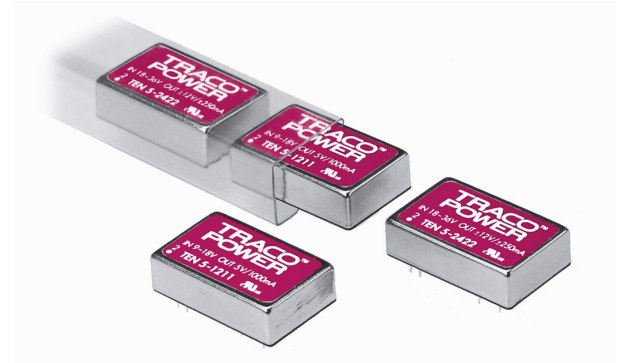


Features

- ◆ Wide 2:1 Input Range
- ◆ Full SMD-Design
- ◆ High Efficiency up to 86%
- ◆ Extended Operating Temperature
- ◆ Range -40°C to 85°C
- ◆ I/O-isolation 1'500 VDC
- ◆ Indefinite Short-Circuit Protection
- ◆ 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
- ◆ High Reliability, MTBF >1 Mio. h
- ◆ 3 Year Product Warranty



The TEN 5 Series is a range of DC/DC-converter modules with wide input range of 2:1. State of the art SMD-technology guarantees a product with very high reliability and good cost /performance ratio. High efficiency allows an operating temperature range of -40°C to +85°C without derating. I/O-isolation of 1'500 VDC together with conducted noise compliance to EN 55022-A and FCC, level A makes these converters ideal for a wide range of applications in communications, mobile battery powered equipments and industrial systems.

Models

Ordercode	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TEN 5-0510	4.5 – 7 VDC	3.3 VDC	1200 mA	75 %
TEN 5-0511		5 VDC	1000 mA	79 %
TEN 5-0512		12 VDC	500 mA	82 %
TEN 5-0513		15 VDC	400 mA	82 %
TEN 5-0521		± 5 VDC	± 500 mA	79 %
TEN 5-0522		± 12 VDC	± 250 mA	82 %
TEN 5-0523		± 15 VDC	± 200 mA	82 %
TEN 5-1210	9 – 18 VDC	3.3 VDC	1200 mA	77 %
TEN 5-1211		5 VDC	1000 mA	81 %
TEN 5-1212		12 VDC	500 mA	84 %
TEN 5-1213		15 VDC	400 mA	84 %
TEN 5-1221		± 5 VDC	± 500 mA	81 %
TEN 5-1222		± 12 VDC	± 250 mA	84 %
TEN 5-1223		± 15 VDC	± 200 mA	84 %
TEN 5-2410	18 – 36 VDC	3.3 VDC	1200 mA	79 %
TEN 5-2411		5 VDC	1000 mA	83 %
TEN 5-2412		12 VDC	500 mA	86 %
TEN 5-2413		15 VDC	400 mA	86 %
TEN 5-2421		± 5 VDC	± 500 mA	83 %
TEN 5-2422		± 12 VDC	± 250 mA	86 %
TEN 5-2423		± 15 VDC	± 200 mA	86 %
TEN 5-4810	36 – 75 VDC	3.3 VDC	1200 mA	79 %
TEN 5-4811		5 VDC	1000 mA	83 %
TEN 5-4812		12 VDC	500 mA	86 %
TEN 5-4813		15 VDC	400 mA	86 %
TEN 5-4821		± 5 VDC	± 500 mA	83 %
TEN 5-4822		± 12 VDC	± 250 mA	86 %
TEN 5-4823		± 15 VDC	± 200 mA	86 %

