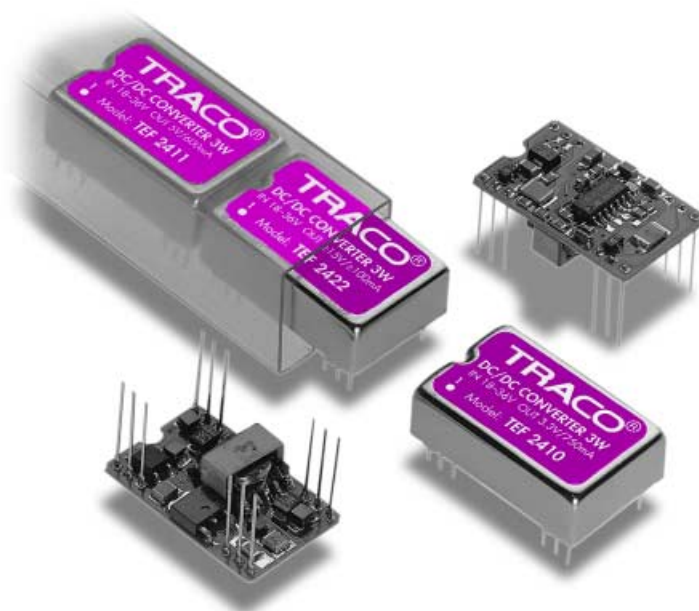


#### Features

- Full SMD design with Ceramic Capacitors
- Wide 2:1 Input range
- High Efficiency
- Short Circuit Protection
- Metal Case, 24-Pin DIP
- 2 Year Product Warranty



The TEF-series is a family of isolated dc/dc-converters that offers a cost effective solution for applications requiring miniature size and high performance features. SMT-design with exclusive use of ceramic capacitors guarantees a very high reliability with an MTBF of over 1'000'000 hours. A highly automated production with 100% parameter test ensures a high quality standard of this product.

| Models                                                   |                     |                |                     |                 |
|----------------------------------------------------------|---------------------|----------------|---------------------|-----------------|
| Ordercode                                                | Input voltage range | Output voltage | Output current max. | Efficiency typ. |
| TEF 0510<br>TEF 0511<br>TEF 0512<br>TEF 0521<br>TEF 0522 | 4.5 – 7 VDC         | 3.3 VDC        | 650 mA              | 69 %            |
|                                                          |                     | 5 VDC          | 500 mA              | 72 %            |
|                                                          |                     | 12 VDC         | 240 mA              | 74 %            |
|                                                          |                     | ±12 VDC        | ± 125 mA            | 74 %            |
|                                                          |                     | ±15 VDC        | ± 95 mA             | 74 %            |
| TEF 1210<br>TEF 1211<br>TEF 1212<br>TEF 1221<br>TEF 1222 | 9 – 18 VDC          | 3.3 VDC        | 700 mA              | 71 %            |
|                                                          |                     | 5 VDC          | 550 mA              | 73 %            |
|                                                          |                     | 12 VDC         | 250 mA              | 78 %            |
|                                                          |                     | ±12 VDC        | ± 125 mA            | 78 %            |
|                                                          |                     | ±15 VDC        | ± 100 mA            | 78 %            |
| TEF 2010<br>TEF 2011<br>TEF 2012<br>TEF 2021<br>TEF 2022 | 10 – 30 VDC         | 3.3 VDC        | 700 mA              | 72 %            |
|                                                          |                     | 5 VDC          | 550 mA              | 75 %            |
|                                                          |                     | 12 VDC         | 250 mA              | 80 %            |
|                                                          |                     | ±12 VDC        | ± 125 mA            | 80 %            |
|                                                          |                     | ±15 VDC        | ± 100 mA            | 80 %            |
| TEF 2410<br>TEF 2411<br>TEF 2412<br>TEF 2421<br>TEF 2422 | 18 – 36 VDC         | 3.3 VDC        | 700 mA              | 76 %            |
|                                                          |                     | 5 VDC          | 600 mA              | 80 %            |
|                                                          |                     | 12 VDC         | 250 mA              | 82 %            |
|                                                          |                     | ±12 VDC        | ± 125 mA            | 82 %            |
|                                                          |                     | ±15 VDC        | ± 100 mA            | 83 %            |
| TEF 4810<br>TEF 4811<br>TEF 4812<br>TEF 4821<br>TEF 4822 | 36 – 72 VDC         | 3.3 VDC        | 700 mA              | 76 %            |
|                                                          |                     | 5 VDC          | 600 mA              | 80 %            |
|                                                          |                     | 12 VDC         | 250 mA              | 82 %            |
|                                                          |                     | ±12 VDC        | ± 125 mA            | 82 %            |
|                                                          |                     | ±15 VDC        | ± 100 mA            | 83 %            |

