## DC/DC Converter

# THD 10WIN Series, 10 Watt

- **Ultra wide 4:1 input voltage range**
- **Internal EMI-filter meets EN 55032, Class A without external components**
- **High efficiency up to 87%**
- **Operating temperature range −40°C to +85°C**
- **I/O isolation 1'500 VDC**
- **Overload protection**
- **3-year product warranty**

UL 62368-1 IEC 62368-1

The THD 10WIN series is designed for an optimized cost/performance ratio of DC/DC converters with output power of 10 Watt. They come with an internal EMI-filter to meet EN 55032, class A without external components. General features like no minimum load requirement, overload protection and high efficiency make these converters easy to design in. With the popular DIP-24 standard package they are also a drop in replacement for many cost critical applications.

## Models

| Order Code | Input Voltage Range | Output 1 | | Output 2 | | Efficiency |
|---|---|---|---|---|---|---|
| | | Vnom | Imax | Vnom | Imax | typ. |
| **THD 10-2410WIN** | 9 - 36 VDC (24 VDC nom.) | 3.3 VDC | 2'700 mA | | | 86 % |
| **THD 10-2411WIN** | | 5.1 VDC | 2'000 mA | | | 85 % |
| **THD 10-2412WIN** | | 12 VDC | 833 mA | | | 87 % |
| **THD 10-2413WIN** | | 15 VDC | 666 mA | | | 87 % |
| **THD 10-2415WIN** | | 24 VDC | 416 mA | | | 87 % |
| **THD 10-2422WIN** | | +12 VDC | 416 mA | −12 VDC | 416 mA | 87 % |
| **THD 10-2423WIN** | | +15 VDC | 333 mA | −15 VDC | 333 mA | 87 % |
| **THD 10-4810WIN** | 18 - 75 VDC (48 VDC nom.) | 3.3 VDC | 2'700 mA | | | 86 % |
| **THD 10-4811WIN** | | 5.1 VDC | 2'000 mA | | | 85 % |
| **THD 10-4812WIN** | | 12 VDC | 833 mA | | | 87 % |
| **THD 10-4813WIN** | | 15 VDC | 666 mA | | | 87 % |
| **THD 10-4815WIN** | | 24 VDC | 416 mA | | | 87 % |
| **THD 10-4822WIN** | | +12 VDC | 416 mA | −12 VDC | 416 mA | 87 % |
| **THD 10-4823WIN** | | +15 VDC | 333 mA | −15 VDC | 333 mA | 87 % |

## Input Specifications

| | | | |
|---|---|---|---|
| Input Current | - At no load | 24 Vin models: | 30 mA typ. |
| | | 48 Vin models: | 20 mA typ. |
| | - At full load | 24 Vin models: | 470 mA typ. |
| | | 48 Vin models: | 240 mA typ. |
| Surge Voltage | | 24 Vin models: | 50 VDC max. (1 s max.) |
| | | 48 Vin models: | 100 VDC max. (1 s max.) |
| Start-up Voltage | | 24 Vin models: | 7 VDC min. / 8 VDC typ. / 9 VDC max. |
| | | 48 Vin models: | 14 VDC min. / 16 VDC typ. / 18 VDC max. |
| Under Voltage Lockout | | 24 Vin models: | 8.5 VDC max. |
| | | 48 Vin models: | 17 VDC max. |
| Reflected Ripple Current | | 24 Vin models: | 40 mAp-p typ. |
| | | 48 Vin models: | 30 mAp-p typ. |
| Recommended Input Fuse | | 24 Vin models: | 2'000 mA (slow blow) |
| | | 48 Vin models: | 1'000 mA (slow blow) |
| | | | (The need of an external fuse has to be assessed in the final application.) |
| Input Filter | | | Internal Pi-Type |

