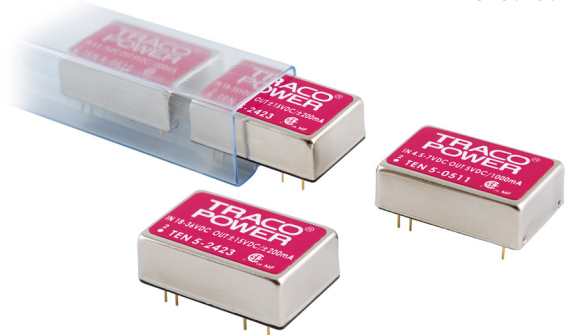


Features

- ◆ 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 to meet 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



UL 60950-1



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. 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 (5 VDC nominal)	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 (12 VDC nominal)	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 (24 VDC nominal)	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 (48 VDC nominal)	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	5 Vin models: 80 mA typ. 12 Vin models: 30 mA typ. 24 Vin models: 15 mA typ. 48 Vin models: 8 mA typ.
Start-up voltage / under voltage shut down	5 Vin models: 4.4 VDC / 4.0 VDC (or lower) 12 Vin models: 8.0 VDC / 8.0 VDC (or lower) 24 Vin models: 16.0 VDC / 16.0 VDC (or lower) 48 Vin models: 32.0 VDC / 32.0 VDC (or lower) long term operation at undervoltage will damage the converter!
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.
Conducted noise (input)	EN 55022 class A, FCC part 15, level A

Output Specifications

Voltage set accuracy	1.0 %
Regulation	– Input variation Vin min. to Vin 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. (25 % / 100 %)
Minimum load	5 % of rated max current (operation at lower load condition is safe but a higher output ripple will be experienced)
Ripple and noise (20 MHz Bandwidth)	50 mVpk-pk typ., 75 mVpk-pk max.
Temperature coefficient	±0.02 %/K
Output current limitation	>120 % of Iout max., foldback
Short-circuit protection	indefinite (automatic recovery)
Start up time (nominal Vin and constant resistive load)	10 ms typ. (for power on and remote on)
Capacitive load	single output models: 6800 µF max. dual output models: 1000 µF max. (each output)

General Specifications

Temperature ranges	– Operating – Case temperature – Storage	–40°C to +85°C +90°C max. –50°C to +125°C
Derating		3.3 %/K above 70°C
Humidity (non condensing)		95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)		>1 Mio. h
Isolation voltage (60 sec.)	– Input/Output	1'500 VDC
Isolation capacitance	– 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 60950-1, IEC/EN 60950-1
Environmental compliance	– Reach – RoHS	www.tracopower.com/info/reach-declaration.pdf directive 2011/65/EU

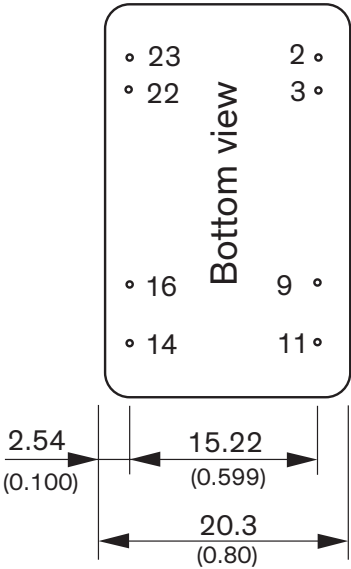
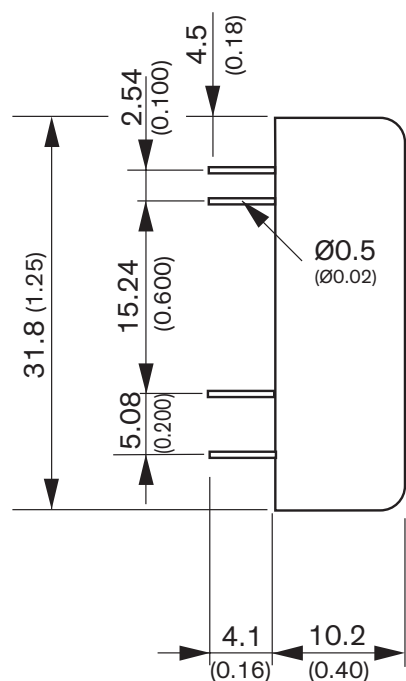
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

Physical Specifications

Casing material	steel, metal
Baseplate material	non conductive FR4
Potting material	Silicone (UL 94 V-0 rated) (5 Vin models) Epoxy (UL 94 V-0 rated) (other models)
Weight	16.9 g (0.59 oz)
Soldering temperature	max. 260°C / 10 sec.

Supporting documents: www.tracopower.com/overview/ten5

Outline Dimensions



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

NC = Not connected

Dimensions in mm (inch)
Tolerances: x.x ±0.25 (x.xx ±0.01)
 x.xx ±0.13 (x.xxx ±0.005)
Pin diameter tolerances: x.x ±0.05 (x.xx ±0.002)

Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at www.tracopower.com

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[TEN 5-1223](#) [TEN 5-0511](#) [TEN 5-1212](#) [TEN 5-2410](#) [TEN 5-4821](#) [TEN 5-2411](#) [TEN 5-4823](#) [TEN 5-0512](#) [TEN 5-0522](#) [TEN 5-1210](#) [TEN 5-1222](#) [TEN 5-4812](#) [TEN 5-1221](#) [TEN 5-0513](#) [TEN 5-4810](#) [TEN 5-2412](#) [TEN 5-2422](#) [TEN 5-2421](#) [TEN 5-4811](#) [TEN 5-0523](#) [TEN 5-1211](#) [TEN 5-2413](#) [TEN 5-2423](#) [TEN 5-1213](#) [TEN 5-4813](#) [TEN 5-0510](#) [TEN 5-0521](#) [TEN 5-4822](#)