

### Features

- ◆ 2:1 input voltage range
- ◆ High efficiency
- ◆ Operating temperature range  
-40°C to +85°C
- ◆ No minimum load required
- ◆ Input filter meets EN 55032, class A
- ◆ Overload protection
- ◆ I/O-isolation 1'500 VDC
- ◆ DIP-24 plastic package
- ◆ Industry standard pinout
- ◆ 3-year product warranty



The TEN-6N 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 EN55032 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 range	Output voltage	Output current max.	Efficiency typ.
TEN 6-1210N	9 – 18 VDC (12 VDC nominal)	3.3 VDC	1200 mA	75 %
TEN 6-1211N		5 VDC	1200 mA	78 %
TEN 6-1212N		12 VDC	500 mA	82 %
TEN 6-1213N		15 VDC	400 mA	82 %
TEN 6-1215N		24 VDC	250 mA	84 %
TEN 6-1221N		±5 VDC	±500 mA	78 %
TEN 6-1222N		±12 VDC	±250 mA	82 %
TEN 6-1223N		±15 VDC	±200 mA	82 %
TEN 6-2410N	18 – 36 VDC (24 VDC nominal)	3.3 VDC	1200 mA	77 %
TEN 6-2411N		5 VDC	1200 mA	80 %
TEN 6-2412N		12 VDC	500 mA	84 %
TEN 6-2413N		15 VDC	400 mA	84 %
TEN 6-2415N		24 VDC	250 mA	84 %
TEN 6-2421N		±5 VDC	±500 mA	80 %
TEN 6-2422N		±12 VDC	±250 mA	84 %
TEN 6-2423N		±15 VDC	±200 mA	84 %
TEN 6-4810N	36 – 75 VDC (48 VDC nominal)	3.3 VDC	1200 mA	77 %
TEN 6-4811N		5 VDC	1200 mA	80 %
TEN 6-4812N		12 VDC	500 mA	84 %
TEN 6-4813N		15 VDC	400 mA	84 %
TEN 6-4815N		24 VDC	250 mA	84 %
TEN 6-4821N		±5 VDC	±500 mA	80 %
TEN 6-4822N		±12 VDC	±250 mA	84 %
TEN 6-4823N		±15 VDC	±200 mA	84 %

### Input Specifications

Input current at no load	12 Vin models: 40 mA typ. 24 Vin models: 20 mA typ. 48 Vin models: 10 mA typ.
Input current at full load	12 Vin, 3.3VDC models: 440 mA typ. 12 Vin other models: 610 mA typ. 24 Vin, 3.3VDC models: 220 mA typ. 24 Vin other models: 300 mA typ. 48 Vin, 3.3VDC models: 110 mA typ. 48 Vin other models: 150 mA typ.
Recommended input fuse (slow blow)	12 Vin models: 1500 mA 24 Vin models: 700 mA 48 Vin models: 350 mA
Start-up voltage / under voltage shut down	12 Vin models: 9.0 VDC / 8.5 VDC (or lower) 24 Vin models: 18 VDC / 16 VDC (or lower) 48 Vin models: 36 VDC / 35 VDC (or lower)
Surge voltage (1 sec. max.)	12 Vin models: 25 V max. 24 Vin models: 50 V max. 48 Vin models: 100 V max.
Conducted noise	internal filter to meet EN 55032 class A

### Output Specifications

Voltage set accuracy	±2 %
Regulation	– Input variation Vin min. to Vin max. 0.5 % max. – Load variation 0 – 100 % single output models: 1.2 % max. dual output models balanced load: 1.2 % max. dual output models 50%/100% unbalanced load: 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	145 % of lout max. typ., constant power
Short circuit protection	continuous, automatic recovery
Capacitive load	3.3 & 5.0 VDC models: 470 µF max. 12 & 15 VDC models: 100 µF max. 24 VDC models: 47 µF max. dual output models: 100 µF max. (each output)

### General Specifications

Temperature ranges	– Operating –40°C to +85°C – Case temperature +100°C max. – Storage –50°C to +125°C
Derating	3.3 & 5.0 VDC models: 2.5 %/K above +60°C other models: 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 (functional insulation)
Isolation capacitance	– Input/Output (100 KHz, 1 V) 1000 pF typ.
Isolation resistance	– Input/Output (500 VDC) >1'000 M Ohm
Altitude during operation	6'000 m max.
Switching frequency	330 kHz typ.

**General Specifications**

Safety standards	UL/cUL 60950-1, IEC/EN 60950-1 UL 62368-1, IEC/EN 62368-1 <a href="http://www.tracopower.com/overview/ten6n">www.tracopower.com/overview/ten6n</a>
– Certification documents	
Environmental compliance	– Reach – RoHS <a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a> RoHS directive 2011/65/EU

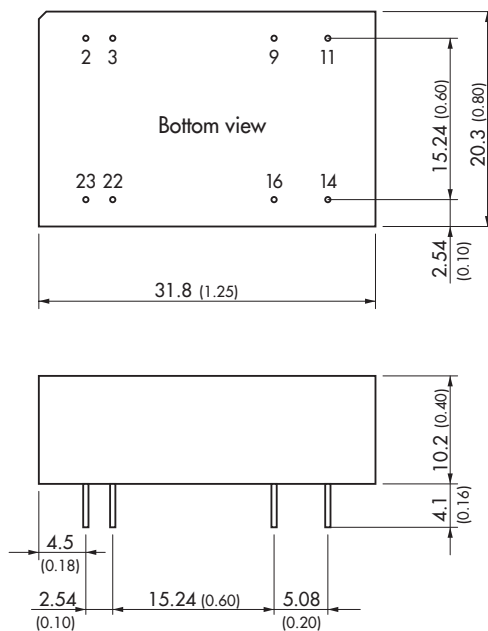
**Physical Specifications**

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

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

**Supporting documents:** [www.tracopower.com/overview/ten6n](http://www.tracopower.com/overview/ten6n)

**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  $\varnothing 0.5 \pm 0.05$  ( $0.02 \pm 0.002$ )  
 Tolerances  $\pm 0.25$  ( $\pm 0.01$ )  
 Pin pitch tolerances  $\pm 0.13$  ( $\pm 0.0005$ )

Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at [www.tracopower.com](http://www.tracopower.com)

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