



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



Contact us

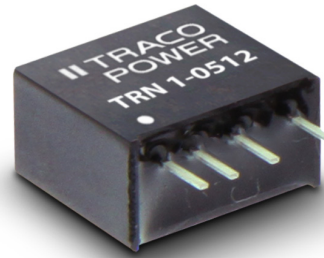
Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



- **Compact SIP package**
11,9 × 7,7 × 11,0 mm
- **Fully regulated outputs**
- **Input Voltage range**
4.5-13.2, 9-18, 18-36, 36-75 VDC
- **I/O-isolation 1'600 VDC**
- **Operating temperature range**
-40°C to +90°C without derating
- **Short circuit protection**
- **3-year product warranty**
- **Designed to meet UL 62368-1 (UL 60950-1)**



The TRN 1 Series comprises 1 Watt fully regulated, high performance DC/DC converters. They come in a compact cubical package of only 1.00 cm³. Full load operation is reliable up to 90°C environment temperature. With 1'600 VDC I/O-isolation voltage, and short current protection they cover a wide range of application when space is limited. The input of the converters is designed for a wide voltage range (2:1) and minimum load is not required. The functional I/O-isolation system is designed to meet IEC/EN 62368-1 with a test voltage (60 s) of 1600 VDC.

Models				
Order code	Input voltage	Output voltage	Output current max.	Efficiency typ.
TRN 1-0510	4.5 – 13.2 VDC (9 VDC nominal)	3.3 VDC	300 mA	77 %
TRN 1-0511		5.0 VDC	200 mA	79 %
TRN 1-0512		12 VDC	90 mA	81 %
TRN 1-0513		15 VDC	70 mA	82 %
TRN 1-0515		24 VDC	45 mA	83 %
TRN 1-0521		± 5.0 VDC	±100 mA	79 %
TRN 1-0522		±12 VDC	±45 mA	83 %
TRN 1-0523		±15 VDC	±35 mA	80 %
TRN 1-1210	9 – 18 VDC (12 VDC nominal)	3.3 VDC	300 mA	77 %
TRN 1-1211		5.0 VDC	200 mA	80 %
TRN 1-1212		12 VDC	90 mA	81 %
TRN 1-1213		15 VDC	70 mA	83 %
TRN 1-1215		24 VDC	45 mA	83 %
TRN 1-1221		± 5.0 VDC	±100 mA	79 %
TRN 1-1222		±12 VDC	±45 mA	83 %
TRN 1-1223		±15 VDC	±35 mA	80 %
TRN 1-2410	18 – 36 VDC (24 VDC nominal)	3.3 VDC	300 mA	77 %
TRN 1-2411		5.0 VDC	200 mA	81 %
TRN 1-2412		12 VDC	90 mA	82 %
TRN 1-2413		15 VDC	70 mA	83 %
TRN 1-2415		24 VDC	45 mA	82 %
TRN 1-2421		± 5.0 VDC	±100 mA	79 %
TRN 1-2422		±12 VDC	±45 mA	82 %
TRN 1-2423		±15 VDC	±35 mA	80 %
TRN 1-4810	36 – 75 VDC (48 VDC nominal)	3.3 VDC	300 mA	77 %
TRN 1-4811		5.0 VDC	200 mA	78 %
TRN 1-4812		12 VDC	90 mA	80 %
TRN 1-4813		15 VDC	70 mA	81 %
TRN 1-4815		24 VDC	45 mA	81 %
TRN 1-4821		± 5.0 VDC	±100 mA	78 %
TRN 1-4822		±12 VDC	±45 mA	81 %
TRN 1-4823		±15 VDC	±35 mA	79 %

Input Specifications

Input current no load		9 Vin models: 35 mA typ 12 Vin models: 20 mA typ. 24 Vin models: 10 mA typ. 48 Vin models: 5 mA typ.
Surge voltage (1 s max.)		9 Vin models: 15 V max. 12 Vin models: 25 V max. 24 Vin models: 50 V max. 48 Vin models: 100 V max.
Reflected ripple current		30 mA _{p-p} typ.
Conducted noise	– conducted input emission	EN 55032 class A or B with external components
EMC immunity	– ESD (electrostatic discharge) – Radiated immunity – Fast transient / surge (with external input capacitor) – Conducted immunity – Magnetic field immunity	EN 61000-4-2, air ±8 kV, contact ±6 kV, perf. criteria A EN 61000-4-3, 10 V/m, perf. criteria A EN 61000-4-4, ±2 kV, perf. criteria A EN 61000-4-5, ±1 kV perf. criteria A Nippon chemi-con KY 220 µF/ 100 V EN 61000-4-6, 10 V _{rms} , perf. criteria A EN 61000-4-8 100 A/m, continuous, perf. criteria A 1000 A/m, 1 sec., perf. criteria A
Input filter		capacitor type

