DC/DC Converters

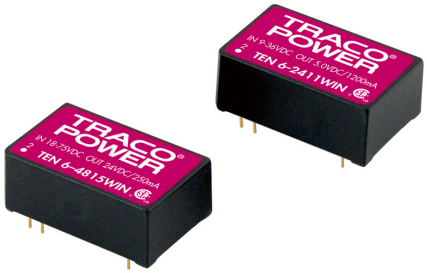
TEN 6WIN Series, 6 Watt

CB Scheme IEC 60950-1

c US UL 60950-1

Features

- Wide 4:1 input voltage range
- High efficiency
- Operating temperature range –40°C to +85°C
- No minimum load required
- Models with 1'500 VDC and 3'000 VDC I/O isolation (functional insulation)
- Input filter meets EN 55022, class A
- Overload protection
- DIP-24 plastic package
- Industry standard pinout
- 3-year product warranty



The TEN-6WIN series is designed for an optimized cost/performance ratio of DC/DC converters with output power of 6 Watt.
General features like no minimum load requirement, overload protection, internal filter for EN55022 class A and high efficiency make these converters easy to design in. With the popular DIP-24 standard package they are also a drop in replacement for many cost critical applications.

Models

Order code		Input voltage	Output voltage	Output current	Efficiency typ.
1'500 VDC isolation	3'000 VDC isolation	range		max.	
TEN 6-2410WIN	**TEN 6-2410WIN-HI**		3.3 VDC	1200 mA	77 %
TEN 6-2411WIN	**TEN 6-2411WIN-HI**		5 VDC	1200 mA	80 %
TEN 6-2412WIN	**TEN 6-2412WIN-HI**		12 VDC	500 mA	84 %
TEN 6-2413WIN	**TEN 6-2413WIN-HI**	**9 – 36 VDC**	15 VDC	400 mA	84 %
TEN 6-2415WIN	**TEN 6-2415WIN-HI**	(24 VDC nominal)	24 VDC	250 mA	84 %
TEN 6-2421WIN	**TEN 6-2421WIN-HI**		±5 VDC	±500 mA	80 %
TEN 6-2422WIN	**TEN 6-2422WIN-HI**		±12 VDC	±250 mA	84 %
TEN 6-2423WIN	**TEN 6-2423WIN-HI**		±15 VDC	±200 mA	84 %
TEN 6-4810WIN	**TEN 6-4810WIN-HI**		3.3 VDC	1200 mA	77 %
TEN 6-4811WIN	**TEN 6-4811WIN-HI**		5 VDC	1200 mA	80 %
TEN 6-4812WIN	**TEN 6-4812WIN-HI**		12 VDC	500 mA	84 %
TEN 6-4813WIN	**TEN 6-4813WIN-HI**	**18 – 75 VDC**	15 VDC	400 mA	84 %
TEN 6-4815WIN	**TEN 6-4815WIN-HI**	(48 VDC nominal)	24 VDC	250 mA	84 %
TEN 6-4821WIN	**TEN 6-4821WIN-HI**		± 5 VDC	±500 mA	80 %
TEN 6-4822WIN	**TEN 6-4822WIN-HI**		±12 VDC	±250 mA	84 %
TEN 6-4823WIN	**TEN 6-4823WIN-HI**		±15 VDC	±200 mA	84 %

Input Specifications

Input current at no load	24 Vin models: 48 Vin models:	20 mA typ. 10 mA typ.
Input current at full load	24 Vin, 3.3VDC models: 24 Vin other models: 48 Vin, 3.3VDC models: 48 Vin other models:	215 mA typ. 300 mA typ. 110 mA typ. 150 mA typ.
Recommended input fuse (slow blow)	24 Vin models: 48 Vin models:	1500 mA 800 mA
Start-up voltage / under voltage shut down	24 Vin models: 48 Vin models:	9 VDC / 8.5 VDC (or lower) 18 VDC / 16 VDC (or lower)
Surge voltage (1 sec. max.)	24 Vin models: 48 Vin models:	50 V max. 100 V max.
Conducted noise		EN 55022 class A

