

DC/DC Converter

TEC 2WI Series, 2 Watt

- Compact SIP-8 package
- I/O-isolation voltage 1'600 VDC
- Ultra-wide 4:1 input voltage range
- Fully regulated outputs
- Operating temperature range -40°C to $+93^{\circ}\text{C}$
- Continuous short circuit protection
- Remote On/Off
- Designed to meet IEC/EN/UL 62368-1 (not certified)
- 3-year product warranty



TEC 2WI is a new series with the design purpose to improve the prevalent 2 Watt SIP-8 DC/DC converters in terms of cost, efficiency and performance. The latest technology and components enable an increase in efficiency by more than 20%. With the reduction of thermal loss, the operating temperature range can be expanded from -40°C to $+93^{\circ}\text{C}$. The converters are fully regulated over 0 - 100% load (no minimum load is required). The models are available with ultra-wide input ranges of 4.5-18, 9-36 and 18-75 VDC. The functional I/O-isolation system is designed to meet IEC/EN/UL 62368-1 (not certified) with a test voltage (60 s) of 1600 VDC.

Models						
Order Code	Input Voltage Range	Output 1		Output 2		Efficiency typ.
		Vnom	I _{max}	Vnom	I _{max}	
TEC 2-1210WI	4.5 - 18 VDC (12 VDC nom.)	3.3 VDC	500 mA			75 %
TEC 2-1211WI		5 VDC	400 mA			80 %
TEC 2-1219WI		9 VDC	222 mA			81 %
TEC 2-1212WI		12 VDC	167 mA			81 %
TEC 2-1213WI		15 VDC	134 mA			82 %
TEC 2-1215WI		24 VDC	83 mA			82 %
TEC 2-1221WI		+5 VDC	200 mA	-5 VDC	200 mA	80 %
TEC 2-1222WI		+12 VDC	83 mA	-12 VDC	83 mA	82 %
TEC 2-1223WI		+15 VDC	67 mA	-15 VDC	67 mA	81 %
TEC 2-2410WI	9 - 36 VDC (24 VDC nom.)	3.3 VDC	500 mA			76 %
TEC 2-2411WI		5 VDC	400 mA			80 %
TEC 2-2419WI		9 VDC	222 mA			80 %
TEC 2-2412WI		12 VDC	167 mA			82 %
TEC 2-2413WI		15 VDC	134 mA			82 %
TEC 2-2415WI		24 VDC	83 mA			82 %
TEC 2-2421WI		+5 VDC	200 mA	-5 VDC	200 mA	79 %
TEC 2-2422WI		+12 VDC	83 mA	-12 VDC	83 mA	82 %
TEC 2-2423WI		+15 VDC	67 mA	-15 VDC	67 mA	80 %
TEC 2-4810WI	18 - 75 VDC (48 VDC nom.)	3.3 VDC	500 mA			74 %
TEC 2-4811WI		5 VDC	400 mA			79 %
TEC 2-4819WI		9 VDC	222 mA			81 %
TEC 2-4812WI		12 VDC	167 mA			82 %
TEC 2-4813WI		15 VDC	134 mA			81 %
TEC 2-4815WI		24 VDC	83 mA			81 %
TEC 2-4821WI		+5 VDC	200 mA	-5 VDC	200 mA	79 %
TEC 2-4822WI		+12 VDC	83 mA	-12 VDC	83 mA	81 %
TEC 2-4823WI		+15 VDC	67 mA	-15 VDC	67 mA	81 %

Input Specifications

Input Current	- At no load	12 Vin models: 35 mA typ. 24 Vin models: 20 mA typ. 48 Vin models: 10 mA typ.
Surge Voltage		12 Vin models: 25 VDC max. (1 s max.) 24 Vin models: 50 VDC max. (1 s max.) 48 Vin models: 100 VDC max. (1 s max.)
Under Voltage Lockout		12 Vin models: 2 VDC min. / 3 VDC typ. / 4 VDC max. 24 Vin models: 6 VDC min. / 7 VDC typ. / 8 VDC max. 48 Vin models: 13 VDC min. / 15 VDC typ. / 17 VDC max.
Recommended Input Fuse		12 Vin models: 1'000 mA (slow blow) 24 Vin models: 500 mA (slow blow) 48 Vin models: 315 mA (slow blow) (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. dual output models: 0.2% max.
	- Load Variation (0 - 100%)	single output models: 1% max. dual output models: 1% max. (Output 1) 1% max. (Output 2)
	- Cross Regulation (25% / 100% asym. load)	dual output models: 5% max.
Ripple and Noise	- 20 MHz Bandwidth	75 mVp-p typ.
Capacitive Load	- single output	3.3 Vout models: 3'300 µF max. 5 Vout models: 1'680 µF max. 9 Vout models: 1'000 µF max. 12 Vout models: 820 µF max. 15 Vout models: 680 µF max. 24 Vout models: 220 µF max.
	- dual output	5 / -5 Vout models: 1'000 / 1'000 µF max. 12 / -12 Vout models: 470 / 470 µF max. 15 / -15 Vout models: 330 / 330 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
Output Current Limitation		130 - 230% of Iout max. 170% typ. of Iout max.
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)
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EMC Specifications

