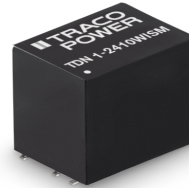




# THE DATASHEET OF TDN 1-1223WISM

- Compact SMD 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 +90°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 1WISM Series comprises 1 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 90°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 1-1210WISM | 4.5 - 18 VDC<br>(12 VDC nom.) | 3.3 VDC  | 300 mA           |          |                  | 77 %            |
| TDN 1-1211WISM |                               | 5 VDC    | 200 mA           |          |                  | 79 %            |
| TDN 1-1219WISM |                               | 9 VDC    | 112 mA           |          |                  | 79 %            |
| TDN 1-1212WISM |                               | 12 VDC   | 90 mA            |          |                  | 81 %            |
| TDN 1-1213WISM |                               | 15 VDC   | 70 mA            |          |                  | 81 %            |
| TDN 1-1215WISM |                               | 24 VDC   | 45 mA            |          |                  | 80 %            |
| TDN 1-1221WISM |                               | +5 VDC   | 100 mA           | -5 VDC   | 100 mA           | 77 %            |
| TDN 1-1222WISM |                               | +12 VDC  | 45 mA            | -12 VDC  | 45 mA            | 80 %            |
| TDN 1-1223WISM |                               | +15 VDC  | 35 mA            | -15 VDC  | 35 mA            | 81 %            |
| TDN 1-2410WISM | 9 - 36 VDC<br>(24 VDC nom.)   | 3.3 VDC  | 300 mA           |          |                  | 76 %            |
| TDN 1-2411WISM |                               | 5 VDC    | 200 mA           |          |                  | 78 %            |
| TDN 1-2419WISM |                               | 9 VDC    | 112 mA           |          |                  | 79 %            |
| TDN 1-2412WISM |                               | 12 VDC   | 90 mA            |          |                  | 81 %            |
| TDN 1-2413WISM |                               | 15 VDC   | 70 mA            |          |                  | 81 %            |
| TDN 1-2415WISM |                               | 24 VDC   | 45 mA            |          |                  | 80 %            |
| TDN 1-2421WISM |                               | +5 VDC   | 100 mA           | -5 VDC   | 100 mA           | 77 %            |
| TDN 1-2422WISM |                               | +12 VDC  | 45 mA            | -12 VDC  | 45 mA            | 80 %            |
| TDN 1-2423WISM |                               | +15 VDC  | 35 mA            | -15 VDC  | 35 mA            | 81 %            |
| TDN 1-4810WISM | 18 - 75 VDC<br>(48 VDC nom.)  | 3.3 VDC  | 300 mA           |          |                  | 75 %            |
| TDN 1-4811WISM |                               | 5 VDC    | 200 mA           |          |                  | 78 %            |
| TDN 1-4819WISM |                               | 9 VDC    | 112 mA           |          |                  | 79 %            |
| TDN 1-4812WISM |                               | 12 VDC   | 90 mA            |          |                  | 81 %            |
| TDN 1-4813WISM |                               | 15 VDC   | 70 mA            |          |                  | 81 %            |
| TDN 1-4815WISM |                               | 24 VDC   | 45 mA            |          |                  | 80 %            |
| TDN 1-4821WISM |                               | +5 VDC   | 100 mA           | -5 VDC   | 100 mA           | 77 %            |
| TDN 1-4822WISM |                               | +12 VDC  | 45 mA            | -12 VDC  | 45 mA            | 80 %            |
| TDN 1-4823WISM |                               | +15 VDC  | 35 mA            | -15 VDC  | 35 mA            | 81 %            |

## Input Specifications

|                          |              |                                                                                                                                                                                            |
|--------------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Current            | - At no load | 12 Vin models: 20 mA typ.<br>24 Vin models: 10 mA typ.<br>48 Vin models: 5 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 |              | 12 Vin models: 15 mAp-p typ.<br>24 Vin models: 10 mAp-p typ.<br>48 Vin models: 5 mAp-p typ.                                                                                                |
| Recommended Input Fuse   |              | 12 Vin models: 500 mA (slow blow)<br>24 Vin models: 315 mA (slow blow)<br>48 Vin models: 160 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                                                                                           | 30 mVp-p typ.                                                                                                                                                                                                                                                                                                          |
| Capacitive Load          | - single output<br><br><br><br><br><br>- dual output                                                         | 3.3 Vout models: 1'680 µF max.<br>5 Vout models: 820 µF max.<br>9 Vout models: 630 µF max.<br>12 Vout models: 470 µF max.<br>15 Vout models: 330 µF max.<br>24 Vout models: 160 µF max.<br>5 / -5 Vout models: 470 / 470 µF max.<br>12 / -12 Vout models: 330 / 330 µF max.<br>15 / -15 Vout models: 220 / 220 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     | EN 55032 class A (with external filter)<br>EN 55032 class B (with external filter)             |
|               | - Radiated Emissions      | 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/tdn1wism">www.tracopower.com/overview/tdn1wism</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 +90°C (without derating)                                                                              |
|                            | - Case Temperature                         | +105°C max.                                                                                                    |
|                            | - Storage Temperature                      | -55°C to +125°C                                                                                                |
| Power Derating             | - High Temperature                         | 6.67 %/K above 90°C                                                                                            |
|                            | See application note:                      | <a href="http://www.tracopower.com/overview/tdn1wism">www.tracopower.com/overview/tdn1wism</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                          | 8'400'000 h (MIL-HDBK-217F, ground benign)                                                                     |
| Moisture Sensitivity (MSL) |                                            | Level 2 (J-STD-033C)                                                                                           |
| 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            |                                            | SMD (Surface-Mount Device)                                                                                     |
| Footprint Type             |                                            | SMD8                                                                                                           |
| Soldering Profile          |                                            | Lead-Free Reflow Soldering (acc. J-STD-020E)                                                                   |
|                            |                                            | 245°C max. (Tp)                                                                                                |
|                            |                                            | 10 s max. (tp, at Tp - 5°C)                                                                                    |
|                            |                                            | 90 s max. (tL, time above 217°C)                                                                               |
|                            | See application note:                      | <a href="http://www.tracopower.com/info/reflow-soldering.pdf">www.tracopower.com/info/reflow-soldering.pdf</a> |
| Weight                     |                                            | 2.7 g                                                                                                          |

