DC/DC Converters

THL 20WI 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
- 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
- Lead free design, RoHS compliant
- 3-year product warranty

c SA us 226037 CB Scheme IEC 60950-1

The THL 20WI series is the latest generation of dc-dc converter modules with highest power density. The product achieves 20 Watt 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 ultra wide 4:1 input voltage range and precisely regulated output voltages. 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. 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.
THL 20-2410WI	9 – 36 VDC (24 VDC nominal)	3.3 VDC	4500 mA	87 %
THL 20-2411WI		5.0 VDC	4000 mA	89 %
THL 20-2412WI		12 VDC	1670 mA	89 %
THL 20-2413WI		15 VDC	1340 mA	89 %
THL 20-2415WI		24 VDC	835 mA	88 %
THL 20-2422WI		±12 VDC	±835 mA	89 %
THL 20-2423WI		±15 VDC	±670 mA	89 %
THL 20-4810WI	18 – 75 VDC (48 VDC nominal)	3.3 VDC	4500 mA	88 %
THL 20-4811WI		5.0 VDC	4000 mA	89 %
THL 20-4812WI		12 VDC	1670 mA	89 %
THL 20-4813WI		15 VDC	1340 mA	89 %
THL 20-4815WI		24 VDC	835 mA	88 %
THL 20-4822WI		±12 VDC	±835 mA	89 %
THL 20-4823WI		±15 VDC	±670 mA	89 %

Input Specifications

Input current at no load (at nominal input voltage)	– 24 Vin	3.3 VDC models:	80 mA typ.
		5.0 VDC models:	90 mA Typ.
		all other models:	40 mA typ.
	– 48 Vin	3.3 VDC models:	40 mA typ.
		5.0 VDC models:	45 mA typ.
		all other models:	25 mA typ.
Input current at full load (at nominal input voltage)	– 24 Vin	3.3 VDC models:	700 mA typ.
		other models:	940 mA typ..
	– 48 Vin	3.3 VDC models:	350 mA typ.
		other models:	470 mA typ.
Start-up voltage		24 V models:	9 VDC (or lower)
		48 V models:	18 VDC (or lower)
Surge voltage (1 sec. max.)		24 Vin models:	50 V max.
		48 Vin models:	100 V max.
Reflected input ripple current		24 Vin models:	50 mAp-p typ.
		48 Vin models:	30 mAp-p typ.
Conducted noise (input)			EN 55022 class A, FCC part 15, level A with external components (see application note)
ESD (electrostatic discharge)			EN 61000-4-2, air ±8 kV, contact ±4 kV, perf. criteria B
Radiated immunity			EN 61000-4-3, 10 V/m, perf. criteria A
Recommended input fuse (slow blow)		24 Vin models:	5000 mA
		48 Vin models:	2500 mA

Output Specifications

Voltage set accuracy			±1 %
Output voltage adj. range			±10 % for single output models only. Trim up via resistor over Trim and -Vout Trim down via resistor over Trim and +Vout (Resistor values tba, 0 Ohm=max. adjustment)
Regulation	– Input variation (Vmin – Vmax)	single output models:	0.2 % max.
		dual output models:	0.5 % max.
	– Load variation	single output models:	0.5 % max. (0 – 100 % load)
		dual output models:	1.0 % max. (8 – 100 % balanced load)
Minimum load		single output models:	not required
		dual output models:	8 % of rated max current (operation at lower load condition will not damage the converters. However, they may not meet all listed specifications)
Ripple and noise (20 MHz bandwidth)		3.3 & 5.0 VDC models:	75 mVp-p typ.
		12 & 15 VDC models:	100 mVp-p typ.
		24 VDC models:	150 mVp-p typ. Measured with a 1µF M/C and a 10µF T/C
Temperature coefficient			±0.02 %/K
Output current limitation			at 150 % of Iout max., foldback
Short circuit protection			indefinite, automatic recovery
Transient response setting time			300 µs typ. (25% load step change)
Max. capacitive load		3.3 VDC models:	10'300 µF
		5 VDC models:	6'800 µF
		12 VDC models:	1'200 µF
		15 VDC models:	750 µF
		24 VDC models:	300 µF
		±12 VDC models:	680 µF (each output)
		±15 VDC models:	380 µF (each output)

