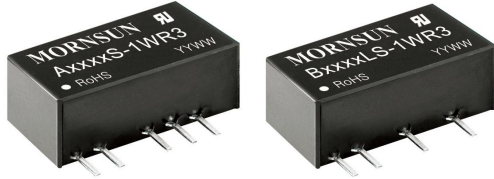


1W isolated DC-DC converter
Fixed input voltage, unregulated dual/single output



UL[®] 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

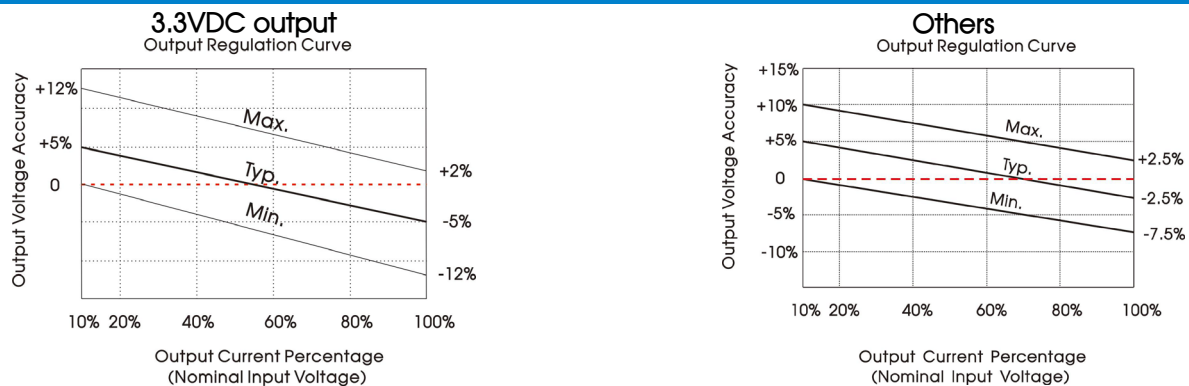
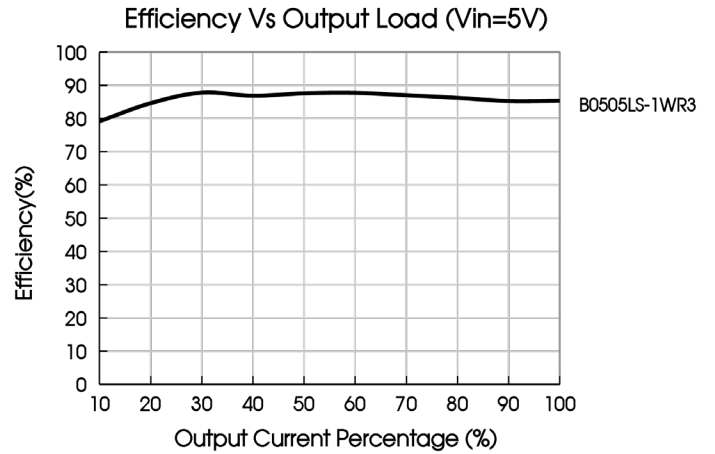
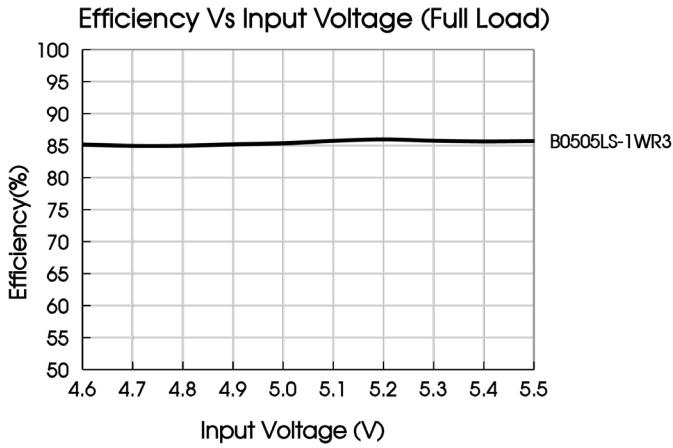
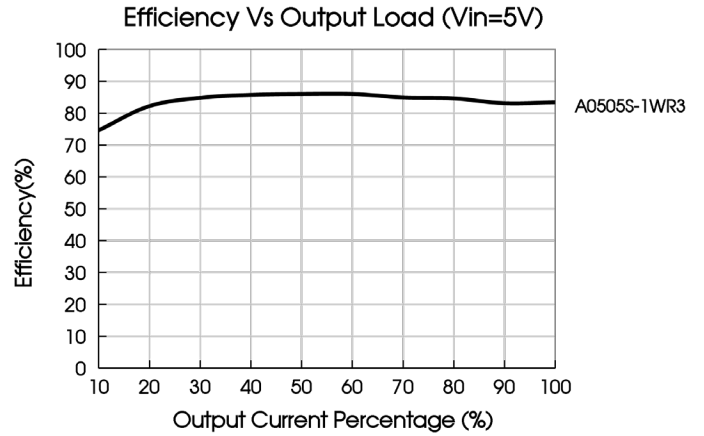
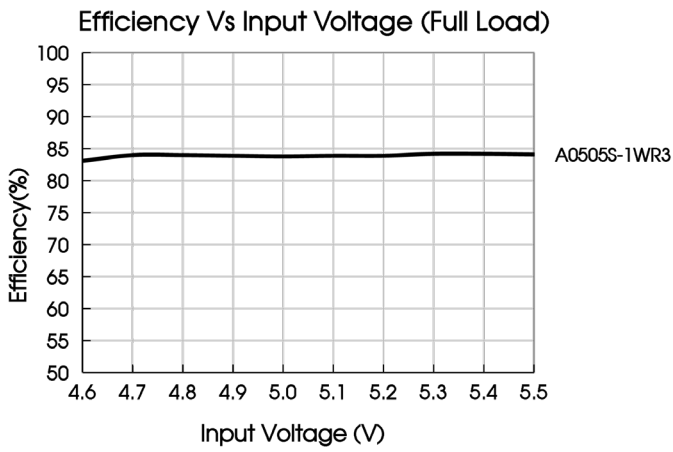
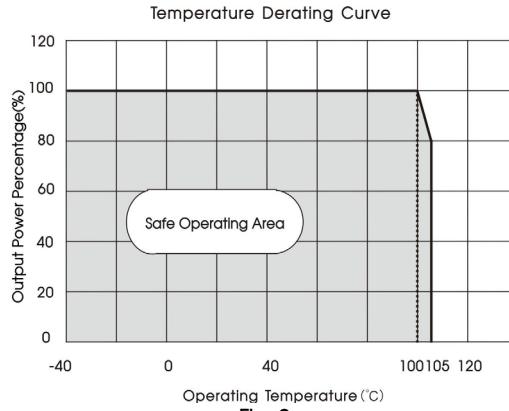


