

### FEATURES

1. Continuous short-circuit protection
2. No-load input current as low as 8mA
3. Operating ambient temperature range: -40°C to +105°C
4. High efficiency up to 85%
5. I/O isolation test voltage: 1.5k VDC
6. Industry standard pin-out



3 years  
Warranty

### Selection Guide

Part No.	Input Voltage (VDC)	Output		Full Load Efficiency (%) Min./Typ.	Capacitive Load(μF) Max.
	Nominal (Range)	Voltage (VDC)	Current (mA) Max./Min.		
B0303S-1WR3	3.3 (2.97-3.63)	3.3	303/30	75/79	2400
B0305S-1WR3		5	200/20	78/82	2400
B0309S-1WR3		9	111/11	81/85	1000
B0312S-1WR3		12	83/8	78/82	560
B0315S-1WR3		15	67/7	78/82	560
B0324S-1WR3		24	42/4	80/84	220
B0503S-1WR3	5 (4.5-5.5)	3.3	303/30	70/74	2400
B0505S-1WR3		5	200/20	78/82	2400
B0509S-1WR3		9	111/12	79/83	1000
B0512S-1WR3		12	84/9	79/83	560
B0515S-1WR3		15	67/7	79/83	560
B0524S-1WR3		24	42/4	81/85	220
B1203S-1WR3	12 (10.8-13.2)	3.3	303/30	71/75	2400
B1205S-1WR3		5	200/20	76/80	2400
B1209S-1WR3		9	111/12	76/80	1000
B1212S-1WR3		12	83/9	76/80	560
B1215S-1WR3		15	67/7	77/81	560
B1224S-1WR3		24	42/5	77/81	220
B1505S-1WR3	15 (13.5-16.5)	5	200/20	76/80	2400
B1509S-1WR3		9	111/12	76/80	1000
B1512S-1WR3		12	83/9	76/80	560
B1515S-1WR3		15	67/7	77/81	560
B1524S-1WR3		24	42/5	77/81	220
B2403S-1WR3		24 (21.6-26.4)	3.3	303/30	69/75
B2405S-1WR3	5		200/20	73/79	2400
B2409S-1WR3	9		111/12	74/80	1000
B2412S-1WR3	12		83/9	75/81	560
B2415S-1WR3	15		67/7	75/81	560
B2424S-1WR3	24		42/5	75/81	220

### Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	3.3V input	3.3VDC output	-	384/10	405/-	mA
		Other output	-	370/18	389/-	

Input Current (full load / no-load)	5V input	3.3VDC output	-	271/8	286/-	mA
		5VDC output	-	244/8	257/-	
		9VDC/12VDC/15VDC output	-	241/12	254/-	
		24VDC output	-	241/18	254/-	
	12V input	3.3VDC output	-	112/8	118/-	
		5VDC/9VDC/12VDC output	-	105/8	110/-	
		15VDC/24VDC output	-	103/8	109 /-	
	15V input	5VDC/9VDC/12VDC output	-	84/8	88/-	
		15VDC/24VDC output	-	83/8	87/-	
	24V input	3.3VDC output	-	56/8	61/-	
		5VDC output	-	53/8	58/-	
		9VDC output	-	53/8	57/-	
		12VDC/15VDC/24VDC output	-	52/8	56/-	
Reflected Ripple Current		-	15	-		
Surge Voltage(1sec. max.)	3.3VDC input	-0.7	-	5	VDC	
	5VDC input	-0.7	-	9		
	12VDC input	-0.7	-	18		
	15VDC input	-0.7	-	21		
	24VDC input	-0.7	-	30		
Input Filter			Capacitance filter			
Hot Plug			Unavailable			
Note: * Refer to DC-DC Converter Application Notes for detailed description of reflected ripple current test method.						

## Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Voltage Accuracy		See output regulation curves (Fig. 1)				
Linear Regulation	Input voltage change: $\pm 1\%$	3.3VDC output	-	-	1.5	-
		Other output	-	-	1.2	
Load Regulation	3.3VDC input 10%-100% load	3.3VDC output	-	12	18	%
		Other output	-	8	15	
	5VDC input 10%-100% load	3.3VDC output	-	15	20	
		5VDC output	-	10	15	
		9VDC output	-	8	10	
		12VDC output	-	7	10	
		15VDC output	-	6	10	
	12VDC/15VDC/24VDC input 10%-100% load	24VDC output	-	5	10	
		3.3VDC output	-	8	20	
		5VDC output	-	5	15	
		9VDC output	-	3	10	
		12VDC output	-	3	10	
Ripple & Noise*	20MHz bandwidth	15VDC output	-	3	10	mVp-p
		24VDC output	-	2	10	
		Other output	-	30	75	
Temperature Coefficient	Full load	-	$\pm 0.02$	-	%/°C	
Short-Circuit Protection		Continuous, self-recovery				
Note:* The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information.						

### General Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Isolation	Input-output electric strength test for 1 minute with a leakage current of 1mA max.		1500	-	-	VDC
	5V input, input-output electric strength test for 1 second with a leakage current of 1mA max.		3000	-	-	
Insulation Resistance	Input-output resistance at 500VDC		1000	-	-	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		-	20	-	pF
Operating Temperature	3.3V input	Derating when operating temperature ≥ 100°C, (see Fig. 2)	-40	-	105	°C
	Other input	Derating when operating temperature ≥ 85°C, (see Fig. 2)				
Storage Temperature			-55	-	125	
Case Temperature Rise	Ta=25°C		-	25	-	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds		-	-	300	
Storage Humidity	Non-condensing	5V input	-	-	95	
		Other output	5	-	95	
Vibration	3.3V/12V/15V/24V input		10-150Hz, 5G, 0.75mm. along X, Y and Z			
Switching Frequency	3.3V input, full load, nominal input voltage		-	220	-	kHz
	5V input, full load, nominal input voltage		-	270	-	
	12V/15V/24V input, full load, nominal input voltage		-	260	-	
MTBF	MIL-HDBK-217F @ 25°C		3500	-	-	k hours

### Mechanical Specifications

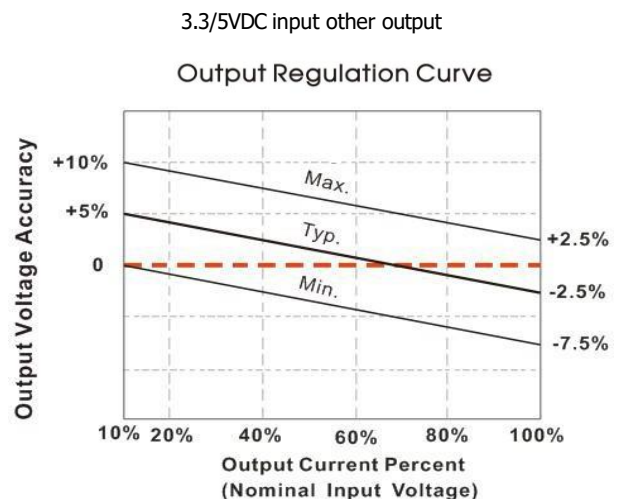
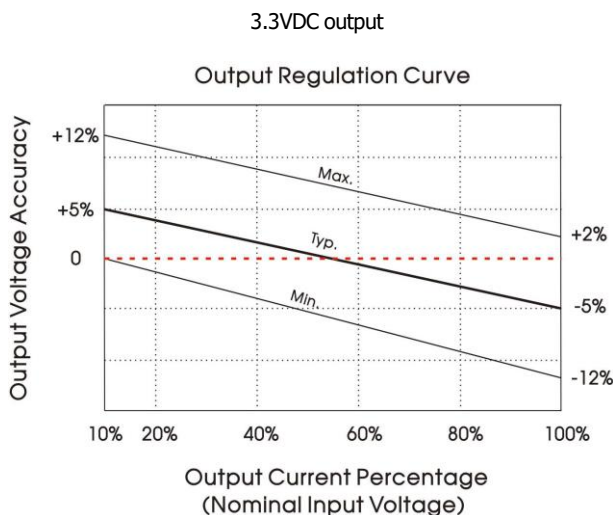
<b>Case Material</b>	Black plastic; flame-retardant and heat-resistant (UL94 V-0)
<b>Dimensions</b>	11.60 x 6.00 x 10.16 mm
<b>Weight</b>	1.3g (Typ.)
<b>Cooling Method</b>	Free air convection

### EMC Specifications

<b>Emissions</b>	CE	CISPR32/EN55032 CLASS B
	RE	CISPR32/EN55032 CLASS B
<b>Immunity</b>	ESD	IEC/EN61000-4-2 Air ±8kV, Contact ±6kV perf. Criteria B

Note: Refer to Fig.4 for recommended circuit test.

