Nieuwland Parc 13i
2952 DA Alblasserdam

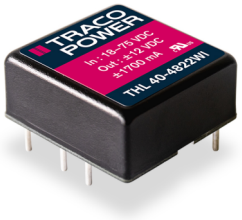
T +31 (0)78 6215900
F +31 (0)78 6215815
E info@ave-nl.com
W www.ave-nl.com

TRACO POWER

DC/DC Converter

THL 40WI Series, 40 Watt

- **40 Watt converter in a 1” x 1” metal package**
- **Cost efficient design**
- **Wide 4:1 input voltage range: 9-36 and 18-75 VDC**
- **Operating temperature range -40 to +65 °C without derating**
- **1500 VDC I/O-isolation**
- **Protection against overload, overvoltage and short circuit**
- **Remote On/Off and Trim function**
- **Optional heatsink for increased temperature capabilities**
- **3-year product warranty**



UL 62368-1 IEC 62368-1

The THL 40WI series extends Traco Power’s existing DC/DC converter portfolio with 40 Watt, 1” x 1” package converters. With the focus on combining cost efficiency and quality this isolated high performance DC/DC converter series is suitable for many different applications. The series comes in an encapsulated, shielded 1” x 1” x 0.43” metal package and offers integrated remote on/off and trim functions. High efficiency up to 93% enables the converter to operate from –40°C to +65°C without derating. All models have a wide 4:1 input voltage range and precisely regulated, isolated outputs. The series meets the latest IT safety certifications (UL 62368-1) and is suitable for uses in mobile equipment, instrumentation, distributed power architectures in communication and industrial electronics and everywhere where cost efficiency and quality are critical factors.

Models

Order Code	Input Voltage Range	Output 1 Vnom	Output 1 Imax	Output 2 Vnom	Output 2 Imax	Efficiency typ.
THL 40-2411WI	9 - 36 VDC (24 VDC nom.)	5 VDC	8'000 mA			91 %
THL 40-2412WI		12 VDC	3'350 mA			92 %
THL 40-2413WI		15 VDC	2'700 mA			92 %
THL 40-2415WI		24 VDC	1'700 mA			91 %
THL 40-2422WI		+12 VDC	1'700 mA	–12 VDC	1'700 mA	91 %
THL 40-2423WI		+15 VDC	1'350 mA	–15 VDC	1'350 mA	91 %
THL 40-4811WI	18 - 75 VDC (48 VDC nom.)	5 VDC	8'000 mA			92 %
THL 40-4812WI		12 VDC	3'350 mA			93 %
THL 40-4813WI		15 VDC	2'700 mA			93 %
THL 40-4815WI		24 VDC	1'700 mA			92 %
THL 40-4822WI		+12 VDC	1'700 mA	–12 VDC	1'700 mA	91 %
THL 40-4823WI		+15 VDC	1'350 mA	–15 VDC	1'350 mA	90 %

Options

THL-HS2	- Optional Heat Sink: www.tracopower.com/overview/thl-hs2
on demand (backorder with MOQ non stocking item)	- Optional model with 48 VDC and 835 mA Output, and 9 - 36 VDC Input - Optional model with 54 VDC and 740 mA Output, and 9 - 36 VDC Input - Optional model with 48 VDC and 835 mA Output, and 18 - 75 VDC Input - Optional model with 54 VDC and 740 mA Output, and 18 - 75 VDC Input - Optional models with inverse Remote On/Off function (passive = off) - Optional models with pre-assembled heatsink

Input Specifications

Input Current	- At no load	24 Vin models:	8 mA typ. / 10 mA max.
		48 Vin models:	5 mA typ. / 7 mA max.
	- At full load	24 Vin models:	1'850 mA typ. / 1'889 mA max.
		48 Vin models:	921 mA typ. / 948 mA max.
Surge Voltage		24 Vin models:	50 VDC max. (100 ms max.)
		48 Vin models:	100 VDC max. (100 ms max.)
Input Inrush Current			7 A typ. (24 Vin models) 10 A typ. (48 Vin models)
Start-up Voltage		24 Vin models:	7.8 VDC min. / 8.5 VDC typ. / 9 VDC max.
		48 Vin models:	17 VDC min. / 17.5 VDC typ. / 18 VDC max.
Under Voltage Lockout		24 Vin models:	7.5 VDC min. / 7.8 VDC typ. / 8.1 VDC max.
		48 Vin models:	16 VDC min. / 16.5 VDC typ. / 17 VDC max.
Recommended Input Fuse		24 Vin models:	8'000 mA (slow blow)
		48 Vin models:	4'000 mA (slow blow)
			(The need of an external fuse has to be assessed in the final application.)
Input Filter			Internal Capacitor

