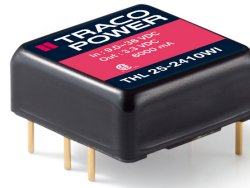


- High power density 25W converter  
Ultra compact design: 1.0" x 1.0" x 0.4"
- Shielded metal case with isolated baseplate
- Ultra wide 4:1 input voltage ranges
- Very high efficiency up to 90%
- Output voltage adjustable
- Remote On/Off control
- Operating temp. range  $-40^{\circ}\text{C}$  to  $+80^{\circ}\text{C}$   
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 a generation of DC-DC converter modules with high 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 1		Output 2		Efficiency typ.
		Vnom	I <sub>max</sub>	Vnom	I <sub>max</sub>	
THL 25-2410WI	9 - 36 VDC (24 VDC nom.)	3.3 VDC	6'000 mA			87 %
THL 25-2411WI		5 VDC	5'000 mA			89 %
THL 25-2412WI		12 VDC	2'090 mA			89 %
THL 25-2413WI		15 VDC	1'670 mA			90 %
THL 25-2422WI		+12 VDC	1'040 mA	-12 VDC	1'040 mA	89 %
THL 25-2423WI		+15 VDC	840 mA	-15 VDC	840 mA	89 %
THL 25-4810WI	18 - 75 VDC (48 VDC nom.)	3.3 VDC	6'000 mA			88 %
THL 25-4811WI		5 VDC	5'000 mA			90 %
THL 25-4812WI		12 VDC	2'090 mA			90 %
THL 25-4813WI		15 VDC	1'670 mA			90 %
THL 25-4822WI		+12 VDC	1'040 mA	-12 VDC	1'040 mA	89 %
THL 25-4823WI		+15 VDC	840 mA	-15 VDC	840 mA	89 %

### Options

THL-HS1	- Optional Heat Sink: <a href="http://www.tracopower.com/products/thl-hs1.pdf">www.tracopower.com/products/thl-hs1.pdf</a>
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## Input Specifications

Input Current	- At no load	24 Vin models: <b>80 mA typ.</b> 48 Vin models: <b>55 mA typ.</b>
	- At full load	24 Vin models: <b>950 mA typ.</b> (3.3 Vout model) <b>1'150 mA typ.</b> (5 Vout model) <b>1'150 mA typ.</b> (12 Vout model) <b>1'150 mA typ.</b> (15 Vout model) <b>1'150 mA typ.</b> (12 / -12 Vout model) <b>1'150 mA typ.</b> (15 / -15 Vout model) 48 Vin models: <b>450 mA typ.</b> (3.3 Vout model) <b>580 mA typ.</b> (5 Vout model) <b>580 mA typ.</b> (12 Vout model) <b>580 mA typ.</b> (15 Vout model) <b>580 mA typ.</b> (12 / -12 Vout model) <b>580 mA typ.</b> (15 / -15 Vout model)
Surge Voltage		24 Vin models: <b>50 VDC max.</b> (100 ms max.) 48 Vin models: <b>100 VDC max.</b> (100 ms max.)
Reflected Ripple Current		24 Vin models: <b>50 mA<sub>p-p</sub> typ.</b> 48 Vin models: <b>30 mA<sub>p-p</sub> typ.</b>
Recommended Input Fuse		24 Vin models: <b>2'500 mA</b> (slow blow) 48 Vin models: <b>1'250 mA</b> (slow blow) (The need of an external fuse has to be assessed in the final application.)
Input Filter		<b>Internal LC-Type</b>

