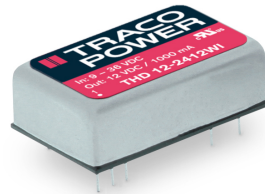


- Ultra-wide 4:1 input range
- High efficiency up to 85%
- I/O isolation 1500V
- Remote On/Off
- Under voltage lock-out circuit
- Shielded metal case with insulated Baseplate
- Continuous short-circuit protection
- Operating temp. range  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- 3-year product warranty



The THD 12WI series is a range of high performance, isolated 12W DC/DC converter modules featuring ultra wide 4:1 input voltage ranges in a DIP-24 package with industry-standard footprint. Overload and overvoltage protection as well as remote On/Off are included as standard. Built-in filters for both input and output minimizes the need of external filtering. Full SMD-design with exclusive use of ceramic capacitors guarantees a high reliability and long product lifetime. Typical applications for these converters are industrial electronics, instrumentation, data communication systems and battery operated equipment with limited space available on the PCB.

### Models

| Order Code    | Input Voltage Range          | Output 1 |                  | Output 2 |                  | Efficiency typ. |
|---------------|------------------------------|----------|------------------|----------|------------------|-----------------|
|               |                              | Vnom     | I <sub>max</sub> | Vnom     | I <sub>max</sub> |                 |
| THD 12-2410WI | 9 - 36 VDC<br>(24 VDC nom.)  | 3.3 VDC  | 3'500 mA         |          |                  | 84 %            |
| THD 12-2411WI |                              | 5.1 VDC  | 2'400 mA         |          |                  | 87 %            |
| THD 12-2412WI |                              | 12 VDC   | 1'000 mA         |          |                  | 87 %            |
| THD 12-2413WI |                              | 15 VDC   | 800 mA           |          |                  | 87 %            |
| THD 12-2421WI |                              | +5 VDC   | 1'200 mA         | -5 VDC   | 1'200 mA         | 84 %            |
| THD 12-2422WI |                              | +12 VDC  | 500 mA           | -12 VDC  | 500 mA           | 87 %            |
| THD 12-2423WI |                              | +15 VDC  | 400 mA           | -15 VDC  | 400 mA           | 87 %            |
| THD 12-4810WI | 18 - 75 VDC<br>(48 VDC nom.) | 3.3 VDC  | 3'500 mA         |          |                  | 84 %            |
| THD 12-4811WI |                              | 5.1 VDC  | 2'400 mA         |          |                  | 87 %            |
| THD 12-4812WI |                              | 12 VDC   | 1'000 mA         |          |                  | 87 %            |
| THD 12-4813WI |                              | 15 VDC   | 800 mA           |          |                  | 88 %            |
| THD 12-4821WI |                              | +5 VDC   | 1'200 mA         | -5 VDC   | 1'200 mA         | 85 %            |
| THD 12-4822WI |                              | +12 VDC  | 500 mA           | -12 VDC  | 500 mA           | 87 %            |
| THD 12-4823WI |                              | +15 VDC  | 400 mA           | -15 VDC  | 400 mA           | 87 %            |

## Input Specifications

|                        |                |  |
|------------------------|----------------|--|
| Input Current          | - At no load   | 24 Vin models: <b>55 mA typ.</b> (3.3 Vout model)<br><b>55 mA typ.</b> (5.1 Vout model)<br><b>15 mA typ.</b> (12 Vout model)<br><b>15 mA typ.</b> (15 Vout model)<br><b>15 mA typ.</b> (5 / -5 Vout model)<br><b>15 mA typ.</b> (12 / -12 Vout model)<br><b>15 mA typ.</b> (15 / -15 Vout model) |
|                        | - At full load | 48 Vin models: <b>20 mA typ.</b> (3.3 Vout model)<br><b>20 mA typ.</b> (5.1 Vout model)<br><b>7 mA typ.</b> (12 Vout model)<br><b>7 mA typ.</b> (15 Vout model)<br><b>7 mA typ.</b> (5 / -5 Vout model)<br><b>7 mA typ.</b> (12 / -12 Vout model)<br><b>7 mA typ.</b> (15 / -15 Vout model)      |
| Surge Voltage          |                | 24 Vin models: <b>50 VDC max.</b> (100 ms max.)<br>48 Vin models: <b>100 VDC max.</b> (100 ms max.)  |
| Under Voltage Lockout  |                | 24 Vin models: <b>7 VDC min. / 8 VDC typ. / 8.8 VDC max.</b><br>48 Vin models: <b>15 VDC min. / 16 VDC typ. / 17.5 VDC max.</b>  |
| Recommended Input Fuse |                | 24 Vin models: <b>2'500 mA</b> (slow blow)<br>48 Vin models: <b>1'250 mA</b> (slow blow)<br>(The need of an external fuse has to be assessed in the final application.)  |
| Input Filter           |                | <b>Internal Pi-Type</b>  |

