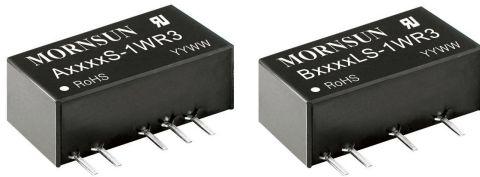


1W isolated DC-DC converter  
Fixed input voltage, unregulated dual/single output



UL US CE UK CA CB Report RoHS Patent Protection

UL 62368-1 EN 62368-1 BS EN 62368-1 IEC 62368-1

A05\_S-1WR3 & B05\_LS-1WR3 series are specially designed for applications where an isolated (two isolated) voltage is required in a distributed power supply system. They are suitable for: pure digital circuits, low frequency analog circuits, relay-driven circuits and data switching circuits.

## FEATURES

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

## Selection Guide

Certification	Part No.	Input Voltage(VDC)	Output		Full Load Efficiency(%) Min./Typ.	Capacitive Load(μF)* Max.
		Nominal (Range)	Voltage (VDC)	Current(mA) Max./Min.		
EN/BS EN	A0503S-1WR3	5 (4.5-5.5)	±3.3	±152/±15	70/74	1200
UL/EN/BS EN/IEC	A0505S-1WR3		±5	±100/±10	78/82	1200
	A0509S-1WR3		±9	±56/±6	79/83	470
	A0512S-1WR3		±12	±42/±5	79/83	220
	A0515S-1WR3		±15	±34/±4	79/83	220
	A0524S-1WR3		±24	±21/±3	81/85	100
	B0503LS-1WR3		3.3	303/30	70/74	2400
	B0505LS-1WR3		5	200/20	78/82	2400
	B0509LS-1WR3		9	111/12	79/83	1000
	B0512LS-1WR3		12	84/9	79/83	560
	B0515LS-1WR3		15	67/7	79/83	560
B0524LS-1WR3	24		42/4	81/85	220	

Note: \*The specified maximum capacitive load for positive and negative output is identical.

## Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	3.3VDC/5VDC output	--	270/5	286/10	mA
	9VDC/12VDC output	--	241/12	254/20	
	15VDC/24VDC output	--	241/18	254/30	
Reflected Ripple Current*		--	15	--	
Surge Voltage (1sec. max.)	5VDC input	-0.7	--	9	VDC
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 curve(Fig. 1)				
Linear Regulation	Input voltage change: ±1%	3.3VDC output	--	--	1.5	--
		Others	--	--	1.2	

Load Regulation	10%-100% load	3.3VDC output	--	15	20	%
		5VDC output	--	10	15	
		9VDC output	--	8	10	
		12VDC output	--	7	10	
		15VDC output	--	6	10	
		24VDC output	--	5	10	
Ripple & Noise*	20MHz bandwidth	Others	--	30	75	mVp-p
		24VDC output	--	50	100	
Temperature Coefficient	100% load		--	±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
Insulation Resistance	Input-output resistance at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	--	20	--	pF
Operating Temperature	Derating when operating temperature ≥ 85°C, (see Fig. 2)	-40	--	105	°C
Storage Temperature		-55	--	125	
Case Temperature Rise	Ta=25°C	3.3VDC output	--	25	
		Others	--	15	--
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	300	
Storage Humidity	Non-condensing	--	--	95	%RH
Switching Frequency	100% load, nominal input voltage	--	270	--	kHz
MTBF	MIL-HDBK-217F@25°C	3500	--	--	k hours

### Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)
Dimensions	19.65 x 6.00 x 10.16mm
Weight	2.1g(Typ.)
Cooling Method	Free air convection

### Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B (see Fig. 4 for recommended circuit)	
	RE	CISPR32/EN55032	CLASS B (see Fig. 4 for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2	Air ±8kV, Contact ±4kV	perf. Criteria B

