chanhvinh.com

TRACO POWER

DC/DC Medical Converter

THM 60WI Series, 60 Watt

- **Wide 4:1 input voltage 60 W DC/DC converter in a compact 2.3 x 1.45 ” plastic case**
- **I/O isolation 5000 VAC rated for 250 VAC working voltage**
- **Certification according to IEC/EN/ES 60601-1 3rd edition for 2 x MOPP**
- **Risk management process according to ISO 14971**
- **Acceptance criteria for electronic assemblies acc. to IPC-A-610 Level 3**
- **Low leakage current <4.5 µA**
- **Operating temperature range: -40 to +75°C**
- **EMC compliance according to IEC 60601-1-2 4th edition**
- **Operating up to 5000m altitude**
- **5 year product warranty**



2MOPP cULus CB Scheme

ES 60601-1 IEC 60601-1
UL 62368-1 IEC 62368-1

The THM 60WI series is a range of medical 60 Watt DC/DC converters in a compact 2.3” x 1.45” plastic package and with wide 4:1 input voltage range. They provide a reinforced isolation system (5000 VAC) and a very low leakage current of less than 4.5 µA. With a high efficiency of up to 92% and highest-grade components the converters can reliably operate in an ambient temperature range of –40°C up to +75°C with derating. For more demanding applications regarding temperature, Traco also offers a special heatsink which will greatly increase the thermal capabilities for natural convection conditions. The units are approved according to IEC/EN/ES 60601-1 3rd edition for 2 x MOPP as well as IEC/EN/UL 62368-1 and come along with an ISO 14971 risk management file. Design and production conform to the quality management system ISO 13485. The THM 60WI constitutes a reliable solution not only for medical equipment but also for demanding ranges of application such as control & measurement and transportation.

Models

Order Code	Input Voltage Range	Output 1		Output 2		Efficiency
		Vnom	Imax	Vnom	Imax	typ.
THM 60-2411WI	9 - 36 VDC (24 VDC nom.)	5.1 VDC	12'000 mA			90 %
THM 60-2412WI		12 VDC	5'000 mA			92 %
THM 60-2413WI		15 VDC	4'000 mA			90 %
THM 60-2415WI		24 VDC	2'500 mA			89 %
THM 60-2422WI		+12 VDC	2'500 mA	–12 VDC	2'500 mA	89 %
THM 60-2423WI		+15 VDC	2'000 mA	–15 VDC	2'000 mA	90 %
THM 60-4811WI	18 - 75 VDC (48 VDC nom.)	5.1 VDC	12'000 mA			90 %
THM 60-4812WI		12 VDC	5'000 mA			92 %
THM 60-4813WI		15 VDC	4'000 mA			93 %
THM 60-4815WI		24 VDC	2'500 mA			90 %
THM 60-4822WI		+12 VDC	2'500 mA	–12 VDC	2'500 mA	90 %
THM 60-4823WI		+15 VDC	2'000 mA	–15 VDC	2'000 mA	90 %

Options

THM-HS1	- Optional Heat Sink: www.tracopower.com/products/thm-hs1.pdf

chanhvinh.com

Input Specifications

Input Current	- At no load	24 Vin models:	15 mA typ.
		48 Vin models:	12 mA typ.
Surge Voltage		24 Vin models:	50 VDC max. (3 s max.)
		48 Vin models:	100 VDC max. (3 s max.)
Under Voltage Lockout		24 Vin models:	7.8 VDC min. / 8 VDC typ. / 8.6 VDC max.
		48 Vin models:	15.8 VDC min. / 16 VDC typ. / 17.4 VDC max.
Recommended Input Fuse		24 Vin models:	10'000 mA (fast acting)
		48 Vin models:	6'300 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% (5.1 & 12 Vout models)
			–10% to +20% (other single output models)
			(By external trim resistor)
		See application note:	www.tracopower.com/overview/thm60wi
			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	5.1 Vout models:	75 mVp-p typ. (w/ 10 µF, 25 V, X7R)
		12 Vout models:	100 mVp-p typ. (w/ 10 µF, 25 V, X7R)
		15 Vout models:	100 mVp-p typ. (w/ 10 µF, 25 V, X7R)
		24 Vout models:	150 mVp-p typ. (w/ 4.7 µF, 50 V, X7R)
	- dual output	12 / -12 Vout models:	100 / 100 mVp-p typ. (w/ 10 µF, 25 V, X7R)
		15 / -15 Vout models:	100 / 100 mVp-p typ. (w/ 10 µF, 25 V, X7R)
Capacitive Load	- single output	5.1 Vout models:	17'000 µF max.
		12 Vout models:	3'000 µF max.
		15 Vout models:	1'900 µF max.
		24 Vout models:	730 µF max.
	- dual output	12 / -12 Vout models:	1'500 / 1'500 µF max.
		15 / -15 Vout models:	940 / 940 µF max.
Minimum Load			Not required
Temperature Coefficient			±0.02 %/K max.
Start-up Time			30 ms typ. / 60 ms max.
Short Circuit Protection			Continuous, Automatic recovery
Output Current Limitation			195% max. of Iout max.
			150% typ. of Iout max.
Overvoltage Protection			130% typ. of Vout nom.
			(15 and 24 Vout models)
			120% typ. of Vout nom.
			(5.1, 12, ±12 and ±15 Vout models)
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.

chanhvinh.com

Safety Specifications

Safety Standards	- IT / Multimedia Equipment	EN 62368-1 IEC 62368-1 UL 62368-1
	- Medical Equipment	EN 60601-1 IEC 60601-1 ANSI/AAMI ES 60601-1 2 x MOPP (Means Of Patient Protection)
	- Certification Documents	www.tracopower.com/overview/thm60wi
Pollution Degree		PD 2