### Typical Characteristic Curves



12VDC/15VDC/24VDC input  
Other output  
Output Regulation Curve

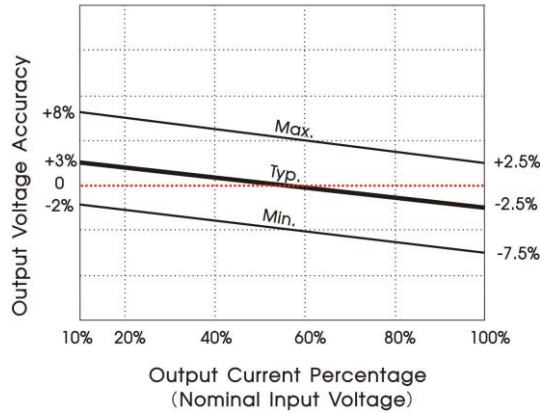


Fig. 1

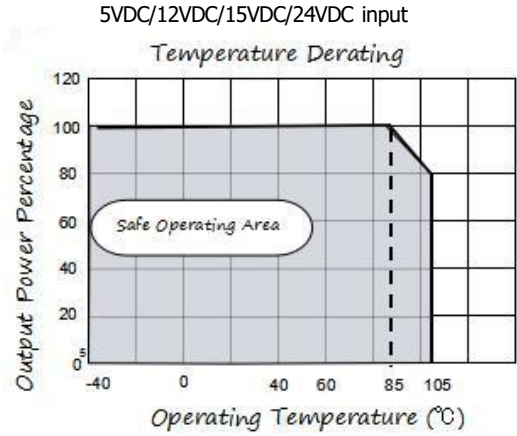
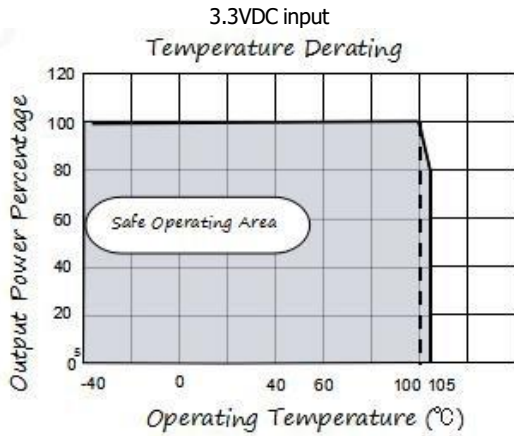
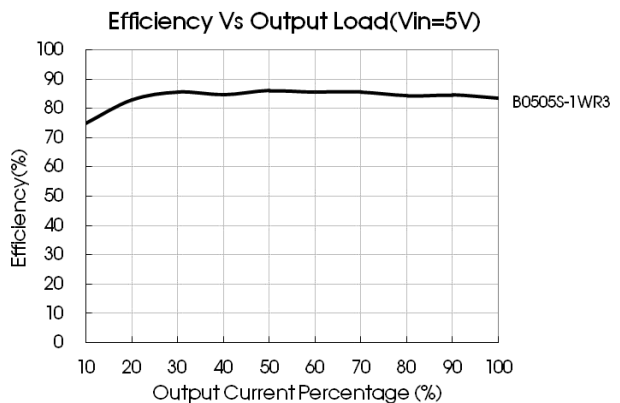
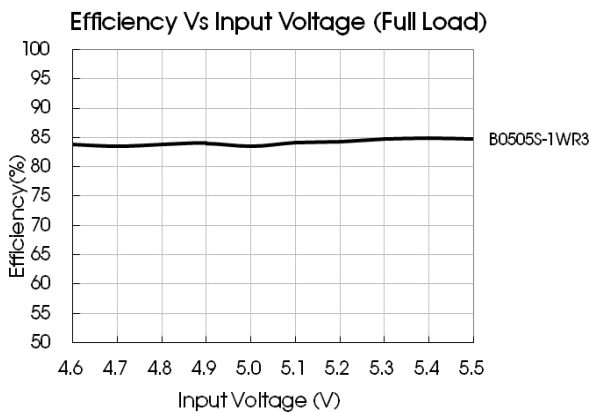
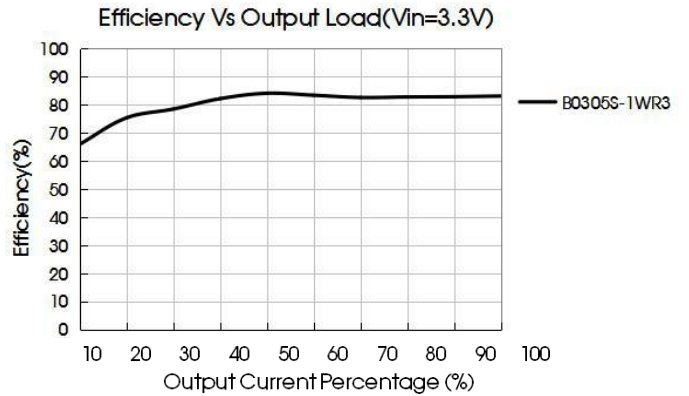
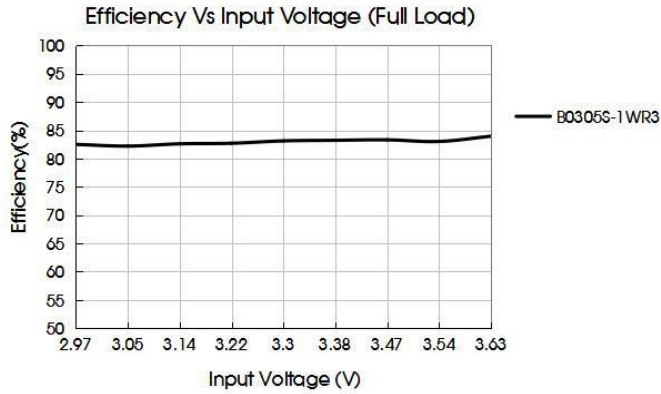
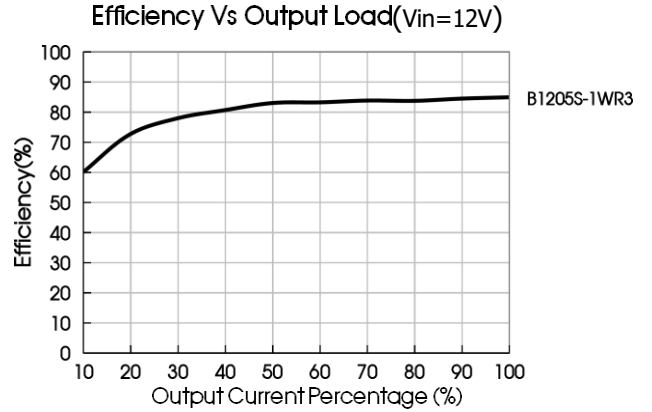
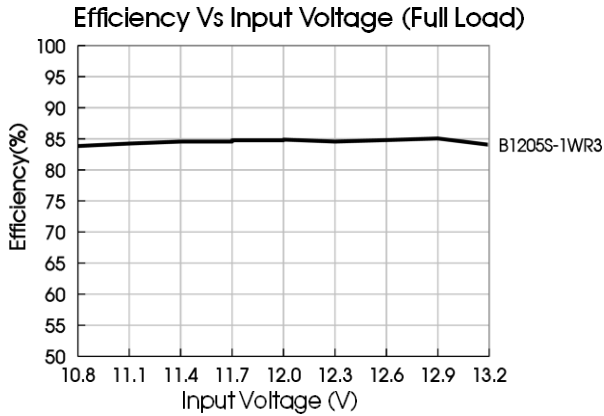


Fig. 2





## Design Reference

### 1. Typical application

Input and/or output ripple can be further reduced, by connecting a filter capacitor from the input and/or output terminals to ground as shown in Fig.3.

Choosing suitable filter capacitor values is very important for a smooth operation of the modules, particularly to avoid start-up problems caused by capacitor values that are too high. For recommended input and output capacitor values refer to Table 1.

