

- Reinforced I/O-isolation 3000 VAC
- Shock and vibration resistance according to EN 61373
- Wide 4:1 input voltage range: 9-36, 18-75, 40-160 VDC
- Operating temperature range -40 to +90°C
- Internal EN 55032 class A filter
- High efficiency up to 89%
- Protection against overload, overvoltage and short circuit
- 3-year product warranty



The THR 10WI is 10 Watt DC/DC converters series with reinforced isolation (3000 VAC). These regulated DC/DC converters come in either a 2"x1" package and also feature increased resistance against shock and vibration according to EN 61373. The THR 3WI offers an internal input filter to comply with EN 55032 class A. High efficiencies up to 89% allow safe operation from -40°C to +90°C (with derating). All models have a wide 4:1 input voltage range and precisely regulated, isolated output voltages. With the latest IT safety certifications (IEC/EN/UL 62368-1) the THR 10WI series is the perfect choice for many demanding applications in the industrial, transportation and instrumentation sectors.

| Models | | | | | | |
|---------------|--------------------------------|----------|------------------|----------|------------------|-----------------|
| Order Code | Input Voltage Range | Output 1 | | Output 2 | | Efficiency typ. |
| | | Vnom | I _{max} | Vnom | I _{max} | |
| THR 10-2411WI | 9 - 36 VDC (24 VDC nom.) | 5 VDC | 2'000 mA | | | 84 % |
| THR 10-2412WI | | 12 VDC | 835 mA | | | 86 % |
| THR 10-2413WI | | 15 VDC | 670 mA | | | 87 % |
| THR 10-2415WI | | 24 VDC | 417 mA | | | 88 % |
| THR 10-2422WI | | +12 VDC | 417 mA | -12 VDC | 417 mA | 86 % |
| THR 10-2423WI | | +15 VDC | 335 mA | -15 VDC | 335 mA | 87 % |
| THR 10-4811WI | 18 - 75 VDC (48 VDC nom.) | 5 VDC | 2'000 mA | | | 85 % |
| THR 10-4812WI | | 12 VDC | 835 mA | | | 87 % |
| THR 10-4813WI | | 15 VDC | 670 mA | | | 87 % |
| THR 10-4815WI | | 24 VDC | 417 mA | | | 86 % |
| THR 10-4822WI | | +12 VDC | 417 mA | -12 VDC | 417 mA | 89 % |
| THR 10-4823WI | | +15 VDC | 335 mA | -15 VDC | 335 mA | 88 % |
| THR 10-7211WI | 40 - 160 VDC (110 VDC nom.) | 5 VDC | 2'000 mA | | | 82 % |
| THR 10-7212WI | | 12 VDC | 835 mA | | | 85 % |
| THR 10-7213WI | | 15 VDC | 670 mA | | | 85 % |
| THR 10-7215WI | | 24 VDC | 417 mA | | | 85 % |
| THR 10-7222WI | | +12 VDC | 417 mA | -12 VDC | 417 mA | 86 % |
| THR 10-7223WI | | +15 VDC | 335 mA | -15 VDC | 335 mA | 86 % |

| Options | |
|--|---|
| on demand (backorder with MOQ non stocking item) | - Optional models with alternative pinning - Optional models with heatsink |

