

- **Highest power density 30 W Converter!**
Ultra compact size: 1.0" x 1.0" x 0.4"
- **Shielded metal case with isolated baseplate**
- **Ultrawide 4:1 input voltage range**
- **Very high efficiency across full load range up to 92%**
- **Over temperature protection**
- **Operating temp. range: -40°C to +80°C and up to 85°C with heat sink**
- **Ultra low no load input current**
- **Remote On/Off control and output voltage adjustable**
- **I/O isolation voltage 1600 VDC**
- **3-year product warranty**



The THN 30WI series is the latest generation of high performance DC/DC converter modules with highest power density. The product achieves 30 W output power while it comes in a metal case with dimensions of only 1.0" x 1.0" x 0.4". All models have an ultra wide 4:1 input voltage range and precisely regulated output voltages, even under no load conditions. Highest efficiency across full load range makes this product very reliable and applicable in temperature ranges of up to 85°C. With a low input current at minimal load and remote On/Off control these converters are the ideal solution for battery-operated systems. Typical applications are in mobile equipments, instrumentation, distributed power architectures in communication and industrial electronics and everywhere where space on the PCB is critical.

| Models | | | | | | |
|------------------|-----------------------------|------------------------------|------------------|----------|------------------|-----------------|
| Order Code | Input Voltage Range | Output 1 | | Output 2 | | Efficiency typ. |
| | | Vnom | I _{max} | Vnom | I _{max} | |
| THN 30-2410WI | 9 - 36 VDC (24 VDC nom.) | 3.3 VDC | 7'000 mA | | | 88 % |
| THN 30-2411WI | | 5 VDC | 6'000 mA | | | 89 % |
| THN 30-2411WI-A1 | | 5 VDC | 6'000 mA | | | 88 % |
| THN 30-2412WI | | 12 VDC | 2'500 mA | | | 89 % |
| THN 30-2413WI | | 15 VDC | 2'000 mA | | | 89 % |
| THN 30-2415WI | | 24 VDC | 1'250 mA | | | 90 % |
| THN 30-2422WI | | +12 VDC | 1'250 mA | -12 VDC | 1'250 mA | 89 % |
| THN 30-2423WI | | +15 VDC | 1'000 mA | -15 VDC | 1'000 mA | 91 % |
| THN 30-2425WI | | +24 VDC | 625 mA | -24 VDC | 625 mA | 91 % |
| THN 30-4810WI | | 18 - 75 VDC (48 VDC nom.) | 3.3 VDC | 7'000 mA | | |
| THN 30-4811WI | 5 VDC | | 6'000 mA | | | 90 % |
| THN 30-4811WI-A1 | 5 VDC | | 6'000 mA | | | 89 % |
| THN 30-4812WI | 12 VDC | | 2'500 mA | | | 90 % |
| THN 30-4813WI | 15 VDC | | 2'000 mA | | | 91 % |
| THN 30-4815WI | 24 VDC | | 1'250 mA | | | 92 % |
| THN 30-4822WI | +12 VDC | | 1'250 mA | -12 VDC | 1'250 mA | 91 % |
| THN 30-4823WI | +15 VDC | | 1'000 mA | -15 VDC | 1'000 mA | 92 % |
| THN 30-4825WI | +24 VDC | | 625 mA | -24 VDC | 625 mA | 92 % |

| Options | |
|---------|--|
| THN-HS1 | - Optional Heat Sink: www.tracopower.com/products/thn-hs1.pdf |

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.

Input Specifications

| | | |
|--------------------------|--------------|---|
| Input Current | - At no load | 24 Vin models: 10 mA typ. 48 Vin models: 8 mA typ. |
| Surge Voltage | | 24 Vin models: 50 VDC max. (1 s max.) 48 Vin models: 100 VDC max. (1 s max.) |
| Under Voltage Lockout | | 24 Vin models: 7.5 VDC min. / 8 VDC typ. / 8.8 VDC max. 48 Vin models: 15.5 VDC min. / 16 VDC typ. / 17.5 VDC max. |
| Reflected Ripple Current | | 30 mA_{p-p} typ. |
| Recommended Input Fuse | | 24 Vin models: 6'000 mA (slow blow) 48 Vin 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% to +20% (A1, 15 & 24 Vout models) ±10% (other models) (By external trim resistor) See application note: www.tracopower.com/overview/thn30wi Output power must not exceed rated power! |
| Voltage Set Accuracy | | ±1% max. |
| Regulation | - Input Variation (Vmin - Vmax) - Load Variation (0 - 100%) - Cross Regulation (25% / 100% asym. load) | single output models: 0.2% max. dual output models: 0.5% max. single output models: 0.2% max. dual output models: 1% max. (Output 1) 1% max. (Output 2) dual output models: 5% max. |
| Ripple and Noise (20 MHz Bandwidth) | - single output - dual output | 3.3 Vout models: 75 mV_{p-p} typ. (w/ 22 µF, 25 V X7R) 5 Vout models: 75 mV_{p-p} typ. (w/ 22 µF, 25 V X7R) 12 Vout models: 75 mV_{p-p} typ. (w/ 2x 22 µF, 25 V X7R) 15 Vout models: 75 mV_{p-p} typ. (w/ 2x 22 µF, 25 V X7R) 24 Vout models: 75 mV_{p-p} typ. (w/ 2x 6.8 µF, 50 V X7R) 12 / -12 Vout models: 60 / 60 mV_{p-p} typ. (w/ 10 µF, 25 V X7R) 15 / -15 Vout models: 60 / 60 mV_{p-p} typ. (w/ 10 µF, 25 V X7R) 24 / -24 Vout models: 75 / 75 mV_{p-p} typ. (w/ 4.7 µF, 50 V X7R) |
| Capacitive Load | - single output - dual output | 3.3 Vout models: 10'000 µF max. 5 Vout models: 7'200 µF max. 12 Vout models: 1'200 µF max. 15 Vout models: 1'000 µF max. 24 Vout models: 375 µF max. 12 / -12 Vout models: 750 / 750 µF max. 15 / -15 Vout models: 500 / 500 µF max. 24 / -24 Vout models: 180 / 180 µF max. |
| Minimum Load | | Not required |
| Temperature Coefficient | | ±0.02 %/K max. |
| Start-up Time | | 30 ms max. |
| Short Circuit Protection | | Continuous, Automatic recovery |
| Output Current Limitation | | 150 - 205% of I_{out} max. 170% typ. of I_{out} max. |
| Overvoltage Protection | | 112 - 164% of V_{out} nom. |
| Transient Response | - Response Time | 250 µs typ. (25% Load Step) |