General Specifications

Temperature ranges	– Operating (convection cooling 50 LFM, 0.25 m/s)		–40°C to +75°C (with derating)
	– Operating with heat sink (natural convection 20 LFM)		–40°C to +85°C (with derating)
	– Case temperature		+105°C max.
	– Storage		–50°C to +125°C
Load derating (convection cooling 50 LFM, 0.25 m/s)	– without heat sink	24 Vin; 3.3 VDC models:	2.5 %/K above +64°C
		48 Vin; 3.3 VDC models:	2.7 %/K above +68°C
		5, 12 & 15 VDC single output models:	2.2 %/K above +60°C
		24 VDC output models:	2.0 %/K above +55°C
		dual output models:	2.2 %/K above +60°C
	– with heat sink	24 V; 3.3 VDC models:	3.3 %/K above +70°C
		48 V; 3.3 VDC models:	3.2 %/K above +74°C
		5, 12 & 15 VDC output models:	3.1 %/K above +67°C
		24 VDC output models:	2.7 %/K above +63°C
		dual output models:	3.1 %/K above +67°C
Thermal inpedance	– Natural convection		18.2°C/W
	– Natural convection with heat sink		15.3°C/W
Humidity (non condensing)			95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)			>451'600 h
Isolation voltage (60sec.)	– Input/Output		1500 VDC
Isolation capacitance	– Input/Output (100 kHz, 1 V)		1500 pF max.
	– Input/Case		1000 VDC
	– Output/Case		1000 VDC
Isolation resistance	– Input/Output (500 VDC)		>1000 MOhm
Remote On/Off	– On:		3.5 ... 12 VDC or open circuit
	– Off:		0 ... 1.2 VDC or short circuit pin 6 and pin 2
	– Off idle current:		10 mA
Switching frequency (fixed)			330 kHz typ. (pulse width modulation PWM)
Altitude during operation			5'000 m max. (16'400 ft) approved
Safety standards (designed to meet)			UL/cUL 60950-1, IEC/EN 60950-1
Safety approvals	– CSA certificate of compliance		CAN/CSA-C22.2 No 60950-1-07, Am 1:2011 ANSI/UL Std No 60950-1, 2nd Ed, AM 1:2011
	– CB test certificate		IEC 60950-1:2005 2nd Ed, Am 1:2009
	– Certification documents		www.tracopower.com/overview/thl20wi
Environmental compliance	– Reach		www.tracopower.com/overview/thl20wi
	– RoHS		RoHS directive 2011/65/EU

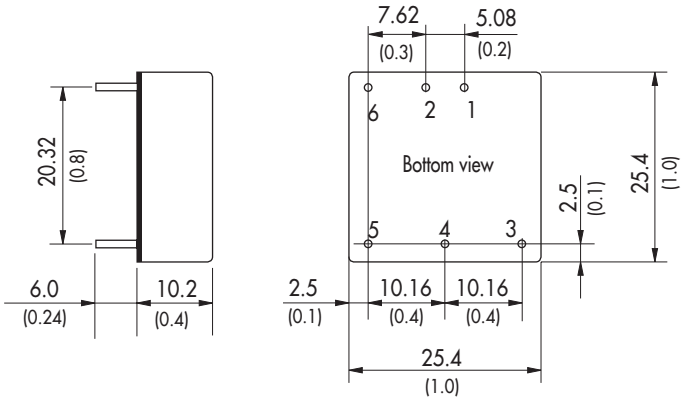
Physical Specifications

Casing material	aluminium alloy
Pin material	copper alloy with gold platet nickel subplate
Baseplate	non conductive FR4
Potting material	epoxy (UL 94V-0 rated)
Weight	15 g (0.53 oz)
Soldering temperature	max. 260°C / 10sec.

Application note : www.tracopower.com/overview/thl20wi

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

Outline Dimensions

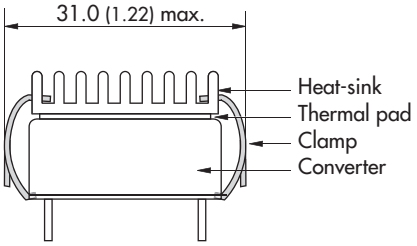


Pin-Out		
Pin	**Single**	**Dual**
1	+Vin (Vcc)	+Vin (Vcc)
2	–Vin (GND)	–Vin (GND)
3	+Vout	+Vout
4	Trim	Common
5	–Vout	–Vout
6	Remote On/Off	

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: **THL-HS1**
(cont.: heat-sink, thermal pad, 2 clamps)
Material: Aluminum
Finish: Anodic treatment (black)
Weight: 4 g (0.14 oz) without converter
Thermal impedance after assembling: 15.8 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.