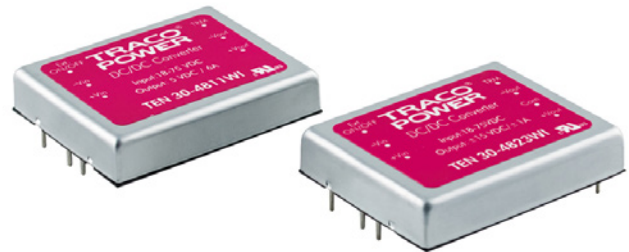


#### Features

- ◆ Ultra wide 4:1 input voltage range
- ◆ Single output voltage models from 1.8 to 15 VDC
- ◆ Dual output voltage models
- ◆ Extended operating temperature range: -40°C to 85°C
- ◆ Under voltage lockout
- ◆ Remote On/Off
- ◆ Shielded metal case with insulated baseplate
- ◆ Optional heatsink
- ◆ Lead free design - RoHS compliant
- ◆ 3-year product warranty



The TEN 30WI series is a family of high performance 30W dc-dc converters featuring ultra wide 4:1 input voltage ranges in a compact low profile package with industry-standard footprint. A very high efficiency allows operating temperatures up to 85°C. A built-in filter for both input and output minimizes the need for external filtering. Further standard features include remote On/Off, output voltage trimming, over voltage protection, under voltage lockout and short circuit protection. Typical applications for these products are battery operated equipment and distributed power architectures in communication and industrial electronics, everywhere where isolated, tightly regulated voltages are required and space is limited on the PCB.

#### Models

| Order code    | Input voltage range             | Output voltage | Output current max. | Efficiency typ. |
|---------------|---------------------------------|----------------|---------------------|-----------------|
| TEN 30-2408WI | 10 – 40 VDC<br>(nominal 24 VDC) | 1.8 VDC        | 8'000 mA            | 80 %            |
| TEN 30-2409WI |                                 | 2.5 VDC        | 8'000 mA            | 85 %            |
| TEN 30-2410WI |                                 | 3.3 VDC        | 6'000 mA            | 87 %            |
| TEN 30-2411WI |                                 | 5.0 VDC        | 6'000 mA            | 87 %            |
| TEN 30-2412WI |                                 | 12 VDC         | 2'500 mA            | 87 %            |
| TEN 30-2413WI |                                 | 15 VDC         | 2'000 mA            | 88 %            |
| TEN 30-2422WI |                                 | ±12 VDC        | ±1'250 mA           | 85 %            |
| TEN 30-2423WI |                                 | ±15 VDC        | ±1'000 mA           | 86 %            |
| TEN 30-4808WI | 18 – 75 VDC<br>(nominal 48 VDC) | 1.8 VDC        | 8'000 mA            | 81 %            |
| TEN 30-4809WI |                                 | 2.5 VDC        | 8'000 mA            | 86 %            |
| TEN 30-4810WI |                                 | 3.3 VDC        | 6'000 mA            | 87 %            |
| TEN 30-4811WI |                                 | 5.0 VDC        | 6'000 mA            | 88 %            |
| TEN 30-4812WI |                                 | 12 VDC         | 2'500 mA            | 87 %            |
| TEN 30-4813WI |                                 | 15 VDC         | 2'000 mA            | 88 %            |
| TEN 30-4822WI |                                 | ±12 VDC        | ±1'250 mA           | 86 %            |
| TEN 30-4823WI |                                 | ±15 VDC        | ±1'000 mA           | 87 %            |

