

DC/DC Converter TSR 2 Series, 2 A

- ◆ Ultra compact SIP package 0.55 × 0.30 × 0.40 inch
- Up to 96 % efficiencyNo 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.

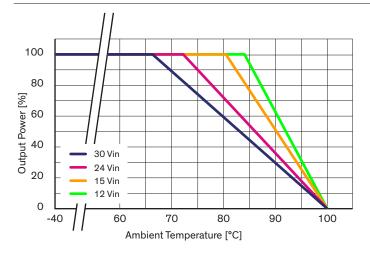
The TSR 2 switching regulators provide other significant features over linear regulators, i.e. better output accuracy (± 2 %), lower standby current of 2 mA and no requirement of external capacitors. The high efficiency and low standby power consumption makes these regulators an ideal solution for many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

Models						
Order code	Input voltage	Output voltage	Output current	Efficiency typ.		Capacitive
	range		max.	@ Vin min.	@ Vin max.	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 μ F / 50 V is recommend, to prevent damage due to power-on voltage peaks.



Input current no load			1 mA typ.	
Input filter			internal capacitor	
Output Specifica	tions			
Voltage set accuracy			±2 % max.	
Regulation	Input variationLoad variation 0 - 100 %		0.5 % max. 1 % max.	
Ripple and noise (20 MHz Bandwidth)			50 mVp-p typ. for Vout \leq 6.5 VDC 75 mVp-p typ. for Vout \geq 9.0 VDC	
Start up time (constant resistive load)			5 ms typ.	
Dynamic load response (50% load step change)		9, 12 & 15 VDC models: other models:	150 μs typ. response time 300 mV typ. peak deviation 150 mV typ. peak deviation	
Short circuit protection		continuous, automatic recovery		
Overload protection (hiccup mode)		5 Vin models: other models:		
General Specific	ations			
Temperature ranges	Operating (convection of a convection of a converted conve	cooling 20LFM, 0,1m/s)	-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:	31	
Environmental complia	nce - Reach - RoHS		www.tracopower.com/info/reach-declaration.pd RoHS directive 2011/65/EU	



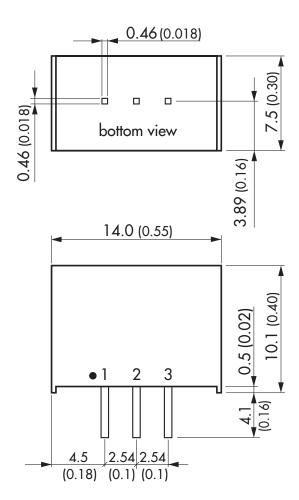
Supporting Documents: www.tracopower.com/overview/tsr2

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	Pin Single			
1	+Vin			
2	GND			
3	+Vout			

Dimensions in [mm], () = lnch

Tolerances: x.xx $\pm 0.5 (\pm 0.02)$

x.xxx $\pm 0.25(\pm 0.01)$

Pin pitch tolerances $\pm 0.25 (\pm 0.01)$ pin dimension tolerance $\pm 0.1 (\pm 0.004)$