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

Safety Specifications

| | | |
|-----------------------|-----------------------------|--|
| Safety Standards | - IT / Multimedia Equipment | EN 60950-1 EN 62368-1 IEC 60950-1 IEC 62368-1 UL 60950-1 UL 62368-1 |
| | - Certification Documents | www.tracopower.com/overview/thn30wi |
| 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) |
| | External filter proposal: | www.tracopower.com/overview/thn30wi |
| 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 | EN 61000-4-3, 10 V/m, perf. criteria A |
| | - EFT (Burst) / Surge | EN 61000-4-4, ± 2 kV, perf. criteria A EN 61000-4-5, ± 2 kV, perf. criteria A |
| | - Conducted RF Disturbances | Ext. input component: 24 Vin models: 220 μ F, 100 V // TVS SMDJ58A 48 Vin models: 220 μ F, 100 V EN 61000-4-6, 10 Vrms, perf. criteria A |
| | - PF Magnetic Field | Continuous: EN 61000-4-8, 100 A/m, perf. criteria A 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 +80°C |
| | - Case Temperature | +105°C max. |
| | - Storage Temperature | -55°C to +125°C |
| Power Derating | - High Temperature | Depending on model Depending on model (with Heat Sink) |
| | | See application note: www.tracopower.com/overview/thn30wi |
| Over Temperature Protection Switch Off | - Protection Mode | 105°C min. / 130°C typ. / 115°C max. (Automatic recovery at 100°C typ.) |
| | - Measurement Point | Case |
| Cooling System | | Natural convection (20 LFM) |
| Remote Control | - Voltage Controlled Remote | On: 3.0 to 15 VDC or open circuit Off: 0 to 1.2 VDC or short circuit Refers to 'Remote' and '-Vin' Pin |
| | - Off Idle Input Current | 2 mA max. |
| | - Remote Pin Input Current | -0.5 to 1.0 mA |
| Altitude During Operation | | 5'000 m max. |
| Switching Frequency | | 275 kHz typ. (PWM) ($\pm 10\%$, 3.3 & 5 Vout model) 330 kHz typ. (PWM) ($\pm 10\%$, other models) |
| Insulation System | | Functional Insulation |
| Isolation Test Voltage | - Input to Output, 60 s | 1'600 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 M Ω min. |
| Isolation Capacitance | - Input to Output, 100 kHz, 1 V | 1'500 pF max. |
| Reliability | - Calculated MTBF | 1'200'000 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.

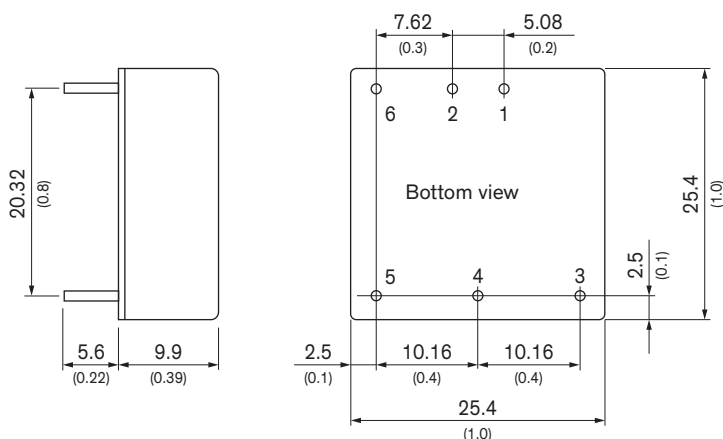
| | | |
|--------------------------|---|--|
| Washing Process | | Allowed (hermetical product) |
| | See Cleaning Guideline: | www.tracopower.com/info/cleaning.pdf |
| Environment | - Vibration - Thermal Shock | MIL-STD-810F MIL-STD-810F |
| Housing Material | | Copper |
| Base Material | | Non-conductive FR4 (UL 94 V-0 rated) |
| Potting Material | | Silicone (UL 94 V-0 rated) |
| Pin Material | | Copper |
| Pin Foundation Plating | | Nickel (2 - 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 | | 1" x 1" |
| Soldering Profile | | 265°C / 10 s max. |
| Weight | | 16.5 g |
| Thermal Impedance | - Case to Ambient | 15 K/W typ. 13.8 K/W typ. (with Heat Sink) |
| Environmental Compliance | - REACH Declaration - RoHS 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). The SCIP number is provided on request.) |

Supporting Documents

Overview Link (for additional Documents)

www.tracopower.com/overview/thn30wi

Outline Dimensions



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

| Pinout | | |
|--------|---------------|---------------|
| Pin | Single | Dual |
| 1 | +Vin (Vcc) | +Vin (Vcc) |
| 2 | -Vin (GND) | -Vin (GND) |
| 3 | +Vout | +Vout |
| 4 | Trim | Common |
| 5 | -Vout | -Vout |
| 6 | Remote On/Off | Remote On/Off |