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# TRACO POWER

## DC/DC Converter

## TEC 3UI Series, 3 Watt

- **Compact SIP8 plastic case**
- **Ultra-wide input range: 9 VDC to 75 VDC**
- **Certification according to IEC/EN/UL 62368-1**
- **Approved operating temperature from -40°C to +80°C**
- **I/O isolation 2000 VDC**
- **Operating up to 5000m altitude**
- **Short circuit protection and over current limitation**
- **Under voltage lockout**
- **Remote ON/OFF**
- **3-year product warranty**




UL 62368-1 IEC 62368-1

The TEC 3UI is a series of isolated DC/DC converters with ultra-wide input range. This new converter generation is designed to seamlessly replace and offer an alternative to existing 2:1 and 4:1 input converter series, ensuring no compromise on performance or cost-effectiveness. With an input voltage ranging from 9 to 75 VDC, the TEC 3UI covers a variety of standard bus voltages, minimizing the need for multiple model variants in an application. All models are equipped with short circuit protection, over current limitation, under voltage lockout and feature remote control functions. The converters operate reliably up to a maximum temperature of +90°C, with an approved operating temperature range of -40°C to +80°C according to IEC/EN/UL 62368-1 and can operate at altitudes up to 5000 meters. The compact SIP8 plastic case makes the TEC 3UI series ideal for space-constrained applications. Available as both single and dual output models, these converters are suitable for various industrial applications.

## Models

| Order Code | Input Voltage Range | Output 1 | | Output 2 | | Efficiency |
|---|---|---|---|---|---|---|
| | | Vnom | Imax | Vnom | Imax | typ. |
| **TEC 3-2410UI** | 9 - 75 VDC (24 VDC nom.) | 3.3 VDC | 700 mA | | | 75 % |
| **TEC 3-2411UI** | | 5 VDC | 600 mA | | | 79 % |
| **TEC 3-2412UI** | | 12 VDC | 250 mA | | | 81 % |
| **TEC 3-2413UI** | | 15 VDC | 200 mA | | | 81 % |
| **TEC 3-2421UI** | | +5 VDC | 300 mA | −5 VDC | 300 mA | 77 % |
| **TEC 3-2422UI** | | +12 VDC | 125 mA | −12 VDC | 125 mA | 79 % |
| **TEC 3-2423UI** | | +15 VDC | 100 mA | −15 VDC | 100 mA | 79 % |

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## Input Specifications

| | | | |
|---|---|---|---|
| Input Current | - At no load | | 10 mA max. |
| | - At full load | | 185 mA typ. / 400 mA max. |
| Surge Voltage | | | 100 VDC max. (100 ms max.) |
| Input Inrush Current | | | 12 A typ. |
| Under Voltage Lockout | | | 7 VDC min. / 7.5 VDC typ. / 9 VDC max. |
| Recommended Input Fuse | | | 1'000 mA (slow blow) (3.3 Vout model)<br>1'500 mA (slow blow) (other models)<br>(The need of an external fuse has to be assessed in the final application.) |
| Input Filter | | | Internal Capacitor |

## Output Specifications

| | | | |
|---|---|---|---|
| Voltage Set Accuracy | | | ±3% max. |
| Regulation | - Input Variation (Vmin - Vmax) | single output models: | 0.5% max. |
| | | dual output models: | 1% max. |
| | - Load Variation (0 - 100%) | single output models: | 1% max. |
| | | dual output models: | 1.5% max. (Output 1) |
| | | | 1.5% max. (Output 2) |
| | - Voltage Balance (symmetrical load) | dual output models: | 3% max. |
| | - Cross Regulation (25% / 100% asym. load) | dual output models: | 5% max. |
| Ripple and Noise | - 20 MHz Bandwidth | | 100 mVp-p max. (w/ 22 µF \|\| 22 µF) |
| Capacitive Load | - single output | 3.3 Vout models: | 4'400 µF max. |
| | | 5 Vout models: | 2'200 µF max. |
| | | 12 Vout models: | 1'000 µF max. |
| | | 15 Vout models: | 680 µF max. |
| | - dual output | 5 / -5 Vout models: | 330 / 330 µF max. |
| | | 12 / -12 Vout models: | 330 / 330 µF max. |
| | | 15 / -15 Vout models: | 220 / 220 µF max. |
| Minimum Load | | | Not required |
| Temperature Coefficient | | | ±0.05 %/K max. |
| Hold-up Time | | | 1 ms min. |
| Start-up Time | | | 30 ms max. |
| Short Circuit Protection | | | Continuous, Automatic recovery |
| Output Current Limitation | | | 200% typ. of Iout max. |
| Transient Response | - Response Deviation | | 3% typ. / 5% max. (75% to 100% Load Step) |
| | - Response Time | | 500 µs max. (75% to 100% Load Step) |

## Safety Specifications

| | | |
|---|---|---|
| Standards | - IT / Multimedia Equipment | EN 62368-1<br>IEC 62368-1<br>UL 62368-1 |
| | - Certification Documents | www.tracopower.com/overview/tec3ui |
| Pollution Degree | | PD 2 |
| Over Voltage Category | | Not mains connected |

## 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: | www.tracopower.com/overview/tec3ui |

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

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| | | | |
|---|---|---|---|
| EMS (Immunity) | | | EN 55035 (Multimedia) |
| | - 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, ±2 kV, perf. criteria A |
| | | Ext. input component: | 1500 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 |
| | | 1 s: | EN 61000-4-8, 1000 A/m, perf. criteria A |
| EMC / Environmental | - Certification Documents | | www.tracopower.com/overview/tec3ui |

