600 mA			60 %
THI 3-0512		12 VDC	250 mA			62 %
THI 3-0513		15 VDC	200 mA			62 %
THI 3-0522		+12 VDC	125 mA	-12 VDC	125 mA	60 %
THI 3-0523		+15 VDC	100 mA	-15 VDC	100 mA	60 %
THI 3-1211	10.8 - 13.2 VDC (12 VDC nom.)	5 VDC	600 mA			60 %
THI 3-1212		12 VDC	250 mA			62 %
THI 3-1213		15 VDC	200 mA			62 %
THI 3-1222		+12 VDC	125 mA	-12 VDC	125 mA	60 %
THI 3-1223		+15 VDC	100 mA	-15 VDC	100 mA	60 %
THI 3-2411	21.6 - 26.4 VDC (24 VDC nom.)	5 VDC	600 mA			60 %
THI 3-2412		12 VDC	250 mA			64 %
THI 3-2413		15 VDC	200 mA			64 %
THI 3-2422		+12 VDC	125 mA	-12 VDC	125 mA	60 %
THI 3-2423		+15 VDC	100 mA	-15 VDC	100 mA	60 %

Input Specifications

Input Current	- At no load	5 Vin models: 130 mA typ. 12 Vin models: 60 mA typ. 24 Vin models: 40 mA typ.
	- At full load	5 Vin models: 1'000 mA typ. 12 Vin models: 420 mA typ. 24 Vin models: 210 mA typ.
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.)
Recommended Input Fuse		5 Vin models: 2'000 mA (slow blow) 12 Vin models: 1'000 mA (slow blow) 24 Vin models: 500 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		2.5 W max.

Output Specifications

Voltage Set Accuracy		±4% max.
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 50 mVp-p max. (To further reduce Ripple and Noise, a capacitor with 1.5 µF X7R is recommended.)
Capacitive Load	- single output	5 Vout models: 470 µF max. 12 Vout models: 470 µF max. 15 Vout models: 470 µF max.
	- dual output	12 / -12 Vout models: 220 / 220 µF max. 15 / -15 Vout models: 220 / 220 µF max.
Minimum Load		Not required
Temperature Coefficient		±0.02 %/K max.
Start-up Time		18 ms max.
Short Circuit Protection		Continuous, Automatic recovery

Safety Specifications

Standards	- IT / Multimedia Equipment	CSA-C22.2, No. 60950-1 EN 60950-1 EN 62368-1 IEC 60950-1 IEC 62368-1 UL 60950-1 UL 62368-1
	- Medical Equipment	EN 60601-1 IEC 60601-1 ANSI/AAMI ES 60601-1 CSA-C22.2, No 60601-1 2 x MOOP (Means Of Operator Protection) www.tracopower.com/overview/thi3
	- Certification Documents	
Pollution Degree		PD 2
Over Voltage Category		OVC II

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

EMC Specifications

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

General Specifications

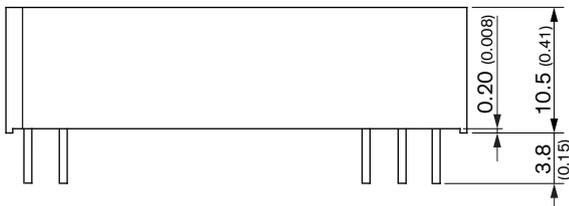
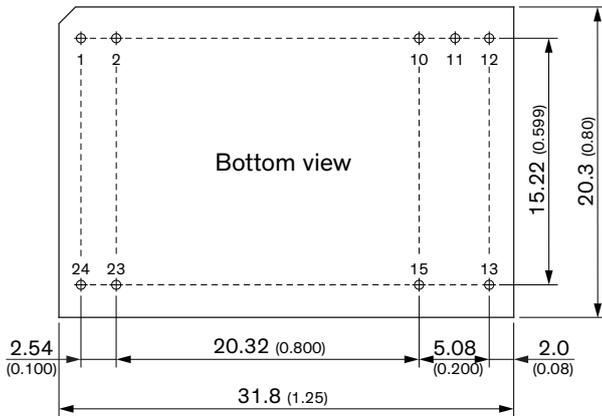
Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-40°C to +75°C
	- Case Temperature	+95°C max.
	- Storage Temperature	-50°C to +125°C
Power Derating	- High Temperature	2.85 %/K above 60°C
		See application note: www.tracopower.com/overview/thi3
Cooling System		Natural convection (20 LFM)
Altitude During Operation		4'000 m max. (acc. to IEC/EN/UL 60601-1)
		5'000 m max. (acc. to IEC/EN/UL 62368-1)
Regulator Topology		Push-Pull Converter
Switching Frequency		25 - 75 kHz (PFM)
		60 kHz typ. (PFM)
Insulation System		Reinforced Insulation
Working Voltage (rated)		300 VAC
Isolation Test Voltage	- Input to Output, 60 s	4'000 VAC (acc. to IEC/EN 60601-1)
		3'000 VAC (acc. to IEC/EN/UL 62368-1)
Isolation Resistance	- Input to Output, 500 VDC	10'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	20 pF typ.
Leakage Current	- Touch Current	2 μA max. (240 VAC, 60 Hz)
Reliability	- Calculated MTBF	1'000'000 h (MIL-HDBK-217F, ground benign)
Washing Process		According to Cleaning Guideline www.tracopower.com/info/cleaning.pdf
Housing Material		Plastic resin (UL 94 V-0 rated)
Base Material		Non-conductive Plastic (UL 94 V-0 rated)
Potting Material		Silicone (UL 94 V-0 rated)
Pin Material		Copper Alloy (C6801)
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		Lead-Free Wave Soldering
		260°C / 10 s max.
Weight		12.4 g
Thermal Impedance	- Case to Ambient	16.3 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: 7(a) (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number	e5360cbc-6a16-41f4-a0c1-106f7a68dd67

Additional Information

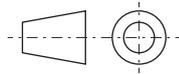
Supporting Documents	www.tracopower.com/overview/thi3
Frequently Asked Questions	www.tracopower.com/glossary-faq
Glossary	www.tracopower.com/info/glossary.pdf

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Outline Dimensions



Dimensions in mm (inch)
 Pin diameter: 0.5 ± 0.05 (0.02 ± 0.002)
 Tolerance: $x.x \pm 0.25$ ($x.xx \pm 0.01$)
 $x.xx \pm 0.13$ ($x.xxx \pm 0.005$)



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)	