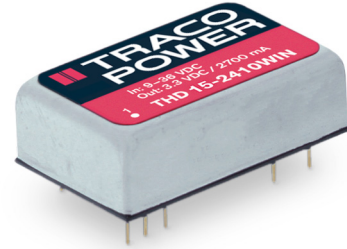


#### Features

- ◆ Highest power density in DIP 24 package
- ◆ Shielded metal case with isolated baseplate
- ◆ Very high efficiency up to 90%
- ◆ Ultra wide 4:1 input ranges
- ◆ No minimum load required
- ◆ Input filter meets EN 55022 class A without external components
- ◆ I/O isolation voltage 1500 VDC
- ◆ Operating temp. range : -40°C to +85°C
- ◆ Remote On/Off control
- ◆ Industry standard pinout
- ◆ 3-year product warranty



The THD-15WIN series models provide 15 Watt output power out of a very compact shielded metal case that occupies only 1 inch<sup>2</sup> of board space. The converters work with a high efficiency over the full load range and draw a very low input current at no load conditions. All models have a wide 4:1 input voltage range and a precisely regulated output voltage.

Typical applications for these converters are mobile equipment, instrumentation, distributed power architectures in communication and industrial electronics and everywhere where space on PCB is critical.

#### Models

| Order code     | Input voltage range | Output voltage | Output current max. | Efficiency typ. |
|----------------|---------------------|----------------|---------------------|-----------------|
| THD 15-2410WIN | 9 – 36 VDC          | 3.3 VDC        | 4'000 mA            | 88 %            |
| THD 15-2411WIN |                     | 5.1 VDC        | 3'000 mA            | 90 %            |
| THD 15-2412WIN |                     | 12 VDC         | 1'250 mA            | 90 %            |
| THD 15-2413WIN |                     | 15 VDC         | 1'000 mA            | 90 %            |
| THD 15-2421WIN |                     | ±5 VDC         | ±1'500 mA           | 86 %            |
| THD 15-2422WIN |                     | ±12 VDC        | ±625 mA             | 89 %            |
| THD 15-2423WIN |                     | ±15 VDC        | ±500 mA             | 90 %            |
| THD 15-4810WIN | 18 – 75 VDC         | 3.3 VDC        | 4'000 mA            | 89 %            |
| THD 15-4811WIN |                     | 5.1 VDC        | 3'000 mA            | 89 %            |
| THD 15-4812WIN |                     | 12 VDC         | 1'250 mA            | 90 %            |
| THD 15-4813WIN |                     | 15 VDC         | 1'000 mA            | 90 %            |
| THD 15-4821WIN |                     | ±5 VDC         | ±1'500 mA           | 86 %            |
| THD 15-4822WIN |                     | ±12 VDC        | ±625 mA             | 89 %            |
| THD 15-4823WIN |                     | ±15 VDC        | ±500 mA             | 90 %            |

## Input Specifications

|                                                    |                                                                                                                                                                                      |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input current at no load (nominal input voltage)   | 24 Vin models: 6 mA typ.<br>48 Vin models: 4 mA typ.                                                                                                                                 |
| Input current at full load (nominal input voltage) | 24 Vin models: 740 mA typ.<br>48 Vin models: 370 mA typ.                                                                                                                             |
| Start-up voltage / under voltage shut down         | 24 Vin models: 9 VDC / 8 VDC<br>48 Vin models: 18 VDC / 16 VDC                                                                                                                       |
| Surge voltage (1 sec. max.)                        | 24 Vin models: 50 V max.<br>48 Vin models: 100 V max.                                                                                                                                |
| Conducted noise (input)                            | EN 55022 class A, FCC part 15, level A<br>(without external components)<br>EN 55022 class B,<br>with external filter see Application note                                            |
| ESD (electrostatic discharge)                      | EN 61000-4-2, air $\pm 8$ kV, contact $\pm 6$ kV,<br>perf. criteria A                                                                                                                |
| Radiated immunity                                  | EN 61000-4-3 10 V/m, perf. criteria A                                                                                                                                                |
| Fast transient / Surge                             | EN 61000-4-4, $\pm 2$ kV, perf. criteria A<br>EN 61000-4-5, $\pm 2$ kV perf. criteria A<br>with external input capacitor e.g. Nippon<br>chemi-con KY 220 $\mu$ F, 100 V, ESR 48 mOhm |
| Conducted immunity                                 | EN 61000-4-6, 10 Vrms, perf. criteria A                                                                                                                                              |
| Reflected ripple current                           | 20 mA <sub>p-p</sub> typ.                                                                                                                                                            |