Output Specifications

Voltage set accuracy		±2 %
Regulation	– Input variation Vin min. to Vin max. – Load variation 0 – 100 % single output models: dual output models balanced load: dual output models 50%/100% unbalanced load:	0.5 % max. 1.2 % max. 1.2 % max. 3.0 % max.
Minimum load		not required
Temperature coefficient		±0.02 %/K
Ripple and noise (20 MHz Bandwidth)		80 mVp-p max.
Dynamic load response (change from 75 % to 100 % load)		±3 % peak variation typ. 300 µS response time typ.
Current limitation		150 % of Iout max. typ., constant power
Short circuit protection		continuous, automatic recovery
Capacitive load	3.3 & 5.0 VDC models: 12 & 15 VDC models: 24 VDC models: dual output models:	470 µF max. 100 µF max. 47 µF max. 100 µF max. (each output)

General Specifications

Temperature ranges	– Operating – Case temperature – Storage	–40°C to +85°C +100°C max. –50°C to +125°C
Derating	3.3 & 5.0 VDC models: other models:	2.5 %/K above +60°C 3.3 %/K above +70°C
Humidity (non condensing)		95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)		>800'000 h
Isolation voltage (input/output, 60 sec., functional insulation)	standard models: models with suffix -H:	1'500 VDC 3'000 VDC
Isolation capacitance (input/output, 100 KHz, 1 V)		1000 pF typ.
Isolation resistance (input/output, 500 VDC)		>1'000 M Ohm
Switching frequency		330 kHz typ.

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

General Specifications

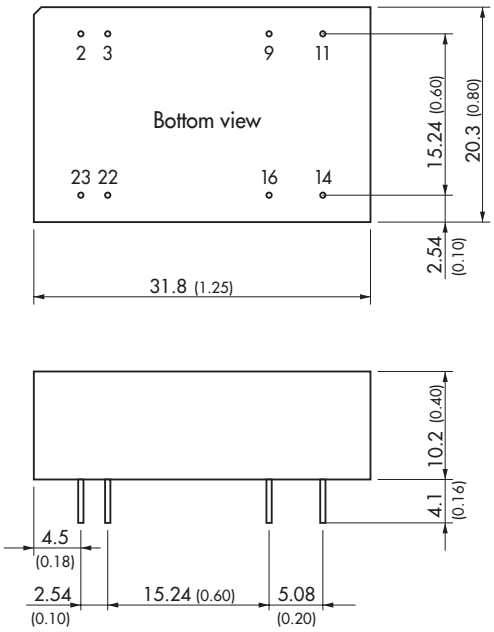
Safety approvals	– CSA certificate of compliance	CAN/CSA-C22.2 No 60950-1-07, Am 1:2011 ANSI/UL Std No 60950-1, 2nd Ed, AM 1:2011
	– CB test certificate	IEC 60950-1:2005 2nd Ed, Am 1:2009 EN 60950-1:2006, +A11:2009, +A1:2010, +A12:2011
	– certification documents	www.tracopower.com/overview/ten6win
Environmental compliance	– Reach	www.tracopower.com/info/reach-declaration.pdf
	– RoHS	RoHS directive 2011/65/EU

Physical Specifications

Casing material	non conductive plastic (UL 94V-0-rated)
Potting material	epoxy (XM-2109 & XY-2110, UL 94V-0-rated)
Weight	13.0 g (0.46 oz)
Soldering temperature (1.5mm from case for 10 sec.)	max. 260°C

Supporting documents: www.tracopower.com/overview/ten6win

Outline Dimensions



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

Dimensions in [mm], () = Inch
Pin diameter ⌀ 0.5 ±0.05 (0.02 ±0.002)
Tolerances ±0.25 (±0.01)
Pin pich tolerances ±0.13 (±0.0005)