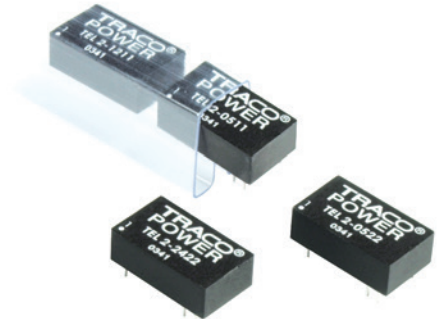


## Features

- ◆ Ultracompact DIP-16 plastic package
- ◆ Wide 2:1 input range
- ◆ Regulated output
- ◆ I/O isolation 1500V
- ◆ Input filter meets EN55022, class A without ext. components
- ◆ Low ripple and noise
- ◆ Indefinite shortcircuit protection
- ◆ Operating temperature range -40°C to +75°C
- ◆ Lead free design, RoHS compliant
- ◆ 3-year product warranty



The TEL-2 series, comprising 28 models, is a range of isolated 2 Watt converters in a low profile DIP-16 package. Requiring only 3.25 cm<sup>2</sup> of space on the PCB they provide a complete DC/DC converter without need of any external components. Wide input range and tightly regulated output voltage qualifies these converters for many cost critical applications in industrial and consumer electronics.

## Models

Ordercode	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TEL 2-0510	4.5 – 9 VDC (nominal 5 VDC)	3.3 VDC	500 mA	70 %
TEL 2-0511		5 VDC	400 mA	73 %
TEL 2-0512		12 VDC	165 mA	75 %
TEL 2-0513		15 VDC	135 mA	73 %
TEL 2-0521		±5 VDC	±200 mA	64 %
TEL 2-0522		±12 VDC	±85 mA	69 %
TEL 2-0523		±15 VDC	±65 mA	71 %
TEL 2-1210	9 – 18 VDC (nominal 12 VDC)	3.3 VDC	500 mA	73 %
TEL 2-1211		5 VDC	400 mA	77 %
TEL 2-1212		12 VDC	165 mA	80 %
TEL 2-1213		15 VDC	135 mA	80 %
TEL 2-1221		±5 VDC	±200 mA	73 %
TEL 2-1222		±12 VDC	±85 mA	78 %
TEL 2-1223		±15 VDC	±65 mA	78 %
TEL 2-2410	18 – 36 VDC (nominal 24 VDC)	3.3 VDC	500 mA	72 %
TEL 2-2411		5 VDC	400 mA	77 %
TEL 2-2412		12 VDC	165 mA	80 %
TEL 2-2413		15 VDC	135 mA	81 %
TEL 2-2421		±5 VDC	±200 mA	74 %
TEL 2-2422		±12 VDC	±85 mA	78 %
TEL 2-2423		±15 VDC	±65 mA	80 %
TEL 2-4810	36 – 75 VDC (nominal 48 VDC)	3.3 VDC	500 mA	71 %
TEL 2-4811		5 VDC	400 mA	73 %
TEL 2-4812		12 VDC	165 mA	79 %
TEL 2-4813		15 VDC	135 mA	79 %
TEL 2-4821		±5 VDC	±200 mA	71 %
TEL 2-4822		±12 VDC	±85 mA	77 %
TEL 2-4823		±15 VDC	±65 mA	77 %

### Input Specifications

Input current at full load / full load (nominal input)	5 Vin models: 600 mA / 40 mA typ. 12 Vin models: 220 mA / 20 mA typ. 24 Vin models: 110 mA / 10 mA typ. 48 Vin models: 55 mA / 8 mA typ.
Start-up voltage / under voltage shut down	5 Vin models: 4 VDC / 3.5 VDC typ. 12 Vin models: 7 VDC / 6.5 VDC typ. 24 Vin models: 12 VDC / 11 VDC typ. 48 Vin models: 24 VDC / 22 VDC typ.
Surge voltage (100 msec. max.)	5 Vin models: 11 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 class A, FCC part 15, level A

