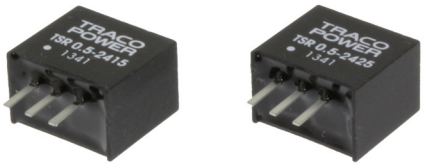
DC/DC Converters

TSR 0.5 Series, 0.5 A Switching Regulator

Features

- Compact SIP package
- Very high efficiency up to 97%
- Excellent line / load regulation
- Low standby current
- Operating temperature range –40 to 90°C
- Over-temperature protection
- Remote On/Off input
- Adjustable output voltage
- Short circuit protection



TSR-0.5 is a series of step-down non–isolated switching regulators in compact SIP package. These converters are an ideal drop-in replacement to LM78 linear regulators when energy efficiency is a parameter of the design. The high efficiency up to 97 % allows full load operation up to +80°C (+90°C with 50% load) ambient temperature without the need of forced aircooling.
Excellent output voltage accuracy and low standby current are other features that distinguish switching regulators from linear regulators.

Models

Order code	Input voltage range [1]	Output voltage		Output current	Efficiency typ.	
		nominal	trim range [2]	max.	@ Vin min.	@ Vin 32VDC
TSR 0.5-2415	4.75 – 32 VDC	1.5 VDC	–	0.5 A	73 %	63 %
TSR 0.5-2418		1.8 VDC	1.5 – 3.0 VDC		82 %	71 %
TSR 0.5-2425		2.5 VDC	1.5 – 3.0 VDC		87 %	77 %
TSR 0.5-2433		3.3 VDC	3.0 – 5.5 VDC		91 %	81 %
TSR 0.5-2450	6.5 – 32 VDC	5.0 VDC	3.0 – 8.0 VDC		94 %	86 %
TSR 0.5-2465	8 – 32 VDC	6.5 VDC	3.3 – 11 VDC		95 %	88 %
TSR 0.5-2490	11 – 32 VDC	9.0 VDC	4.5 – 12.6 VDC		96 %	92 %
TSR 0.5-24120	15 – 32 VDC	12 VDC	4.5 – 15 VDC		97 %	94 %
TSR 0.5-24150	18 – 32 VDC	15 VDC	–		97 %	95 %

1) For input voltage higher 24 VDC an input capacitor 22 µF/ 50 V is required

Input Specifications

No load input current (at 24Vin)			5 mA typ.
Short circuit input power			1.5 W max.
Surge voltage			-0.3 / 34 VDC max.
Input filter			internal capacitor, see filter suggestion page 3 for to meet EN55022 class A, class B

Output Specifications

Voltage set accuracy			±3 % (at full load)
Regulation	– Input variation	1.5 to 6.5 Vin models:	0.4 %
		other models:	0.2 %
	– Load variation (10 – 100 %)	1.5 to 6.5 Vin models:	0.6 %
		other models:	0.4 %
Minimum load			not required
Ripple and noise		1.5 to 6.5 Vin models:	30 mVp-p max.
		other models:	40 mVp-p max.
Temperature coefficient			±0.015 %/K max.
Dynamic load (50% load step change)	– Peak variation		±2 % max.
	– Response time		100 µS max.
Short circuit protection			continuous, automatic recovery
Current limitation			1.0 A max.
Capacitive load			220 µF max.

General Specifications

Temperature ranges	– Operating	–40°C to +90°C
	– Case temperature	+100°C. max.
	– Storage	–55°C to +125°C
Derating	– positive output circuit	5 %/K above +80°C
Overtemperature protection		at +160°C (on internal IC)
Humidity (non condensing)		95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)		>2'000'000 h
Isolation voltage		none
Switching frequency		330 kHz ±50 kHz (pulse width modulation)
Environmental compliance	– Reach	www.tracopower.com/products/reach-declaration.pdf
	– RoHS	RoHS directive 2011/65/EU

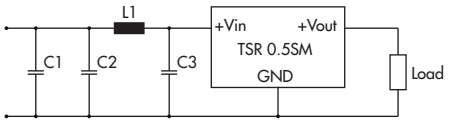
Physical Specifications

Casing material	non-conductive plastic (UL94V-0 rated)
Pin material	alloy 42
Weight	1.95 g (0.69 oz)
Lead temperature	260°C
Washing	baking after washing: 100°C for 30 min.

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

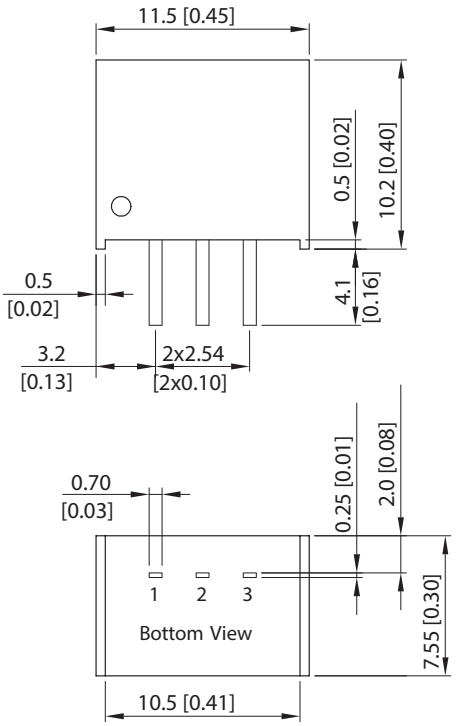
Applications notes

EMI filter for EN 55022 class A & B



Class	C1	C2 & C3	L1 value	order code (SMD type)	datasheet:
A	–	4.7 µF / 50 V 1206 MLCC	3.3 µH	**TCK-044**	www.tracopower.com/products/tck044.pdf
B	4.7 µF / 50 V 1206 MLCC		10 µH	**TCK-047**	www.tracopower.com/products/tck047.pdf

Outline Dimensions



Pinout	
1	+Vin
2	GND
3	+Vout

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