## Output Specifications

|                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Voltage set accuracy                                    | $\pm 1$ % max                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Regulation                                              | <div> <div>– Input variation</div> <div>single output models: 0.2 % max. (Vin min to Vin max.)<br/>dual output models: 0.5 % max. (Vin min to Vin max.)</div> </div> <div> <div>– Load variation 0 – 100%</div> <div>single output models: 0.5 % max.<br/>dual output models: 1.0 % max. balanced load</div> </div> <div> <div>– Load variation 10 – 90%</div> <div>single output models: 0.3 % max.<br/>dual output models: 0.8 % max. balanced load</div> </div> <div> <div>– Load cross regulation 25/100% (asymmetrical)</div> <div>5.0 % max. (dual output models)</div> </div> |
| Minimum load                                            | no minimum load                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Temperature coefficient                                 | $\pm 0.02$ %/K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Ripple and noise (20 MHz bandwidth)                     | 60 mV <sub>p-p</sub> typ. (with 1 $\mu$ F/25 V)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Output current limitation                               | at 150 % of I <sub>out</sub> max. hiccup                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Short circuit protection                                | continuous, automatic recovery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Over voltage protection (single output models only)     | 3.3 VDC models: 3.9 VDC<br>5.1 VDC models: 6.2 VDC<br>12 VDC models: 15 VDC<br>15 VDC models: 18 VDC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Start up time (nominal Vin and constant resistive load) | 60 ms typ. (for power on and remote on)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Transient response setting time (25% load step change)  | 250 $\mu$ s typ.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Capacitive load                                         | 3.3 VDC models: 4700 $\mu$ F max.<br>5.1 VDC models: 3300 $\mu$ F max.<br>12 VDC models: 600 $\mu$ F max.<br>15 VDC models: 400 $\mu$ F max.<br>$\pm 5$ VDC models: $\pm 1500$ $\mu$ F max.<br>$\pm 12$ VDC models: $\pm 288$ $\mu$ F max.<br>$\pm 15$ VDC models: $\pm 200$ $\mu$ F max.                                                                                                                                                                                                                                                                                            |

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

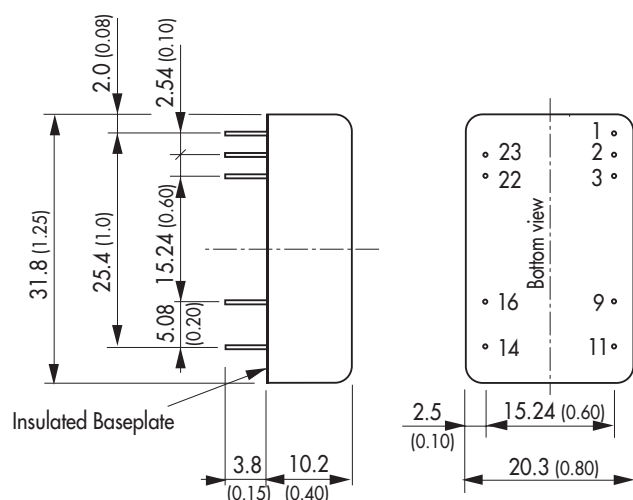
## General Specifications

|                                                                       |                                                                                                              |                                                                                                                                  |
|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Temperature ranges                                                    | <ul style="list-style-type: none"> <li>– Operating</li> <li>– Case temperature</li> <li>– Storage</li> </ul> | –40°C to +85°C (with derating)<br>+105°C max.<br>–55°C to +125°C                                                                 |
| Power derating                                                        | ±5 VDC models:<br>other models:                                                                              | 2.5 %/K above 60°C<br>3.3 %/K above 70°C                                                                                         |
| Thermal inpedance                                                     | – Natural convection                                                                                         | 20°K/W                                                                                                                           |
| Humidity (non condensing)                                             |                                                                                                              | 5 % to 95 % rel H max.                                                                                                           |
| Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign) |                                                                                                              | >1'600'000 h                                                                                                                     |
| Isolation voltage (60sec.)                                            | – Input/Output                                                                                               | 1'500 VDC                                                                                                                        |
| Isolation capacitance                                                 | – Input/Output                                                                                               | 2'000 pF typ.                                                                                                                    |
| Isolation resistance                                                  | – Input/Output (500 VDC)                                                                                     | >1'000 MOhm                                                                                                                      |
| Remote On/Off                                                         | <ul style="list-style-type: none"> <li>– On:</li> <li>– Off:</li> <li>– Off idle current:</li> </ul>         | 3.0 ... 12 VDC or open circuit<br>0 ... 1.2 VDC or short circuit pin 1 and pin 2<br>2.5 mA                                       |
| Altitude during operation                                             |                                                                                                              | 4'000 m max.                                                                                                                     |
| Switching frequency                                                   |                                                                                                              | 330 kHz typ. (pulse width modulation PWM)                                                                                        |
| Thermal shock, mechanical shock & vibration                           | – Test conditions                                                                                            | EN 61373, MIL-STD-810F<br><a href="http://www.tracopower.com/products/mil810.pdf">www.tracopower.com/products/mil810.pdf</a>     |
| Safety standards                                                      | – Certification documents                                                                                    | UL/cUL 60950-1, IEC/EN 60950-1<br><a href="http://www.tracopower.com/overview/thd15win">www.tracopower.com/overview/thd15win</a> |
| Environmental compliance                                              | <ul style="list-style-type: none"> <li>– Reach</li> <li>– RoHS</li> </ul>                                    | <a href="http://www.tracopower.com/overview/thd15win">www.tracopower.com/overview/thd15win</a><br>RoHS directive 2011/65/EU      |

## Physical Specifications

|                       |                          |
|-----------------------|--------------------------|
| Casing material       | nickel coated copper     |
| Baseplate             | non conductive FR4       |
| Potting material      | silicon (UL 94V-0 rated) |
| Weight                | 14.4 g (0.51oz)          |
| Soldering temperature | max. 265°C / 10sec.      |

## Outline Dimensions



### Pin-Out

| 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)    |

Dimensions in [mm], ( ) = Inch  
 Pin diameter  $\varnothing$  0.5 (0.02)  
 Pin pitch tolerances:  $\pm 0.35$  ( $\pm 0.014$ )  
 Tolerances:  $\pm 0.5$  ( $\pm 0.02$ )

Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at [www.tracopower.com](http://www.tracopower.com)

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