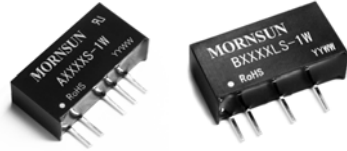


MORNSUN®

A_S-1W & B_LS-1W Series 1W, FIXED INPUT, ISOLATED & UNREGULATED DUAL/SINGLE OUTPUT DC-DC CONVERTER



FEATURES

- Efficiency up to 84%
- Small Size
- Low Temperature Rise
- 1KVDC Isolation
- Operating Temperature Range: -40°C ~ +85°C
- No External Component Required
- Industry Standard Pinout

APPLICATIONS

The A_S-1W & B_LS-1W Series are designed for application where isolated output is required from a distributed power system.

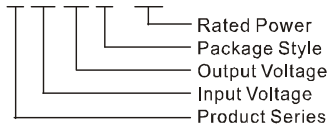
These products apply to where:

- 1) Input voltage variation $\leq \pm 10\%$;
- 2) 1KVDC input and output isolation;
- 3) Regulated and low ripple noise is not required.

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

PART NUMBER SYSTEM

A0505S-1W



SELECTION GUIDE

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# (μF)	Efficiency (%, typ.) @Max. Load	Approval
			Max.	Min.	@Max. Load	@No Load				
B0303LS-1W	3.3 (3.0-3.6)	3.3	303	31	417	42	14	220	72	
B0305LS-1W		5	200	20	392				74	
A0505S-1W	5 (4.5-5.5)	±5	±100	±10	273	33	20	100	72	UL
A0509S-1W		±9	±56	±6	268				77	UL
A0512S-1W		±12	±42	±5	253				79	UL
A0515S-1W		±15	±33	±4	229				80	UL
A0524S-1W		±24	±21	±3	241				82	
B0503LS-1W		3.3	303	31	271				35	21
B0505LS-1W	5	200	20	273	70	UL CE				
B0506LS-1W	6	167	16	267	70					
B0507LS-1W	7.2	139	14	264	72					
B0509LS-1W	9	111	12	252	78	UL CE				
B0512LS-1W	12	83	9	250	78	UL CE				
B0515LS-1W	15	67	7	248	80	UL CE				
B0524LS-1W	24	42	5	237	81					
A1205S-1W	12 (10.8-13.2)	±5	±100	±10	114	17	15	100	72	UL
A1209S-1W		±9	±56	±6	109				78	UL
A1212S-1W		±12	±42	±5	105				79	UL
A1215S-1W		±15	±33	±4	105				78	UL
B1203LS-1W	12 (10.8-13.2)	3.3	303	31	112	14	22	220	74	
B1205LS-1W		5	200	20	116				71	UL CE
B1209LS-1W		9	111	12	107				76	UL CE
B1212LS-1W		12	83	9	101				78	UL CE
B1215LS-1W		15	67	7	101				79	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				
B1224LS-1W	12(10.8-13.2)	24	42	5	97	14	22	220	84	
A1505S-1W	15 (13.5-16.5)	±5	±100	±10	95	15	22	100	72	
A1512S-1W		±12	±42	±5	84				76	
A1515S-1W		±15	±33	±4	88				79	
B1505LS-1W		5	200	20	94	14	24	220	72	
B1512LS-1W		12	83	9	85				76	
B1515LS-1W		15	67	7	84				75	
A2405S-1W	24 (21.6-26.4)	±5	±100	±10	56	8	43	100	73	UL
A2409S-1W		±9	±56	±6	53				79	UL
A2412S-1W		±12	±42	±5	52				80	UL
A2415S-1W		±15	±33	±4	51				80	UL
A2424S-1W		±24	±21	±3	51	7	53	220	81	
B2405LS-1W		5	200	20	56				73	UL CE
B2409LS-1W		9	111	12	52				78	UL CE
B2412LS-1W		12	83	9	51				78	UL CE
B2415LS-1W		15	67	7	50				79	UL CE
B2424LS-1W		24	42	4	50				78	

Note: 1. [#] For each output.
2. The A_S-W25/B_LS-W25 series also are available in our company.

INPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (1 sec. max.)	3.3VDC input	-0.7	--	5	VDC
	5VDC input	-0.7	--	9	
	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 Power		0.1	--	1	W	
Output Voltage Accuracy		See tolerance envelope curve				
Output Voltage Balance	Dual Output, Balanced Loads	--	±0.5	±1	%	
Line Regulation	For Vin change of ±1%	--	--	±1.2		
Load Regulation	10% to 100% load	3.3VDC output	--	12		20
		5V/6V/7.2VDC output	--	10.5		15
		9VDC output	--	8.3		15
		12VDC output	--	6.8		15
		15VDC output	--	6.3		15
24VDC output	--	5	15			
Temperature Drift	100% full load	--	--	±0.03	%/°C	
Ripple & Noise*	20MHz Bandwidth	AXXXXS-1W	--	50	75	mVp-p
		AXX24S-1W	--	100	150	
		BXXXXLS-1W	--	75	100	
		BXX24LS-1W	--	100	150	
Short Circuit Protection**		--	--	1	s	

Note: 1. Dual output models unbalanced load: ±5%.
2. *Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.
3. **Supply voltage must be discontinued at the end of short circuit duration.

COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Tested for 1 minute and leakage current less than 1 mA	1000	--	--	VDC
Isolation Resistance	Test at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input/Output, 100KHz/1V	A2424S-1W, B2424LS-1W		--	pF
		Others		--	
Switching Frequency	Full load, nominal input	--	100	--	KHz
MTBF	MIL-HDBK-217F@25°C	3500	--	--	K hours
Case Material	Plastic(UL94-V0)				
Weight		--	2.1	--	g

ENVIRONMENTAL SPECIFICATIONS

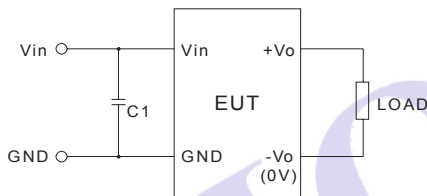
Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage Humidity	Non condensing	--	--	95	%
Operating Temperature	Power derating (above 85°C)	-40	--	85	°C
Storage Temperature		-55	--	125	
Temp. rise at full load		--	25	--	
Lead Temperature	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			

EMC SPECIFICATIONS

EMI	CE	CISPR22/EN55022	CLASS A (External Circuit Refer to Figure1)		
EMS	ESD	AxxxxS-1W Series	IEC/EN61000-4-2	Contact ±6KV	perf. Criteria B
		BxxxxLS-1W Series	IEC/EN61000-4-2	Contact ±8KV	perf. Criteria B

EMC RECOMMENDED CIRCUIT

EMI Recommended External Circuit:



(Figure 1)

A_S-1W Series

Recommended external circuit parameters:

Vin: 5V
 C1: 4.7μF/50V
 Vin: 24V
 C1: 1μF/50V
 Remarks: Product bare input of 12V、15V already meet CLASS A.

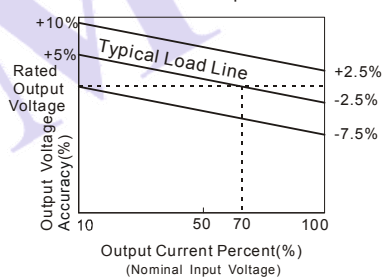
B_LS-1W Series

Recommended external circuit parameters:

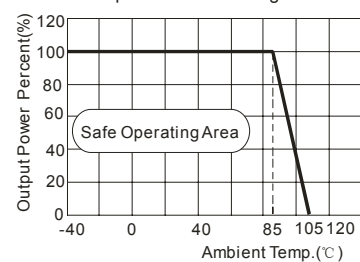
Vin: 3.3V
 C1: 4.7μF/50V
 Vin: 5V/12V/15V/24V
 C1: 1μF/50V
 Remarks: Product bare input of 3.3V、5V、12V already meet CLASS A, increase the capacitor margin increase.

