



**THE DATASHEET OF  
TEC 3-4812WI**



- 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<br>(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<br>(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<br>(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><br>12 Vin models: <b>35 mA typ.</b> (3.3 Vout model)<br><b>40 mA typ.</b> (5 Vout model)<br><b>40 mA typ.</b> (9 Vout model)<br><b>40 mA typ.</b> (12 Vout model)<br><b>40 mA typ.</b> (15 Vout model)<br><b>40 mA typ.</b> (24 Vout model)<br><b>40 mA typ.</b> (5 / -5 Vout model)<br><b>40 mA typ.</b> (12 / -12 Vout model)<br><b>50 mA typ.</b> (15 / -15 Vout model)<br>24 Vin models: <b>20 mA typ.</b> (3.3 Vout model)<br><b>20 mA typ.</b> (5 Vout model)<br><b>20 mA typ.</b> (9 Vout model)<br><b>25 mA typ.</b> (12 Vout model)<br><b>25 mA typ.</b> (15 Vout model)<br><b>25 mA typ.</b> (24 Vout model)<br><b>25 mA typ.</b> (5 / -5 Vout model)<br><b>25 mA typ.</b> (12 / -12 Vout model)<br><b>25 mA typ.</b> (15 / -15 Vout model) |
| Surge Voltage          |              | 12 Vin models: <b>25 VDC max.</b> (1 s max.)<br>24 Vin models: <b>50 VDC max.</b> (1 s max.)<br>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><br>24 Vin models: <b>6 VDC min. / 7 VDC typ. / 8 VDC max.</b><br>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)<br>24 Vin models: <b>800 mA</b> (slow blow)<br>48 Vin models: <b>500 mA</b> (slow blow)<br>(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)<br>- Load Variation (0 - 100%)<br>- Cross Regulation (25% / 100% asym. load) | single output models: <b>0.2% max.</b><br>dual output models: <b>0.2% max.</b><br>single output models: <b>1% max.</b><br>dual output models: <b>1% max.</b> (Output 1)<br><b>1% max.</b> (Output 2)<br>dual output models: <b>5% max.</b>  |
| Ripple and Noise         | - 20 MHz Bandwidth   | <b>55 mVp-p max.</b>  |
| Capacitive Load          | - single output<br><br><br><br><br><br><br><br><br>- dual output   | 3.3 Vout models: <b>4'400 µF max.</b><br>5 Vout models: <b>2'200 µF max.</b><br>9 Vout models: <b>1'300 µF max.</b><br>12 Vout models: <b>1'000 µF max.</b><br>15 Vout models: <b>820 µF max.</b><br>24 Vout models: <b>470 µF max.</b><br>5 / -5 Vout models: <b>1'200 / 1'200 µF max.</b><br>12 / -12 Vout models: <b>520 / 520 µF max.</b><br>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.<br>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) |
|-----------|-----------------------------|--|

### 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/tec3wi">www.tracopower.com/overview/tec3wi</a>           |
| EMS Immunity  | - Electrostatic Discharge   | Air: EN 61000-4-2, ±8 kV, perf. criteria A<br>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<br>EN 61000-4-5, ±1 kV, perf. criteria A                       |
|               | - Conducted RF Disturbances | Ext. input component: KY 220 μF / 100 V<br>EN 61000-4-6, 10 Vrms, perf. criteria A                   |
|               | - PF Magnetic Field         | Continuous: EN 61000-4-8, 100 A/m, perf. criteria A<br>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<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 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<br><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.

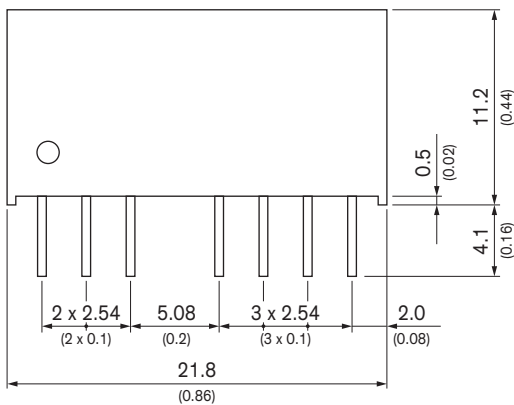
|                          |  |
|--------------------------|--|
| Connection Type          | THD (Through-Hole Device)  |
| Footprint Type           | SIP8   |
| Soldering Profile        | Lead-Free Wave Soldering<br>260°C / 10 s max.  |
| Weight                   | 4.5 g  |
| Environmental Compliance | <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<br/>(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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