TRACO POWER

DC/DC Converter

TSR 2 Series, 2 A

- **Ultra compact SIP package 0.55 × 0.30 × 0.40 inch**
- **Up to 96 % efficiency – No heat-sink required**
- **Pin compatible with LMxx linear regulators**
- **Built in filter capacitors**
- **Operating temperature range -40°C to +85°C**
- **Excellent line / load regulation**
- **Short circuit protection**
- **3-year product warranty**

The new TSR 2 series step-down switching regulators are drop-in replacement for inefficient LMxx linear regulators. A high efficiency up to 96 % allows full load operation up to +67°C ambient temperature without the need of any heat-sink or forced cooling.

The TSR 2 switching regulators provide other significant features over linear regulators, i.e. better output accuracy (±2 %), lower standby current of 2 mA and no requirement of external capacitors. The high efficiency and low standby power consumption makes these regulators an ideal solution for many battery powered applications.

Models

Order code	Input voltage range	Output voltage	Output current max.	Efficiency typ. @ Vin min.	Efficiency typ. @ Vin max.	Capacitive Load max.
TSR 2-0512	**3.0 - 5.5 VDC**	1.2 VDC		90 %	86 %	2500 µF
TSR 2-0515	**3.0 - 5.5 VDC**	1.5 VDC		91 %	88 %	2000 µF
TSR 2-0518	**3.0 - 5.5 VDC**	1.8 VDC		92 %	90 %	1600 µF
TSR 2-0525	**3.8 - 5.5 VDC**	2.5 VDC		95 %	92 %	1200 µF
TSR 2-2412	**4.6 - 36 VDC***	1.2 VDC		84 %	75 %	2500 µF
TSR 2-2415	**4.6 - 36 VDC***	1.5 VDC		86 %	77 %	2000 µF
TSR 2-2418	**4.6 - 36 VDC***	1.8 VDC	2.0 A	87 %	79 %	1600 µF
TSR 2-2425	**4.6 - 36 VDC***	2.5 VDC		89 %	83 %	1200 µF
TSR 2-2433	**4.75 - 36 VDC***	3.3 VDC		91 %	86 %	900 µF
TSR 2-2450	**6.5 - 36 VDC***	5 VDC		94 %	89 %	600 µF
TSR 2-2465	**9.0 - 36 VDC***	6.5 VDC		94 %	91 %	470 µF
TSR 2-2490	**12 - 36 VDC***	9 VDC		95 %	92 %	330 µF
TSR 2-24120	**15 - 36 VDC***	12 VDC		95 %	93 %	270 µF
TSR 2-24150	**18 - 36 VDC***	15 VDC		96 %	94 %	200 µF

* For input voltage higher than 20 VDC an input capacitor 22 µF / 50 V is recommend, to prevent damage due to power-on voltage peaks.

Input Specifications

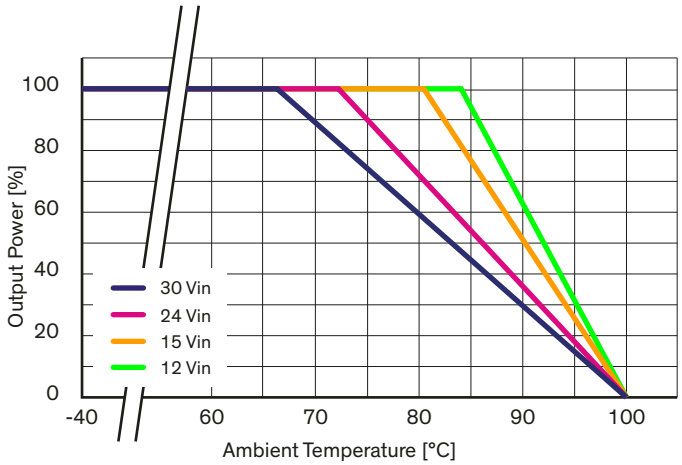
Input current no load		1 mA typ.
Input filter		internal capacitor

Output Specifications

Voltage set accuracy		±2 % max.
Regulation	– Input variation – Load variation 0 – 100 %	0.5 % max. 1 % max.
Ripple and noise (20 MHz Bandwidth)		50 mVp-p typ. for Vout ≤ 6.5 VDC 75 mVp-p typ. for Vout ≥ 9.0 VDC
Start up time (constant resistive load)		5 ms typ.
Dynamic load response (50% load step change)		150 µs typ. response time 9, 12 & 15 VDC models: 300 mV typ. peak deviation other models: 150 mV typ. peak deviation
Short circuit protection		continuous, automatic recovery
Overload protection (hiccup mode)	5 Vin models: other models:	8.0 A 3.6 A

General Specifications

Temperature ranges	– Operating (convection cooling 20LFM, 0,1m/s) – Case temperature – Storage temperature	–40°C to +85°C +105°C max. –55°C to +125°C
Derating		see graph below
Humidity (non condensing)		5 - 95 % rel H max.
Shock and vibration		acc MIL-STD-810F
Temperature coefficient		±0.02 %/K typ.
Reliability, calculated MTBF (MIL-HDBK-217F at +25°C, ground benign)		13‘520‘000 h
Switching frequency (Pulse frequency modulation)	5 Vin models: other models:	1200 kHz typ. 410 kHz typ.
Environmental compliance	– Reach – RoHS	www.tracopower.com/info/reach-declaration.pdf RoHS directive 2011/65/EU



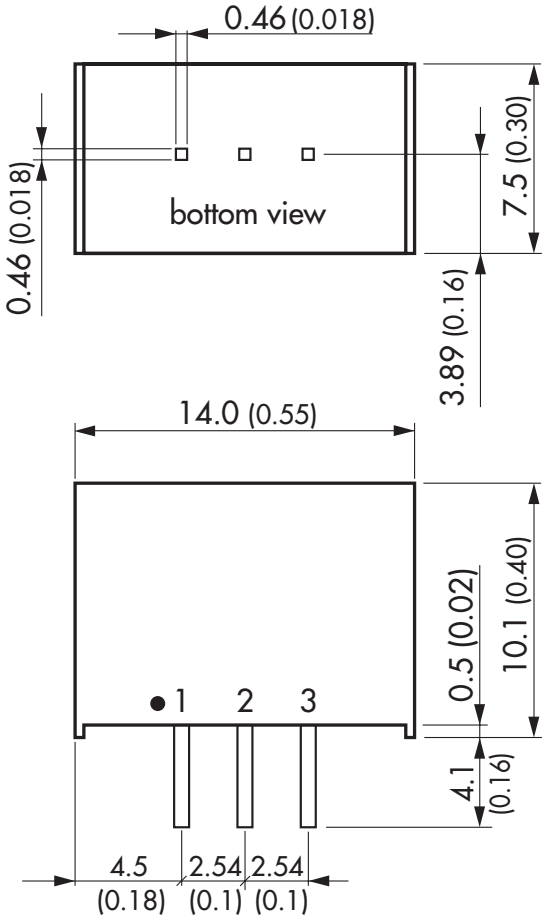
Supporting Documents: www.tracopower.com/overview/tsr2

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

Physical Specifications

Casing material	plastic, non-conducting
Potting material	Silicone (UL 94V-0 rated)
Package weight	2.6g (0.092oz)
Soldering temperature	max. 260°C / 10 sec.

Outline Dimensions



Pin-Out	
Pin	**Single**
1	+Vin
2	GND
3	+Vout

Dimensions in [mm], () = Inch

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