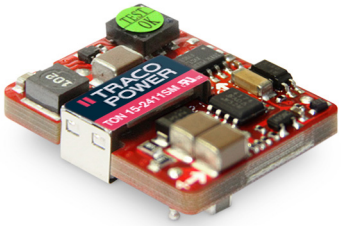
DC/DC Converters

TON 15 Series, 15 Watt

CB Scheme cULus UL 60950-1

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.

Models

Order code	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TON 15-2410	**18 – 36 VDC** (nominal 24 VDC)	3.3 VDC	3'500 mA	86 %
TON 15-2411		5.0 VDC	3'000 mA	87 %
TON 15-2412		12 VDC	1'250 mA	87 %
TON 15-2413		15 VDC	1'000 mA	88 %
TON 15-4810	**36 – 75 VDC** (nominal 48 VDC)	3.3 VDC	3'500 mA	85 %
TON 15-4811		5.0 VDC	3'000 mA	87 %
TON 15-4812		12 VDC	1'250 mA	87 %
TON 15-4813		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:	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 chemi-con KY 220 µF, 100 V, ESR 48 mOhm
Conducted immunity		EN 61000-4-6, 3 Vrms, perf. criteria A
Reflected ripple current		30 mAp-p typ.

Output Specifications

Voltage set accuracy		±1 %
Output voltage adjustment		±10 % (see application note)
Regulation	– Input variation Vin min. to Vin max	0.2 % max.
	– Load variation 0 – 100 %	0.2 % max.
Minimum load		0 % of rated max. load
Temperature coefficient		±0.02 %/K
Ripple and noise (20 MHz Bandwidth)	3.3 & 5.0 Vout models:	75 mVpk-pk typ
(measured with 1 µF M/C and 10 µF TC)	12 & 15 Vout models:	100 mVpk-pk typ
Start up time	– Power On	30 ms typ.
(constant resistive load)	– 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 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 – 19.8 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.

Supporting documents: www.tracopower.com/overview/ton15

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

General Specifications

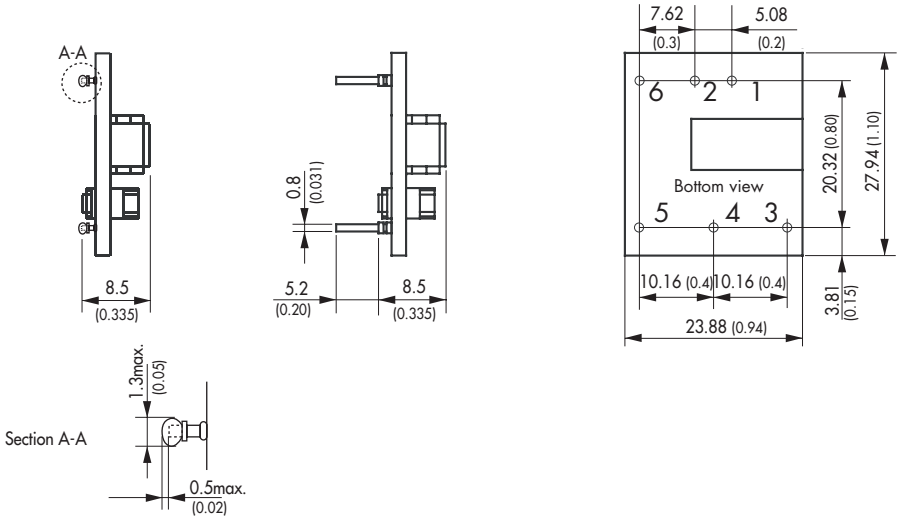
Temperature ranges	– Operating – Storage		–40°C to +85°C (with derating) –55°C to +125°C
Derating			6.7 %/K above 75°C
Humidity (non condensing)			5 % to 95 % rel H
Thermal shock			acc. MIL-STD-810F
Vibration			acc. MIL-STD-810F
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)			>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: 12 / 15 Vout models:	270 kHz typ. 470 kHz typ.
Remote On/Off	– On: – Off: – Off idle current:		3.0 to 15 VDC or open circuit. 0 to 1.2 VDC or short circuit pin 6 and pin 2 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 – RoHS		www.tracopower.com/info/reach-declaration.pdf 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	
Pin	**Single**
1	+Vin (Vcc)
2	–Vin (GND)
3	+Vout
4	Trim
5	–Vout
6	Remote On/Off

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