## Output Specifications

| | | | |
|---|---|---|---|
| Voltage Set Accuracy | | | ±2% max. |
| Regulation | - Input Variation (Vmin - Vmax) | single output models: | 1% max. |
| | | dual output models: | 1% max. |
| | - Load Variation (0 - 100%) | single output models: | 1.2% max. |
| | | dual output models: | 1.2% max. (Output 1) |
| | | | 1.2% max. (Output 2) |
| | - Voltage Balance (symmetrical load) | dual output models: | 2% max. |
| Ripple and Noise | - 20 MHz Bandwidth | | 100 mVp-p max. |
| Capacitive Load | - single output | 3.3 Vout models: | 1'000 µF max. |
| | | 5.1 Vout models: | 1'000 µF max. |
| | | 12 Vout models: | 470 µF max. |
| | | 15 Vout models: | 330 µF max. |
| | | 24 Vout models: | 150 µF max. |
| | - dual output | 12 / -12 Vout models: | 220 / 220 µF max. |
| | | 15 / -15 Vout models: | 150 / 150 µF max. |
| Minimum Load | | | Not required |
| Temperature Coefficient | | | ±0.02 %/K max. |
| Short Circuit Protection | | | Continuous, Automatic recovery |
| Output Current Limitation | | | 150% typ. of Iout max. |
| Transient Response | - Response Deviation | | 3% typ. / 5% max. (75% to 100% Load Step) |
| | - Response Time | | 300 µs typ. / 600 µs max. (75% to 100% Load Step) |

## Safety Specifications

| | | |
|---|---|---|
| Standards | - IT / Multimedia Equipment | CSA-C22.2, No. 60950-1 |
| | | EN 60950-1 |
| | | EN 62368-1 |
| | | IEC 60950-1 |
| | | IEC 62368-1 |
| | | UL 60950-1 |
| | | UL 62368-1 |
| | - Certification Documents | www.tracopower.com/overview/thd10win |
| Pollution Degree | | PD 2 |

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

## EMC Specifications

| | | | |
|---|---|---|---|
| EMI (Emissions) | - Conducted Emissions | | EN 55032 class A (internal filter) |
| EMS (Immunity) | | | EN 55024 (IT Equipment)<br>EN 55035 (Multimedia) |
| | - Electrostatic Discharge | 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<br>EN 61000-4-5, ±1 kV, perf. criteria A |
| | | Ext. input component: | 220 µF, 100 V |
| | - Conducted RF Disturbances | | EN 61000-4-6, 10 Vrms, perf. criteria A |

## General Specifications

| | | | |
|---|---|---|---|
| Relative Humidity | | | 95% max. (non condensing) |
| Temperature Ranges | - Operating Temperature | | –40°C to +85°C |
| | - Case Temperature | | +105°C max. |
| | - Storage Temperature | | –50°C to +125°C |
| Power Derating | - High Temperature | | 2.86 %/K above 70°C |
| | | See application note: | www.tracopower.com/overview/thd10win |
| Cooling System | | | Natural convection (20 LFM) |
| Remote Control | - Voltage Controlled Remote (passive = on) | | On: 3.5 to 12 VDC or open circuit<br>Off: 0 to 1.2 VDC or short circuit<br>Refers to 'Remote' and '-Vin' Pin |
| | - Off Idle Input Current | | 10 mA max. |
| | - Remote Pin Input Current | | -0.5 to 0.5 mA |
| Altitude During Operation | | | 6'000 m max. |
| Switching Frequency | | | 300 - 360 kHz (PWM)<br>330 kHz typ. (PWM) |
| Insulation System | | | Functional Insulation |
| Isolation Test Voltage | - Input to Output, 60 s | | 1'500 VDC |
| Isolation Resistance | - Input to Output, 500 VDC | | 1'000 MΩ min. |
| Isolation Capacitance | - Input to Output, 100 kHz, 1 V | | 1'000 pF typ.<br>1'500 pF max. |
| Reliability | - Calculated MTBF | | 1'000'000 h (MIL-HDBK-217F, ground benign) |
| Washing Process | | | According to Cleaning Guideline<br>www.tracopower.com/info/cleaning.pdf |
| Housing Material | | | Metal |
| Base Material | | | Non-conductive Plastic (UL 94 V-0 rated) |
| Potting Material | | | Silicone (UL 94 V-0 rated) |
| Pin Material | | | Copper Alloy (C6801) |
| Pin Foundation Plating | | | Nickel (2.5 µm min.) |
| Pin Surface Plating | | | Gold (75 - 125 nm), glossy |
| Housing Type | | | Metal Case |
| Mounting Type | | | PCB Mount |
| Connection Type | | | THD (Through-Hole Device) |
| Footprint Type | | | DIP24 |
| Soldering Profile | | | Lead-Free Wave Soldering<br>260°C / 10 s max. |
| Weight | | | 17.3 g |

