

- Highest power density in DIP 24 package
- Shielded metal case with isolated Baseplate
- Very high efficiency up to 91%
- Wide 2:1 input ranges
- No minimum load required
- Input filter meets EN 55022 class A without external components
- I/O isolation voltage 1500 VDC
- Operating temp. range : -40°C to +85°C
- Remote On/Off control
- Industry standard pinout



The THD 15N series models provide 15 Watt output power out of a very compact shielded metal case that occupies only 1 inch<sup>2</sup> of board space. The converters work with a high efficiency over the full load range and draw a very low input current at no load conditions. All models have a wide 2:1 input voltage range and a precisely regulated output voltage. 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>	
THD 15-1210N	9 - 18 VDC (12 VDC nom.)	3.3 VDC	4'000 mA			87 %
THD 15-1211N		5.1 VDC	3'000 mA			90 %
THD 15-1212N		12 VDC	1'250 mA			90 %
THD 15-1213N		15 VDC	1'000 mA			90 %
THD 15-1221N		+5 VDC	1'500 mA	-5 VDC	1'500 mA	86 %
THD 15-1222N		+12 VDC	625 mA	-12 VDC	625 mA	90 %
THD 15-1223N		+15 VDC	500 mA	-15 VDC	500 mA	90 %
THD 15-2410N	18 - 36 VDC (24 VDC nom.)	3.3 VDC	4'000 mA			88 %
THD 15-2411N		5.1 VDC	3'000 mA			90 %
THD 15-2412N		12 VDC	1'250 mA			91 %
THD 15-2413N		15 VDC	1'000 mA			91 %
THD 15-2421N		+5 VDC	1'500 mA	-5 VDC	1'500 mA	87 %
THD 15-2422N		+12 VDC	625 mA	-12 VDC	625 mA	90 %
THD 15-2423N		+15 VDC	500 mA	-15 VDC	500 mA	90 %
THD 15-4810N	36 - 75 VDC (48 VDC nom.)	3.3 VDC	4'000 mA			88 %
THD 15-4811N		5.1 VDC	3'000 mA			90 %
THD 15-4812N		12 VDC	1'250 mA			90 %
THD 15-4813N		15 VDC	1'000 mA			91 %
THD 15-4821N		+5 VDC	1'500 mA	-5 VDC	1'500 mA	87 %
THD 15-4822N		+12 VDC	625 mA	-12 VDC	625 mA	90 %
THD 15-4823N		+15 VDC	500 mA	-15 VDC	500 mA	90 %

## Input Specifications

Input Current	- At no load	12 Vin models: <b>8 mA typ.</b> 24 Vin models: <b>5 mA typ.</b> 48 Vin models: <b>4 mA typ.</b>
	- At full load	12 Vin models: <b>1'450 mA max.</b> 24 Vin models: <b>720 mA max.</b> 48 Vin models: <b>360 mA max.</b>
Surge Voltage		12 Vin models: <b>36 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 VDC min. / 8 VDC typ. / 8.8 VDC max.</b> 24 Vin models: <b>15 VDC min. / 16 VDC typ. / 17.5 VDC max.</b> 48 Vin models: <b>32 VDC min. / 33.5 VDC typ. / 35 VDC max.</b>
Reflected Ripple Current		<b>20 mA<sub>p-p</sub> typ.</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

Voltage Set Accuracy		<b>±1% max.</b>
Regulation	- Input Variation (V <sub>min</sub> - V <sub>max</sub> )	single output models: <b>0.2% max.</b> dual output models: <b>0.5% max.</b>
	- Load Variation (0 - 100%)	single output models: <b>0.5% 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	<b>60 mV<sub>p-p</sub> typ.</b> (w/ 1 µF, 25 V, X7R, MLCC)
Capacitive Load	- single output	3.3 V <sub>out</sub> models: <b>4'700 µF max.</b> 5.1 V <sub>out</sub> models: <b>3'300 µF max.</b> 12 V <sub>out</sub> models: <b>600 µF max.</b> 15 V <sub>out</sub> models: <b>400 µF max.</b>
	- dual output	5 / -5 V <sub>out</sub> models: <b>1'500 / 1'500 µF max.</b> 12 / -12 V <sub>out</sub> models: <b>288 / 288 µF max.</b> 15 / -15 V <sub>out</sub> models: <b>200 / 200 µF max.</b>
Minimum Load		<b>Not required</b>
Temperature Coefficient		<b>±0.02 %/K max.</b>
Start-up Time		<b>60 ms max.</b> (Power On) <b>60 ms max.</b> (Remote On)
Short Circuit Protection		<b>Continuous, Automatic recovery</b>
Output Current Limitation		<b>150% typ. of I<sub>out</sub> max.</b>
Overvoltage Protection		<b>118 - 125% of V<sub>out</sub> nom.</b> (depending on model) <b>3.9 VDC typ.</b> (3.3 V <sub>out</sub> models) <b>6.2 VDC typ.</b> (5.1 V <sub>out</sub> models) <b>15 VDC typ.</b> (12 V <sub>out</sub> models) <b>18 VDC typ.</b> (15 V <sub>out</sub> models)
Transient Response	- Response Deviation	<b>8% max.</b> (25% Load Step)
	- Response Time	<b>250 µs typ.</b> (25% Load Step)