### Typical Characteristic Curves

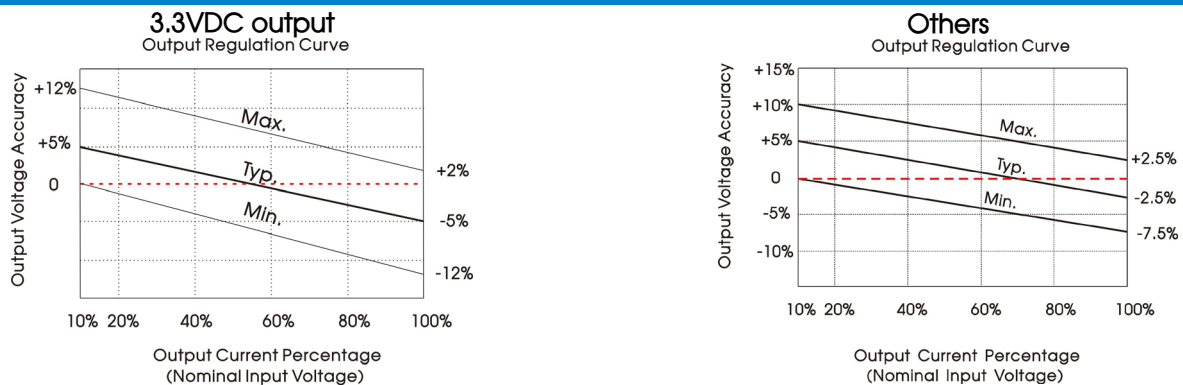


Fig. 1

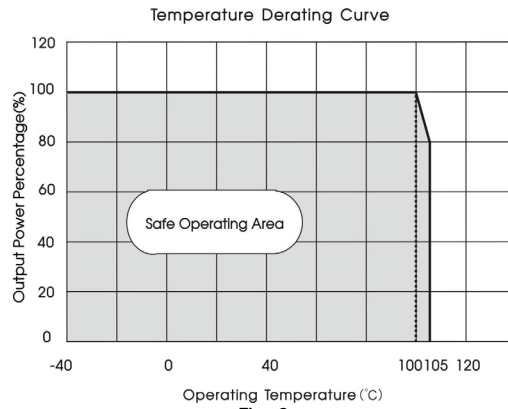
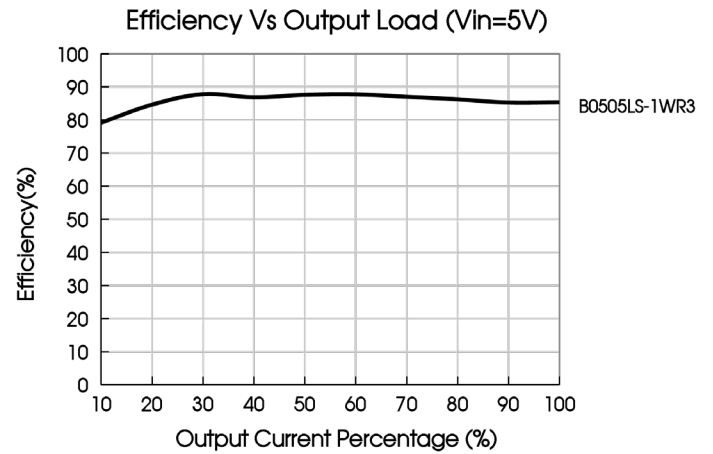
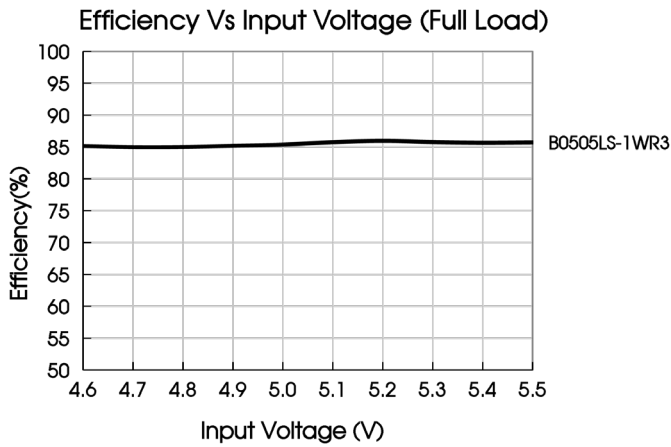
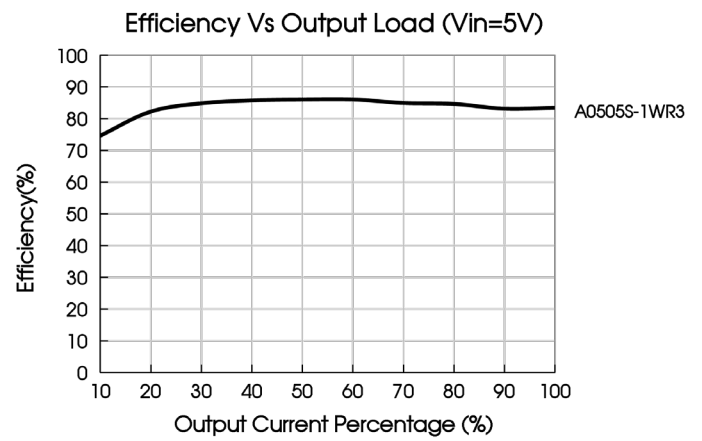
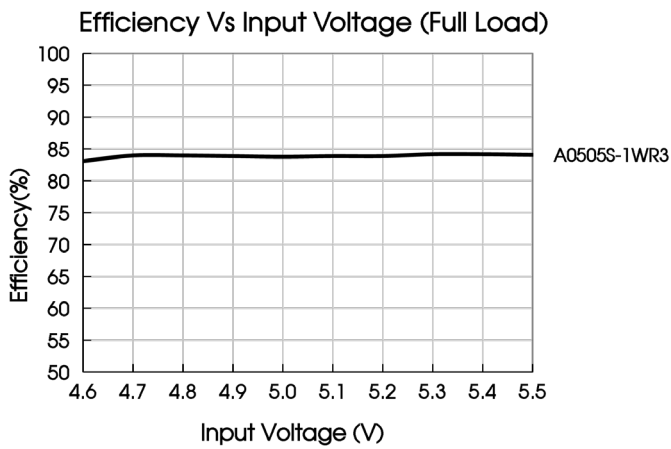