### Output Specifications

Voltage set accuracy	±2 % max.
Regulation	– Input variation Vin min. to Vin max. 0.5 % max. – Load variation 25 – 100 % single output models: 0.75 % max. dual output models: 2.0 % (balanced load)
Ripple and noise (20 MHz Bandwidth)	50 mVpk-pk max
Temperature coefficient	±0.02 %/K
Short circuit protection	indefinite, automatic recovery
Minimum load	25 % of rated max current (operation at lower load condition is safe but a higher output ripple will be experienced)
Capacitive load	3.3 VDC output models: 2'200 µF max. 5 VDC output models: 1'000 µF max. 12 VDC output models: 170 µF max. 15 VDC output models: 110 µF max. ±5 VDC output models: 470 µF max. ±12 VDC output models: 100 µF max. ±15 VDC output models: 47 µF max.

### General Specifications

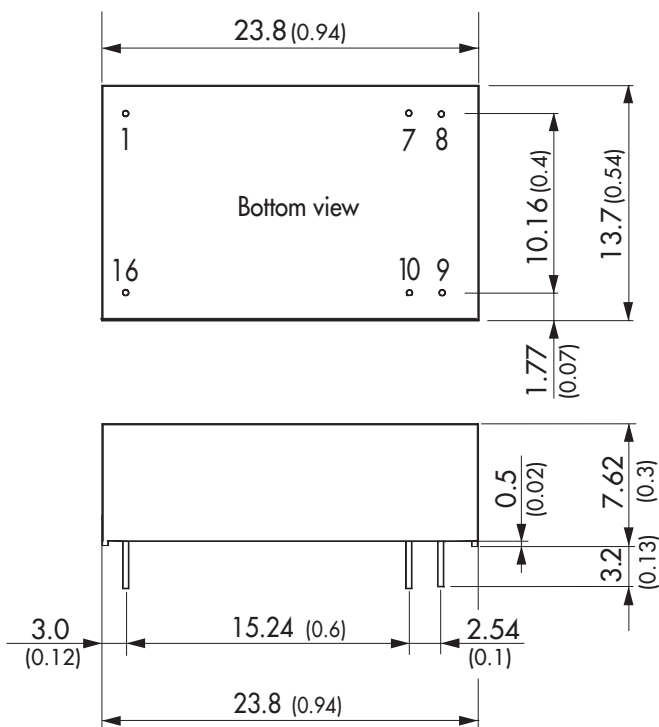
Temperature ranges	– Operating –55°C to +125°C – Storage –40°C to +75°C (no derating)
Humidity (non condensing)	95 % rel. H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)	>1.2 Mio h
Isolation voltage	Input/Output (60 sec.) 1'500 VDC
Isolation capacitance	Input/Output 250 pF max.
Isolation resistance	Input/Output (500 VDC) >1'000 M Ohm
Switching frequency	300 kHz (PFM)
Safety standards	UL/cUL 60950-1 , IEC/EN 60950-1
Safety approval	CSA 60950-1-03 (File no. 226037) <a href="http://www.tracopower.com/products/tel2-csa.pdf">www.tracopower.com/products/tel2-csa.pdf</a>
Environmental compliance	– Reach <a href="http://www.tracopower.com/products/tel2-reach.pdf">www.tracopower.com/products/tel2-reach.pdf</a> – RoHS RoHS 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	non conductive FR4
Potting material	epoxy, UL94V-0 - rated
Weight	5.1 g (0.17oz)
Soldering temperature	max. 265°C / 10 sec.

**Outline Dimensions mm (inches)**



Pin-Out		
Pin	Single	Dual
1	-Vin (GND)	-Vin (GND)
7	No con.	No con.
8	No con.	Common
9	+Vout	+Vout
10	-Vout	-Vout
16	+Vin	+Vin

Pin diameter  $\varnothing 0.5 \pm 0.05$  (0.02)  $\pm 0.002$   
Tolerances  $\pm 0.25$  ( $\pm 0.01$ )