## Input Specifications

|                                                                |                                                           |                                                                                |
|----------------------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------------------------------|
| <b>Input current at no load</b><br>(nominal input 24/48 Vin)   | 1.8 Vout models:<br>2.5/3.3 Vout models:<br>other models: | 35 / 20 mA typ.<br>40 / 25 mA typ.<br>70 / 45 mA typ.                          |
| <b>Input current at full load</b><br>(nominal input 24/48 Vin) | 1.8 Vout models:<br>2.5/3.3 Vout models:<br>other models: | 760 / 380 mA typ.<br>1030 / 510 mA typ.<br>1500 / 750 mA typ.                  |
| <b>Input voltage variation</b> (dv/dt)                         |                                                           | 5 V/ms, max.<br>(complies with ETS 300 132 part. 4.4)                          |
| <b>Start-up voltage / under voltage lockout</b>                | 24 Vin models:<br>48 Vin models:                          | 10 VDC / 8 VDC (typ.)<br>18 VDC / 16 VDC (typ.)                                |
| <b>Surge voltage</b> (100 msec. max.)                          | 24 Vin models:<br>48 Vin models:                          | 50 V max.<br>100 V max.                                                        |
| <b>Conducted noise</b> (input)                                 |                                                           | EN 55022 level A, FCC part 15, level A with<br>external capacitor (see note 1) |
| <b>ESD</b> (input)                                             |                                                           | EN 61000-4-2, perf. criteria B                                                 |
| <b>Fast transient</b> (input)                                  |                                                           | EN 61000-4-4, perf. criteria A                                                 |
| <b>Surge</b> (input)                                           |                                                           | EN 61000-4-5, perf. criteria B                                                 |

## Output Specifications

|                                                         |                                                                                                       |                                                                                                                                                      |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Voltage set accuracy                                    |                                                                                                       | ±1 %                                                                                                                                                 |
| Output voltage adjustment                               |                                                                                                       | ±10 %                                                                                                                                                |
| Regulation                                              | – Input variation Vin min. to Vin max.<br>– Load variation 10 – 100 %:                                | ±0.5 % max.<br>single output models: ±0.5 % max.<br>dual output models: ±1.0 % max. (balanced load)<br>±5 % max. (Load cross variation 25 % / 100 %) |
| Temperature coefficient                                 |                                                                                                       | ±0.02 %/K                                                                                                                                            |
| Ripple and noise (20 MHz Bandwidth):                    |                                                                                                       | 75 mVpk-pk max.                                                                                                                                      |
| Start up time (nominal Vin and constant resistive load) |                                                                                                       | 10 ms typ.                                                                                                                                           |
| Transient response setting time (25% load step change)  |                                                                                                       | 300 µs typ.                                                                                                                                          |
| Short circuit protection                                |                                                                                                       | indefinite (automatic recovery)                                                                                                                      |
| Over load protection                                    |                                                                                                       | 150 % of Iout max typ. foldback                                                                                                                      |
| Thermal shutdown                                        |                                                                                                       | at +115°C typ                                                                                                                                        |
| Over voltage protection                                 | 1.8, 2.5 & 3.3 V output models:<br>5.0 V output models:<br>12 V output models:<br>15 V output models: | 3.9 V<br>6.2 V<br>15 V<br>18 V                                                                                                                       |
| Minimum load (only for dual output models)              |                                                                                                       | 10% of rated max current (operation at lower load condition will not damage these converters, however, they may not meet all listed specifications)  |
| Capacitive load                                         | 1.8 / 2.5 Vout models:<br>3.3 / 5.0 Vout models:<br>12 / 15 Vout models:<br>±12 / ±15 Vout models:    | 65'000 µF max./ 33'000 µF max.<br>19'500 µF max./ 10'200 µF max.<br>3'300 µF max./ 1'100 µF max.<br>±1'000 µF max./ ±680 µF max. (per output)        |

