

#### Features

- Wide 2 : 1 Input Range
- High Power Density
- Operating Temp. Range  
– 40°C to +75°C
- Indefinite Short-Circuit Protection
- I/O-Isolation 1500 VDC
- Input Filter meets EN 55022, Class A and FCC, Level A without external Components
- Industry Standard Pinout
- Shielded Metal Case with insulated Baseplate
- High Reliability, MTBF >1 Mio. h
- 2 Year Product Warranty



The TEN 10 series of DC/DC converters, comprising 24 different models, has been designed for a wide range of applications including communications, industrial systems and battery powered equipments. Full SMD-design with use of ceramic chip capacitors guarantees a high reliability and a long lifetime. Other features of this converters are internal filter to meet EN 55022, class A and FCC, level A and a high efficiency.

Models				
Ordercode	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TEN 10-1210	9 – 18 VDC	3,3 VDC	2'400 mA	72 %
TEN 10-1211		5 VDC	2'000 mA	77 %
TEN 10-1212		12 VDC	830 mA	80 %
TEN 10-1213		15 VDC	670 mA	80 %
TEN 10-1215		24 VDC	415 mA	81 %
TEN 10-1221		± 5 VDC	± 1'000 mA	78 %
TEN 10-1222		± 12 VDC	± 415 mA	81 %
TEN 10-1223		± 15 VDC	± 330 mA	80 %
TEN 10-2410	18 – 36 VDC	3,3 VDC	2'400 mA	76 %
TEN 10-2411		5 VDC	2'000 mA	78 %
TEN 10-2412		12 VDC	830 mA	82 %
TEN 10-2413		15 VDC	670 mA	82 %
TEN 10-2415		24 VDC	415 mA	83 %
TEN 10-2421		± 5 VDC	± 1'000 mA	80 %
TEN 10-2422		± 12 VDC	± 415 mA	82 %
TEN 10-2423		± 15 VDC	± 330 mA	82 %
TEN 10-4810	36 – 75 VDC	3,3 VDC	2'400 mA	76 %
TEN 10-4811		5 VDC	2'000 mA	80 %
TEN 10-4812		12 VDC	830 mA	82 %
TEN 10-4813		15 VDC	670 mA	83 %
TEN 10-4815		24 VDC	415 mA	83 %
TEN 10-4821		± 5 VDC	± 1'000 mA	81 %
TEN 10-4822		± 12 VDC	± 415 mA	83 %
TEN 10-4823		± 15 VDC	± 330 mA	83 %

**Input Specifications**

Input current (no load)	12 Vin models	30 mA typ.
	24 Vin models	20 mA typ.
	48 Vin models	10 mA typ.
Input current (full load)	12 Vin; 3.3 Vout models:	915 mA typ.
	12 Vin; 5 & ±5 Vout models:	1080 mA typ.
	12 Vin; other output models:	1045 mA typ.
	24 Vin; 3.3 Vout models:	435 mA typ.
	24 Vin; 5 & ±5 Vout models:	530 mA typ.
	24 Vin; other output models:	510 mA typ.
	48 Vin; 3.3 Vout models:	215 mA typ.
	48 Vin; 5 & ±5 Vout models:	260 mA typ.
	48 Vin; other output models:	250 mA typ.
Start-up voltage / under voltage shut down	12 Vin models	8.5 VDC / 8 VDC
	24 Vin models	16.5 VDC / 16 VDC
	48 Vin models	32.5 VDC / 32 VDC
Surge voltage (1 sec. 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)		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 – 90 %	
	– single output models	± 0.5 % max.
	– dual output models balanced load	± 1 % max.
– dual output models unbalanced load	± 3 % max.	
Ripple and noise (20 MHz Bandwidth)		50 mVpk-pk max.
Temperature coefficient		± 0.02 % / °C
Output current limitation		>110% of Iout max., constant current
Short circuit protection		Hiccup mode, indefinite (automatic recovery)
Capacitive load	– single output models	2200 µF max.
	– dual output models	470 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	120 pF typ
Isolation resistance	Input/Output (500 VDC)	> 1'000 M Ohm

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

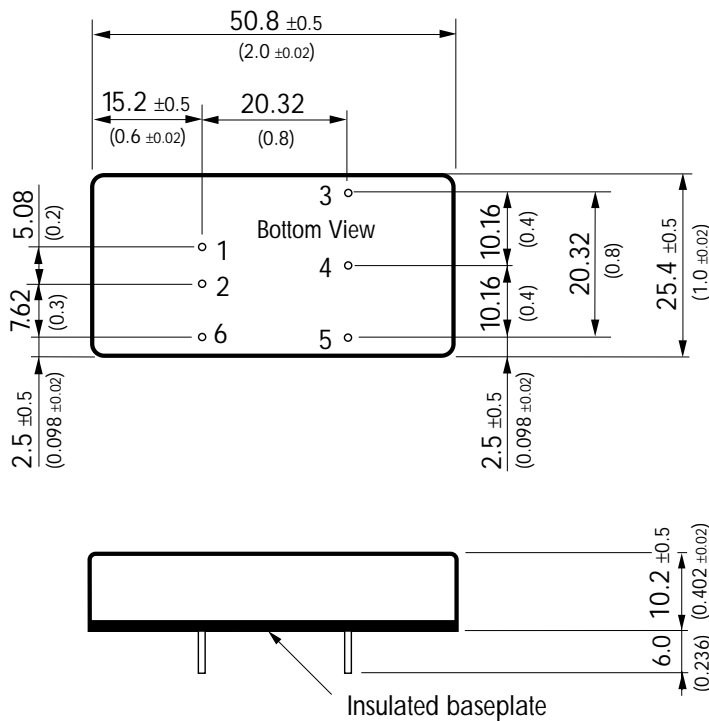
**General Specifications**

Switching frequency (fixed)	300 kHz typ. (Pulse width modulation PWM)
Safety standards	UL 1950, EN 60950, IEC 60950 Compliance up to 60 VDC input voltage(SELV limit)
Safety approvals	UL /cUL File E188913

**Physical Specifications**

Case material	Steel chrome-nickel plated
Baseplate	Epoxy
Potting material	Silicon rubber TES (flammability to UL 94V-0)
Weight	30 g (1.2 oz)
Soldering temperature	max. 250 °C / 10 sec.

**Outline Dimensions mm (inches)**



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	Case ground (option)	Case ground (option)

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

Specifications can be changed without notice