DC/DC Converters
TON 15 Series, 15 Watt

Features
◆ Ultra compact 15W converter
◆ Cost efficient open frame design with industry standard pin-out
◆ Surface-mount (SM) and through-hole version
◆ I/O isolation voltage 2250V, rated for basic insulation
◆ Extended operating temperature range -40°C to +85°C
◆ Remote On/Off
◆ Under voltage lockout
◆ Lead free design, RoHS compliant
◆ 3-years product warranty

The TON-15 series is a new generation of high performance 15W dc-dc converters with wide input voltage range and precisely regulated output voltage. The ultra compact open frame design with industry standard pin-out provides the designer now a 50% smaller, cost efficient alternative to existing 10 to 15W converters in the market. Built-in filters for both input and output minimize the need for external filtering.

Further features include remote On/Off, output voltage trimming, over voltage protection and short circuit protection. Typical applications are distributed power systems, instrumentation and industrial electronics, everywhere where space on the PCB is a critical factor.

<table>
<thead>
<tr>
<th>Models</th>
<th>Input voltage range</th>
<th>Output voltage</th>
<th>Output current max.</th>
<th>Efficiency typ.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TON 15-2410</td>
<td>18 – 36 VDC (nominal 24 VDC)</td>
<td>3.3 VDC</td>
<td>3'500 mA</td>
<td>86 %</td>
</tr>
<tr>
<td>TON 15-2411</td>
<td>5.0 VDC</td>
<td>3'000 mA</td>
<td>87 %</td>
<td></td>
</tr>
<tr>
<td>TON 15-2412</td>
<td>12 VDC</td>
<td>1'250 mA</td>
<td>87 %</td>
<td></td>
</tr>
<tr>
<td>TON 15-2413</td>
<td>15 VDC</td>
<td>1'000 mA</td>
<td>88 %</td>
<td></td>
</tr>
<tr>
<td>TON 15-4810</td>
<td>36 – 75 VDC (nominal 48 VDC)</td>
<td>3.3 VDC</td>
<td>3'500 mA</td>
<td>85 %</td>
</tr>
<tr>
<td>TON 15-4811</td>
<td>5.0 VDC</td>
<td>3'000 mA</td>
<td>87 %</td>
<td></td>
</tr>
<tr>
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<td>12 VDC</td>
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</tr>
</tbody>
</table>

Add suffix SM for surface mount version
### Input Specifications

| Input current at no load | 24 V; 3.3/5 Vout models: 20 mA typ. |
| 24 V; 12/15 Vout models: 15 mA typ. |
| 48 V; 3.3/5 Vout models: 15 mA typ. |
| 48 V; 12/15 Vout models: 10 mA typ. |
| Input current at full load | 24 V; 3.3 Vout models: 590 mA typ. |
| 24 V; other output models: 750 mA typ. |
| 48 V; 3.3 Vout models: 300 mA typ. |
| 48 V; other output models: 380 mA typ. |
| Start-up voltage / under voltage lockout | 24 V models: 17 VDC / 14.5 VDC |
| 48 V models: 33 VDC / 30.5 VDC |
| Surge voltage (100 msec. max.) | 24 V models: 50 V max. |
| 48 V models: 100 V max. |

#### Input filter
- Capacitor type (see application note for compliance to EN 55022 class A/B)

#### Radiated immunity
- EN 61000-4-3 10 V/m, perf. criteriy A

#### Fast transient / surge
- EN 61000-4-4, ±2 kV, perf. criteria B
- EN 61000-4-5, ±1 kV perf. criteria A
- With external input capacitor e.g. Nippon chemicon KY 220 µF, 100 V, ESR 48 mOhm

#### Conducted immunity
- EN 61000-4-6, 3 Vrms, perf. criteria A

### Output Specifications

| Voltage set accuracy | ±1 % |
| Output voltage adjustment | ±10 % (see application note) |

#### Regulation
- Input variation: Vin min. to Vin max
- Load variation 0 – 100 %
- 0.2 % max. (see application note)
- 0.2 % max.

#### Minimum load
- 0 % of rated max. load

#### Temperature coefficient
- ±0.02 %/K

#### Ripple and noise (20 MHz Bandwidth) (measured with 1 µF M/C and 10 µF TC)
- 3.3 & 5.0 Vout models: 75 mVpk-pk typ
- 12 & 15 Vout models: 100 mVpk-pk typ

#### Start up time (constant resistive load)
- Power On: 30 ms typ.
- Remote On: 30 ms typ.

#### Transient response setting time (25% load step chang)
- 300 µs typ.

#### Short circuit protection
- Indefinite (automatic recovery)

#### Over load protection
- At 150 % of load max., foldback

#### Over voltage protection
- 3.3 Vout models: 3.7 – 5.4 Vout
- 5 Vout models: 5.6 – 7.0 Vout
- 12 Vout models: 13.5 – 19.8 Vout
- 15 Vout models: 16.8 – 20.5 Vout

#### Capacitive load
- 3.3 & 5.0 Vout models: 1'000 µF max.
- 12 Vout models: 330 µF max.
- 15 Vout models: 220 µF max.

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**Supporting documents:** [www.tracopower.com/overview/ton15](http://www.tracopower.com/overview/ton15)

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

Temperature ranges
- Operating: -40°C to +85°C (with derating)
- Storage: -55°C to +125°C

Derating
6.7 %/K above 75°C

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

Thermal shock
acc. MIL-STD-810F

Vibration
acc. MIL-STD-810F

Reliability, calculated MTBF (WILHDBK217F, at +25°C, ground benign)
>3.4 Mio. h

Isolation voltage [60 sec.]
- Input / Output: 2’250 VDC (complies with basic insulation rating per EN 60950-1)

Isolation resistance
- Input / Output: >10 M Ohm

Isolation capacitance
- Input / Output: 1000 pF max.

Switching frequency
(Pulse width modulation PWM) 3.3 / 5 Vout models: 270 kHz typ.
12 / 15 Vout models: 470 kHz typ.

Remote On/Off
- On: 3.0 to 15 VDC or open circuit.
- Off: 0 to 1.2 VDC or short circuit pin 6 and pin 2
- Off idle current: 2.5 mA max.
  negative remote On/Off logic on demand

Safety approvals
- Certification documents
  UL 60950-1, EN 60950-1, IEC 60950-1
  www.tracopower.com/overview/ton15

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

Physical Specifications

Weight
10.5 g (0.36oz)

Soldering profile for trough hole version
max. 265°C / 10 sec. (wave soldering)

Lead-free reflow solder process for SMD-package models
as per J-STD-020D.01 [to find at:
www.jedec.org - free registration required]

Outline Dimensions

SMD version (SM) thru hole version (TH)

Pin-Out

<table>
<thead>
<tr>
<th>Pin</th>
<th>Single</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+Vin (Vcc)</td>
</tr>
<tr>
<td>2</td>
<td>-Vin (GND)</td>
</tr>
<tr>
<td>3</td>
<td>+Vout</td>
</tr>
<tr>
<td>4</td>
<td>Trim</td>
</tr>
<tr>
<td>5</td>
<td>-Vout</td>
</tr>
<tr>
<td>6</td>
<td>Remote On/Off</td>
</tr>
</tbody>
</table>

Dimensions in [mm], || = Inch
Tolerances: ±0.5 (±0.02)
Pin pitch tolerances: ±0.25 (±0.01)

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

www.tracopower.com