

MB-1W Series



1W 2:1 Regulated Single & Dual output

Features

- 6 Pins SIL Package
- Wide 2:1 Input Range
- 1500VDC Isolation
- Fully regulated output
- No minimum load required
- Continuous Short Circuit Protection
- Efficiency up to 81%
- Low Ripple and Noise
- -40°C ~ +85°C Operating Temperature Range



The MB-1W series is a family of cost effective 1W single & dual output DC-DC converters. These converters are consisted with Non-conductive Black Plastic in a 6-pin SIL package with high performance features such as 1500VDC input/output isolation voltage, continuous short circuit protection with automatic restart and tight line / load regulation. Devices are encapsulated using flame retardant resin. Input voltages of 5, 12, 24 and 48 with output voltage of 5, 12, 15, 24, ± 12 and ± 15 Vdc. High performance features include high efficiency operation up to 81% and output voltage accuracy of $\pm 2\%$ maximum.

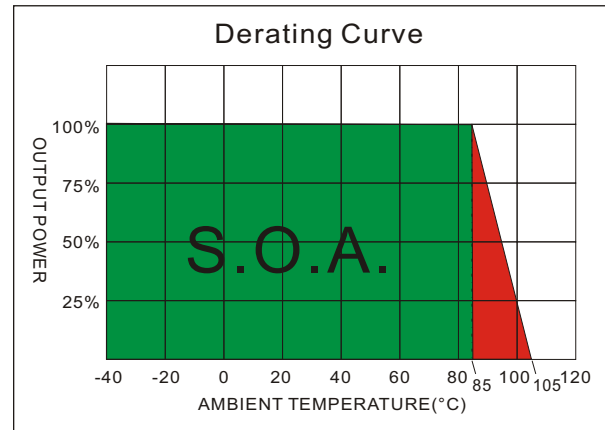
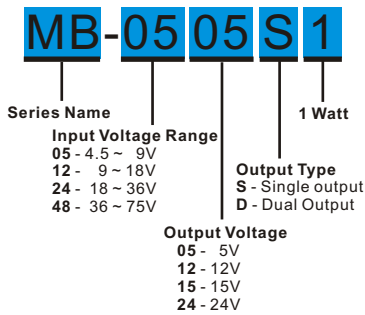
All specifications typical at Ta=25°C, nominal input voltage and full load unless otherwise specified.

OUTPUT SPECIFICATIONS		PHYSICAL SPECIFICATIONS	
Output Voltage Accuracy	$\pm 2\%$, max.	Case Material	Non-conductive Black Plastic(UL94V-0 rated)
Output Current	See table, max.	Pin Material	C5191R-H Solder-coated
Line Regulation	$\pm 0.2\%$, max.	Potting Material	Epoxy (UL94V-0 rated)
Load Regulation (Single Output)(0% to 100%)	$\pm 1.0\%$, max.	Weight	3.0g
(Dual Output)(0% to 100%)	$\pm 2.0\%$, max.	Dimensions	0.67"x0.30"x0.43"
(Dual Output)(5% to 100%)	$\pm 1.0\%$, max.		
Cross Regulation (Dual Output) (1)	$\pm 5\%$, max.	ENVIRONMENT SPECIFICATIONS	
Ripple&Noise (20 MHz bandwidth) (2)	50mVpk-pk, max.	Operating Temperature	-40°C ~ +85°C(See Derating Curve)
Short Circuit Protection	Continuous(Automatic Recovery)	Maximum Case Temperature	105°C
Temperature Coefficient	$\pm 0.02\%/^{\circ}\text{C}$	Storage Temperature	-55°C~125°C
Capacitive Load (3)	See table, max.	Cooling	Nature Convection
Transient Recovery Time (4)	500 μs , typ.	ABSOLUTE MAXIMUM RATINGS(6)	
Transient Response Deviation (4)	$\pm 3\%$, max.	These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.	
		Input Surge Voltage (1000mS)	
		05 Models	15Vdc, max.
		12 Models	25Vdc, max.
		24 Models	50Vdc, max.
		48 Models	100Vdc, max.
		Soldering Temperature	260°C, max.
		(1.5mm from case 10sec max.)	
INPUT SPECIFICATIONS		EMC SPECIFICATIONS	
Input Voltage Range	See table.	Radiated Emissions	EN55032 CLASS A
Input Filter	Capacitors	Conducted Emissions (7)	EN55032 CLASS A
Input Current (No-Load)	See table, max.	ESD	IEC 61000-4-2 Perf. Criteria A
Input Current (Full-Load)	See table, typ.	RS	IEC 61000-4-3 Perf. Criteria A
Input Reflected Ripple Current (5)	35mApk-pk, typ.	EFT (8)	IEC 61000-4-4 Perf. Criteria A
		Surge (8)	IEC 61000-4-5 Perf. Criteria A
		CS	IEC 61000-4-6 Perf. Criteria A
		PFMF	IEC 61000-4-8 Perf. Criteria A
GENERAL SPECIFICATIONS			
Efficiency	See table, typ.		
I/O Isolation Voltage (60sec)	1500Vdc		
I/O Isolation Capacitance	70pF, typ.		
I/O Isolation Resistance	1000M Ω , min.		
Switching Frequency	150~550KHz		
Humidity	95% rel H		
Reliability Calculated MTBF (MIL-HDBK-217 F)	> 2.8 Mhrs		
Safety Standard	UL/cUL 60950-1 , IEC/EN 60950-1		
Safety Approvals	UL/cUL 60950-1 , IEC/EN 60950-1		