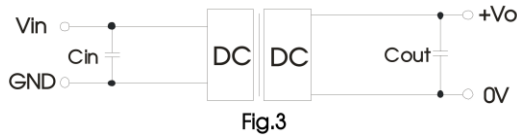


Table 1: Recommended input and output capacitor values

Vin	Cin	Vo	Cout
3.3VDC	10µF/25V	3.3VDC	10µF/16V
5VDC	4.7µF/16V	5VDC	10µF/16V
12VDC	2.2µF/25V	9VDC	2.2µF/16V
15VDC	2.2µF/25V	12VDC	2.2µF/25V
24VDC	1µF/50V	15VDC	1µF/25V
-	-	24VDC	1µF/50V

### 2. EMC compliance circuit

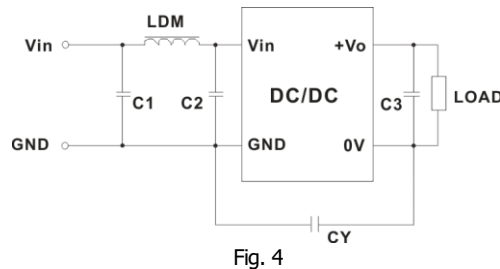
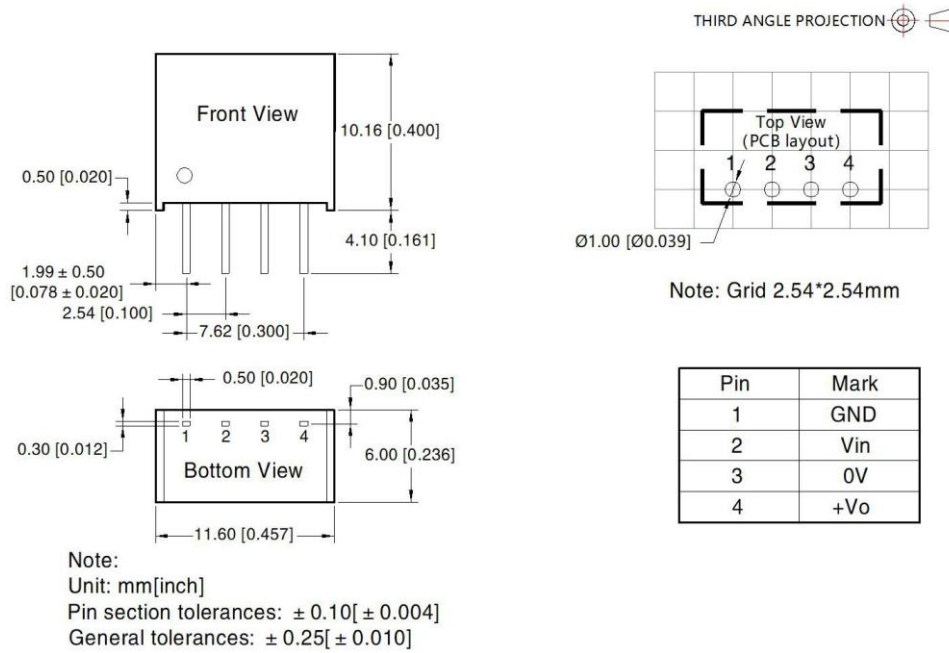


Table 2: Recommended EMC filter values

Input voltage	3.3VDC		5VDC		12/15/24VDC	
Output voltage	3.3/5VDC	9/12/15/24VDC	3.3/5/9VDC	12/15/24VDC	-	
Emissions	C1/C2	4.7µF /16V	4.7µF/16V	4.7µF/25V	4.7µF/25V	4.7µF/50V
	CY	-	270pF /4kVDC VISHAY HGZ102MBP	100pF/4kV	1000pF/4kV	270pF/2kV
	C3	Refer to the Cout in table 1				
	LDM	6.8µH				

### Dimensions and Recommended Layout



### Notes & Instructions

1. If the product works under the minimum required load, it cannot guarantee that the performance of the product complies with all the performance indicators in this manual;
2. The maximum capacitive load is tested under the input voltage range and full load condition;
3. Unless otherwise stated, all indexes in this manual are measured at Ta=25°C, humidity <75%RH, nominal input voltage and rated output load;
4. All index testing methods in this manual are based on the enterprise standards of the company;
5. Our company can provide product customization, specific needs can directly contact our technical staff;