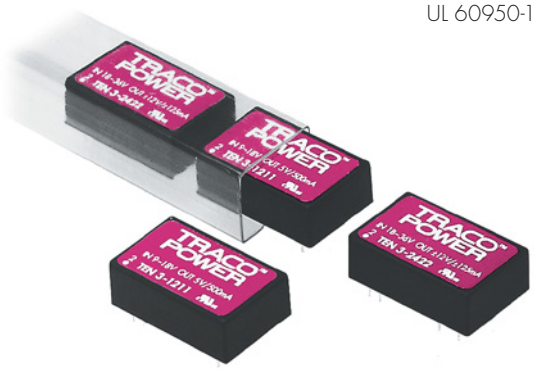
DC/DC Converters

TEN 3 Series, 3 Watt

CB Scheme c SP us
UL 60950-1

Features

- Wide 2 : 1 input range
- High efficiency up to 84%
- Full SMD-design
- Short circuit protection
- Extended operating temperature range –40°C to 85°C
- I/O isolation 1'500 VDC
- Input filter to meet EN 55022, Class A and FCC, level A without external components
- 24-pin DIP with industry standard pinout
- High reliability, MTBF >1.1 Mio. h
- 3-year product warranty



The TEN 3 series of DC/DC converters, comprising 28 models, has been designed for a wide range of applications in industrial and communication systems. High efficiency allows an operating temperature range of –40°C to +85°C. Other features of these converters are internal filtering according to EN 55022-A and FCC, level A. Full SMD-design guarantees a high reliability of this product.

Models

Ordercode	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TEN 3-0510	4.5 – 9.0 VDC (nominal 5 VDC)	3.3 VDC	600 mA	70 %
TEN 3-0511		5 VDC	500 mA	73 %
TEN 3-0512		12 VDC	250 mA	77 %
TEN 3-0513		15 VDC	200 mA	77 %
TEN 3-0521		±5 VDC	±250 mA	72 %
TEN 3-0522		±12 VDC	±125 mA	75 %
TEN 3-0523		±15 VDC	±100 mA	75 %
TEN 3-1210	9 – 18 VDC (nominal 12 VDC)	3.3 VDC	600 mA	74 %
TEN 3-1211		5 VDC	500 mA	78 %
TEN 3-1212		12 VDC	250 mA	82 %
TEN 3-1213		15 VDC	200 mA	82 %
TEN 3-1221		±5 VDC	±250 mA	77 %
TEN 3-1222		±12 VDC	±125 mA	80 %
TEN 3-1223		±15 VDC	±100 mA	80 %
TEN 3-2410	18 – 36 VDC (nominal 24 VDC)	3.3 VDC	600 mA	76 %
TEN 3-2411		5 VDC	500 mA	79 %
TEN 3-2412		12 VDC	250 mA	84 %
TEN 3-2413		15 VDC	200 mA	84 %
TEN 3-2421		±5 VDC	±250 mA	79 %
TEN 3-2422		±12 VDC	±125 mA	82 %
TEN 3-2423		±15 VDC	±100 mA	82 %
TEN 3-4810	36 – 72 VDC (nominal 48 VDC)	3.3 VDC	600 mA	76 %
TEN 3-4811		5 VDC	500 mA	79 %
TEN 3-4812		12 VDC	250 mA	84 %
TEN 3-4813		15 VDC	200 mA	84 %
TEN 3-4821		±5 VDC	±250 mA	80 %
TEN 3-4822		±12 VDC	±125 mA	84 %
TEN 3-4823		±15 VDC	±100 mA	84 %

Input Specifications

Input current no load / full load	5 Vin models	40 mA / 800 mA typ.
	12 Vin models	20 mA / 300 mA typ.
	24 Vin models	5 mA / 150 mA typ.
	48 Vin models	3 mA / 75 mA typ.
Start-up voltage / under voltage shut down	5 Vin models	4 VDC / 3.5 VDC typ.
	12 Vin models	7 VDC / 6.5 VDC typ.
	24 Vin models	12 VDC / 11 VDC typ.
	48 Vin models	24 VDC / 22 VDC typ
Surge voltage (1 sec. max.)	5 Vin models	11 V max.
	12 Vin models	25 V max.
	24 Vin models	50 V max.
	48 Vin models	100 V max.
Reverse voltage protection		1.0 A max.
Conducted noise (input)	(5 V input models excluded)	EN 55022 level A, FCC part 15, level A

