

### 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 mAp-p typ. 24 Vin models: 50 mAp-p typ. 48 Vin models: 30 mAp-p 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 $\pm 8$ kV, contact $\pm 6$ 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, $\pm 2$ kV, perf. criteria A EN 61000-4-5, $\pm 1$ kV perf. criteria A external input capacitor: Nippon chemi-con KY 220 $\mu$ F, 100 V, ESR 48 mOhm
Conducted immunity	EN 61000-4-6, 10 Vrms, perf. criteria A

### **Output Specifications**

Voltage set accuracy	$\pm 1$ %
Output voltage adj. range	$\pm 10$ % for single output models only. Trim up via resistor between Trim and -Vout Trim down via resistor between Trim and +Vout resistor values see application note
Regulation	- Input variation ( $V_{min} - V_{max}$ )      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 mVp-p typ. 12 & 15 VDC models: 150 mVp-p typ.
Temperature coefficient	$\pm 0.02$ %/K
Output current limitation	at 150 % of Iout max., hiccup
Short circuit protection	indefinite, automatic recovery
Over voltage protection	shutdown at +20% of nominal output
Transient response setting time	250 $\mu$ s typ. (25% load step change)
Max. capacitive load	3.3 VDC models: 10'300 $\mu$ F 5 VDC models: 6'800 $\mu$ F 12 VDC models: 1'200 $\mu$ F 15 VDC models: 750 $\mu$ F $\pm 12$ VDC models: 680 $\mu$ F (each output) $\pm 15$ VDC models: 380 $\mu$ F (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>
<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

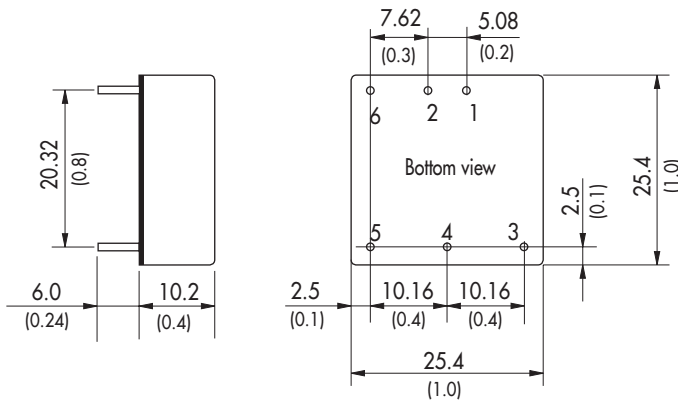
**Physical Specifications**

<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)

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

### 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

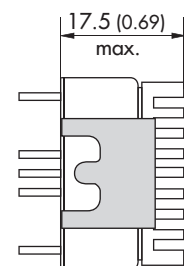
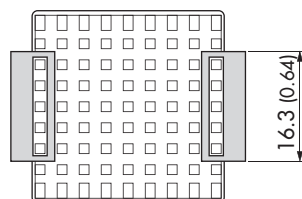
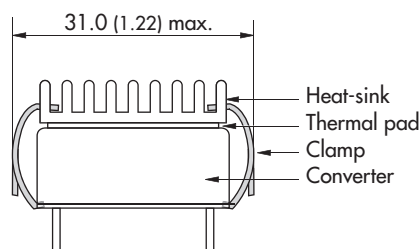


**Note:**

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)