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**



cULus (pending) CB Scheme 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 %

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) 1'500 mA (slow blow) (other models) (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 IEC 62368-1 UL 62368-1 (pending)
	- 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) 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/tec3ui

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

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) +80°C max. (at min. Vin or max. Vin) (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 Off: 0 to 1.2 VDC or short circuit 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) 300 kHz typ. (PWM) (3.3 Vout model) 400 kHz typ. (PWM) (5/12 Vout models) 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 10 g, 3 axis, sine sweep, 10-55 Hz, 1 oct/min
	- Mechanical Shock	MIL-STD-202 100 g, 3 axis, half sine, 6 ms, total 18 shocks
	- Thermal Shock	MIL-STD-202 -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

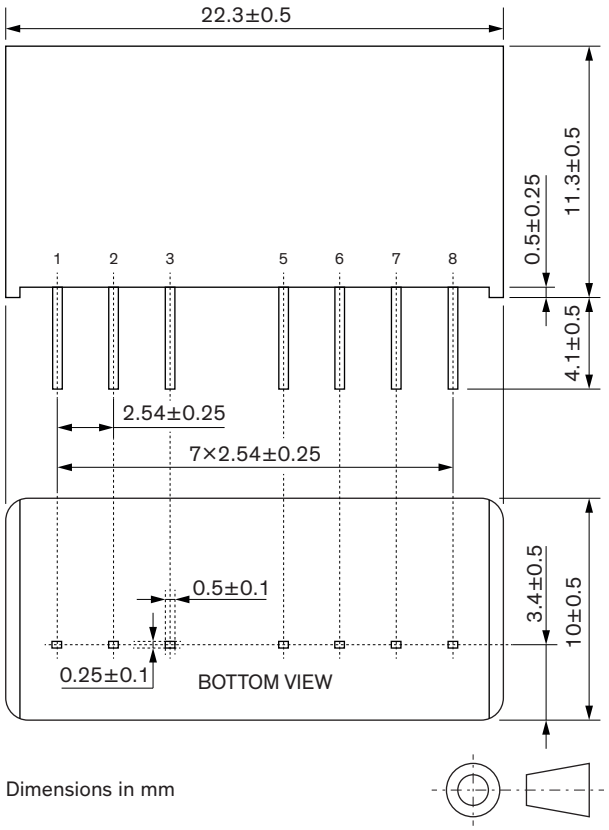
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Soldering Profile		Lead-Free Wave Soldering 260°C / 5 s max.
Weight		4.5 g
Thermal Impedance	- Case to Ambient	45.2 K/W typ.
Environmental Compliance	- REACH Declaration	www.tracopower.com/info/reach-declaration.pdf
		REACH SVHC list compliant REACH Annex XVII compliant
	- RoHS Declaration	www.tracopower.com/info/rohs-declaration.pdf
		Exemptions: 7a, 7c-I (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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