- **Reinforced I/O-isolation 3000 VAC**
- **Shock and vibration resistance according to EN 61373**
- **Wide 4:1 input voltage range: 9-36, 18-75, 40-160 VDC**
- **Operating temperature range -40 to +85°C**
- **Internal EN 55032 class A filter**
- **High efficiency up to 88%**
- **Protection against overload, overvoltage and short circuit**
- **3-year product warranty**

UL 62368-1 IEC 62368-1

The THR 20WI is 20 Watt DC/DC converters series with reinforced isolation (3000 VAC). These regulated DC/DC converters come in either a 2"x1" package and also feature increased resistance against shock and vibration according to EN 61373. The THR 20WI offers an internal input filter to comply with EN 55032 class A. High efficiencies up to 88% allow safe operation from –40°C to +80°C (with derating). All models have a wide 4:1 input voltage range and precisely regulated, isolated output voltages. With the latest IT safety certifications (IEC/EN/UL 62368-1) the THR 20WI series is the perfect choice for many demanding applications in the industrial, transportation and instrumentation sectors.

Models

Order Code	Input Voltage Range	Output 1		Output 2		Efficiency
		Vnom	Imax	Vnom	Imax	typ.
THR 20-2411WI	9 - 36 VDC (24 VDC nom.)	5 VDC	4'000 mA			87 %
THR 20-2412WI		12 VDC	1'670 mA			87 %
THR 20-2413WI		15 VDC	1'330 mA			87 %
THR 20-2415WI		24 VDC	833 mA			87 %
THR 20-2422WI		+12 VDC	833 mA	–12 VDC	833 mA	86 %
THR 20-2423WI		+15 VDC	667 mA	–15 VDC	667 mA	86 %
THR 20-4811WI	18 - 75 VDC (48 VDC nom.)	5 VDC	4'000 mA			87 %
THR 20-4812WI		12 VDC	1'670 mA			88 %
THR 20-4813WI		15 VDC	1'330 mA			88 %
THR 20-4815WI		24 VDC	833 mA			88 %
THR 20-4822WI		+12 VDC	833 mA	–12 VDC	833 mA	87 %
THR 20-4823WI		+15 VDC	667 mA	–15 VDC	667 mA	87 %
THR 20-7211WI	40 - 160 VDC (110 VDC nom.)	5 VDC	4'000 mA			84 %
THR 20-7212WI		12 VDC	1'670 mA			86 %
THR 20-7213WI		15 VDC	1'330 mA			86 %
THR 20-7215WI		24 VDC	833 mA			86 %
THR 20-7222WI		+12 VDC	833 mA	–12 VDC	833 mA	86 %
THR 20-7223WI		+15 VDC	667 mA	–15 VDC	667 mA	86 %

Options

on demand (backorder with MOQ non stocking item)	- Optional models with alternative pinning - Optional models with heatsink

Input Specifications

Input Current	- At no load	24 Vin models:	25 mA typ.
		48 Vin models:	15 mA typ.
		110 Vin models:	10 mA typ.
	- At full load	24 Vin models:	961 mA typ.
		48 Vin models:	476 mA typ.
		110 Vin models:	212 mA typ.
Surge Voltage		24 Vin models:	50 VDC max. (100 ms max.)
		48 Vin models:	100 VDC max. (100 ms max.)
		110 Vin models:	170 VDC max. (100 ms max.)
Under Voltage Lockout		24 Vin models:	7.5 VDC typ.
		48 Vin models:	16 VDC typ.
		110 Vin models:	37 VDC typ.
Recommended Input Fuse			(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% (single output models only) (By external trim resistor) See application note: www.tracopower.com/overview/thr20wi 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:	0.2% max.
	- Load Variation (0 - 100%)	single output models:	0.5% max.
		dual output models:	1% max. (Output 1)
			1% max. (Output 2)
	- Voltage Balance (symmetrical load)	dual output models:	2% max.
Ripple and Noise (20 MHz Bandwidth)	- single output	5 Vout models:	50 mVp-p typ. (w/ 10 µF, 25 V MLCC)
		12 Vout models:	100 mVp-p typ. (w/ 10 µF, 25 V MLCC)
		15 Vout models:	100 mVp-p typ. (w/ 10 µF, 25 V MLCC)
		24 Vout models:	150 mVp-p typ. (w/ 4.7 µF, 50 V MLCC)
	- dual output	12 / -12 Vout models:	100 / 100 mVp-p typ. (w/ 10 µF, 25 V MLCC)
		15 / -15 Vout models:	100 / 100 mVp-p typ. (w/ 10 µF, 25 V MLCC)
Capacitive Load	- single output	5 Vout models:	6'800 µF max.
		12 Vout models:	1'200 µF max.
		15 Vout models:	750 µF max.
		24 Vout models:	300 µF max.
	- dual output	12 / -12 Vout models:	600 / 600 µF max.
		15 / -15 Vout models:	380 / 380 µF max.
Minimum Load			Not required
Temperature Coefficient			±0.02 %/K max.
Start-up Time			30 ms typ. / 50 ms max.
Short Circuit Protection			Continuous, Automatic recovery
Output Current Limitation			150% typ. of Iout max.
Overvoltage Protection			125% typ. of Vout nom.
Transient Response	- Response Deviation		3% typ. / 5% max. (75% to 100% Load Step)
	- Response Time		300 µs max. (75% to 100% Load Step)

