

#### Features

- ◆ Ultra compact size: 1.0" x 1.0" x 0.4"
- ◆ Shielded metal case 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  $-40^{\circ}\text{C}$  to  $+75^{\circ}\text{C}$  and up to  $85^{\circ}\text{C}$  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



The THN 20WI series models are high performance dc-dc converters. They achieve 20 Watt 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  $85^{\circ}\text{C}$ . 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 voltage	Output current max.	Efficiency typ.
THN 20-2410WI	9 – 36 VDC (24 VDC nominal)	3.3 VDC	4500 mA	86 %
THN 20-2411WI		5.0 VDC	4000 mA	89 %
THN 20-2412WI		12 VDC	1670 mA	89 %
THN 20-2413WI		15 VDC	1330 mA	89 %
THN 20-2415WI		24 VDC	833 mA	91 %
THN 20-2422WI		$\pm 12$ VDC	$\pm 833$ mA	89 %
THN 20-2423WI		$\pm 15$ VDC	$\pm 667$ mA	89 %
THN 20-2425WI		$\pm 24$ VDC (48 VDC)*	$\pm 417$ mA	91 %
THN 20-4810WI	18 – 75 VDC (48 VDC nominal)	3.3 VDC	4500 mA	86 %
THN 20-4811WI		5.0 VDC	4000 mA	89 %
THN 20-4812WI		12 VDC	1670 mA	89 %
THN 20-4813WI		15 VDC	1330 mA	90 %
THN 20-4815WI		24 VDC	833 mA	91 %
THN 20-4822WI		$\pm 12$ VDC	$\pm 833$ mA	89 %
THN 20-4823WI		$\pm 15$ VDC	$\pm 667$ mA	89 %
THN 20-4825WI		$\pm 24$ VDC (48 VDC)*	$\pm 417$ mA	91 %

\* The outputs can also be used in serial circuit for single 48 VDC operation.

### Input Specifications

Input current at no load (at nominal input voltage)	- 24 Vin	3.3, 5.0, 24 VDC models: 10 mA typ. 12, 15, ±12, ±15 VDC models: 6 mA typ. ±24 VDC models: 12 mA typ.
	- 48 Vin	3.3, 5.0, ±24 VDC models: 10 mA typ. 24 VDC models: 8 mA typ. all other models: 4 mA typ.
Start-up voltage / under voltage shut down	24 Vin models: 9 VDC / 8 VDC 48 Vin models: 18 VDC / 16 VDC	
Surge voltage (1 sec. max.)	24 Vin models: 50 V max. 48 Vin models: 100 V max.	
Reflected input ripple current	30 mA <sub>p-p</sub> 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 mΩ	
Conducted immunity	EN 61000-4-6, 10 Vrms, perf. criteria A	

### Output Specifications

Voltage set accuracy	±1 %
Output voltage adj. range	24 Vin models: -10 / +20 % all other models: ±10 % only for single output models <a href="#">see application note</a>
Regulation	- Input variation (V <sub>min</sub> - V <sub>max</sub> ) 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 mV <sub>p-p</sub> typ. with external capacitor dual output models: 100 mV <sub>p-p</sub> typ. with external capacitor <a href="#">see application note</a>
Temperature coefficient	±0.02 %/K
Output current limitation	typ. 150 % of I <sub>out</sub> max., Hiccup
Short circuit protection	continuous, automatic recovery
Over voltage protection	3.3 VDC models: 3.7 - 5.4 V <sub>out</sub> 5 VDC models: 5.6 - 7.0 V <sub>out</sub> 12 VDC models: 13.5 - 19.6 V <sub>out</sub> 15 VDC models: 16.8 - 20.5 V <sub>out</sub> 24 VDC models: 29.1 - 32.5 V <sub>out</sub>
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)
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 24 VDC models: 220 µF ±12 VDC models: 500 µF (each output) ±15 VDC models: 350 µF (each output) ±24 VDC models: 100 µF