## Output Specifications

Output Voltage Adjustment		<b>±10%</b> (By external trim resistor) See application note: <a href="http://www.tracopower.com/overview/thl25wi">www.tracopower.com/overview/thl25wi</a> Output power must not exceed rated power!
Voltage Set Accuracy		<b>±1% max.</b>
Regulation	- Input Variation (Vmin - Vmax)	single output models: <b>0.2% max.</b> dual output models: <b>0.2% max.</b>
	- Load Variation (0 - 100%)	single output models: <b>0.2% max.</b> dual output models: <b>1% max.</b> (Output 1) <b>1% max.</b> (Output 2)
	- Voltage Balance (symmetrical load)	dual output models: <b>2% max.</b>
	- Cross Regulation (25% / 100% asym. load)	dual output models: <b>5% max.</b>
Ripple and Noise (20 MHz Bandwidth)	- single output	3.3 Vout models: <b>100 mVp-p max.</b> (w/ 1 µF MLCC // 10 µF Tantalum)
		5 Vout models: <b>100 mVp-p max.</b> (w/ 1 µF MLCC // 10 µF Tantalum)
		12 Vout models: <b>150 mVp-p max.</b> (w/ 1 µF MLCC // 10 µF Tantalum)
		15 Vout models: <b>150 mVp-p max.</b> (w/ 1 µF MLCC // 10 µF Tantalum)
	- dual output	12 / -12 Vout models: <b>150 / 150 mVp-p max.</b> (w/ 1 µF MLCC // 10 µF Tantalum)
		15 / -15 Vout models: <b>150 / 150 mVp-p max.</b> (w/ 1 µF MLCC // 10 µF Tantalum)
Capacitive Load	- single output	3.3 Vout models: <b>10'300 µF max.</b>
		5 Vout models: <b>6'800 µF max.</b>
		12 Vout models: <b>1'200 µF max.</b>
		15 Vout models: <b>750 µF max.</b>
	- dual output	12 / -12 Vout models: <b>680 / 680 µF max.</b>
		15 / -15 Vout models: <b>380 / 380 µF max.</b>

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

Minimum Load	Not required
Temperature Coefficient	±0.02 %/K max.
Start-up Time	30 ms max. (Power On) 30 ms (Remote On)
Short Circuit Protection	Continuous, Automatic recovery
Output Current Limitation	150% typ. of I <sub>out</sub> max.
Overvoltage Protection	118 - 125% of V <sub>out</sub> nom. (depending on model) 3.9 VDC typ. (3.3 V <sub>out</sub> models) 6.2 VDC typ. (5.1 V <sub>out</sub> models) 15 VDC typ. (12 V <sub>out</sub> models) 18 VDC typ. (15 V <sub>out</sub> models)
Transient Response	- Response Deviation - Response Time
	3% typ. / 5% max. (75% to 100% Load Step) 250 μs typ. (75% to 100% Load Step)

### Safety Specifications

Safety Standards	- IT / Multimedia Equipment	CSA-C22.2, No. 60950-1 EN 62368-1 IEC 62368-1 UL 62368-1
	- Certification Documents	<a href="http://www.tracopower.com/overview/thl25wi">www.tracopower.com/overview/thl25wi</a>

### EMC Specifications

EMI Emissions	- Conducted Emissions - Radiated Emissions	EN 55032 class A (with external filter) EN 55032 class A (with external filter) (see application note)
EMS Immunity	- Electrostatic Discharge - RF Electromagnetic Field - EFT (Burst) / Surge	EN 55024 (IT Equipment) Air: EN 61000-4-2, ±8 kV, perf. criteria A Contact: EN 61000-4-2, ±6 kV, perf. criteria A EN 61000-4-3, 10 V/m, perf. criteria A EN 61000-4-4, ±2 kV, perf. criteria A EN 61000-4-5, ±1 kV, perf. criteria A
	Ext. input component: External filter proposal:	KY 220 μF, 100 V, ESR 48 mOhm <a href="http://www.tracopower.com/overview/thl25wi">www.tracopower.com/overview/thl25wi</a>
	- Conducted RF Disturbances	EN 61000-4-6, 10 V <sub>rms</sub> , perf. criteria A

