



**THE DATASHEET OF  
TEC 3-2412WI**



- Compact SIP-8 package
- I/O-isolation voltage 1'600 VDC
- Ultra-wide 4:1 input voltage range
- Fully regulated outputs
- Operating temperature range  $-40^{\circ}\text{C}$  to  $+90^{\circ}\text{C}$
- Continuous short circuit protection
- Remote On/Off
- Designed to meet IEC/EN/UL 62368-1 (not certified)
- 3-year product warranty



TEC 3WI is a new series with the design purpose to improve the prevalent 3 Watt SIP-8 DC/DC converters in terms of cost, efficiency and performance. The latest technology and components effectuate a high efficiency for a low thermal loss. This enables an operating temperature range from  $-40^{\circ}\text{C}$  up to  $+90^{\circ}\text{C}$ . 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 <sub>max</sub>	Vnom	I <sub>max</sub>	
TEC 3-1210WI	4.5 - 18 VDC (12 VDC nom.)	3.3 VDC	700 mA			75 %
TEC 3-1211WI		5 VDC	600 mA			79 %
TEC 3-1219WI		9 VDC	333 mA			81 %
TEC 3-1212WI		12 VDC	250 mA			82 %
TEC 3-1213WI		15 VDC	200 mA			83 %
TEC 3-1215WI		24 VDC	125 mA			82 %
TEC 3-1221WI		+5 VDC	300 mA	-5 VDC	300 mA	80 %
TEC 3-1222WI		+12 VDC	125 mA	-12 VDC	125 mA	82 %
TEC 3-1223WI		+15 VDC	100 mA	-15 VDC	100 mA	81 %
TEC 3-2410WI	9 - 36 VDC (24 VDC nom.)	3.3 VDC	700 mA			76 %
TEC 3-2411WI		5 VDC	600 mA			80 %
TEC 3-2419WI		9 VDC	333 mA			81 %
TEC 3-2412WI		12 VDC	250 mA			83 %
TEC 3-2413WI		15 VDC	200 mA			83 %
TEC 3-2415WI		24 VDC	125 mA			81 %
TEC 3-2421WI		+5 VDC	300 mA	-5 VDC	300 mA	79 %
TEC 3-2422WI		+12 VDC	125 mA	-12 VDC	125 mA	81 %
TEC 3-2423WI		+15 VDC	100 mA	-15 VDC	100 mA	81 %
TEC 3-4810WI	18 - 75 VDC (48 VDC nom.)	3.3 VDC	700 mA			74 %
TEC 3-4811WI		5 VDC	600 mA			80 %
TEC 3-4819WI		9 VDC	333 mA			81 %
TEC 3-4812WI		12 VDC	250 mA			82 %
TEC 3-4813WI		15 VDC	200 mA			83 %
TEC 3-4815WI		24 VDC	125 mA			82 %
TEC 3-4821WI		+5 VDC	300 mA	-5 VDC	300 mA	80 %
TEC 3-4822WI		+12 VDC	125 mA	-12 VDC	125 mA	82 %
TEC 3-4823WI		+15 VDC	100 mA	-15 VDC	100 mA	82 %

