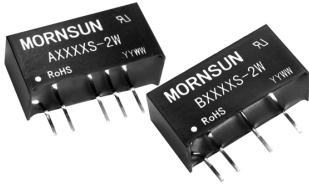


## A\_S-2W & B\_S-2W Series 2W, FIXED INPUT, ISOLATED & UNREGULATED DUAL/SINGLE OUTPUT DC-DC CONVERTER



### PRODUCT FEATURES

- High efficiency up to 86%
- 1KVDC Isolation
- SIP package
- High Power Density
- Internal SMD construction
- Temperature range: -40°C ~ +85°C
- No heat sink required
- No external component required
- Industry standard pinout
- RoHS Compliance

### APPLICATIONS

The A\_S-2W & B\_S-2W Series are specially designed for applications where a group of polar power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

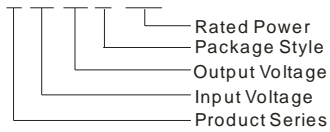
These products apply to:

- 1) Where the voltage of the input power supply is fixed (voltage variation  $\leq \pm 10\%$ );
- 2) Where isolation is necessary between input and output (isolation voltage  $\leq 1000\text{VDC}$ );
- 3) Where the regulation of the output voltage and the output ripple noise are not demanding.

Such as: purely digital circuits, ordinary low frequency analog circuits, and IGBT power device driving circuits.

### MODEL SELECTION

A0505S-2W



### PRODUCT PROGRAM

Model Number	Input Voltage(VDC) Nominal (Range)	Output Voltage (VDC)	Output Current (mA)		Input Current (mA)(typ.)		Reflected Ripple Current (mA,typ.)	Max. Capacitive Load( $\mu\text{F}$ )	Efficiency (%, typ.) @Max. Load	Approval
			Max.	Min.	@Max. Load	@No Load				
B0303S-2W	3.3(2.97-3.63)	3.3	400	40	--	--	--	220	73	
B0305S-2W	3.3(2.97-3.63)	5	400	40	749	46	32	220	78	
A0505S-2W	5 (4.5-5.5)	$\pm 5$	$\pm 200$	$\pm 20$	491	33	30	100	82	UL
A0509S-2W		$\pm 9$	$\pm 111$	$\pm 12$	466	36	22		85	UL
A0512S-2W		$\pm 12$	$\pm 83$	$\pm 9$	464	34	26		86	UL
A0515S-2W		$\pm 15$	$\pm 67$	$\pm 7$	459	19	33		82	UL
A0524S-2W		$\pm 24$	$\pm 42$	$\pm 5$	453	25	49		84	
B0503S-2W		3.3	400	40	355	35	43		220	74
B0505S-2W		5	400	40	490	44	44	81		UL CE
B0509S-2W		9	222	23	467	33	19	84		UL CE
B0512S-2W		12	167	17	463	33	20	83		UL CE
B0515S-2W		15	133	14	466	33	20	84		UL CE
B0524S-2W		24	84	10	465	34	59	82		
A1205S-2W		12 (10.8-13.2)	$\pm 5$	$\pm 200$	$\pm 20$	198	18	23	100	81
A1209S-2W	$\pm 9$		$\pm 111$	$\pm 12$	191	17	30	84		UL
A1212S-2W	$\pm 12$		$\pm 83$	$\pm 9$	188	16	20	86		UL
A1215S-2W	$\pm 15$		$\pm 67$	$\pm 7$	197	20	21	82		UL
A1224S-2W	$\pm 24$		$\pm 42$	$\pm 5$	186	12	19	84		
B1205S-2W	5		400	40	204	16	31	220		81
B1209S-2W	9		222	23	202	24	28		82	UL CE
B1212S-2W	12		167	17	190	16	22		85	UL CE
B1215S-2W	15		133	14	196	19	16		82	UL CE

Model Number	Input Voltage(VDC)	Output Voltage (VDC)	Output Current (mA)		Input Current (mA)(typ.)		Reflected Ripple Current (mA,typ.)	Max. Capacitive Load(μF)	Efficiency (% ,typ.) @Max. Load	Approval
	Nominal (Range)		Max.	Min.	@Max. Load	@No Load				
B1224S-2W	12(10.8-13.2)	24	84	10	189	15	13	220	84	
A1505S-2W	15 (13.5-16.5)	±5	±200	±20	160	15	32	100	80	
A1515S-2W		±15	±67	±7	152	14	17		82	
B1505S-2W		5	400	40	159	14	30	220	80	
B1515S-2W		15	133	14	157	15	20		80	
A2405S-2W	24 (21.6-26.4)	±5	±200	±20	100	9	42	100	80	UL
A2409S-2W		±9	±111	±12	98	9	22		84	UL
A2412S-2W		±12	±83	±9	93	7	17		84	UL
A2415S-2W		±15	±67	±7	98	9	17		84	UL
A2424S-2W		±24	±42	±5	99	10	41	220	85	
B2403S-2W		3.3	400	40	55	7	26		76	
B2405S-2W		5	400	40	102	8	21		80	UL CE
B2409S-2W		9	222	23	98	8	28		83	UL CE
B2412S-2W		12	167	17	95	7	19		84	UL CE
B2415S-2W		15	133	14	95	7	27		84	UL CE
B2424S-2W	24	84	10	96	9	21	84			

Note: Models listed with strike-through text have been officially discontinued. The A\_S\_1W/B\_LS\_1W series also are available in our company.

## INPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Units
Input Surge Voltage (1sec. max.)	3.3VDC Input Models	-0.7	--	5	VDC
	5VDC Input Models	-0.7	--	9	
	12VDC Input Models	-0.7	--	18	
	15VDC Input Models	-0.7	--	21	
	24VDC Input Models	-0.7	--	30	
Reverse Polarity Input Current*		--	--	0.4	A
Input Filter		C Filter			

Note: \*If the product reverse did not seek to limit current, may result in injury or permanent damage, testing is not recommended.

## OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Units	
Output Power		0.2	--	2	W	
Output Voltage Accuracy		See tolerance envelope graph				
Output Voltage Balance	Dual Output, Balanced Loads	--	±0.5	±1.0	%	
Line Regulation	For Vin change of ±1%	--	--	±1.2		
Load Regulation	10% to 100% load	3.3V output	--	15		20
		5V output	--	12.8		15
		9V output	--	8.3		15
		12V output	--	6.8		15
		15V output	--	6.3		15
24V output	--	5	15			
Temperature Drift	100% full load	--	--	±0.03	%/°C	
Ripple & Noise*	20MHz Bandwidth	--	75	150	mVp-p	
Short Circuit Protection**		--	--	1	s	

Note: Dual output models unbalanced load: ±5%.

\*Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

\*\*Supply voltage must be discontinued at the end of short circuit duration.

## COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Units	
Isolation Voltage	Tested for 1 minute and 1mA max	1000	--	--	VDC	
Isolation Resistance	Test at 500VDC	1000	--	--	MΩ	
Isolation Capacitance	Input/Output, 100KHz/1V	24VDC Input/Output Models	--	100	--	pF
		Other Models	--	30	--	
Switching Frequency	Full load, nominal input	--	75	--	KHz	
MTBF	MIL-HDBK-217F@25°C	3500	--	--	K hours	
Case Material		Epoxy Resin (UL94-V0)				
Weight		--	2.8	--	g	

## ENVIRONMENTAL SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Units
Storage Humidity		--	--	95	%
Operating Temperature	Power derating (above 85°C)	-40	--	85	°C
Storage Temperature		-55	--	125	
Temp. rise at full load		--	25	--	
Lead Temperature	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			

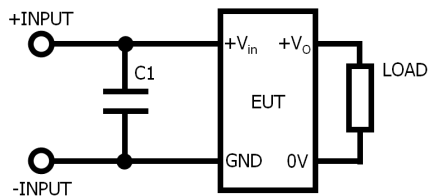
## EMC SPECIFICATIONS

EMI	CE	CISPR22/EN55022 CLASS A (External Circuit Refer to Figure1、2)
EMS	ESD	IEC/EN61000-4-2 Contact ±8KV perf. Criteria B

## EMC RECOMMENDED CIRCUIT

### B\_S-2W Series

EMI Recommended External Circuit (CLASS A):



(Figure 1)

Recommended external circuit parameters:

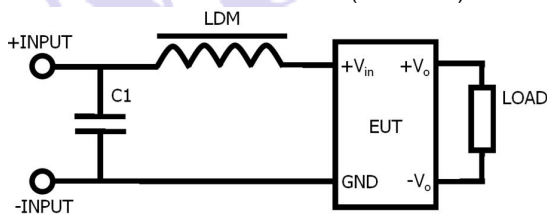
Vin: 5V/15V

C1: 2.2μF/50V 1210

Remarks: Product bare input of 12V、24V can be tested by the CLASS A.

