TRACO POWER

DC/DC Converter — THN 15WI Series, 15 Watt

- **Smallest encapsulated 15 W Converter! Ultra compact size: 1.0" x 1.0" x 0.4"**
- **Shielded metal case with isolated baseplate**
- **Ultrawide 4:1 input ranges: 9-36 VDC or 18-75 VDC**
- **Output voltage Trim**
- **5 Vout models with trim up to 6 VDC ideal for LDO applications**
- **I/O isolation voltage 1600 VDC**
- **Very high efficiency up to 91%**
- **Operating temp. range: –40°C to +85°C**
- **Remote On/Off control**
- **3-year product warranty**



UL 62368-1 IEC 62368-1

The THN 15WI series is the latest generation of high performance DC/DC converter modules setting new standards concerning power density. This product with 15 W comes in a encapsulated, shielded metal package with dimensions of only 1.0" x 1.0" x 0.4" and occupies 50% (!) less board space. All models have ultra wide 4:1 input voltage range and precisely regulated output voltages. Advanced circuit design provides high efficiency up to 87% which allows an operating temperature range of –40°C to +85°C (with derating) Further features include remote On/Off and trimmable output. Typical applications for these converters are battery operated equipment, mobile instrumentation, distributed power architectures in communication and industrial electronics and everywhere where space on PCB is critical.

Models

Order Code	Input Voltage Range	Output 1		Output 2		Efficiency
		Vnom	Imax	Vnom	Imax	typ.
THN 15-2410WI	9 - 36 VDC (24 VDC nom.)	3.3 VDC	4'000 mA			86 %
THN 15-2411WI		5 VDC	3'000 mA			86 %
THN 15-2411WI-A1		5 VDC	3'000 mA			86 %
THN 15-2412WI		12 VDC	1'300 mA			87 %
THN 15-2413WI		15 VDC	1'000 mA			87 %
THN 15-2415WI		24 VDC	625 mA			90 %
THN 15-2421WI		+5 VDC	1'500 mA	–5 VDC	1'500 mA	85 %
THN 15-2422WI		+12 VDC	625 mA	–12 VDC	625 mA	87 %
THN 15-2423WI		+15 VDC	500 mA	–15 VDC	500 mA	88 %
THN 15-2425WI		+24 VDC	315 mA	–24 VDC	315 mA	91 %
THN 15-4810WI	18 - 75 VDC (48 VDC nom.)	3.3 VDC	4'000 mA			86 %
THN 15-4811WI		5 VDC	3'000 mA			87 %
THN 15-4811WI-A1		5 VDC	3'000 mA			87 %
THN 15-4812WI		12 VDC	1'300 mA			87 %
THN 15-4813WI		15 VDC	1'000 mA			87 %
THN 15-4815WI		24 VDC	625 mA			91 %
THN 15-4821WI		+5 VDC	1'500 mA	–5 VDC	1'500 mA	85 %
THN 15-4822WI		+12 VDC	625 mA	–12 VDC	625 mA	86 %
THN 15-4823WI		+15 VDC	500 mA	–15 VDC	500 mA	87 %
THN 15-4825WI		+24 VDC	315 mA	–24 VDC	315 mA	91 %

Options

Suffix A1	- Adjustable output up to 6VDC, ideal for low Ripple and Noise with an LDO regulator
THN-HS1	- Optional Heat Sink: www.tracopower.com/overview/thn-hs1

Note - ±24 Vout models: The output can also be used in serial circuit for single 48 VDC operation.

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Input Specifications

Input Current	- At no load	24 Vin models:	45 mA typ.
		48 Vin models:	20 mA typ.
Surge Voltage		24 Vin models:	50 VDC max. (100 ms max.)
		48 Vin models:	100 VDC max. (100 ms max.)
Under Voltage Lockout		24 Vin models:	7 VDC min. / 8 VDC typ. / 8.8 VDC max.
		48 Vin models:	14.5 VDC min. / 16 VDC typ. / 17.5 VDC max.
Reflected Ripple Current			30 mAp-p typ.
Recommended Input Fuse		24 Vin models:	3'150 mA (slow blow)
		48 Vin models:	1'600 mA (slow blow)
			(The need of an external fuse has to be assessed in the final application.)
Input Filter			Internal Pi-Type

Output Specifications

Output Voltage Adjustment			–10% to +20% (A1 & 24 Voutmodels)
			±10% (other models)
			(single output models only)
			(By external trim resistor)
		See application note:	www.tracopower.com/thn15wi-adj/
			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:	0.5% max.
	- Load Variation (0 - 100%)	single output models:	0.2% max.
		dual output models:	1% max. (Output 1)
			1% max. (Output 2)
	- Cross Regulation (25% / 100% asym. load)	dual output models:	5% max.
Ripple and Noise (20 MHz Bandwidth)	- single output	3.3 Vout models:	75 mVp-p typ. (w/ 1 µF X7R || 10 µF TC)
		5 Vout models:	75 mVp-p typ. (w/ 1 µF X7R || 10 µF TC)
		12 Vout models:	100 mVp-p typ. (w/ 1 µF X7R || 10 µF TC)
		15 Vout models:	100 mVp-p typ. (w/ 1 µF X7R || 10 µF TC)
		24 Vout models:	100 mVp-p typ. (w/ 6.8 µF X7R)
	- dual output	5 / -5 Vout models:	100 / 100 mVp-p typ. (w/ 1µF X7R || 10µF TC)
		12 / -12 Vout models:	100 / 100 mVp-p typ. (w/ 1µF X7R || 10µF TC)
		15 / -15 Vout models:	100 / 100 mVp-p typ. (w/ 1µF X7R || 10µF TC)
		24 / -24 Vout models:	100 / 100 mVp-p typ. (w/ 4.7µF X7R)
Capacitive Load	- single output	3.3 Vout models:	12'000 µF max.
		5 Vout models:	6'000 µF max.
		12 Vout models:	1'000 µF max.
		15 Vout models:	660 µF max.
		24 Vout models:	200 µF max.
	- dual output	5 / -5 Vout models:	3'000 / 3'000 µF max.
		12 / -12 Vout models:	520 / 520 µF max.
		15 / -15 Vout models:	330 / 330 µF max.
		24 / -24 Vout models:	100 / 100 µF max.
Minimum Load			Not required
Temperature Coefficient			±0.02 %/K max.
Start-up Time			30 ms max.
Short Circuit Protection			Continuous, Automatic recovery
Output Current Limitation			135 - 204% of Iout max.
			150% typ. of Iout max.
Overvoltage Protection			112 - 164% of Vout nom.
Transient Response	- Response Time		250 µs typ. (25% Load Step)

