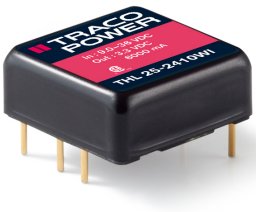
TRACO POWER

DC/DC Converter

THL 25WI Series, 25 Watt

- **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°C and up to +85°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°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 1		Output 2		Efficiency
		Vnom	Imax	Vnom	Imax	typ.
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/overview/thl-hs1

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 Iout max.
Overvoltage Protection		118 - 125% of Vout nom. (depending on model) 3.9 VDC typ. (3.3 Vout models) 6.2 VDC typ. (5.1 Vout models) 15 VDC typ. (12 Vout models) 18 VDC typ. (15 Vout models)
Transient Response	- Response Deviation	3% typ. / 5% max. (75% to 100% Load Step)
	- Response Time	250 µs typ. (75% to 100% Load Step)

Safety Specifications

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		EN 55032 class A (with external filter)
	- Radiated Emissions		EN 55032 class A (with external filter)
		External filter proposal:	www.tracopower.com/overview/thl25wi
EMS (Immunity)			EN 55024 (IT Equipment) EN 55035 (Multimedia)
	- Electrostatic Discharge	Air:	EN 61000-4-2, ±8 kV, perf. criteria A
		Contact:	EN 61000-4-2, ±6 kV, perf. criteria A
	- RF Electromagnetic Field		EN 61000-4-3, 10 V/m, perf. criteria A
	- EFT (Burst) / Surge		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
	- Conducted RF Disturbances		EN 61000-4-6, 10 Vrms, perf. criteria A
	- PF Magnetic Field	Continuous:	EN 61000-4-8, 3 A/m, perf. criteria A
EMC / Environmental	- Certification Documents		www.tracopower.com/overview/thl25wi

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		Depending on model
		See application note:	www.tracopower.com/overview/thl25wi
Cooling System			Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote (passive = on)		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

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Isolation Test Voltage	- Input to Output, 60 s	1'500 VDC
	- Input to Output, 1 s	1'800 VDC
Isolation Resistance	- Input to Output, 500 VDC	1'000 MΩ 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		According to 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 µm 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		Lead-Free 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).)
	- SCIP Reference Number	8cb0eff2-677a-444b-b63b-898d682a98b8

Supporting Documents

Overview Link (for additional Documents)	www.tracopower.com/overview/thl25wi

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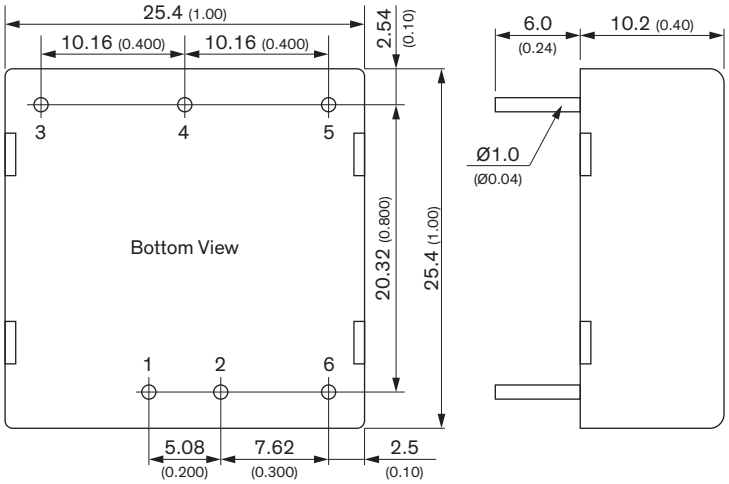
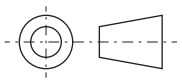
Outline Dimensions



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