

- Ultra wide 4:1 input voltage 20 W DC/DC converter in a 1.6 x 1 " 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 incl. risk management file
- Acceptance criteria for electronic assemblies acc. to IPC-A-610 Level 3
- Low leakage current <2.5 μ A
- Operating temperature -40°C to 80°C
- EMC compliance to IEC 60601-1-2 4th edition and EN55032 class A
- Operating up to 5000m altitude
- 5-year product warranty



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

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 VAC isolation and a very low leakage current of less than 2.5 μ A. The units are approved to IEC/EN/ES 60601-1 3rd edition for 2 x MOPP 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 $+80^{\circ}\text{C}$. 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 1 | | Output 2 | | Efficiency typ. |
|---------------|-----------------------------|------------------------------|------------------|----------|------------------|-----------------|
| | | Vnom | I _{max} | Vnom | I _{max} | |
| THM 20-2411WI | 9 - 36 VDC (24 VDC nom.) | 5 VDC | 4'000 mA | | | 89 % |
| THM 20-2412WI | | 12 VDC | 1'670 mA | | | 89 % |
| THM 20-2413WI | | 15 VDC | 1'330 mA | | | 89 % |
| THM 20-2415WI | | 24 VDC | 833 mA | | | 89 % |
| THM 20-2421WI | | +5 VDC | 2'000 mA | -5 VDC | 2'000 mA | 86 % |
| THM 20-2422WI | | +12 VDC | 833 mA | -12 VDC | 833 mA | 89 % |
| THM 20-2423WI | | +15 VDC | 667 mA | -15 VDC | 667 mA | 89 % |
| THM 20-4811WI | | 18 - 75 VDC (48 VDC nom.) | 5 VDC | 4'000 mA | | |
| THM 20-4812WI | 12 VDC | | 1'670 mA | | | 89 % |
| THM 20-4813WI | 15 VDC | | 1'330 mA | | | 89 % |
| THM 20-4815WI | 24 VDC | | 833 mA | | | 89 % |
| THM 20-4821WI | +5 VDC | | 2'000 mA | -5 VDC | 2'000 mA | 86 % |
| THM 20-4822WI | +12 VDC | | 833 mA | -12 VDC | 833 mA | 89 % |
| THM 20-4823WI | +15 VDC | | 667 mA | -15 VDC | 667 mA | 89 % |

Options

| | |
|---|---|
| on demand (backorder with MOQ non stocking item) | - Optional models with remote-control function - Optional models with remote-control function with inverse logic |
|---|---|

Input Specifications

| | | |
|------------------------|--------------|---|
| Input Current | - At no load | 24 Vin models: 10 mA typ. 48 Vin models: 9 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: 4'000 mA (slow blow) 48 Vin models: 2'000 mA (slow blow) |
| Input Filter | | Internal Pi-Type |

Output Specifications

| | | |
|-------------------------------------|--|---|
| Output Voltage Adjustment | | -10% to +20% (By external trim resistor) (15 & 24 VDC single output models) ±10% (By external trim resistor) (other single output models) See application note: www.tracopower.com/overview/thm20wi 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 Vout models: 50 mVp-p typ. (with 10 µF X7R) 12 Vout models: 75 mVp-p typ. (with 10 µF X7R) 15 Vout models: 75 mVp-p typ. (with 10 µF X7R) 24 Vout models: 100 mVp-p typ. (with 4.7 µF X7R) |
| | - dual output | 5 / -5 Vout models: 50 / 50 mVp-p typ. (with 10 µF X7R) 12 / -12 Vout models: 75 / 75 mVp-p typ. (with 10 µF X7R) 15 / -15 Vout models: 75 / 75 mVp-p typ. (with 10 µF X7R) |
| Capacitive Load | - single output | 5 Vout models: 5'000 µF max. 12 Vout models: 850 µF max. 15 Vout models: 700 µF max. 24 Vout models: 220 µF max. |
| | - dual output | 12 / -12 Vout models: 500 / 500 µF max. 15 / -15 Vout models: 350 / 350 µF max. |
| | - 24 Vin input | 5 / -5 Vout models: 2'500 / 2'500 µF max. |
| | - 48 Vin input | 5 / -5 Vout models: 500 / 500 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 | | 185% max. of Iout max. 150% typ. of Iout max. |

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

| | | |
|------------------------|-----------------|--|
| Overvoltage Protection | | 125% typ. of Vout nom. (depending on model) 6.2 VDC typ. (5 VDC model) 15 VDC typ. (12 VDC model) 20 VDC typ. (15 VDC model) 30 VDC typ. (24 VDC model) 6.2 VDC typ. (±5 VDC model) 15 VDC typ (±12 VDC model) 20 VDC typ. (±15 VDC model) |
| Transient Response | - Response Time | 250 µs typ. (25% Load Step) |

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/thm20wi |
| Pollution Degree | | PD 2 |
| Over Voltage Category | | OVC II |

