Features

- Smallest encapsulated 30 W converter
- 2” x 1” x 0.4” shielded metal package with isolated baseplate
- Single- and dual output models
- I/O isolation voltage 1500 VDC
- Excellent efficiency up to 91%
- Operating temperature range –40°C to +85°C
- Remote On/Off
- Over-temperature protection
- 3-year product warranty

The TEN-30 series is the latest generation of high performance dc-dc converter modules setting a new standard concerning power density. This product with 30W comes in an encapsulated, shielded metal package with a footprint of only 1.0” x 2.0”. All models have wide 2:1 input voltage range and precisely regulated, isolated output voltages. Advanced circuit topology provides high efficiency up to 91% which allows an industrial operating temperature range of –40°C to +85°C (with derating).

Further features include remote On/Off, trimmable output, under-voltage lockout and overtemperature protection. Typical applications for these converters are mobile equipment, instrumentation, distributed power architectures in communication and industrial electronics and everywhere where space on the PCB is critical.

### Models

<table>
<thead>
<tr>
<th>Ordercode</th>
<th>Input voltage</th>
<th>Output voltage</th>
<th>Output current max.</th>
<th>Efficiency typ.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEN 30-1210</td>
<td>3.3 VDC</td>
<td>8'000 mA</td>
<td>85 %</td>
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</tr>
<tr>
<td>TEN 30-1211</td>
<td>5.1 VDC</td>
<td>6'000 mA</td>
<td>87 %</td>
<td></td>
</tr>
<tr>
<td>TEN 30-1212</td>
<td>12 VDC</td>
<td>2'500 mA</td>
<td>89 %</td>
<td></td>
</tr>
<tr>
<td>TEN 30-1213</td>
<td>15 VDC</td>
<td>2'000 mA</td>
<td>89 %</td>
<td></td>
</tr>
<tr>
<td>TEN 30-1221</td>
<td>±5 VDC</td>
<td>±3'000 mA</td>
<td>87 %</td>
<td></td>
</tr>
<tr>
<td>TEN 30-1222</td>
<td>±12 VDC</td>
<td>±1'250 mA</td>
<td>87 %</td>
<td></td>
</tr>
<tr>
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<td>±15 VDC</td>
<td>±1'000 mA</td>
<td>90 %</td>
<td></td>
</tr>
<tr>
<td>TEN 30-4810</td>
<td>3.3 VDC</td>
<td>7'500 mA</td>
<td>87 %</td>
<td></td>
</tr>
<tr>
<td>TEN 30-4811</td>
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<td>6'000 mA</td>
<td>89 %</td>
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</tbody>
</table>
## Input Specifications

### Input current at no load
- 12 Vin models: ±12 / ±15 Vout models: 50 mA typ.
- 24 Vin models: 5.1 / ±5 Vout models: 70 mA typ.
- 48 Vin models: ±15 Vout models: 20 mA typ.

### Input current at full load
- 12 Vin models: 3.3 Vout models: 2700 mA typ.
- 24 Vin models: 3.3 Vout models: 1300 mA typ.
- 48 Vin models: 3.3 Vout models: 650 mA typ.

### Start-up voltage / under voltage shut down
- 12 V models: 9 VDC / 8 VDC typ.
- 24 V models: 18 VDC / 16 VDC typ.
- 48 V models: 36 VDC / 32 VDC typ.

### Surge voltage (100 ms max.)
- 12 V models: 25 V max.
- 24 V models: 50 V max.
- 48 V models: 100 V max.

## Output Specifications

### Voltage set accuracy
±1 %

### Output voltage adj. range
±10 % (only for single output models)

### Regulation
- Input variation: Vin min. to Vin max.: 0.2 % max.
- Load variation 0 – 100 % single output models: 0.5 % max.
- dual output models balanced load: 1.0 % max.
- dual output models unbalanced load (25% /100%): 5.0 % max.

