

Features

- ◆ 10 Watt in 1" x 1" package
- ◆ Shielded metal case with isolated baseplate
- ◆ Wide 2:1 input voltage ranges
- ◆ Remote On/Off control
- ◆ Operating temp. range -40°C to $+80^{\circ}\text{C}$ and up to $+85^{\circ}\text{C}$ with heat-sink
- ◆ I/O isolation voltage 1500 VDC
- ◆ Input filter meets EN 55022 class A without external components
- ◆ Cost optimized design
- ◆ Industry standard pinout
- ◆ 3-year product warranty



The THL 10 is a series of general purpose 10 Watt dc/dc-converters packed in the compact 1" x 1" case and is a pin to pin replacement for the popular 1" x 2" size products. The industrial standard pinout, the wide 2:1 input voltage range and the input filter that meets EN 55022 Class A without external components make these converters easy to design in and suitable for to cost optimize many existing and new applications.

The models have a remote On/Off control, short circuit and overvoltage protection and are applicable in temperature ranges of up to $+80^{\circ}\text{C}$ or $+85^{\circ}\text{C}$ with optional mounted heat sink. Typical applications are instrumentation, distributed power architectures in communication and industrial electronics.

Models

Order code	Input voltage range	Output voltage	Output current max.	Efficiency typ.
THL 10-1210	9 – 18 VDC (12 VDC nominal)	3.3 VDC	2500 mA	82 %
THL 10-1211		5.1 VDC	2000 mA	84 %
THL 10-1212		12 VDC	830 mA	86 %
THL 10-1213		15 VDC	670 mA	86 %
THL 10-1221		± 5.0 VDC	± 1000 mA	84 %
THL 10-1222		± 12 VDC	± 416 mA	85 %
THL 10-1223		± 15 VDC	± 333 mA	85 %
THL 10-2410	18 – 36 VDC (24 VDC nominal)	3.3 VDC	2500 mA	83 %
THL 10-2411		5.1 VDC	2000 mA	85 %
THL 10-2412		12 VDC	830 mA	87 %
THL 10-2413		15 VDC	670 mA	87 %
THL 10-2421		± 5.0 VDC	± 1000 mA	85 %
THL 10-2422		± 12 VDC	± 416 mA	86 %
THL 10-2423		± 15 VDC	± 333 mA	86 %
THL 10-4810	36 – 75 VDC (48 VDC nominal)	3.3 VDC	2500 mA	83 %
THL 10-4811		5.1 VDC	2000 mA	85 %
THL 10-4812		12 VDC	830 mA	87 %
THL 10-4813		15 VDC	670 mA	88 %
THL 10-4821		± 5.0 VDC	± 1000 mA	86 %
THL 10-4822		± 12 VDC	± 416 mA	87 %
THL 10-4823		± 15 VDC	± 333 mA	87 %

Input Specifications

Input current at no load (at nominal input voltage)	12 Vin models: 20 mA typ. 24 Vin models: 15 mA typ. 48 Vin models: 10 mA typ.
Input current at full load (at nominal input voltage)	12 Vin; 3.3 VDC models: 800 mA typ. 12 Vin; other models: 1000 mA typ. 24 Vin; 3.3 VDC models: 400 mA typ. 24 Vin; other models: 500 mA typ. 48 Vin; 3.3 VDC models: 200 mA typ. 48 V; other models: 250 mA typ.
Start-up voltage / under voltage lockout (hysteresis for assertive on)	12 Vin models: 9.0 / 8.5 VDC (or lower) 24 Vin models: 18 / 17 VDC (or lower) 48 Vin models: 36 / 34 VDC (or lower) (long term operation at undervoltage will damage the converter!)
Surge voltage (1 sec. max.)	12 Vin models: 25 V max. 24 Vin models: 50 V max. 48 Vin models: 100 V max.
Conducted noise (input)	EN 55022 class A, FCC part 15, level A without external components
ESD (electrostatic discharge)	EN 61000-4-2, air ± 8 kV, contact ± 6 kV, perf. criteria A
Radiated immunity	EN 61000-4-3, 10 V/m, perf. criteria A
Fast transient / Surge	EN 61000-4-4, ± 2 kV, perf. criteria A EN 61000-4-5, ± 1 kV perf. criteria A
Conducted immunity	EN 61000-4-6, 10 Vrms, perf. criteria A

