Features

◆ High efficiency up to 86 %
◆ Operating temperature range
  −40°C to +80°C
◆ Indefinite short-circuit protection
◆ I/O isolation 1500 VDC
◆ Industry standard pinout
◆ Cost optimized design
◆ Lead free design, RoHS compliant
◆ 3-year product warranty

The TEL 15 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 good cost /performance ratio. High efficiency allows an operating temperature range of −40°C to +80°C at full load. This product series provides an economical solution for many cost critical applications in industrial and consumer electronics.

Models

<table>
<thead>
<tr>
<th>Ordercode</th>
<th>Input voltage range</th>
<th>Output voltage</th>
<th>Output current max.</th>
<th>Efficiency typ.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEL 15-1210</td>
<td>3.3 VDC</td>
<td>3'000 mA</td>
<td>78 %</td>
<td></td>
</tr>
<tr>
<td>TEL 15-1211</td>
<td>5.1 VDC</td>
<td>3'000 mA</td>
<td>81 %</td>
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<tr>
<td>TEL 15-1212</td>
<td>12 VDC</td>
<td>1'250 mA</td>
<td>86 %</td>
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<tr>
<td>TEL 15-1213</td>
<td>15 VDC</td>
<td>1'000 mA</td>
<td>86 %</td>
<td></td>
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<tr>
<td>TEL 15-1222</td>
<td>±12 VDC</td>
<td>±625 mA</td>
<td>86 %</td>
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<tr>
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<td>±15 VDC</td>
<td>±500 mA</td>
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<td>±500 mA</td>
<td>86 %</td>
<td></td>
</tr>
<tr>
<td>TEL 15-4810</td>
<td>3.3 VDC</td>
<td>3'000 mA</td>
<td>78 %</td>
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</tr>
<tr>
<td>TEL 15-4811</td>
<td>5.1 VDC</td>
<td>3'000 mA</td>
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</table>
### DC/DC Converters

**TEL 15 Series**  
**15 Watt**

## Input Specifications

| Input current no load | 12 Vin models: | 30 mA typ.  
| 24 Vin models: | 20 mA typ.  
| 48 Vin models: | 10 mA typ.  

| Input current (full load) | 12 Vin; 3.3 Vout models: | 1050 mA typ.  
| 12 Vin; other output models: | 1500 mA typ.  
| 24 Vin; 3.3 Vout models: | 550 mA typ.  
| 24 Vin; other output models: | 750 mA typ.  
| 48 Vin; 3.3 Vout models: | 250 mA typ.  
| 48 Vin; other output models: | 350 mA typ.  

### Start-up voltage / under voltage shut down

| Voltage | 12 Vin models: | 8.5 VDC / 8.0 VDC typ.  
| 24 Vin models: | 17 VDC / 15 VDC typ.  
| 48 Vin models: | 33 VDC / 29 VDC typ.  

### Surge voltage

| Voltage | 12 Vin models: | 25 V max.  
| 24 Vin models: | 50 V max.  
| 48 Vin models: | 100 V max.  

## Output Specifications

| Voltage set accuracy | ±1 %  

### Regulation

| Regulation | Vin min. to Vin max. | 1 % max.  
| Load variation | 10 – 100 % | 0.5 % max.  
| single output models | 1 % max.  
| dual output models balanced load | 3 % max. / Minimum load 10 %  
| dual output models unbalanced load | 1 % max.  

### Ripple and noise (20 MHz Bandwidth)

| Ripple and noise | 50 mVpk-pk max.  
| dual output models | 75 mVpk-pk max.  

### Temperature coefficient

| Temperature coefficient | ±0.02 %/K  

### Output current limitation

>120 % of Iout max., foldback

### Short circuit protection

indefinite (automatic recovery)

### Capacitive load

| Capacitive load | 470 µF max.  
| dual output models | 220 µF max. (per output)  

## General Specifications

### Temperature ranges

- Operating: -40°C to +80°C (without load derating)  
- Case temperature: +100°C max.  
- Storage: -55°C to +125°C

### Power derating

- Natural convection: 2.5 %/K above +60°C  
- Natural convection with heat sink (optional): 1.0 %/K above +70°C

### Humidity (non condensing)

| Humidity | 95 % rel H max.  

### Reliability, calculated MTBF

>700'000 h

### Isolation voltage (60 sec.)

| Isolation voltage | 1500 VDC  

| Isolation capacitance | 1200 pF typ.  

| Isolation resistance | >1000 M Ohm  

### Switching frequency (fixed)

330 kHz typ. (Pulse width modulation PWM)

### Safety standards

UL/cUL 60950-1, IEC/EN 60950-1  
(Compliance up to 60 VDC input voltage (SELV limit))

### Thermal Impedance

12.2 K/W typ.  
9.2 K/W typ. (with Heatsink)

### Environmental compliance

- Reach  
- RoHS  

www.tracopower.com/info/reach-declaration.pdf  
RoHS directive 2011/65/EU

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

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casing material</td>
<td>copper nickel plated</td>
</tr>
<tr>
<td>Baseplate</td>
<td>non conductive FR4</td>
</tr>
<tr>
<td>Potting material</td>
<td>epoxy (UL 94V-0 rated)</td>
</tr>
<tr>
<td>Weight</td>
<td>32 g (1.13 oz)</td>
</tr>
<tr>
<td>Soldering temperature</td>
<td>max. 265°C / 10 sec.</td>
</tr>
</tbody>
</table>

### Outline Dimensions

![Outline Dimensions Diagram](image)

### Pin-Out

<table>
<thead>
<tr>
<th>Pin</th>
<th>Single</th>
<th>Dual</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+Vin (Vcc)</td>
<td>+Vin (Vcc)</td>
</tr>
<tr>
<td>2</td>
<td>–Vin (GND)</td>
<td>–Vin (GND)</td>
</tr>
<tr>
<td>3</td>
<td>+Vout</td>
<td>+Vout</td>
</tr>
<tr>
<td>4</td>
<td>No pin</td>
<td>Common</td>
</tr>
<tr>
<td>5</td>
<td>–Vout</td>
<td>–Vout</td>
</tr>
</tbody>
</table>

Dimensions in [mm], () = Inch
- Pin diameter: 1.0 ±0.05 (0.02 ±0.002)
- Pin pitch tolerances: ±0.13 (±0.005)
- Case tolerances: ±0.25 (±0.01)

### Heat-Sink (Option)

#### Heat-sink TEN-HS4 (optional)

![Heat-sink TEN-HS4 Diagram](image)

- **Order code**: TEN-HS4
  - (cont.: heat-sink, thermal pad, 2 clamps)
- **Material**: Aluminum
- **Finish**: Anodic treatment (black)
- **Weight**: 9 g (0.31 oz) without converter

**Note:**
- Before attaching the heatsink, the product label on converter has to be removed for optimal performance.
- For volume orders we can supply the converters with heatsink already mounted.
- Please contact us for a relative quotation.