

#### Features

- ◆ Highest power density 25W converter!  
Ultra compact design: 1.0" x 1.0" x 0.4"
- ◆ Shielded metal case with isolated baseplate
- ◆ Ultra wide 4 : 1 input voltage ranges
- ◆ Very high efficiency up to 90%
- ◆ Output voltage adjustable
- ◆ Remote On/Off control
- ◆ Operating temp. range  $-40^{\circ}\text{C}$  to  $+80^{\circ}\text{C}$   
and up to  $+85^{\circ}\text{C}$  with heat-sink
- ◆ I/O isolation voltage 1500 VDC
- ◆ 3-year product warranty



The THL 25WI 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 4:1 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  $+80^{\circ}\text{C}$  or up to  $+85^{\circ}\text{C}$  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 25-2410WI	9 – 36 VDC (24 VDC nominal)	3.3 VDC	6000 mA	87 %
THL 25-2411WI		5.0 VDC	5000 mA	89 %
THL 25-2412WI		12 VDC	2090 mA	89 %
THL 25-2413WI		15 VDC	1670 mA	90 %
THL 25-2422WI		$\pm 12$ VDC	$\pm 1040$ mA	89 %
THL 25-2423WI		$\pm 15$ VDC	$\pm 840$ mA	89 %
THL 25-4810WI		18 – 75 VDC (48 VDC nominal)	3.3 VDC	6000 mA
THL 25-4811WI	5.0 VDC		5000 mA	90 %
THL 25-4812WI	12 VDC		2090 mA	90 %
THL 25-4813WI	15 VDC		1670 mA	90 %
THL 25-4822WI	$\pm 12$ VDC		$\pm 1040$ mA	89 %
THL 25-4823WI	$\pm 15$ VDC		$\pm 840$ mA	89 %

### Input Specifications

Input current at no load (at nominal input voltage)	24 Vin models: 85 mA typ. 48 Vin models: 45 mA typ.
Recommended input fuse (slow blow)	24 Vin models: 2500 mA 48 Vin models: 1250 mA
Start-up voltage	24 Vin models: 9 VDC (or lower) 48 Vin models: 18 VDC (or lower)
Surge voltage (0.1 sec. max.)	24 Vin models: 50 V max. 48 Vin models: 100 V max.
Reflected input ripple current	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	<ul style="list-style-type: none"> <li>- Input variation (Vmin – Vmax) 0.2 % max.</li> <li>- Load variation single output models: 0.2 % max. (0 – 100 % load) dual output models: 1.0 % max. (0 – 100 % balanced load)</li> <li>-Cross regulation dual output models: 5.0 % max. (25 – 100 % asymmetrical load)</li> </ul>
Minimum load	not required
Start up time	30 ms
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, hiccup automatic recovery
Over voltage protection	shutdown at +20% of nominal output
Transient recovery time	250 $\mu$ s typ. (25% load step change)
Transient response deviation	$\pm 5$ % max. (25% load step change)
Max. capacitive load	<ul style="list-style-type: none"> <li>3.3 VDC models: 10'300 <math>\mu</math>F</li> <li>5 VDC models: 6'800 <math>\mu</math>F</li> <li>12 VDC models: 1'200 <math>\mu</math>F</li> <li>15 VDC models: 750 <math>\mu</math>F</li> <li><math>\pm 12</math> VDC models: 680 <math>\mu</math>F (each output)</li> <li><math>\pm 15</math> VDC models: 380 <math>\mu</math>F (each output)</li> </ul>

### General Specifications

Temperature ranges	<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>
Load derating (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>
Thermal impedance	<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>
Humidity (non condensing)		95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)		>315'000 h
Isolation voltage (60sec.)	- Input/Output	1500 VDC
Isolation capacitance	- Input/Output	2000 pF max.
Isolation resistance	- Input/Output (500 VDC)	>1000 MOhm
Remote On/Off	<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>
Switching frequency (fixed)		285 kHz typ. (pulse width modulation PWM)
Altitude during operation		4'000 m max. (13'123 ft) approved
Safety standards (designed to meet)		UL/cUL 60950-1, IEC/EN 60950-1
Safety approvals	<ul style="list-style-type: none"> <li>- CSA certificate of compliance</li> <li>- CB test certificate</li> <li>- Certification documents</li> </ul>	<ul style="list-style-type: none"> <li>CAN/CSA-C22.2 No 60950-1-07, Am 1:2011</li> <li>ANSI/UL Std No 60950-1, 2nd Ed, AM 1:2011</li> <li>IEC 60950-1:2005 2nd Ed, Am 1:2009</li> <li><a href="http://www.tracopower.com/overview/thl25wi">www.tracopower.com/overview/thl25wi</a></li> </ul>
Environmental compliance	<ul style="list-style-type: none"> <li>- Reach</li> <li>- RoHS</li> </ul>	<ul style="list-style-type: none"> <li><a href="http://www.tracopower.com/overview/thl25wi">www.tracopower.com/overview/thl25wi</a></li> <li>RoHS directive 2011/65/EU</li> </ul>

### Physical Specifications

Casing material	aluminium alloy, black anodized coating
Baseplate	non conductive FR4
Potting material	epoxy (UL 94V-0 rated)
Pin material	copper alloy with gold plated subplate
Weight	16.5 g (0.58 oz)
Soldering temperature	max. 260°C / 10sec.

Application note : [www.tracopower.com/products/thl25wi-application.pdf](http://www.tracopower.com/products/thl25wi-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 (optional)**

**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

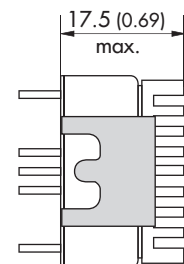
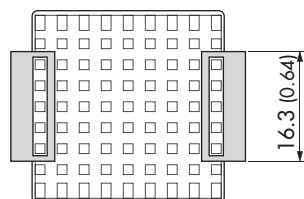
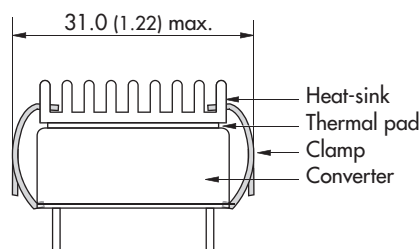


**Note:**

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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