## Input Specifications

|                             |                |             |
|-----------------------------|----------------|-------------|
| Input current no load       | 5 Vin models:  | 60 mA typ.  |
|                             | 12 Vin models: | 15 mA typ.  |
|                             | 20 Vin models: | 25 mA typ.  |
|                             | 24 Vin models: | 7 mA typ.   |
|                             | 48 Vin models: | 6 mA typ.   |
| Input current full load     | 5 Vin models:  | 720 mA typ. |
|                             | 12 Vin models: | 310 mA typ. |
|                             | 20 Vin models: | 180 mA typ. |
|                             | 24 Vin models: | 140 mA typ. |
|                             | 48 Vin models: | 70 mA typ.  |
| Surge voltage (1 sec. max.) | 5 Vin models:  | 7.5 V max.  |
|                             | 12 Vin models: | 15 V max.   |
|                             | 24 Vin models: | 30 V max.   |
| Input filter                | Pi-Filter      |             |

## Output Specifications

|                                     |                                        |              |
|-------------------------------------|----------------------------------------|--------------|
| Voltage set accuracy                | ± 3 %                                  |              |
| Regulation                          | – Input variation Vin min. to Vin max. |              |
|                                     | – Load variation 10 – 90 %;            |              |
|                                     | single output:                         | ± 0.5 % max. |
|                                     | dual output:                           | ± 1.0 % max. |
|                                     |                                        | ± 2.0 % max. |
| Ripple and noise (20 MHz Bandwidth) | 80 mVpk-pk max.                        |              |
| Temperature coefficient             | ± 0.02 % / °C                          |              |
| Short circuit protection            | continuous                             |              |
| Capacitive load                     | – Single output models                 | 2200 µF max. |
|                                     | – Dual output models                   | 2200 µF max. |

## General Specifications

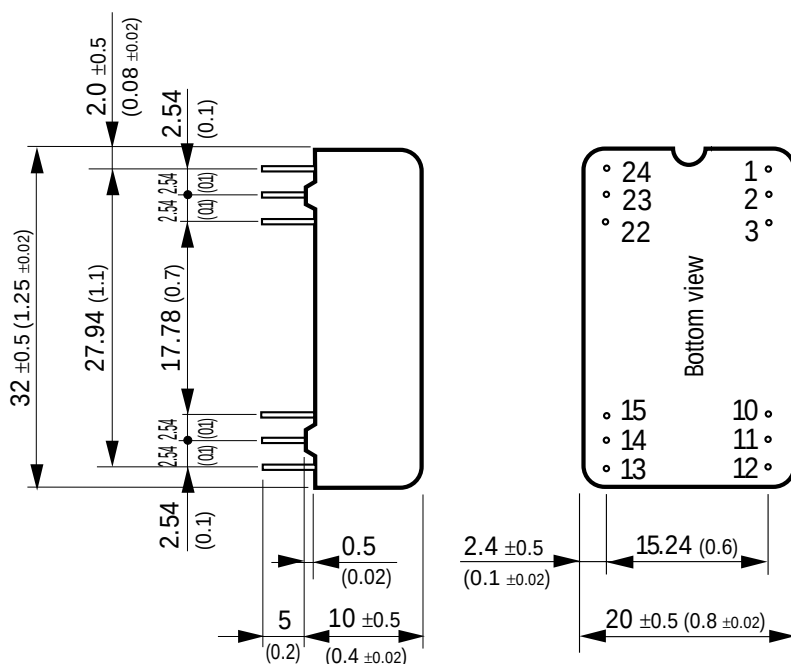
|                                               |                                 |                     |
|-----------------------------------------------|---------------------------------|---------------------|
| Temperature ranges                            | – Operating                     | – 25 °C ... +75 °C  |
|                                               | – Case                          | + 95 °C             |
|                                               | – Storage                       | – 40 °C ... +115 °C |
| Humidity (non condensing)                     | 95 % rel H max.                 |                     |
| Reliability, calculated MTBF (MIL-HDBK-217 E) | >1'000'000 h @ 25 °C            |                     |
| Isolation voltage                             | – Input / Output                | 1'000 VDC           |
|                                               | – Input / Case                  | 1'000 VDC           |
|                                               | – Output / Case                 | 500 VDC             |
| Isolation capacity                            | – Input / Output                | 500 pF typ.         |
| Isolation resistance                          | – Input / Output                | >1'000 M Ohm        |
| Switching frequency                           | 25 – 85 KHz (depending on load) |                     |

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

## Physical Specifications

|                       |                               |
|-----------------------|-------------------------------|
| Case material         | Steel nickel-plated           |
| Potting material      | Silicon rubber TSE (UL 94V-O) |
| Weight                | 14 g (0.49 oz)                |
| Soldering temperature | max. 260°C / 10 sec           |

## Outline Dimensions mm (inches)



| Pin-Out |             |            |
|---------|-------------|------------|
| Pin     | Single      | Dual       |
| 1       | +Vin (Vcc)  | +Vin (Vcc) |
| 2       | No function | -Vout      |
| 3       | No function | 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 function | Common     |
| 23      | No function | -Vout      |
| 24      | +Vin (Vcc)  | +Vin (Vcc) |

( ) = inches

Pin  $\varnothing$  0.5 (0.02)

Specifications can be changed without notice