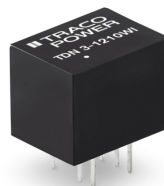


## DC/DC Converter

## TDN 3WI Series, 3 Watt

- Ultra compact DIP package  
13.2 x 9.1 x 10.2 mm
- I/O-isolation 1'600 VDC
- Fully regulated outputs
- Operating temperature range  
-40°C to +70°C without derating
- Short circuit protection
- Remote On/Off
- Designed to meet IEC/EN/UL 62368-1  
(not certified)
- 3-year product warranty



The TDN 3WI Series comprises 3 Watt fully regulated, high performance DC/DC converters. They come in a compact cubical package of only 1.23 cm<sup>3</sup>. Full load operation is reliable up to 70°C environment temperature. With 1'600 VDC I/O-isolation voltage, external On/Off, and short current protection they cover a wide range of application when space is limited. The input of the converters is designed for a wide voltage range (4:1) and minimum load is not required.

The functional I/O-isolation system is designed to meet IEC/EN/UL 62368-1 (not certified) with a test voltage (60 s) of 1'600 VDC.

| Models       |                               |          |                  |          |                  |                 |
|--------------|-------------------------------|----------|------------------|----------|------------------|-----------------|
| Order Code   | Input Voltage Range           | Output 1 |                  | Output 2 |                  | Efficiency typ. |
|              |                               | Vnom     | I <sub>max</sub> | Vnom     | I <sub>max</sub> |                 |
| TDN 3-1210WI | 4.5 - 18 VDC<br>(12 VDC nom.) | 3.3 VDC  | 700 mA           |          |                  | 76 %            |
| TDN 3-1211WI |                               | 5 VDC    | 600 mA           |          |                  | 80 %            |
| TDN 3-1219WI |                               | 9 VDC    | 333 mA           |          |                  | 81 %            |
| TDN 3-1212WI |                               | 12 VDC   | 250 mA           |          |                  | 83 %            |
| TDN 3-1213WI |                               | 15 VDC   | 200 mA           |          |                  | 84 %            |
| TDN 3-1215WI |                               | 24 VDC   | 125 mA           |          |                  | 82 %            |
| TDN 3-1221WI |                               | +5 VDC   | 300 mA           | -5 VDC   | 300 mA           | 80 %            |
| TDN 3-1222WI |                               | +12 VDC  | 125 mA           | -12 VDC  | 125 mA           | 82 %            |
| TDN 3-1223WI |                               | +15 VDC  | 100 mA           | -15 VDC  | 100 mA           | 82 %            |
| TDN 3-2410WI | 9 - 36 VDC<br>(24 VDC nom.)   | 3.3 VDC  | 700 mA           |          |                  | 77 %            |
| TDN 3-2411WI |                               | 5 VDC    | 600 mA           |          |                  | 80 %            |
| TDN 3-2419WI |                               | 9 VDC    | 333 mA           |          |                  | 81 %            |
| TDN 3-2412WI |                               | 12 VDC   | 250 mA           |          |                  | 83 %            |
| TDN 3-2413WI |                               | 15 VDC   | 200 mA           |          |                  | 83 %            |
| TDN 3-2415WI |                               | 24 VDC   | 125 mA           |          |                  | 82 %            |
| TDN 3-2421WI |                               | +5 VDC   | 300 mA           | -5 VDC   | 300 mA           | 80 %            |
| TDN 3-2422WI |                               | +12 VDC  | 125 mA           | -12 VDC  | 125 mA           | 82 %            |
| TDN 3-2423WI |                               | +15 VDC  | 100 mA           | -15 VDC  | 100 mA           | 82 %            |
| TDN 3-4810WI | 18 - 75 VDC<br>(48 VDC nom.)  | 3.3 VDC  | 700 mA           |          |                  | 77 %            |
| TDN 3-4811WI |                               | 5 VDC    | 600 mA           |          |                  | 80 %            |
| TDN 3-4819WI |                               | 9 VDC    | 333 mA           |          |                  | 81 %            |
| TDN 3-4812WI |                               | 12 VDC   | 250 mA           |          |                  | 83 %            |
| TDN 3-4813WI |                               | 15 VDC   | 200 mA           |          |                  | 83 %            |
| TDN 3-4815WI |                               | 24 VDC   | 125 mA           |          |                  | 82 %            |
| TDN 3-4821WI |                               | +5 VDC   | 300 mA           | -5 VDC   | 300 mA           | 80 %            |
| TDN 3-4822WI |                               | +12 VDC  | 125 mA           | -12 VDC  | 125 mA           | 82 %            |
| TDN 3-4823WI |                               | +15 VDC  | 100 mA           | -15 VDC  | 100 mA           | 82 %            |