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

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Safety Specifications

Standards	- IT / Multimedia Equipment		EN 60950-1 EN 62368-1 IEC 60950-1 IEC 62368-1 UL 60950-1 UL 62368-1
	- Certification Documents		www.tracopower.com/thn15wi-safety-cert/
Energy Source	- Output, acc. to 62368-1		ES1
Power Source	- Output, acc. to 62368-1		PS3
Pollution Degree			PD 2
Over Voltage Category			Not mains connected

EMC Specifications

EMI (Emissions)	- 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/thn15wi-emc-filter/
EMS (Immunity)	- 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:	220 µF, 100 V
	- Conducted RF Disturbances		EN 61000-4-6, 3 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

General Specifications

Relative Humidity			95% max. (non condensing)
Temperature Ranges	- Operating Temperature		–40°C to +85°C –40°C to +90°C (with heatsink THN-HS1)
	- Case Temperature		+105°C max.
	- Storage Temperature		–55°C to +125°C
Power Derating	- High Temperature		2.5 %/K above 60°C 2.9 %/K above 70°C (with heatsink THN-HS1)
		See application note:	www.tracopower.com/thn15wi-cc/
Cooling System			Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote (passive = on)		On: 3.0 to 15 VDC or open circuit Off: 0 to 1.2 VDC or short circuit Refers to 'Remote' and '-Vin' Pin
	- Off Idle Input Current		2.5 mA typ.
	- Remote Pin Input Current		-0.5 to 1.0 mA
Altitude During Operation			5'000 m max.
Regulator Topology			Flyback Converter
Switching Frequency			360 - 440 kHz (PWM) 400 kHz typ. (PWM)
Insulation System			Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s		1'600 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		1'000 pF max.
Reliability	- Calculated MTBF		1'400'000 h (MIL-HDBK-217F, ground benign)

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

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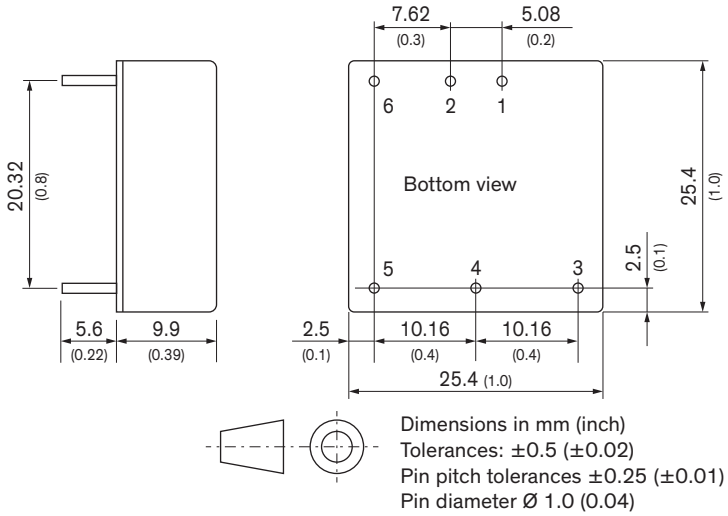
Washing Process		According to Cleaning Guideline www.tracopower.com/info/cleaning.pdf
Environment	- Vibration	MIL-STD-810F
	- Thermal Shock	MIL-STD-810F
Housing Material		Copper, Nickel plated
Base Material		Non-conductive FR4 (UL 94 V-0 rated)
Potting Material		Epoxy (UL 94 V-0 rated)
Pin Material		Copper
Pin Foundation Plating		Nickel (2 - 3 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 265°C / 10 s max.
Weight		15 g
Thermal Impedance	- Case to Ambient	18.2 K/W typ. 15.8 K/W typ. (with heatsink THN-HS1)
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	264a8e95-274a-487c-8a57-a20af46e4226

Additional Information

Supporting Documents	www.tracopower.com/overview/thn15wi
Frequently Asked Questions	www.tracopower.com/glossary-faq
Glossary	www.tracopower.com/info/glossary.pdf
Service Portal	www.tracoserviceportal.com

Outline Dimensions



Dimensions in mm (inch)
Tolerances: ±0.5 (±0.02)
Pin pitch tolerances ±0.25 (±0.01)
Pin diameter Ø 1.0 (0.04)

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

Avoid routing PCB traces under the converter.

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