**DC/DC Converters**

**THL 25WI Series, 25 Watt**

**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°C to +80°C and up to +85°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°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

<table>
<thead>
<tr>
<th>Order code</th>
<th>Input voltage range</th>
<th>Output voltage</th>
<th>Output current max.</th>
<th>Efficiency typ.</th>
</tr>
</thead>
<tbody>
<tr>
<td>THL 25-2410WI</td>
<td>9 – 36 VDC (24 VDC nominal)</td>
<td>3.3 VDC</td>
<td>6000 mA</td>
<td>87 %</td>
</tr>
<tr>
<td>THL 25-2411WI</td>
<td></td>
<td>5.0 VDC</td>
<td>5000 mA</td>
<td>89 %</td>
</tr>
<tr>
<td>THL 25-2412WI</td>
<td></td>
<td>12 VDC</td>
<td>2090 mA</td>
<td>89 %</td>
</tr>
<tr>
<td>THL 25-2413WI</td>
<td></td>
<td>15 VDC</td>
<td>1670 mA</td>
<td>90 %</td>
</tr>
<tr>
<td>THL 25-2422WI</td>
<td></td>
<td>±12 VDC</td>
<td>±1040 mA</td>
<td>89 %</td>
</tr>
<tr>
<td>THL 25-2423WI</td>
<td></td>
<td>±15 VDC</td>
<td>±840 mA</td>
<td>89 %</td>
</tr>
<tr>
<td>THL 25-4810WI</td>
<td>18 – 75 VDC (48 VDC nominal)</td>
<td>3.3 VDC</td>
<td>6000 mA</td>
<td>88 %</td>
</tr>
<tr>
<td>THL 25-4811WI</td>
<td></td>
<td>5.0 VDC</td>
<td>5000 mA</td>
<td>90 %</td>
</tr>
<tr>
<td>THL 25-4812WI</td>
<td></td>
<td>12 VDC</td>
<td>2090 mA</td>
<td>90 %</td>
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</table>
## Input Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>24 Vin models</th>
<th>48 Vin models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input current at no load (at nominal input voltage)</td>
<td>85 mA typ.</td>
<td>45 mA typ.</td>
</tr>
<tr>
<td>Recommended input fuse (slow blow)</td>
<td>2500 mA</td>
<td>1250 mA</td>
</tr>
<tr>
<td>Start-up voltage</td>
<td>9 VDC (or lower)</td>
<td>18 VDC (or lower)</td>
</tr>
<tr>
<td>Surge voltage (0.1 sec. max.)</td>
<td>50 V max.</td>
<td>100 V max.</td>
</tr>
<tr>
<td>Reflected input ripple current</td>
<td>50 mAp-p typ.</td>
<td>30 mAp-p typ.</td>
</tr>
</tbody>
</table>

### Conducted noise (input)
- EN 55022 class A with external L/C
- EN 55022 class B with external filter

### 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 Vrms, perf. criteria A

## Output Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>3.3 &amp; 5.0 VDC models</th>
<th>12 &amp; 15 VDC models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage set accuracy</td>
<td>±1 %</td>
<td>±10 % for single output models only. Trim up via resistor between Trim and -Vout Trim down via resistor between Trim and +Vout</td>
</tr>
<tr>
<td>Output voltage adj. range</td>
<td>100 mVp-p typ.</td>
<td>150 mVp-p typ.</td>
</tr>
<tr>
<td>Regulation</td>
<td>0.2 % max.</td>
<td>0.2 % max. [0 – 100 % load]</td>
</tr>
<tr>
<td>- Input variation (Vmin – Vmax)</td>
<td>0.2 % max.</td>
<td>1.0 % max. [0 – 100 % balanced load]</td>
</tr>
<tr>
<td>- Load variation</td>
<td>0.2 % max.</td>
<td>5.0 % max. [25 – 100 % asymmetrical load]</td>
</tr>
<tr>
<td>- Cross regulation</td>
<td>0.2 % max.</td>
<td>1.0 % max. [0 – 100 % balanced load]</td>
</tr>
</tbody>
</table>

### 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
- ±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 µs typ. [25% load step change]

### Transient response deviation
- ± 5% max. [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

Temperature ranges
- Operating [natural convection 20 LFM] -40°C to +80°C (with derating)
- Operating with heat sink [natural convection 20 LFM] -40°C to +85°C (with derating)
- Case temperature +105°C max.
- Storage -50°C to +125°C

Load derating
- without heat sink 2.0 %/K above +55°C
- with heat sink 2.5 %/K above +65°C

Thermal impedance
- Natural convection 17.6°C/W
- Natural convection with heat sink 14.8°C/W

Humidity [non condensing] 95 % rel H max.

Reliability, calculated MTBF [MILHDBK217F, 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
- On: 3.5 ... 15 VDC or open circuit
- Off: 0 ... 1.2 VDC or short circuit pin 6 and pin 2
- Off idle current: 3 mA typ.

Altitude during operation 6'000 m max.

Switching frequency [fixed] 285 kHz typ. [pulse width modulation PWM]

Safety standards [designed to meet]
- UL/cUL 60950-1, IEC/EN 60950-1
- UL 62368-1, IEC/EN 62368-1

Safety approvals
- CSA certificate of compliance CAN/CSA-C22.2 No 60950-1-07, Am 1:2011
- CB test certificate ANSI/UL Std No 60950-1, 2nd Ed, AM 1:2011

Environmental compliance
- Reach www.tracopower.com/info/reach-declaration.pdf
- RoHS directive 2011/65/EU

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.

Supporting documents: www.tracopower.com/overview/thl25wi

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

![Outline Dimensions Diagram]

### Pin-Out

<table>
<thead>
<tr>
<th>Pin</th>
<th>Single</th>
<th>Dual</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+Vin (Vcc)</td>
<td>+Vin (Vcc)</td>
</tr>
<tr>
<td>2</td>
<td>–Vin (GND)</td>
<td>–Vin (GND)</td>
</tr>
<tr>
<td>3</td>
<td>+Vout</td>
<td>+Vout</td>
</tr>
<tr>
<td>4</td>
<td>Trim</td>
<td>Common</td>
</tr>
<tr>
<td>5</td>
<td>–Vout</td>
<td>–Vout</td>
</tr>
<tr>
<td>6</td>
<td>Remote On/Off</td>
<td></td>
</tr>
</tbody>
</table>

All dimensions in mm (inch)
Tolerance: X.X ±0.5 (X.XX ±0.02)
X.XX ±0.25 (X.XXX ±0.01)
Pin diameter: 1.0 ±0.05 (0.04 ±0.002)

### 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.