## Input Specifications

|                          |              |                                                                                                                                                                                              |
|--------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Current            | - At no load | 12 Vin models: 40 mA typ.<br>24 Vin models: 24 mA typ.<br>48 Vin models: 13 mA typ.                                                                                                          |
| Surge Voltage            |              | 12 Vin models: 25 VDC max. (1 s max.)<br>24 Vin models: 50 VDC max. (1 s max.)<br>48 Vin models: 100 VDC max. (1 s max.)                                                                     |
| Reflected Ripple Current |              | 20 mAp-p typ.                                                                                                                                                                                |
| Recommended Input Fuse   |              | 12 Vin models: 1'600 mA (slow blow)<br>24 Vin models: 800 mA (slow blow)<br>48 Vin models: 500 mA (slow blow)<br>(The need of an external fuse has to be assessed in the final application.) |
| Input Filter             |              | Internal Capacitor                                                                                                                                                                           |

## Output Specifications

|                          |                                                                                                              |                                                                                                                                                                                                                                                                                                                                    |
|--------------------------|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Voltage Set Accuracy     |                                                                                                              | ±1% max.                                                                                                                                                                                                                                                                                                                           |
| Regulation               | - Input Variation (Vmin - Vmax)<br>- Load Variation (0 - 100%)<br>- Cross Regulation (25% / 100% asym. load) | single output models: 0.2% max.<br>dual output models: 0.2% max.<br>single output models: 1% max.<br>dual output models: 1% max. (Output 1)<br>1% max. (Output 2)<br>dual output models: 5% max.                                                                                                                                   |
| Ripple and Noise         | - 20 MHz Bandwidth                                                                                           | 50 mVp-p typ.                                                                                                                                                                                                                                                                                                                      |
| Capacitive Load          | - single output<br><br><br><br><br><br>- dual output                                                         | 3.3 Vout models: 4'700 µF max.<br>5 Vout models: 2'530 µF max.<br>9 Vout models: 1'470 µF max.<br>12 Vout models: 1'220 µF max.<br>15 Vout models: 1'000 µF max.<br>24 Vout models: 470 µF max.<br>5 / -5 Vout models: 1'470 / 1'470 µF max.<br>12 / -12 Vout models: 680 / 680 µF max.<br>15 / -15 Vout models: 470 / 470 µF max. |
| Minimum Load             |                                                                                                              | Not required                                                                                                                                                                                                                                                                                                                       |
| Temperature Coefficient  |                                                                                                              | ±0.02 %/K max.                                                                                                                                                                                                                                                                                                                     |
| Start-up Time            |                                                                                                              | 10 ms typ. / 20 ms max.                                                                                                                                                                                                                                                                                                            |
| Short Circuit Protection |                                                                                                              | Continuous, Automatic recovery                                                                                                                                                                                                                                                                                                     |
| Transient Response       | - Response Time                                                                                              | 500 µs typ. (25% Load Step)                                                                                                                                                                                                                                                                                                        |

## Safety Specifications

|           |                             |                                                |
|-----------|-----------------------------|------------------------------------------------|
| Standards | - IT / Multimedia Equipment | Designed for IEC/EN/UL 62368-1 (not certified) |
|-----------|-----------------------------|------------------------------------------------|

## EMC Specifications

|                           |                                                   |                                                                                                                                                                          |
|---------------------------|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EMI Emissions             | - Conducted Emissions<br><br>- Radiated Emissions | EN 55032 class A (with external filter)<br>EN 55032 class B (with external filter)<br>EN 55032 class A (with external filter)<br>EN 55032 class B (with external filter) |
| External filter proposal: |                                                   | <a href="http://www.tracopower.com/overview/tdn3wi">www.tracopower.com/overview/tdn3wi</a>                                                                               |