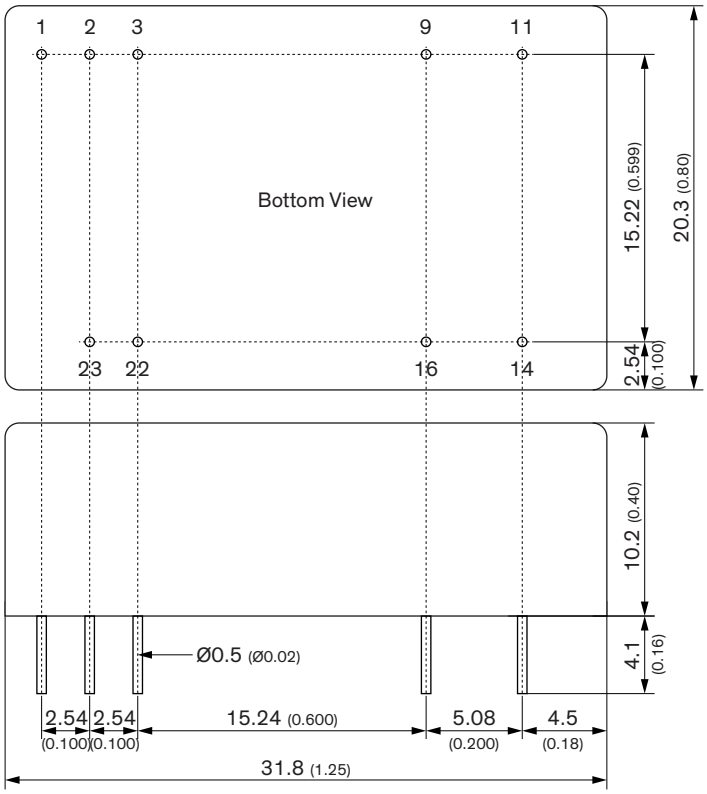
All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

| | | |
|---|---|---|
| Environmental Compliance | - REACH Declaration | www.tracopower.com/info/reach-declaration.pdf |
| | | REACH SVHC list compliant<br>REACH Annex XVII compliant |
| | - RoHS Declaration | www.tracopower.com/info/rohs-declaration.pdf |
| | | Exemptions: 7(a)<br>(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).) |
| | - SCIP Reference Number | b791aa3f-0104-4139-9ff5-537e1ec921bd |

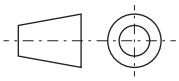
## Additional Information

| | |
|---|---|
| Supporting Documents | www.tracopower.com/overview/thd10win |
| Frequently Asked Questions | www.tracopower.com/glossary-faq |
| Glossary | www.tracopower.com/info/glossary.pdf |

## Outline Dimensions




Dimensions in mm (inch)
Tolerances: x.x ±0.50 (x.xx ±0.02)
Tolerances: x.xx ±0.25 (x.xxx ±0.01)
Pin diameter tolerance: x.x ±0.05 (x.xx ±0.002)



| Pinout | | |
|---|---|---|
| **Pin** | **Single** | **Dual** |
| **1** | Remote On/Off | Remote On/Off |
| **2** | –Vin (GND) | –Vin (GND) |
| **3** | –Vin (GND) | –Vin (GND) |
| **9** | No pin | Common |
| **11** | NC | –Vout |
| **14** | +Vout | +Vout |
| **16** | –Vout | Common |
| **22** | +Vin (Vcc) | +Vin (Vcc) |
| **23** | +Vin (Vcc) | +Vin (Vcc) |

NC: Not connected

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