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

## General Specifications

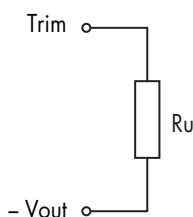
|                                                                       |                                                                                                              |                                                                                                                                                |
|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature ranges                                                    | <ul style="list-style-type: none"> <li>– Operating</li> <li>– Case temperature</li> <li>– Storage</li> </ul> | –40°C to +85°C<br>+100°C max.<br>–55°C to +105°C                                                                                               |
| Thermal impedance                                                     | <ul style="list-style-type: none"> <li>– with heat-sink TEN-HS2</li> <li>– without heat-sink</li> </ul>      | 8.24 K/Watt<br>10 K/Watt                                                                                                                       |
| Derating                                                              |                                                                                                              | <a href="http://www.tracopower.com/products/ten30wi-derating.pdf">www.tracopower.com/products/ten30wi-derating.pdf</a>                         |
| Humidity (non condensing)                                             |                                                                                                              | 95 % rel H max.                                                                                                                                |
| Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign) |                                                                                                              | >750'000 h                                                                                                                                     |
| Isolation voltage (60sec.)                                            | – Input / Output                                                                                             | 1'500 VDC                                                                                                                                      |
| Isolation resistance                                                  | – Input / Output                                                                                             | >1'000 M Ohm                                                                                                                                   |
| Isolation capacitance                                                 | – Input / Output                                                                                             | 1000 pF max.                                                                                                                                   |
| Remote On/Off                                                         | <ul style="list-style-type: none"> <li>– On:</li> <li>– Off:</li> <li>– Off idle current:</li> </ul>         | 3.5 ... 12 VDC or open circuit.<br>0 ... 1.2 VDC or short circuit pin 3 and pin 2<br>3 mA typ.                                                 |
| Switching frequency                                                   |                                                                                                              | 300 kHz typ. (pulse width modulation PWM)                                                                                                      |
| Vibration                                                             |                                                                                                              | 10–55 Hz, 2G, 30 minutes along X,Y,Z                                                                                                           |
| Safety standards                                                      |                                                                                                              | UL 60950, IEC/EN 60950, compliance up to 60 VDC input voltage (SELV limit)                                                                     |
| Safety approvals                                                      | – UL/cUL                                                                                                     | <a href="http://www.ul.com">www.ul.com</a> > UL File no.: e188913                                                                              |
| Environmental compliance                                              | <ul style="list-style-type: none"> <li>– Reach</li> <li>– RoHS</li> </ul>                                    | <a href="http://www.tracopower.com/products/ten30wi-reach.pdf">www.tracopower.com/products/ten30wi-reach.pdf</a><br>RoHS directive 20011/65/EU |

### Note 1:

In order to meet conducted emissions EN55022-A and EN55011-A a capacitor between +Vin and -Vin has to be installed. The capacitor should be capable to handle 1 A ripple current. A suggestion is KMF Series of Nippon chemi-con, 220µF/100V, ESR 90mOhm.

## Output Voltage Adjustment

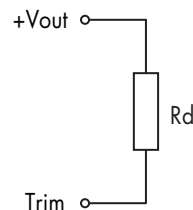
### Trim up



Ru [kohm]\*

| output | 1.8V  | 2.5V | 3.3V | 5.0V |
|--------|-------|------|------|------|
| +5%    | 1.2   | 4.3  | 6.8  | 4.7  |
| +10%   | 0.068 | 0.82 | 1.5  | 0.56 |
| output | 12V   | 15V  | ±12V | ±15V |
| +5%    | 47    | 47   | 27   | 33   |
| +10%   | 8.2   | 6.8  | 2.2  | 2.7  |

### Trim down



Rd [kohm]\*

| output | 1.8V | 2.5V | 3.3V | 5.0V |
|--------|------|------|------|------|
| –5%    | 1.8  | 6.8  | 8.2  | 5.6  |
| –10%   | 0.1  | 0.82 | 0.68 | 0.68 |
| output | 12V  | 15V  | ±12V | ±15V |
| –5%    | 56   | 56   | 33   | 39   |
| –10%   | 5.6  | 2.2  | 2.7  | 3.3  |

