DC/DC Converter

THL 30WI Series, 30 Watt

- 30 Watt converter in a 1" x 1" metal package
- Cost efficient design
- Wide 4:1 input voltage range: 9-36 and 18-75 VDC
- Operating temperature range -40 to +60 °C without derating
- 1500 VDC I/O-isolation
- Protection against overload, overvoltage and short circuit
- Remote On/Off and Trim function
- Optional heatsink for increased temperature capabilities
- 3-year product warranty

The THL 30WI series extends Traco Power’s existing 30 Watt DC/DC converter portfolio with a new generation of 1" x 1" package converters. With the focus on combining cost efficiency and quality this isolated high performance 30 Watt DC/DC converter series is suitable for many different applications. The series comes in an encapsulated, shielded 1” x 1” x 0.4” metal package and offers integrated remote on/off and trim functions. High efficiency up to 88% enables the converter to operate from –40°C to +60°C without derating. All models have a wide 4:1 input voltage range and precisely regulated, isolated outputs. The series meets the latest IT safety certifications (UL 62368-1) and is suitable for uses in mobile equipment, instrumentation, distributed power architectures in communication and industrial electronics and everywhere where cost efficiency and quality are critical factors.

Models

<table>
<thead>
<tr>
<th>Order Code</th>
<th>Input Voltage Range</th>
<th>Vnom (Imax)</th>
<th>Output 1</th>
<th>Vnom (Imax)</th>
<th>Output 2</th>
<th>Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>THL 30-2410WI</td>
<td>9 - 36 VDC (24 VDC nom.)</td>
<td>3.3 VDC (7’000 mA)</td>
<td>5 VDC (6’000 mA)</td>
<td>12 VDC (2’500 mA)</td>
<td>15 VDC (2’000 mA)</td>
<td>24 VDC (1’250 mA)</td>
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<tr>
<td>THL 30-2411WI</td>
<td>9 - 36 VDC (24 VDC nom.)</td>
<td>3.3 VDC (7’000 mA)</td>
<td>5 VDC (6’000 mA)</td>
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Options


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## Input Specifications

**Input Current**
- At no load
  - 24 Vin models: 10 mA typ.
  - 48 Vin models: 8 mA typ.
- At full load
  - 24 Vin models: 1'106 mA typ. (3.3 Vout model)
  - 1'420 mA typ. (5 Vout model)
  - 1'420 mA typ. (12 Vout model)
  - 1'420 mA typ. (15 Vout model)
  - 1'420 mA typ. (24 Vout model)
  - 1'420 mA typ. (12 / -12 Vout model)
  - 1'400 mA typ. (15 / -15 Vout model)
  - 48 Vin models: 553 mA typ. (3.3 Vout model)
  - 702 mA typ. (5 Vout model)
  - 702 mA typ. (12 Vout model)
  - 702 mA typ. (15 Vout model)
  - 694 mA typ. (24 Vout model)
  - 694 mA typ. (12 / -12 Vout model)
  - 694 mA typ. (15 / -15 Vout model)

**Surge Voltage**
- 24 Vin models: 50 VDC max. (100 ms max)
- 48 Vin models: 100 VDC max. (100 ms max)

**Start-up Voltage**
- 24 Vin models: 8.4 VDC min. / 8.7 VDC typ. / 9 VDC max.
- 48 Vin models: 16.4 VDC min. / 17.2 VDC typ. / 18 VDC max.

**Under Voltage Lockout**
- 24 Vin models: 7.8 VDC min. / 8.1 VDC typ. / 8.4 VDC max.
- 48 Vin models: 15.5 VDC min. / 16 VDC typ. / 16.4 VDC max.

**Reflected Ripple Current**
- 30 mAp-p typ.

**Recommended Input Fuse**
- 24 Vin input
  - 3.3 Vout models: 4'500 mA (slow blow)
  - 5 Vout models: 6'500 mA (slow blow)
  - 12 Vout models: 6'500 mA (slow blow)
  - 15 Vout models: 6'500 mA (slow blow)
  - 24 Vout models: 6'500 mA (slow blow)
  + 12 / -12 Vout models: 6'500 mA (slow blow)
  + 15 / -15 Vout models: 6'500 mA (slow blow)
- 48 Vin input
  - 3.3 Vout models: 2'500 mA (slow blow)
  - 5 Vout models: 3'000 mA (slow blow)
  - 12 Vout models: 3'000 mA (slow blow)
  - 15 Vout models: 3'000 mA (slow blow)
  - 24 Vout models: 3'000 mA (slow blow)
  + 12 / -12 Vout models: 3'000 mA (slow blow)
  + 15 / -15 Vout models: 3'000 mA (slow blow)
  (The need of an external fuse has to be assessed in the final application.)

**Input Filter**
- Internal Pi-Type

## Output Specifications

**Output Voltage Adjustment**
±10% (single output models only)
(By external trim resistor)
[See application note: www.tracopower.com/overview/thl30wi](www.tracopower.com/overview/thl30wi)
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: 0.5% max.
- Load Variation (0 - 100%)
  - single output models: 0.2% max.
  - dual output models: 1% max. (Output 1)
  - 1% max. (Output 2)
- Voltage Balance (symmetrical load)
  - dual output models: 2% max.
- Cross Regulation (25% / 100% asym. load)
  - dual output models: 5% max.

