TRACO POWER

DC/DC Converter

THN 15N Series, 15 Watt

- **15 Watt converter in a compact 1.0" x 1.0" metal package**
- **Wide 2:1 input voltage: 9-18, 18-36, 36-75 VDC**
- **Internal EN 55032 class A filter**
- **Operating temperature range -40 to +70 °C without derating**
- **Low no-load power consumption 96-336 mW**
- **High efficiency up to 91%**
- **I/O-isolation voltage 1600 VDC**
- **Protection against overload, overvoltage and short circuit**
- **Remote On/Off and Trim function**
- **3-year product warranty**



UL 62368-1 IEC 62368-1

The THN 15N series is the latest generation of high performance 15 W DC/DC converters and comes in an encapsulated, shielded 1.0" x 1.0" x 0.4" metal package. The new and improved design allows to fully integrate an EN 55032 class A filter and greatly reduces the no-load power consumption (96-336 mW). Advanced circuit design and a high efficiency of up to 91% enable the THN 15N to operate in a temperature range of –40°C to +70°C without derating. All models have a wide 2:1 input voltage range and precisely regulated, isolated output voltages. Further features include remote On/Off and trimmable outputs. Together with the latest IT safety certifications (UL 62368-1) 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 15-1210N	9 - 18 VDC (12 VDC nom.)	3.3 VDC	4'500 mA			88 %
THN 15-1211N		5 VDC	3'000 mA			90 %
THN 15-1212N		12 VDC	1'300 mA			89 %
THN 15-1213N		15 VDC	1'000 mA			90 %
THN 15-1215N		24 VDC	625 mA			91 %
THN 15-1221N		+5 VDC	1'500 mA	–5 VDC	1'500 mA	86 %
THN 15-1222N		+12 VDC	625 mA	–12 VDC	625 mA	90 %
THN 15-1223N		+15 VDC	500 mA	–15 VDC	500 mA	90 %
THN 15-1225N		+24 VDC	315 mA	–24 VDC	315 mA	90 %
THN 15-2410N	18 - 36 VDC (24 VDC nom.)	3.3 VDC	4'500 mA			88 %
THN 15-2411N		5 VDC	3'000 mA			90 %
THN 15-2412N		12 VDC	1'300 mA			89 %
THN 15-2413N		15 VDC	1'000 mA			90 %
THN 15-2415N		24 VDC	625 mA			91 %
THN 15-2421N		+5 VDC	1'500 mA	–5 VDC	1'500 mA	86 %
THN 15-2422N		+12 VDC	625 mA	–12 VDC	625 mA	90 %
THN 15-2423N		+15 VDC	500 mA	–15 VDC	500 mA	90 %
THN 15-2425N		+24 VDC	315 mA	–24 VDC	315 mA	90 %
THN 15-4810N	36 - 75 VDC (48 VDC nom.)	3.3 VDC	4'500 mA			87 %
THN 15-4811N		5 VDC	3'000 mA			89 %
THN 15-4812N		12 VDC	1'300 mA			89 %
THN 15-4813N		15 VDC	1'000 mA			89 %
THN 15-4815N		24 VDC	625 mA			90 %
THN 15-4821N		+5 VDC	1'500 mA	–5 VDC	1'500 mA	85 %
THN 15-4822N		+12 VDC	625 mA	–12 VDC	625 mA	89 %
THN 15-4823N		+15 VDC	500 mA	–15 VDC	500 mA	89 %
THN 15-4825N		+24 VDC	315 mA	–24 VDC	315 mA	89 %

Options

THN-HS1	- Optional Heat Sink: www.tracopower.com/overview/thn-hs1
THN-HS2	- Optional Heat Sink: www.tracopower.com/overview/thn-hs2
on demand (backorder with MOQ non stocking item)	- Optional Heat Sink: www.tracopower.com/overview/thn-hs3 - Optional Heat Sink: www.tracopower.com/overview/thn-hs4

Input Specifications

Input Current	- At no load	12 Vin models:	**10 mA typ.**
		24 Vin models:	**8 mA typ.**
		48 Vin models:	**7 mA typ.**
Surge Voltage		12 Vin models:	**25 VDC max.** (1 s max.)
		24 Vin models:	**50 VDC max.** (1 s max.)
		48 Vin models:	**100 VDC max.** (1 s max.)
Under Voltage Lockout		12 Vin models:	**7.5 VDC min. / 8 VDC typ. / 8.8 VDC max.**
		24 Vin models:	**15.5 VDC min. / 16 VDC typ. / 17.5 VDC max.**
		48 Vin models:	**32.5 VDC min. / 33 VDC typ. / 35.5 VDC max.**
Recommended Input Fuse		12 Vin models:	**3'150 mA** (slow blow)
		24 Vin models:	**1'600 mA** (slow blow)
		48 Vin models:	**800 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%** (15 & 24 Vout models) **±10%** (other models) (single output models only) (By external trim resistor)
		See application note:	www.tracopower.com/thn15n-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/ 10 µF, 6.3 V X7R)
		5 Vout models:	**75 mVp-p typ.** (w/ 10 µF, 6.3 V X7R)
		12 Vout models:	**100 mVp-p typ.** (w/ 1 µF, 25 V X7R)
		15 Vout models:	**100 mVp-p typ.** (w/ 1 µF, 25 V X7R)
		24 Vout models:	**125 mVp-p typ.** (w/ 2.2 µF, 50 V X7R)
	- dual output	5 / -5 Vout models:	**75 / 75 mVp-p typ.** (w/ 10 µF, 6.3 V X7R)
		12 / -12 Vout models:	**100 / 100 mVp-p typ.** (w/ 1 µF, 25 V X7R)
		15 / -15 Vout models:	**100 / 100 mVp-p typ.** (w/ 1 µF, 25 V X7R)
		24 / -24 Vout models:	**125 / 125 mVp-p typ.** (w/ 2.2 µF, 50 V X7R)