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PART NUMBER STRUCTURE



MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current		EFFICIENCY @FL (% , typ.)	Capacitor Load @FL (µF, max.)
		No-Load (mA, max.)	Full Load (mA, typ.)		Min. load (mA)	Full load (mA)		
MB-0505S1	4.5 - 9	35	263	5	0	200	76	1680
MB-0512S1	4.5 - 9	35	253	12	0	83	79	820
MB-0515S1	4.5 - 9	35	250	15	0	67	80	680
MB-0524S1	4.5 - 9	35	250	24	0	42	80	470
MB-1205S1	9 - 18	20	107	5	0	200	78	1680
MB-1212S1	9 - 18	20	105	12	0	83	80	820
MB-1215S1	9 - 18	20	103	15	0	67	81	680
MB-1224S1	9 - 18	20	105	24	0	42	80	470
MB-2405S1	18 - 36	10	54	5	0	200	78	1680
MB-2412S1	18 - 36	10	52	12	0	83	80	820
MB-2415S1	18 - 36	10	52	15	0	67	80	680
MB-2424S1	18 - 36	10	52	24	0	42	81	470
MB-4805S1	36 - 75	7	28	5	0	200	76	1680
MB-4812S1	36 - 75	7	27	12	0	83	78	820
MB-4815S1	36 - 75	7	27	15	0	67	78	680
MB-4824S1	36 - 75	7	27	24	0	42	77	470
MB-0512D1	4.5 - 9	35	259	±12	0	±42	77	±470
MB-0515D1	4.5 - 9	35	254	±15	0	±33	79	±330
MB-1212D1	9 - 18	20	106	±12	0	±42	79	±470
MB-1215D1	9 - 18	20	105	±15	0	±33	80	±330
MB-2412D1	18 - 36	10	52	±12	0	±42	80	±470
MB-2415D1	18 - 36	10	53	±15	0	±33	79	±330
MB-4812D1	36 - 75	7	27	±12	0	±42	77	±470
MB-4815D1	36 - 75	7	27	±15	0	±33	77	±330

NOTE

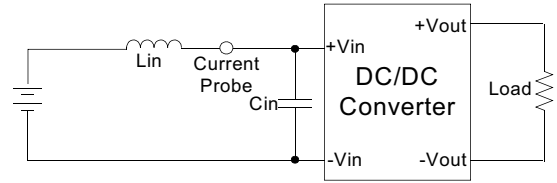
- One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
- Ripple/Noise measured with a 1µF ceramic capacitor.
- Tested by minimal Vin and constant resistive load.
- Tested by normal Vin and 25% load step change (75%-50%-25% of Io).
- Measured Input reflected ripple current with a simulated source inductance of 12µH.
- Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.
- Input filter components are be required to help meet conducted emission class A, which application refer to The EMI Filter of Design & feature configuration.
- An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5.
The filter capacitor Motien suggest: 5Vin models : Nippon - chemi - con KY series, 330µF/100V.
Other models : Nippon - chemi - con KY series, 220µF/100V.

The models listed above is just for standard type. If you need the special specification product, please contact our service member by telephone presented in shortform cover or e-mail to : sales@motien.com.tw

TEST CONFIGURATIONS

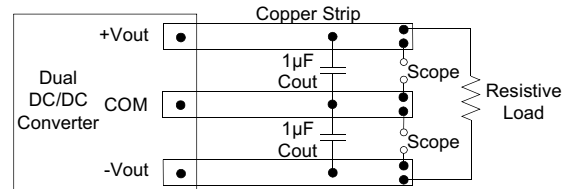
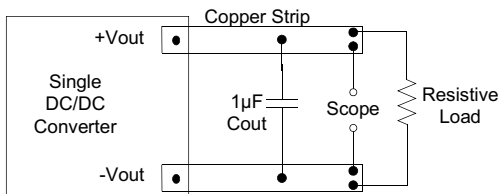
Input Reflected Ripple Current Test Step

Input reflected ripple current is measured through a source inductor L_{in} ($12\mu\text{H}$) and a source capacitor C_{in} ($47\mu\text{F}$, $\text{ESR} < 1.0\Omega$ at 100KHz) at nominal input and full load.



