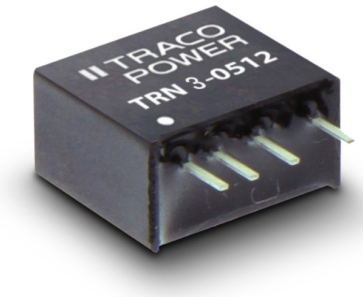
TRACO POWER

DC/DC Converter

TRN 3 Series, 3 Watt

- **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 +85°C
- **Short circuit protection**
- **3-year product warranty**



The TRN 3 Series comprises 3 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 tp 85°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.

Models

Order code	Input voltage	Output voltage	Output current max.	Efficiency typ.
TRN 3-0510	**4.5 – 13.2 VDC** (9 VDC nominal)	3.3 VDC	700 mA	75 %
TRN 3-0511		5.0 VDC	600 mA	78 %
TRN 3-0512		12 VDC	250 mA	82 %
TRN 3-0513		15 VDC	200 mA	80 %
TRN 3-0515		24 VDC	125 mA	80 %
TRN 3-0521		± 5.0 VDC	±300 mA	77 %
TRN 3-0522		±12 VDC	±125 mA	80 %
TRN 3-0523		±15 VDC	±100 mA	80 %
TRN 3-1210	**9 – 18 VDC** (12 VDC nominal)	3.3 VDC	700 mA	76 %
TRN 3-1211		5.0 VDC	600 mA	79 %
TRN 3-1212		12 VDC	250 mA	84 %
TRN 3-1213		15 VDC	200 mA	83 %
TRN 3-1215		24 VDC	125 mA	82 %
TRN 3-1221		± 5.0 VDC	±300 mA	78 %
TRN 3-1222		±12 VDC	±125 mA	82 %
TRN 3-1223		±15 VDC	±100 mA	81 %
TRN 3-2410	**18 – 36 VDC** (24 VDC nominal)	3.3 VDC	700 mA	76 %
TRN 3-2411		5.0 VDC	600 mA	78 %
TRN 3-2412		12 VDC	250 mA	84 %
TRN 3-2413		15 VDC	200 mA	84 %
TRN 3-2415		24 VDC	125 mA	83 %
TRN 3-2421		± 5.0 VDC	±300 mA	79 %
TRN 3-2422		±12 VDC	±125 mA	83 %
TRN 3-2423		±15 VDC	±100 mA	82 %
TRN 3-4810	**36 – 75 VDC** (48 VDC nominal)	3.3 VDC	700 mA	75 %
TRN 3-4811		5.0 VDC	600 mA	79 %
TRN 3-4812		12 VDC	250 mA	83 %
TRN 3-4813		15 VDC	200 mA	83 %
TRN 3-4815		24 VDC	125 mA	82 %
TRN 3-4821		± 5.0 VDC	±300 mA	77 %
TRN 3-4822		±12 VDC	±125 mA	82 %
TRN 3-4823		±15 VDC	±100 mA	80 %

Input Specifications

Input current no load		9 Vin models:	75 mA max.
		12 Vin models:	40 mA max.
		24 Vin models:	20 mA max.
		48 Vin models:	12 mA max.
Surge voltage (1 sec. 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		9 Vin models:	100 mAp-p typ.
		12 & 24 Vin models:	75 mAp-p typ.
		48 Vin models:	50 mAp-p typ.
Conducted noise	– conducted input emission		EN 55032 class A or B with external components
EMC immunity	– ESD (electrostatic discharge)		EN 61000-4-2, air ±8 kV, contact ±6 kV, perf. criteria A
	– Radiated immunity		EN 61000-4-3, 10 V/m, perf. criteria A
	– Fast transient / surge (with external input capacitor)		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
	– Conducted immunity		EN 61000-4-6, 10 Vrms, perf. criteria A
	– Magnetic field immunity		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		0.2 % max.
	– Load variation 0 – 100 %		1 % max.
	– cross regulation - dual output:		5 % max. (asymmetrical load 25 % / 100 %)
Temperature coefficient			±0.02 %/K typ.
Ripple and noise (20 MHz Bandwidth)			50 mVp-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	3.3 VDC models:	4400 µF max.
		5.0 VDC models:	2200 µF max.
		12 VDC models:	1000 µF max.
		15 VDC models:	820 µF max.
		24 VDC models:	330 µF max.
	–Dual output	±5.0 VDC models:	1200 µF max. (each output)
		±12 VDC models:	520 µF max. (each output)
		+15 VDC models:	440 µF max. (each output)

General Specifications

Temperature ranges	– Operating (convection cooling 20LFM, 0,1m/s)	–40°C to +85°C
	– Case temperature	+95°C max.
	– Storage temperature	–55°C to +125°C
Derating		2.5%/K above 65°C
Humidity (non condensing)		5 – 95 % rel H max.
Isolation voltage	– I/O isolation voltage (60 sec.)	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

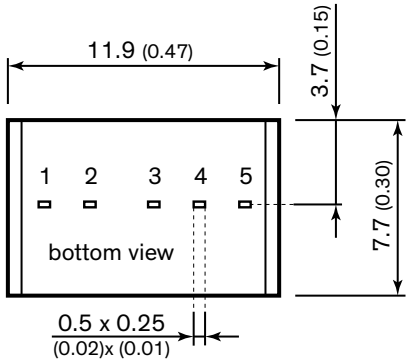
Reliability, calculated MTBF (MIL-HDBK-217F at +25°C, ground benign)		4‘400‘000 h
Switching frequency		100 kHz min. Pulse frequency modulation.
Thermal shock & vibration		MIL-STD-810F
Safety standards	– Information technology	IEC/EN 60950-1, UL 60950-1
Environmental compliance	– Reach – RoHS	www.tracopower.com/products/reach-declaration.pdf RoHS directive 2011/65/EU

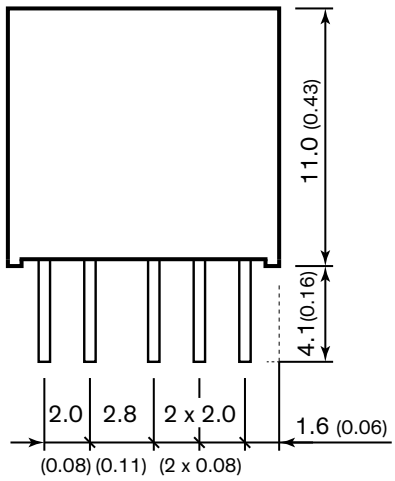
Physical Specifications

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

Supporting Documents: www.tracopower.com/overview/trn3

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)

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TRACO Power:

TRN 3-1211 TRN 3-0510 TRN 3-4811 TRN 3-2412 TRN 3-1210 TRN 3-1215 TRN 3-0513 TRN 3-1212 TRN 3-4821 TRN 3-0521 TRN 3-1222 TRN 3-2423 TRN 3-2413 TRN 3-2410 TRN 3-4813 TRN 3-1221 TRN 3-1213 TRN 3-2421 TRN 3-0512 TRN 3-4823 TRN 3-1223 TRN 3-4812 TRN 3-2415 TRN 3-4815 TRN 3-0523 TRN 3-2422 TRN 3-0515 TRN 3-2411 TRN 3-0511 TRN 3-4810 TRN 3-0522 TRN 3-4822