

Product Feature

- ◆ Package Type: SIP4
- ◆ Operating temperature range: -40°C - +105°C
- ◆ Isolation voltage: 1500VDC
- ◆ High efficiency up to: 88% (Type)
- ◆ Complies with standards: International standard pin method
- ◆ Application areas: electric power, industrial control, communications, Internet of Things, automotive, etc.



Selection Guide



Certification	Part No.	Input Voltage (VDC)	Output		Full Load Efficiency (%)Typ. ^①	Capacitive Load(μF) Max.
		Nominal (Range)	Output Voltage (VDC)	Output Current Max./Min.(mA)		
EN	SB-0303 S-2WR4	3.3 (2.97-3.63)	3.3	400/40	76	2400
	SB-0305 S-2WR4		5	400/40	83	2400
	SB-0309 S-2WR4		9	222/22	85	1000
	SB-0312 S-2WR4		12	167/16	85	560
	SB-0315 S-2WR4		15	133/13	85	560
	SB-0324 S-2WR4		24	83/8	85	220
	SB-0503 S-2WR4	5 (4.5-5.5)	3.3	400/40	81	2400
	SB-0505 S-2WR4		5	400/40	83	2400
	SB-0509 S-2WR4		9	222/22	86	1000
	SB-0512 S-2WR4		12	167/16	85	560
	SB-0515 S-2WR4		15	133/13	86	560
	SB-0524 S-2WR4		24	83/8	85	220
	SB-1203 S-2WR4	12 (10.8-13.2)	3.3	400/40	82	2400
	SB-1205 S-2WR4		5	400/40	83	2400
	SB-1209 S-2WR4		9	222/22	84	1000
	SB-1212 S-2WR4		12	167/16	87	560
	SB-1215 S-2WR4		15	133/13	87	560
	SB-1224 S-2WR4		24	83/8	87	220
	SB-1503 S-2WR4	15 (13.5-16.5)	3.3	400/40	82	2400
	SB-1505 S-2WR4		5	400/40	83	2400
	SB-1509 S-2WR4		9	222/22	85	1000
	SB-1512 S-2WR4		12	167/16	87	560
	SB-1515 S-2WR4		15	133/13	88	560
	SB-1524 S-2WR4		24	83/8	88	220
	SB-2403 S-2WR4	24 (21.6-26.4)	3.3	400/40	82	2400
	SB-2405 S-2WR4		5	400/40	84	2400
	SB-2409 S-2WR4		9	222/22	85	1000
	SB-2412 S-2WR4		12	167/16	88	560
	SB-2415 S-2WR4		15	133/13	88	560
	SB-2424 S-2WR4		24	83/8	88	220

Notes:
 ①.Efficiency is measured at nominal input voltage and rated output load.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load/no load)	3.3VDC Nominal input series, Nominal input voltage	3.3VDC Output	--	526/10	540/15	mA
		5VDC Output	--	730/10	748/15	
		Other Output	--	713/12	730/18	
	5VDC Nominal input series, Nominal input voltage	3.3VDC Output	--	326/8	334/15	
		5VDC Output	--	482/8	494/15	
		9/12VDC Output	--	470/10	482/15	
		15/24VDC Output	--	470/25	482/35	
	12VDC Nominal input series, Nominal input voltage	3.3VDC Output	--	134/8	138/15	
		5/9VDC Output	--	200/8	205/15	
		Other Output	--	192/8	197/15	
	15VDC Nominal input series, Nominal input voltage	3.3VDC Output	--	107/7	110/15	
		5/9VDC Output	--	160/7	164/15	
		Other Output	--	153/7	157/15	
	24VDC Nominal input series, Nominal input voltage	3.3VDC Output	--	67/5	69/15	
		5/9VDC Output	--	99/5	101/15	
		Other Output	--	95/5	98/15	
Reflected Ripple Current			--	15	--	
Impulse Voltage	3.3VDC Nominal input series		-0.7	--	5	VDC
	5VDC Nominal input series		-0.7	--	9	
	12VDC Nominal input series		-0.7	--	18	
	15VDC Nominal input series		-0.7	--	21	
	24VDC Nominal input series		-0.7	--	30	
Input Filter			Capacitance Filter			
Hot Plug			Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy			See Envelope Curve Fig.1			
Linear Regulation Rate	Input Voltage Variation $\pm 1\%$	3.3VDC output	--	± 1.5	--	--
		Others output	--	± 1.2	--	
Load Regulation Rate	10% - 100% load	3.3/5VDC output	--	12	--	%
		9/12/15VDC output	--	8	--	
		24VDC output	--	6	--	
Ripple Noise	20MHz Bandwidth, 100% Load, Parallel line test method		--	60	120	mVp-p
Temperature Drift Coefficient	Full Load		--	± 0.02	--	%/°C
Short-Circuit Protection			Continuous, Self-Recovery			