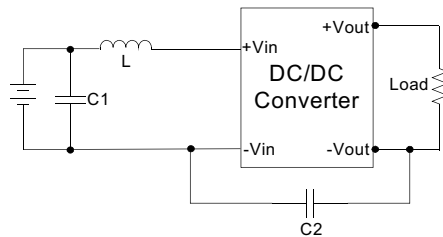
Output Ripple & Noise Measurement Test

Use a capacitor C_{out} ($1.0\mu\text{F}$) measurement. The Scope measurement bandwidth is 20MHz .

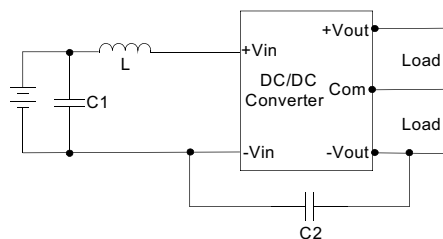


EMI Filter

Input filter components (C_1, C_2, L) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



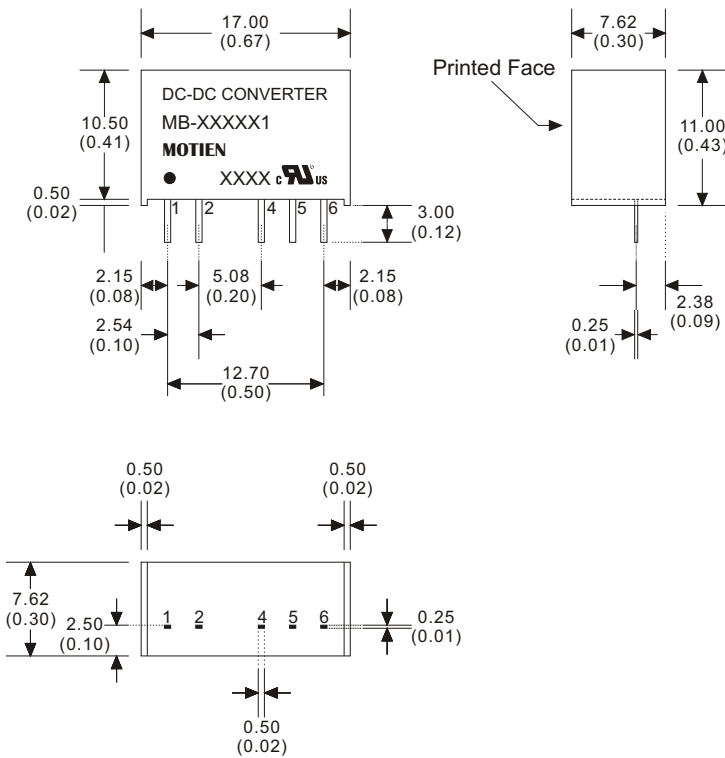
	C1	C2	L
MB-05XXS1	MLCC 4.7µF/50V	MLCC 220pF/3KV	4.7µH
MB-12XXS1	MLCC 4.7µF/50V	MLCC 220pF/3KV	4.7µH
MB-24XXS1	MLCC 4.7µF/50V	MLCC 220pF/3KV	18 µH
MB-48XXS1	MLCC 4.7µF/100V	MLCC 220pF/3KV	18 µH



	C1	C2	L
MB-05XXD1	MLCC 4.7µF/50V	MLCC 220pF/3KV	4.7µH
MB-12XXD1	MLCC 4.7µF/50V	MLCC 220pF/3KV	4.7µH
MB-24XXD1	MLCC 4.7µF/50V	MLCC 220pF/3KV	18 µH
MB-48XXD1	MLCC 4.7µF/100V	MLCC 220pF/3KV	18 µH

The models listed above is just for standard type. If you need the special specification product, please contact our service member by telephone presented in shortform cover or e-mail to : sales@motien.com.tw

MECHANICAL SPECIFICATIONS



PIN CONNECTIONS		
PIN NUMBER	SINGLE	DUAL
1	-V Input	-V Input
2	+V Input	+V Input
4	+V Output	+V Output
5	N.P.	Common
6	-V Output	-V Output

6 Pin SIL Package

- Notes : All dimensions are typical in millimeters (inches).
1. Pin diameter: 0.5 ± 0.05 (0.02 ± 0.002)
 2. Pin pitch and length tolerance: ± 0.35 (± 0.014)
 3. Pin to case tolerance: ± 0.5 (± 0.02)
 4. Case Tolerance: ± 0.5 (± 0.02)