

- Wide 2:1 input voltage range
- Internal EMI-filter meets EN 55032, Class A without external components
- High efficiency up to 89%
- Operating temperature range -40°C to +85°C
- I/O isolation 1'500 VDC
- Overload protection
- 3-year product warranty



UL 62368-1 IEC 62368-1

The THD 10N series is a range of isolated high performance 10W DC/DC converters in a low profile DIL-24 package with standard industry pin-out. Other features of this product are built-in overvoltage protection and internal EMI-filter to meet EN 55032, class A. Full SMD-design with exclusive use of ceramic capacitors guarantees a high reliability and long product lifetime. Typical applications for these converters are industrial electronics, instrumentation, data communication systems and battery operated equipment with limited space available on the PCB.

Models						
Order Code	Input Voltage Range	Output 1		Output 2		Efficiency typ.
		Vnom	I <sub>max</sub>	Vnom	I <sub>max</sub>	
THD 10-1210N	9 - 18 VDC (12 VDC nom.)	3.3 VDC	2'700 mA			86 %
THD 10-1211N		5.1 VDC	2'000 mA			85 %
THD 10-1212N		12 VDC	833 mA			88 %
THD 10-1213N		15 VDC	666 mA			89 %
THD 10-1222N		+12 VDC	416 mA	-12 VDC	416 mA	88 %
THD 10-1223N		+15 VDC	333 mA	-15 VDC	333 mA	89 %
THD 10-2410N	18 - 36 VDC (24 VDC nom.)	3.3 VDC	2'700 mA			86 %
THD 10-2411N		5.1 VDC	2'000 mA			85 %
THD 10-2412N		12 VDC	833 mA			89 %
THD 10-2413N		15 VDC	666 mA			89 %
THD 10-2422N		+12 VDC	416 mA	-12 VDC	416 mA	88 %
THD 10-2423N		+15 VDC	333 mA	-15 VDC	333 mA	89 %
THD 10-4810N	36 - 75 VDC (48 VDC nom.)	3.3 VDC	2'700 mA			86 %
THD 10-4811N		5.1 VDC	2'000 mA			85 %
THD 10-4812N		12 VDC	833 mA			87 %
THD 10-4813N		15 VDC	666 mA			88 %
THD 10-4822N		+12 VDC	416 mA	-12 VDC	416 mA	87 %
THD 10-4823N		+15 VDC	333 mA	-15 VDC	333 mA	88 %

## Input Specifications

Input Current	- At no load	12 Vin models: <b>20 mA typ.</b> 24 Vin models: <b>15 mA typ.</b> 48 Vin models: <b>10 mA typ.</b>
	- At full load	12 Vin models: <b>940 mA typ.</b> 24 Vin models: <b>470 mA typ.</b> 48 Vin models: <b>240 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>8.5 VDC max.</b> 24 Vin models: <b>17 VDC max.</b> 48 Vin models: <b>34 VDC max.</b>
Recommended Input Fuse		(The need of an external fuse has to be assessed in the final application.)
Input Filter		Internal Pi-Type

## Output Specifications

Voltage Set Accuracy		<b>±2% max.</b>
Regulation	- Input Variation (Vmin - Vmax)	single output models: <b>1% max.</b> dual output models: <b>1% max.</b>
	- Load Variation (0 - 100%)	single output models: <b>1.2% max.</b> dual output models: <b>1.2% max.</b> (Output 1) <b>1.2% max.</b> (Output 2)
	- Voltage Balance (symmetrical load)	dual output models: <b>2% max.</b>
Ripple and Noise (20 MHz Bandwidth)	- single output	3.3 Vout models: <b>80 mVp-p typ.</b> 5.1 Vout models: <b>80 mVp-p typ.</b> 12 Vout models: <b>100 mVp-p typ.</b> 15 Vout models: <b>100 mVp-p typ.</b>
	- dual output	12 / -12 Vout models: <b>100 / 100 mVp-p typ.</b> 15 / -15 Vout models: <b>100 / 100 mVp-p typ.</b>
Capacitive Load	- single output	3.3 Vout models: <b>1'000 µF max.</b> 5.1 Vout models: <b>1'000 µF max.</b> 12 Vout models: <b>470 µF max.</b> 15 Vout models: <b>330 µF max.</b>
	- dual output	12 / -12 Vout models: <b>220 / 220 µF max.</b> 15 / -15 Vout models: <b>150 / 150 µF max.</b>
Minimum Load		Not required
Temperature Coefficient		<b>±0.02 %/K max.</b>
Short Circuit Protection		Continuous, Automatic recovery
Output Current Limitation		<b>110% min. of Iout max.</b> <b>150% typ. of Iout max.</b>
Transient Response	- Response Deviation	<b>3% typ. / 5% max.</b> (75% to 100% Load Step)
	- Response Time	<b>300 µs typ. / 600 µs max.</b> (75% to 100% 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	CSA-C22.2, No. 60950-1 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/thd10n">www.tracopower.com/overview/thd10n</a>
Pollution Degree		PD 2