### Minimum load
not required

### Temperature coefficient
±0.02 %/K

### Ripple and noise (20 MHz Bandwidth)
100 mVpp-pk max.
(150 mVpp-pk for 12/±12/15/±15V models)

### Start up time (nominal Vin and constant resistive load)
30 ms typ.

### Transient response time (25% load change)
250 µs typ.

### Short circuit protection
indefinite, automatic recovery

### Over load protection
150 % of Iout max. typ.

### Over voltage protection
- 3.3 VDC models: 3.9 V
- 5.1 VDC models: 6.2 V
- 12 VDC models: 15 V
- 15 VDC models: 18 V

### Capacitive load (max.)
- 3.3 Vout models: 20'000 µF
- 5.1 Vout models: 14'400 µF
- 12 Vout models: 3'000 µF
- 15 Vout models: 2'000 µF
- ±5 Vout models: 3'000 µF (each output)
- ±12 Vout models: 2'000 µF (each output)
- ±15 Vout models: 1'300 µF (each output)

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

http://www.tracopower.com
General Specifications

Temperature ranges
- Operating: -40°C to +85°C
- Case temperature: +105°C max.
- Storage: -55°C to +125°C

Load derating
3.3 %/K above +60°C

Over temperature protection
- Operating: at +115°C typ.

Humidity (non condensing)
5 % to 95 % rel H max.

Thermal impedance
- Natural convection: 12 °C/W
- Natural convection with heat sink: 10 °C/W

Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)
1.4 Mio. h

Isolation voltage (60 s)
- Input/Output: 1'500 VDC

Isolation capacitance
- Input/Output: 1500 pF max.

Isolation resistance
- Input/Output (500 VDC): >1'000 MOhm

Remote On/Off:
- On: 3 to 12 VDC or open circuit.
- Off: 0 to 1.2 VDC or short circuit pin 3 and pin 2 3 mA max.
- Standby current: 3 mA max.

Switching frequency (fixed)
430 kHz typ. (puls width modulation)

Vibration and thermal shock
MIL-STD-810F

Safety approvals
- cUL/UL 60950-1, IEC/EN 60950-1
- Certification documents: www.tracopower.com/overview/ten30

Output Voltage Adjustment

<table>
<thead>
<tr>
<th>Trim up</th>
<th>Trim down</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ru [kohm]</td>
<td>Rd [kohm]</td>
</tr>
<tr>
<td>output</td>
<td>1.5</td>
</tr>
<tr>
<td>+5%</td>
<td>0.56</td>
</tr>
<tr>
<td>+10%</td>
<td>0.051</td>
</tr>
</tbody>
</table>

Physical Specifications

Casing material: copper, nickel plated

Baseplate: non conductive FR4

Potting material: epoxy (UL 94V-0 -rated)

Weight: 31 g (1.1 oz)

Soldering temperature: max. 265°C / 10 s

Environmental compliance
- Reach
- RoHS

Supporting documents: www.tracopower.com/overview/ten30

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

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>Remote On/Off</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>+ Vout</td>
<td>+ Vout</td>
</tr>
<tr>
<td>5</td>
<td>–Vout</td>
<td>Common</td>
</tr>
<tr>
<td>6</td>
<td>Trim</td>
<td>–Vout</td>
</tr>
</tbody>
</table>

Dimensions in [mm], () = Inch
Pin diameter: 1.0 ±0.1 (0.04 ±0.004)
Pin pitch tolerances: ±0.25 (±0.01)
Case tolerances: ±0.5 (±0.02)

Heat-Sink (Option)

Order code: TEN-HS1
(cont.: heat-sink, thermal pad, 2 clamps)

Material: Aluminum
Finish: Anodic treatment (black)
Weight: 17g (0.60oz) without converter
Thermal impedance after assembling: 10 K/W

Note:
The product label on converter has to be removed before mounting the heat-sink.
For volume orders converters will be supplied with heat-sinks already mounted. Please contact factory for quotation.
Separate heat-sinks are only available for prototypes and small quantity orders.

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