Output Specifications

Voltage set accuracy	± 2 %
Regulation	– Input variation ($V_{min} - V_{max}$) – Load variation
	single output models: 1.0 % max. dual output models: 0.5 % max. (0 – 100 % load) cross regulation: 1.0 % max. (0 – 100 % balanced load) 5 % max. (25% / 100% asymmetrical load)
Minimum load	not required
Ripple and noise (20 MHz bandwidth)	3.3 & 5.0 VDC models: 80 mVp-p typ. other models: 100 mVp-p typ.
Temperature coefficient	± 0.02 %/K
Output current limitation	>110 % of Iout max.
Short circuit protection	hiccup, automatic recovery
Transient response setting time	300 μ s typ. (25 % load step change)
Maximum capacitive load	3.3 VDC models: 4700 μ F 5.1 VDC models: 2200 μ F 12 VDC models: 330 μ F 15 VDC models: 220 μ F ± 5.0 VDC models: 1000 μ F (each output) ± 12 VDC models: 150 μ F (each output) ± 15 VDC models: 100 μ F (each output)

General Specifications

Temperature ranges	<ul style="list-style-type: none"> - Operating without heat sink - Operating with heat sink - Case temperature - Storage 	<ul style="list-style-type: none"> -40°C to +80°C (with derating) -40°C to +85°C (with derating) +100°C max. -50°C to +125°C
Power derating	<ul style="list-style-type: none"> - Operating without heat sink - Operating with heat sink 	<ul style="list-style-type: none"> 2.5 %/K above +60°C 3.5 %/K above +70°C
Humidity (non condensing)		95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)		tbid
Isolation voltage (60 sec.)	- Input/Output	1'500 VDC
Isolation capacitance	- Input/Output	2000 pF max.
Isolation resistance	- Input/Output (500 VDC)	>1'000 MOhm
Remote On/Off	<ul style="list-style-type: none"> - On: - Off: - Off idle current: 	<ul style="list-style-type: none"> 3.5 ... 12 VDC or open circuit 0 ... +1.2 VDC or short circuit pin 6 and pin 2 10 mA max.
Switching frequency (fixed)		300 kHz typ. (pulse width modulation PWM)
Altitude during operation		5'000 m max. (16'400 ft) approved
Safety standards		UL/cUL 60950-1, IEC/EN 60950-1
Safety approvals	<ul style="list-style-type: none"> - UL/cUL - CB test certificate according IEC 60950-1 - CSA certificate for UL/cUL 60950-1 	<ul style="list-style-type: none"> www.ul.com -> File no. e188913 (entry pending) www.tracopower.com/products/thl10-cb.pdf www.tracopower.com/products/thl10-csa.pdf
Environmental compliance	<ul style="list-style-type: none"> - Reach - RoHS 	<ul style="list-style-type: none"> www.tracopower.com/products/reach-declaration.pdf RoHS directive 2011/65/EU

Physical Specifications

Casing material	metal
Baseplate	non conductive FR4
Potting material	epoxy (UL 94V-0 rated)
Pin material	copper alloy with gold-plated subplate
Weight	15 g (0.53oz)
Soldering temperature	max. +260°C / 10sec.

Application note : www.tracopower.com/products/thl10-application.pdf

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
6	Remote On/Off	

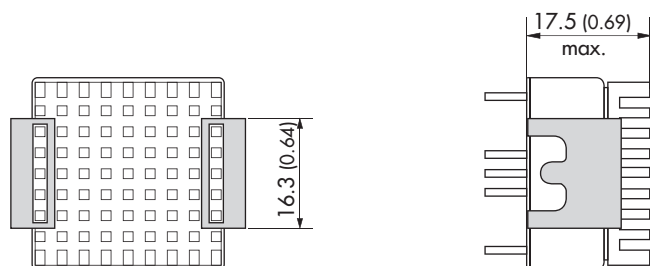
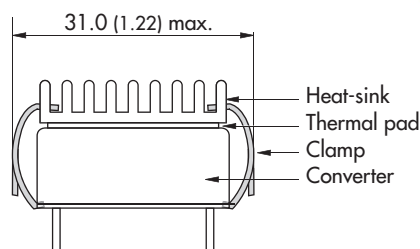
Dimensions in [mm], () = Inch
 Pin diameter \varnothing 1.0 (0.04)
 Pin pitch tolerances: ± 0.25 (± 0.01)
 Tolerances: ± 0.5 (± 0.02)

Heat-Sink (Option)

Order code: THL-HS1
 (cont.: heat-sink, thermal pad, 2 clamps)
Material: Aluminum
Finish: Anodic treatment (black)
Weight: 4.0 g (0.14oz) without converter
 Thermal impedance after assembling: 15.8 K/W



Note:
 The product label on converter has to be removed before mounting the heat-sink.
 For volume orders converters will be supplied with heat-sink already mounted. Please contact factory for quotation.
 Separate heat-sinks are only available for prototypes and small quantity orders.



Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at www.tracopower.com