DC/DC Converters

THM 6WI Series, 6 Watt

ES 60601-1

Features

- Ultra wide 4:1 input voltage
- I/O isolation 5000 VACrms rated for 250 working voltage
- 2 x MOPP Medical safety according to AAMI/ANSI ES 60601-1:2005(R) and IEC/EN 60601-1 3rd edition
- Low leakage current <2 µA
- Very high efficiency up to 88%
- Extended operating temperature range –40°C to 88°C at full load.
- Input filter to meet EN55022 class A
- 3-year product warranty

The THM-6WI series is a range of high performance, regulated 6 Watt DC/DC converters in a DIP-24 plastic package. The reinforced I/O-isolation system complies with the medical safety requirements for MOPP (Means Of Patient Protection). Together with a wide 4:1 input voltage range, and an internal EMI filter to meet EN55022 class A the converters constitute also a reliable solution for many demanding applications such as transportation systems, industrial control equipments, measurement equipments, and some IGBT driver applications. With A high efficiency of up to 88% and highest grade components the converters can reliably operate in an ambient temperature range of –40 up to +88°C at full load.

Models

Order code	Input voltage range	Output voltage	Output current max.	Efficiency typ.
THM 6-0510WI	4.5 – 9 VDC (5 VDC nominal)	3.3 VDC	1800 mA	81.5 %
THM 6-0511WI		5.0 VDC	1200 mA	86.0 %
THM 6-0512WI		12 VDC	500 mA	86.0 %
THM 6-0513WI		15 VDC	400 mA	86.0 %
THM 6-0515WI		24 VDC	250 mA	87.0 %
THM 6-0521WI		±5.0 VDC	±600 mA	84.0 %
THM 6-0522WI		±12 VDC	±250 mA	86.5 %
THM 6-0523WI		±15 VDC	±200 mA	87.5 %
THM 6-2410WI	9 – 36 VDC (12 VDC nominal)	3.3 VDC	1800 mA	83.0 %
THM 6-2411WI		5.0 VDC	1200 mA	86.0 %
THM 6-2412WI		12 VDC	500 mA	89.0 %
THM 6-2413WI		15 VDC	400 mA	89.0 %
THM 6-2415WI		24 VDC	250 mA	88.5 %
THM 6-2421WI		±5.0 VDC	±600 mA	85.0 %
THM 6-2422WI		±12 VDC	±250 mA	88.5 %
THM 6-2423WI		±15 VDC	±200 mA	88.0 %
THM 6-4810WI	18 – 75 VDC (48 VDC nominal)	3.3 VDC	1800 mA	82.5 %
THM 6-4811WI		5.0 VDC	1200 mA	86.5 %
THM 6-4812WI		12 VDC	500 mA	88.0 %
THM 6-4813WI		15 VDC	400 mA	88.5 %
THM 6-4815WI		24 VDC	250 mA	88.0 %
THM 6-4821WI		±5.0 VDC	±600 mA	85.0 %
THM 6-4822WI		±12 VDC	±250 mA	88.0 %
THM 6-4823WI		±15 VDC	±200 mA	88.0 %

Input Specifications

Input current at no load	5 Vin models:	20 mA typ.
	24 Vin models:	6 mA typ.
	48 Vin models:	4 mA typ.
Start-up voltage / under voltage shut down	5 Vin models:	4.5 VDC / 4.0 VDC typ.
	24 Vin models:	9.0 VDC / 8.0 VDC typ.
	48 Vin models:	18 VDC / 16 VDC typ.
Surge voltage (1 sec. max.)	5 Vin models:	16 VDC max.
	24 Vin models:	50 VDC max.
	48 Vin models:	100 VDC max.
Conducted noise		EN 55022 class 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 (with external input capacitor / diode)		EN 61000-4-4, ±2 kV, perf. criteria A EN 61000-4-5, ±2 kV perf. criteria A
– external input capacitor:	5 Vin models:	Nippon chemi-con KY 1000 µF/25 V and reverse diode (Vishay V10P45) in parallel
	24 Vin models:	Nippon chemi-con KY 470 µF/ 50 V
	48 Vin models:	Nippon chemi-con KY 330 µF/ 100 V
Conducted immunity		EN 61000-4-6, 10 V, perf. criteria A
External input fuse required (recommended values, slow blow type)	5 Vin models:	5 A
	24 Vin models:	2.5 A
	48 Vin models:	1.5 A