Output Specifications

Voltage set accuracy		±1 % max.
Regulation	– Input variation – Load variation 0 – 100 % – Cross regulation - dual output:	0.2 % max. 1 % max. 5 % max. (asymmetrical load 25 % / 100 %)
Temperature coefficient		±0.02 %/K typ.
Ripple and noise (20 MHz Bandwidth)		50 mV _{p-p} typ.
Start-up time		15 ms max. (5 ms typ.)
Transient response (25% load step change)		500 µs typ.
Short circuit protection		continuous, automatic recovery
Capacitive load	– Single output – Dual output	3.3 VDC models: 1680 µF max. 5.0 VDC models: 820 µF max. 12 VDC models: 470 µF max. 15 VDC models: 330 µF max. 24 VDC models: 160 µF max. ±5.0 VDC models: 470 µF max. (each output) ±12 VDC models: 330 µF max. (each output) +15 VDC models: 220 µF max. (each output)

General Specifications

Temperature ranges	– Operating (convection cooling 20LFM, 0.1m/s) – Case temperature – Storage temperature	–40°C to +90°C (without derating) +95°C max. –55°C to +125°C
Derating		6.7%/K above 90°C
Humidity (non condensing)		5 – 95 % rel H max.
Isolation voltage	– I/O isolation voltage (60 s)	1'600 VDC
Isolation capacitance		75 pF max.
Isolation resistance (@ 500 VDC)		>1 Gohm

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

General Specifications

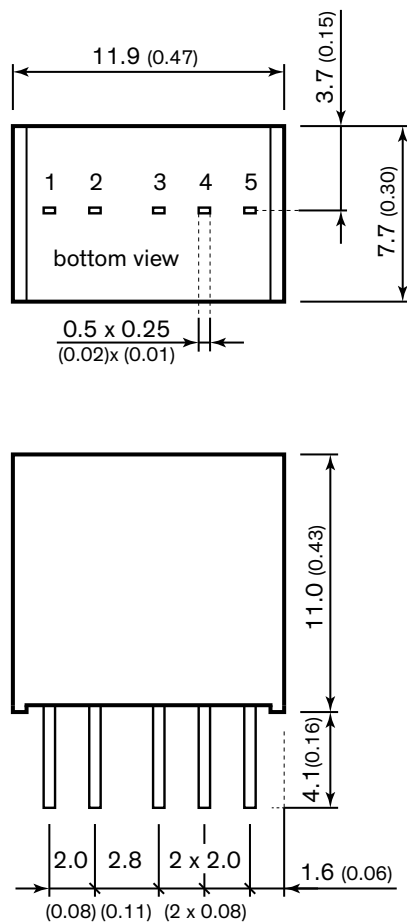
Reliability, calculated MTBF (MIL-HDBK-217F at +25°C, ground benign)	7'400'000 h
Switching frequency	100 kHz min. Pulse frequency modulation.
Thermal shock & vibration	MIL-STD-810F
Safety standards	- Designed to meet (no certification) IEC/EN/UL 62368-1, UL 60950-1
Environmental compliance	- Reach www.tracopower.com/products/reach-declaration.pdf - RoHS RoHS directive 2011/65/EU

Physical Specifications

Casing material	non-conductive black plastic
Potting material	silicone (UL 94V-0 rated)
Package weight	2.1 g (0.07 oz)
Soldering temperature	260°C / 6 s max.

Supporting Documents: www.tracopower.com/overview/trn1

Outline Dimensions



Pin-Out		
Pin	Single	Dual
1	-Vin (GND)	-Vin (GND)
2	+Vin (Vcc)	+Vin (Vcc)
3	+Vout	+Vout
4	no pin	common
5	-Vout	-Vout

Dimensions in [mm], () = Inch

Tolerances: x.x	±0.5 (±0.02)
x.xx	±0.25 (±0.01)
Pin pitch tolerances	±0.25 (±0.01)
Pin dimension tolerance	±0.1 (±0.004)