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TRACO POWER

DC/DC Converter

THN 20WI Series, 20 Watt

- **Ultra compact size: 1.0" x 1.0" x 0.4"**
- **Shielded metal casing with isolated baseplate**
- **Ultrawide 4:1 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 1600 VDC**
- **Input filter meets EN 55032 class A without external components**
- **3-year product warranty**



UL 62368-1 IEC 62368-1

The THN 20WI series models are high performance DC/DC converters. They achieve 20 W output power and come in a small size metal casing (1.0" x 1.0" x 0.4"). The models feature an ultra-wide 4:1 input voltage range while the output voltages are precisely regulated even under no load conditions. Highest efficiency of up to 90% makes this product very reliable and applicable in temperature ranges of up to 85°C. The low no-load input current characteristics and the remote On/Off control make these converters an ideal solution for battery operated systems. Typical applications are in mobile equipment, 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
		Vnom	Imax	Vnom	Imax	typ.
THN 20-2410WI	9 - 36 VDC (24 VDC nom.)	3.3 VDC	4'500 mA			89 %
THN 20-2411WI		5 VDC	4'000 mA			89 %
THN 20-2411WI-A1		5 VDC	4'000 mA			88 %
THN 20-2412WI		12 VDC	1'670 mA			89 %
THN 20-2413WI		15 VDC	1'330 mA			89 %
THN 20-2415WI		24 VDC	833 mA			91 %
THN 20-2422WI		+12 VDC	833 mA	–12 VDC	833 mA	89 %
THN 20-2423WI		+15 VDC	667 mA	–15 VDC	667 mA	90 %
THN 20-2425WI		+24 VDC	417 mA	–24 VDC	417 mA	91 %
THN 20-4810WI	18 - 75 VDC (48 VDC nom.)	3.3 VDC	4'500 mA			90 %
THN 20-4811WI		5 VDC	4'000 mA			90 %
THN 20-4811WI-A1		5 VDC	4'000 mA			89 %
THN 20-4812WI		12 VDC	1'670 mA			89 %
THN 20-4813WI		15 VDC	1'330 mA			90 %
THN 20-4815WI		24 VDC	833 mA			91 %
THN 20-4822WI		+12 VDC	833 mA	–12 VDC	833 mA	89 %
THN 20-4823WI		+15 VDC	667 mA	–15 VDC	667 mA	90 %
THN 20-4825WI		+24 VDC	417 mA	–24 VDC	417 mA	91 %

Options

Suffix A1	- Adjustable output up to 6VDC, ideal for low Ripple and Noise with an LDO regulator
THN-HS1	- Optional Heat Sink: www.tracopower.com/overview/thn-hs1

Note - ±24 Vout models: The output can also be used in serial circuit for single 48 VDC operation.

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Input Specifications

Input Current	- At no load	24 Vin models:	8 mA typ.
		48 Vin models:	7 mA typ.
Surge Voltage		24 Vin models:	50 VDC max. (1 s max.)
		48 Vin models:	100 VDC max. (1 s max.)
Under Voltage Lockout		24 Vin models:	7.5 VDC min. / 8 VDC typ. / 8.8 VDC max.
		48 Vin models:	15.5 VDC min. / 16 VDC typ. / 17.5 VDC max.
Reflected Ripple Current			30 mAp-p typ.
Recommended Input Fuse		24 Vin models:	4'000 mA (slow blow)
		48 Vin models:	2'000 mA (slow blow)
			(The need of an external fuse has to be assessed in the final application.)
Input Filter			Internal Pi-Type