## General Specifications

| | | | |
|---|---|---|---|
| Relative Humidity | | | 95% max. (non condensing) |
| Temperature Ranges | - Operating Temperature | | –40°C to +90°C |
| | - Approved Ambient Temp. | | +90°C max. (at nominal Vin)<br>+80°C max. (at min. Vin or max. Vin)<br>(for compliance to 62368-1) |
| | - Case Temperature | | +110°C max. |
| | - Storage Temperature | | –55°C to +125°C |
| Power Derating | - High Temperature | | 4 %/K above 80°C (average) |
| | | See application note: | www.tracopower.com/overview/tec3ui |
| Cooling System | | | Natural convection (20 LFM) |
| Remote Control | - Voltage Controlled Remote (passive = on) | | On: 3.5 to 12 VDC or open circuit<br>Off: 0 to 1.2 VDC or short circuit<br>Refers to 'Remote' and '-Vin' Pin |
| | - Off Idle Input Current | | 2 mA typ. |
| | - Remote Pin Input Current | | -0.4 mA max. |
| Altitude During Operation | | | 5'000 m max. |
| Regulator Topology | | | Flyback Converter |
| Switching Frequency | | | 267 - 444 kHz (PWM) (all models)<br>300 kHz typ. (PWM) (3.3 Vout model)<br>400 kHz typ. (PWM) (5/12 Vout models)<br>270 kHz typ. (PWM) (15 Vout models) |
| Insulation System | | | Functional Insulation |
| Isolation Test Voltage | - Input to Output, 60 s | | 2'000 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 | | 2'400'000 h (MIL-HDBK-217F, ground benign) |
| Washing Process | | | Not allowed |
| Environment | - Vibration | | MIL-STD-202<br>10 g, 3 axis, sine sweep, 10-55 Hz, 1 oct/min |
| | - Mechanical Shock | | MIL-STD-202<br>100 g, 3 axis, half sine, 6 ms, total 18 shocks |
| | - Thermal Shock | | MIL-STD-202<br>-55°C to +125°C, 1000 cycles, 30 min each |
| Housing Material | | | Non-conductive Plastic (UL 94 V-0 rated) |
| Base Material | | | Non-conductive FR4 (UL 94 V-0 rated) |
| Isolation Frame Material | | | Non-conductive Plastic (UL 94 V-0 rated) |
| Potting Material | | | Silicone (UL 94 V-0 rated) |
| Pin Material | | | Phosphor Bronze (C5191) |
| Pin Foundation Plating | | | Nickel (0.75 µm min.) |
| Pin Surface Plating | | | Tin (120 µm min.), bright |
| Housing Type | | | Plastic Case |
| Mounting Type | | | PCB Mount |
| Connection Type | | | THD (Through-Hole Device) |
| Footprint Type | | | SIP8 |

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

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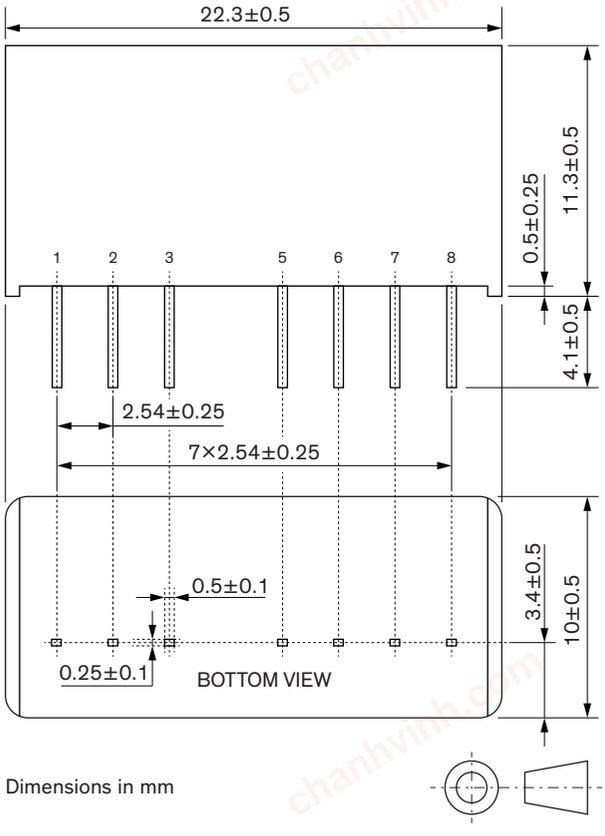


| | | |
|---|---|---|
| Soldering Profile | | Lead-Free Wave Soldering<br>260°C / 5 s max. |
| Weight | | 4.5 g |
| Thermal Impedance | - Case to Ambient | 45.2 K/W typ. |
| Environmental Compliance | - REACH Declaration | www.tracopower.com/info/reach-declaration.pdf |
| | | REACH SVHC list compliant<br>REACH Annex XVII compliant |
| | - RoHS Declaration | www.tracopower.com/info/rohs-declaration.pdf |
| | | Exemptions: 7a, 7c-I<br>(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).) |
| | - SCIP Reference Number | 8e8d0849-d454-4473-8918-bb276d036424 |

## Supporting Documents

| | |
|---|---|
| Overview Link (for additional Documents) | www.tracopower.com/overview/tec3ui |

## Outline Dimensions




Dimensions in mm

| Pinout | | |
|---|---|---|
| **Pin** | **Single** | **Dual** |
| **1** | –Vin | |
| **2** | +Vin | |
| **3** | Remote On/Off | |
| **5** | NC | |
| **6** | +Vout | |
| **7** | –Vout | Common |
| **8** | NC | –Vout |

NC: Not connected

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