

#### Features

- Ultrawide 4 : 1 Input Range  
9 – 36 VDC and 18 – 75 VDC
- Full SMD-Design
- Input Filter meets EN 55022, Class A and FCC, Level A without external Components
- Indefinite Short-Circuit Protection
- Overvoltage Protection
- I/O-Isolation 1500 VDC
- 2" x 1" Metal Package
- Insulated Baseplate
- Industry Standard Pinout
- 2 Year Product Warranty



The TEN 12 series of DC/DC converters has been designed for a wide range of applications including communications, industrial systems and battery powered mobile equipments. Key features are high power density (12W in a 2" x 1" x 0.4" package) and ultrawide input ranges of 9– 36 VDC and 18– 75 VDC. Other features of this converter are internal filtering according to EN 55022, level A, safety approval to EN 60950 and UL 1950, wide operating temperature range and remote on/off (opt.).

#### Models

Ordercode	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TEN 12-2410	9 – 36 VDC	3,3 VDC	2'400 mA	78 %
TEN 12-2411		5 VDC	2'000 mA	82 %
TEN 12-2412		12 VDC	1'000 mA	84 %
TEN 12-2413		15 VDC	800 mA	84 %
TEN 12-2421		± 5 VDC	± 1'000 mA	82 %
TEN 12-2422		± 12 VDC	± 500 mA	84 %
TEN 12-2423		±15 VDC	± 400 mA	84 %
TEN 12-4810	18 – 75 VDC	3,3 VDC	2'400 mA	78 %
TEN 12-4811		5 VDC	2'000 mA	82 %
TEN 12-4812		12 VDC	1'000 mA	84 %
TEN 12-4813		15 VDC	800 mA	84 %
TEN 12-4821		± 5 VDC	± 1'000 mA	82 %
TEN 12-4822		± 12 VDC	± 500 mA	84 %
TEN 12-4823		± 15 VDC	± 400 mA	84 %

### Input Specifications

Input current (no load)	24 Vin models 48 Vin models	40 mA typ. 20 mA typ.
Input current (full load)	24 Vin; 3.3 Vout models: 24 Vin; 5 & ±5 Vout models: 24 Vin; other output models: 48 Vin; 3.3 Vout models: 48 Vin; 5 & ±5 Vout models: 48 Vin; other output models:	425 mA typ. 510 mA typ. 600 mA typ. 215 mA typ. 255 mA typ. 300 mA typ.
Surge voltage (1 sec. max.)	24 Vin models 48 Vin models	42 V max.. 84 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 – 90 %	± 0.5 % max. ± 0.5 % max.
Ripple and noise (20 MHz Bandwidth)		50 mVpk-pk typ.
Temperature coefficient		± 0.02 % / °C
Output current limitation		>110% of Iout max. foldback
Short circuit protection		Hiccup mode, indefinite (automatic recovery)
Capacitive load	– single output models – dual output models	470 µF max. 100 µF max.

### General Specifications

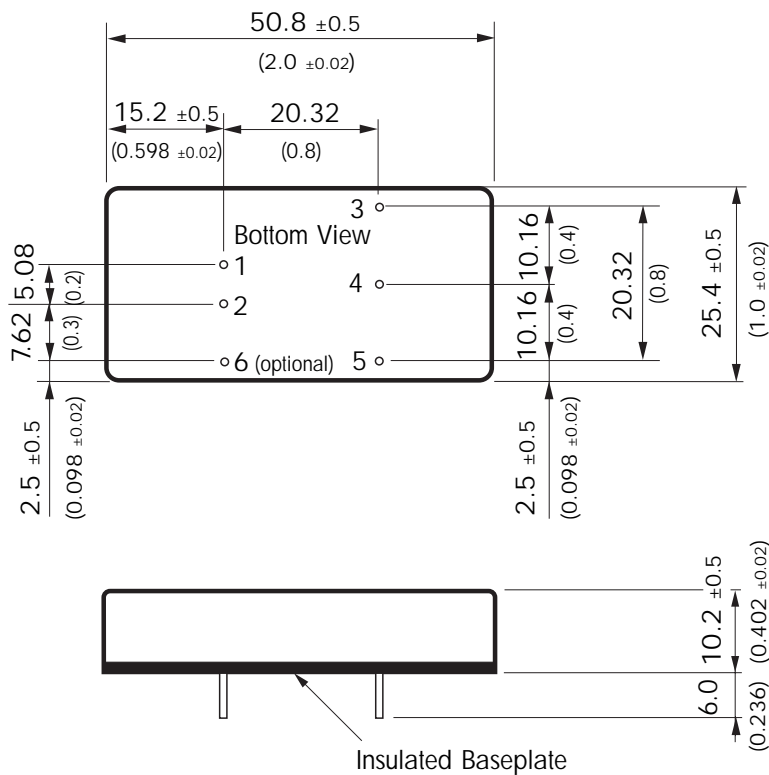
Temperature ranges	– Operating – Case temperature – Storage	– 40 °C ... + 60 °C + 95 °C max. – 40 °C ... + 125 °C
Derating		above 60°C: 3% /°C
Humidity (non condensing)		95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217 E)		> 700'000 h @ +25 °C
Isolation voltage	Input/Output	1'500 VDC
Isolation capacity	Input/Output	200 pF typ
Isolation resistance	Input/Output (500 VDC)	> 1'000 M Ohm
Switching frequency (fixed)		400 kHz typ. (Pulse width modulation PWM)
Remote ON/OFF (optional):	ON: OFF: OFF idle current:	2.5 ... 5.5 VDC or open circuit. 0 ... 0.8 VDC or short circuit pin 2 and pin 6 10 mA max.
Safety standards:		UL 1950, EN 60950, IEC 60950 Compliance up to 60 VDC input voltage (SELV limit)
Safety approvals:		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 (flammability to UL 94 V-0)
Weight	30 g (1.2 oz)
Soldering temperature	max. 250 °C / 10 sec.

**Outline Dimensions mm (inches)**



Pin diameter  $\varnothing$  1.0 ±0.05 (0.039) ±0.002

Pin-Out		
Pin	Single	Dual
1	+Vin (Vcc)	+Vin (Vcc)
2	-Vin (GND)	-Vin (GND)
3	+Vout	+Vout
4	No pin	Common
5	-Vout	-Vout
6	Remote on/off (option)	Remote on/off (option)

Specifications can be changed without notice