### A\_S-2W Series

EMI Recommended External Circuit (CLASS A):



(Figure 2)

Recommended external circuit parameters:

①Vin: 5V

C1: 4.7μF/50V 1210

LDM: 4.7μH

②Vin: 12V

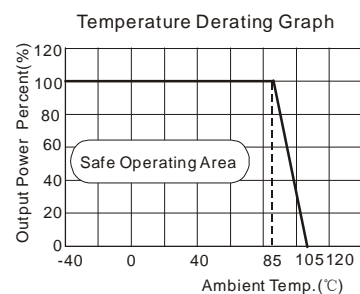
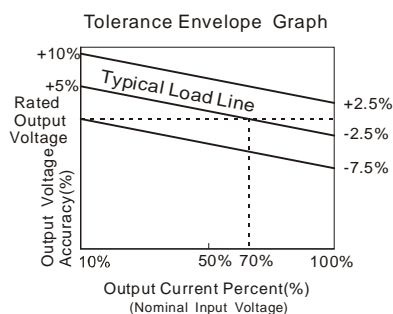
C1: 4.7μF/50V 1210

③Vin: 15V

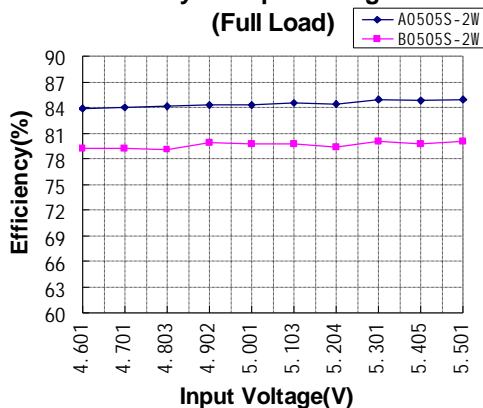
C1: 2.2μF/50V 1210

Remarks: Product bare input of 3.3V、24V can be tested by the CLASS A.

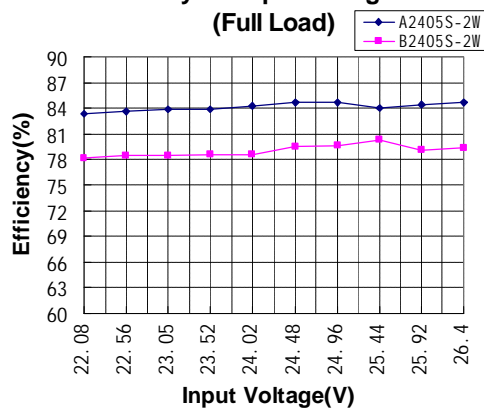
## PRODUCT TYPICAL CURVE



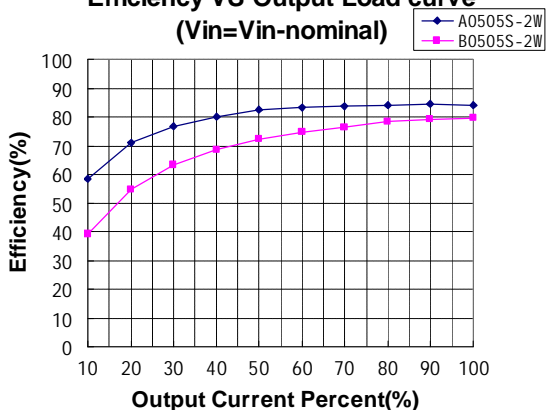
Efficiency VS Input Voltage curve



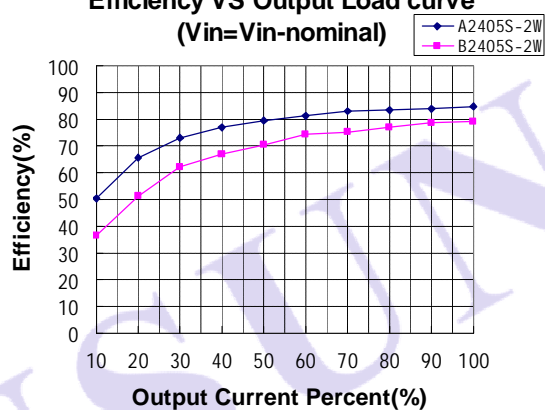
Efficiency VS Input Voltage curve



Efficiency VS Output Load curve (Vin=Vin-nominal)



Efficiency VS Output Load curve (Vin=Vin-nominal)



**OUTLINE DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING**

**MECHANICAL DIMENSIONS**

(Top View) 19.60[0.772] x 7.00[0.276]

(Front View) 10.00[0.394] x 4.10[0.161]

(Bottom View) 0.90[0.035] x 7.62[0.300] x 12.70[0.500]

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

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

**RECOMMENDED FOOTPRINT**

**DUAL OUTPUT**

19.60[0.772] x 7.62[0.300] x 12.70[0.500]

0.90[0.035] x 0.70[0.028]

**SINGLE OUTPUT**

Note: Grid 2.54\*2.54mm.

