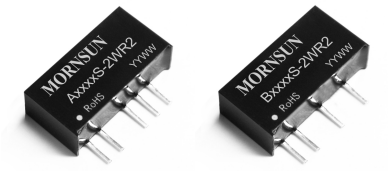
MORNSUN®

A_S-2WR2 & B_S-2WR2 SERIES

2W, FIXED INPUT, ISOLATED & UNREGULATED DUAL/SINGLE OUTPUT DC-DC CONVERTER



Continuous Short Circuit Protection

Patent Protected **RoHS**

FEATURES

- ●Miniature SIP package
- ● Efficiency up to 89%
- ● High power density
- ● 1500VDC isolation
- ● Operating temperature range: -40℃~+105℃
- ● No external component required
- ● Industry standard pinout

PART NUMBER SYSTEM

A0505S-2WR2

- Rated Power
- Package
- Output Voltage
- Input Voltage
- Product Series

APPLICATIONS

The A_S-2WR2 & B_S-2WR2 Series are designed for application where isolated output is required from a distributed power system.

These products apply to where:

1) Input voltage rang :±10%Vin;

2) 1500VDC input and output isolation;

3) Regulated and low ripple noise is not required.

Such as: digital circuits, low frequency analog circuits, and relay drive circuit.

SELECTION GUIDE

Model	Input Voltage(VDC) Nominal (Range)	Output Voltage (VDC)	Output Current (mA) Max.	Output Current (mA) Max.	Input Current (mA)(Typ.) @Max. Load	Input Current (mA)(Typ.) @No Load	Reflected Ripple Current (mA,Typ.)	Max. Capacitive Load ① (μF)	Efficiency (%, Typ.) @Max. Load
A0503S-2WR2	5 (4.5-5.5)	±3.3	±303	±30	540	25	15	100	74
A0505S-2WR2		±5	±200	±20	500				80
A0512S-2WR2		±12	±83	±8	476				84
A0515S-2WR2		±15	±67	±7	476				84
A0524S-2WR2		±24	±42	±4	476				84
B0503S-2WR2		3.3	400	40	476			220	84
B0505S-2WR2		5	400	40	450				89
B0512S-2WR2		12	167	17	476				84
B0515S-2WR2		15	133	13	476				84
B0524S-2WR2		24	83	8	476				84
A1203S-2WR2	12 (10.8-13.2)	±3.3	±200	±20	208	15		100	80
A1205S-2WR2		±5	±200	±20	198				84
A1212S-2WR2		±12	±83	±8	196				85
A1215S-2WR2		±15	±67	±7	198				84
B1203S-2WR2		3.3	400	40	198			220	84
B1205S-2WR2		5	400	40	198				84
B1212S-2WR2		12	167	17	198				84
B1215S-2WR2		15	133	13	198				84
A1515S-2WR2	15 (13.5-16.5)	±15	±67	±7	157	10		100	85
A2403S-2WR2	24 (21.6-26.4)	±3.3	±200	±20	104	8			80
A2405S-2WR2		±5	±200	±20	99				84
A2412S-2WR2		±12	±83	±8	99				84
A2415S-2WR2		±15	±67	±7	99				84
B2403S-2WR2		3.3	400	40	99			220	84
B2405S-2WR2		5	400	40	99				84

B2412S-2WR2	24 (21.6-26.4)	12	167	17	99	8	15	220	84
B2415S-2WR2		15	133	13	99				84
B2424S-2WR2		24	83	8	98				85
Note: ①for each output.									

INPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (1sec.max.)	5VDC input	-0.7	--	9	VDC
	12VDC input	-0.7	--	18	
	15VDC input	-0.7	--	21	
	24VDC input	-0.7	--	30	
Input Filter		Capacitance Filter			

OUTPUT SPECIFICATIONS

Item	Test Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy			See tolerance envelope curve			
Line Regulation	For Vin change of ±1%	3.3V output	--	--	±1.5	%
		Others	--	--	±1.2	
Load Regulation	10% to 100% load	3.3V output	--	18	--	
		5V output	--	12	--	
		12V output	--	8	--	
		15V output	--	7	--	
		24V output	--	6	--	
Temperature Drift	Full load		--	--	±0.03	%/°C
Ripple & Noise*	20MHz bandwidth	Output Voltage≤12V	--	60	--	mVp-p
		Output Voltage:15V,24V	--	75	--	
Short Circuit Protection			Continuous, automatic recovery			
Note: *Ripple and noise tested by “parallel cable” method. See detailed operation instructions at DC-DC Application Notes.						

COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-Output, tested for 1 minute and leakage current less than 1 mA	1500	--	--	VDC
Isolation Resistance	Input-Output, test at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-Output,100KHz/0.1V	--	20	--	pF
Switching Frequency	100% load, Input voltage range	--	100	300	KHz
MTBF	MIL-HDBK-217F@25℃	3500	--	--	K hours
Case Material		Plastic (UL94-V0)			
Weight		--	2.4	--	g

ENVIRONMENTAL SPECIFICATIONS

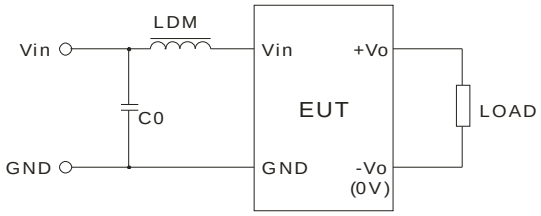
Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage Humidity	Non condensing	--	--	95	%
Operating Temperature	Power derating (above 85℃, see Figure 2)	-40	--	105	℃
Storage Temperature		-55	--	125	
Temp. rise at full load	Ta=25°C	--	25	--	
Lead Temperature	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			

EMC SPECIFICATIONS

EMI	CE		CISPR22/EN55022 CLASS B（Recommended Circuit Refer to Figure1）
	RE		CISPR22/EN55022 CLASS B（Recommended Circuit Refer to Figure1）
EMS	ESD	A_S-2WR2	IEC/EN61000-4-2 Contact ±6KV perf. Criteria B
		B_S-2WR2	IEC/EN61000-4-2 Contact ±8KV perf. Criteria B

EMC RECOMMENDED CIRCUIT

EMI Typical Recommended Circuit (CLASS B):

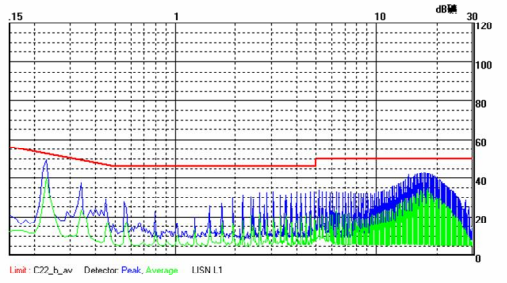


(Figure1)

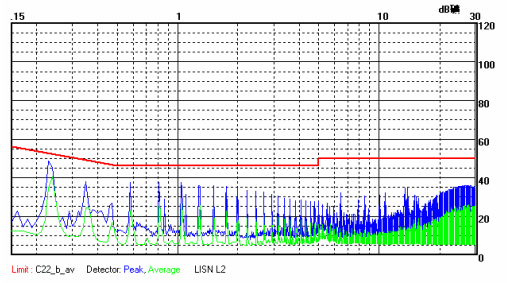
Recommended external circuit parameters:

Vin(V)		5/12/15/24
EMI	C0	4.7μF /50V
	LDM	6.8μH

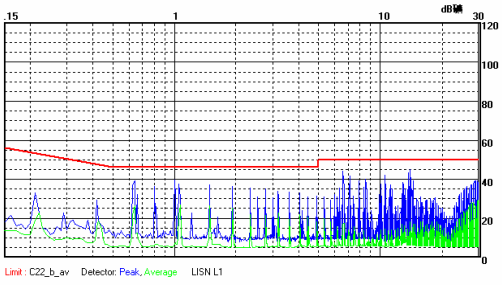
EMI TEST WAVEFORM (RECOMMENDED CIRCUIT FINGURE 1)



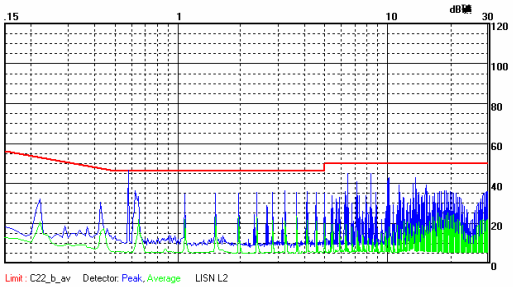
A0512S-2WR2 CE(Class B, Positive line)