Input Specifications

| | | |
|------------------------|----------------|--|
| Input Current | - At no load | 24 Vin models: 25 mA typ. 48 Vin models: 15 mA typ. 110 Vin models: 10 mA typ. |
| | - At full load | 24 Vin models: 484 mA typ. 48 Vin models: 240 mA typ. 110 Vin models: 107 mA typ. |
| Surge Voltage | | 24 Vin models: 50 VDC max. (100 ms max.) 48 Vin models: 100 VDC max. (100 ms max.) 110 Vin models: 170 VDC max. (100 ms max.) |
| Under Voltage Lockout | | 24 Vin models: 7.5 VDC typ. 48 Vin models: 16 VDC typ. 110 Vin models: 37 VDC typ. |
| Recommended Input Fuse | | (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% (single output models only) (By external trim resistor) See application note: www.tracopower.com/overview/thr10wi 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: 0.2% max. |
| | - Load Variation (0 - 100%) | single output models: 0.5% max. dual output models: 1% max. (Output 1) 1% max. (Output 2) |
| | - Voltage Balance (symmetrical load) | dual output models: 2% max. |
| Ripple and Noise (20 MHz Bandwidth) | - single output | 5 Vout models: 50 mVp-p typ. (w/ 10 µF, 25 V MLCC) 12 Vout models: 100 mVp-p typ. (w/ 10 µF, 25 V MLCC) 15 Vout models: 100 mVp-p typ. (w/ 10 µF, 25 V MLCC) 24 Vout models: 150 mVp-p typ. (w/ 4.7 µF, 50 V MLCC) |
| | - dual output | 12 / -12 Vout models: 100 / 100 mVp-p typ. (w/ 10 µF, 25 V MLCC) 15 / -15 Vout models: 100 / 100 mVp-p typ. (w/ 10 µF, 25 V MLCC) |
| Capacitive Load | - single output | 5 Vout models: 2'200 µF max. 12 Vout models: 330 µF max. 15 Vout models: 220 µF max. 24 Vout models: 100 µF max. |
| | - dual output | 12 / -12 Vout models: 150 / 150 µF max. 15 / -15 Vout models: 100 / 100 µF max. |
| Minimum Load | | Not required |
| Temperature Coefficient | | ±0.02 %/K max. |
| Start-up Time | | 50 ms typ. |
| Short Circuit Protection | | Continuous, Automatic recovery |
| Output Current Limitation | | 150% typ. of Iout max. |
| Oversvoltage Protection | | 125% typ. of Vout nom. |
| Transient Response | - Response Deviation | 3% typ. / 5% max. (75% to 100% Load Step) |
| | - Response Time | 300 µs max. (75% to 100% Load Step) |

Safety Specifications

| | | |
|------------------|-----------------------------|--|
| Safety Standards | - IT / Multimedia Equipment | EN 62368-1 IEC 62368-1 UL 62368-1 |
| | - Certification Documents | www.tracopower.com/overview/thr10wi |

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

EMC Specifications

| | | |
|---------------|-----------------------------|--|
| EMI Emissions | - Conducted Emissions | EN 55011 class A (internal filter) EN 55032 class A (internal filter) FCC Part 15 class A (internal filter) |
| | - Radiated Emissions | EN 55011 class A (with external filter) EN 55032 class A (with external filter) FCC Part 15 class A (with external filter) |
| EMS Immunity | - Electrostatic Discharge | EN 55024 (IT Equipment) Air: EN 61000-4-2, ± 8 kV, perf. criteria A Contact: EN 61000-4-2, ± 6 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: 390 μ F chemi-con KY 48 Vin models: 330 μ F chemi-con KY 110 Vin models: 220 μ F chemi-con KXG 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

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|--------------------------|---------------------------------|--|
| Relative Humidity | | 95% max. (non condensing) |
| Temperature Ranges | - Operating Temperature | -40°C to +90°C |
| | - Case Temperature | -40°C to +95°C (with Heat Sink) |
| | - Storage Temperature | +105°C max. -50°C to +125°C |
| Power Derating | - High Temperature | See application note: www.tracopower.com/overview/thr10wi |
| Cooling System | | Natural convection (20 LFM) |
| Remote Control | - Voltage Controlled Remote | On: 3.5 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 | 2.5 mA typ. |
| | - Remote Pin Input Current | -0.5 to 0.5 mA |
| Switching Frequency | | 280 kHz typ. (PWM) |
| Insulation System | | Reinforced Insulation |
| Working Voltage (rated) | | 250 VAC |
| Isolation Test Voltage | - Input to Output, 60 s | 3'000 VAC |
| | - Input to Case, 60 s | 1'500 VAC |
| | - Output to Case, 60 s | 1'500 VAC |
| Isolation Resistance | - Input to Output, 500 VDC | 1'000 M Ω min. |
| Isolation Capacitance | - Input to Output, 100 kHz, 1 V | 1'500 pF typ. |
| Reliability | - Calculated MTBF | 2'850'000 h (MIL-HDBK-217F, ground benign) |
| Environment | - Vibration | EN 61373 |
| | - Mechanical Shock | EN 61373 |
| Housing Material | | Red Copper, Powder Coating |
| Base Material | | Non-conductive FR4 (UL94 V-0 rated) |
| Isolation Frame Material | | Non-conductive black Plastic (UL94 V-0 rated) |
| Potting Material | | Epoxy (UL 94 V-0 rated) |
| Pin Material | | Copper Alloy (C6801) |
| Pin Foundation Plating | | Nickel (2 - 4 μ m) |
| Pin Surface Plating | | Tin (3 - 5 μ m), matte |
| Soldering Profile | | 260°C / 10 s max. |
| Connection Type | | THD (Through-Hole Device) |
| Weight | | 40.5 g |

