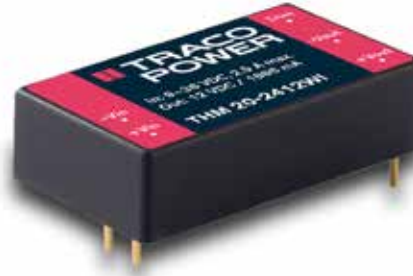


DC/DC Converter

- Compact 1.6 × 1.0 " plastic case
- Ultra wide 4:1 input voltage range
- I/O isolation 5000 VACrms rated for 250 VACrms working voltage
- Certification according to IEC/EN/ES 60601-1 3rd edition for 2×MOPP
- EMC compliance to IEC 60601-1-2 4th edition
- Risk management process according to ISO 14971 including risk management file
- Acceptance criteria for electronic assemblies according to IPC-A-610 Level 3
- Low leakage current < 2.5 μA
- Extended operating temperature range -40°C to 80°C.
- Input filter to meet EN55032 class A
- Operating up to 5000 m altitude
- 5 year product warranty

THM 20WI Series, 20 Watt



The THM-20WI series is a range of medical 20 Watt DC/DC converters in 1.6" x 1.0" plastic package and with ultra wide 4:1 input voltage range. They provide a reinforced isolation system for 5000 VACrms isolation and a very low leakage current of less than 2.5 μA. The units are approved to IEC/EN/ES 60601-1 3rd edition for 2 × MOPP (Means Of Patient Protection) and come along with an ISO 14971 risk management file. Design and production conform to the quality management system ISO 13485. With a high efficiency of up to 89% and highest grade components the converters can reliably operate in an ambient temperature range of -40°C up to +80°C. They constitute a reliable solution not only for medical equipment but also for demanding ranges of application such as transportation, control & measurement or IGBT drivers.

Models

Order code	Input voltage range	Output voltage	Output current max.	Efficiency typ.
THM 20-2411WI	9.0 – 36 VDC (24 VDC nominal)	5.0 VDC	4000 mA	87.0 %
THM 20-2412WI		12 VDC	1670 mA	88.5 %
THM 20-2413WI		15 VDC	1330 mA	88.0 %
THM 20-2415WI		24 VDC	833 mA	88.0 %
THM 20-2421WI		±5 VDC	±2000 mA	86.0 %
THM 20-2422WI		±12 VDC	±833 mA	88.0 %
THM 20-2423WI		±15 VDC	±667 mA	88.0 %
THM 20-4811WI	18 – 75 VDC (48 VDC nominal)	5.0 VDC	4000 mA	89.5 %
THM 20-4812WI		12 VDC	1670 mA	88.0 %
THM 20-4813WI		15 VDC	1330 mA	88.0 %
THM 20-4815WI		24 VDC	833 mA	88.5 %
THM 20-4821WI		±5 VDC	±2000 mA	86.0 %
THM 20-4822WI		±12 VDC	±833 mA	88.5 %
THM 20-4823WI		±15 VDC	±667 mA	88.0 %

Input Specifications

Input current no load	24 Vin models: 13 mA typ. 48 Vin models: 10 mA typ.	
Surge voltage (3 sec. max.)	24 Vin models: 50 V max. 48 Vin models: 100 V max.	
Start-up voltage	24 Vin models: 9 VDC (or lower) 48 Vin models: 18 VDC (or lower)	
Startup time	60 ms max. (30 ms typ.)	
Under voltage shut down (lock-out circuit)	24 Vin models: 7.8 - 8.6 VDC 48 Vin models: 15.8 - 17.4 VDC	
Input filter	Pi-type	
Conducted noise	EN 55011 limits to IEC 60601-1-2 4th edition EN55032 class A (internal filter) EN55032 class B with external components – Filter proposal	
EMC immunity	– Generic for Medical equipment – ESD (electrostatic discharge) – Radiated immunity – Fast transient / surge (with external input capacitor / diode) – Conducted immunity – Magnetic field immunity	IEC/EN 60601-1-2 4th edition EN 61000-4-2, air ± 15 kV, contact ± 8 kV, perf. criteria A EN 61000-4-3, 10 V/m, perf. criteria A EN 61000-4-4, ± 2 kV, perf. criteria A EN 61000-4-5, ± 2 kV perf. criteria A 24 Vin models: Nippon chemi-con KY 220 μ F/ 100 V TVS - SMDJ58A, 58V, 3000 W) 48 Vin models: Nippon chemi-con KY 220 μ F/ 100 V TVS - SMDJ120A, 120V, 3000 W) EN 61000-4-6, 10 Vrms, perf. criteria A EN 61000-4-8 100 A/m, continuous, perf. criteria A 1000 A/m, 1 sec., perf. criteria A
External input fuse required (recommended values, slow blow type)	24 Vin models: 4 A 48 Vin models: 2 A	

