



**THE DATASHEET OF  
THN 30-1223**



- **Highest power density 30 W Converter!**  
Ultra compact size: 1.0" x 1.0" x 0.4"
- **Shielded metal case with isolated baseplate**
- **Wide 2:1 input voltage range**
- **Very high efficiency across full load range up to 92%**
- **Over temperature protection**
- **Operating temp. range: -40°C to +80°C and up to 85°C with heat sink**
- **Ultra low no load input current**
- **Remote On/Off control and output voltage adjustable**
- **I/O isolation voltage 1600 VDC**
- **3-year product warranty**



The THN 30 series is the latest generation of high performance DC/DC converter modules with highest power density. The product achieves 30 W output power while it comes in a metal case with dimensions of only 1.0" x 1.0" x 0.4". All models have an wide 2:1 input voltage range and precisely regulated output voltages, even under no load conditions. Highest efficiency across load range makes this product very reliable and applicable in temperature ranges of up to 85°C. With a low input current at no load and remote On/Off control these converters are the ideal solution for battery-operated systems. Typical applications are in mobile equipments, instrumentation, distributed power architectures in communication and industrial electronics and everywhere where space on the 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 30-1210	9 - 18 VDC (12 VDC nom.)	3.3 VDC	7'000 mA			87 %
THN 30-1211		5 VDC	6'000 mA			89 %
THN 30-1212		12 VDC	2'500 mA			89 %
THN 30-1213		15 VDC	2'000 mA			89 %
THN 30-1215		24 VDC	1'250 mA			90 %
THN 30-1222		+12 VDC	1'250 mA	-12 VDC	1'250 mA	89 %
THN 30-1223		+15 VDC	1'000 mA	-15 VDC	1'000 mA	90 %
THN 30-2410	18 - 36 VDC (24 VDC nom.)	3.3 VDC	7'000 mA			87 %
THN 30-2411		5 VDC	6'000 mA			90 %
THN 30-2412		12 VDC	2'500 mA			91 %
THN 30-2413		15 VDC	2'000 mA			91 %
THN 30-2415		24 VDC	1'250 mA			93 %
THN 30-2422		+12 VDC	1'250 mA	-12 VDC	1'250 mA	91 %
THN 30-2423		+15 VDC	1'000 mA	-15 VDC	1'000 mA	91 %
THN 30-4810	36 - 75 VDC (48 VDC nom.)	3.3 VDC	7'000 mA			88 %
THN 30-4811		5 VDC	6'000 mA			90 %
THN 30-4812		12 VDC	2'500 mA			90 %
THN 30-4813		15 VDC	2'000 mA			91 %
THN 30-4815		24 VDC	1'250 mA			92 %
THN 30-4822		+12 VDC	1'250 mA	-12 VDC	1'250 mA	91 %
THN 30-4823		+15 VDC	1'000 mA	-15 VDC	1'000 mA	92 %

Options	
THN-HS1	- Optional Heat Sink: <a href="http://www.tracopower.com/products/thn-hs1.pdf">www.tracopower.com/products/thn-hs1.pdf</a>

## Input Specifications

Input Current	- At no load	12 Vin models: <b>12 mA typ.</b> 24 Vin models: <b>10 mA typ.</b> 48 Vin models: <b>8 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>
Reflected Ripple Current		<b>30 mA<sub>p-p</sub> typ.</b>
Recommended Input Fuse		12 Vin models: <b>6'000 mA</b> (slow blow) 24 Vin models: <b>3'000 mA</b> (slow blow) 48 Vin models: <b>2'000 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		<b>-10% to +20%</b> (15 & 24 V <sub>out</sub> models) <b>±10%</b> (other models) (single output models only) (By external trim resistor) See application note: <a href="http://www.tracopower.com/overview/thn30">www.tracopower.com/overview/thn30</a> Output power must not exceed rated power!
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>0.2% 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 V <sub>out</sub> models: <b>75 mV<sub>p-p</sub> typ.</b> (w/ 22 µF, 25 V X7R) 5 V <sub>out</sub> models: <b>75 mV<sub>p-p</sub> typ.</b> (w/ 22 µF, 25 V X7R) 12 V <sub>out</sub> models: <b>75 mV<sub>p-p</sub> typ.</b> (w/ 2x 22 µF, 25 V X7R) 15 V <sub>out</sub> models: <b>75 mV<sub>p-p</sub> typ.</b> (w/ 2x 22 µF, 25 V X7R) 24 V <sub>out</sub> models: <b>75 mV<sub>p-p</sub> typ.</b> (w/ 2x 6.8 µF, 50 V X7R)
	- dual output	12 / -12 V <sub>out</sub> models: <b>60 / 60 mV<sub>p-p</sub> typ.</b> (w/ 10 µF, 25 V X7R) 15 / -15 V <sub>out</sub> models: <b>60 / 60 mV<sub>p-p</sub> typ.</b> (w/ 10 µF, 25 V X7R)
Capacitive Load	- single output	3.3 V <sub>out</sub> models: <b>10'000 µF max.</b> 5 V <sub>out</sub> models: <b>7'200 µF max.</b> 12 V <sub>out</sub> models: <b>1'200 µF max.</b> 15 V <sub>out</sub> models: <b>1'000 µF max.</b> 24 V <sub>out</sub> models: <b>375 µF max.</b>
	- dual output	12 / -12 V <sub>out</sub> models: <b>750 / 750 µF max.</b> 15 / -15 V <sub>out</sub> models: <b>500 / 500 µF max.</b>
Minimum Load		<b>Not required</b>
Temperature Coefficient		<b>±0.02 %/K max.</b>
Start-up Time		<b>30 ms max.</b>
Short Circuit Protection		<b>Continuous, Automatic recovery</b>
Output Current Limitation		<b>140% typ. of I<sub>out</sub> max.</b>
Overvoltage Protection		<b>112 - 164% of V<sub>out</sub> nom.</b>
Transient Response	- 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

