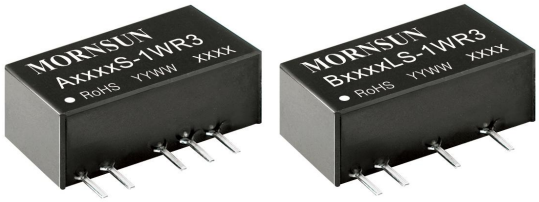
DC/DC Converter

A_S-1WR3 & B_LS-1WR3 Series

MORNSUN®

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



Patent Protection RoHS

3 years Warranty

Continuous Short Circuit Protection

FEATURES

- Continuous short-circuit protection
- No-load input current as low as 8mA
- Operating ambient temperature range: -40℃ to +105℃
- High efficiency up to 81%
- I/O isolation test voltage: 1.5k VDC
- Industry standard pin-out

A_S-1WR3 & B_LS-1WR3 series are specially designed for applications where an(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.

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.		
--	A1203S-1WR3	12 (10.8-13.2)	±3.3	±152/±15	71/75	1200
	A1205S-1WR3		±5	±100/±10	76/80	
	A1212S-1WR3		±12	±42/±5	77/81	220
	A1215S-1WR3		±15	±34/±4	77/81	
	A1224S-1WR3		±24	±21/±3	76/80	100
	B1203LS-1WR3		3.3	303/30	71/75	2400
	B1205LS-1WR3		5	200/20	76/80	
	B1209LS-1WR3		9	111/12	76/80	1000
	B1212LS-1WR3		12	83/9	76/80	560
	B1215LS-1WR3		15	67/7	77/81	
	B1224LS-1WR3		24	42/4	77/81	220
	A1505S-1WR3	15 (13.5-16.5)	±5	±100/±10	76/80	1200
	A1512S-1WR3		±12	±42/±5	76/80	220
	A1515S-1WR3		±15	±34/±4	77/81	
	B1505LS-1WR3		5	200/20	76/80	2400
	B1509LS-1WR3		9	111/12	76/80	1000
	B1512LS-1WR3		12	83/9	76/80	560
	B1515LS-1WR3		15	67/7	77/81	
	A2405S-1WR3	24 (21.6-26.4)	±5	±100/±10	74/80	1200
	A2412S-1WR3		±12	±42/±5	75/81	220
	A2415S-1WR3		±15	±34/±4	73/79	
	A2424S-1WR3		±24	±21/±3	74/80	100
	B2403LS-1WR3		3.3	303/30	69/75	2400
	B2405LS-1WR3		5	200/20	73/79	
	B2409LS-1WR3		9	111/12	74/80	1000
	B2412LS-1WR3		12	83/9	75/81	560
	B2415LS-1WR3		15	67/7	75/81	
	B2424LS-1WR3		24	42/4	75/81	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)	12VDC input	--	105/8	110/--	mA
	15VDC input	--	84/8	88/--	
	24VDC input	--	56/8	61/--	
Reflected Ripple Current*		--	30	--	
Surge Voltage(1sec. max.)	12VDC input	-0.7	--	18	VDC
	15VDC input	-0.7	--	21	
	24VDC input	-0.7	--	30	
Input Filter		Capacitance filter			
Hot Plug		Unavailable			

Note: * Reflected ripple current testing method please see DC-DC Converter Application Notes for specific operation.