EMC Specifications

| | | |
|---------------|-----------------------------|--|
| EMI Emissions | - Conducted Emissions | EN 60601-1-2 edition 4 (Medical Devices) EN 55011 class A (internal filter) EN 55011 class B (with external filter) EN 55032 class A (internal filter) EN 55032 class B (with external filter) FCC Part 18, class A FCC Part 18, class B |
| | - Radiated Emissions | EN 55011 class A (internal filter) EN 55011 class B (with external filter) EN 55032 class A (internal filter) EN 55032 class B (with external filter) FCC Part 18, class A FCC Part 18, class B |
| | | External filter proposal: www.tracopower.com/overview/thm20wi |
| EMS Immunity | - Electrostatic Discharge | EN 60601-1-2 edition 4 (Medical Devices) 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 |
| | - Conducted RF Disturbances | Ext. input component: 24 Vin models: 2 x KY 220 µF // TVS SMDJ58A 48 Vin models: 2 x KY 220 µF // TVS SMDJ120A 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 +80°C |
| | - Case Temperature | +105°C max. |
| | - Storage Temperature | -55°C to +125°C |
| Power Derating | - High Temperature | 2 %/K above 55°C |

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

| | | |
|--|---|--|
| Over Temperature Protection Switch Off | - Protection Mode - Measurement Point | 115°C typ. (Automatic recovery) Case |
| Cooling System | | Natural convection (20 LFM) |
| Remote Control | - Voltage Controlled Remote - Off Idle Input Current - Remote Pin Input Current | On: 3.5 to 12 VDC or open circuit Off: 0 to 1.2 VDC or short circuit Refers to 'Remote' and '-Vin' Pin 2.5 mA typ. -0.5 to 1.0 mA (Only for optional models with remote-control. Inverse models available.) |
| Altitude During Operation | | 5'000 m max. |
| Switching Frequency | | 225 - 285 kHz (PWM) 250 kHz typ. (PWM) |
| Insulation System | | Reinforced Insulation |
| 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 Capacitance | - Input to Output, 100 kHz, 1 V | 20 pF typ. |
| Leakage Current | - Touch Current | 2.5 µA max. (240 VAC, 60 Hz) |
| Reliability | - Calculated MTBF | 1'712'000 h (MIL-HDBK-217F, ground benign) |
| Environment | - Vibration - Thermal Shock | MIL-STD-810F MIL-STD-810F |
| Housing Material | | Non-conductive Plastic (UL94 V-0 rated) |
| Base Material | | Non-conductive Plastic (UL 94 V-0 rated) |
| Potting Material | | Silicone (UL 94 V-0 rated) |
| Soldering Profile | | 265°C / 10 s max. |
| Connection Type | | THD (Through-Hole Device) |
| Weight | | 24 g |
| Thermal Impedance | | 14.4 K/W |
| Environmental Compliance | - Reach - RoHS | www.tracopower.com/info/reach-declaration.pdf www.tracopower.com/info/rohs-declaration.pdf |

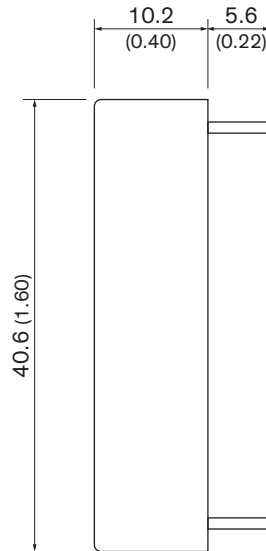
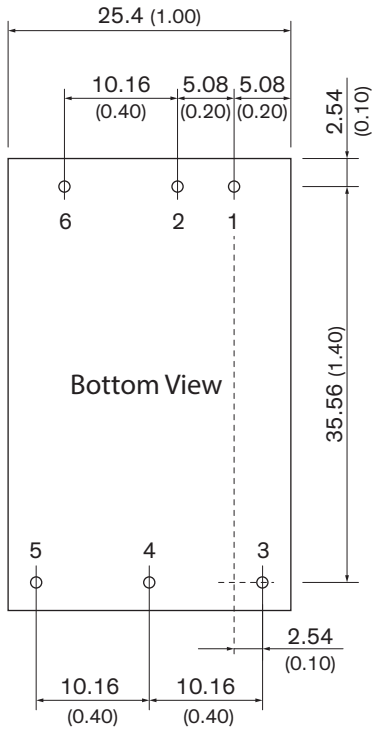
Supporting Documents

Overview Link (for additional Documents)

www.tracopower.com/overview/thm20wi

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

Outline Dimensions



Dimensions in mm (inch)
 Tolerances ± 0.5 (± 0.02)
 Pin \varnothing 1.0 ± 0.1 (0.039 ± 0.004)
 Pin pitch tolerances ± 0.25 (± 0.01)

| Pinout | | |
|--------|----------------|----------------|
| Pin | Single Output | Dual Output |
| 1 | +Vin (Vcc) | +Vin (Vcc) |
| 2 | -Vin (GND) | -Vin (GND) |
| 3 | +Vout | +Vout |
| 4 | -Vout | Common |
| 5 | Trim | -Vout |
| 6 | No pin*/Remote | No pin*/Remote |

*If remote is not selected there will be no pin.

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