DC/DC Converters

THN 20 Series, 20 Watt

Features

- Smallest encapsulated 20W Converter! Ultra compact size: 1.0" x 1.0" x 0.4"
- Shielded metal case with isolated baseplate
- Wide 2:1 input voltage ranges
- Very high efficiency up to 90%
- Output voltage adjustable
- Remote On/Off control
- Operating temp. range –40°C to +75°C and up to 85 °C with heat-sink
- I/O isolation voltage 1500 VDC
- Input filter meets EN 55022 class A without external components
- No minimum load required
- Lead free design, RoHS compliant
- 3-year product warranty

CB Scheme UL 60950-1

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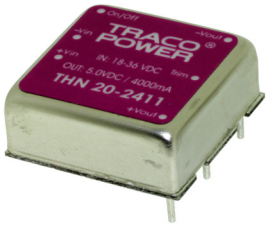


The THN-20 series is the latest generation of high performance dc-dc converter modules with highest power density. The product achieves 20W output power while it comes in a metal case with dimensions of only 1.0"x 1.0"x 0.4".
All models have an wide 2:1 input voltage range and precisely regulated output voltages, even under no load conditions. Highest efficiency of up to 90% makes this product very reliable and applicable in temperature ranges of up to 75°C or 85°C with optional mounted heat sink. Together with low input current characteristics at minimal 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 voltage	Output current max.	Efficiency typ.
THN 20-1210	9 – 18 VDC (12 VDC nominal)	3.3 VDC	4500 mA	86 %
THN 20-1211		5.0 VDC	4000 mA	90 %
THN 20-1212		12 VDC	1670 mA	89 %
THN 20-1213		15 VDC	1330 mA	89 %
THN 20-1222		±12 VDC	±833 mA	89 %
THN 20-1223		±15 VDC	±667 mA	89 %
THN 20-2410	18 – 36 VDC (24 VDC nominal)	3.3 VDC	4500 mA	86 %
THN 20-2411		5.0 VDC	4000 mA	90 %
THN 20-2412		12 VDC	1670 mA	90 %
THN 20-2413		15 VDC	1330 mA	90 %
THN 20-2422		±12 VDC	±833 mA	90 %
THN 20-2423		±15 VDC	±667 mA	90 %
THN 20-4810	36 – 75 VDC (48 VDC nominal)	3.3 VDC	4500 mA	86 %
THN 20-4811		5.0 VDC	4000 mA	90 %
THN 20-4812		12 VDC	1670 mA	90 %
THN 20-4813		15 VDC	1330 mA	90 %
THN 20-4822		±12 VDC	±833 mA	90 %
THN 20-4823		±15 VDC	±667 mA	90 %

Input Specifications

Input current at no load (at nominal input voltage)		12 Vin models:	10 mA typ
		24 Vin models:	6 mA typ.
		48 Vin models:	4 mA typ.
Input current at full load (at nominal input voltage)	– 12 Vin	3.3 VDC models:	1510 mA typ.
		other models:	1960 mA typ.
	– 24 Vin	3.3 VDC models:	755 mA typ.
		other models:	970 mA typ..
	– 48 Vin	3.3 VDC models:	375 mA typ.
		other models:	485 mA typ.
Start-up voltage / under voltage shut down		12 Vin models:	9 VDC / 8 VDC
		24 Vin models:	18 VDC / 16 VDC
		48 Vin models:	36 VDC / 33 VDC
Surge voltage (1 sec. max.)		12 Vin models:	25 V max.
		24 Vin models:	50 V max.
		48 Vin models:	100 V max.
Reflected input ripple current			30 mAp-p typ.
Conducted noise (input)			EN 55022 class A, FCC part 15, level A without external components
ESD (electrostatic discharge)			EN 61000-4-2, air ±8 kV, contact ±6 kV, perf. criteria A
Radiated immunity			EN 61000-4-3, 10 V/m, perf. criteria A
Fast transient / Surge			EN 61000-4-4, ±2 kV, perf. criteria A EN 61000-4-5, ±2 kV perf. criteria A With external input capacitor e.g. Nippon chemi-con KY 200 µF, 100 V, ESR 48 mOhm
Conducted immunity			EN 61000-4-6, 10 Vrms, perf. criteria A

Output Specifications

Voltage set accuracy			±1 %
Output voltage adjustment range		24 Vin models:	–10 / +20 %
		all other models:	±10 % only for single output models see application note
Regulation	– Input variation (Vmin – Vmax)	single output models:	0.2 % max.
		dual output models:	0.5 % max.
	– Load variation (0 – 100%)	single output models:	0.2 % max.
		dual output models balanced load:	1.0 % max.
		dual output models unbalanced load (25% /100%):	5.0 % max.
Minimum load			not required
Ripple and noise (20 MHz bandwidth)		single output models:	75 mVp-p typ. with external capacitor
		dual output models:	100 mVp-p typ. with external capacitor see application note
Temperature coefficient			±0.02 %/K
Output current limitation			typ. 150 % of Iout max., Hiccup
Short circuit protection			continuous, automatic recovery
Over voltage protection		3.3 VDC models:	3.7 – 5.4 Vout
		5 VDC models:	5.6 – 7.0 Vout
		12 VDC models:	13.5 – 19.6 Vout
		15 VDC models:	16.8 – 20.5 Vout
Start up time (nominal Vin and constant resistive load)			30 ms typ. (for power on and remote on)
Transient response setting time			250 µs typ. (25% load step change)