PRODUCT TYPICAL CURVE

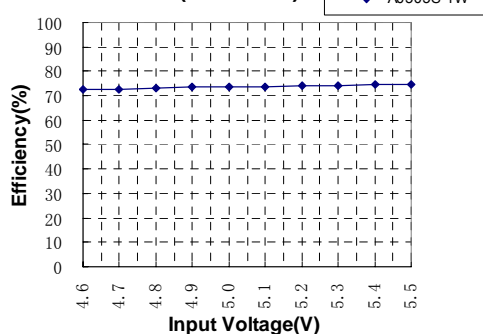
Tolerance Envelope Curve



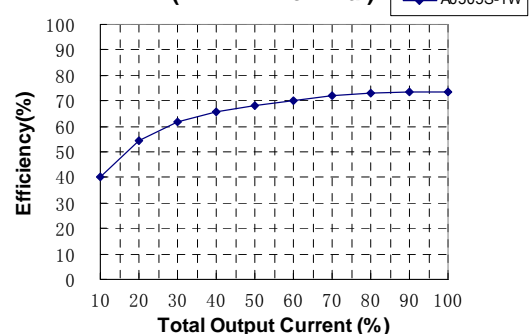
Temperature Derating Curve



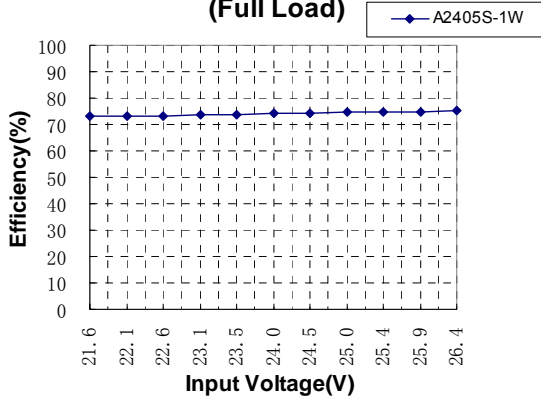
Efficiency VS Input Voltage curve (Full Load)



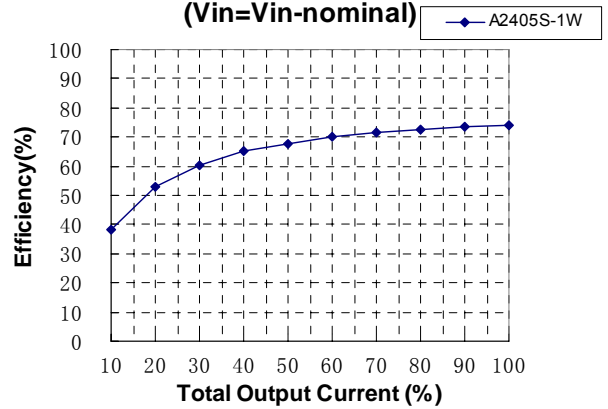
Efficiency VS Output Load curve (Vin=Vin-nominal)



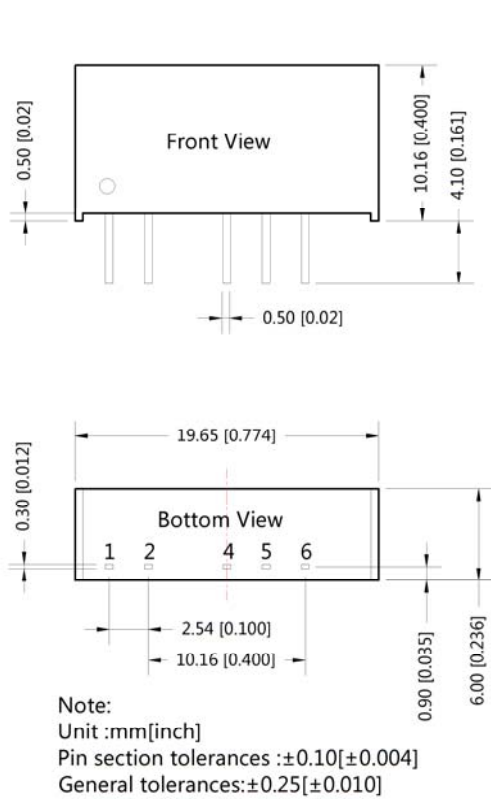
Efficiency VS Input Voltage curve (Full Load)