All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.
# THL 30WI Series, 30 Watt

<table>
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<th>Specifications</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ripple and Noise</strong></td>
<td>- 20 MHz Bandwidth: 75 mVp-p max. (w/ 0.1 µF</td>
</tr>
</tbody>
</table>
| **Capacitive Load**            | - single output: 3.3 Vout models: 10'000 µF max.  
5 Vout models: 7'200 µF max.  
12 Vout models: 1'250 µF max.  
15 Vout models: 800 µF max.  
24 Vout models: 330 µF max.  
- dual output: 12 / -12 Vout models: 680 / 680 µF max.  
15 / -15 Vout models: 470 / 470 µF max. |
| **Minimum Load**               | Not required |
| **Temperature Coefficient**    | ±0.02 %/K max. |
| **Start-up Time**              | 30 ms max. |
| **Start-up Overshoot Voltage** | 5% max. |
| **Short Circuit Protection**   | Continuous, Automatic recovery |
| **Output Current Limitation**  | - Response Deviation: 3% typ. 7% / 5% max. (25% Load Step)  
- Response Time: 250 µs typ. (25% Load Step) |
| **Overvoltage Protection**    | 125% typ. of Vout nom. (By Zener diode) |
| **Transients**                 | - Response Deviation: 3% typ. 7% / 5% max. (25% Load Step)  
- Response Time: 250 µs typ. (25% Load Step) |

## Safety Specifications
- **Safety Standards**:  
  - IT / Multimedia Equipment: EN 62368-1  
  - Certification Documents: IEC 62368-1  
  - UL 62368-1  
  - www.tracopower.com/overview/thl30wi

## EMC Specifications
- **EMI Emissions**:  
  - Conducted Emissions: EN 55032 class A (with external filter)  
  - Radiated Emissions: EN 55032 class A (with external filter)  
  - External filter proposal: www.tracopower.com/overview/thl30wi

- **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:  
    - EFT (Burst) / Surge: EN 61000-4-4, ±2 kV, perf. criteria A  
    - EN 61000-4-5, ±2 kV, perf. criteria A  
  - Conducted RF Disturbances:  
    - Continuous: EN 61000-4-6, 10 Vrms, perf. criteria A  
    - 1 s: EN 61000-4-8, 1000 A/m, perf. criteria A  
  - PF Magnetic Field:  
    - Continuous: EN 61000-4-8, 1000 A/m, perf. criteria A  
  - External filter proposal: www.tracopower.com/overview/thl30wi

## General Specifications
- **Relative Humidity**: 95% max. (non condensing)
- **Temperature Ranges**:  
  - Operating Temperature: -40°C to +80°C  
  - Case Temperature: +105°C max.  
  - Storage Temperature: -55°C to +125°C
- **Power Derating**:  
  - High Temperature: 2.6 %/K above 65°C (average)  
  - 3 %/K above 70°C (average) (with Heat Sink)  
  - See application note: www.tracopower.com/overview/thl30wi
- **Cooling System**: Natural convection (20 LFM)

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

## THL 30WI Series, 30 Watt

### Remote Control
- Voltage Controlled Remote
  - Off Idle Input Current: 2 mA typ.
  - Remote Pin Input Current: -0.5 to 0.5 mA

### Altitude During Operation
- 6'000 m max.

### Switching Frequency
- On: 3.5 to 12 VDC or open circuit
- Off: 0 to 1.2 VDC or short circuit
- Refers to 'Remote' and '"Vin' Pin

### Insulation System
- Functional Insulation

### Isolation Test Voltage
- Input to Output, 60 s: 1'500 VDC
- Input to Output, 1 s: 1'800 VDC
- Input to Case, 60 s: 1'000 VDC

### Isolation Resistance
- Input to Output, 100 kHz, 1 V: 1'000 MΩ min.

### Isolation Capacitance
- Input to Output, 100 kHz, 1 V: 1'500 pF max.

### Reliability
- Calculated MTBF: 1'310'710 h (MIL-HDBK-217F, ground benign)

### Washing Process
- According to Cleaning Guideline
  www.tracopower.com/info/cleaning.pdf

### Environment
- Vibration: IEC 60068-2-64
  - 2.4 g, 3 axis, random waveform, 30 min
- Mechanical Shock: IEC 60068-2-27
  - 30 g, 3 axis, half sine, 11 ms
- Thermal Shock: IPC-9592B
  - -40 to +125°C, 100 cycles, 30 min each

### Housing Material
- Plastic base-plate w. metal case

### Base Material
- Non-conductive FR4 (UL 94 V-0 rated)

### Potting Material
- Silicone (UL 94 V-0 rated)

### Pin Material
- Copper

### Pin Foundation Plating
- Nickel (2 - 4 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
- 1" x 1"

### Soldering Profile
- Lead-Free Wave Soldering
  - 260°C / 10 s max.

### Weight
- 25 g

### Thermal Impedance
- Case to Ambient: 11 K/W typ.
- 10 K/W typ., (with Heat Sink)

### Environmental Compliance
- REACH Declaration
  - www.tracopower.com/info/reach-declaration.pdf
  - REACH SVHC list compliant
  - REACH Annex XVII compliant
  - 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))
    - 4857a92c-ac23-447a-b527-3f0812941172

### Supporting Documents

| Overview Link (for additional Documents) | www.tracopower.com/overview/thl30wi |

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)
Tolerance: X.X ±0.5 (X.XX ±0.02)
X.XX ±0.25 (X.XXX ±0.01)
Pin Diameter: ±0.05 (±0.002)

Pinout

<table>
<thead>
<tr>
<th>Pin</th>
<th>Single</th>
<th>Dual</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+Vin</td>
<td>+Vin</td>
</tr>
<tr>
<td>2</td>
<td>−Vin</td>
<td>−Vin</td>
</tr>
<tr>
<td>3</td>
<td>+Vout</td>
<td>+Vout</td>
</tr>
<tr>
<td>4</td>
<td>Trim</td>
<td>Common</td>
</tr>
<tr>
<td>5</td>
<td>−Vout</td>
<td>−Vout</td>
</tr>
<tr>
<td>6</td>
<td>Remote On/Off</td>
<td>Remot On/Off</td>
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