A0512S-2WR2 CE(Class B , Negative line)

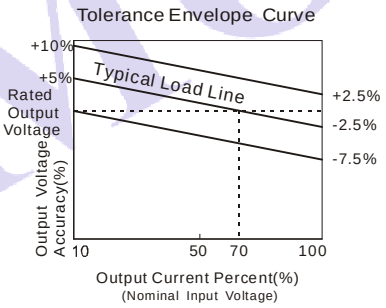


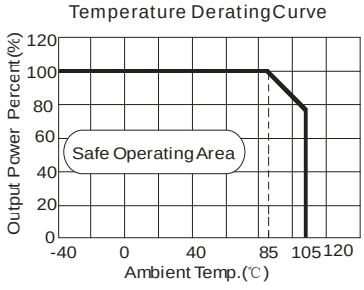
B2415S-2WR2 CE(Class B, Positive line)



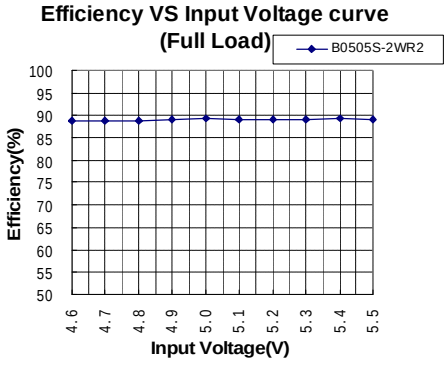
B2415S-2WR2 CE(Class B , Negative line)

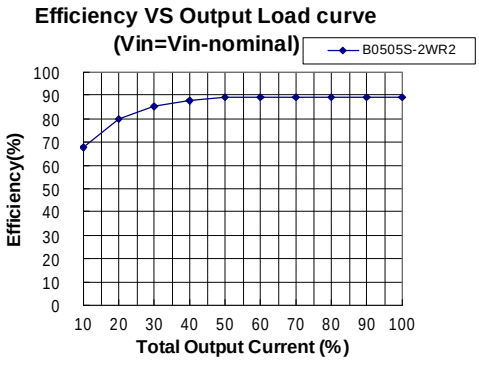
PRODUCT TYPICAL CURVE

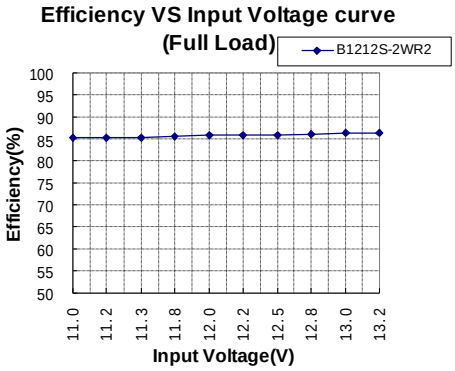


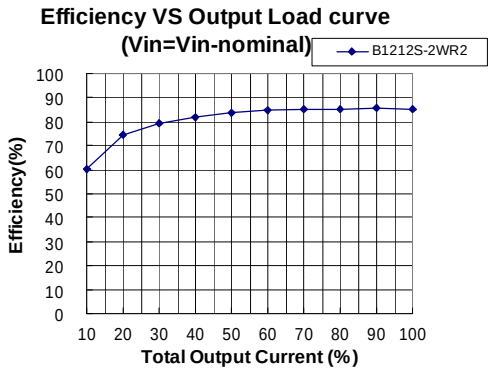


(Figure2)



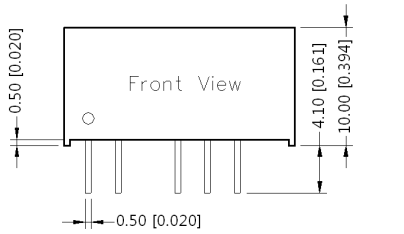


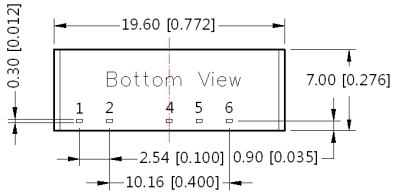




DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING

MECHANICAL DIMENSIONS



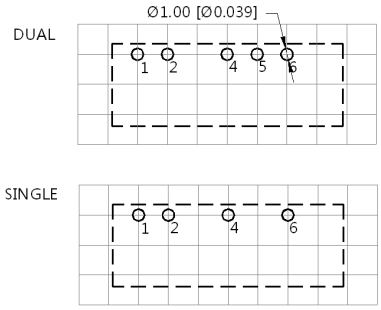


PIN CONNECTION		
Pin	Single	Dual
1	Vin	Vin
2	GND	GND
4	0V	-Vo
5	No Pin	0V
6	+Vo	+Vo