## Input Specifications

Input Current	- At no load	48 Vin models: <b>13 mA typ.</b> 12 Vin models: <b>35 mA typ.</b> (3.3 Vout model) <b>40 mA typ.</b> (5 Vout model) <b>40 mA typ.</b> (9 Vout model) <b>40 mA typ.</b> (12 Vout model) <b>40 mA typ.</b> (15 Vout model) <b>40 mA typ.</b> (24 Vout model) <b>40 mA typ.</b> (5 / -5 Vout model) <b>40 mA typ.</b> (12 / -12 Vout model) <b>50 mA typ.</b> (15 / -15 Vout model) 24 Vin models: <b>20 mA typ.</b> (3.3 Vout model) <b>20 mA typ.</b> (5 Vout model) <b>20 mA typ.</b> (9 Vout model) <b>25 mA typ.</b> (12 Vout model) <b>25 mA typ.</b> (15 Vout model) <b>25 mA typ.</b> (24 Vout model) <b>25 mA typ.</b> (5 / -5 Vout model) <b>25 mA typ.</b> (12 / -12 Vout model) <b>25 mA typ.</b> (15 / -15 Vout model)
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.)
Under Voltage Lockout		12 Vin models: <b>2 VDC min. / 3 VDC typ. / 4 VDC max.</b> 24 Vin models: <b>6 VDC min. / 7 VDC typ. / 8 VDC max.</b> 48 Vin models: <b>13 VDC min. / 15 VDC typ. / 17 VDC max.</b>
Recommended Input Fuse		12 Vin models: <b>1'600 mA</b> (slow blow) 24 Vin models: <b>800 mA</b> (slow blow) 48 Vin models: <b>500 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 (Vmin - Vmax) - Load Variation (0 - 100%) - Cross Regulation (25% / 100% asym. load)	single output models: <b>0.2% max.</b> dual output models: <b>0.2% max.</b> single output models: <b>1% max.</b> dual output models: <b>1% max.</b> (Output 1) <b>1% max.</b> (Output 2) dual output models: <b>5% max.</b>
Ripple and Noise	- 20 MHz Bandwidth	<b>55 mVp-p max.</b>
Capacitive Load	- single output - dual output	3.3 Vout models: <b>4'400 µF max.</b> 5 Vout models: <b>2'200 µF max.</b> 9 Vout models: <b>1'300 µF max.</b> 12 Vout models: <b>1'000 µF max.</b> 15 Vout models: <b>820 µF max.</b> 24 Vout models: <b>470 µF max.</b> 5 / -5 Vout models: <b>1'200 / 1'200 µF max.</b> 12 / -12 Vout models: <b>520 / 520 µF max.</b> 15 / -15 Vout models: <b>440 / 440 µF max.</b>
Minimum Load		<b>Not required</b>
Temperature Coefficient		<b>±0.02 %/K max.</b>
Start-up Time		<b>10 ms typ. / 20 ms max.</b>
Short Circuit Protection		<b>Continuous, Automatic recovery</b>

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

Output Current Limitation		130 - 230% of I <sub>out</sub> max. 170% typ. of I <sub>out</sub> 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:	<a href="http://www.tracopower.com/overview/tec3wi">www.tracopower.com/overview/tec3wi</a>
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
	- Conducted RF Disturbances	Ext. input component: KY 220 μF / 100 V 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
	- Case Temperature	+105°C max.
	- Storage Temperature	-55°C to +125°C
Power Derating	- High Temperature	3.4 %/K above 75°C
		See application note: <a href="http://www.tracopower.com/overview/tec3wi">www.tracopower.com/overview/tec3wi</a>
Cooling System		Natural convection (20 LFM)
Remote Control	- Current Controlled Remote (passive = on)	On: open circuit Off: 2 to 4 mA current (internal 1 kΩ 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 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 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	50 pF max.
Reliability	- Calculated MTBF	5'124'000 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
	- 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 μm)
Pin Surface Plating		Tin (3 - 5 μm), matte
Housing Type		Plastic Case
Mounting Type		PCB Mount

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

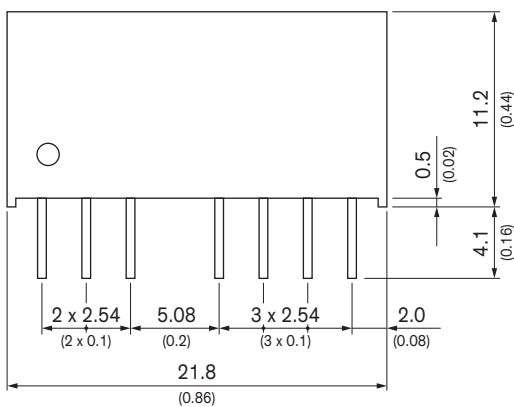
Connection Type	THD (Through-Hole Device)
Footprint Type	SIP8
Soldering Profile	Lead-Free Wave Soldering 260°C / 10 s max.
Weight	4.5 g
Environmental Compliance	<p>- REACH Declaration <a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a></p> <p>REACH SVHC list compliant</p> <p>REACH Annex XVII compliant</p> <p><a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a></p> <p>Exemptions: 7a, 7c-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)</p> <p>- RoHS Declaration</p> <p>- SCIP Reference Number <b>9efed3a1-acdc-437d-b381-9e7c53d9d2c2</b></p>

### Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tec3wi](http://www.tracopower.com/overview/tec3wi)

### Outline Dimensions



Dimensions in mm (inch)  
Tolerances:  $\pm 0.5$  ( $\pm 0.02$ )  
Pin pitch tolerances  $\pm 0.25$  ( $\pm 0.01$ )  
Pin dimension tolerance  $\pm 0.1$  (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

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

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