

- 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°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



UL 62368-1 IEC 62368-1

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 _{max}	Vnom	I _{max}	
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: www.tracopower.com/products/thl-hs1.pdf
---------	--

Input Specifications

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

Output Specifications

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

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 max. (Remote On)
Short Circuit Protection	Continuous, Automatic recovery
Output Current Limitation	150% typ. of I _{out} max.
Overvoltage Protection	118 - 125% of V _{out} nom. (depending on model) 3.9 VDC typ. (3.3 V _{out} models) 6.2 VDC typ. (5.1 V _{out} models) 15 VDC typ. (12 V _{out} models) 18 VDC typ. (15 V _{out} 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	www.tracopower.com/overview/thl25wi

EMC Specifications

EMI Emissions	- Conducted Emissions - Radiated Emissions	EN 55032 class A (with external filter) EN 55032 class A (with external filter)
	External filter proposal:	www.tracopower.com/overview/thl25wi (see application note)
EMS Immunity	- Electrostatic Discharge - RF Electromagnetic Field - EFT (Burst) / Surge - Conducted RF Disturbances	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: KY 220 μF, 100 V, ESR 48 mOhm EN 61000-4-6, 10 V _{rms} , perf. criteria A

General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature - Case Temperature - Storage Temperature	-40°C to +80°C -40°C to +85°C (with Heat Sink) +105°C max. -50°C to +125°C
Power Derating	- High Temperature	Depending on model Depending on model (with Heat Sink)
	See application note:	www.tracopower.com/overview/thl25wi
Cooling System		Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote - Off Idle Input Current - Remote Pin Input Current	On: 3.5 to 12 VDC or open circuit Off: 0 to 1.2 VDC or short circuit Refers to 'Remote' and '-Vin' Pin 3 mA typ. -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 - Input to Output, 1 s	1'500 VDC 1'800 VDC

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

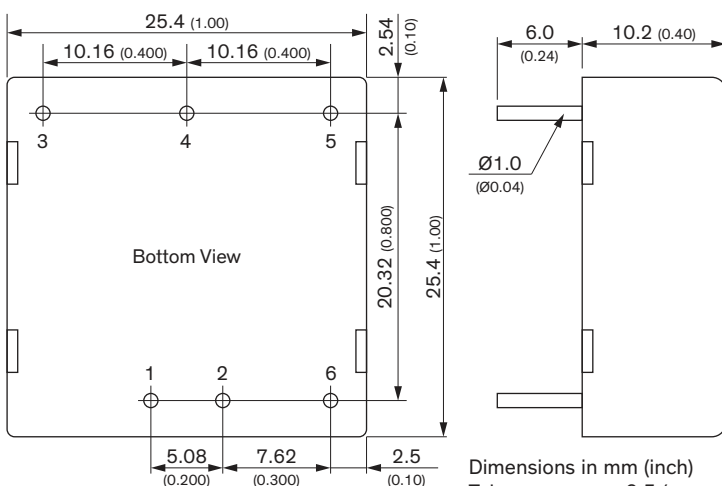
Isolation Resistance	- Input to Output, 500 VDC	1'000 M Ω min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	2'000 pF max.
Reliability	- Calculated MTBF	444'000 h (MIL-HDBK-217F, ground benign)
Washing Process		Allowed (hermetical product)
	See Cleaning Guideline:	www.tracopower.com/info/cleaning.pdf
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 μ 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	- Case to Ambient	17.6 K/W typ. 14.8 K/W typ. (with Heat Sink)
Environmental Compliance	- REACH Declaration	www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant
	- RoHS Declaration	www.tracopower.com/info/rohs-declaration.pdf 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

Outline Dimensions



Dimensions in mm (inch)
Tolerances: x.x \pm 0.5 (x.xx \pm 0.02)
 x.xx \pm 0.25 (x.xxx \pm 0.01)
Pin tolerances: x.x \pm 0.05 (x.xx \pm 0.002)

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