

DESCRIPTION: 1W 3KVDC Isolated Single Output DC/DC Converters



The TPR-1W series are miniature, isolated 1W DC/DC converters in a SIP package. They offer the ideal solution in many space critical applications for board level power distribution. The internal SMD construction makes it possible to offer a product with high performance at low cost. The series offers smaller size, improved efficiency, lower output ripple noise and 3KVDC isolation.

FEATURES

RoHS compliant	3KVDC isolation	Efficiency up to 80%
Operating temperature: -40°C to 105°C	Power density up to 0.90W/cm ³	UL 94V-0 package material
Footprint from 1.17cm ²	Industry standard pinout	Input voltage:3.3V,5V, 12V, 15V, 24V
Output voltage: 3.3V,3.6V,5V, 9V,12V, 15V, 24V,etc	Custom solutions available	CE certification

SELECTION GUIDE

Part Number	Nominal Input Voltage	Output Voltage	Output Current (Max./Min)	Efficiency
	V	V	mA	%
TPR0303S-1W	3.3	3.3	303/30.3	72
TPR0305S-1W	3.3	5	200/20	74
TPR0503S-1W	5	3.3	303/30.3	72
TPR0505S-1W	5	5	200/20	68
TPR0509S-1W	5	9	111/11.1	78
TPR0512S-1W	5	12	84/8.1	76
TPR0515S-1W	5	15	68/6.8	79
TPR0524S-1W	5	24	42/4.2	81
TPR1203S-1W	12	3.3	303/30.3	74
TPR1205S-1W	12	5	200/20	69
TPR1209S-1W	12	9	111/11.1	76
TPR1212S-1W	12	12	84/8.4	77
TPR1215S-1W	12	15	68/6.8	76
TPR1224S-1W	12	24	42/4.2	84
TPR1505S-1W	15	5	200/20	69
TPR1512S-1W	15	12	83/8.3	76
TPR1515S-1W	15	15	67/6.7	75
TPR2405S-1W	24	5	200/20	71
TPR2409S-1W	24	9	111/11.1	78
TPR2412S-1W	24	12	84/8.4	78
TPR2415S-1W	24	15	68/6.8	80
TPR2424S-1W	24	24	42/4.2	80
TPR2404S-1W	24	3.6	277/27.7	74

Add suffix "P" for continuous short circuit protection, for example TPR0505SP-1W.

INPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Voltage range	3.3V input	2.9	3.3	3.6	V
Voltage range	5V input	4.5	5	5.5	V
Voltage range	12V input	11	12	13.3	V
Voltage range	15V input	13.4	15	16.4	V
Voltage range	24V input	22	24	26.6	V

ISOLATION CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation voltage	Tested for 1 second	3000			VDC
Resistance	Viso=1000VDC	1			GΩ

OUTPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Rated Power	TA=-40°C to 85°C			1	W
Voltage Set Point Accuracy	See tolerance envelope				
Line regulation	High VIN to low VIN (voltage variation +/-5%)		1.2		%/%
Load Regulation(10% load to rated load)	TPRXX03S-1W, TPRXX03S-1W, TPRXX05S-1W, TPRXX09S-1W		13		%
Load Regulation(10% load to rated load)	TPR0512S-1W/1212S-1W		7		%
Load Regulation(10% load to rated load)	TPR0515S-1W/1215S-1W		7		%
Load Regulation(10% load to rated load)	24V input variants		7		%
Load Regulation(10% load to rated load)	24V input variants		3		%
Load Regulation(10% load to rated load)	24V input variants		3		%

ABSOLUTE MAXIMUM RATINGS

Short-circuit protection	1 second
Lead temperature 1.5mm from case for 10 seconds	300°C
Internal power dissipation	540mW
Input voltage Vin, TPR03 variants	5.5V
Input voltage Vin, TPR05 variants	7V
Input voltage Vin, TPR12 variants	15V
Input voltage Vin, TPR15 variants	18V
Input voltage Vin, TPR24 variants	28V

All specifications typical at TA=25° C, nominal input voltage and rated output current unless otherwise specified.