Output Specifications

Voltage set accuracy	± 1 % max.	
Output voltage adjustment range (single output models only)	5 & 12 VDC models: ± 10 % 15 & 24 VDC models: $-10 / +20$ %	
Regulation	– Input variation – Load variation 0 – 100 % – Cross regulation	single output: 0.2% max. dual output: 0.5% max. single output: 0.2% max. dual output: 1.0% max. dual output: 5.0% max. (asymmetrical load 25/100%)
Temperature coefficient	± 0.02 %/K max.	
Minimum load	not required	
Ripple and noise (20 MHz Bandwidth)	(\pm)5.0 VDC models: 50 mVp-p typ. with cap. 10 μ F/25V X7R MLCC (\pm)12 VDC models: 75 mVp-p typ. with cap. 10 μ F/25V X7R MLCC (\pm)15 VDC models: 75 mVp-p typ. with cap. 10 μ F/25V X7R MLCC 24 VDC models: 100 mVp-p typ. with cap. 4.7 μ F/50V X7R MLCC	
Transient response	– Recovery time (25% load step change)	250 μ s typ.
Overload protection		at 150 % typ. of lout rated (hiccup mode)
Short-circuit protection		Continuous, automatic recovery

General Specifications

Overvoltage protection	(±)5.0 VDC models: (±)12 VDC models: (±)15 VDC models: 24 VDC models:	6.2 VDC typ. 15 VDC typ. 20 VDC typ. 30 VDC typ.
Capacitive load	–Single output –Dual output	5.0 VDC models: 5'000 µF max. 12 VDC models: 850 µF max. 15 VDC models: 700 µF max. 24 VDC models: 220 µF max. ±5 VDC models: 2'500 µF max. (each output) ±12 VDC models: 500 µF max. (each output) ±15 VDC models: 350 µF max. (each output)
Temperature ranges	– Operating – Case temperature – Storage temperature	–40°C to +80°C +105°C max. –55°C to +125°C
Derating		2% above 55°C
Overtemperature protection		at 115°C typ.
Thermal impedance		14.36 °C/W
Humidity (non condensing)		5 % to 95 % rel H max.
Isolation voltage (50 Hz, 60 s)		5000 VACrms, reinforced
Clearance/creepage		8 mm min.
Leakage current (at 240VAC, 60Hz)		2.5 µA max.
Isolation capacitance (input/output)		20 pF typ.
Altitude during operation		5000 m
Reliability, calculated MTBF		tbd
Switching frequency		250 kHz typ. (pulse width modulation)
Vibration and thermal shock resistance		according to MIL-STD-810F
Safety standards/approvals – Medical equipment		ANSI/AAMI ES 60601-1:2005/(R)2012, IEC/EN 60601-1 3rd edition
	– Certification documents	
Environmental compliance	– Reach – RoHS	RoHS directive 2011/65/EU

Physical Specifications

Casing material	non-conductive plastic
Base material	non-conductive plastic
Potting material	silicone (UL94 V-0 rated)
Package weight	24 g (0.85oz)
Soldering temperature	max. 265°C / 10 s