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy			See output regulation curves (Fig. 1)			
Linear Regulation	Input voltage change: ±1%	3.3VDC output	--	--	1.5	--
		5VDC/9VDC/12VDC/15 VDC/24VDC output	--	--	1.2	
Load Regulation	10% -100% load	3.3VDC output	--	15	20	%
		5VDC output	--	10	15	
		9VDC output	--	6	10	
		12VDC output	--	5	10	
		15VDC output	--	5	10	
		24VDC output	--	4	10	
Ripple & Noise*	20MHz bandwidth	3.3VDC/5VDC/9VDC/12 VDC/15VDC output	--	30	75	mVp-p
		24VDC output	--	50	100	
Temperature Coefficient	100% load		--	±0.02	--	%/℃
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≥100℃, (see Fig. 2)	-40	--	105	℃
Storage Temperature		-55	--	125	
Case Temperature Rise	Ta=25℃	--	30	--	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	300	
Storage Humidity	Non-condensing	5	--	95	%RH
Vibration		10-150Hz, 5G, 30 Min. along X, Y and Z			
Switching Frequency	Full load, nominal input voltage	--	260	--	kHz
MTBF	MIL-HDBK-217F@25℃	3500	--	--	k hours

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94 V-0)

Dimensions	19.65 x 6.00 x 10.16mm
Weight	2.1g(Typ.)
Cooling Method	Free air convection

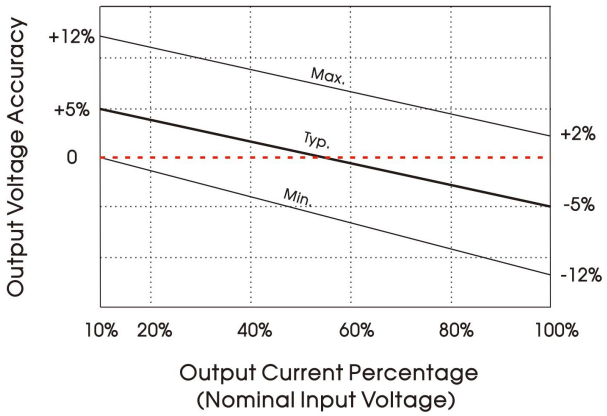
Electromagnetic Compatibility (EMC)

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	Contact ±6kV perf. Criteria B