Output Specifications

Voltage set accuracy		±1 %
Regulation	– Input variation Vin min. to Vin max.	0.5 % max.
	– Load variation 10 – 100 %	
	single output models	0.5 % max.
	dual output models balanced load	1.0 % max.
	dual output models unbalanced load	2.0 % max.
Ripple and noise (20 MHz Bandwidth)		50 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	4000 µF max.
	dual output models	1000 µF max.

General Specifications

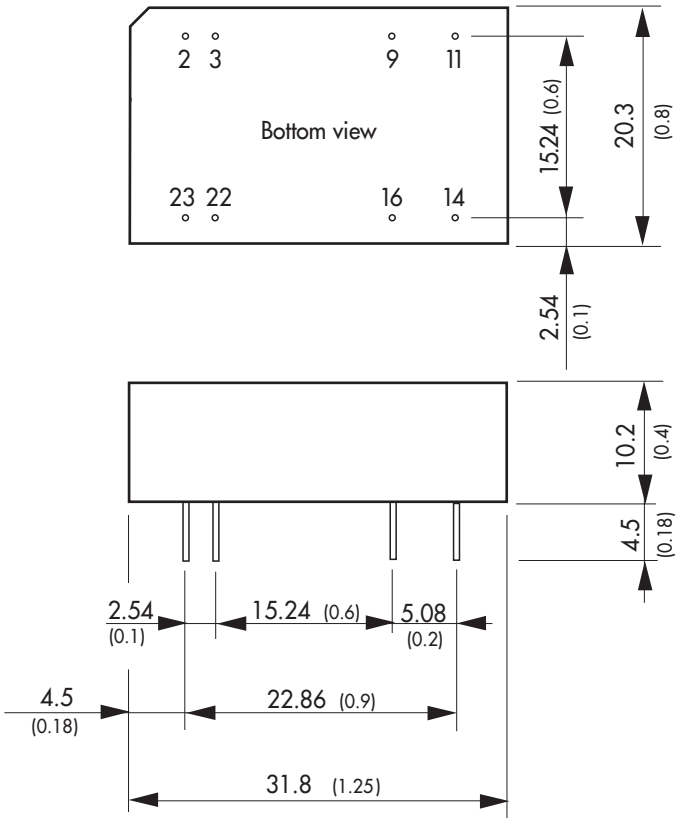
Temperature ranges	– Operating	–40°C to +85°C
	– Case temperature	+100°C max.
	– Storage	–55°C to +125°C
Derating		3 %/K above 70°C
Humidity (non condensing)		95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217 F, at +25°C, ground benign)		>1.1 Mio. h
Isolation voltage (60 sec.)	– Input/Output	1'500 VDC
Isolation capacitance	– Input/Output	65 pF typ
Isolation resistance	– Input/Output (500 VDC)	>1'000 M Ohm
Switching frequency		300 kHz typ. (Pulse frequency modulation PFM)
Safety standards		cUL/UL 60950-1, IEC/EN 60950-1
Safety approval		CSA File No. 226037 http://directories.csa-international.org
Environmental compliance	– Reach	www.tracopower.com/products/ten3-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

Casing material	non conductive FR4
Potting material	epoxy (UL 94V-0 rated)
Weight	12 g (0.42 oz)
Soldering temperature	max. 265°C / 10 sec.

Outline Dimensions



Dimensions in [mm], () = Inch
Pin diameter ø 0.5 ±0.05 (0.02) ±0.002
Tolerances ±0.25 (±0.01)
Pin pitch tolerances ±0.13 (±0.005)

Pin-Out

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