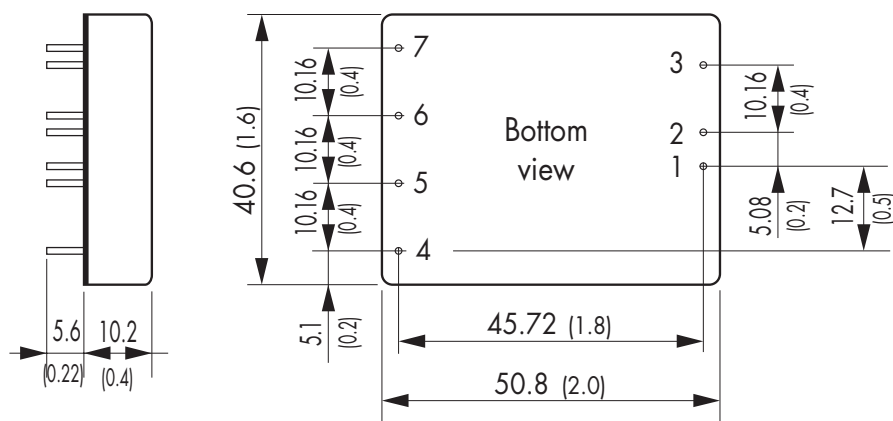
\*approximate values

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

## Physical Specifications

|                       |                         |
|-----------------------|-------------------------|
| Casing material       | copper, nickel plated   |
| Baseplate material    | none conductive FR4     |
| Potting material      | epoxy (UL 94V-0 -rated) |
| Weight                | 48 g (1.69 oz)          |
| Soldering temperature | max. 265°C / 10 sec.    |

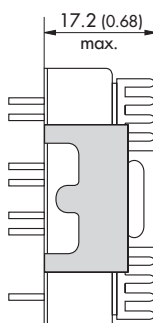
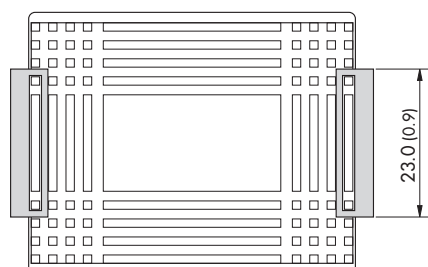
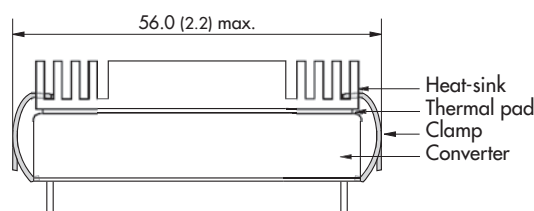
## Outline Dimensions



| Pin-Out |               |            |
|---------|---------------|------------|
| Pin     | Single        | Dual       |
| 1       | +Vin (Vcc)    | +Vin (Vcc) |
| 2       | -Vin (GND)    | -Vin (GND) |
| 3       | Remote On/Off |            |
| 4       | No pin        | +Vout      |
| 5       | +Vout         | Common     |
| 6       | -Vout         | -Vout      |
| 7       | Trim          |            |

Dimensions in [mm], ( ) = Inch  
Pin diameter: 1.0 ±0.05 (0.02 ±0.002)  
Pin pitch tolerances: ±0.35 (±0.014)  
Case tolerances: ±0.5 (±0.02)

## Heat-sink TEN-HS2



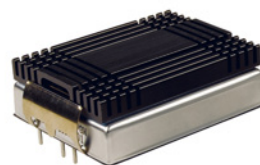
**Order code:** TEN-HS2

(cont.: heat-sink, thermal pad, 2 clamps)

**Material:** Aluminum

**Finish:** Anodic treatment (black)

**Weight:** 19 g (0.67oz) (without converter)



3D step file: [www.tracopower.com/products/ten30wi-3d.stp](http://www.tracopower.com/products/ten30wi-3d.stp)

### Note:

The product label on converter has to be removed before mounting the heat-sink. For volume orders converters will be supplied with heat-sinks already mounted. Please contact factory for quotation. Separate heat-sinks are only available for prototypes and small quantity orders.