

- Compact design in SMD package
- Ultra wide 4:1 input voltage range
- Fully regulated outputs
- Low ripple and noise
- Temperature range  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  without derating
- I/O isolation 1600 VDC
- Continuous short-circuit protection
- Remote On/Off control
- Fully RoHS compliant
- 3-year product warranty



The TDR 3WISM series is a family of compact 3 W DC/DC-converters with 4:1 input voltage ranges and tightly regulated output voltages even under no load conditions. The product is available in SMD-package. They work with high efficiency over the full load range and come with a remote On/Off input. The usability in temperature ranges of up to  $+85^{\circ}\text{C}$ , continuous short circuit protection and excellent immunity against environmental influences make these converters very reliable. A TDR 3WISM converter is the ideal solution for space critical high end applications in communication equipment, instrumentation and industrial electronics.

| Models         |                               |          |                  |          |                  |                 |
|----------------|-------------------------------|----------|------------------|----------|------------------|-----------------|
| Order Code     | Input Voltage Range           | Output 1 |                  | Output 2 |                  | Efficiency typ. |
|                |                               | Vnom     | I <sub>max</sub> | Vnom     | I <sub>max</sub> |                 |
| TDR 3-1211WISM | 4.5 - 18 VDC<br>(12 VDC nom.) | 5 VDC    | 600 mA           |          |                  | 81 %            |
| TDR 3-1212WISM |                               | 12 VDC   | 250 mA           |          |                  | 82 %            |
| TDR 3-1213WISM |                               | 15 VDC   | 200 mA           |          |                  | 82 %            |
| TDR 3-1222WISM |                               | +12 VDC  | 125 mA           | -12 VDC  | 125 mA           | 82 %            |
| TDR 3-1223WISM |                               | +15 VDC  | 100 mA           | -15 VDC  | 100 mA           | 81 %            |
| TDR 3-2411WISM | 9 - 36 VDC<br>(24 VDC nom.)   | 5 VDC    | 600 mA           |          |                  | 80 %            |
| TDR 3-2412WISM |                               | 12 VDC   | 250 mA           |          |                  | 82 %            |
| TDR 3-2413WISM |                               | 15 VDC   | 200 mA           |          |                  | 82 %            |
| TDR 3-2422WISM |                               | +12 VDC  | 125 mA           | -12 VDC  | 125 mA           | 82 %            |
| TDR 3-2423WISM |                               | +15 VDC  | 100 mA           | -15 VDC  | 100 mA           | 81 %            |
| TDR 3-4811WISM | 18 - 75 VDC<br>(48 VDC nom.)  | 5 VDC    | 600 mA           |          |                  | 80 %            |
| TDR 3-4812WISM |                               | 12 VDC   | 250 mA           |          |                  | 83 %            |
| TDR 3-4813WISM |                               | 15 VDC   | 200 mA           |          |                  | 82 %            |
| TDR 3-4822WISM |                               | +12 VDC  | 125 mA           | -12 VDC  | 125 mA           | 82 %            |
| TDR 3-4823WISM |                               | +15 VDC  | 100 mA           | -15 VDC  | 100 mA           | 81 %            |

## Input Specifications

|                          |                |                                                                                                                                                                                                  |
|--------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Current            | - At no load   | 12 Vin models: 40 mA typ.<br>24 Vin models: 20 mA typ.<br>48 Vin models: 13 mA typ.                                                                                                              |
|                          | - At full load | 12 Vin models: 330 mA max.<br>24 Vin models: 165 mA max.<br>48 Vin models: 80 mA max.                                                                                                            |
| 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: 80 mAp-p typ.<br>24 Vin models: 40 mAp-p typ.<br>48 Vin models: 30 mAp-p typ.                                                                                                     |
| Recommended Input Fuse   |                | 12 Vin models: 2'500 mA (slow blow)<br>24 Vin models: 1'500 mA (slow blow)<br>48 Vin models: 1'000 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)            | single output models: 0.2% max.<br>dual output models: 0.2% max.                              |
|                          | - Load Variation (0 - 100%)                | single output models: 1% max.<br>dual output models: 1% max. (Output 1)<br>1% max. (Output 2) |
|                          | - Cross Regulation (25% / 100% asym. load) | dual output models: 5% max.                                                                   |
|                          |                                            |                                                                                               |
| Ripple and Noise         | - 20 MHz Bandwidth                         | 30 mVp-p typ.                                                                                 |
| Capacitive Load          | - single output                            | 5 Vout models: 1'680 µF max.<br>12 Vout models: 820 µF max.<br>15 Vout models: 680 µF max.    |
|                          | - dual output                              | 12 / -12 Vout models: 470 / 470 µF max.<br>15 / -15 Vout models: 330 / 330 µF max.            |
| Minimum Load             |                                            | Not required                                                                                  |
| Temperature Coefficient  |                                            | ±0.02 %/K max.                                                                                |
| Start-up Time            |                                            | 5 ms typ.                                                                                     |
| Short Circuit Protection |                                            | Continuous, Automatic recovery                                                                |
| Transient Response       | - Response Time                            | 250 µs typ. (25% Load Step)                                                                   |