Typical Performance Curves

3.3VDC output

Output Regulation Curve



5VDC/9VDC/12VDC/15VDC/24VDC output

Output Regulation Curve

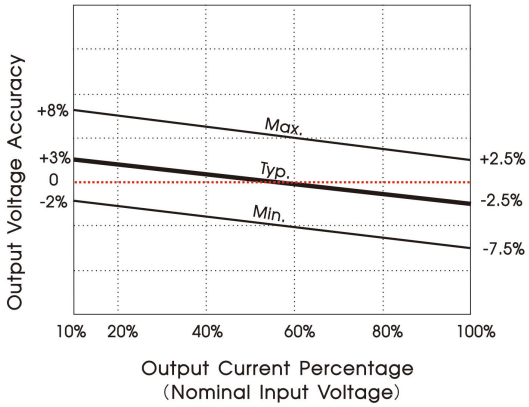


Fig. 1

Temperature Derating Curve

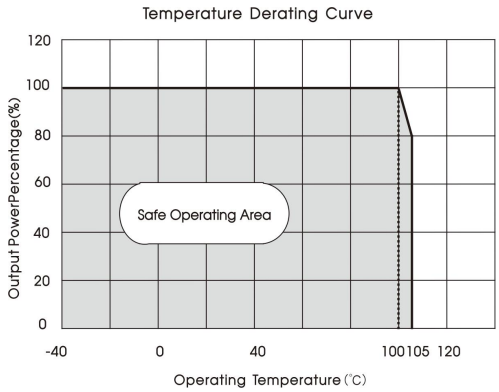
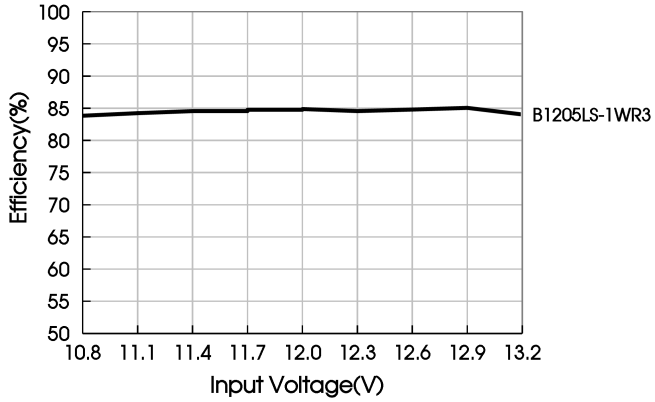
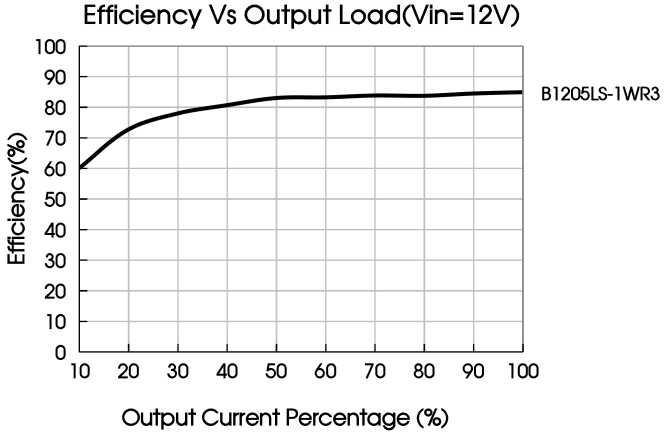


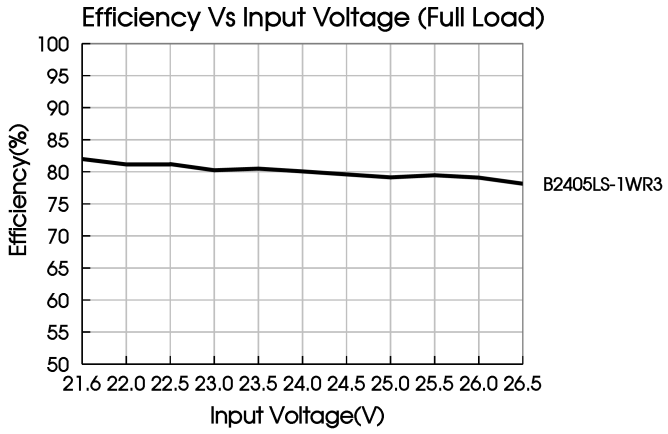
Fig. 2

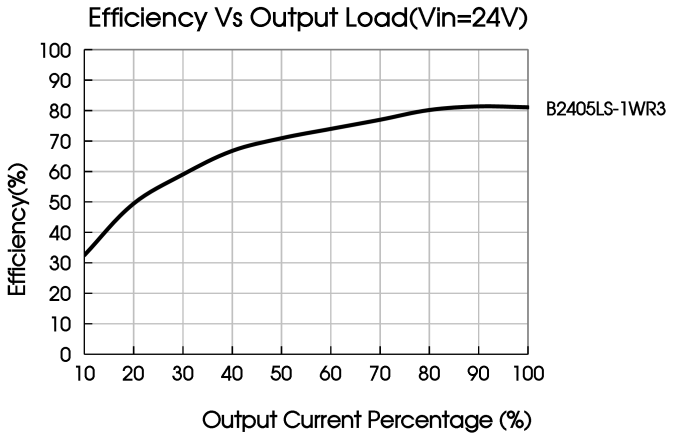
Efficiency Vs Input Voltage (Full Load)



Efficiency Vs Output Load(Vin=12V)







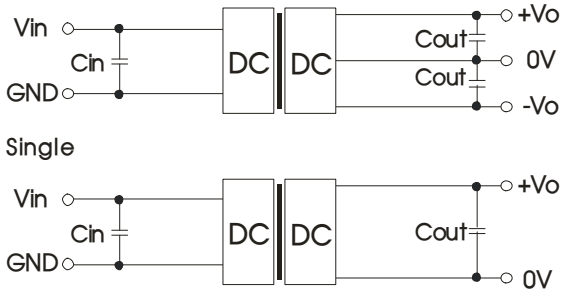
Design Reference

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.