Output Specifications

Voltage set accuracy			±1.0 % max.
Regulation	– Input variation	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:	5.0 % max.
Minimum load			not required
Start up time			30 mS
Ripple and noise (20 MHz Bandwidth)		3.3 & 5.0 VDC models:	30 mVp-p typ. with cap. 10µF/25V X7R MLCC
		12 & 15 VDC models:	40 mVp-p typ. with cap. 10µF/25V X7R MLCC
		24 VDC models:	50 mVp-p typ. with cap. 4.7µF/50V X7R MLCC
Transient response (25% load step change)			250 µs typ.
Current limitation			150 % Iout nominal typ. (hiccup mode)
Short circuit protection			continuous (automatic recovery)
Over voltage protection		3.3 VDC output models:	3.7 – 5.4 VDC
		5 VDC output models:	5.6 – 7.0 VDC
		12 VDC output models:	13.5 – 19.6 VDC
		15 VDC output models:	18.3 – 22.0 VDC
		24 VDC output models:	29.1 – 32.5 VDC
Capacitive load		3.3 VDC output models:	2100 µF max.
		5 VDC output models:	1500 µF max.
		12 VDC output models:	260 µF max.
		15 VDC output models:	210 µF max.
		24 VDC output models:	75 µF max.
		±5 VDC output models:	860 µF max. (each output)
		±12 VDC output models:	150 µF max. (each output)
		±15 VDC output models:	100 µF max. (each output)

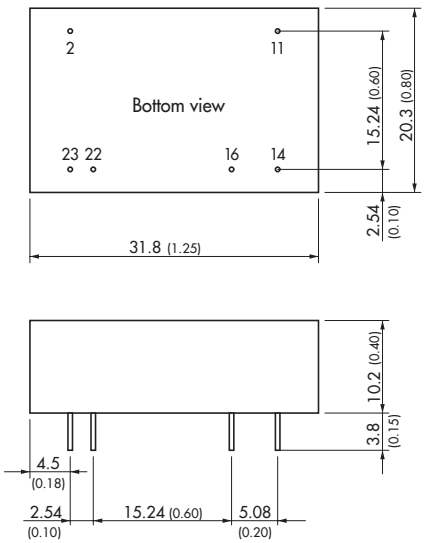
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

General Specifications

Temperature ranges	– Operating – Casing – Storage	–40°C to +88°C (without derating) +105°C max. –55°C to +125°C
Humidity (non condensing)		95 % rel H max.
Temperature coefficient		±0.02 %/K typ.
Switching frequency		250 kHz ±25 kHz. (puls width modulation)
I/O isolation voltage (50Hz, 60sec.)	– to meet UL/IEC/EN 60601-1	5000 VACrms, rated for 250 Vrms working voltage, 2 x MOPP
Clearance/creepage		8 mm min.
Leakage current		2 µA max. (at 240 VAC, 60 Hz)
Isolation capacitance	– Input/Output	17 pF max. (at 100 KHz, 1 V)
Safety standards		ANSI/AAMI ES 60601-1:2005/(R)2012, IEC/EN 60601-1 3rd edition
Safety approvals	– UL online certification UL 60601-1	www.ul.com File E188913, copy: e188913qqhm2.pdf
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)		>1.1 Mio. h
Casing material		non conductive plastic (UL 94V-0-rated)
Potting material		silicone (UL 94V-0-rated)
Vibration and thermal shock resistance		according to MIL-STD-810F
Weight		14.0 g (0.48 oz)
Soldering temperature		max. 265°C / 10 sec.
Environmental compliance	– Reach – RoHS	www.tracopower.com/products/reach-declaration.pdf according RoHS directive 2011/65/EU

- The component is not be used in an oxygen rich environment.
- The component is not to be used in conjunction with flammable anaesthetics and agents.
- The component has to be disposed appropriately. Please refer to local regulations (Waste Electrical and Electronic Equipment).
- A modification of the component is not allowed.

Outline Dimensions



Pin-Out		
Pin	**Single**	**Dual**
2	–Vin (GND)	–Vin (GND)
11	No con.	–Vout
14	+Vout	+Vout
16	–Vout	Common
22	+Vin (Vcc)	+Vin (Vcc)
23	+Vin (Vcc)	+Vin (Vcc)

Dimensions in [mm], () = Inch
Pin diameter ø 0.6 ±0.1 (0.024 ±0.004)
Tolerances ±0.5 (±0.02)
Pin pich tolerances ±0.25 (±0.01)