Output Specifications

Output Voltage Adjustment			±10% (By external trim resistor)
		See application note:	www.tracopower.com/overview/thl40wi
			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:	0.3% max.
		dual output models:	0.3% max. (Output 1)
			0.3% 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		100 mVp-p max. (5 Vout) (w/ 10µF/10V MLCC || 33µF/35V Polymer) 125 mVp-p max. (12/15 Vout) (w/ 10µF/35V MLCC || 33µF/35V Polymer) 200 mVp-p max. (24 Vout) (w/ 10µF/50V MLCC || 33µF/35V Polymer) 300 mVp-p max. (48/54 Vout) (w/ 2.2µF/100V MLCC)
Capacitive Load	- single output	5 Vout models:	14'300 µF max.
		12 Vout models:	2'500 µF max.
		15 Vout models:	1'600 µF max.
		24 Vout models:	620 µF max.
		48 Vout models:	160 µF max.
		54 Vout models:	120 µF max.
	- dual output	12 / -12 Vout models:	1'250 / 1'250 µF max.
		15 / -15 Vout models:	800 / 800 µF max.
Minimum Load			Not required
Temperature Coefficient			±0.02 %/K max.
Start-up Time			50 ms max.
Start-up Overshoot Voltage			5% max.
Short Circuit Protection			Continuous, Automatic recovery
Output Current Limitation			110 - 180% of Iout max.
Overvoltage Protection			120% typ. of Vout nom.

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

Transient Response	- Response Deviation	5% max. (75% to 100% Load Step)
	- Response Time	500 µs max. (75% to 100% Load Step)

Safety Specifications

Standards	- IT / Multimedia Equipment	EN 62368-1 IEC 62368-1 UL 62368-1
	- Certification Documents	www.tracopower.com/overview/thl40wi
Pollution Degree		PD 3
Over Voltage Category		Not mains connected

EMC Specifications

EMI (Emissions)			EN 61000-6-4 (Generic Industrial)
	- Conducted Emissions		EN 55032 class A (with external filter) EN 55032 class B (with external filter)
	- Radiated Emissions		EN 55032 class A (with external filter) EN 55032 class B (with external filter)
		External filter proposal:	www.tracopower.com/overview/thl40wi
EMS (Immunity)			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, ±2 kV, perf. criteria A
		Ext. input component:	24Vin models: 2x 1'200 µF / 50V 48 Vin models: 2x 470 µF / 100 V
	- Conducted RF Disturbances		EN 61000-4-6, 10 Vrms, perf. criteria A
	- PF Magnetic Field	Continuous:	EN 61000-4-8, 100 A/m, perf. criteria A
		1 s:	EN 61000-4-8, 1000 A/m, perf. criteria A
EMC / Environmental	- Certification Documents		www.tracopower.com/overview/thl40wi

General Specifications

Relative Humidity			95% max. (non condensing)
Temperature Ranges	- Operating Temperature		–40°C to +85°C –40°C to +90°C (with Heat Sink)
	- Case Temperature		+105°C max.
	- Storage Temperature		–50°C to +125°C
Power Derating	- High Temperature		2.5 %/K above 65°C (average) 3.3 %/K above 75°C (average) (with Heat Sink)
		See application note:	www.tracopower.com/overview/thl40wi
Over Temperature Protection Switch Off	- Protection Mode		115°C max. (Automatic recovery at 65°C typ.)
	- Measurement Point		Internal IC temperature
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
	- Current Controlled Remote (passive = on)		On: open circuit Off: 2 to 4 mA current (internal 1 kΩ resistor) Refers to 'Remote' and '-Vin' Pin
	- Off Idle Input Current		3 mA max.
	- Remote Pin Input Current		-0.5 to 0.5 mA (Optional models with inverse Remote On/Off function (passive = off))
Altitude During Operation			5'000 m max.
Regulator Topology			Flyback Converter

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

Switching Frequency		167 - 231 kHz (PWM) (all models) 185 kHz typ. (PWM) (5 Vout models) 200 kHz typ. (PWM) (other models)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s	1'500 VDC
	- Input to Output, 1 s	1'800 VDC
	- Input to Case, 60 s	1'000 VDC
	- Output to Case, 60 s	1'000 VDC
Isolation Resistance	- Input to Output, 500 VDC	1'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	1'500 pF typ. 2'200 pF max.
Distance Through Isolation		1.5 mm
Reliability	- Calculated MTBF	1'051'000 h (MIL-HDBK-217F, ground benign)
Washing Process		According to Cleaning Guideline www.tracopower.com/info/cleaning.pdf
Environment	- Vibration	IPC-9592B 2.4 g, 3 axis, random waveform, 30 min
	- Mechanical Shock	IPC-9592B 30 g, 3 axis, half sine, 11 ms
	- Thermal Shock	IPC-9592B -40 to +125°C, 100 cycles, 30 min each
Housing Material		Alu alloy, black anodized coating
Base Material		Non-conductive FR4 (UL 94 V-0 rated)
Potting Material		Polyurethane (UL 94 V-2 rated)
Pin Material		Copper (C14500)
Pin Foundation Plating		Nickel (2 - 4 µm)
Pin Surface Plating		Tin (3 - 5 µm), matte
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 245°C / 10 s max.
Weight		26 g (standard models) 32 g (models with pre-assembled heatsink)
Thermal Impedance	- Case to Ambient	11 K/W typ. 6.6 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: 7(a), 7(c)-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number	9b6f7def-c1eb-4d09-8b7a-535171a8d96f

