

- **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**



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 typ.
		Vnom	I <sub>max</sub>	Vnom	I <sub>max</sub>	
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: <a href="http://www.tracopower.com/products/thn-hs1.pdf">www.tracopower.com/products/thn-hs1.pdf</a>
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## Input Specifications

Input Current	- At no load	12 Vin models: <b>120 mA typ.</b> 24 Vin models: <b>50 mA typ.</b> 48 Vin models: <b>25 mA typ.</b>
Surge Voltage		12 Vin models: <b>36 VDC max.</b> (100 ms max.) 24 Vin models: <b>50 VDC max.</b> (100 ms max.) 48 Vin models: <b>100 VDC max.</b> (100 ms max.)
Under Voltage Lockout		12 Vin models: <b>7 VDC min. / 8 VDC typ. / 8.8 VDC max.</b> 24 Vin models: <b>14.5 VDC min. / 15.5 VDC typ. / 17.5 VDC max.</b> 48 Vin models: <b>32 VDC min. / 33.5 VDC typ. / 35 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>1'000 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% (24 Vout single models) ±10% (other single models) (By external trim resistor) See application note: <a href="http://www.tracopower.com/overview/thn15">www.tracopower.com/overview/thn15</a> Output power must not exceed rated power!
Voltage Set Accuracy		±1% max.
Regulation	- Input Variation (Vmin - Vmax) - Load Variation (0 - 100%) - Cross Regulation (25% / 100% asym. load)	single output models: <b>0.2% max.</b> dual output models: <b>0.5% max.</b> single output models: <b>0.2% max.</b> dual output models: <b>1% max.</b> (Output 1) <b>1% max.</b> (Output 2) dual output models: <b>5% max.</b>
Ripple and Noise (20 MHz Bandwidth)	- single output - dual output	3.3 Vout models: <b>75 mVp-p typ.</b> (w/ 1 µF MC // 10 µF TC) 5 Vout models: <b>75 mVp-p typ.</b> (w/ 1 µF MC // 10 µF TC) 12 Vout models: <b>100 mVp-p typ.</b> (w/ 1 µF MC // 10 µF TC) 15 Vout models: <b>100 mVp-p typ.</b> (w/ 1 µF MC // 10 µF TC) 24 Vout models: <b>100 mVp-p typ.</b> (w/ 6.8 µF MC) 5 / -5 Vout models: <b>100 / 100 mVp-p typ.</b> (w/ 1 µF MC // 10 µF TC) 12 / -12 Vout models: <b>100 / 100 mVp-p typ.</b> (w/ 1 µF MC // 10 µF TC) 15 / -15 Vout models: <b>100 / 100 mVp-p typ.</b> (w/ 1 µF MC // 10 µF TC) 24 / -24 Vout models: <b>100 / 100 mVp-p typ.</b> (w/ 4.7 µF MC)
Capacitive Load	- single output - dual output	3.3 Vout models: <b>12'000 µF max.</b> 5 Vout models: <b>6'000 µF max.</b> 12 Vout models: <b>1'000 µF max.</b> 15 Vout models: <b>660 µF max.</b> 24 Vout models: <b>200 µF max.</b> 5 / -5 Vout models: <b>3'000 / 3'000 µF max.</b> 12 / -12 Vout models: <b>520 / 520 µF max.</b> 15 / -15 Vout models: <b>330 / 330 µF max.</b> 24 / -24 Vout models: <b>100 / 100 µF max.</b>
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.

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

Overvoltage Protection		112 - 164% of Vout nom.
Transient Response	- Response Time	250 $\mu$ s typ. (25% Load Step)

### Safety Specifications

Safety Standards	- IT / Multimedia Equipment	EN 60950-1 IEC 60950-1 UL 60950-1
	- Certification Documents	<a href="http://www.tracopower.com/overview/thn15">www.tracopower.com/overview/thn15</a>
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)
EMS Immunity	- Electrostatic Discharge	Air: EN 61000-4-2, $\pm 8$ kV, perf. criteria A Contact: EN 61000-4-2, $\pm 6$ kV, perf. criteria A
	- RF Electromagnetic Field	EN 61000-4-3, 10 V/m, perf. criteria A
	- EFT (Burst) / Surge	EN 61000-4-4, $\pm 2$ kV, perf. criteria A EN 61000-4-5, $\pm 1$ kV, perf. criteria A
	- Conducted RF Disturbances	Ext. input component: 220 $\mu$ F, 100 V 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 3.3 %/K above 75°C (with Heat Sink)
	Cooling System	Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote	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		2'000 m max.
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 M $\Omega$ 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)
Environment	- Vibration	MIL-STD-810F EN 61373
		MIL-STD-810F EN 61373
	- Thermal Shock	
Housing Material		Nickel coated Copper
Base Material		Non-conductive FR4 (UL94 V-0 rated)

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

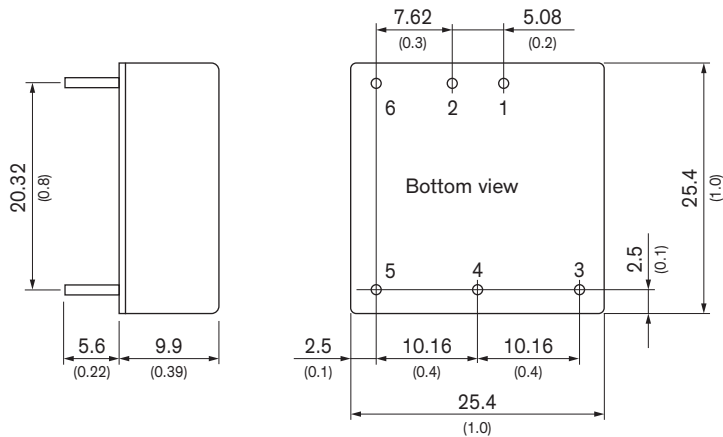
Potting Material	Epoxy (UL 94 V-0 rated)
Pin Material	Copper
Pin Foundation Plating	Nickel (2 - 3 $\mu\text{m}$ )
Pin Surface Plating	Tin (3 - 5 $\mu\text{m}$ ), matte
Soldering Profile	265°C / 10 s max.
Connection Type	THD (Through-Hole Device)
Weight	15 g
Thermal Impedance	18.2 K/W 15.8 K/W (with Heat Sink)
Environmental Compliance	- Reach - RoHS
	<a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a> <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a>

### Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/thn15](http://www.tracopower.com/overview/thn15)

### 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