## EMC Specifications

EMI Emissions	- Conducted Emissions - Radiated Emissions	EN 55032 class A (internal filter) EN 55032 class A (with external filter) External filter proposal: <a href="http://www.tracopower.com/overview/thd10n">www.tracopower.com/overview/thd10n</a>
EMS Immunity	- Electrostatic Discharge - RF Electromagnetic Field - EFT (Burst) / Surge - Conducted RF Disturbances	EN 55024 (IT Equipment) EN 55035 (Multimedia) Air: EN 61000-4-2, $\pm 8$ kV, perf. criteria A Contact: EN 61000-4-2, $\pm 6$ kV, perf. criteria A EN 61000-4-3, 10 V/m, perf. criteria A EN 61000-4-4, $\pm 2$ kV, perf. criteria A EN 61000-4-5, $\pm 1$ kV, perf. criteria A Ext. input component: 220 $\mu$ F, 100 V EN 61000-4-6, 10 Vrms, perf. criteria A

## General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature - Case Temperature - Storage Temperature	-40°C to +85°C +105°C max. -50°C to +125°C
Power Derating	- High Temperature	2.86 %/K above 70°C See application note: <a href="http://www.tracopower.com/overview/thd10n">www.tracopower.com/overview/thd10n</a>
Cooling System		Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote - Off Idle Input Current - Remote Pin Input Current	On: 3.5 to 12 VDC or open circuit Off: 0 to 1.2 VDC or short circuit Refers to 'Remote' and '-Vin' Pin 10 mA max. -0.5 to 0.5 mA
Altitude During Operation		6'000 m max.
Switching Frequency		330 kHz typ. (PWM)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s - Input to Output, 1 s	1'500 VDC 1'800 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 typ. 1'500 pF max.
Reliability	- Calculated MTBF	1'000'000 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>
Housing Material		Metal
Base Material		Non-conductive Plastic (UL 94 V-0 rated)
Potting Material		Silicone (UL 94 V-0 rated)
Pin Material		Copper Alloy (C6801)
Pin Foundation Plating		Nickel (2 - 4 $\mu$ m)
Pin Surface Plating		Tin (3 - 5 $\mu$ m), matte
Housing Type		Metal Case

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

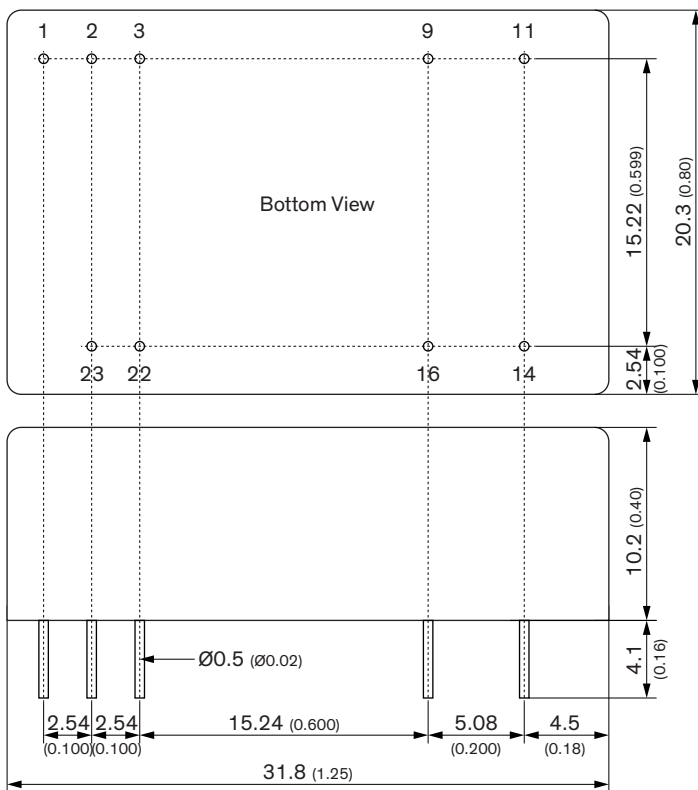
Mounting Type	PCB Mount
Connection Type	THD (Through-Hole Device)
Footprint Type	DIP24
Soldering Profile	Lead-Free Wave Soldering 260°C / 10 s max.
Weight	17.3 g
Environmental Compliance	- REACH Declaration <a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a> REACH SVHC list compliant REACH Annex XVII compliant - RoHS Declaration <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a> Exemptions: 7a (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule)) - SCIP Reference Number Oe7ab114-c5ea-46b9-89dd-9cc326cfc9f0

### Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/thd10n](http://www.tracopower.com/overview/thd10n)

### Outline Dimensions



Dimensions in mm (inch)

Tolerances:  $x.x \pm 0.50$  ( $x.xx \pm 0.02$ )

Tolerances:  $x.xx \pm 0.25$  ( $x.xxx \pm 0.01$ )

Pin diameter tolerance:  $x.x \pm 0.05$  ( $x.xx \pm 0.002$ )

### Pinout

Pin	Single	Dual
1	Remote On/Off	Remote On/Off
2	-Vin (GND)	-Vin (GND)
3	-Vin (GND)	-Vin (GND)
9	No pin	Common
11	NC	-Vout
14	+Vout	+Vout
16	-Vout	Common
22	+Vin (Vcc)	+Vin (Vcc)
23	+Vin (Vcc)	+Vin (Vcc)

NC: Not connected