

#### Features

- Wide 2 : 1 Input Range
- High Efficiency up to 88 %
- Extended Operating Temperature Range – 40°C to +85°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 Footprint
- Shielded Metal Case with insulated Baseplate
- 3 Year Product Warranty



The TEN 15 series is a family of high performance 15W DC/DC converters in a compact 2"x1" low profile package with industry-standard footprint.

A high efficiency allows a wide operating temperature range of –40°C to 85°C. A built-in EMI filter meets EN 55022, class A without any external components. Further standard features include over voltage protection and short-circuit protection.

Typical applications for these converters are battery operated equipment, instrumentation, distributed power architectures in communication and industrial electronics, everywhere where isolated, tightly regulated voltages are required.

Models				
Ordercode	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TEN 15-1210	9 – 18 VDC	3,3 VDC	4'000 mA	79 %
TEN 15-1211		5 VDC	3'000 mA	82 %
TEN 15-1212		12 VDC	1'250 mA	86 %
TEN 15-1213		15 VDC	1'000 mA	86 %
TEN 15-1221		± 5 VDC	± 1'500 mA	83 %
TEN 15-1222		± 12 VDC	± 625 mA	86 %
TEN 15-1223		± 15 VDC	± 500 mA	84 %
TEN 15-2410	18 – 36 VDC	3,3 VDC	4'000 mA	80 %
TEN 15-2411		5 VDC	3'000 mA	84 %
TEN 15-2412		12 VDC	1'250 mA	85 %
TEN 15-2413		15 VDC	1'000 mA	85 %
TEN 15-2421		± 5 VDC	± 1'500 mA	84 %
TEN 15-2422		± 12 VDC	± 625 mA	86 %
TEN 15-2423		± 15 VDC	± 500 mA	86 %
TEN 15-4810	36 – 75 VDC	3,3 VDC	4'000 mA	81 %
TEN 15-4811		5 VDC	3'000 mA	83 %
TEN 15-4812		12 VDC	1'250 mA	87 %
TEN 15-4813		15 VDC	1'000 mA	86 %
TEN 15-4821		± 5 VDC	± 1'500 mA	85 %
TEN 15-4822		± 12 VDC	± 625 mA	88 %
TEN 15-4823		± 15 VDC	± 500 mA	87 %

### Input Specifications

Input current no load /full load	12 Vin models: 24 Vin models: 48 Vin models:	40 mA typ. 25 mA typ. 20 mA typ.
Input current (full load)	12 Vin; 3.3 Vout models: 12 Vin; other output models: 24 Vin; 3.3 Vout models: 24 Vin; other output models: 48 Vin; 3.3 Vout models: 48 Vin; other output models:	1580 mA typ. 1500 mA typ. 780 mA typ. 740 mA typ. 390 mA typ. 370 mA typ.
Surge voltage (100 msec. max.)	12 Vin models: 24 Vin models: 48 Vin models:	36 V max. 50 V max.. 100 V max.
Conducted noise (input)		EN 55022 level A, FCC part 15, level A
ESD (input)		EN 61000-4-2, Perf. Criteria B
Fast Transient (input)		EN 61000-4-4, Perf. Criteria B
Surge (input)		EN 61000-4-5, Perf. Criteria B

### Output Specifications

Voltage set accuracy		± 1 %
Regulation	– Input variation Vin min. to Vin max. – Load variation 10 – 100 % single output models: dual output models: – Load cross variation 25 % /100 %	± 1 % max.  ± 1 % max. ± 2 % max. ± 5 % max.
Ripple and noise (20 MHz Bandwidth)	single output models: dual output models:	50 mVpk-pk max. 75 mVpk-pk max
Temperature coefficient		± 0.02 % /K
Start up time (nominal Vin and constant resistive load)		20 ms typ.
Transient Response (25% load step change)		500 µs typ.
Short circuit protection		indefinite (automatic recovery)
Over load protection		150% of Iout max typ. foldback
Over voltage protection (Zener Diode Clamp)	3.3/5.0 Vout models: 12/15 Vout models:	3.9/6.2 V 15/18 V
Capacitive load	3.3 Vout models: 5 Vout models / ± 5 Vout models: 12 Vout models / ±12 Vout models: 15 Vout models / ±15 Vout models:	10'200 µF max. 7'050 µF max. / ± 1'020 µF max. 1'035 µF max. / ± 495 µF max. 750 µF max. / ± 165 µF max.

### General Specifications

Temperature ranges	– Operating – Case temperature – Storage	– 40 °C ... +85 °C + 100 °C max. – 55 °C ... + 125 °C
Derating	3.3 VDC output models:	2.5%/K above 60°C

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

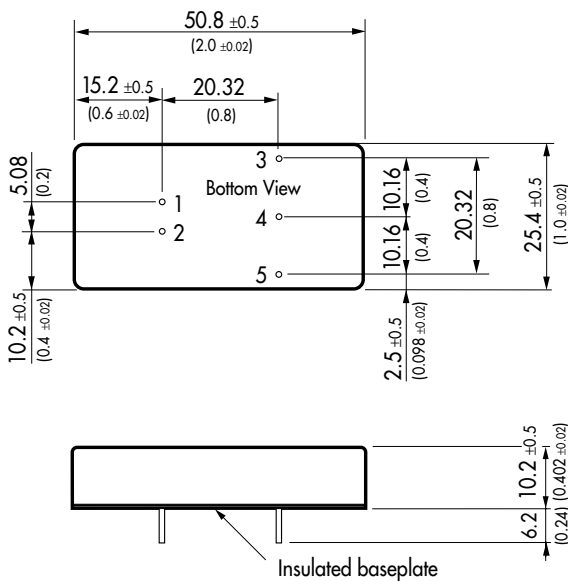
**General Specifications**

Humidity (non condensing)		95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217 E)		> 560'000 h @ + 25 °C
Isolation (Input/Output)	- Voltage - Capacity - Resistance	1'500 VDC 680 pF max. > 1'000 M Ohm
Switching frequency (fixed)	single output models: dual output models:	500 kHz typ. (Pulse width modulation PWM) 300 kHz typ. (Pulse width modulation PWM)
Vibration		10-55Hz, 2G, 30 minutes along X,Y,Z
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	Copper, Nickel plated
Baseplate material	Non conductive FR4
Potting material	Epoxy (UL 94V-0 rated)
Weight	31g (1.09oz)
Soldering temperature	max. 260 °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

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

Specifications can be changed without notice