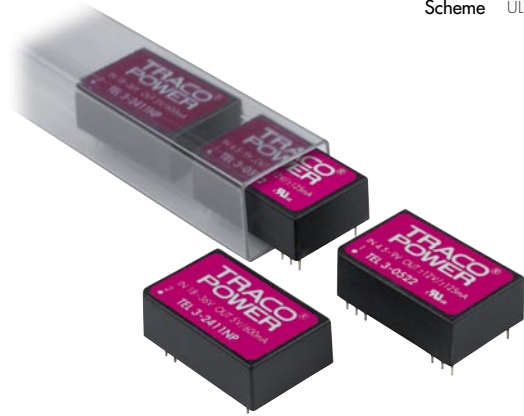


### Features

- ◆ 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
- ◆ Available with industry standard Pinout (NP)
- ◆ 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 2:1 and 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<br>(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<br>(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<br>(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<br>(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<br>(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

### 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     |
| Reverse voltage protection  |               | 1.0 A max.  |

### Output Specifications

|                                     |  |                                    |
|-------------------------------------|--|------------------------------------|
| Voltage set accuracy                |  | ±1 %                               |
| Regulation                          | – Input variation Vin min. to Vin max. | 0.5 % max.                         |
|                                     | – Load variation 10 – 100 %            |                                    |
|                                     | 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 @ 25°C, ground benign) |                          | >1 Mio. h   |
| Isolation voltage (60 sec)   | – Input/Output/Case      | 1500 VDC  |
| Isolation capacity   | – 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, EN 60950-1, IEC 60950-1<br>Compliance up to 60 VDC input voltage (SELV limit)   |
| Safety approvals   |                          | CSA File No. 226037 (-NP models pending)<br><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.

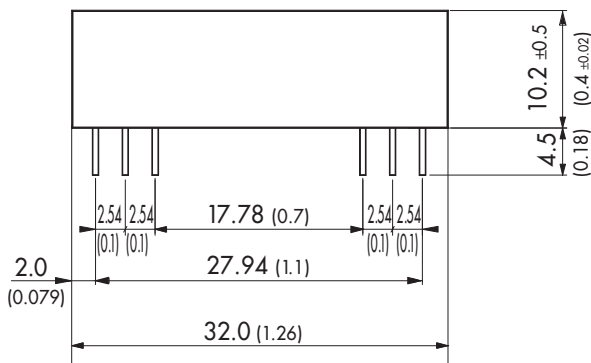
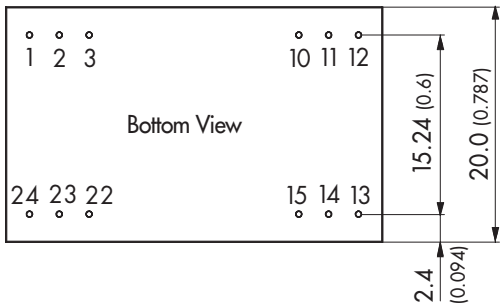
**Physical Specifications**

|                       |                              |
|-----------------------|------------------------------|
| 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.         |

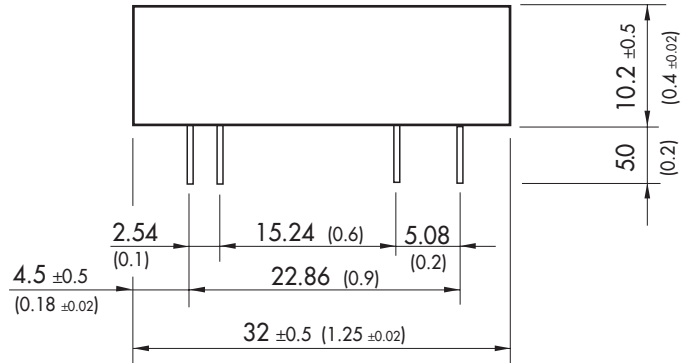
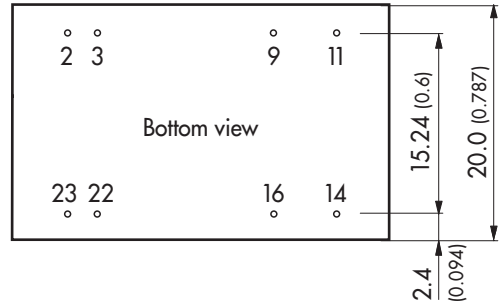
**Outline Dimensions mm (inches)**

**Standard Pinout:**

compatible with TED / TEM-3 Series)



**Pinout NP Version:**



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

| Pin-Out |            |            |
|---------|------------|------------|
| Pin     | Single     | Dual       |
| 1       | +Vin (Vcc) | +Vin (Vcc) |
| 2       | No con.    | -Vout      |
| 3       | No con.    | Common     |
| 10      | -Vout      | Common     |
| 11      | +Vout      | +Vout      |
| 12      | -Vin (GND) | -Vin (GND) |
| 13      | -Vin (GND) | -Vin (GND) |
| 14      | +Vout      | +Vout      |
| 15      | -Vout      | Common     |
| 22      | No con.    | Common     |
| 23      | No con.    | -Vout      |
| 24      | +Vin (Vcc) | +Vin (Vcc) |

| 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) |

Specifications can be changed any time without notice