



#### Features

- ◆ Smallest 15W Converter  
Ultra compact Size: 27.9 x 23.9 x 8.5mm
- ◆ Ultra Wide 4:1 Input Voltage Range
- ◆ 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
- ◆ Input Filter meets EN55022, Class A
- ◆ Under Voltage Lockout
- ◆ Remote On/Off
- ◆ Lead free Design, RoHS compliant
- ◆ 3 Years Product Warranty



The TON-15WI series is a new generation of high performance 15W dc-dc converters with ultra-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, under voltage lockout and short circuit protection. Typical applications are distributed power systems, instrumentation and industrial electronics, everywhere where space on the PCB is a critical factor.

#### Models

| Order code    | Input voltage range                    | Output voltage | Output current max. | Efficiency typ. |
|---------------|----------------------------------------|----------------|---------------------|-----------------|
| TON 15-2410WI | <b>9 – 36 VDC</b><br>(24 VDC nominal)  | 3.3 VDC        | 4'000 mA            | 84 %            |
| TON 15-2411WI |                                        | 5.0 VDC        | 3'000 mA            | 84 %            |
| TON 15-2412WI |                                        | 12 VDC         | 1'300 mA            | 85 %            |
| TON 15-2413WI |                                        | 15 VDC         | 1'000 mA            | 86 %            |
| TON 15-4810WI | <b>18 – 75 VDC</b><br>(48 VDC nominal) | 3.3 VDC        | 4'000 mA            | 86 %            |
| TON 15-4811WI |                                        | 5.0 VDC        | 3'000 mA            | 86 %            |
| TON 15-4812WI |                                        | 12 VDC         | 1'300 mA            | 87 %            |
| TON 15-4813WI |                                        | 15 VDC         | 1'000 mA            | 88 %            |

Add suffix **SM** for surface mount version

## Input Specifications

|                                            |                            |                                                         |
|--------------------------------------------|----------------------------|---------------------------------------------------------|
| Input current at no load                   | 24 V; 3.3/5 Vout models:   | 50 mA typ.                                              |
|                                            | 24 V; 12/15 Vout models:   | 20 mA typ.                                              |
|                                            | 24 V; 3.3/5 Vout models:   | 40 mA typ.                                              |
|                                            | 24 V; 12/15 Vout models:   | 15 mA typ.                                              |
| Input current at full load                 | 24 V; 3.3 Vout models:     | 690 mA typ.                                             |
|                                            | 24 V; other output models: | 800 mA typ.                                             |
|                                            | 48 V; 3.3 Vout models:     | 340 mA typ.                                             |
|                                            | 48 V; other output models: | 390 mA typ.                                             |
| Input voltage variation (dv/dt)            |                            | 5 V / ms, max.<br>(complies with ETS 300 132 part. 4.4) |
| Start-up voltage / Under voltage lockout   | 24 V models:               | 9 VDC / 8 VDC (typ.)                                    |
|                                            | 48 V models:               | 18 VDC / 16 VDC (typ.)                                  |
| Surge voltage (100 msec. max.)             | 24 V models:               | 50 V max.                                               |
|                                            | 48 V models:               | 100 V max.                                              |
| Conducted input noise (no ext. components) |                            | EN 55022 level A, FCC part 15, level A                  |

## Output Specifications

|                                                                                  |                                       |                                 |
|----------------------------------------------------------------------------------|---------------------------------------|---------------------------------|
| Voltage set accuracy                                                             |                                       | ±1%                             |
| Output voltage adjustment                                                        |                                       | ±10 %                           |
| Regulation                                                                       | – Input variation Vin min. to Vin max | 0.2 % max.                      |
|                                                                                  | – Load variation 0 – 100 %            | 0.2 % max.                      |
| Temperature coefficient                                                          |                                       | ±0.02 % /K                      |
| Ripple and noise (20 MHz Bandwidth)<br>with a 1µF M/C and a 10µF T/C, see note 1 | 3.3 / 5 Vout models:                  | 75 mVpk-pk max.                 |
|                                                                                  | 12 / 15 Vout models:                  | 100 mVpk-pk max.                |
| Start up time (nominal Vin and constant resistive load)                          |                                       | 30 ms typ.                      |
| Transient response setting time (25% load step chang)                            |                                       | 250 µs typ.                     |
| Short circuit protection                                                         |                                       | indefinite (automatic recovery) |
| Over load protection                                                             |                                       | <150 % of Iout 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 – 19.6 Vout                |
|                                                                                  | 15 Vout models:                       | 16.8 – 20.5 Vout                |
| Capacitive load                                                                  | 3.3 Vout & 5.0 Vout models:           | 1'000 µF max.                   |
|                                                                                  | 12 Vout models:                       | 330 µF max.                     |
|                                                                                  | 15 Vout models:                       | 220 µF max.                     |