EMC Specifications

EMI Emissions		EN 60601-1-2 edition 4 (Medical Devices)
	- Conducted Emissions	EN 55011 class A (with external filter) EN 55011 class B (with external filter) EN 55032 class A (with external filter) EN 55032 class B (with external filter) FCC Part 15 class A (with external filter) FCC Part 15 class B (with external filter) FCC Part 18 class A (with external filter) FCC Part 18 class B (with external filter)
	- Radiated Emissions	EN 55011 class A (with external filter) EN 55011 class B (with external filter) EN 55032 class A (with external filter) EN 55032 class B (with external filter) FCC Part 15 class A (with external filter) FCC Part 15 class B (with external filter) FCC Part 18 class A (with external filter) FCC Part 18 class B (with external filter)
	External filter proposal:	www.tracopower.com/overview/thm60wi
EMS Immunity		EN 55024 (IT Equipment) EN 55035 (Multimedia) EN 60601-1-2 edition 4 (Medical Devices)
	- Electrostatic Discharge	Air: EN 61000-4-2, ±15 kV, perf. criteria A Contact: EN 61000-4-2, ±8 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: 2 x 220 µF, 100 V || TVS SMDJ58A 48 Vin models: 2 x 220 µF, 100 V || TVS SMDJ120A
	- 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
	- 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/overview/thm60wi
Over Temperature Protection Switch Off	- Protection Mode	108°C min. / 115°C typ. / 125°C max. (Automatic recovery at 100°C typ.)
	- Measurement Point	Case
Cooling System		Natural convection (20 LFM)

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

chanhvinh.com

Sense Function		10% max. of Vout nom. (If sense function is not used, sense pins must be connected to corresponding polarity output pins)
Remote Control	- Voltage Controlled Remote	On: 3.0 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	3 mA typ.
	- Remote Pin Input Current	-0.5 to 0.5 mA
Altitude During Operation		5'000 m max.
Switching Frequency		225 - 275 kHz (PWM) 250 kHz typ. (PWM)
Insulation System		Reinforced Insulation
Working Voltage (rated)		250 VAC
Isolation Test Voltage	- Input to Output, 60 s	5'000 VAC
Creepage	- Input to Output	8 mm min.
Clearance	- Input to Output	8 mm min.
Isolation Resistance	- Input to Output, 500 VDC	10'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	40 pF typ.
Leakage Current	- Touch Current	4.5 µA max.
Reliability	- Calculated MTBF	1'064'000 h (MIL-HDBK-217F, ground benign)
Washing Process		According to Cleaning Guideline www.tracopower.com/info/cleaning.pdf
Environment	- Vibration	MIL-STD-810F
	- Mechanical Shock	MIL-STD-810F
	- Thermal Shock	MIL-STD-810F
Housing Material		Non-conductive Plastic (UL 94 V-0 rated)
Base Material		Non-conductive Plastic (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		Plastic Case
Mounting Type		PCB Mount
Connection Type		THD (Through-Hole Device)
Footprint Type		Quarter-Brick
Soldering Profile		Wave Soldering 260°C / 6 s max.
Weight		51 g
Thermal Impedance	- Case to Ambient	9.7 K/W typ. 5.5 K/W typ. (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, 7c-I (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.)

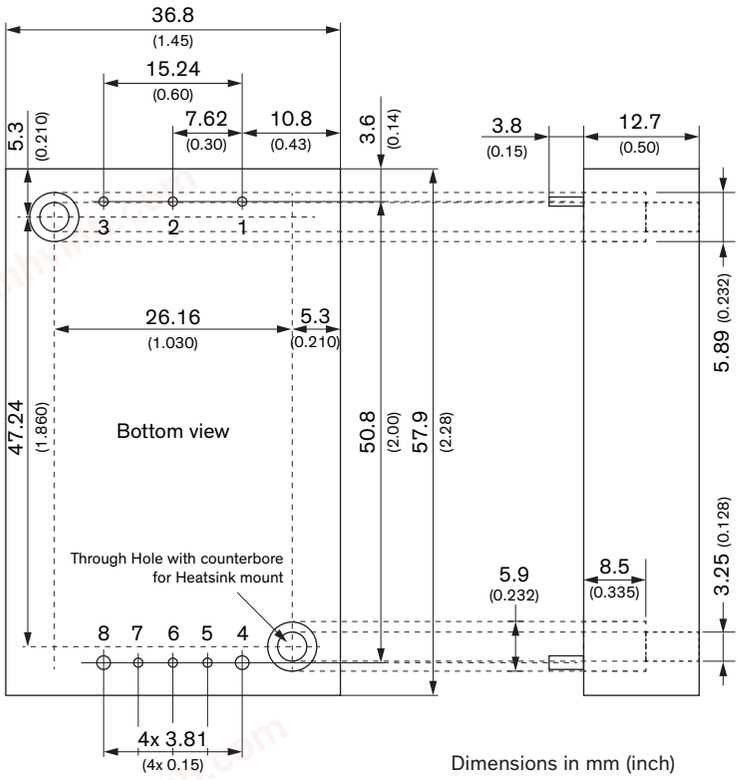
Supporting Documents

Overview Link (for additional Documents)	www.tracopower.com/overview/thm60wi

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

chanhvinh.com

Outline Dimensions



Pin (4, 8): Ø1.5 (Ø0.06)
Pin (other): Ø1.0 (Ø0.04)

Dimensions in mm (inch)
Tolerances: x.x ±0.50 (±0.02)
x.xx ±0.25 (±0.01)
Pin dimension tolerances ±0.1 (0.004)

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

© Copyright 2023 Traco Electronic AG Specifications can be changed without notice.