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°C to +75°C and up to 85 °C with heat-sink**
- **I/O isolation voltage 1500 VDC**
- **Input filter meets EN 55032 class A without external components**
- **No minimum load required**
- **Lead free design, RoHS compliant**
- **3-year product warranty**

CB Scheme UL 60950-1

cULus UL 60950-1

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°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		3.3 VDC	4500 mA	86 %
THN 20-2411WI		5.0 VDC	4000 mA	89 %
THN 20-2411WI-A1		5.0 VDC *1	4000 mA	89 %
THN 20-2412WI		12 VDC	1670 mA	89 %
THN 20-2413WI	**9 – 36 VDC**	15 VDC	1330 mA	89 %
THN 20-2415WI	(24 VDC nominal)	24 VDC	833 mA	91 %
THN 20-2422WI		±12 VDC	±833 mA	89 %
THN 20-2423WI		±15 VDC	±667 mA	89 %
THN 20-2425WI		±24 VDC (48 VDC) *2	±417 mA	91 %
THN 20-4810WI		3.3 VDC	4500 mA	86 %
THN 20-4811WI		5.0 VDC	4000 mA	89 %
THN 20-4811WI-A1		5.0 VDC *1	4000 mA	89 %
THN 20-4812WI		12 VDC	1670 mA	89 %
THN 20-4813WI	**18 – 75 VDC**	15 VDC	1330 mA	90 %
THN 20-4815WI	(48 VDC nominal)	24 VDC	833 mA	91 %
THN 20-4822WI		±12 VDC	±833 mA	89 %
THN 20-4823WI		±15 VDC	±667 mA	89 %
THN 20-4825WI		±24 VDC (48 VDC) *2	±417 mA	91 %

*1 Adjustable output up to 6 VDC

*2 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 Vout models:	10 mA typ.
		12, 15, ±12, ±15 Vout models:	6 mA typ.
		±24 Vout models:	12 mA typ.
	– 48 Vin	3.3, 5.0, ±24 Vout models:	10 mA typ.
		24 Vout 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 s 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 55032 class A, FCC part 15, level A without external components
	– Filter proposal for compling to EN 55032 class B		
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 adj. range		5.0 Vout A1 models:	–10 to +20 %
		24 Vout models:	–10 to +20 %
		all other models:	±10 % only for single output models
	– For further information 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
	– For further information 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 Vout models:	3.7 – 5.4 VDC
		5.0 Vout models:	5.6 – 7.0 VDC
		5.0 Vout A1 models:	6.3 – 7.4 VDC
		12 Vout models:	13.5 – 19.6 VDC
		15 Vout models:	16.8 – 20.5 VDC
		24 Vout models:	29.1 – 32.5 VDC
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 (continued)

Max. capacitive load	3.3 Vout models:	7'000 µF
	5 Vout models:	5'000 µF
	12 Vout models:	850 µF
	15 Vout models:	700 µF
	24 Vout models:	220 µF
	±12 Vout models:	500 µF (each output)
	±15 Vout models:	350 µF (each output)
	±24 Vout models:	100 µF (each output)

General Specifications

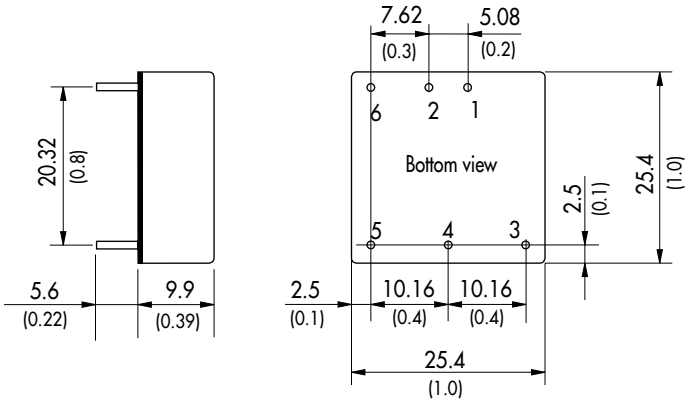
Temperature ranges	– Operating without heat sink	–40°C to +75°C (with derating)
	– Operating with heat sink	–40°C to +85°C (with derating)
	– Case temperature	+105°C max.
	– Storage	–55°C to +125°C
Power derating	– Operating without heat sink	2.0 %/K above 60°C
	– Operating with heat sink	2.0 %/K above 70°C
Thermal impedance	– Natural convection	17.6°C/W
	– Natural convection with heat sink	14.8°C/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 (60 s)	– 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	UL 60950-1, 2nd Edition, 2007-03-27 CSA C22.2 No. 60950-1-07, 2nd Ed. 2007-03
	– CB	IEC 60950-1:2005 (2nd Edition); Am 1:2009 EN 60950-1:2006/A11:2009/A1:2010
	– Certification documents	

Physical Specifications

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

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 ⌀ 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.