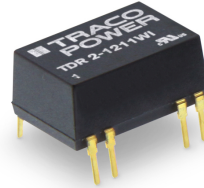


- Compact design in THD Package
- Ultra wide 4:1 input voltage range
- Fully regulated outputs
- Low ripple and noise
- Temperature range  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  without derating
- I/O isolation 1600 VDC
- Continuous short-circuit protection
- Remote On/Off control
- Fully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



The TDR 2WI series is a family of compact 2 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 THD-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  $85^{\circ}\text{C}$  without power derating, continuous short circuit protection and excellent immunity against environmental influences make these converters very reliable. A TDR 2WI 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 2-1211WI TDR 2-1212WI TDR 2-1213WI TDR 2-1222WI TDR 2-1223WI	4.5 - 18 VDC (12 VDC nom.)	5 VDC 12 VDC 15 VDC +12 VDC +15 VDC	400 mA 167 mA 134 mA 83 mA 67 mA	-12 VDC -15 VDC	83 mA 67 mA	79 % 80 % 81 % 81 % 81 %
TDR 2-2411WI TDR 2-2412WI TDR 2-2413WI TDR 2-2422WI TDR 2-2423WI	9 - 36 VDC (24 VDC nom.)	5 VDC 12 VDC 15 VDC +12 VDC +15 VDC	400 mA 167 mA 134 mA 83 mA 67 mA	-12 VDC -15 VDC	83 mA 67 mA	79 % 80 % 82 % 81 % 81 %
TDR 2-4811WI TDR 2-4812WI TDR 2-4813WI TDR 2-4822WI TDR 2-4823WI	18 - 75 VDC (48 VDC nom.)	5 VDC 12 VDC 15 VDC +12 VDC +15 VDC	400 mA 167 mA 134 mA 83 mA 67 mA	-12 VDC -15 VDC	83 mA 67 mA	78 % 81 % 82 % 81 % 81 %

## Input Specifications

Input Current	- At no load	12 Vin models: <b>35 mA typ.</b> 24 Vin models: <b>20 mA typ.</b> 48 Vin models: <b>10 mA typ.</b>
	- At full load	12 Vin models: <b>215 mA max.</b> 24 Vin models: <b>110 mA max.</b> 48 Vin models: <b>55 mA max.</b>
Surge Voltage		12 Vin models: <b>25 VDC max.</b> (1 s max.) 24 Vin models: <b>50 VDC max.</b> (1 s max.) 48 Vin models: <b>100 VDC max.</b> (1 s max.)
Reflected Ripple Current		12 Vin models: <b>80 mA<sub>p-p</sub> typ.</b> 24 Vin models: <b>40 mA<sub>p-p</sub> typ.</b> 48 Vin models: <b>30 mA<sub>p-p</sub> typ.</b>
Recommended Input Fuse		12 Vin models: <b>1'600 mA</b> (slow blow) 24 Vin models: <b>1'000 mA</b> (slow blow) 48 Vin models: <b>1'000 mA</b> (slow blow) (The need of an external fuse has to be assessed in the final application.)
Input Filter		<b>Internal Capacitor</b>

## Output Specifications

Voltage Set Accuracy		<b>±1% max.</b>
Regulation	- Input Variation (V <sub>min</sub> - V <sub>max</sub> )	single output models: <b>0.2% max.</b>
	- Load Variation (0 - 100%)	single output models: <b>1% max.</b> dual output models: <b>1% max.</b> (Output 1) <b>1% max.</b> (Output 2)
	- Cross Regulation (25% / 100% asym. load)	dual output models: <b>5% max.</b>
Ripple and Noise	- 20 MHz Bandwidth	<b>30 mV<sub>p-p</sub> typ.</b>
Capacitive Load	- single output	5 V <sub>out</sub> models: <b>1'680 μF max.</b> 12 V <sub>out</sub> models: <b>820 μF max.</b> 15 V <sub>out</sub> models: <b>680 μF max.</b>
	- dual output	12 / -12 V <sub>out</sub> models: <b>470 / 470 μF max.</b> 15 / -15 V <sub>out</sub> models: <b>330 / 330 μF max.</b>
Minimum Load		<b>Not required</b>
Temperature Coefficient		<b>±0.02 %/K max.</b>
Start-up Time		<b>5 ms typ.</b>
Short Circuit Protection		<b>Continuous, Automatic recovery</b>
Transient Response	- Response Time	<b>250 μs typ.</b> (25% Load Step)