## Safety Specifications

|                       |                             |                                                                                                        |
|-----------------------|-----------------------------|--------------------------------------------------------------------------------------------------------|
| Standards             | - IT / Multimedia Equipment | EN 60950-1<br>EN 62368-1<br>IEC 60950-1<br>IEC 62368-1<br>UL 60950-1<br>UL 62368-1                     |
|                       | - Certification Documents   | <a href="http://www.tracopower.com/tdr3wism-safety-cert/">www.tracopower.com/tdr3wism-safety-cert/</a> |
| Energy Source         | - Output, acc. to 62368-1   | ES1                                                                                                    |
| Power Source          | - Output, acc. to 62368-1   | PS3                                                                                                    |
| Pollution Degree      |                             | PD 2                                                                                                   |
| Over Voltage Category |                             | Not mains connected                                                                                    |

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

## EMC Specifications

|                           |                             |                                                                                                      |
|---------------------------|-----------------------------|------------------------------------------------------------------------------------------------------|
| EMI (Emissions)           | - Conducted Emissions       | EN 55032 class A (with external filter)                                                              |
|                           | - Radiated Emissions        | EN 55032 class B (with external filter)                                                              |
| External filter proposal: |                             | <a href="http://www.tracopower.com/tdr3wism-emc-filter/">www.tracopower.com/tdr3wism-emc-filter/</a> |
| 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                                                  |
|                           |                             | EN 61000-4-3, 10 V/m, perf. criteria A                                                               |
|                           | - RF Electromagnetic Field  | EN 61000-4-4, $\pm 2$ kV, perf. criteria A                                                           |
|                           |                             | EN 61000-4-5, $\pm 1$ kV, perf. criteria A                                                           |
|                           | - EFT (Burst) / Surge       | EN 61000-4-6, 10 Vrms, perf. criteria A                                                              |
| Ext. input component:     |                             | 220 $\mu$ F / 100 V                                                                                  |
|                           | - Conducted RF Disturbances | Continuous: EN 61000-4-8, 100 A/m, perf. criteria A                                                  |
|                           | - PF Magnetic Field         | 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 +85°C                                                                                                                       |
|                            | - Case Temperature                                                                                                                    | +100°C max.                                                                                                                          |
|                            | - Storage Temperature                                                                                                                 | -55°C to +125°C                                                                                                                      |
| Power Derating             | - High Temperature                                                                                                                    | 3.3 %/K above 70°C                                                                                                                   |
|                            | See application note: <a href="http://www.tracopower.com/tdr3wism-cc/">www.tracopower.com/tdr3wism-cc/</a>                            |                                                                                                                                      |
| Cooling System             |                                                                                                                                       | Natural convection (20 LFM)                                                                                                          |
| Remote Control             | - Current Controlled Remote (passive = on)                                                                                            | On: open circuit<br>Off: 2 to 4 mA current (internal 1 kΩ resistor)<br>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.                                                                                                                          |
| Altitude During Operation  |                                                                                                                                       | 5'000 m max.                                                                                                                         |
| Regulator Topology         |                                                                                                                                       | Flyback Converter                                                                                                                    |
| Switching Frequency        |                                                                                                                                       | 100 kHz min. (RCC)                                                                                                                   |
| Insulation System          |                                                                                                                                       | Basic Insulation                                                                                                                     |
| Isolation Test Voltage     | - Input to Output, 60 s                                                                                                               | 1'600 VDC                                                                                                                            |
| Isolation Resistance       | - Input to Output, 500 VDC                                                                                                            | 1'000 MΩ min.                                                                                                                        |
| Isolation Capacitance      | - Input to Output, 100 kHz, 1 V                                                                                                       | 50 pF max.                                                                                                                           |
| Reliability                | - Calculated MTBF                                                                                                                     | 5'700'000 h (MIL-HDBK-217F, ground benign)                                                                                           |
| Moisture Sensitivity (MSL) |                                                                                                                                       | Level 2a (J-STD-033C)                                                                                                                |
| Washing Process            |                                                                                                                                       | According to Cleaning Guideline<br><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)                                                                                             |
| Potting Material           |                                                                                                                                       | Epoxy (UL 94 V-0 rated)                                                                                                              |
| Pin Material               |                                                                                                                                       | Copper                                                                                                                               |
| Pin Foundation Plating     |                                                                                                                                       | Nickel (40 - 120 μm)                                                                                                                 |
| Pin Surface Plating        |                                                                                                                                       | Gold (25 - 75 nm), matte                                                                                                             |
| Housing Type               |                                                                                                                                       | Overmold                                                                                                                             |
| Mounting Type              |                                                                                                                                       | PCB Mount                                                                                                                            |
| Connection Type            |                                                                                                                                       | SMD (Surface-Mount Device)                                                                                                           |
| Footprint Type             |                                                                                                                                       | SMD14                                                                                                                                |
| Soldering Profile          |                                                                                                                                       | Lead-Free Reflow Soldering (acc. J-STD-020E)<br>245°C max. (Tc)<br>23 s max. (tp, at Tp - 5°C)<br>85 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> |