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

### Safety Specifications

Safety Standards	- IT / Multimedia Equipment	EN 60950-1 EN 62368-1 IEC 60950-1 IEC 62368-1 UL 60950-1 UL 62368-1
	- Certification Documents	<a href="http://www.tracopower.com/overview/thd15n">www.tracopower.com/overview/thd15n</a>
Pollution Degree		PD 2
Over Voltage Category		OVC I

### EMC Specifications

EMI Emissions	- Conducted Emissions	EN 55032 class A (internal filter) EN 55032 class B (with external filter) FCC Part 15 class A (internal filter)
	- Radiated Emissions	EN 55032 class A (internal filter) EN 55032 class B (with external filter) FCC Part 15 class A (internal filter)
	External filter proposal:	<a href="http://www.tracopower.com/overview/thd15n">www.tracopower.com/overview/thd15n</a>
EMS Immunity		EN 55024 (IT Equipment) EN 55035 (Multimedia)
	- 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, $\pm 2$ kV, perf. criteria A
	- Conducted RF Disturbances	Ext. input component: Nippon chemi-con KY 220 $\mu$ F, 100 V 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

### General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-40°C to +85°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/thd15n">www.tracopower.com/overview/thd15n</a>
Cooling System		Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote	On: 3.0 to 12 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 0.5 mA
Altitude During Operation		5'000 m max.
Switching Frequency		297 - 363 kHz (PWM)
		330 kHz typ. (PWM)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s	1'600 VDC
	- Input to Case, 60 s	1'600 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 typ.
Reliability	- Calculated MTBF	1'800'000 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>

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

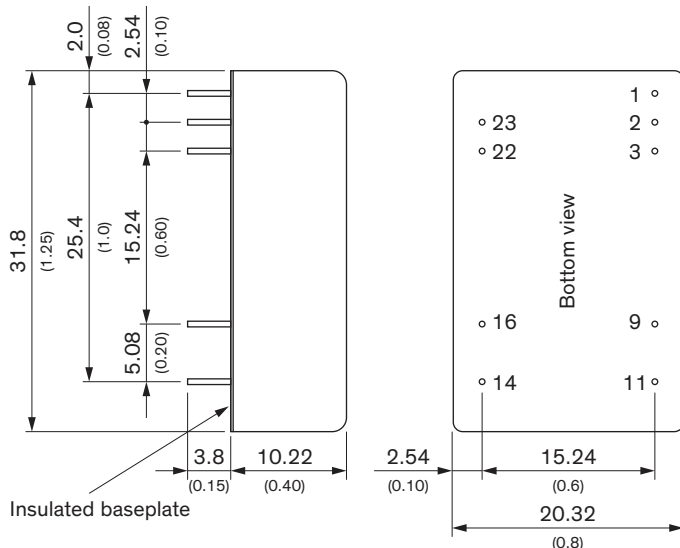
Environment	- Vibration - Thermal Shock	MIL-STD-810F MIL-STD-810F
Housing Material		Copper, Nickel plated
Base Material		Non-conductive FR4 (UL 94 V-0 rated)
Potting Material		Silicone (UL 94 V-0 rated)
Pin Material		Copper
Pin Foundation Plating		Nickel (2 - 3 µm)
Pin Surface Plating		Tin (3 - 5 µm), matte
Housing Type		Metal Case
Mounting Type		PCB Mount
Connection Type		THD (Through-Hole Device)
Footprint Type		DIP24
Soldering Profile		Wave Soldering 265°C / 10 s max.
Weight		16.2 g
Thermal Impedance	- Case to Ambient	20 K/W typ.
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)) b9db1681-27a8-4582-8668-2de2b5959db2

### Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/thd15n](http://www.tracopower.com/overview/thd15n)

### Outline Dimensions



Pinout		
Pin	Single	Dual
1	Remote On/Off	Remote On/Off
2	-Vin (GND)	-Vin (GND)
3	-Vin (GND)	-Vin (GND)
9	NC	Common
11	NC	-Vout
14	+Vout	+Vout
16	-Vout	Common
22	+Vin (Vcc)	+Vin (Vcc)
23	+Vin (Vcc)	+Vin (Vcc)

NC: Not connected

Dimensions in mm (inch)  
Tolerances: x.x ±0.5 (x.xx ±0.02)  
              x.xx ±0.25 (x.xxx ±0.01)  
Pin Ø 0.5 ±0.1 (0.02 ±0.004)