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

| | |
|--|--|
| Thermal Impedance | 12.1 K/W 9.8 K/W (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 (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.) |

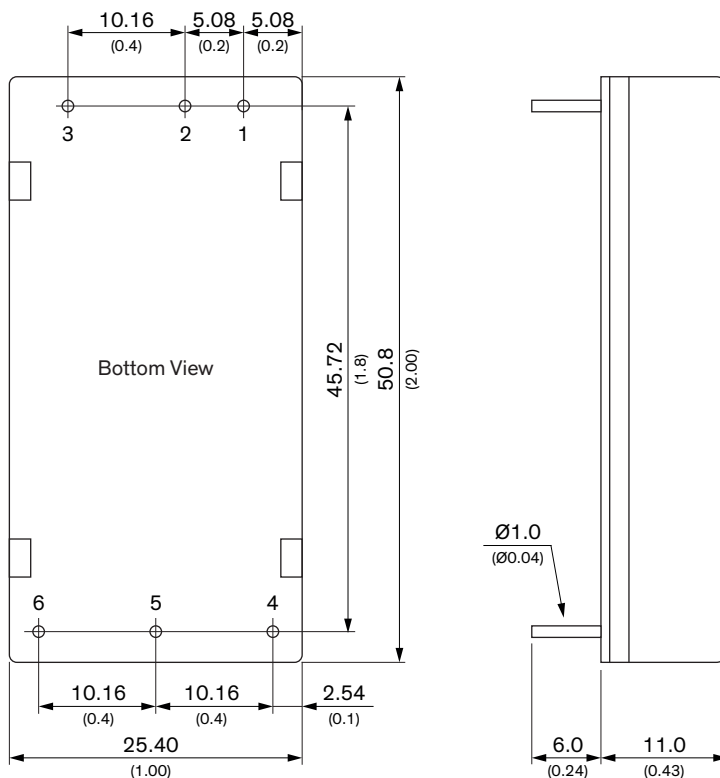
Supporting Documents

Overview Link (for additional Documents)

www.tracopower.com/overview/thr10wi

Outline Dimensions

Standard version

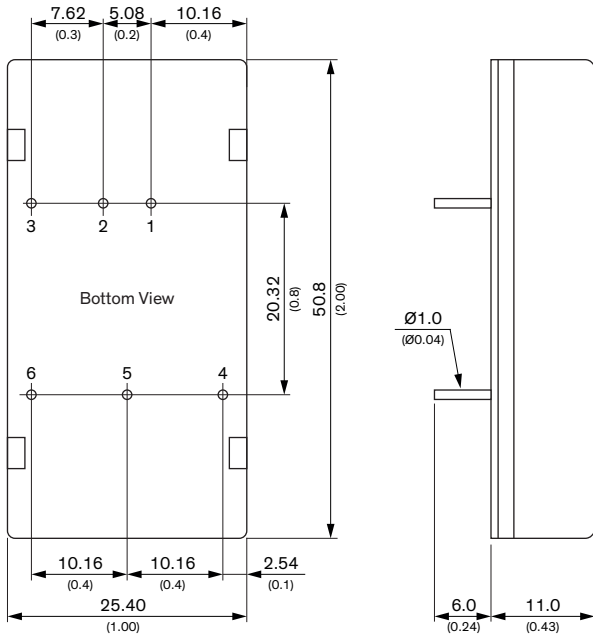


Dimensions in mm (inch)
 Tolerances: x.x ±0.75 (±0.03)
 x.xx ±0.25 (±0.01)
 Pin diameter ±0.05 (±0.002)

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

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

Alternative Pinning version



Dimensions in mm (inch)
 Tolerances: x.x ±0.75 (±0.03)
 x.xx ±0.25 (±0.01)
 Pin diameter ±0.05 (±0.002)

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

Heatsink version