Safety Specifications

Safety Standards	- IT / Multimedia Equipment	EN 62368-1 IEC 62368-1 UL 62368-1
	- Certification Documents	www.tracopower.com/overview/thr20wi

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

EMC Specifications

EMI Emissions	- Conducted Emissions		EN 55011 class A (internal filter)
			EN 55032 class A (internal filter)
			FCC Part 15 class A (internal filter)
	- Radiated Emissions		EN 55011 class A (with external filter)
			EN 55032 class A (with external filter)
			FCC Part 15 class A (with external filter)
		External filter proposal:	www.tracopower.com/overview/thr20wi
EMS Immunity			EN 55024 (IT Equipment)
	- 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:	24 Vin models: 390µF chemi-con KY 48 Vin models: 330 µF chemi-con KY 110 Vin models: 390µF chemi-con KXJ
	- 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 +80°C
			–40°C to +90°C (with Heat Sink)
	- Case Temperature		+105°C max.
	- Storage Temperature		–50°C to +125°C
Power Derating	- High Temperature	See application note:	www.tracopower.com/overview/thr20wi
Cooling System			Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote		On: 3.5 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
Switching Frequency			260 - 310 kHz (PWM)
			280 kHz typ. (PWM)
Insulation System			Reinforced Insulation
Working Voltage (rated)			250 VAC
Isolation Test Voltage	- Input to Output, 60 s		3'000 VAC
	- Input to Case, 60 s		1'500 VAC
	- Output to Case, 60 s		1'500 VAC
Isolation Resistance	- Input to Output, 500 VDC		1'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V		1'500 pF typ.
Reliability	- Calculated MTBF		665'000 h (MIL-HDBK-217F, ground benign)
Environment	- Vibration		EN 61373
	- Mechanical Shock		EN 61373
Housing Material			Red Copper, Powder Coating
Base Material			Non-conductive FR4 (UL94 V-0 rated)
Isolation Frame Material			Non-conductive black Plastic (UL94 V-0 rated)
Potting Material			Epoxy (UL 94 V-0 rated)
Pin Material			Copper Alloy (C6801)
Pin Foundation Plating			Nickel (2 - 4 µm)
Pin Surface Plating			Tin (3 - 5 µm), matte
Soldering Profile			260°C / 10 s max.
Connection Type			THD (Through-Hole Device)

