

### Features

- ◆ Highest power density 25W converter!  
Ultra compact design: 1.0" x 1.0" x 0.4"
- ◆ Shielded metal case with isolated baseplate
- ◆ Wide 2:1 input voltage ranges
- ◆ Very high efficiency up to 90%
- ◆ Output voltage adjustable
- ◆ Remote On/Off control
- ◆ Operating temp. range -40°C to +80°C  
and up to +85°C with heat-sink
- ◆ I/O isolation voltage 1500 VDC
- ◆ 3-year product warranty



The THL 25 series is the latest generation of dc-dc converter modules with highest power density. The product achieves 25 Watt output power and comes in a metal case with small dimensions of only 1.0"x 1.0"x 0.4".

All models have a wide 2:1 input voltage range and precisely regulated output voltages. High efficiency of up to 90% makes this product very reliable and applicable in temperature ranges of up to +80°C or up to +85°C with optional mounted heat sink. Typical applications are in mobile equipments, instrumentation, distributed power architectures in communication and industrial electronics and everywhere where space on the PCB is critical.

### Models

Order code	Input voltage range	Output voltage	Output current max.	Efficiency typ.
THL 25-1210	9 – 18 VDC (12 VDC nominal)	3.3 VDC	6000 mA	87 %
THL 25-1211		5.0 VDC	5000 mA	89 %
THL 25-1212		12 VDC	2090 mA	89 %
THL 25-1213		15 VDC	1670 mA	89 %
THL 25-1222		±12 VDC	±1040 mA	89 %
THL 25-1223		±15 VDC	±840 mA	89 %
THL 25-2410		18 – 36 VDC (24 VDC nominal)	3.3 VDC	6000 mA
THL 25-2411	5.0 VDC		5000 mA	90 %
THL 25-2412	12 VDC		2090 mA	90 %
THL 25-2413	15 VDC		1670 mA	90 %
THL 25-2422	±12 VDC		±1040 mA	89 %
THL 25-2423	±15 VDC		±840 mA	89 %
THL 25-4810	36 – 75 VDC (48 VDC nominal)		3.3 VDC	6000 mA
THL 25-4811		5.0 VDC	5000 mA	90 %
THL 25-4812		12 VDC	2090 mA	90 %
THL 25-4813		15 VDC	1670 mA	90 %
THL 25-4822		±12 VDC	±1040 mA	89 %
THL 25-4823		±15 VDC	±840 mA	89 %

### Input Specifications

Input current at no load (at nominal input voltage)	12 Vin models: 80 mA typ. 24 Vin models: 55 mA typ. 48 Vin models: 40 mA typ.
Recommended input fuse (slow blow)	12 Vin models: 5000 mA 24 Vin models: 2500 mA 48 Vin models: 1250 mA
Start-up voltage	12 Vin models: 9 VDC (or lower) 24 Vin models: 18 VDC (or lower) 48 Vin models: 36 VDC (or lower)
Surge voltage (0.1 sec. max.)	12 Vin models: 25 V max. 24 Vin models: 50 V max. 48 Vin models: 100 V max.
Reflected input ripple current	12 Vin models: 80 mA <sub>p-p</sub> typ. 24 Vin models: 50 mA <sub>p-p</sub> typ. 48 Vin models: 30 mA <sub>p-p</sub> typ.
Conducted noise (input)	EN 55022 class A with external L/C EN 55022 class B with external filter <a href="#">see application note</a>
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 (with external input capacitor)	EN 61000-4-4, ±2 kV, perf. criteria A EN 61000-4-5, ±1 kV perf. criteria A external input capacitor: Nippon chemi-con KY 220 µF, 100 V, ESR 48 mOhm
Conducted immunity	EN 61000-4-6, 10 V <sub>rms</sub> , perf. criteria A

### Output Specifications

Voltage set accuracy	±1 %
Output voltage adj. range	±10 % for single output models only. Trim up via resistor between Trim and -V <sub>out</sub> Trim down via resistor between Trim and +V <sub>out</sub> resistor values see application note
Regulation	– Input variation (V <sub>min</sub> – V <sub>max</sub> ) 0.2 % max. – Load variation single output models: 0.2 % max. (0 – 100 % load) dual output models: 1.0 % max. (0 – 100 % balanced load) – Cross regulation dual output models: 5.0 % max. (25 – 100 % asymmetrical load)
Minimum load	not required
Ripple and noise (20 MHz bandwidth)	3.3 & 5.0 VDC models: 100 mV <sub>p-p</sub> typ. 12 & 15 VDC models: 150 mV <sub>p-p</sub> typ.
Temperature coefficient	±0.02 %/K
Output current limitation	at 150 % of I <sub>out</sub> max., hiccup
Short circuit protection	indefinite, automatic recovery
Over voltage protection	shutdown at +20% of nominal output
Transient response setting time	250 µs typ. (25% load step change)
Max. capacitive load	3.3 VDC models: 10'300 µF 5 VDC models: 6'800 µF 12 VDC models: 1'200 µF 15 VDC models: 750 µF ±12 VDC models: 680 µF (each output) ±15 VDC models: 380 µF (each output)