Dual



Single

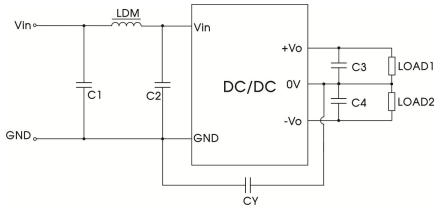
Fig.3

Table 1: Recommended input and output capacitor values

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

2.EMC (CLASS B) compliance circuit

Dual



Single

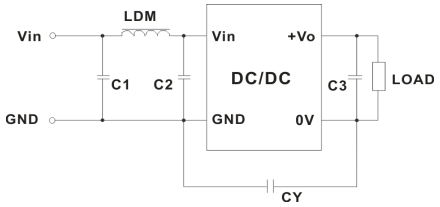


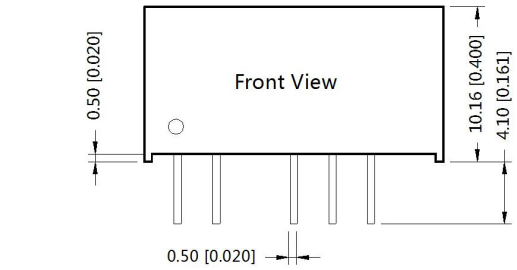
Fig.4

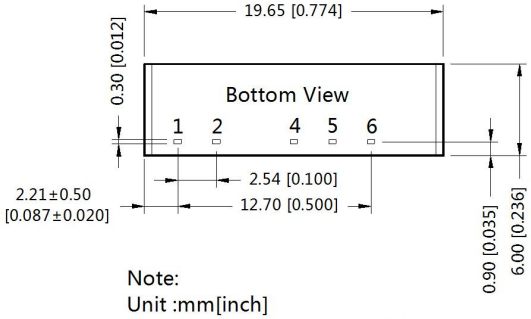
Table 2: EMC recommended circuit value table

Emissions	C1	4.7μF /50V
	C2	4.7μF /50V
	CY	270pF/2kV
	C3	Refer to the Cout in table 1
	C4	Refer to the Cout in table 1
	LDM	6.8μH

3. For additional information, please refer to DC-DC converter application notes on www.mornsun-power.com

Dimensions and Recommended Layout

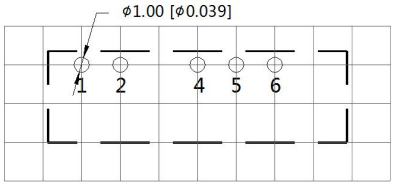




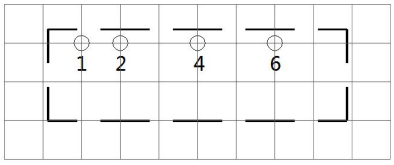
Note:
Unit :mm[inch]
Pin section tolerances :±0.10[±0.004]
General tolerances:±0.25[±0.010]

THIRD ANGLE PROJECTION

Duals Output



Singles Output



Note : Grid 2.54*2.54mm

Pin-Out		
Pin	Singles	Duals
1	Vin	Vin
2	GND	GND
4	0V	-Vo
5	No Pin	0V
6	+Vo	+Vo

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58200001;
2. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
3. The maximum capacitive load offered were tested at input voltage range and full load;
4. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
5. All index testing methods in this datasheet are based on our company corporate standards;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Products are related to laws and regulations: see "Features" and "EMC";
8. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

MORNSUN Guangzhou Science & Technology Co., Ltd.
Address: No. 5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Huangpu District, Guangzhou, P. R. China
Tel: 86-20-38601850 Fax: 86-20-38601272 E-mail: info@mornsun.cn www.mornsun-power.com