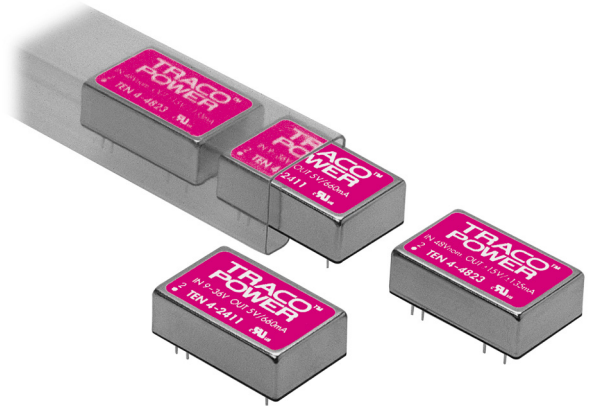


#### Features

- ◆ 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
- ◆ 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
- ◆ MTTF >1 Mio. h
- ◆ 3-year product warranty

*not recommended for new design in*



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 at full load. Input filtering according to EN 55022-A and FCC, level A. Low output ripple minimize design-in time and cost.

#### Models

Ordercode	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TEN 4-2410	9 – 36 VDC (24 VDC nominal)	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 (48 VDC nominal)	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 typ. / 400 mA typ. (at 12 VDC Vin) 20 mA typ. / 200 mA typ. (at 24 VDC Vin)
	48 Vin models	6 mA typ. / 200 mA typ. (at 24 VDC Vin) 6 mA typ. / 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.
Conducted noise (input)	EN 55022 level A, FCC part 15, level A	

### Output Specifications

Voltage set accuracy	±1.0 %	
Regulation	– Input variation Vin min. to Vin max.	0.3 % max.
	– Load variation 10 – 100 %	
	single output models	1.0 % max.
	dual output models	1.0 % max. balanced load 3.0 % max. unbalanced load
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	3000 µF max.
	– Dual output models	680 µF max.

### General Specifications

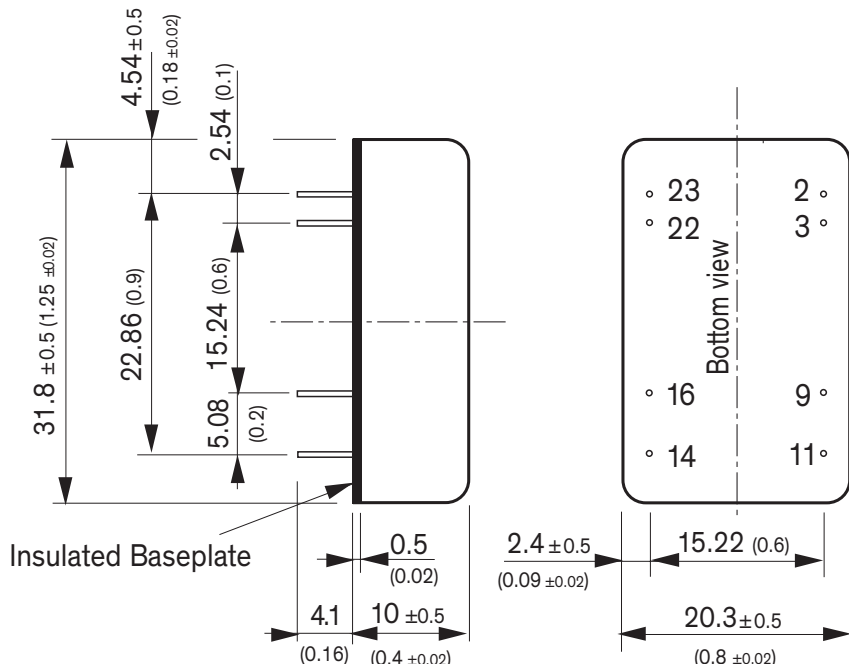
Temperature ranges	– Operating	–40°C to +75°C
	– Casing temperature	+95°C max.
	– Storage	–40°C to +125°C
Humidity (non condensing)	95 % rel H max.	
Reliability, calculated MTTF (MIL-HDBK-217F @ +25°C, ground benign)	>1 Mio. h	
Isolation voltage (60 sec.)	– Input/Output	1'500 VDC
Isolation capacity	– 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/EN 60950 Compliance up to 60 VDC input voltage (SELV limit)	
Safety approvals	– UL/cUL	<a href="http://www.ul.com">www.ul.com</a> > UL File no.: E188913

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

**Physical Specifications**

Casing material	Steel chrome-nickel plated
Baseplate material	Epoxy
Potting material	Epoxy (UL 94 V-0 rated)
Weight	16.2 g (0.57 oz)
Soldering temperature	max. 265°C / 10 sec.

**Outline Dimensions**



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

NC = Not connected

Dimensions in [mm], ( ) = Inch  
 Pin diameter  $\varnothing$  0.5 ±0.05 (0.02 ±0.002)  
 Tolerances ±0.5 (±0.02)  
 Pin pitch tolerances ±0.35 (±0.014)