Input Specifications

Input current no load /full load	5 Vin models: 50 mA / 1460 mA typ. 12 Vin models: 20 mA / 590 mA typ. 24 Vin models: 5 mA / 290 mA typ. 48 Vin models: 3 mA / 145 mA typ.
Start-up voltage / under voltage shut down	5 Vin models: 4.4 VDC / 4.0 VDC 12 Vin models: 8.0 VDC / 8.0 VDC 24 Vin models: 16.0 VDC / 16.0 VDC 48 Vin models: 32.0 VDC / 32.0 VDC
Surge voltage (1 sec. max.)	5 Vin models: 10 V 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	1.0 %
Regulation	– Input variation Vin min. to Vin max. 0.3 % max. – Load variation 20 – 100 % single output models: 1.0 % max. dual output models balanced load: 2.0 % max. dual output models unbalanced load: 5.0 % max.
Ripple and noise (20 MHz Bandwidth)	50 mVpk-pk max.
Temperature coefficient	± 0.02 % /K
Output current limitation	>120 % of Iout max., constant current
Short-circuit protection	indefinite (automatic recovery)
Capacitive load	single output models: 6800 µF max. dual output models: 1000 µF max. (each output)

General Specifications

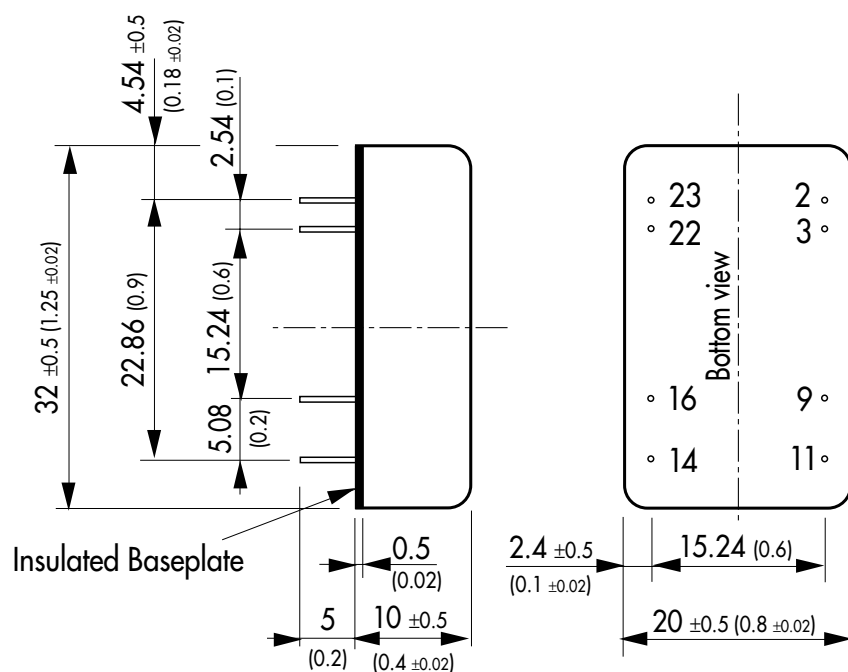
Temperature ranges	– Operating – 40 °C ... + 85 °C – Case temperature + 100 °C max. – Storage – 55 °C ... + 125 °C
Derating	3.5% /K above 70°C
Humidity (non condensing)	95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217 E)	>1 Mio. h @ + 25 °C
Isolation voltage (Input/Output)	1'500 VDC
Isolation capacity (Input/Output)	380 pF typ.
Isolation resistance (Input/Output)	> 1'000 M Ohm (500 VDC)
Switching frequency	300 kHz typ. (Pulse frequency modulation PFM)
Safety standards	UL 60950, IEC 60950, EN 60950 Compliance up to 60 VDC input voltage (SELV limit)
Safety approval	UL /cUL File E188913 (5Vin models pending)

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

Physical Specifications

Case material	steel, nickel plated
Baseplate material	non conductive FR4
Potting material	epoxy (UL 94V-0 rated)
Weight	14 g (0.55 oz)
Soldering temperature	max. 265 °C / 10 sec.

Outline Dimensions mm (inches)



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

Pin diameter $\varnothing 0.5 \pm 0.05$ (0.02 ± 0.002)
Tolerances ± 0.5 (0.02)

Specifications can be changed without notice