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TRACO POWER

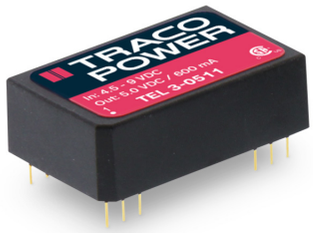
DC/DC Converters

TEL 3 Series, 3 Watt

CB Scheme c SP us
UL 60950-1

Features

- Wide 2:1 and 3:1 input range
- High efficiency up to 81%
- DIL-24 plastic package
- Indefinite short-circuit protection
- I/O isolation 1500 VDC
- Operating temperature range –40°C to +85°C
- 3-year product warranty



The TEL 3 series is a range of isolated 3 Watt converters in DIL-24 package offering wide 2:1and 3:1 input voltage ranges. Further features are high efficiency which allows operation temperature up to +71°C at full load and low output noise.
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 3-0511	4.5 – 9.0 VDC (nominal 5 VDC)	5 VDC	600 mA	70 %
* TEL 3-0512		12 VDC	250 mA	74 %
TEL 3-0513		15 VDC	200 mA	74 %
* TEL 3-0522		±12 VDC	±125 mA	74 %
* TEL 3-0523		±15 VDC	±100 mA	74 %
* TEL 3-1211	9 – 18 VDC (nominal 12 VDC)	5 VDC	600 mA	76 %
* TEL 3-1212		12 VDC	250 mA	80 %
TEL 3-1213		15 VDC	200 mA	80 %
* TEL 3-1222		±12 VDC	±125 mA	80 %
* TEL 3-1223		±15 VDC	±100 mA	80 %
TEL 3-2011	10 – 30 VDC (nominal 20 VDC)	5 VDC	600 mA	76 %
TEL 3-2012		12 VDC	250 mA	80 %
TEL 3-2013		15 VDC	200 mA	80 %
TEL 3-2022		±12 VDC	±125 mA	80 %
TEL 3-2023		±15 VDC	±100 mA	80 %
* TEL 3-2411	18 – 36 VDC (nominal 24 VDC)	5 VDC	600 mA	77 %
* TEL 3-2412		12 VDC	250 mA	81 %
TEL 3-2413		15 VDC	200 mA	81 %
* TEL 3-2422		±12 VDC	±125 mA	81 %
* TEL 3-2423		±15 VDC	±100 mA	81 %
TEL 3-4811	36 – 75 VDC (nominal 48 VDC)	5 VDC	600 mA	77 %
TEL 3-4812		12 VDC	250 mA	81 %
TEL 3-4813		15 VDC	200 mA	81 %
TEL 3-4822		±12 VDC	±125 mA	81 %
TEL 3-4823		±15 VDC	±100 mA	81 %

* add suffix **-NP** for models with industry standard pinout

not recommended for new designs

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DC/DC Converters

TEL 3 Series **3 Watt**

Input Specifications

Input current (no load)	5 Vin models	**40 mA typ.**
	12 Vin models	**20 mA typ.**
	20 Vin models	**15 mA typ.**
	24 Vin models	**5 mA typ.**
	48 Vin models	**3 mA typ.**
Input current (full load)	5 Vin models	**820 mA typ.**
	12 Vin models	**320 mA typ.**
	20 Vin models	**190 mA typ.**
	24 Vin models	**155 mA typ.**
	48 Vin models	**80 mA typ.**
Surge voltage (1 sec. max.)	5 Vin models	**11 VDC**
	12 Vin models	**25 VDC**
	20 Vin models	**50 VDC**
	24 Vin models	**50 VDC**
	48 Vin models	**100 VDC**

Output Specifications

Voltage set accuracy		**±1 %**
Regulation	– Input variation Vin min. to Vin max. – Load variation 10 – 100 %	**0.5 % max.**
	single output models	**0.5 % max.**
	dual output models balanced load	**1.0 % max.**
	dual output models unbalanced load	**2.0 % max**
Ripple and noise (20 MHz Bandwidth)		**<60 mVpk-pk typ.**
Temperature coefficient		**±0.02 %/°K**
Output current limitation		**>110 % Iout max., constant current**
Short circuit protection		**indefinite** (automatic recovery)
Capacitive load	single output models	**2000 µF max.**
	dual output models	**1000 µF max.**

General Specifications

Temperature ranges	– Operating	**–40°C to +85°C**
	– Case	**+95°C max.**
	– Storage	**–40°C to +125°C**
Load 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/Case	**1500 VDC**
Isolation capacitance	– Input/Output	**500 pF typ.**
Isolation resistance	– Input/Output (500 VDC)	**>1'000 M Ohm**
Switching frequency		**300 kHz typ.** (Pulse frequency modulation PFM)
Safety standards		**UL 60950-1, IEC/EN 60950-1** Compliance up to 60 VDC input voltage (SELV limit)
Safety approvals		**CSA File No. 226037** http://directories.csa-international.org
	– Certification documents	www.tracopower.com/overview/tel3
Environmental compliance	– Reach	www.tracopower.com/info/reach-declaration.pdf
	– 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.