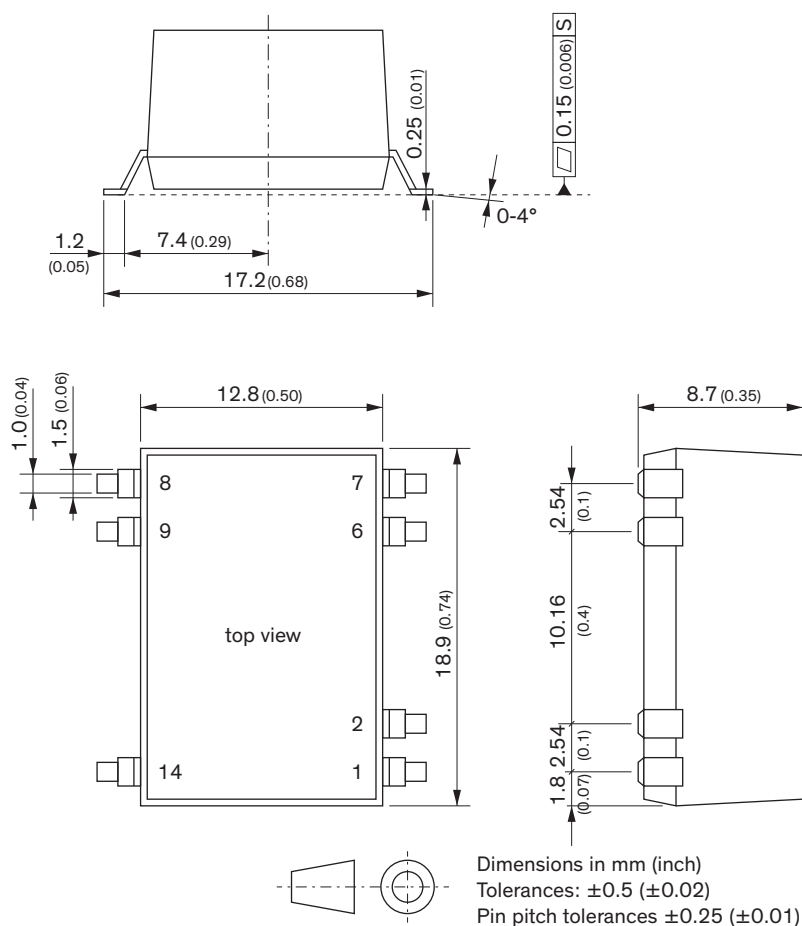
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|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Weight                   | 4.5 g                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Environmental Compliance | - REACH Declaration<br><a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a><br>REACH SVHC list compliant<br>REACH Annex XVII compliant<br><a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a><br>Exemptions: 7(a), 7(c)-I<br>(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule)) |
|                          | - RoHS Declaration                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                          | - SCIP Reference Number<br>Odc3970e-8b6b-4c6e-8099-8fecb766394                                                                                                                                                                                                                                                                                                                                                                                                              |

### Additional Information

|                            |                                                                                                |
|----------------------------|------------------------------------------------------------------------------------------------|
| Supporting Documents       | <a href="http://www.tracopower.com/overview/tdr3wism">www.tracopower.com/overview/tdr3wism</a> |
| Frequently Asked Questions | <a href="http://www.tracopower.com/glossary-faq">www.tracopower.com/glossary-faq</a>           |
| Glossary                   | <a href="http://www.tracopower.com/info/glossary.pdf">www.tracopower.com/info/glossary.pdf</a> |
| Service Portal             | <a href="http://www.tracoserviceportal.com">www.tracoserviceportal.com</a>                     |

### Outline Dimensions



| Pinout |               |               |
|--------|---------------|---------------|
| Pin    | Single        | Dual          |
| 1      | -Vin (GND)    | -Vin (GND)    |
| 2      | Remote On/Off | Remote On/Off |
| 6      | NC            | Common        |
| 7      | NC            | -Vout         |
| 8      | +Vout         | +Vout         |
| 9      | -Vout         | Common        |
| 14     | +Vin (Vcc)    | +Vin (Vcc)    |

NC: Not connected

Avoid routing PCB traces under the converter.

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

### Recommended Solder Pad Layout

