DC/DC Converter

THN 15WI Series, 15 Watt

- Smallest encapsulated 15 W Converter!
  Ultra compact size: 1.0” x 1.0” x 0.4”
- Shielded metal case with isolated baseplate
- Ultrawide 4:1 input ranges: 9-36 VDC or 18-75 VDC
- Output voltage Trim
- 5 Vout models with trim up to 6 VDC ideal for LDO applications
- I/O isolation voltage 1500 VDC
- Very high efficiency up to 87%
- Operating temp. range: −40°C to +85°C
- Remote On/Off control
- 3-year product warranty

The THN 15WI series is the latest generation of high performance DC/DC converter modules setting new standards concerning power density. This product with 15 W comes in a encapsulated, shielded metal package with dimensions of only 1.0” x 1.0” x 0.4” and occupies 50% (!) less board space. All models have ultra wide 4:1 input voltage range and precisely regulated output voltages. Advanced circuit design provides high efficiency up to 87% which allows an operating temperature range of −40°C to +85°C (with derating) Further features include remote On/Off and trimmable output. Typical applications for these converters are battery operated equipment, mobile instrumentation, distributed power architectures in communication and industrial electronics and everywhere where space on PCB is critical.

<table>
<thead>
<tr>
<th>Models</th>
<th>Input Voltage Range</th>
<th>Output 1</th>
<th>Output 2</th>
<th>Efficiency typ.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Vnom</td>
<td>Imax</td>
<td>Vnom</td>
</tr>
<tr>
<td>THN 15-2410WI</td>
<td>9 - 36 VDC</td>
<td>3.3 VDC</td>
<td>4’000 mA</td>
<td>−5 VDC</td>
</tr>
<tr>
<td>THN 15-2411WI</td>
<td></td>
<td>5 VDC</td>
<td>3’000 mA</td>
<td>−5 VDC</td>
</tr>
<tr>
<td>THN 15-2411WI-A1</td>
<td></td>
<td>5 VDC</td>
<td>3’000 mA</td>
<td>−5 VDC</td>
</tr>
<tr>
<td>THN 15-2412WI</td>
<td></td>
<td>12 VDC</td>
<td>1’300 mA</td>
<td>−5 VDC</td>
</tr>
<tr>
<td>THN 15-2413WI</td>
<td></td>
<td>15 VDC</td>
<td>1’000 mA</td>
<td>−5 VDC</td>
</tr>
<tr>
<td>THN 15-2415WI</td>
<td></td>
<td>24 VDC</td>
<td>625 mA</td>
<td>−5 VDC</td>
</tr>
<tr>
<td>THN 15-2421WI</td>
<td>9 - 36 VDC</td>
<td>+5 VDC</td>
<td>1’500 mA</td>
<td>−5 VDC</td>
</tr>
<tr>
<td>THN 15-2422WI</td>
<td></td>
<td>+12 VDC</td>
<td>625 mA</td>
<td>−12 VDC</td>
</tr>
<tr>
<td>THN 15-2423WI</td>
<td></td>
<td>+15 VDC</td>
<td>500 mA</td>
<td>−15 VDC</td>
</tr>
<tr>
<td>THN 15-2425WI</td>
<td></td>
<td>+24 VDC</td>
<td>315 mA</td>
<td>−24 VDC</td>
</tr>
<tr>
<td>THN 15-4810WI</td>
<td>18 - 75 VDC</td>
<td>3.3 VDC</td>
<td>4’000 mA</td>
<td>−5 VDC</td>
</tr>
<tr>
<td>THN 15-4811WI</td>
<td></td>
<td>5 VDC</td>
<td>3’000 mA</td>
<td>−5 VDC</td>
</tr>
<tr>
<td>THN 15-4811WI-A1</td>
<td></td>
<td>5 VDC</td>
<td>3’000 mA</td>
<td>−5 VDC</td>
</tr>
<tr>
<td>THN 15-4812WI</td>
<td></td>
<td>12 VDC</td>
<td>1’300 mA</td>
<td>−5 VDC</td>
</tr>
<tr>
<td>THN 15-4813WI</td>
<td></td>
<td>15 VDC</td>
<td>1’000 mA</td>
<td>−5 VDC</td>
</tr>
<tr>
<td>THN 15-4815WI</td>
<td></td>
<td>24 VDC</td>
<td>625 mA</td>
<td>−5 VDC</td>
</tr>
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<td>THN 15-4821WI</td>
<td>18 - 75 VDC</td>
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<tr>
<td>THN 15-4823WI</td>
<td></td>
<td>+15 VDC</td>
<td>500 mA</td>
<td>−15 VDC</td>
</tr>
<tr>
<td>THN 15-4825WI</td>
<td></td>
<td>+24 VDC</td>
<td>315 mA</td>
<td>−24 VDC</td>
</tr>
</tbody>
</table>

