



**THE DATASHEET OF  
THN 15-2422N**



- 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



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 typ.
		Vnom	I <sub>max</sub>	Vnom	I <sub>max</sub>	
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	
<b>THN-HS1</b>	- Optional Heat Sink: <a href="http://www.tracopower.com/products/thn-hs1.pdf">www.tracopower.com/products/thn-hs1.pdf</a>
<b>THN-HS2</b>	- Optional Heat Sink: <a href="http://www.tracopower.com/products/thn-hs2.pdf">www.tracopower.com/products/thn-hs2.pdf</a>
<b>on demand</b> (backorder with MOQ non stocking item)	- Optional Heat Sink: <a href="http://www.tracopower.com/products/thn-hs3.pdf">www.tracopower.com/products/thn-hs3.pdf</a>
	- Optional Heat Sink: <a href="http://www.tracopower.com/products/thn-hs4.pdf">www.tracopower.com/products/thn-hs4.pdf</a>

Input Specifications	
Input Current	- At no load 12 Vin models: <b>10 mA typ.</b> 24 Vin models: <b>8 mA typ.</b> 48 Vin models: <b>7 mA typ.</b>
Surge Voltage	12 Vin models: <b>25 VDC max.</b> (1 s max.) 24 Vin models: <b>50 VDC max.</b> (1 s max.) 48 Vin models: <b>100 VDC max.</b> (1 s max.)
Under Voltage Lockout	12 Vin models: <b>7.5 VDC min. / 8 VDC typ. / 8.8 VDC max.</b> 24 Vin models: <b>15.5 VDC min. / 16 VDC typ. / 17.5 VDC max.</b> 48 Vin models: <b>32.5 VDC min. / 33 VDC typ. / 35.5 VDC max.</b>
Recommended Input Fuse	12 Vin models: <b>3'150 mA</b> (slow blow) 24 Vin models: <b>1'600 mA</b> (slow blow) 48 Vin models: <b>800 mA</b> (slow blow) (The need of an external fuse has to be assessed in the final application.)
Input Filter	<b>Internal Pi-Type</b>

Output Specifications	
Output Voltage Adjustment	-10% to +20% (15 & 24 Vout models) <b>±10%</b> (other models) (single output models only) (By external trim resistor) See application note: <a href="http://www.tracopower.com/overview/thn15n">www.tracopower.com/overview/thn15n</a> Output power must not exceed rated power!
Voltage Set Accuracy	<b>±1% max.</b>
Regulation	- Input Variation (Vmin - Vmax) single output models: <b>0.2% max.</b> dual output models: <b>0.5% max.</b> - Load Variation (0 - 100%) single output models: <b>0.2% max.</b> dual output models: <b>1% max.</b> (Output 1) <b>1% max.</b> (Output 2) - Cross Regulation (25% / 100% asym. load) dual output models: <b>5% max.</b>
Ripple and Noise (20 MHz Bandwidth)	- single output 3.3 Vout models: <b>75 mVp-p typ.</b> (w/ 10 µF, 6.3 V X7R) 5 Vout models: <b>75 mVp-p typ.</b> (w/ 10 µF, 6.3 V X7R) 12 Vout models: <b>100 mVp-p typ.</b> (w/ 1 µF, 25 V X7R) 15 Vout models: <b>100 mVp-p typ.</b> (w/ 1 µF, 25 V X7R) 24 Vout models: <b>125 mVp-p typ.</b> (w/ 2.2 µF, 50 V X7R) - dual output 5 / -5 Vout models: <b>75 / 75 mVp-p typ.</b> (w/ 10 µF, 6.3 V X7R) 12 / -12 Vout models: <b>100 / 100 mVp-p typ.</b> (w/ 1 µF, 25 V X7R) 15 / -15 Vout models: <b>100 / 100 mVp-p typ.</b> (w/ 1 µF, 25 V X7R) 24 / -24 Vout models: <b>125 / 125 mVp-p typ.</b> (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.
Oversvoltage 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	<a href="http://www.tracopower.com/overview/thn15n">www.tracopower.com/overview/thn15n</a>
Pollution Degree		PD 2