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

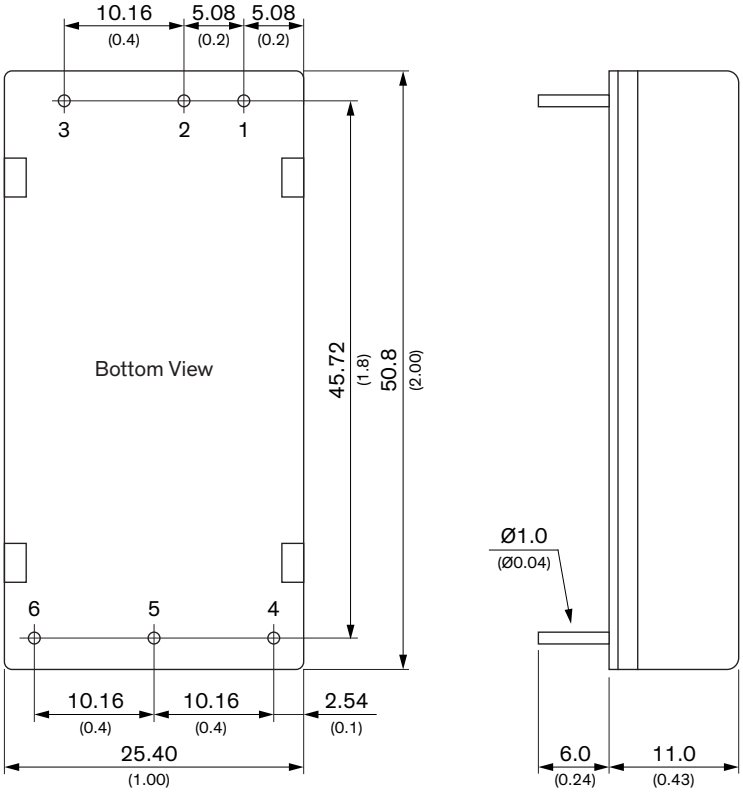
Weight		40.5 g
Thermal Impedance		12.1 K/W 9.8 K/W (with Heat Sink)
Environmental Compliance	- REACH Declaration	www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant
	- RoHS Declaration	www.tracopower.com/info/rohs-declaration.pdf Exemptions: 7a (RoHS exemptions 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/thr20wi

Outline Dimensions

Standard version

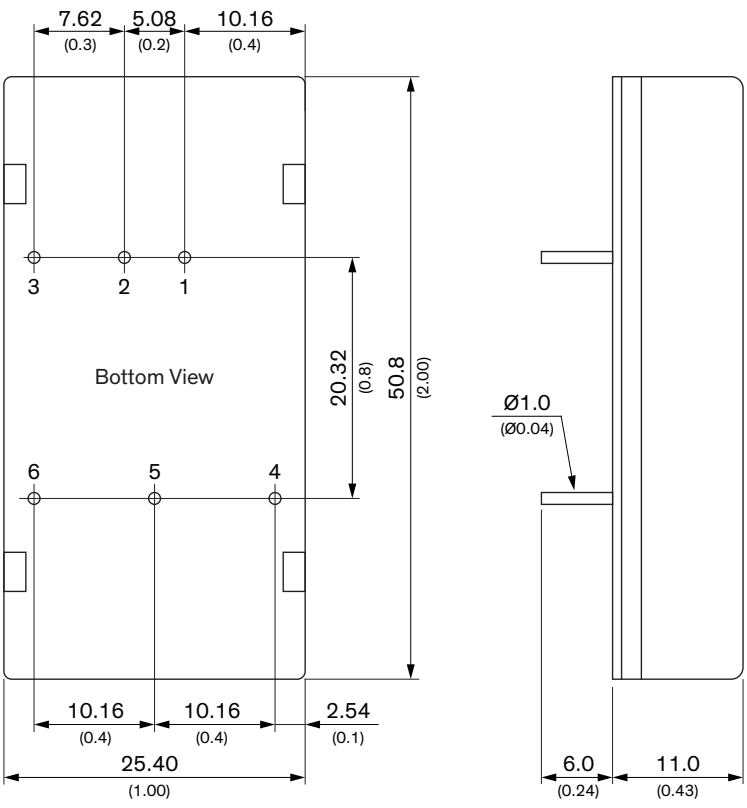


Dimensions in mm (inch)
Tolerances: x.x ±0.75 (±0.03)
x.xx ±0.25 (±0.01)
Pin diameter ±0.05 (±0.002)

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

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

Alternative Pinning version



Dimensions in mm (inch)
Tolerances: x.x ±0.75 (±0.03)
x.xx ±0.25 (±0.01)
Pin diameter ±0.05 (±0.002)

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