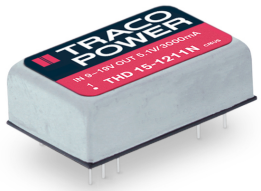
TRACO POWER

DC/DC Converter

THD 15N Series, 15 Watt

- **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**



UL 62368-1 IEC 62368-1

The THD 15N series models provide 15 Watt output power out of a very compact shielded metal case that occupies only 1 inch² 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
		Vnom	Imax	Vnom	Imax	typ.
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:	8 mA typ.
		24 Vin models:	5 mA typ.
		48 Vin models:	4 mA typ.
	- At full load	12 Vin models:	1'450 mA max.
		24 Vin models:	720 mA max.
		48 Vin models:	360 mA max.
Surge Voltage		12 Vin models:	36 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 VDC min. / 8 VDC typ. / 8.8 VDC max.
		24 Vin models:	15 VDC min. / 16 VDC typ. / 17.5 VDC max.
		48 Vin models:	32 VDC min. / 33.5 VDC typ. / 35 VDC max.
Reflected Ripple Current			20 mAp-p typ.
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

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:	0.5% 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		60 mVp-p typ. (w/ 1 µF, 25 V, X7R, MLCC)
Capacitive Load	- single output	3.3 Vout models:	4'700 µF max.
		5.1 Vout models:	3'300 µF max.
		12 Vout models:	600 µF max.
		15 Vout models:	400 µF max.
	- dual output	5 / -5 Vout models:	1'500 / 1'500 µF max.
		12 / -12 Vout models:	288 / 288 µF max.
		15 / -15 Vout models:	200 / 200 µF max.
Minimum Load			Not required
Temperature Coefficient			±0.02 %/K max.
Start-up Time			60 ms max. (Power On)
			60 ms max. (Remote On)
Short Circuit Protection			Continuous, Automatic recovery
Output Current Limitation			150% typ. of Iout max.
Overvoltage Protection			118 - 125% of Vout nom.
			(depending on model)
			3.9 VDC typ. (3.3 Vout models)
			6.2 VDC typ. (5.1 Vout models)
			15 VDC typ. (12 Vout models)
			18 VDC typ. (15 Vout models)
Transient Response	- Response Deviation		8% max. (25% Load Step)
	- Response Time		250 µs typ. (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		www.tracopower.com/overview/thd15n
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:	www.tracopower.com/overview/thd15n
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, ±2 kV, perf. criteria A
		Ext. input component:	Nippon chemi-con KY 220 µF, 100 V
	- 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

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:	www.tracopower.com/overview/thd15n
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 MΩ 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 www.tracopower.com/info/cleaning.pdf

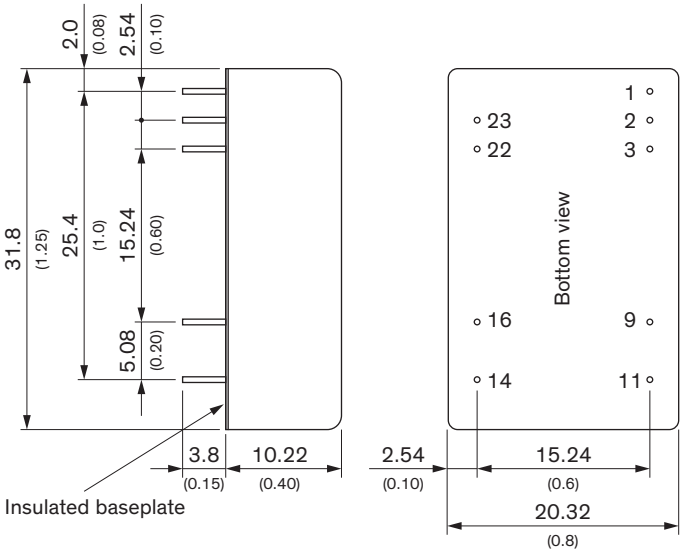
All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

Environment	- Vibration	MIL-STD-810F
	- Thermal Shock	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	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). The SCIP number is provided on request.)

Supporting Documents

Overview Link (for additional Documents)	www.tracopower.com/overview/thd15n

Outline Dimensions



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)

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