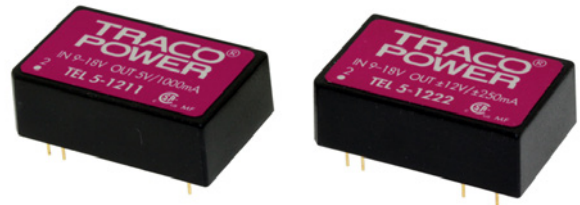


Features

- ◆ 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
- ◆ Input filter to meet EN 55022, Class A and FCC, level A without external components
- ◆ Indefinite short-circuit protection
24-pin DIP with industry standard pinout
- ◆ High reliability, MTBF >1 Mio. h
- ◆ 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 -40°C to $+85^{\circ}\text{C}$ 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 (nominal 12 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 | | ± 12 VDC | ± 250 mA | 84 % |
| TEL 5-1223 | | ± 15 VDC | ± 200 mA | 84 % |
| TEL 5-2410 | 18 – 36 VDC (nominal 24 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 | | ± 12 VDC | ± 250 mA | 86 % |
| TEL 5-2423 | | ± 15 VDC | ± 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. |
| Conducted noise (input) | EN 55022 class A, FCC part 15 level A |

Output Specifications

| | |
|-------------------------------------|--|
| Voltage set accuracy | ±1 % |
| Regulation | – Input variation Vin min. to Vin 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 | continuous (automatic recovery) |
| Capacitive load | single output models: 6800 µF max. dual output models: 1000 µF max. (each output) |

General Specifications

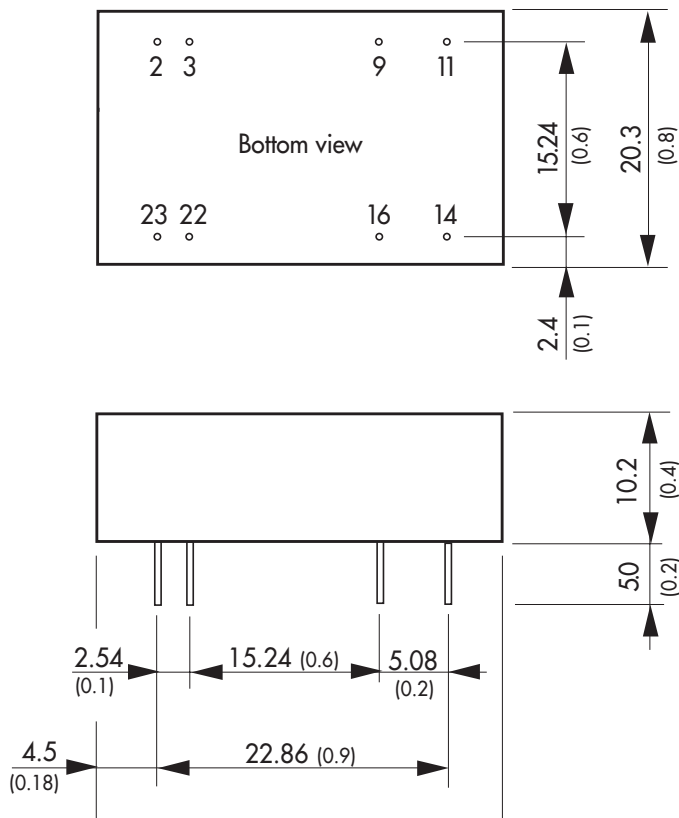
| | |
|--|--|
| Temperature ranges | – Operating –40°C to +85°C – Case temperature +90°C – Storage –40°C to +125°C |
| Derating (convection cooling) | 3.3 %/K above 70°C |
| Humidity (non condensing) | 95 % rel H max. |
| Reliability, calculated MTBF (MIL-HDBK-217F at +25°C, ground benign) | >1 Mio. h |
| Isolation voltage (60 sec.) – Input/Output | 1'500 VDC |
| Isolation capacitance – Input/Output | 380 pF typ. |
| Isolation resistance – Input/Output (500 VDC) | >1'000 M Ohm |
| Switching frequency | 300 kHz typ. |
| Safety standards | UL/cUL 60950-1, IEC/EN 60950-1 |
| Safety approvals | – CB report (SIQ) (IEC/EN 60950-1) www.tracopower.com/products/tel5-cb.pdf – CSA certification (UL 60950-1, CSA 60950-1-03) CSA File No. 226037 http://directories.csa-international.org www.tracopower.com/products/tel5-csa.pdf |

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 plastic (UL 94V-0 rated) |
| Weight | 17 g (0.60 oz) |
| Soldering temperature | max. 265°C / 10 sec. |

Outline Dimensions



| 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) |

Dimensions in [mm], () = Inch
 Pin diameter $\varnothing 0.5 \pm 0.05$ (0.02 \pm 0.002)
 Tolerances ± 0.25 (± 0.01)
 Pin pitch tolerances ± 0.13 (± 0.005)

Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at www.tracopower.com