Output Specifications

Max. capacitive load	3.3 VDC models:	7'000 µF
	5 VDC models:	5'000 µF
	12 VDC models:	850 µF
	15 VDC models:	700 µF
	±12 VDC models:	500 µF (each output)
	±15 VDC models:	350 µF (each output)

General Specifications

Temperature ranges	– Operating without heat sink	–40°C to +75°C (with derating)
	– Operating with heat sink	–40°C to +85°C (with derating)
	– Case temperature	+105°C max.
	– Storage	–55°C to +125°C
Power derating	– Operating without heat sink	2.0 %/K above 60°C
	– Operating with heat sink	2.0 %/K above 70°C
Thermal impedance	– Natural convection	17.6°K/W
	– Natural convection with heat sink	14.8°K/W
Humidity (non condensing)		5 % to 95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)		>1.4 Mio. h
Isolation voltage (60sec.)	– Input/Output	1'500 VDC
Isolation capacitance	– Input/Output	1000 pF typ.
Isolation resistance	– Input/Output (500 VDC)	>1'000 MOhm
Remote On/Off	– On:	3.0 ... 15 VDC or open circuit
	– Off:	0 ... 1.2 VDC or short circuit pin 6 and pin 2
	– Off idle current:	1.5 mA
Switching frequency (fixed)		330 kHz typ. (pulse width modulation PWM)
Vibration and thermal shock		EN 61373, MIL-STD-810F
Safety standards		UL /cUL 60950-1, EN 60950-1, IEC 60950-1
	– Certification documents	www.tracopower.com/overview/thn20

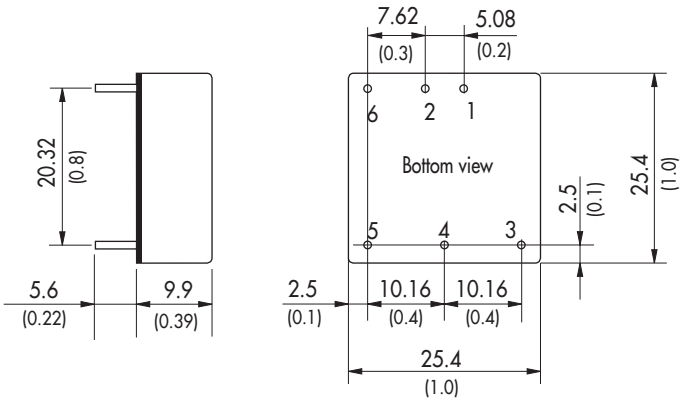
Physical Specifications

Casing material		nickel coated copper
Baseplate		non conductive FR4
Potting material		silicone (UL 94V-0 rated)
Weight		15 g (0.53oz)
Soldering temperature		max. 265°C / 10 sec.
Environmental compliance	– Reach	www.tracopower.com/overview/thn20
	– RoHS	RoHS directive 2011/65/EU

Application note: www.tracopower.com/products/thn20-application.pdf

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

Outline Dimensions

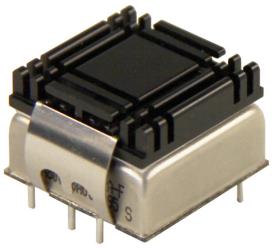


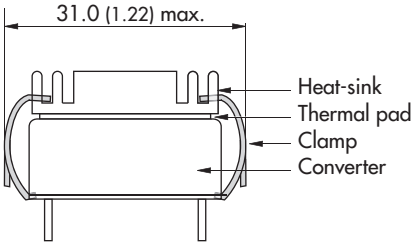
Pin-Out		
Pin	**Single**	**Dual**
1	+Vin (Vcc)	+Vin (Vcc)
2	–Vin (GND)	–Vin (GND)
3	+ Vout	+ Vout
4	Trim	Common
5	–Vout	–Vout
6	Remote On/Off	

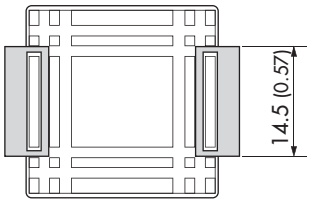
Dimensions in [mm], () = Inch
Pin diameter ø 1.0 (0.04)
Pin pitch tolerances: ±0.25 (±0.01)
Tolerances: ±0.5 (±0.02)

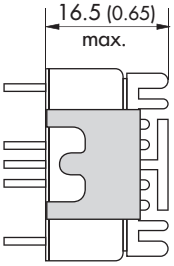
Heat-Sink (Option)

Order code: **THN-HS1**
(cont.: heat-sink, thermal pad, 2 clamps)
Material: Aluminum
Finish: Anodic treatment (black)
Weight: 8 g (0.28oz) without converter
Thermal impedance after assembling: 14.8 K/W









Note:
The product label on converter has to be removed before mounting the heat-sink.
For volume orders converters will be supplied with heat-sink already mounted. Please contact factory for quotation.
Separate heat-sinks are only available for prototypes and small quantity orders.