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Insulation Voltage	Input-output, test time 1 minute, leakage current less than 1mA	1500	--	--	VDC
Insulation Resistance	Input-output, insulated voltage 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V	--	20	--	pF
Operating Temperature	Derating when operating temperature $\geq$ 85°C, (See Fig. 2)	-40	--	105	°C
Storage Temperature		-55	--	125	
Case Temperature Rise	Ta=25°C,input nominal, output full load	--	25	--	
Storage Humidity	Non-condensing	5	--	95	%RH
Soldering Profile	Wave-soldering	260 $\pm$ 5°C; time:5 - 10s			
	Manual-welding	360 $\pm$ 10°C;time:3 - 5s			
Switching Frequency	Full load, nominal input voltage	--	220	--	kHz
MTBF	MIL-HDBK-217F@25°C	3500	--	--	k Hours

Mechanical Specification

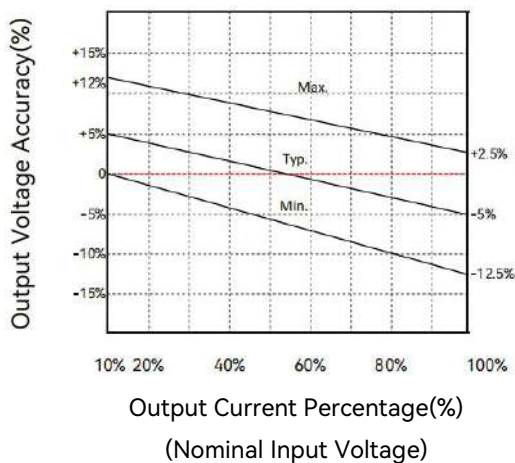
Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)
Package Dimensions	11.6 x 6.00 x 10.20mm
Weight	1.3g (Typ.)
Cooling Method	Free air convection

EMC Specifications

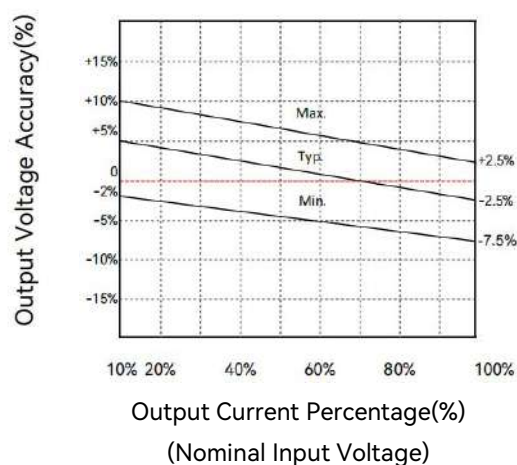
EMI	CE	CISPR32/EN55032 CLASS B (The EMC recommended circuit is shown in Fig.4)
	RE	CISPR32/EN55032 CLASS B (The EMC recommended circuit is shown in Fig.4)
EMS	ESD	IEC/EN61000-4-2 Contact $\pm$ 6KV ,Air $\pm$ 8KV perf. Criteria B

