

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



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 typ.
		Vnom	I _{max}	Vnom	I _{max}	
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.
		5 / -5 Vout models: 330 / 330 µF max.
		12 / -12 Vout models: 330 / 330 µF max.
		15 / -15 Vout models: 220 / 220 µF max.
	- dual output	
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
	- 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)	- Electrostatic Discharge	EN 55035 (Multimedia)
	- RF Electromagnetic Field	Air: EN 61000-4-2, ± 8 kV, perf. criteria A
	- EFT (Burst) / Surge	Contact: EN 61000-4-2, ± 6 kV, perf. criteria A
	- Conducted RF Disturbances	EN 61000-4-3, 10 V/m, perf. criteria A
	- PF Magnetic Field	EN 61000-4-4, ± 2 kV, perf. criteria A
EMC / Environmental	- Certification Documents	EN 61000-4-5, ± 2 kV, perf. criteria A
		Ext. input component: 1500 μ F / 100 V
		Continuous: EN 61000-4-6, 10 Vrms, perf. criteria A
		1 s: EN 61000-4-8, 100 A/m, perf. criteria A
		1 s: EN 61000-4-8, 1000 A/m, perf. criteria A
		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)
Power Derating	- Case Temperature	+110°C max.
	- Storage Temperature	-55°C to +125°C
	- 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
	- Off Idle Input Current	Refers to 'Remote' and '-Vin' Pin
	- Remote Pin Input Current	2 mA typ.
Altitude During Operation		-0.4 mA max.
Regulator Topology		5'000 m max.
Switching Frequency		Flyback Converter
Insulation System		267 - 444 kHz (PWM) (all models)
Isolation Test Voltage	- Input to Output, 60 s	300 kHz typ. (PWM) (3.3 Vout model)
Isolation Resistance	- Input to Output, 500 VDC	400 kHz typ. (PWM) (5/12 Vout models)
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	270 kHz typ. (PWM) (15 Vout models)
Reliability	- Calculated MTBF	Functional Insulation
Washing Process		2'000 VDC
Environment	- Vibration	1'000 M Ω min.
	- Mechanical Shock	50 pF max.
	- Thermal Shock	2'400'000 h (MIL-HDBK-217F, ground benign)
		Not allowed
Housing Material		MIL-STD-202
Base Material		10 g, 3 axis, sine sweep, 10-55 Hz, 1 oct/min
Isolation Frame Material		MIL-STD-202
Potting Material		100 g, 3 axis, half sine, 6 ms, total 18 shocks
Pin Material		MIL-STD-202
Pin Foundation Plating		-55°C to +125°C, 1000 cycles, 30 min each
Pin Surface Plating		Non-conductive Plastic (UL 94 V-0 rated)
Housing Type		Non-conductive FR4 (UL 94 V-0 rated)
Mounting Type		Non-conductive Plastic (UL 94 V-0 rated)
Connection Type		Silicone (UL 94 V-0 rated)
Footprint Type		Phosphor Bronze (C5191)
		Nickel (0.75 μ m min.)
		Tin (120 μ m min.), bright
		Plastic Case
		PCB Mount
		THD (Through-Hole Device)
		SIP8

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

NC: Not connected