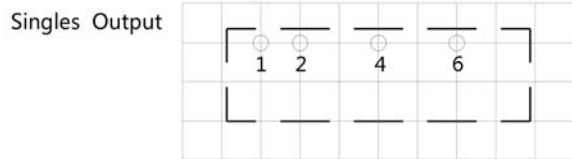
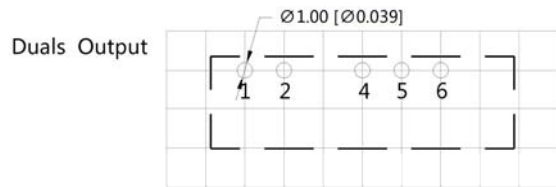
Efficiency VS Output Load curve (Vin=Vin-nominal)



OUTLINE DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING



THIRD ANGLE PROJECTION



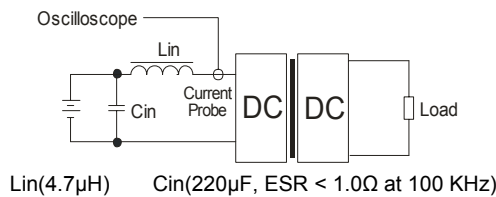
Note : Grid 2.54*2.54mm

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

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.



DESIGN 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 -W25/B_LS-W25 series).

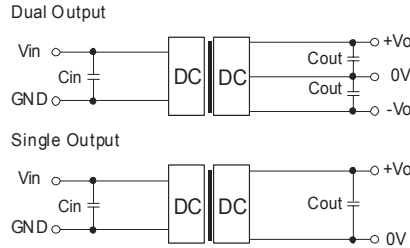
2) Overload Protection

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

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 2).

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 2)

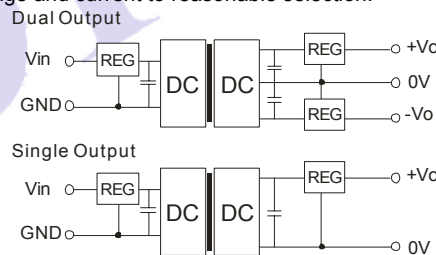
EXTERNAL CAPACITOR TABLE (TABLE 1)

Vin (VDC)	Cin (μF)	Single Vout (VDC)	Cout (μF)	Dual Vout (VDC)	Cout [#] (μF)
3.3/5	4.7	3.3/5/6	10	±5	4.7
12	2.2	7.2/9	4.7	±9	2.2
15	2.2	12	2.2	±12	1
24	1	15	1	±15	0.47
-	-	24	1	±24	0.47

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) 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 3), the recommended capacitance of its filter capacitor sees (Table 1), linear regulator based on the actual voltage and current to reasonable selection.



(Figure 3)

5) Cannot use in parallel and hot swap

Note:

1. Operation under minimum load will not damage the converter; However, they may not meet all specification listed.
2. Max. Capacitive Load tested at input voltage range and full load.
3. All date in the datasheet are measured according to nominal input voltage, rated output load, TA=25°C, humidity<75%, unless otherwise specified.
4. In this datasheet, all the test methods of indications are based on our corporate standards.
5. The performance in the datasheet is just fit for the part number in the selection guide, and may be different from the customer-designed product, you can get more details from MORNSUN FAE.
6. Contact us for your specific requirement.
7. Specifications subject to change without prior notice.

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