## Output Specifications

|                           |  |  |
|---------------------------|--|--|
| Voltage Set Accuracy      |  | <b>±1.2% max.</b>  |
| Regulation                | - Input Variation (Vmin - Vmax)            | single output models: <b>0.2% max.</b><br>dual output models: <b>0.2% max.</b>   |
|                           | - Load Variation (0 - 100%)                | single output models: <b>0.5% max.</b><br>dual output models: <b>1% max.</b> (Output 1)<br><b>1% max.</b> (Output 2)                                       |
|                           | - Cross Regulation (25% / 100% asym. load) | dual output models: <b>5% max.</b>   |
| Ripple and Noise          | - 20 MHz Bandwidth                         | <b>85 mVp-p typ.</b>   |
| Capacitive Load           | - single output                            | 3.3 Vout models: <b>2'000 µF max.</b><br>5.1 Vout models: <b>2'000 µF max.</b><br>12 Vout models: <b>430 µF max.</b><br>15 Vout models: <b>300 µF max.</b> |
|                           | - dual output                              | 5 / -5 Vout models: <b>1'250 / 1'250 µF max.</b><br>12 / -12 Vout models: <b>200 / 200 µF max.</b><br>15 / -15 Vout models: <b>120 / 120 µF max.</b>       |
| Minimum Load              |  | <b>Not required</b>  |
| Temperature Coefficient   |  | <b>±0.02 %/K max.</b>  |
| Start-up Time             |  | <b>450 ms typ.</b> (Power On)<br><b>5 ms typ.</b> (Remote On)  |
|                           |  |  |
| Short Circuit Protection  |  | <b>Continuous, Automatic recovery</b>  |
| Output Current Limitation |  | <b>150% typ. of Iout max.</b>  |
| Overvoltage Protection    |  | <b>118 - 125% of Vout nom.</b><br>(depending on model)   |
|                           |  | <b>3.9 VDC typ.</b> (3.3 Vout models)  |
|                           |  | <b>6.2 VDC typ.</b> (5.1 Vout models)  |
|                           |  | <b>15 VDC typ.</b> (12 Vout models)<br><b>18 VDC typ.</b> (15 Vout models)   |

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

|                    |                      |  |
|--------------------|----------------------|--|
| Transient Response | - Response Deviation | 5% max. (75% to 100% Load Step)          |
|                    | - Response Time      | 250 $\mu$ s typ. (75% to 100% Load Step) |

### Safety Specifications

|                       |                             |  |
|-----------------------|-----------------------------|--|
| Safety Standards      | - IT / Multimedia Equipment | EN 60950-1<br>EN 62368-1<br>IEC 60950-1<br>IEC 62368-1<br>UL 60950-1<br>UL 62368-1           |
|                       | - Certification Documents   | <a href="http://www.tracopower.com/overview/thd12wi">www.tracopower.com/overview/thd12wi</a> |
| Pollution Degree      |                             | PD 2   |
| Over Voltage Category |                             | Not mains connected  |

### EMC Specifications

|               |                             |   |
|---------------|-----------------------------|---|
| EMI Emissions | - Conducted Emissions       | EN 55032 class A (with external filter)<br>EN 55032 class B (with external filter)                      |
|               | - Radiated Emissions        | EN 55032 class A (with external filter)<br>EN 55032 class B (with external filter)                      |
|               | External filter proposal:   | <a href="http://www.tracopower.com/overview/thd12wi">www.tracopower.com/overview/thd12wi</a>            |
| EMS Immunity  |                             | EN 55024 (IT Equipment)<br>EN 55035 (Multimedia)  |
|               | - Electrostatic Discharge   | Air: EN 61000-4-2, $\pm$ 8 kV, perf. criteria A<br>Contact: EN 61000-4-2, $\pm$ 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, $\pm$ 2 kV, perf. criteria A<br>EN 61000-4-5, $\pm$ 1 kV, perf. criteria A                |
|               | - Conducted RF Disturbances | Ext. input component: Nippon chemi-con KY 220 $\mu$ F, 100 V<br>EN 61000-4-6, 10 Vrms, perf. criteria A |
|               | - PF Magnetic Field         | Continuous: EN 61000-4-8, 100 A/m, perf. criteria A<br>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 +85°C   |
|                           | - Case Temperature              | +105°C max.  |
|                           | - Storage Temperature           | -55°C to +125°C  |
| Power Derating            | - High Temperature              | Depending on model   |
|                           | See application note:           | <a href="http://www.tracopower.com/overview/thd12wi">www.tracopower.com/overview/thd12wi</a>                 |
| Cooling System            |                                 | Natural convection (20 LFM)  |
| Remote Control            | - Voltage Controlled Remote     | On: 3.0 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        | 2.5 mA typ.  |
|                           | - Remote Pin Input Current      | -0.5 to 0.5 mA   |
| Altitude During Operation |                                 | 4'000 m max.   |
| Switching Frequency       |                                 | 360 - 440 kHz (PWM)<br>400 kHz typ. (PWM)  |
| Insulation System         |                                 | Functional Insulation  |
| Isolation Test Voltage    | - Input to Output, 60 s         | 1'600 VDC  |
|                           | - Input to Case, 60 s           | 1'600 VDC  |
|                           | - Output to Case, 60 s          | 1'600 VDC  |
| Isolation Resistance      | - Input to Output, 500 VDC      | 1'000 M $\Omega$ min.  |
| Isolation Capacitance     | - Input to Output, 100 kHz, 1 V | 1'500 pF max.  |
| Reliability               | - Calculated MTBF               | 2'090'000 h (MIL-HDBK-217F, ground benign)   |