Typical Characteristic Curves

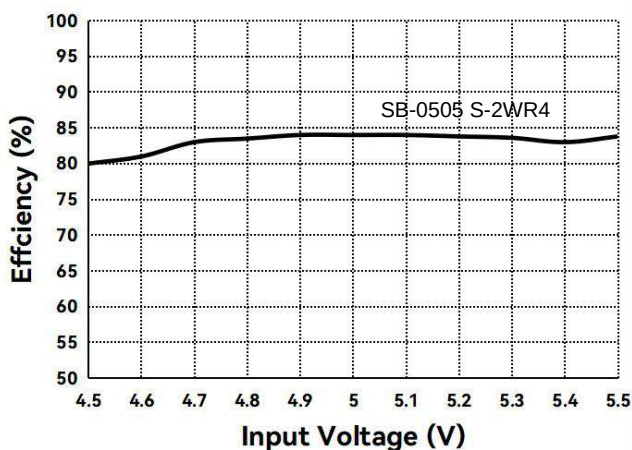
Output Regulation Curve 3.3V_{Output} (Fig.1-1)



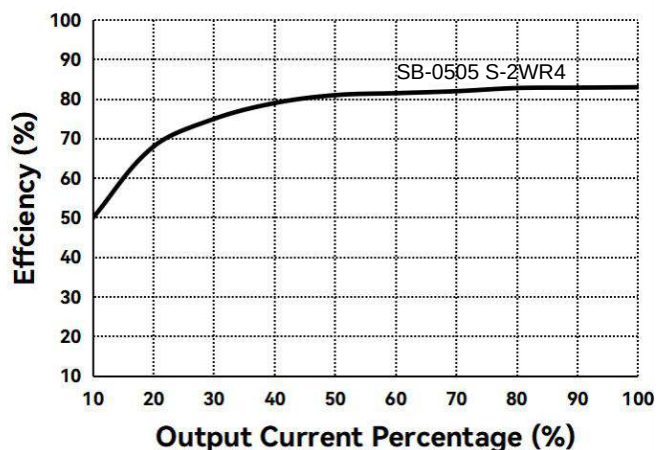
Output Regulation Curve Other Output (Fig.1-2)



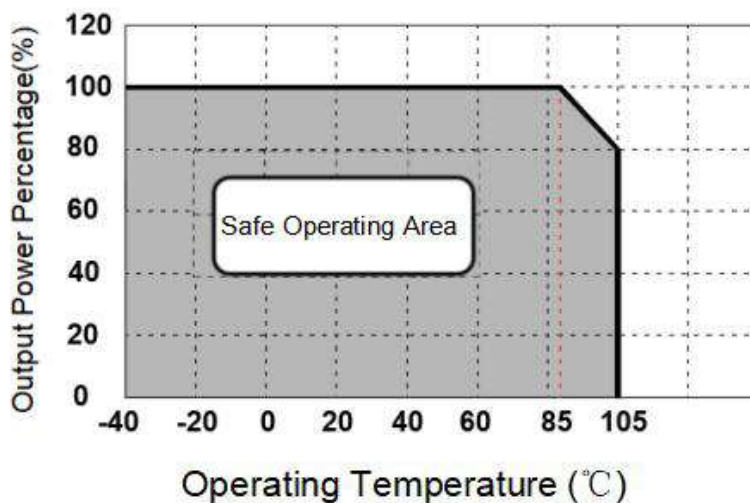
Efficiency VS Input Voltage Curve(full load)



Efficiency VS Output Load (Vin=5V)



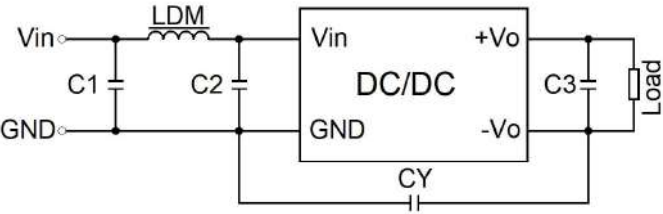
Temperature Derating Curve (Fig.2)



Typical Circuit Design and Application

Recommended Circuit (Fig.3)	Recommended Capacitive Load Value Table			
	Vin	Cin	Vo	Cout
	3.3/5VDC	4.7uF/16V	3.3/5VDC	10µF/16V
	12VDC	2.2uF/25V	9/12VDC	4.7µF/25V
	15VDC	1.0uF/25V	15VDC	1.0µF/25V
	24VDC	1.0uF/50V	24VDC	0.47µF/50V

All the DC/DC converters of this series are tested before delivery using the recommended circuit shown in Fig.3. Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the specified max. capacitive load value of the product.