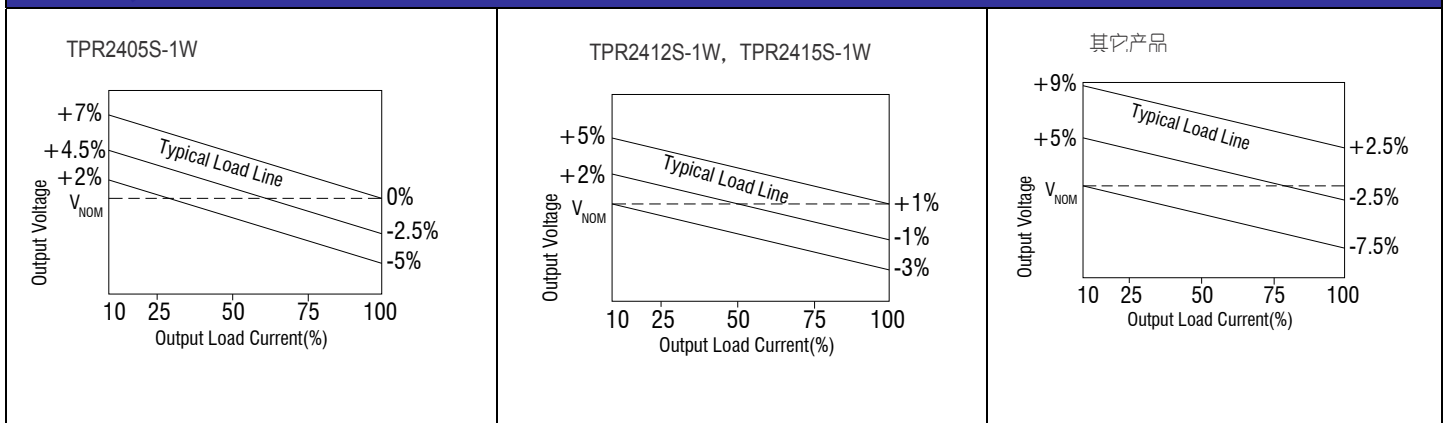
GENERAL CHARACTERISTICS

Parameter	Conditions	Typ.	Max.	Units
Switching frequency	3.3V input	120		kHz
Switching frequency	5V input	120		kHz
Switching frequency	12V input	160		kHz
Switching frequency	15V input	90		kHz
Switching frequency	24V input	90		kHz

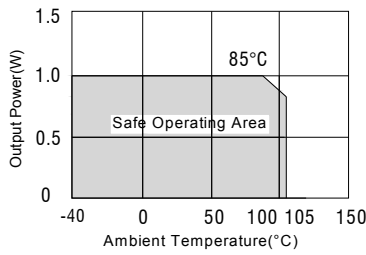
TEMPERATURE CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Specification	Derating if the temperature ≥85°C	-40		105	°C
Storage		-50		130	°C
Case Temperature above ambient	5V output types		35		°C
Case Temperature above ambient	All other output types		30		°C
Cooling	Free air convection				

TOLERANCE ENVELOPES



TEMPERATURE DERATING GRAPHS



EMC SPECIFICATIONS

EMI	CE	CISPR22/EN55022 CLASS B (see Fig. 2 for recommended circuit)
EMI	RE	CISPR22/EN55022 CLASS B (see Fig. 2 for recommended circuit)
EMS	ESD	IEC/EN61000-4-2 Contact ±8KV perf. Criteria B

DESIGN REFERENCE

Typical application circuit

If it is required to further reduce input and output ripple, a filter capacitor may be connected to the input and output terminals, see Fig.1 Moreover, choosing a suitable filter capacitor is very important, start-up problems may be caused if the capacitance is too large. Under the condition of safe and reliable operation, the recommended capacitive load values are shown in Table 1.