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

|                          |  |  |
|--------------------------|--|--|
| Washing Process          |  | According to Cleaning Guideline<br><a href="http://www.tracopower.com/info/cleaning.pdf">www.tracopower.com/info/cleaning.pdf</a>  |
| Environment              | - Vibration<br>- Thermal Shock   | MIL-STD-810F<br>MIL-STD-810F   |
| Housing Material         |  | Copper, Nickel plated  |
| Base Material            |  | Non-conductive FR4 (UL 94 V-0 rated)   |
| Potting Material         |  | Epoxy (UL 94 V-0 rated)  |
| Pin Material             |  | Copper   |
| Pin Foundation Plating   |  | Nickel (2 - 3 µm)  |
| Pin Surface Plating      |  | Tin (3 - 5 µm), matte  |
| Housing Type             |  | Metal Case   |
| Mounting Type            |  | PCB Mount  |
| Connection Type          |  | THD (Through-Hole Device)  |
| Footprint Type           |  | DIP24  |
| Soldering Profile        |  | Lead-Free Wave Soldering<br>245°C / 10 s max.  |
| Weight                   |  | 18 g   |
| Thermal Impedance        | - Case to Ambient  | 20 K/W typ.  |
| Environmental Compliance | - REACH Declaration<br><br>- RoHS Declaration<br><br>- SCIP Reference Number | <a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a><br>REACH SVHC list compliant<br>REACH Annex XVII compliant<br><a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a><br>Exemptions: 7a, 7c-I<br>(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule))<br>952e6754-9097-4042-a284-2f13a33dbf55 |

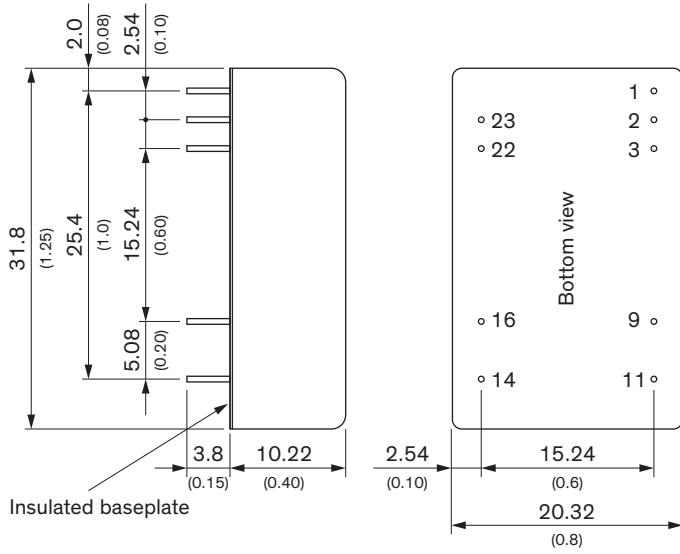
## Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/thd12wi](http://www.tracopower.com/overview/thd12wi)

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

**Outline Dimensions**



Dimensions in mm (inch)  
 Tolerances: x.x ±0.5 (±0.02)  
                   x.xx ±0.25 (±0.01)  
 Pin Ø 0.5 ±0.1 (0.02 ±0.004)

| Pinout |               |               |
|--------|---------------|---------------|
| Pin    | Single        | Dual          |
| 1      | Remote On/Off | Remote On/Off |
| 2      | -Vin (GND)    | -Vin (GND)    |
| 3      | -Vin (GND)    | -Vin (GND)    |
| 9      | NC            | Common        |
| 11     | NC            | -Vout         |
| 14     | +Vout         | +Vout         |
| 16     | -Vout         | Common        |
| 22     | +Vin (Vcc)    | +Vin (Vcc)    |
| 23     | +Vin (Vcc)    | +Vin (Vcc)    |

NC: Not connected