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

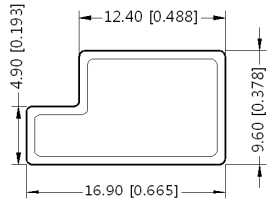
THIRD ANGLE PROJECTION

RECOMMENDED FOOTPRINT DETAILS



Note : Grid 2.54*2.54mm

TUBE PACKAGING DIMENSIONS

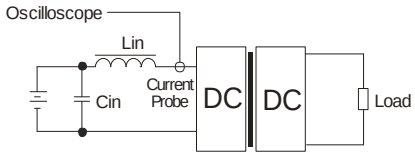


Note:
Unit :mm[inch]
General tolerances:±0.50mm[±0.020inch]
L=530[20.866] Tube Quantity:25pcs
L=220[8.661] Tube Quantity:10pcs
Inner carton(S): L*W*H=255*170*80
Outer carton(S): L*W*H=375*280*270, 6 inner cartons(S)
Inner carton(L): L*W*H=580*200*100
Outer carton(L): L*W*H=600*215*220, 2 inner cartons(L)
Outer carton(L): L*W*H=600*215*325, 3 inner cartons(L)

TEST CONFIGURATIONS

Input Reflected-Ripple Current Test Setup

Input reflected-ripple current is measured with an inductor Lin and Capacitor Cin to simulate source impedance.



Lin(4.7μH) Cin(220μF, ESR < 1.0Ω at 100 KHz)

DESIGN CONSIDERATIONS

1) Requirement on output load

To ensure this module can operate efficiently and reliably, During operation, the minimum output load is not less than 10% of the full load. If the actual output power is very small, please connect a resistor with proper resistance at the output end in parallel to increase the load, or use our company's products with a lower rated output power.

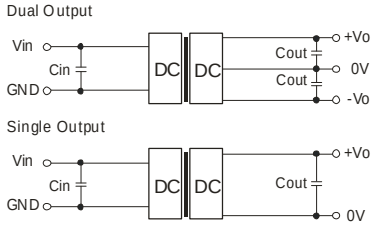
2) Overload Protection

Under normal operating conditions, the output circuit of these products has no protection against overload. The simplest method is to add a circuit breaker to the circuit.

3) Recommended Circuit

If you want to further decrease the input/output ripple, a capacitor filtering network may be connected to the input and output ends of the DC/DC converter, see (Figure 3).

It should also be noted that the capacitance of filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the recommended capacitance of its filter capacitor sees (Table 1).



(Figure 3)

EXTERNAL CAPACITOR TABLE (Table 1)

Vin (VDC)	Cin (μF)	Single Vout (VDC)	Cout (μF)	Dual Vout (VDC)	Cout# (μF)
5	4.7	3.3/5	10	±3.3/±5	4.7
12	2.2	12	2.2	±12	1
15	2.2	15/24	1	±15/±24	0.47
24	1	--	--	--	--

Note: # for each output. It's not recommended to connect any external capacitor in the application field with less than 0.5 watt output.

4) The input and the output of the product are recommended to be connected to ceramic capacitor or electrolytic capacitor. Using tantalum capacitor may cause risk of failure

5) It is not recommended to increase the output power capability by connecting two or more converters in parallel. The product is not hot-swappable

Note:

1. Operation under minimum load will not damage the converter; However, they may not meet all specifications.
2. Max. Capacitive Load is tested at nominal input voltage and full load.
3. Unless otherwise noted, All specifications are measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load.
4. In this datasheet, all test methods are based on our corporate standards.
5. All characteristics are for listed models, and non-standard models may perform differently. Please contact our technical support for more detail.
6. Please contact our technical support for any specific requirement.
7. Specifications of this product are subject to changes without prior notice.

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