## Safety Specifications

Safety Standards	- IT / Multimedia Equipment	<b>EN 60950-1</b> <b>EN 62368-1</b> <b>IEC 60950-1</b> <b>IEC 62368-1</b> <b>UL 60950-1</b> <b>UL 62368-1</b>
	- Certification Documents	<a href="http://www.tracopower.com/overview/tdr2wi">www.tracopower.com/overview/tdr2wi</a>
Pollution Degree		<b>PD 2</b>

## EMC Specifications

EMI Emissions	- Conducted Emissions	<b>EN 55032 class A</b> (with external filter) <b>EN 55032 class B</b> (with external filter)
	- Radiated Emissions	<b>EN 55032 class A</b> (with external filter) <b>EN 55032 class B</b> (with external filter)
	External filter proposal:	<a href="http://www.tracopower.com/overview/tdr2wi">www.tracopower.com/overview/tdr2wi</a>

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

EMS Immunity	- Electrostatic Discharge	Air: EN 61000-4-2, ±8 kV, perf. criteria A
	- RF Electromagnetic Field	Contact: EN 61000-4-2, ±6 kV, perf. criteria A
	- EFT (Burst) / Surge	EN 61000-4-3, 10 V/m, perf. criteria A
		EN 61000-4-4, ±2 kV, perf. criteria A
		EN 61000-4-5, ±1 kV, perf. criteria A
	- Conducted RF Disturbances	Ext. input component: 220 µF / 100 V
	- PF Magnetic Field	EN 61000-4-6, 10 Vrms, perf. criteria A
		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 +85°C (without derating)
	- Case Temperature	+100°C max.
	- Storage Temperature	-55°C to +125°C
Power Derating	- High Temperature	6.67 %/K above 85°C
Cooling System		Natural convection (20 LFM)
Remote Control	- Current Controlled Remote	On: open circuit
		Off: 2 to 4 mA current (internal 1 kΩ resistor)
	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.
Switching Frequency		100 - 2500 kHz (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	6'600'000 h (MIL-HDBK-217F, ground benign)
Environment	- Vibration	MIL-STD-810F
	- Thermal Shock	MIL-STD-810F
Housing Material		Non-conductive Plastic (UL94 V-0 rated)
Pin Material		Copper
Pin Foundation Plating		Nickel (40 - 120 µm)
Pin Surface Plating		Gold (25 - 75 nm), matte
Soldering Profile		Wave Soldering
		265°C / 10 s max.
Connection Type		THD (Through-Hole Device)
Weight		4.5 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

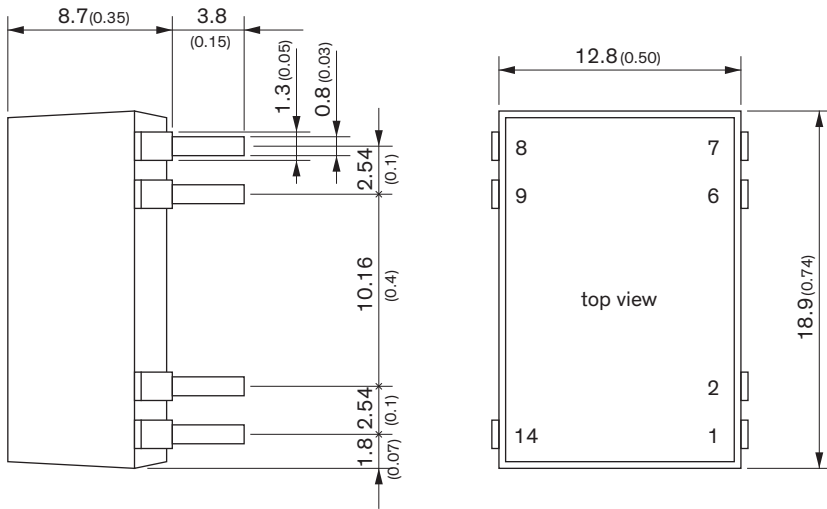
## Supporting Documents

Overview Link (for additional Documents)	<a href="http://www.tracopower.com/overview/tdr2wi">www.tracopower.com/overview/tdr2wi</a>
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All specifications valid at nominal voltage, full load and +25°C after warm-up time unless otherwise stated.

### Outline Dimensions

Dimensions in mm (inch)  
 Tolerances:  $\pm 0.5$  ( $\pm 0.02$ )  
 Pin pitch tolerances  $\pm 0.25$  ( $\pm 0.01$ )



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

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