### General Specifications

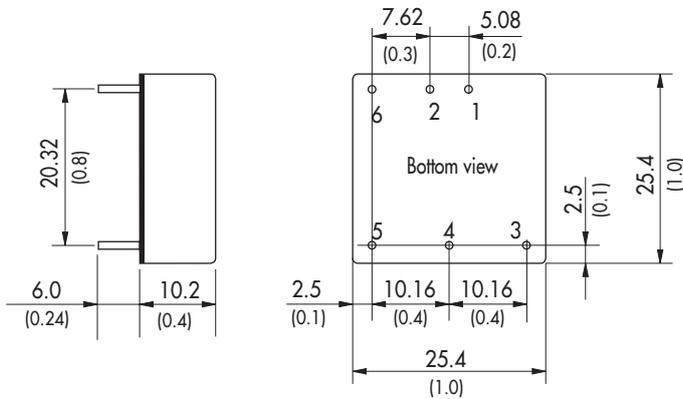
<b>Temperature ranges</b>	<ul style="list-style-type: none"> <li>- Operating (natural convection 20 LFM)</li> <li>- Operating with heat sink (natural convection 20 LFM)</li> <li>- Case temperature</li> <li>- Storage</li> </ul>	<ul style="list-style-type: none"> <li>-40°C to +80°C (with derating)</li> <li>-40°C to +85°C (with derating)</li> <li>+105°C max.</li> <li>-50°C to +125°C</li> </ul>
<b>Load derating</b> (natural convection 20 LFM, typical values over series)	<ul style="list-style-type: none"> <li>- without heat sink</li> <li>- with heat sink</li> </ul>	<ul style="list-style-type: none"> <li>2.0 %/K above +55°C</li> <li>2.5 %/K above +65°C</li> <li>see application note for particular models</li> </ul>
<b>Thermal impedance</b>	<ul style="list-style-type: none"> <li>- Natural convection</li> <li>- Natural convection with heat sink</li> </ul>	<ul style="list-style-type: none"> <li>17.6°C/W</li> <li>14.8°C/W</li> </ul>
<b>Humidity</b> (non condensing)		95 % rel H max.
<b>Reliability, calculated MTBF</b> (MIL-HDBK-217F, at +25°C, ground benign)		>313'300 h
<b>Isolation voltage</b> (60sec.)	- Input/Output	1500 VDC
<b>Isolation capacitance</b>	- Input/Output	2000 pF max.
<b>Isolation resistance</b>	- Input/Output (500 VDC)	>1000 MOhm
<b>Remote On/Off</b>	<ul style="list-style-type: none"> <li>- On:</li> <li>- Off:</li> <li>- Off idle current:</li> </ul>	<ul style="list-style-type: none"> <li>3.5 ... 15 VDC or open circuit</li> <li>0 ... 1.2 VDC or short circuit pin 6 and pin 2</li> <li>3 mA typ.</li> </ul>
<b>Switching frequency</b> (fixed)		285 kHz typ. (pulse width modulation PWM)
<b>Safety standards</b>		CAN/CSA-C22.2 No 60950-1-07, 2nd ed; A1:2011 ANSI/UL No. 60950-1, 2nd ed.; A1:2011 IEC 60950-1:2005 (2nd edition); Am 1:2009 EN 60950-1:2006/A11:2009/A1:2010/A12:2011 <a href="http://www.tracopower.com/overview/thl25">www.tracopower.com/overview/thl25</a>
	- Certification documents	
<b>Environmental compliance</b>	<ul style="list-style-type: none"> <li>- Reach</li> <li>- RoHS</li> </ul>	<a href="http://www.tracopower.com/overview/thl25">www.tracopower.com/overview/thl25</a> RoHS directive 2011/65/EU

### Physical Specifications

<b>Casing material</b>	metal
<b>Baseplate</b>	non conductive FR4
<b>Potting material</b>	epoxy (UL 94V-0 rated)
<b>Weight</b>	16.5 g (0.58 oz)
<b>Soldering temperature</b>	max. 260°C / 10sec.

**Application note :** [www.tracopower.com/products/thl25-application.pdf](http://www.tracopower.com/products/thl25-application.pdf)

**Outline Dimensions**



Pin-Out		
Pin	Single	Dual
1	+Vin (Vcc)	+Vin (Vcc)
2	-Vin (GND)	-Vin (GND)
3	+Vout	+Vout
4	Trim	Common
5	-Vout	-Vout
6	Remote On/Off	

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

**Heat-Sink (Option)**

**Order code:** THL-HS1

(cont.: heat-sink, thermal pad, 2 clamps)

**Material:** Aluminum

**Finish:** Anodic treatment (black)

**Weight:** 4 g (0.14 oz) without converter

Thermal impedance after assembling: 15.8 K/W

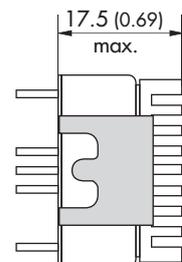
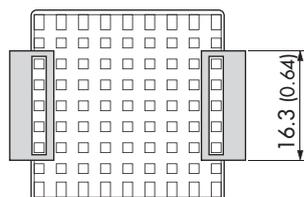
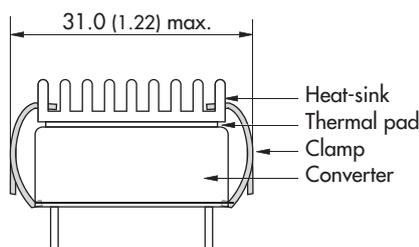


**Note:**

The product label on converter has to be removed before mounting the heat-sink.

For volume orders converters will be supplied with mounted heat-sink. 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](http://www.tracopower.com)

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