### 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:	<a href="http://www.tracopower.com/overview/thn15n">www.tracopower.com/overview/thn15n</a>
EMS Immunity	- Electrostatic Discharge	EN 55024 (IT Equipment) EN 55035 (Multimedia) Air: EN 61000-4-2, ±8 kV, perf. criteria A Contact: EN 61000-4-2, ±6 kV, perf. criteria A
	- RF Electromagnetic Field - EFT (Burst) / Surge	EN 61000-4-3, 10 V/m, perf. criteria A 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 - PF Magnetic Field	Continuous: EN 61000-4-6, 10 Vrms, perf. criteria A 1 s: EN 61000-4-8, 100 A/m, perf. criteria A

### General Specifications

Relative Humidity		95% max. (non condensing)
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:	<a href="http://www.tracopower.com/overview/thn15n">www.tracopower.com/overview/thn15n</a>

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

Cooling System		Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote (passive = on)  - Off Idle Input Current - Remote Pin Input Current	On: 3.0 to 15 VDC or open circuit Off: 0 to 1.2 VDC or short circuit Refers to 'Remote' and '-Vin' Pin 1.5 mA typ. -0.5 to 1.0 mA
Altitude During Operation		5'000 m max.
Regulator Topology		Flyback Converter
Switching Frequency		245 kHz typ. (PWM) ( $\pm 10\%$ , 3.3 & 5 Vout model) 300 kHz typ. (PWM) ( $\pm 10\%$ , other models)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s - Input to Case, 60 s - Output to Case, 60 s	1'600 VDC 1'000 VDC 1'000 VDC
Isolation Resistance	- Input to Output, 500 VDC	1'000 M $\Omega$ 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 <a href="http://www.tracopower.com/info/cleaning.pdf">www.tracopower.com/info/cleaning.pdf</a>
Environment	- Vibration - Mechanical Shock - Thermal Shock	MIL-STD-810F MIL-STD-810F 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 $\mu$ m)
Pin Surface Plating		Tin (3 - 5 $\mu$ m), 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 K/W typ. (without heatsink) 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  - RoHS Declaration  - SCIP Reference Number	<a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a> REACH SVHC list compliant REACH Annex XVII compliant <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a> Exemptions: 7a, 7c-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).) 187f3fa6-6464-4f99-8090-1b7af24fa720

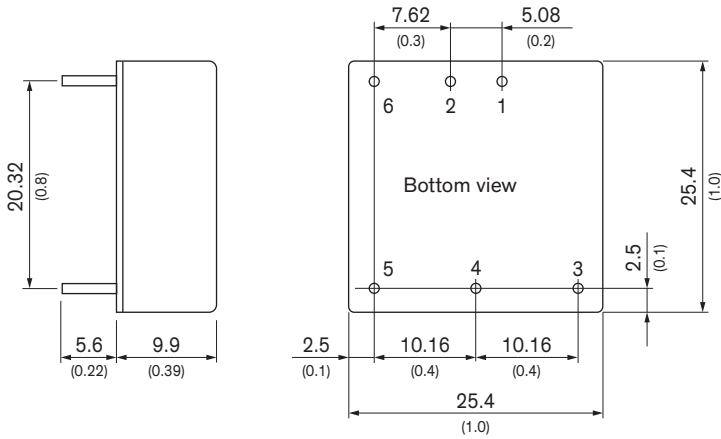
## Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/thn15n](http://www.tracopower.com/overview/thn15n)

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

**Outline Dimensions**





Dimensions in mm (inch)  
 Tolerances:  $\pm 0.5$  ( $\pm 0.02$ )  
 Pin pitch tolerances  $\pm 0.25$  ( $\pm 0.01$ )  
 Pin diameter  $\varnothing 1.0$  ( $0.04$ )

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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