

- 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 + 90°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°C up to +90°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/E-N/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:                                                              | 13 mA typ.                           |
|                        |                       | 12 Vin models:                                                              | 35 mA typ. (3.3 Vout model)          |
|                        |                       |                                                                             | 40 mA typ. (5 Vout model)            |
|                        |                       |                                                                             | 40 mA typ. (9 Vout model)            |
|                        |                       |                                                                             | 40 mA typ. (12 Vout model)           |
|                        |                       |                                                                             | 40 mA typ. (15 Vout model)           |
|                        |                       |                                                                             | 40 mA typ. (24 Vout model)           |
|                        |                       |                                                                             | 40 mA typ. (5 / -5 Vout model)       |
|                        |                       |                                                                             | 40 mA typ. (12 / -12 Vout model)     |
|                        |                       |                                                                             | 50 mA typ. (15 / -15 Vout model)     |
|                        |                       | 24 Vin models:                                                              | 20 mA typ. (3.3 Vout model)          |
|                        |                       |                                                                             | 20 mA typ. (5 Vout model)            |
|                        |                       |                                                                             | 20 mA typ. (9 Vout model)            |
| 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:        | 1'600 mA (slow blow)                                                        |                                      |
|                        | 24 Vin models:        | 800 mA (slow blow)                                                          |                                      |
|                        | 48 Vin models:        | 500 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     |                                 |                       | <b>±1% max.</b>                                        |
| Regulation               | - Input Variation (Vmin - Vmax) | single output models: | <b>0.2% max.</b>                                       |
|                          |                                 | dual 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)<br><b>1% max.</b> (Output 2) |
| Ripple and Noise         | - 20 MHz Bandwidth              | dual output models:   | <b>5% max.</b>                                         |
|                          |                                 |                       |                                                        |
| Capacitive Load          | - single output                 | 3.3 Vout models:      | <b>55 mVp-p max.</b>                                   |
|                          |                                 | 5 Vout models:        | <b>4'400 µF max.</b>                                   |
|                          |                                 | 9 Vout models:        | <b>2'200 µF max.</b>                                   |
|                          |                                 | 12 Vout models:       | <b>1'300 µF max.</b>                                   |
|                          |                                 | 15 Vout models:       | <b>1'000 µF max.</b>                                   |
|                          |                                 | 24 Vout models:       | <b>820 µF max.</b>                                     |
|                          | - dual output                   | 5 / -5 Vout models:   | <b>470 µF max.</b>                                     |
|                          |                                 | 12 / -12 Vout models: | <b>1'200 / 1'200 µF max.</b>                           |
|                          |                                 | 15 / -15 Vout models: | <b>520 / 520 µF max.</b>                               |
|                          |                                 |                       | <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                       |
|                 | Ext. input component:       | KY 220 µF / 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<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<br>- Case Temperature<br>- Storage Temperature                                                                               |
|                        | -40°C to +90°C<br>+105°C max.<br>-55°C to +125°C                                                                                                     |
| Power Derating         | - High Temperature                                                                                                                                   |
|                        | 3.4 %/K above 75°C<br>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><br>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<br>- Mechanical Shock<br>- Thermal Shock                                                                                                 |
|                        | MIL-STD-810F<br>MIL-STD-810F<br>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.

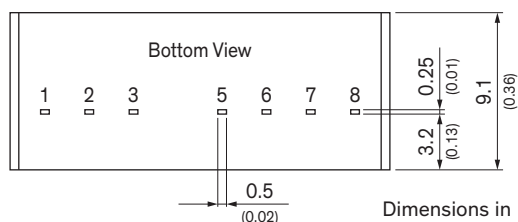
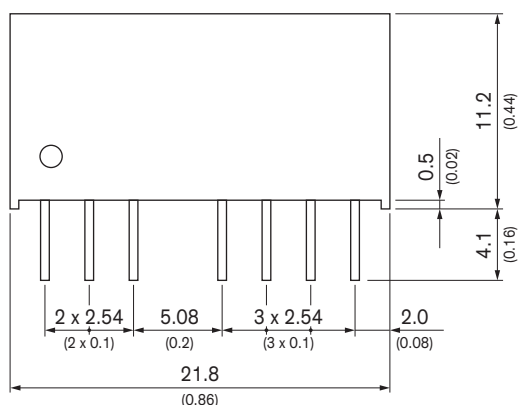
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|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 | - 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: 7a, 7c-I<br>(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)<br>- RoHS Declaration<br><a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a><br>- SCIP Reference Number<br>9efed3a1-acdc-437d-b381-9e7c53d9d2c2 |

### 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

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