

### 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 lout 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.

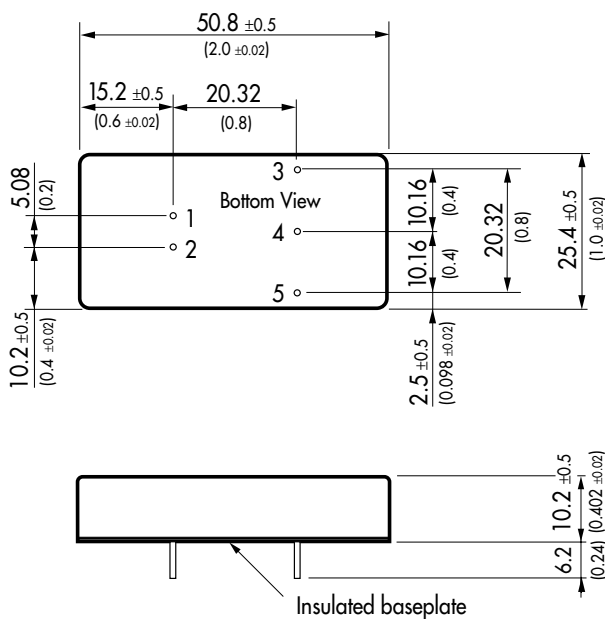
**General Specifications**

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  $\pm$ 0.05 (0.039  $\pm$ 0.002)

Specifications can be changed without notice