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

Capacitive Load	- single output	3.3 Vout models:	5'200 µF max.
		5 Vout models:	3'600 µF max.
		12 Vout models:	600 µF max.
		15 Vout models:	500 µF max.
		24 Vout models:	200 µF max.
	- dual output	5 / -5 Vout models:	1'500 / 1'500 µF max.
		12 / -12 Vout models:	360 / 360 µF max.
		15 / -15 Vout models:	250 / 250 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 typ. / 40 ms max.
Short Circuit Protection			Continuous, Automatic recovery
Output Current Limitation			120 - 190% 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 62368-1 IEC 62368-1 UL 62368-1
	- Certification Documents		www.tracopower.com/thn15n-safety-cert
Energy Source	- Output, acc. to 62368-1		ES1
Power Source	- Output, acc. to 62368-1		PS2
Pollution Degree			PD 2
Over Voltage Category			Not mains connected

EMC Specifications

EMI (Emissions)	- Conducted Emissions		EN 55011 class A (internal filter) EN 55011 class B (with external filter) EN 55032 class A (internal filter) EN 55032 class B (with external filter)
	- Radiated Emissions		EN 55011 class A (internal filter) EN 55011 class B (with external filter) EN 55032 class A (internal filter) EN 55032 class B (with external filter)
		External filter proposal:	www.tracopower.com/thn15n-emc-filter
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:	12 Vin models: 470 µF, 50 V || TVS SMDJ58A 24 Vin models: 470 µF, 50 V || TVS SMDJ70A 48 Vin models: 470 µF, 100 V || TVS SMDJ100A
	- 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/thn15n-emc-cert

General Specifications

Relative Humidity			95% max. (non condensing)

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

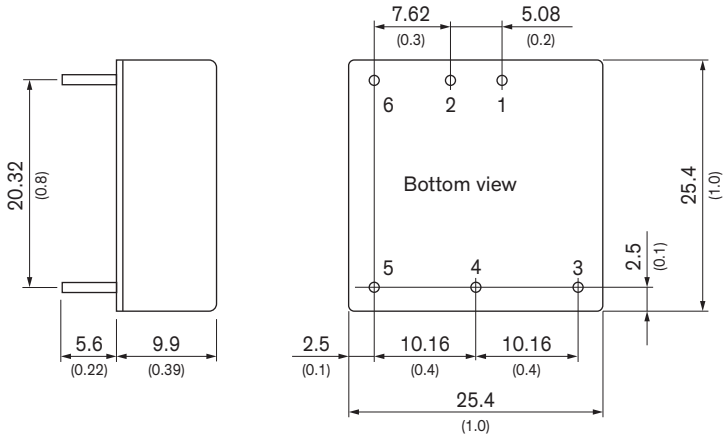
Temperature Ranges	- Operating Temperature	–40°C to +88°C
	- Case Temperature	+105°C max.
	- Storage Temperature	–55°C to +125°C
Power Derating	- High Temperature	Depending on model
	See application note:	www.tracopower.com/thn15n-cc
Cooling System		Natural convection (20 LFM)
Remote Control	- Voltage 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	1.5 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		245 kHz typ. (PWM) (±10%, 3.3 & 5 Vout model) 300 kHz typ. (PWM) (±10%, other models)
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	2'000 pF max.
Reliability	- Calculated MTBF	1'670'000 h (MIL-HDBK-217F, ground benign)
Washing Process		According to Cleaning Guideline www.tracopower.com/info/cleaning.pdf
Environment	- Vibration	MIL-STD-810F
	- Mechanical Shock	MIL-STD-810F
	- Thermal Shock	MIL-STD-810F
Housing Material		Copper
Base Material		Non-conductive FR4 (UL 94 V-0 rated)
Potting Material		Silicone (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 260°C / 6 s max.
Weight		16.5 g
Thermal Impedance	- Case to Ambient	17.0 K/W typ. 15.3 K/W typ. (with heatsink THN-HS1) 12.9 K/W typ. (with heatsink THN-HS2) 10.9 K/W typ. (with heatsink THN-HS3) 9.3 K/W typ. (with heatsink THN-HS4)
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	187f3fa6-6464-4f99-8090-1b7af24fa720

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Additional Information

Supporting Documents	www.tracopower.com/overview/thn15n
Frequently Asked Questions	www.tracopower.com/glossary-faq
Glossary	www.tracopower.com/info/glossary.pdf

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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