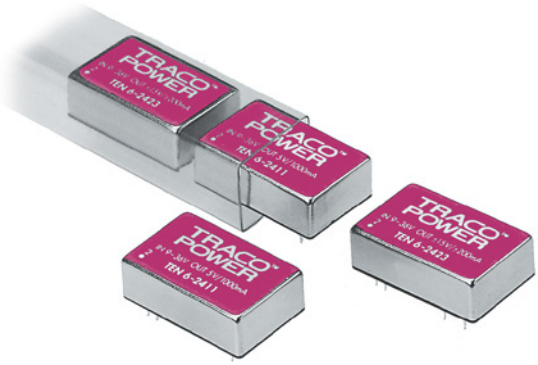
DC/DC Converters

TEN 6 Series, 6 Watt

UL 60950

Features

- Ultra wide 4:1 input range
- Full SMD design
- High efficiency up to 84%
- Extended operating temperature range –40°C to +85°C
- Indefinite short circuit protection
- Reverse voltage protection
- I/O isolation 1'500 VDC
- Input filter meets EN 55022, Class A and FCC, level A without external components
- Shielded metal case with insulated Baseplate
- 24-pin DIP with industry standard pinout
- 3-year product warranty



The TEN 6 series DC/DC converter is designed for applications requiring very wide operating voltage range. Typical applications are tele- and data communication systems, mobile battery powered equipment and industrial process control systems operation from different input voltages i.e. 12/24 VDC or 24/48 VDC battery voltages. High efficiency allows operating temperatures up to +85°C. Input filtering to EN 55022, class A and low output ripple minimise design-in time and cost.

Models

Ordercode	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TEN 6-2410	9 – 36 VDC	3.3 VDC	1200 mA	78 %
TEN 6-2411		5 VDC	1000 mA	81 %
TEN 6-2412		12 VDC	500 mA	84 %
TEN 6-2413		15 VDC	400 mA	84 %
TEN 6-2421		±5 VDC	±500 mA	81 %
TEN 6-2422		±12 VDC	±250 mA	84 %
TEN 6-2423		±15 VDC	±200 mA	84 %
TEN 6-4810	18 – 75 VDC	3.3 VDC	1200 mA	78 %
TEN 6-4811		5 VDC	1000 mA	81 %
TEN 6-4812		12 VDC	500 mA	84 %
TEN 6-4813		15 VDC	400 mA	84 %
TEN 6-4821		±5 VDC	±500 mA	81 %
TEN 6-4822		±12 VDC	±250 mA	84 %
TEN 6-4823		±15 VDC	±200 mA	84 %

Input Specifications

Input current no load /full load		24 Vin models	22 mA / 600 mA typ. (at 12 VDC Vin) 20 mA / 300 mA typ. (at 24 VDC Vin)
		48 Vin models	11 mA / 300 mA typ. (at 24 VDC Vin) 10 mA / 150 mA typ. (at 48 VDC Vin)
Start-up voltage / under voltage shut down		24 Vin models 48 Vin models	8.5 VDC / 8.0 VDC typ. 17 VDC / 16 VDC typ.
Surge voltage (1 sec. max.)		24 Vin models 48 Vin models	50 V max. 100 V max.
Reverse voltage protection			1.0 A max.
Conducted noise (input)			EN 55022 level A, FCC part 15, level A

Output Specifications

Voltage set accuracy			±1 %
Regulation	– Input variation Vin min. to Vin max. – Load variation 10 – 100 %		0.3 % max.
		single output models	1.0 % max.
		dual output models balanced load	1.0 % max.
		dual output models unbalanced load	3.0 % max.
Ripple and noise (20 MHz Bandwidth)			75 mVpk-pk max
Temperature coefficient			±0.02 %/K
Current limitation			>110 % of Iout max., constant current
Short circuit protection			indefinite (automatic recovery)
Capacitive load		single output models	3'000 µF max.
		dual output models	680 µF max.

General Specifications

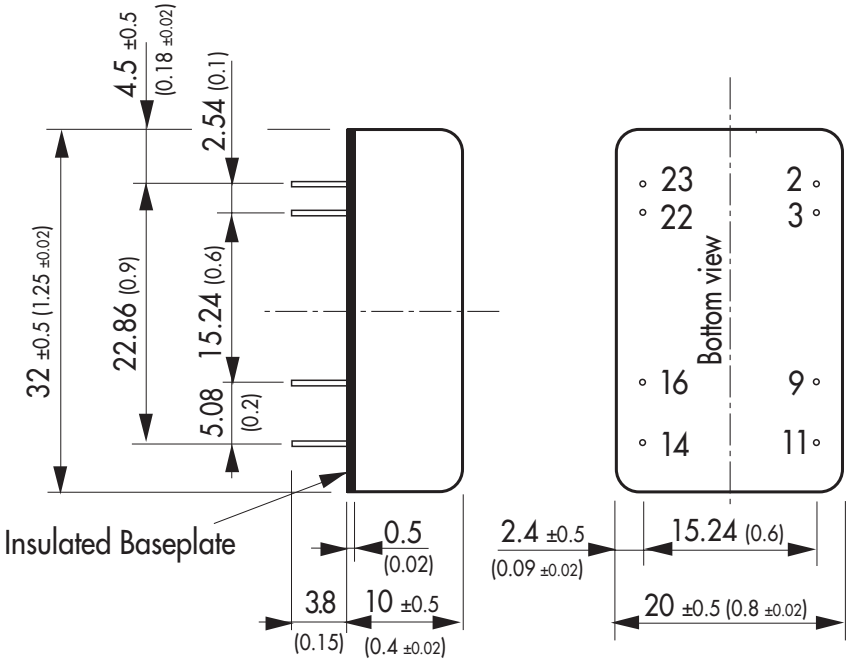
Temperature ranges	– Operating	–40°C to +85°C
	– Case temperature	+100°C max.
	– Storage	–55°C to +125°C
Derating		3.5 %/K above +70°C
Humidity (non condensing)		95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)		>1 Mio. h
Isolation voltage (60 sec.)	– Input/Output	1'500 VDC
Isolation capacitance	– Input/Output	380 pF typ
Isolation resistance	– Input/Output (500 VDC)	> 1'000 M Ohm
Switching frequency		300 kHz typ. (Pulse frequency modulation PFM)
Safety standards		UL 60950-1, IEC 60950-1, EN 60950-1
Safety approval		CSA File No. 226037 http://directories.csa-international.org
Environmental compliance	– Reach	www.tracopower.com/products/ten6-reach.pdf
	– RoHS	directive 2011/65/EU

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

Physical Specifications

Case material	steel, nickel plated
Baseplate material	non conductive FR4
Potting material	silicon TSE 3331 (UL 94V-0 rated)
Weight	14 g (0.49 oz)
Soldering temperature	max. 265 °C / 10 sec.

Outline Dimensions mm (inches)



Pin diameter ø 0.5 ±0.05 (0.02 ±0.002)
Tolerances ±0.5 (0.02)

Pin-Out

Pin	Single	Dual
2	–Vin (GND)	–Vin (GND)
3	–Vin (GND)	–Vin (GND)
9	No pin	Common
11	No function	–Vout
14	+Vout	+Vout
16	–Vout	Common
22	+Vin (Vcc)	+Vin (Vcc)
23	+Vin (Vcc)	+Vin (Vcc)