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

Environmental Compliance - REACH Declaration

[www.tracopower.com/info/reach-declaration.pdf](http://www.tracopower.com/info/reach-declaration.pdf)

- RoHS Declaration

REACH SVHC list compliant

REACH Annex XVII compliant

[www.tracopower.com/info/rohs-declaration.pdf](http://www.tracopower.com/info/rohs-declaration.pdf)

Exemptions: 7a, 7c-I

(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)

- SCIP Reference Number

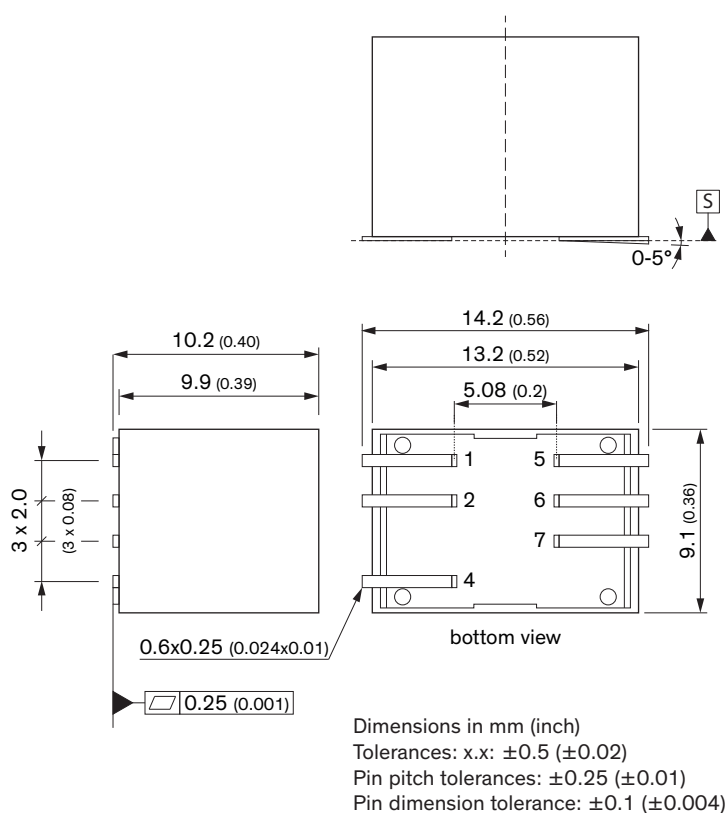
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## Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tdn1wism](http://www.tracopower.com/overview/tdn1wism)

## Outline Dimensions



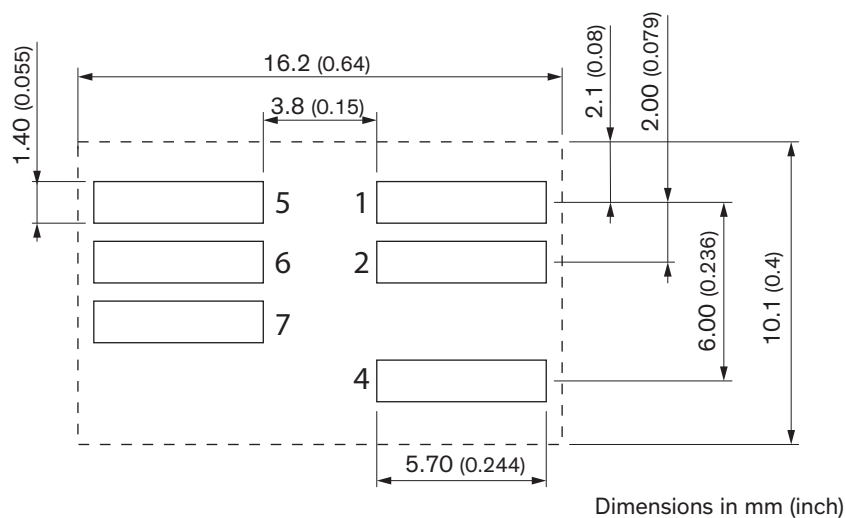
## Pinout

| 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

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

### Recommended Solder Pad Layout



## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

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- ⊖ [Traco Power](#) Information

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- ✓ Obsolete Management
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- ✓ Shortage Management
- ✓ Alternative Solution
- ✓ Excess Inventory Management