Fig. 1



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.

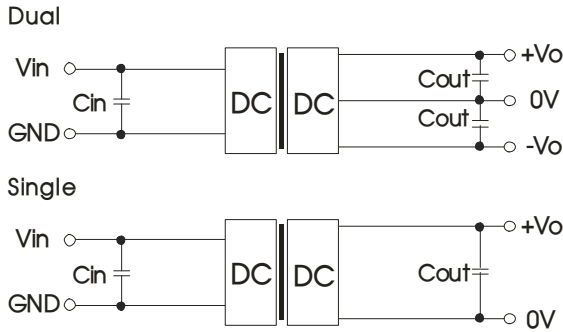


Fig. 3

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

EMC recommended circuit value table (Table 2)

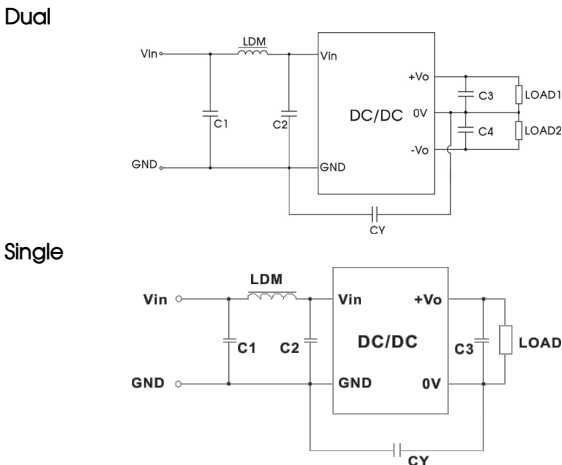
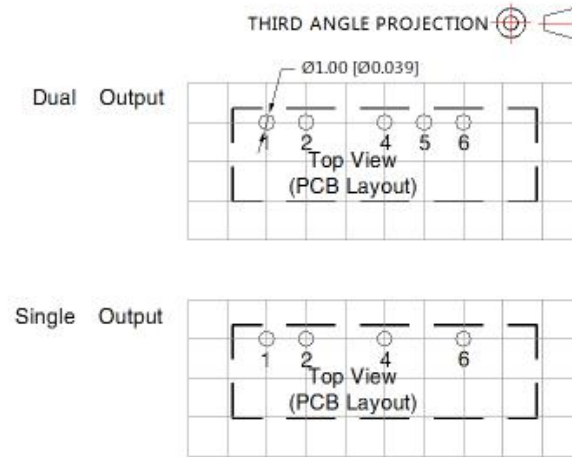
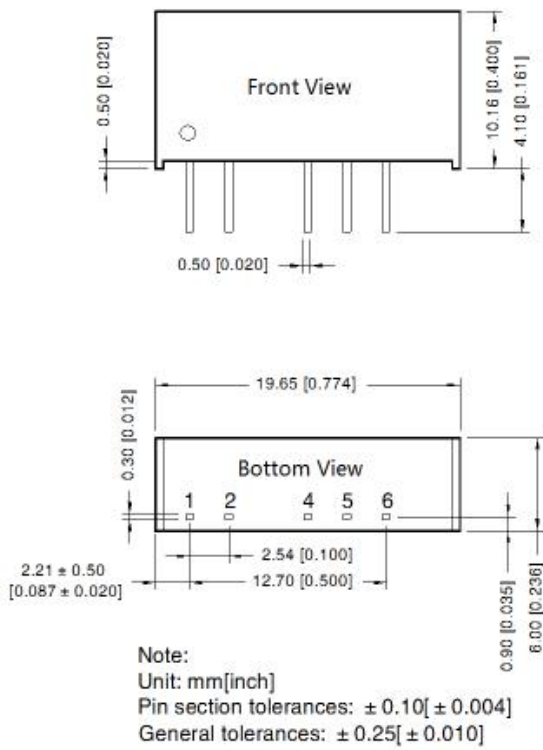


Fig. 4

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: 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