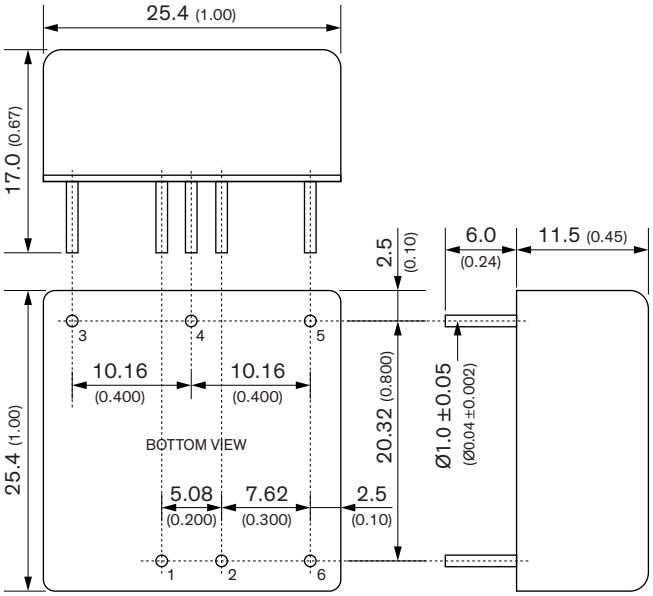
Additional Information

Supporting Documents	www.tracopower.com/overview/thl40wi
Frequently Asked Questions	www.tracopower.com/glossary-faq
Glossary	www.tracopower.com/info/glossary.pdf

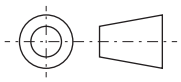
All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

Outline Dimensions

Standard model

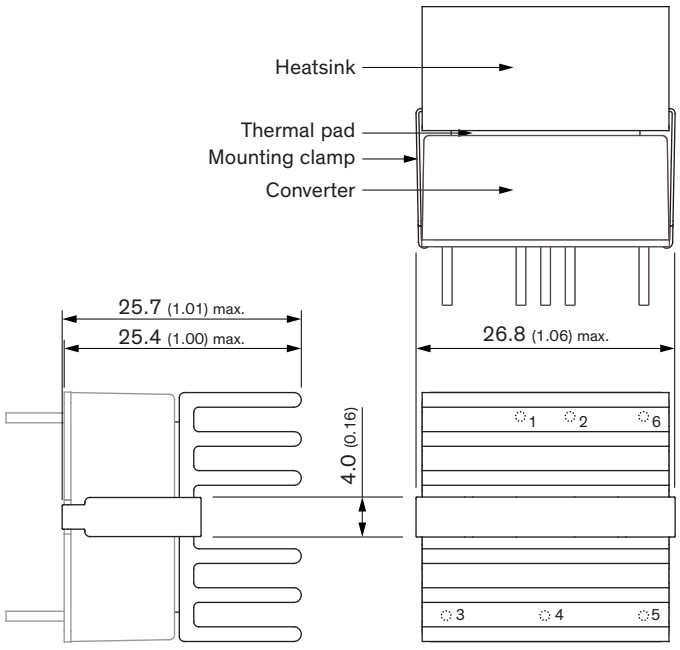


Dimensions in mm (inch)
Tolerances: x.x ±0.5 (x.xx ±0.02)
x.xx ±0.25 (x.xxx ±0.01)

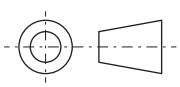


Pinout		
Pin	**Single**	**Dual**
1	+Vin	
2	–Vin	
3	+Vout	
4	Trim	Common
5	–Vout	
6	Remote On/Off	

Optional model with pre-assembled heatsink



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



Pinout		
Pin	**Single**	**Dual**
1	+Vin	
2	–Vin	
3	+Vout	
4	Trim	Common
5	–Vout	
6	Remote On/Off	

AVE ADDED VALUE ELECTRONICS
Nieuwland Parc 13i
2952 DA Alblasserdam
T +31 (0)78 6215900
F +31 (0)78 6215815
E info@ave-nl.com
W www.ave-nl.com