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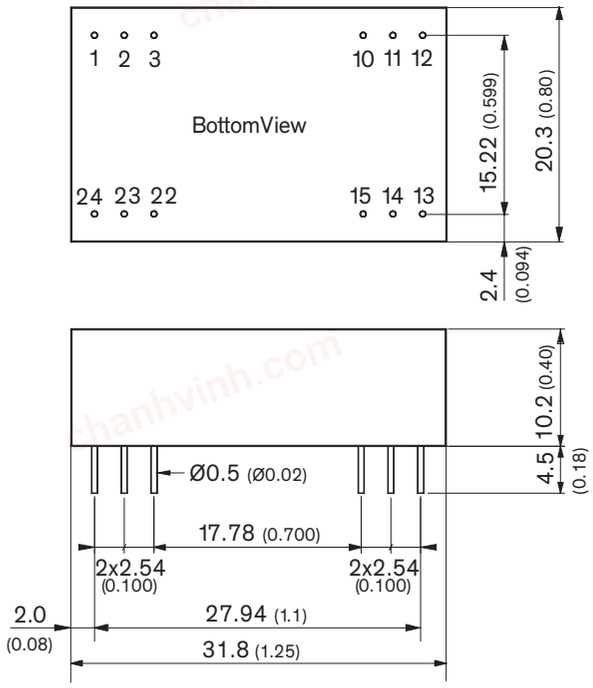
Physical Specifications

Casing material	non conductive black plastic
Potting material	epoxy (UL94V-0 rated)
Weight	12 g (0.42 oz)
Soldering temperature	max. 265°C / 10 sec.

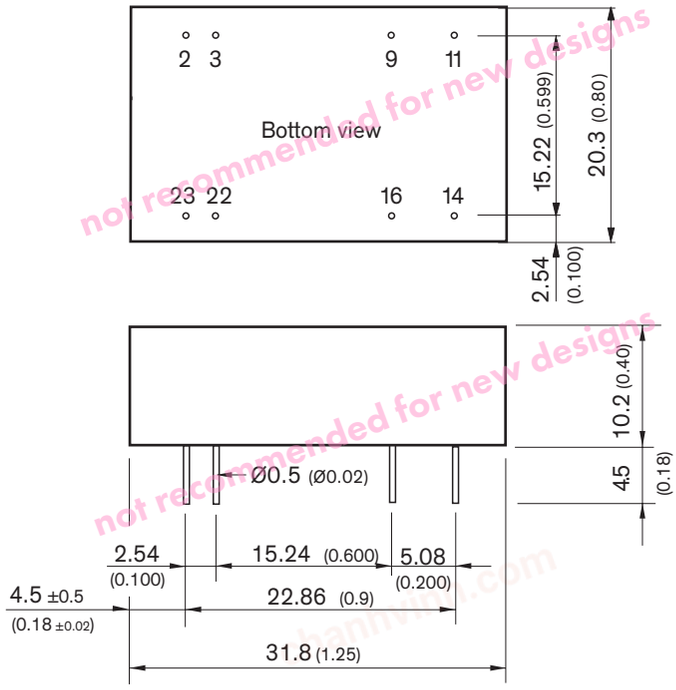
Outline Dimensions mm (inches)

Standard Pinout:

compatible with TED / TEM-3 Series)



Pinout NP Version:



Pin-Out		
Pin	**Single**	**Dual**
1	+Vin (Vcc)	+Vin (Vcc)
2	NC	–Vout
3	NC	Common
10	–Vout	Common
11	+Vout	+Vout
12	–Vin (GND)	–Vin (GND)
13	–Vin (GND)	–Vin (GND)
14	+Vout	+Vout
15	–Vout	Common
22	NC	Common
23	NC	–Vout
24	+Vin (Vcc)	+Vin (Vcc)

NC = Not connected

Tolerances x.x ±0.25 (x.xx ±0.01)
x.xx ±0.13 (x.xxx ±0.005)
Pin diameter tolerance: x.x ±0.05 (x.xx ±0.002)

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

not recommended for new designs