Output Specifications

Output Voltage Adjustment			–10% to +20% (A1 & 24 Vout models)
			±10% (other models)
			(single output models only)
			(By external trim resistor)
		See application note:	www.tracopower.com/thn20wi-adj/
			Output power must not exceed rated power!
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:	0.2% 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)	- single output	3.3 Vout models:	75 mVp-p typ. (w/ 1µF X7R || 10µF TC)
		5 Vout models:	75 mVp-p typ. (w/ 1µF X7R || 10µF TC)
		12 Vout models:	75 mVp-p typ. (w/ 1µF X7R || 10µF TC)
		15 Vout models:	75 mVp-p typ. (w/ 1µF X7R || 10µF TC)
		24 Vout models:	75 mVp-p typ. (w/ 6.8µF X7R)
	- dual output	12 / -12 Vout models:	100 / 100 mVp-p typ. (w/ 1µF X7R || 10µF TC)
		15 / -15 Vout models:	100 / 100 mVp-p typ. (w/ 1µF X7R || 10µF TC)
		24 / -24 Vout models:	100 / 100 mVp-p typ. (w/ 4.7µF X7R)
Capacitive Load	- single output	3.3 Vout models:	7'000 µF max.
		5 Vout models:	5'000 µF max.
		12 Vout models:	850 µF max.
		15 Vout models:	700 µF max.
		24 Vout models:	220 µF max.
	- dual output	12 / -12 Vout models:	500 / 500 µF max.
		15 / -15 Vout models:	350 / 350 µF max.
		24 / -24 Vout models:	100 / 100 µF max.
Minimum Load			Not required
Temperature Coefficient			±0.02 %/K max.
Start-up Time			30 ms max.
Short Circuit Protection			Continuous, Automatic recovery
Output Current Limitation			125 - 190% of Iout max.
			150% typ. of Iout max.
Overvoltage Protection			112 - 164% of Vout nom.
Transient Response	- 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.

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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		www.tracopower.com/thn20wi-safety-cert/
Energy Source	- Output, acc. to 62368-1		ES1
Power Source	- Output, acc. to 62368-1		PS3
Pollution Degree			PD 2
Over Voltage Category			Not mains connected

EMC Specifications

EMI (Emissions)	- Conducted Emissions		EN 55032 class A (internal filter) EN 55032 class B (with external filter)
	- Radiated Emissions		EN 55032 class A (internal filter) EN 55032 class B (with external filter)
		External filter proposal:	www.tracopower.com/thn20wi-emc-filter/
EMS (Immunity)	- 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:	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 +75°C –40°C to +85°C (with heatsink THN-HS1)
	- 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/thn20wi-cc/
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 typ.
	- 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) (±10%, 3.3 & 5 Vout model) 330 kHz typ. (PWM) (±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 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V		1'500 pF max.
Reliability	- Calculated MTBF		1'400'000 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.

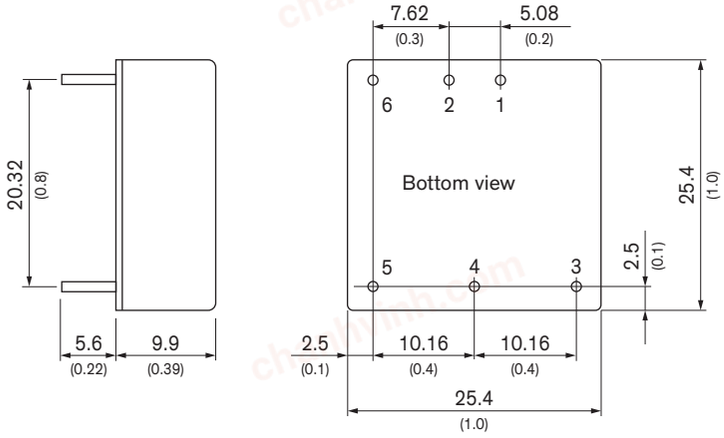
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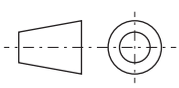
Environment	- Vibration	MIL-STD-810F
	- Thermal Shock	MIL-STD-810F
Housing Material		Copper, Nickel plated
Base Material		Non-conductive FR4 (UL 94 V-0 rated)
Potting Material		Silicone (UL 94 V-0 rated)
Pin Material		Copper
Pin Foundation Plating		Nickel (2 - 3 µm)
Pin Surface Plating		Tin (3 - 5 µm), matte
Housing Type		Metal Case
Mounting Type		PCB Mount
Connection Type		THD (Through-Hole Device)
Footprint Type		1" x 1"
Soldering Profile		Lead-Free Wave Soldering 265°C / 10 s max.
Weight		15 g
Thermal Impedance	- Case to Ambient	17.6 K/W typ. 14.8 K/W typ. (with heatsink THN-HS1)
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: 7(a), 7(c)-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number	b4edc4bb-5f02-48ac-8e5a-36106726a10f

Additional Information

Supporting Documents	www.tracopower.com/overview/thn20wi
Frequently Asked Questions	www.tracopower.com/glossary-faq
Glossary	www.tracopower.com/info/glossary.pdf
Service Portal	www.tracoserviceportal.com

Outline Dimensions





Dimensions in mm (inch)
Tolerances: ±0.5 (±0.02)
Pin pitch tolerances ±0.25 (±0.01)
Pin diameter Ø 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

Avoid routing PCB traces under the converter.

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