Options


Note
- Suffix -A1: Adjustable output up to 6 VDC, suitable for low ripple & noise applications in conjunction with an LDO regulator.
- ±24 Vout models: The output can also be used in serial circuit for single 48 VDC operation.

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### Input Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>- At no load</th>
<th>24 Vin models</th>
<th>48 Vin models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Current</td>
<td></td>
<td>45 mA typ.</td>
<td>20 mA typ.</td>
</tr>
<tr>
<td>Surge Voltage</td>
<td>24 Vin models</td>
<td>50 VDC max. (100 ms max.)</td>
<td>100 VDC max. (100 ms max.)</td>
</tr>
<tr>
<td>Under Voltage Lockout</td>
<td>24 Vin models</td>
<td>7 VDC min. / 8 VDC typ. / 8.8 VDC max.</td>
<td>14.5 VDC min. / 16 VDC typ. / 17.5 VDC max.</td>
</tr>
<tr>
<td>Reflected Ripple Current</td>
<td>24 Vin models</td>
<td>30 mA(p-p typ. (25% / 100% asym. load)</td>
<td>30 mA(p-p typ. (25% / 100% asym. load)</td>
</tr>
<tr>
<td>Recommended Input Fuse</td>
<td>24 Vin models</td>
<td>3'150 mA (slow blow)</td>
<td>1'600 mA (slow blow)</td>
</tr>
<tr>
<td>(The need of an external fuse has to be assessed in the final application)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Filter</td>
<td>Internal Pi-Type</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Output Specifications

**Output Voltage Adjustment**

<table>
<thead>
<tr>
<th>Voltage Set Accuracy</th>
<th>±1% max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulation</td>
<td></td>
</tr>
<tr>
<td>- Input Variation (Vmin - Vmax)</td>
<td></td>
</tr>
<tr>
<td>- Load Variation (0 - 100%)</td>
<td></td>
</tr>
<tr>
<td>- Cross Regulation (25% / 100% asym. load)</td>
<td></td>
</tr>
</tbody>
</table>

**Ripple and Noise (20 MHz Bandwidth)**

<table>
<thead>
<tr>
<th>- Single output</th>
<th>3.3 Vout models:</th>
<th>75 mVp-p typ. (w/ 1 µF X7R // 10 µF TC)</th>
<th>5 Vout models:</th>
<th>75 mVp-p typ. (w/ 1 µF X7R // 10 µF TC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Dual output</td>
<td>5 - -5 Vout models:</td>
<td>100/100 mVp-p typ. (w/ 1µF X7R // 10µF TC)</td>
<td>12/12 Vout models:</td>
<td>100/100 mVp-p typ. (w/ 1µF X7R // 10µF TC)</td>
</tr>
<tr>
<td>- Single output</td>
<td>3.3 Vout models:</td>
<td>12'000 µF max.</td>
<td>5 Vout models:</td>
<td>6'000 µF max.</td>
</tr>
<tr>
<td>- Dual output</td>
<td>5 - -5 Vout models:</td>
<td>3'000 / 3'000 µF max.</td>
<td>12/12 Vout models:</td>
<td>520 / 520 µF max.</td>
</tr>
</tbody>
</table>

**Capacitive Load**

<table>
<thead>
<tr>
<th>- Single output</th>
<th>3.3 Vout models:</th>
<th>12'000 µF max.</th>
<th>5 Vout models:</th>
<th>6'000 µF max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Dual output</td>
<td>5 - -5 Vout models:</td>
<td>3'000 / 3'000 µF max.</td>
<td>12/12 Vout models:</td>
<td>520 / 520 µF max.</td>
</tr>
</tbody>
</table>