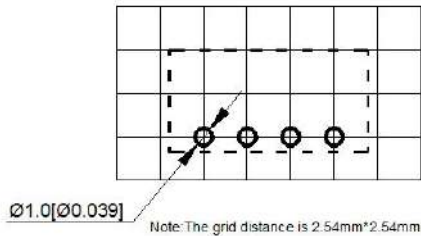
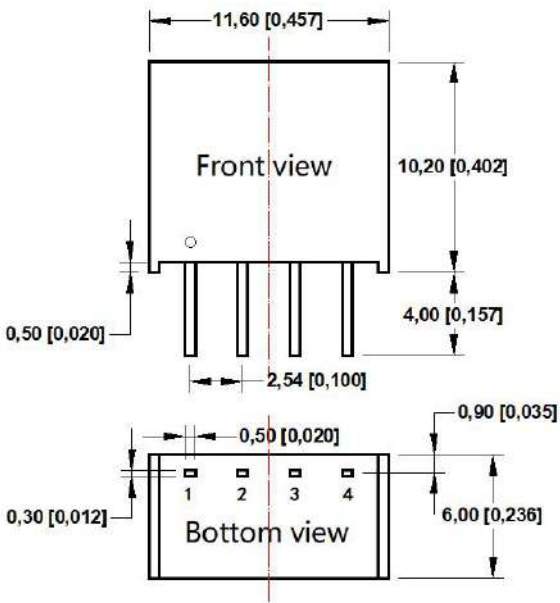
EMC Recommended Circuit (Fig.4)	EMC Recommended Parameter Table		
	EMC	C1,C2	4.7µF /50V
		C3	Refer to the Cout parameter in Fig.3
		CY	1000pF/2kV
		LDM	6.8µH

- Note:
- Typical applications
To further reduce input and output ripple, a capacitor filtering network can be connected at the input and output terminals. The application circuit is shown in Fig.3. However, care should be taken to select a suitable filter capacitor. If the capacitance is too large, it is likely to cause start-up problems. For each output, the recommended capacitive load values are shown in “Recommended Capacitive Load Value Table” for safe and reliable operation.
 - See Fig. 4 for EMC recommended circuit.
 - Output load requirements
In order to ensure that the module can work efficiently and reliably, the minimum output load should not be less than 10% of the rated load when used. If the power required is really small, connect a resistor in parallel to the output end (the sum of the power consumed by the resistance and the power actually used is greater than or equal to 10% of the rated power).

Dimensions and Recommended Layout

Dimensions

PCB Printing Layout



Note:
Unit: mm[inch]
Pin section tolerances:±0.10[±0.004]
General tolerances:±0.50[±0.020]

Pin Definition Table	
Pin	Function
1	GND
2	Vin
3	-Vo
4	+Vo

Packaging instructions

Packaging Information			
Product quantity(pcs /pipe)	Product quantity (pcs/ tray)	Inner carton quantity(pcs/carton)	Outer carton quantity (pcs/carton)
44	704	2816	11264

- Note:**
- ❖ The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage;
 - ❖ It is recommended to use at a load of over 5%. If the load is below 5%, the ripple index of the product may exceed the specifications, but it does not affect the reliability of the product;
 - ❖ The maximum capacitive load is tested within the input voltage range and under full load conditions;
 - ❖ Unless otherwise specified, all indicators in this manual are measured at Ta=25 °C, humidity<75% RH, nominal input voltage, and output rated load;
 - ❖ All indicator testing methods in this manual are based on our company's corporate standards;
 - ❖ Our company can provide product customization, and specific requirements can be directly contacted by our technical personnel;
 - ❖ Product specifications are subject to change without prior notice.