## General Specifications

|                                                     |                      |                                                                  |
|-----------------------------------------------------|----------------------|------------------------------------------------------------------|
| Temperature ranges                                  | – Operating          | –40 °C ... +85 °C                                                |
|                                                     | – Storage            | –55 °C ... +125 °C                                               |
| Derating                                            |                      | TBD                                                              |
| Humidity (non condensing)                           |                      | 95 % rel H max.                                                  |
| Reliability, calculated MTBF (MIL-HDBK-217 F)       |                      | TBD @ 25°C                                                       |
| Isolation voltage (60 sec)                          | – Input / Output     | 2'250 VDC (complies with basic insulation rating per EN 60950-1) |
|                                                     | – Input / Output     | >1'000 M Ohm                                                     |
| Isolation resistance                                | – Input / Output     | >1'000 M Ohm                                                     |
|                                                     | – Input / Output     | 1000 pF max.                                                     |
| Switching frequency<br>(Pulse width modulation PWM) | 3.3 / 5 Vout models: | 300 kHz typ.                                                     |
|                                                     | 12 / 15 Vout models: | 400 kHz typ.                                                     |

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

## General Specifications

|                  |                                                                                                                                  |
|------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Remote On/Off    | – On: 3.0 ... 15 VDC or open circuit.<br>– Off: 0 ... 1.2 VDC or short circuit pin 6 and pin 2<br>– Off idle current: 20 mA typ. |
| Vibration        | 10-55Hz, 2G, 30 minutes along X,Y,Z                                                                                              |
| Safety standards | UL 60950-1, EN 60950-1, IEC 60950-1                                                                                              |
| Safety approvals | UL/cUL File E188913                                                                                                              |

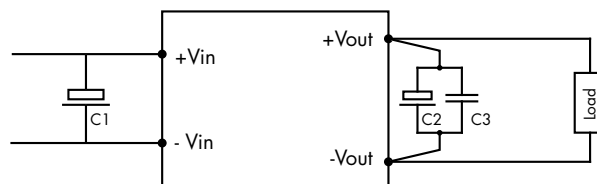
## Physical Specifications

|                   |                                                                                                                                                                              |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Weight            | 10.5g (0.36 oz)                                                                                                                                                              |
| Soldering profile | – Trough Hole Version max. 265 °C / 10 sec. (wave soldering)<br>– SMD Version lead-free reflow solder process as per IPC/JEDEC J-STD-020C<br>peak temp. 245°C (20 sec. max.) |

## Output Voltage Adjustment



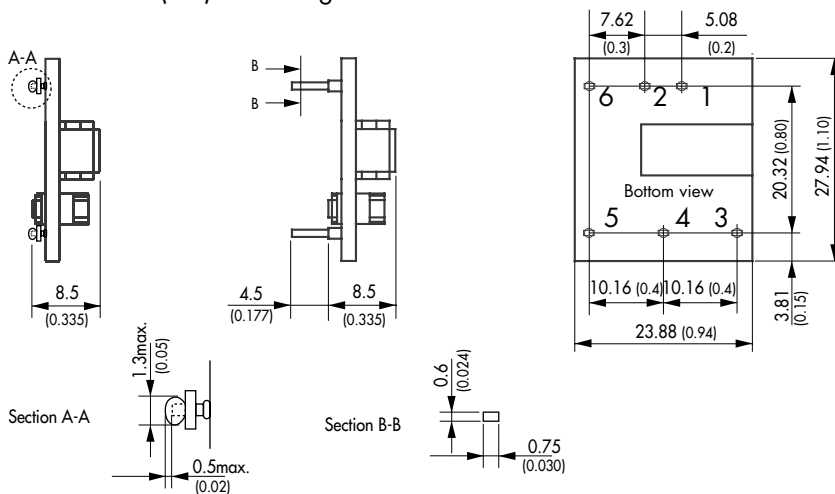
**Note 1** Recommended circuit to reduce conducted noise and output ripple & noise:



C1: 33µF low ESR electrolytic capacitor  
 C2: 10µF low ESR electrolytic capacitor  
 C3: 1µ film capacitor

## Outline Dimensions

SMD Version (SM)      Trough Hole Version



| Pin-Out |               |
|---------|---------------|
| Pin     | Single        |
| 1       | +Vin (Vcc)    |
| 2       | -Vin (GND)    |
| 3       | +Vout         |
| 4       | Trim          |
| 5       | -Vout         |
| 6       | Remote On/Off |

Dimensions in [mm], ( ) = Inch  
 Tolerances ±0.35 (0.014)

Specifications can be changed any time without notice