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/thn30">www.tracopower.com/overview/thn30</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)
	External filter proposal:	<a href="http://www.tracopower.com/overview/thn30">www.tracopower.com/overview/thn30</a>
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, $\pm 2$ kV, perf. criteria A
	- Conducted RF Disturbances	Ext. input component: 12 Vin: 220 $\mu$ F, 100 V    TVS SMDJ58A 24, 48 Vin: 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 +80°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/thn30">www.tracopower.com/overview/thn30</a>
Over Temperature Protection Switch Off	- Protection Mode	105°C min. / 115°C typ. / 130°C max. (Automatic recovery at 100°C typ.)
	- Measurement Point	Case
Cooling System		Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote (passive = on)	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 mA max.
	- Remote Pin Input Current	-0.5 to 1.0 mA
Altitude During Operation		5'000 m max.
Regulator Topology		Flyback Converter
Switching Frequency		275 kHz typ. (PWM) ( $\pm 10\%$ , 3.3 & 5 Vout model) 330 kHz typ. (PWM) ( $\pm 10\%$ , other models)
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	1'500 pF max.
Reliability	- Calculated MTBF	1'300'000 h (MIL-HDBK-217F, ground benign)

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

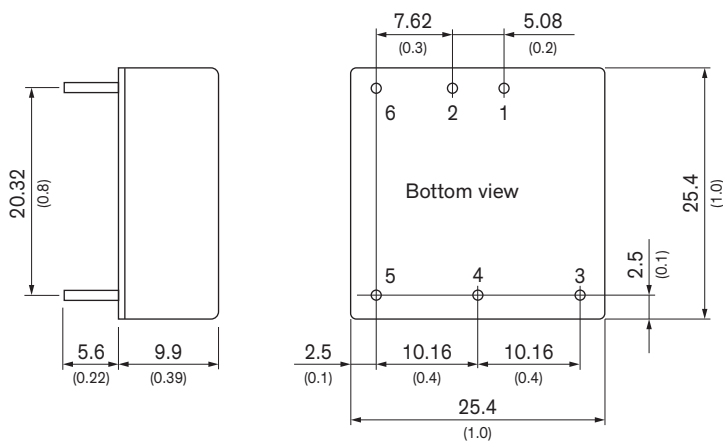
Washing Process		According to Cleaning Guideline <a href="http://www.tracopower.com/info/cleaning.pdf">www.tracopower.com/info/cleaning.pdf</a>
Environment	- Vibration - Thermal Shock	MIL-STD-810F MIL-STD-810F
Housing Material		Copper
Base Material		Non-conductive FR4 (UL 94 V-0 rated)
Potting Material		Silicone (UL 94 V-0 rated)
Pin Material		Copper
Pin Foundation Plating		Nickel (2 - 3 $\mu\text{m}$ )
Pin Surface Plating		Tin (3 - 5 $\mu\text{m}$ ), 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 265°C / 10 s max.
Weight		16.5 g
Thermal Impedance	- Case to Ambient	15 K/W typ. 13.8 K/W typ. (with Heat Sink)
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).) 5ce1e55d-783e-4021-8ec7-29e9c25b8270

### Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/thn30](http://www.tracopower.com/overview/thn30)

### 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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