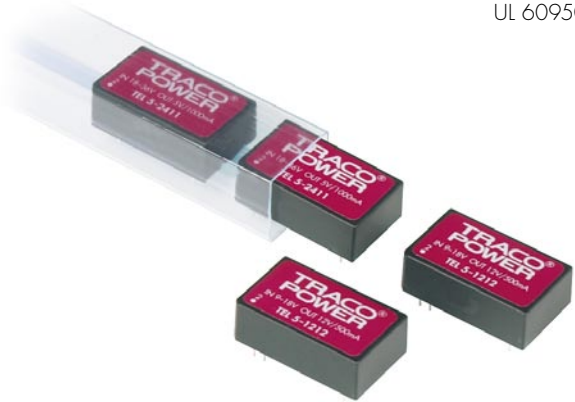




#### Features

- ◆ Wide 2:1 Input Range
- ◆ Cost efficient SMD-Design
- ◆ High Power Density
- ◆ High Efficiency up to 86%
- ◆ Regulated Outputs
- ◆ I/O-Isolation 1'500 VDC
- ◆ Indefinite Short-Circuit Protection  
24-pin DIP with Industry Standard Pinout
- ◆ High Reliability, MTBF >1 Mio. h
- ◆ Internal EMI Filter to comply with  
EN 55022, Class A (optional)
- ◆ Lead free Design, RoHS compliant
- ◆ 3 Year Product Warranty



The TEL 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 excellent cost /performance ratio. High efficiency allows an operating temperature range of  $-25^{\circ}\text{C}$  to  $+71^{\circ}\text{C}$  at full load. This product series provides an economical solution for many cost critical applications in industrial and consumer electronics.

#### Models

Ordercode	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TEL 5-1210	9 – 18 VDC	3.3 VDC	1200 mA	77 %
TEL 5-1211		5 VDC	1000 mA	81 %
TEL 5-1212		12 VDC	500 mA	84 %
TEL 5-1222		$\pm 12$ VDC	$\pm 250$ mA	84 %
TEL 5-1223		$\pm 15$ VDC	$\pm 200$ mA	84 %
TEL 5-2410	18 – 36 VDC	3.3 VDC	1200 mA	79 %
TEL 5-2411		5 VDC	1000 mA	83 %
TEL 5-2412		12 VDC	500 mA	86 %
TEL 5-2422		$\pm 12$ VDC	$\pm 250$ mA	86 %
TEL 5-2423		$\pm 15$ VDC	$\pm 200$ mA	86 %

### Input Specifications

Input current no load /full load	12 Vin models: 20 mA / 590 mA typ. 24 Vin models: 5 mA / 290 mA typ.
Start-up voltage / under voltage shut down	12 Vin models: 8.0 VDC / 8.0 VDC 24 Vin models: 16.0 VDC / 16.0 VDC
Surge voltage (1 sec. max.)	12 Vin models: 25 V max. 24 Vin models: 50 V max.
Reverse voltage protection	1.0 A max.

### Output Specifications

Voltage set accuracy	± 1 %
Regulation	– Input variation Vin min. to Vin max. 0.3 % max. – Load variation 20 – 100 % single output models 1 % max dual output models balanced load 2 % max.
Ripple and noise (20 MHz Bandwidth)	75 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

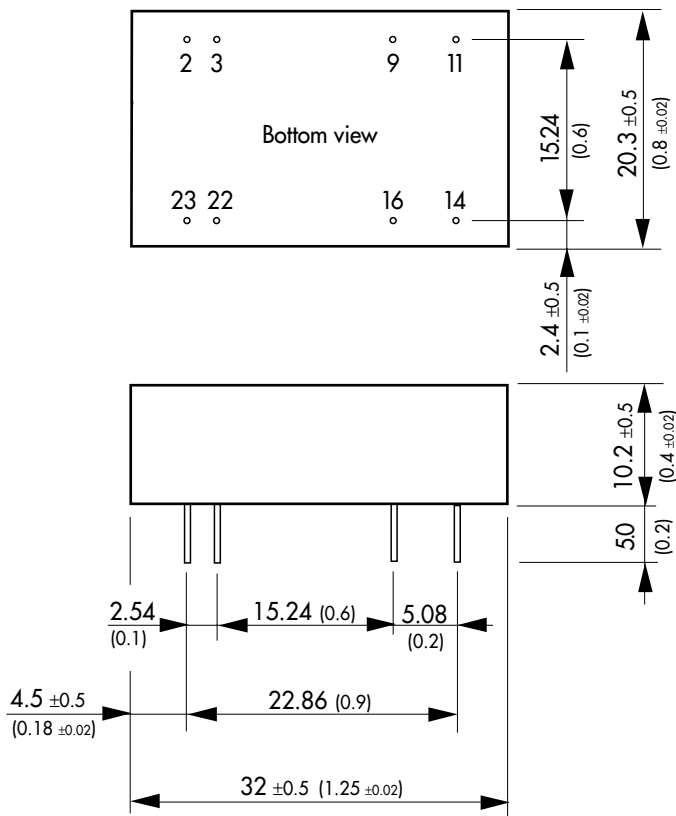
Temperature ranges	– Operating – 25 °C ... + 71 °C (no derating) – Case temperature + 90 °C – Storage – 40 °C ... + 125 °C
Humidity (non condensing)	95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217E ground benign)	> 1 Mio. h @ + 25 °C
Isolation voltage (60 sec) – Input/Output	1'500 VDC
Isolation capacity – Input/Output	380 pF typ.
Isolation resistance – Input/Output (500 VDC)	> 1'000 M Ohm
Switching frequency	300 kHz typ.
Safety standards	UL 60950-1, IEC 60950-1, EN 60950-1
Safety approvals	CSA File No. 226037 <a href="http://directories.csa-international.org">http://directories.csa-international.org</a>

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

**Physical Specifications**

Case material	non conductive plastic (UL 94V-0 rated)
Weight	17 g (0.60 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  $\varnothing 0.5 \pm 0.05$  ( $0.02 \pm 0.002$ )  
Tolerances  $\pm 0.5$  (0.02)

Specifications can be changed any time without notice