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

|              |                             |                       |                                            |
|--------------|-----------------------------|-----------------------|--------------------------------------------|
| EMS Immunity | - Electrostatic Discharge   | Air:                  | EN 61000-4-2, $\pm 8$ kV, perf. criteria A |
|              |                             | Contact:              | EN 61000-4-2, $\pm 6$ kV, perf. criteria A |
|              | - RF Electromagnetic Field  |                       | EN 61000-4-3, 10 V/m, perf. criteria A     |
|              | - EFT (Burst) / Surge       |                       | EN 61000-4-4, $\pm 2$ kV, perf. criteria A |
|              |                             |                       | EN 61000-4-5, $\pm 1$ kV, perf. criteria A |
|              |                             | Ext. input component: | KY 220 $\mu$ F, 100 V                      |
|              | - Conducted RF Disturbances |                       | 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 +70°C (without derating)                                                                                                                |
|                          | - Case Temperature                         | +105°C max.                                                                                                                                      |
|                          | - Storage Temperature                      | -55°C to +125°C                                                                                                                                  |
| Power Derating           | - High Temperature                         | 2.86 %/K above 70°C                                                                                                                              |
|                          | See application note:                      | <a href="http://www.tracopower.com/overview/tdn3wi">www.tracopower.com/overview/tdn3wi</a>                                                       |
| Cooling System           |                                            | Natural convection (20 LFM)                                                                                                                      |
| Remote Control           | - Current Controlled Remote (passive = on) | On: open circuit                                                                                                                                 |
|                          |                                            | Off: 2 to 4 mA current (no internal resistor)                                                                                                    |
|                          |                                            | Refers to 'Remote' and '-Vin' Pin                                                                                                                |
|                          | External circuit proposal:                 | <a href="http://www.tracopower.com/info/current-remote.pdf">www.tracopower.com/info/current-remote.pdf</a>                                       |
|                          | - Off Idle Input Current                   | 2.5 mA max.                                                                                                                                      |
| Regulator Topology       |                                            | RCC Converter                                                                                                                                    |
| Switching Frequency      |                                            | 100 kHz min. (PFM)                                                                                                                               |
| Insulation System        |                                            | Functional Insulation                                                                                                                            |
| Isolation Test Voltage   | - Input to Output, 60 s                    | 1'600 VDC                                                                                                                                        |
| Isolation Resistance     | - Input to Output, 500 VDC                 | 1'000 M $\Omega$ min.                                                                                                                            |
| Isolation Capacitance    | - Input to Output, 100 kHz, 1 V            | 50 pF max.                                                                                                                                       |
| Reliability              | - Calculated MTBF                          | 5'630'000 h (MIL-HDBK-217F, ground benign)                                                                                                       |
| Washing Process          |                                            | According to Cleaning Guideline                                                                                                                  |
|                          |                                            | <a href="http://www.tracopower.com/info/cleaning.pdf">www.tracopower.com/info/cleaning.pdf</a>                                                   |
| Environment              | - Vibration                                | MIL-STD-810F                                                                                                                                     |
|                          | - Thermal Shock                            | MIL-STD-810F                                                                                                                                     |
| Housing Material         |                                            | Non-conductive Plastic (UL 94 V-0 rated)                                                                                                         |
| Base Material            |                                            | Non-conductive Plastic (UL 94 V-0 rated)                                                                                                         |
| Potting Material         |                                            | Silicone (UL 94 V-0 rated)                                                                                                                       |
| Pin Material             |                                            | Copper                                                                                                                                           |
| Pin Foundation Plating   |                                            | Nickel (2 - 3 $\mu$ m)                                                                                                                           |
| Pin Surface Plating      |                                            | Tin (3 - 5 $\mu$ m), matte                                                                                                                       |
| Housing Type             |                                            | Plastic Case                                                                                                                                     |
| Mounting Type            |                                            | PCB Mount                                                                                                                                        |
| Connection Type          |                                            | THD (Through-Hole Device)                                                                                                                        |
| Footprint Type           |                                            | DIP8                                                                                                                                             |
| Soldering Profile        |                                            | Lead-Free Wave Soldering                                                                                                                         |
|                          |                                            | 260°C / 10 s max.                                                                                                                                |
| Weight                   |                                            | 2.7 g                                                                                                                                            |
| Environmental Compliance | - REACH Declaration                        | <a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a>                                 |
|                          |                                            | REACH SVHC list compliant                                                                                                                        |
|                          |                                            | REACH Annex XVII compliant                                                                                                                       |
|                          | - RoHS Declaration                         | <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a>                                   |
|                          |                                            | Exemptions: 7a, 7c-I<br>(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).) |
|                          | - SCIP Reference Number                    | 2552c69d-e1c1-408c-95ee-5f938293c358                                                                                                             |

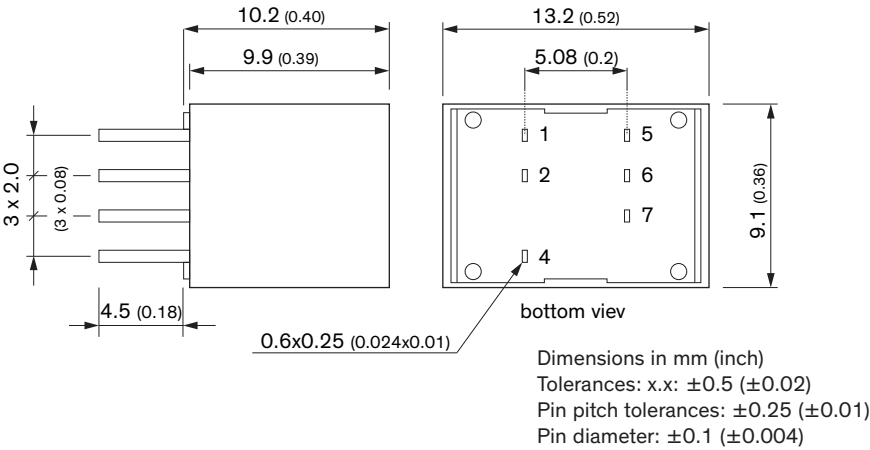
All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tdn3wi](http://www.tracopower.com/overview/tdn3wi)

Outline Dimensions



| Pinout |               |               |
|--------|---------------|---------------|
| Pin    | Single        | Dual          |
| 1      | +Vin (Vcc)    | +Vin (Vcc)    |
| 2      | -Vin (GND)    | -Vin (GND)    |
| 4      | Remote On/Off | Remote On/Off |
| 5      | NC            | -Vout         |
| 6      | -Vout         | Common        |
| 7      | +Vout         | +Vout         |

NC: Not connected