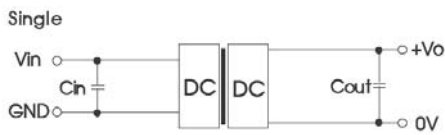


Fig 1

Recommended capacitive load value table (Table 1)

Vin (VDC)	Cin (μF)	Single Vout (VDC)	Cout (μF)
3.3/5	4.7	3.3/5	10
9/12	2.2	9/12	2.2
15	2.2	15/24	1
24	1	--	--

EMC solution-recommended circuit

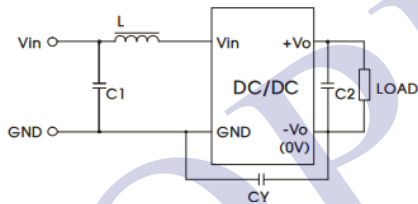


Fig 2

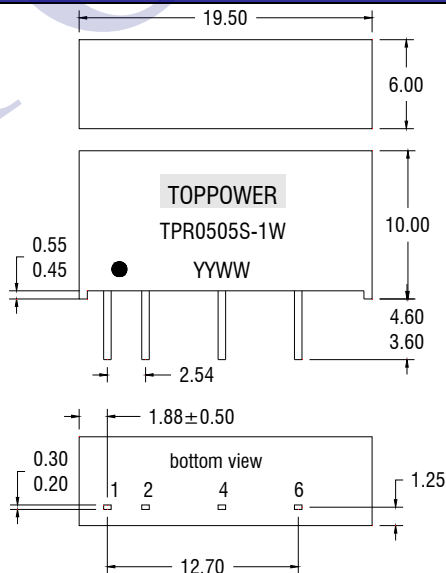
Input voltage (VDC)		3.3/5/9/12	15/24
EMI	C1	4.7μF /50V	
	C2	Refer to the Cout in Fig.3	
	CY	--	1nF/2KV
	LDM	6.8μH	

Output load should be at min. load 10%.

MECHANICAL DIMENSIONS

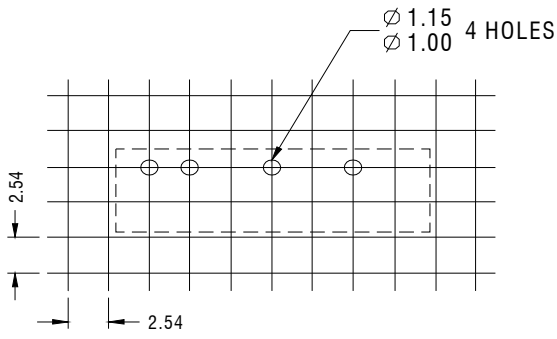
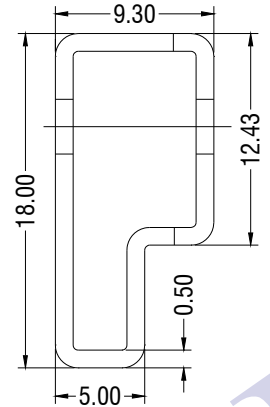
PIN CONNECTIONS

SIP Package



All dimensions in mm ±0.25mm. All pins on a 2.54mm pitch and within ±0.25mm of true position.

7 PIN SIP	
Pin	Function
1	+Vin
2	-Vin
4	-Vout
6	+Vout

RECOMMENDED FOOTPRINT DETAILS	TUBE OUTLINE DIMENSIONS
 <p> $\varnothing 1.15$ $\varnothing 1.00$ 4 HOLES </p> <p>2.54</p> <p>2.54</p> <p>All dimensions in mm±0.25mm</p>	 <p>9.30</p> <p>18.00</p> <p>12.43</p> <p>5.00</p> <p>0.50</p> <p>All dimensions in mm±0.25mm</p> <p>Tube Quantity : 10/25PCS</p>

TOPPOWER