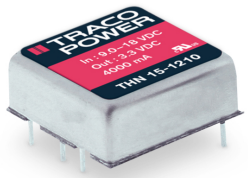
TRACO POWER

DC/DC Converter

THN 15 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**
- **Wide 2:1 input ranges: 9-18, 18-36 or 36-75 VDC**
- **Output voltage Trim**
- **I/O isolation voltage 1600 VDC**
- **Very high efficiency up to 88%**
- **Operating temp. range: –40°C to +85°C**
- **Remote On/Off control**
- **Industry standard pinout**
- **3-year product warranty**



UL 62368-1 IEC 62368-1

The THN 15 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 wide 2:1 input voltage range and precisely regulated, isolated output voltages. Advanced circuit design provides high efficiency up to 88% 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 mobile equipment, 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 15-1210	9 - 18 VDC (12 VDC nom.)	3.3 VDC	4'000 mA			84 %
THN 15-1211		5 VDC	3'000 mA			88 %
THN 15-1212		12 VDC	1'300 mA			86 %
THN 15-1213		15 VDC	1'000 mA			88 %
THN 15-1215		24 VDC	625 mA			90 %
THN 15-1221		+5 VDC	1'500 mA	–5 VDC	1'500 mA	85 %
THN 15-1222		+12 VDC	625 mA	–12 VDC	625 mA	87 %
THN 15-1223		+15 VDC	500 mA	–15 VDC	500 mA	88 %
THN 15-1225		+24 VDC	315 mA	–24 VDC	315 mA	90 %
THN 15-2410	18 - 36 VDC (24 VDC nom.)	3.3 VDC	4'000 mA			86 %
THN 15-2411		5 VDC	3'000 mA			88 %
THN 15-2412		12 VDC	1'300 mA			87 %
THN 15-2413		15 VDC	1'000 mA			88 %
THN 15-2415		24 VDC	625 mA			90 %
THN 15-2421		+5 VDC	1'500 mA	–5 VDC	1'500 mA	85 %
THN 15-2422		+12 VDC	625 mA	–12 VDC	625 mA	88 %
THN 15-2423		+15 VDC	500 mA	–15 VDC	500 mA	88 %
THN 15-2425		+24 VDC	315 mA	–24 VDC	315 mA	90 %
THN 15-4810	36 - 75 VDC (48 VDC nom.)	3.3 VDC	4'000 mA			86 %
THN 15-4811		5 VDC	3'000 mA			88 %
THN 15-4812		12 VDC	1'300 mA			88 %
THN 15-4813		15 VDC	1'000 mA			88 %
THN 15-4815		24 VDC	625 mA			91 %
THN 15-4821		+5 VDC	1'500 mA	–5 VDC	1'500 mA	85 %
THN 15-4822		+12 VDC	625 mA	–12 VDC	625 mA	89 %
THN 15-4823		+15 VDC	500 mA	–15 VDC	500 mA	88 %
THN 15-4825		+24 VDC	315 mA	–24 VDC	315 mA	91 %

Options

THN-HS1	- Optional Heat Sink: www.tracopower.com/overview/thn-hs1
on demand (backorder with MOQ non stocking item)	- Optional models without remote and trim pins - Optional models without remote pin - Optional models without trim pin