### General Specifications

Temperature ranges	<ul style="list-style-type: none"> <li>- Operating without heat sink</li> <li>- Operating with heat sink</li> <li>- Case temperature</li> <li>- Storage</li> </ul>	<ul style="list-style-type: none"> <li>-40°C to +75°C (with derating)</li> <li>-40°C to +85°C (with derating)</li> <li>+105°C max.</li> <li>-55°C to +125°C</li> </ul>
Power derating	<ul style="list-style-type: none"> <li>- Operating without heat sink</li> <li>- Operating with heat sink</li> </ul>	<ul style="list-style-type: none"> <li>2.0 %/K above 60°C</li> <li>2.0 %/K above 70°C</li> </ul>
Thermal impedance	<ul style="list-style-type: none"> <li>- Natural convection</li> <li>- Natural convection with heat sink</li> </ul>	<ul style="list-style-type: none"> <li>17.6°C/W</li> <li>14.8°C/W</li> </ul>
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	<ul style="list-style-type: none"> <li>- On:</li> <li>- Off:</li> <li>- Off idle current:</li> </ul>	<ul style="list-style-type: none"> <li>3.0 ... 15 VDC or open circuit</li> <li>0 ... 1.2 VDC or short circuit pin 6 and pin 2</li> <li>1.5 mA</li> </ul>
Switching frequency (fixed)		330 kHz typ. (pulse width modulation PWM)
Vibration and thermal shock		EN 61373, MIL-STD-810F
Safety standards	<ul style="list-style-type: none"> <li>- UL/cUL</li> <li>- CB</li> <li>- Certification documents</li> </ul>	<ul style="list-style-type: none"> <li>UL 60950-1, 2nd Edition, 2007-03-27</li> <li>CSA C22.2 No. 60950-1-07, 2nd Ed. 2007-03</li> <li>IEC 60950-1:2005 (2nd Edition); Am 1:2009</li> <li>EN 60950-1:2006/A11:2009/A1:2010</li> <li><a href="http://www.tracopower.com/overview/thn20wi">www.tracopower.com/overview/thn20wi</a></li> </ul>

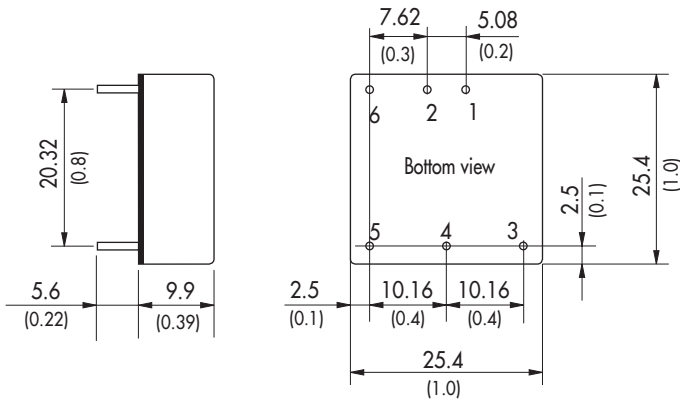
### Physical Specifications

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	<ul style="list-style-type: none"> <li>- Reach</li> <li>- RoHS</li> </ul>	<ul style="list-style-type: none"> <li><a href="http://www.tracopower.com/overview/thn20wi">www.tracopower.com/overview/thn20wi</a></li> <li>RoHS directive 2011/65/EU</li> </ul>

**Supporting Documents:** [www.tracopower.com/overview/thn20wi](http://www.tracopower.com/overview/thn20wi)

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	

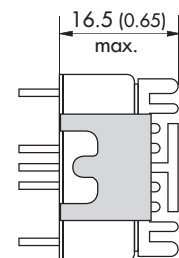
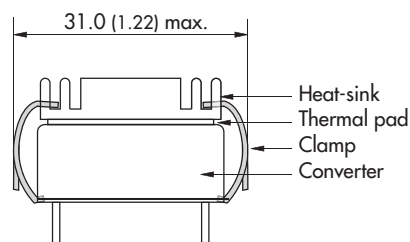
Dimensions in [mm], ( ) = Inch  
 Pin diameter  $\varnothing$  1.0 (0.04)  
 Pin pitch tolerances:  $\pm 0.25$  ( $\pm 0.01$ )  
 Tolerances:  $\pm 0.5$  ( $\pm 0.02$ )

**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.



Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at [www.tracopower.com](http://www.tracopower.com)