MORNSUN

Industrial AC/DC Power Modules

A_M-1W & B_LM-1W Series

1W, FIXED INPUT, ISOLATED & UNREGULATED
DUAL/SINGLE OUTPUT,SUPERMINIATURE SIP PACKAGE

multi-country patent protection **RoHS**

FEATURES

Efficiency up to 80%
Miniature SIP Package Style
Temperature Range: -40°C to+85°C
Internal SMD Construction
Industry Standard Pinout
No Heat sink Required
No External Component Required
RoHS Compliance

APPLICATIONS

The A_M-1W & B_LM-1W 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 ≤ ±10%);
2) Where isolation is necessary between input and output (isolation voltage ≤1000VDC);
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

B0505LM-1W

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

PRODUCT PROGRAM

Part Number	Input		Output			Efficiency (%, Typ)
	Voltage (VDC)		Voltage (VDC)	Current (mA)		
	Nominal	Range		Max	Min	
A0505M-1W	5	4.5-5.5	±5	±100	±10	70
A0509M-1W			±9	±56	±6	75
A0512M-1W			±12	±42	±5	78
A0515M-1W			±15	±33	±4	79
A1205M-1W	12	10.8-13.2	±5	±100	±10	72
A1209M-1W			±9	±56	±6	75
A1212M-1W			±12	±42	±5	77
A1215M-1W			±15	±33	±4	79
B0505LM-1W	5	4.5-5.5	5	200	20	70
B0509LM-1W			9	111	12	75
B0512LM-1W			12	83	9	79
B0515LM-1W			15	67	7	80
B1205LM-1W	12	10.8-13.2	5	200	20	72
B1209LM-1W			9	111	12	75
B1212LM-1W			12	83	9	77
B1215LM-1W			15	67	7	79
B2405LM-1W	24	21.6-26.4	5	200	20	70
B2409LM-1W			9	111	12	73
B2412LM-1W			12	83	9	75
B2415LM-1W			15	67	7	78
B2424LM-1W			24	42	5	77

ISOLATION 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

OUTPUT SPECIFICATION

Item	Test Conditions	Min	Typ	Max	Units
Output power		0.1		1	W
Line regulation	For Vin change of 1%			1.2	%
Load regulation	10% to 100% full load(5V output)		10	15	
	10% to 100% full load(9V output)		8.3	10	
	10% to 100% full load(12V output)		6.8	10	
	10% to 100% full load(15V output)		6.3	10	
	10% to 100% full load(24V output)		5	10	
Temperature drift	100% full load			0.03	%/°C
Output voltage accuracy		See tolerance envelope graph			
Ripple & Noise*	20MHz Bandwidth(AXXXXM-1W)		50	75	mVp-p
	20MHz Bandwidth(BXXXXLM-1W)		75	100	
Switching frequency	100% load, nominal input(5V,12V)		100		KHz
	100% load, nominal input(24V)		500		

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

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COMMON SPECIFICATION

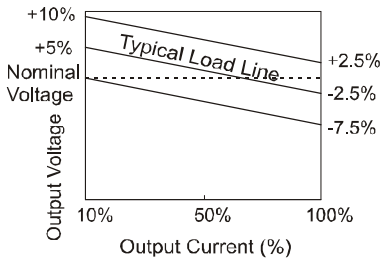
Item	Test Conditions	Min	Typ	Max	Units
Storage humidity				95	%
Operating temperature		-40		85	°C
Storage temperature		-55		125	
Lead temperature			15	25	
Temp. rise at full load	1.5mm from case for 10 seconds			300	
Cooling		Free air convection			
Case material		Plastic(UL94-V0)			
Short circuit protection*				1	S
MTBF		3500			K hours
Weight			2.1		g
*Supply voltage must be discontinued at the end of short circuit duration.					

Note:

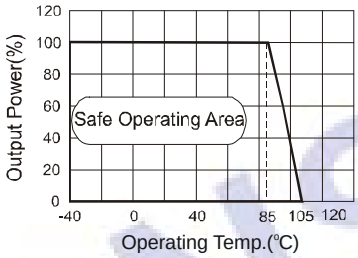
1.All specifications measured at TA=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
2. See below recommended circuits for more details.

TYPICAL CHARACTERISTICS

Tolerance Envelope Graph

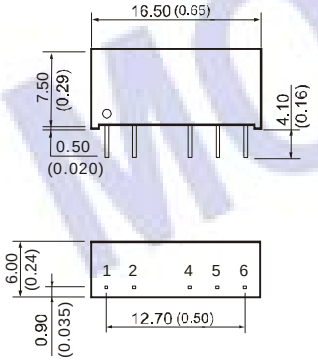


Temperature Derating Graph

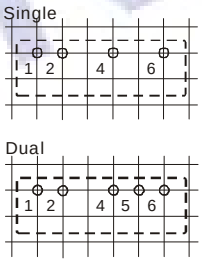


OUTLINE DIMENSIONS & PIN CONNECTIONS

First Angle Projection



RECOMMENDED FOOTPRINT
*Top view,grid:2.54*2.54mm(0.1*0.1inch), diameter:1.00mm(0.039inch)*



FOOTPRINT DETAILS

Pin	Single	Dual
1	Vin	Vin
2	GND	GND
4	0V	-Vo
5	NC	0V
6	+Vo	+Vo

Note:
Unit:mm(inch)
Pin section:0.50*0.30mm(0.020*0.012inch)
Pin tolerances:±0.10mm(±0.004inch)
General tolerances:±0.25mm(±0.010inch)

APPLICATION NOTE

Requirement on output load

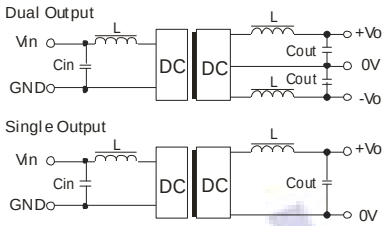
To ensure this module can operate efficiently and reliably, During operation, the minimum output load is ***not less than 10%*** of the full load, and that ***this product should never be operated under no load!*** If the actual output power is very small, please connect a resistor with proper resistance at the output end in parallel to increase the load, or use our company's products with a lower rated output power (A_M –W2/B_LM-W2 series).

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.

Recommended testing and application circuit

If you want to further decrease the input/output ripple, an "LC" filtering network may be connected to the input and output ends of the DC/DC converter, see (Figure 1).



(Figure 1)

It should also be noted that the inductance and the frequency of the "LC" filtering network should be staggered with the DC/DC frequency to avoid mutual interference. However, the capacitance of the output 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).

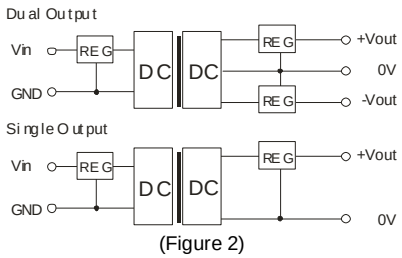
EXTERNAL CAPACITOR TABLE (Table 1)

Vin (VDC)	Cin (uF)	Single Vout (VDC)	Cout (uF)	Dual Vout (VDC)	Cout (uF)
5	4.7	5	10	±5	4.7
12	2.2	9	4.7	±9	2.2
24	1	12	2.2	±12	1
-	-	15	1	±15	0.47

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

Output Voltage Regulation and Over-voltage Protection Circuit

The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with overheat protection that is connected to the input or output end in series (Figure 2).



(Figure 2)

No parallel connection or plug and play.