**Minimum Load**

| - Not required |

**Temperature Coefficient**

| ±0.02 °C/K max. |

**Start-up Time**

| 30 ms max. |

**Short Circuit Protection**

| Continuous, Automatic recovery |

**Output Current Limitation**

| 135 - 204% of Iout max. | 150% typ. of Iout max. |

**Overvoltage Protection**

| 112 - 164% of Vout nom. |

**Transient Response**

| 250 µs typ. (25% Load Step) |

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

| Safety Standards | EN 60950-1  
|                 | IEC 60950-1  
|                 | UL 60950-1  
| Certification Documents | www.tracopower.com/overview/tn15wi  

| Pollution Degree | PD 2  
| Over Voltage Category | OVC I  

### EMC Specifications

| EMI Emissions | - Conducted Emissions  
|               | EN 55032 class A (with external filter)  
|               | EN 55032 class B (with external filter)  
|               | - Radiated Emissions  
|               | EN 55032 class A (with external filter)  
|               | EN 55032 class B (with external filter)  
| EMS Immunity | - 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  
|              | Ext. input component: 220 µf, 100 V  
|              | - EFT (Burst) / Surge  
|              | Ext. input component: 220 µf, 100 V  
|              | - Conducted RF Disturbances  
|              | Continuous: EN 61000-4-6, 3 Vrms, perf. criteria A  
|              | 1 s: EN 61000-4-8, 100 A/m, perf. criteria A  
|              | - PF Magnetic Field  

### General Specifications

| Relative Humidity | 95% max. (non condensing)  
| Temperature Ranges | - Operating Temperature  
|                   | −40°C to +85°C  
|                   | −40°C to +90°C (with Heat Sink)  
|                   | - Case Temperature  
|                   | +105°C max.  
|                   | - Storage Temperature  
|                   | −55°C to +125°C  
| Power Derating | - High Temperature  
|                | 2.5 %/K above 60°C  
|                | 2.9 %/K above 70°C (with Heat Sink)  
| Cooling System | Natural convection (20 LFM)  
| Remote Control | - Voltage Controlled Remote  
|                | Off: 0 to 1.2 VDC or short circuit  
|                | On: 3.0 to 15 VDC or open circuit  
|                | Refers to 'Remote' and '-Vin' Pin  
|                | - Off Idle Input Current  
|                | 2.5 mA typ.  
|                | - Remote Pin Input Current  
|                | −0.5 to 1.0 mA  
| Altitude During Operation | 2000 m max.  
| Switching Frequency | 360 - 440 kHz (PWM)  
|                    | 400 kHz typ. (PWM)  
| Insulation System | Functional Insulation  
| Isolation Test Voltage | - Input to Output, 60 s  
|                        | 1'500 VDC  
|                        | - Input to Case, 60 s  
|                        | 1'000 VDC  
|                        | - Output to Case, 60 s  
|                        | 1'000 VDC  
| Isolation Resistance | - Input to Output, 500 VDC  
|                       | 1'000 MΩ min.  
| Isolation Capacitance | - Input to Output, 100 kHz, 1 V  
|                       | 1'000 pF max.  
| Reliability | - Calculated MTBF  
|             | 1'400’000 h (MIL-HDBK-217F, ground benign)  
| Environment | - Vibration  
|              | - Thermal Shock  
|              | MIL-STD-810F  
|              | MIL-STD-810F  
| Housing Material | Nickel coated Copper  
| Base Material | Non-conductive FR4 (UL94 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  

All specifications valid at nominal voltage, full load and +25°C after warm-up time unless otherwise stated.
THN 15WI Series, 15 Watt

Soldering Profile
265°C / 10 s max.

Connection Type
THD (Through-Hole Device)

Weight
15 g

Thermal Impedance
18.2 K/W
15.8 K/W (with Heat Sink)

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/thn15wi

Outline Dimensions

Dimensions in mm (inch)
Tolerances: ±0.5 (±0.02)
Pin pitch tolerances ±0.25 (±0.01)
Pin diameter Ø 1.0 (0.04)