**TUBE OUTLINE DIMENSIONS**

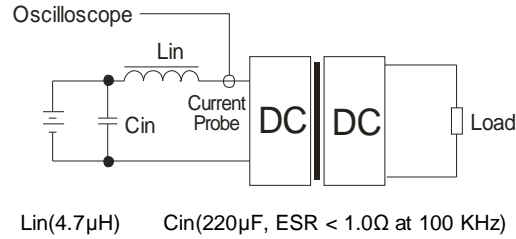
9.40[0.370] x 16.70[0.657] x 4.70[0.185]

Note:  
Unit :mm[inch]  
General tolerances: ± 0.50mm[± 0.020inch]  
L=530mm[20.866inch] Tube Quantity: 25pcs  
L=220mm[8.661inch] Tube Quantity: 10pcs  
Short tube inner packaging dimensions: L\*W\*H=255\*170\*80mm  
Short tube outer packaging dimensions(with six inner packaging boxes): L\*W\*H=375\*280\*270mm  
Long tube inner packaging dimensions: L\*W\*H=580\*200\*100mm  
Long tube outer packaging dimensions(with two inner packaging boxes): L\*W\*H=600\*215\*220mm  
Long tube outer packaging dimensions(with two inner packaging boxes): L\*W\*H=600\*215\*325mm

## TEST CONFIGURATIONS

### Input Reflected-Ripple Current Test Setup

Input reflected-ripple current is measured with an inductor  $L_{in}$  and  $C_{in}$  to simulate source impedance.



## DESIGN & APPLY CONSIDERATIONS

### 1) Requirement on output load

To ensure this module can operate efficiently and reliably, During operation, the minimum output load **could not be 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 (A\_S-1W / B\_LS-1W Series).

### 2) Overload Protection

Under normal operating conditions, the output circuit of these products has no protection against overload. The simplest method is to connect a self-recovery fuse in series at the input end or add a circuit breaker to the circuit.

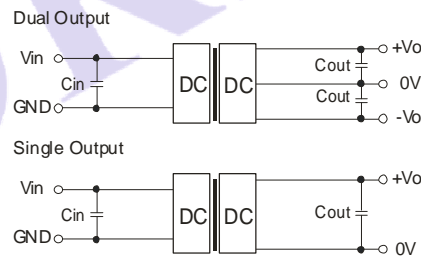
#### Input Fuse Selection Guide

3.3VDC Input Models	500mA slow-Blow Type	15VDC Input Models	100mA slow-Blow Type
5VDC Input Models	500mA slow-Blow Type	24VDC Input Models	100mA slow-Blow Type
12VDC Input Models	200mA slow-Blow Type		

### 3) Recommended circuit

If you want to further decrease the input/output ripple, an 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)

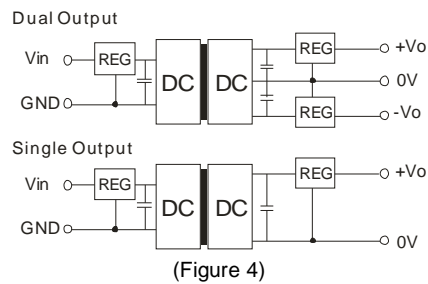
EXTERNAL CAPACITOR TABLE (TABLE 1)

$V_{in}$ (VDC)	$C_{in}$ ( $\mu F$ )	Single $V_{out}$ (VDC)	$C_{out}$ ( $\mu F$ )	Dual $V_{out}$ (VDC)	$C_{out}$ ( $\mu F$ )
3.3/5	4.7	3.3/5	10	$\pm 5$	4.7
12	2.2	9	4.7	$\pm 9$	2.2
15	2.2	12	2.2	$\pm 12$	1
24	1	15	1	$\pm 15$	0.47
--	--	24	1	$\pm 24$	0.47

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

### 4) Output Voltage Regulation and Over-voltage Protection Circuit

The simplest device for output voltage regulation, over-voltage and over-current protection is a linear regulator and an capacitor filtering network with overheat protection that is connected to the input or output end in series (Figure 4), the recommended capacitance of its filter capacitor sees (Table 1), linear regulator based on the actual voltage and current to reasonable selection.



**5) No parallel connection or plug and play**

**Note:**

1. Operation under minimum load will not damage the converter; However, they may not meet all specification listed, and that will reduce the life of product.
2. All specifications measured at  $T_a=25^{\circ}\text{C}$ , humidity<75%, nominal input voltage and rated output load unless otherwise specified.
3. In this datasheet, all the test methods of indications are based on corporate standards.
4. Only typical models listed, other models may be different, please contact our technical person for more details.
5. Our company offer custom products.
6. Specifications subject to change without notice.

**MORNSUN Science & Technology Co.,Ltd.**

Address: No. 5, Kehui St. 1, Kehui development center, Science Ave., Guangzhou Science City, Luogang district, Guangzhou,P.R.China.

Tel: 86-20-28203030

Fax:86-20-28203068

[Http://www.mornsun-power.com](http://www.mornsun-power.com)