EMI (Emissions)	- Conducted Emissions	EN 55032 class A (with external filter) EN 55032 class B (with external filter)
	- Radiated Emissions	EN 55032 class A (with external filter) EN 55032 class B (with external filter)
External filter proposal:		www.tracopower.com/overview/tec2wi

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, ± 8 kV, perf. criteria A
		Contact:	EN 61000-4-2, ± 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, ± 2 kV, perf. criteria A
			EN 61000-4-5, ± 1 kV, perf. criteria A
		Ext. input component:	KY 220 μ 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 +93°C
	- Case Temperature	+105°C max.
	- Storage Temperature	-55°C to +125°C
Power Derating	- High Temperature	4.8 %/K above 84°C
	See application note:	www.tracopower.com/overview/tec2wi
Cooling System		Natural convection (20 LFM)
Remote Control	- Current Controlled Remote (passive = on)	On: open circuit
		Off: 2 to 4 mA current (internal 1 k Ω resistor)
		Refers to 'Remote' and '-Vin' Pin
	External circuit proposal:	www.tracopower.com/info/current-remote.pdf
	- Off Idle Input Current	2.5 mA typ.
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 Ω min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	50 pF max.
Reliability	- Calculated MTBF	6'621'000 h (MIL-HDBK-217F, ground benign)
Washing Process		According to Cleaning Guideline
		www.tracopower.com/info/cleaning.pdf
Environment	- Vibration	MIL-STD-810F
	- Mechanical Shock	MIL-STD-810F
	- Thermal Shock	MIL-STD-810F
Housing Material		Non-conductive Plastic (UL 94 V-0 rated)
Potting Material		Silicone (UL 94 V-0 rated)
Pin Material		Copper
Pin Foundation Plating		Nickel (1 - 2 μ m)
Pin Surface Plating		Tin (3 - 5 μ m), matte
Housing Type		Plastic Case
Mounting Type		PCB Mount
Connection Type		THD (Through-Hole Device)
Footprint Type		SIP8
Soldering Profile		Lead-Free Wave Soldering
		260°C / 10 s max.
Weight		4.5 g
Environmental Compliance	- REACH Declaration	www.tracopower.com/info/reach-declaration.pdf
		REACH SVHC list compliant
		REACH Annex XVII compliant
	- RoHS Declaration	www.tracopower.com/info/rohs-declaration.pdf
		Exemptions: 7(a), 7(c)-I
		(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number	79f309d9-36d3-4626-af05-f90a5ee70fbe

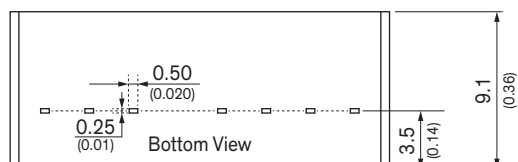
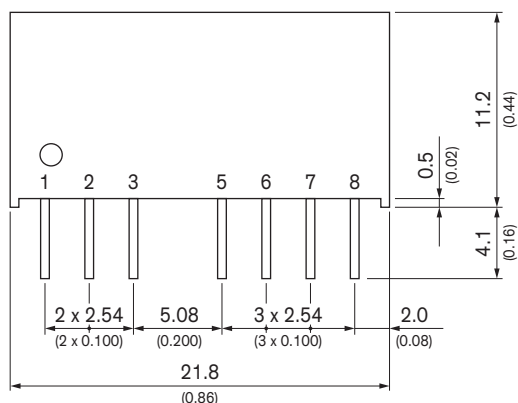
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Supporting Documents

[Overview Link](#) (for additional Documents)

www.tracopower.com/overview/tec2wi

Outline Dimensions

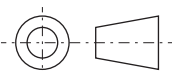


Dimensions in mm (inch)

Tolerances: x.x ±0.5 (x.xx ±0.02)

x.xx ±0.25 (x.xxx ±0.01)

Pin dimension tolerance ±0.1 (0.004)



Pinout		
Pin	Single	Dual
1	–Vin (GND)	–Vin (GND)
2	+Vin (Vcc)	+Vin (Vcc)
3	Remote On/Off	Remote On/Off
5	NC	NC
6	+Vout	+Vout
7	–Vout	Common
8	NC	–Vout

NC: Not connected