Input Specifications

Input Current	- At no load	12 Vin models:	**120 mA typ.** (3.3 Vout model)
			90 mA typ. (5 Vout model)
			30 mA typ. (12 Vout model)
			30 mA typ. (15 Vout model)
			12 mA typ. (24 Vout model)
			30 mA typ. (5 / -5 Vout model)
			30 mA typ. (12 / -12 Vout model)
			30 mA typ. (15 / -15 Vout model)
			17 mA typ. (24 / -24 Vout model)
		24 Vin models:	**50 mA typ.** (3.3 Vout model)
			65 mA typ. (5 Vout model)
			20 mA typ. (12 Vout model)
			20 mA typ. (15 Vout model)
			10 mA typ. (24 Vout model)
			15 mA typ. (5 / -5 Vout model)
			15 mA typ. (12 / -12 Vout model)
			25 mA typ. (15 / -15 Vout model)
			12 mA typ. (24 / -24 Vout model)
		48 Vin models:	**25 mA typ.** (3.3 Vout model)
			35 mA typ. (5 Vout model)
			12 mA typ. (12 Vout model)
			12 mA typ. (15 Vout model)
			10 mA typ. (24 Vout model)
			12 mA typ. (5 / -5 Vout model)
			15 mA typ. (12 / -12 Vout model)
			20 mA typ. (15 / -15 Vout model)
			10 mA typ. (24 / -24 Vout model)
Surge Voltage		12 Vin models:	**36 VDC max.** (100 ms max.)
		24 Vin models:	**50 VDC max.** (100 ms max.)
		48 Vin models:	**100 VDC max.** (100 ms max.)
Under Voltage Lockout		12 Vin models:	**7 VDC min. / 8 VDC typ. / 8.8 VDC max.**
		24 Vin models:	**14.5 VDC min. / 15.5 VDC typ. / 17.5 VDC max.**
		48 Vin models:	**32 VDC min. / 33.5 VDC typ. / 35 VDC max.**
Recommended Input Fuse		12 Vin models:	**3'150 mA** (slow blow)
		24 Vin models:	**1'600 mA** (slow blow)
		48 Vin models:	**1'000 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%** (24 Vout models) **±10%** (other models) (single output models only) (By external trim resistor)
	See application note:	www.tracopower.com/overview/thn15 Output power must not exceed rated power!
Voltage Set Accuracy		**±1%** max.

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

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 MC || 10 µF TC)
		5 Vout models:	75 mVp-p typ. (w/ 1 µF MC || 10 µF TC)
		12 Vout models:	100 mVp-p typ. (w/ 1 µF MC || 10 µF TC)
		15 Vout models:	100 mVp-p typ. (w/ 1 µF MC || 10 µF TC)
		24 Vout models:	100 mVp-p typ. (w/ 6.8 µF MC)
	- dual output	5 / -5 Vout models:	100 / 100 mVp-p typ. (w/ 1 µF MC || 10 µF TC)
		12 / -12 Vout models:	100 / 100 mVp-p typ. (w/ 1 µF MC || 10 µF TC)
		15 / -15 Vout models:	100 / 100 mVp-p typ. (w/ 1 µF MC || 10 µF TC)
		24 / -24 Vout models:	100 / 100 mVp-p typ. (w/ 4.7 µF MC)
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			120 - 175% 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)

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/overview/thn15
Pollution Degree		PD 2
Over Voltage Category		OVC I

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/overview/thn15

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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 Heat Sink)
	- Case Temperature	+105°C max.
	- Storage Temperature	–55°C to +125°C
Power Derating	- High Temperature	2.86 %/K above 70°C (average)
		3.3 %/K above 75°C (with Heat Sink)
	See application note:	www.tracopower.com/overview/thn15
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	1'600'000 h (MIL-HDBK-217F, ground benign)
Washing Process		According to Cleaning Guideline www.tracopower.com/info/cleaning.pdf
Environment	- Vibration	MIL-STD-810F EN 61373
	- 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 Heat Sink)

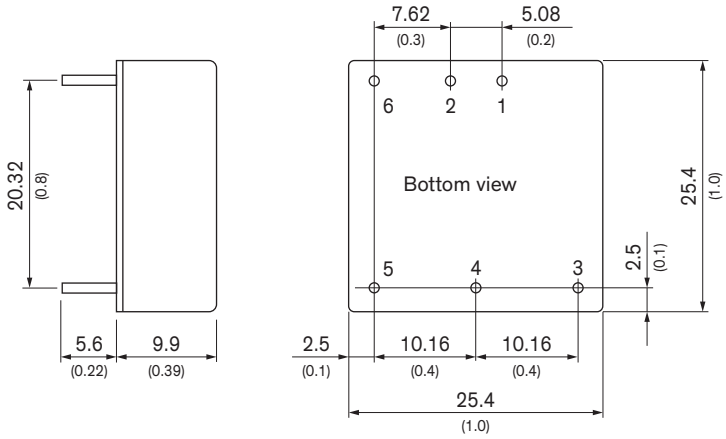
All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

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, 7c-I
		(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number	3db4e27f-c57e-4bda-a2b4-23f5d729020b

Supporting Documents

Overview Link (for additional Documents)	www.tracopower.com/overview/thn15

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

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