Fig. 2



**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.

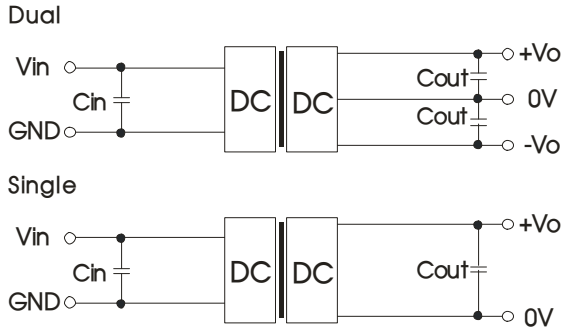


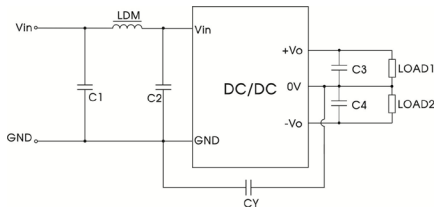
Fig. 3

Recommended capacitive load value table (Table 1)

Vin	Cin	Single Vout	Cout	Dual Vout	Cout
5VDC	4.7µF/16V	3.3/5VDC	10µF/16V	±5VDC	4.7µF/16V
--	--	9/12VDC	2.2µF/25V	±9/±12VDC	1µF/25V
--	--	15/24VDC	1µF/50V	±15/±24VDC	0.47µF/50V

**2. EMC (CLASS B) compliance circuit**

Dual



Single

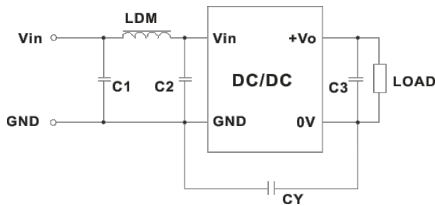


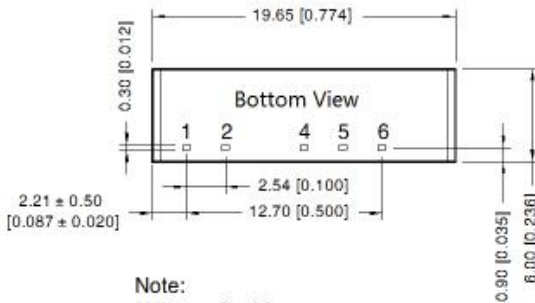
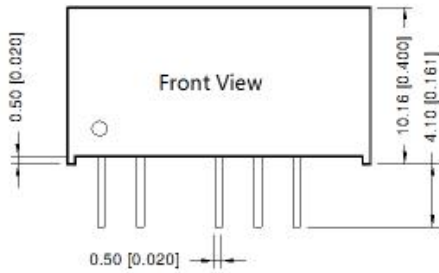
Fig. 4

EMC recommended circuit value table (Table 2)

Input voltage 5VDC	Emissions	Output voltage	3.3/5/9 VDC	12/15/24 VDC
		C1/C2	4.7µF /25V	4.7µF /25V
		CY	--	1nF /2kVDC VISHAY HGZ102MBP TDK CD45-E2GA102M-GKA
		C3/C4	Refer to the Cout in table 1	
LDM		6.8µH	6.8µH	

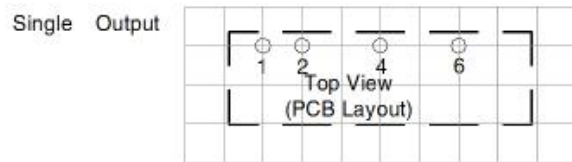
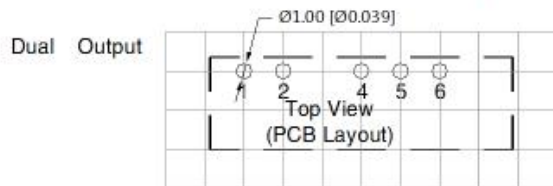
Note: In the case of actual use, the requirements for EMI are high, it is subject to CY .

## Dimensions and Recommended Layout



Note:  
Unit: mm[inch]  
Pin section tolerances:  $\pm 0.10[\pm 0.004]$   
General tolerances:  $\pm 0.25[\pm 0.010]$

THIRD ANGLE PROJECTION 



Note: Grid 2.54\*2.54mm

Pin-Out		
Pin	Single	Dual
1	Vin	Vin
2	GND	GND
4	0V	-Vo
5	No Pin	0V
6	+Vo	+Vo