### General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-40°C to +80°C -40°C to +85°C (with Heat Sink)
	- Case Temperature	+105°C max.
	- Storage Temperature	-50°C to +125°C
Power Derating	- High Temperature	2 %/K above 55°C 2.5 %/K above 65°C (with Heat Sink)
Cooling System		Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote	On: 3.5 to 12 VDC or open circuit Off: 0 to 1.2 VDC or short circuit Refers to 'Remote' and '-Vin' Pin
	- Off Idle Input Current	3 mA typ.
	- Remote Pin Input Current	-0.5 to 0.5 mA
Altitude During Operation		6'000 m max.
Switching Frequency		285 kHz typ. (PWM)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s	1'500 VDC
	- Input to Output, 1 s	1'800 VDC

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

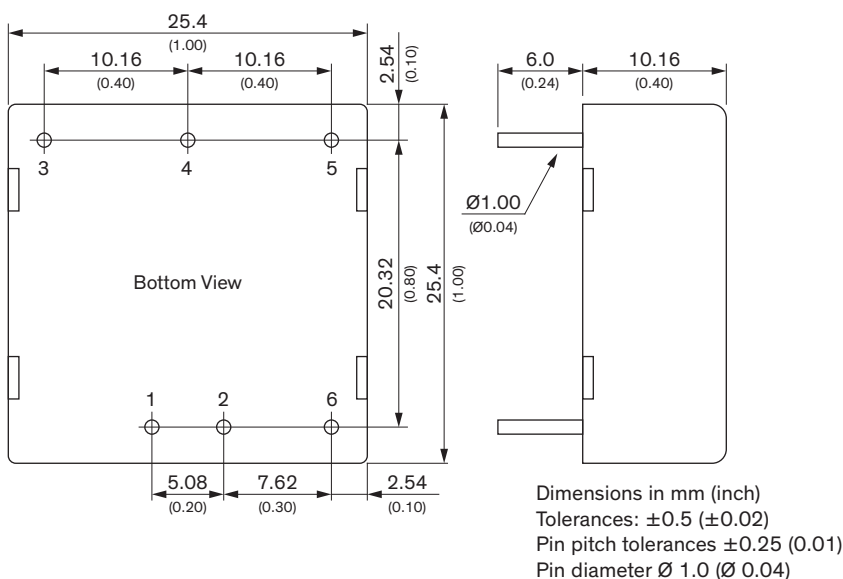
Isolation Resistance	- Input to Output, 500 VDC	1'000 M $\Omega$ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	2'000 pF max.
Reliability	- Calculated MTBF	444'000 h (MIL-HDBK-217F, ground benign)
Washing Process		Allowed (hermetical product)
	See Cleaning Guideline:	<a href="http://www.tracopower.com/info/cleaning.pdf">www.tracopower.com/info/cleaning.pdf</a>
Housing Material		Alu alloy, black anodized coating
Base Material		Non-conductive FR4 (UL 94 V-0 rated)
Potting Material		Epoxy (UL 94 V-0 rated)
Pin Material		Copper Alloy (C6801)
Pin Foundation Plating		Nickel (2.5 $\mu$ m min.)
Pin Surface Plating		Gold (75 - 125 nm), glossy
Housing Type		Metal Case
Mounting Type		PCB Mount
Connection Type		THD (Through-Hole Device)
Footprint Type		1" x 1"
Soldering Profile		Wave Soldering 260°C / 10 s max.
Weight		16.5 g
Thermal Impedance		17.6 K/W 14.8 K/W (with Heat Sink)
Environmental Compliance	- REACH Declaration	<a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a> REACH SVHC list compliant REACH Annex XVII compliant
	- RoHS Declaration	<a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a> Exemptions: 7a (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule). The SCIP number is provided on request.)

### Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/thl25wi](http://www.tracopower.com/overview/thl25wi)

### Outline Dimensions



### Pinout

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	Remote On/Off

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