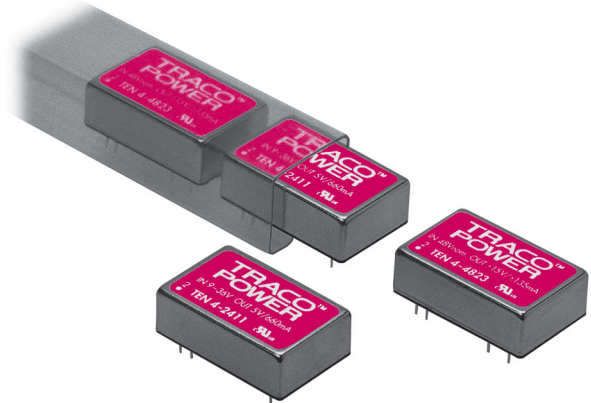


Features

- Ultra wide 4 : 1 Input Range
9 – 36 VDC or 18 – 75 VDC
- Full SMD-Design
- High Efficiency up to 85%
- 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
- MTBF >1 Mio. h
- 3 Year Product Warranty



The TEN 4 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 equipments and industrial process control systems with operation from different input voltages i.e. 12/24 VDC or 24/48 VDC battery voltages. High efficiency allows operation up to 75°C without derating. Input filtering according to EN 55022-A and FCC, level A. Low output ripple minimise design-in time and cost.

Models

Ordercode	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TEN 4-2410	9 – 36 VDC	3.3 VDC	900 mA	77 %
TEN 4-2411		5 VDC	660 mA	81 %
TEN 4-2412		12 VDC	330 mA	83 %
TEN 4-2413		15 VDC	265 mA	83 %
TEN 4-2421		± 5 VDC	± 300 mA	80 %
TEN 4-2422		± 12 VDC	± 165 mA	83 %
TEN 4-2423		± 15 VDC	± 130 mA	83 %
TEN 4-4810	18 – 75 VDC	3.3 VDC	900 mA	78 %
TEN 4-4811		5 VDC	660 mA	82 %
TEN 4-4812		12 VDC	330 mA	85 %
TEN 4-4813		15 VDC	265 mA	85 %
TEN 4-4821		± 5 VDC	± 300 mA	82 %
TEN 4-4822		± 12 VDC	± 165 mA	85 %
TEN 4-4823		± 15 VDC	± 130 mA	85 %

Input Specifications

Input current no load /full load	24 Vin models	20 mA / 400 mA typ. (at 12 VDC Vin)
	48 Vin models	20 mA / 200 mA typ. (at 24 VDC Vin) 6 mA / 200 mA typ. (at 24 VDC Vin) 6 mA / 100 mA typ. (at 48 VDC Vin)
Start-up voltage / under voltage shut down	24 Vin models	8.5 VDC /8.0 VDC typ.
	48 Vin models	17 VDC /16 VDC typ.
Surge voltage (1 sec. max.)	24 Vin models	50 V max.
	48 Vin models	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.	0.3 % max.
	– Load variation 10 – 100 %	
	– 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)		50 mVpk-pk max
Temperature coefficient		± 0.02 % / K
Current limitation		> 110% of Iout max., constant current
Short circuit protection		Hiccup mode, indefinite (automatic recovery)
Capacitive load	– single output models	680 µF max.
	– dual output models	300 µF max.

General Specifications

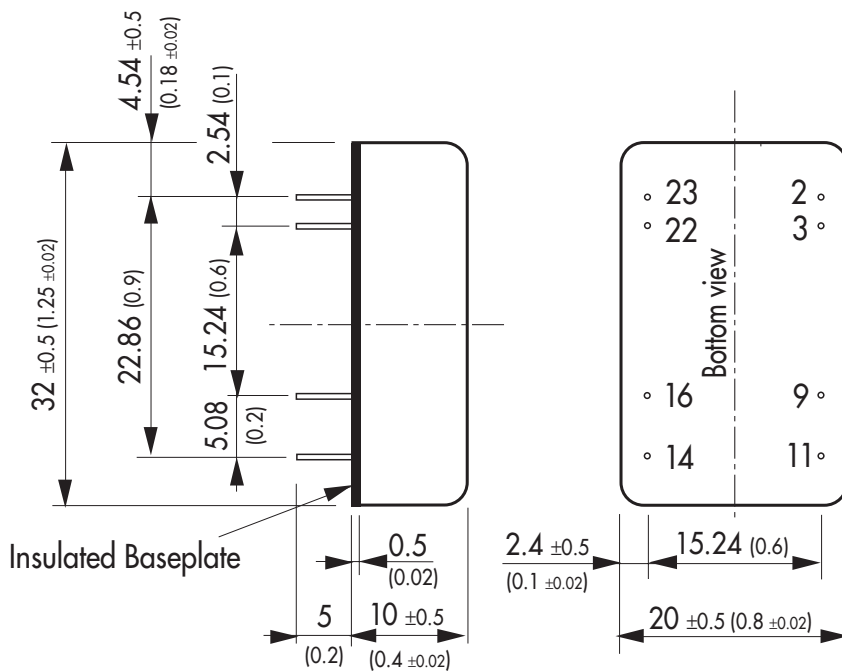
Temperature ranges	– Operating	– 40 °C ... + 75 °C (no derating)
	– Case temperature	+ 95 °C max.
	– Storage	– 40 °C ... + 125 °C
Humidity (non condensing)		95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217 E)		>1 Mio. h @ + 25 °C
Isolation voltage	Input/Output	1'500 VDC
Isolation capacity	Input/Output	380 pF typ
Isolation resistance	Input/Output (500 VDC)	> 1'000 M Ohm
Switching frequency		350 kHz typ. (Pulse frequency modulation PFM)
Safety standards		UL 1950 , IEC 60950, EN 60950 Compliance up to 60 VDC input voltage (SELV limit)
Safety approval		cUL / UL File E188913

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

Physical Specifications

Case material	Steel chrome-nickel plated
Baseplate	Epoxy
Potting material	Silicon rubber TSE (UL 94V-0 rated)
Weight	14 g (0.55 oz)
Soldering temperature	max. 265 °C / 10 sec.

Outline Dimensions mm (inches)



Pin diameter $\varnothing 0.5 \pm 0.05$ (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 con.	-Vout
14	+Vout	+Vout
16	-Vout	Common
22	+Vin (Vcc)	+Vin (Vcc)
23	+Vin (Vcc)	+Vin (Vcc)

Specifications can be changed without notice