

MB-1W Series

1W 2:1 Regulated Single & Dual output



electronic powersolutions

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

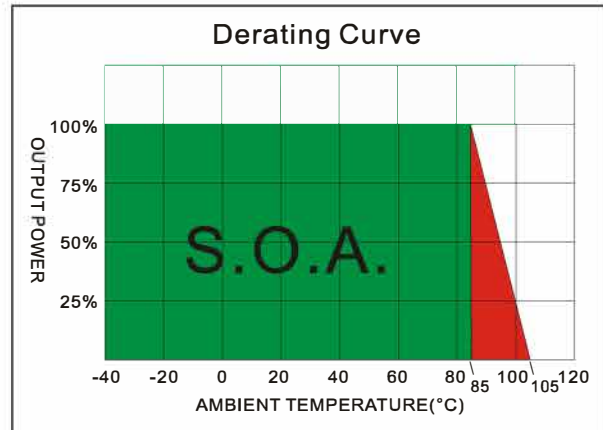
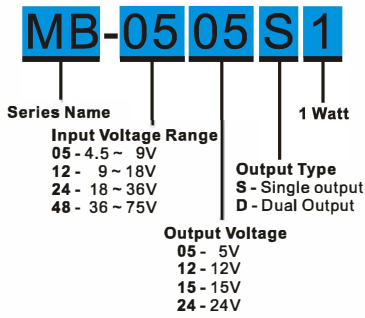


FC CE cULus CB

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 SPECIFICATIONS		Input Surge Voltage (1000mS)	
Input Voltage Range	See table.	05 Models	15Vdc, max.
Input Filter	Capacitors	12 Models	25Vdc, max.
Input Current (No-Load)	See table, max.	24 Models	50Vdc, max.
Input Current (Full-Load)	See table, typ.	48 Models	100Vdc, max.
Input Reflected Ripple Current (5)	35mA _{pk-pk} , typ.	Soldering Temperature	260°C, max.
		(1.5mm from case 10sec max.)	
GENERAL SPECIFICATIONS		EMC SPECIFICATIONS	
Efficiency	See table, typ.	Radiated Emissions	EN55032 CLASS A
I/O Isolation Voltage (60sec)	1500Vdc	Conducted Emissions (7)	EN55032 CLASS A
I/O Isolation Capacitance	70pF, typ.	ESD	IEC 61000-4-2 Perf. Criteria A
I/O Isolation Resistance	1000M Ω , min.	RS	IEC 61000-4-3 Perf. Criteria A
Switching Frequency	150~550KHz	EFT (8)	IEC 61000-4-4 Perf. Criteria A
Humidity	95% rel H	Surge (8)	IEC 61000-4-5 Perf. Criteria A
Reliability Calculated MTBF (MIL-HDBK-217 F)	> 2.8 Mhrs	CS	IEC 61000-4-6 Perf. Criteria A
Safety Approvals	UL/cUL 60950-1 , 62368-1 IEC/EN 60950-1 , 62368-1	PFMF	IEC 61000-4-8 Perf. Criteria A

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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-1224 S1	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-2424 S1	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-4824 S1	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

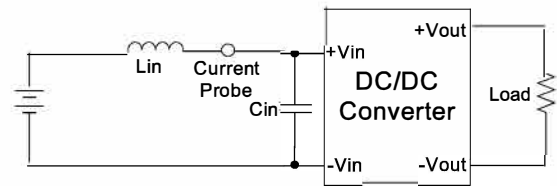
NOTE

- 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 nominal 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 and a source capacitor Cin(47µF, ESR<1.0Ω at 100KHz).
- 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 APPLICATION NOTE.
- 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.

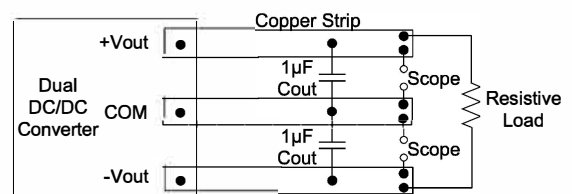
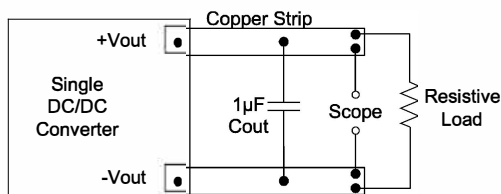
TEST CONFIGURATIONS

Input Reflected Ripple Current Test Step

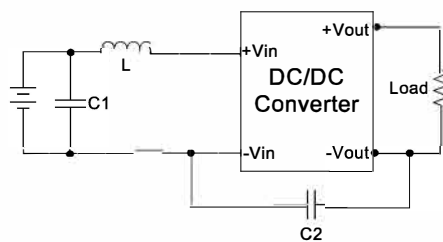
Input reflected ripple current is measured through a source inductor L_{in} ($12\mu\text{H}$) and a source capacitor C_{in} ($47\mu\text{F}$, $\text{ESR} < 1.0\Omega$ at 100KHz) at nominal input and full load.


Output Ripple & Noise Measurement Test

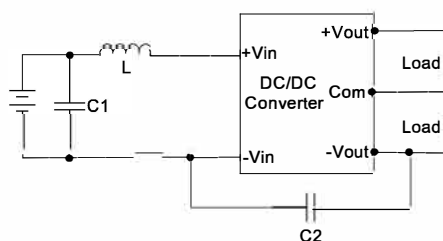
Use a capacitor C_{out} ($1.0\mu\text{F}$) measurement. The Scope measurement bandwidth is 20MHz .


EMI Filter

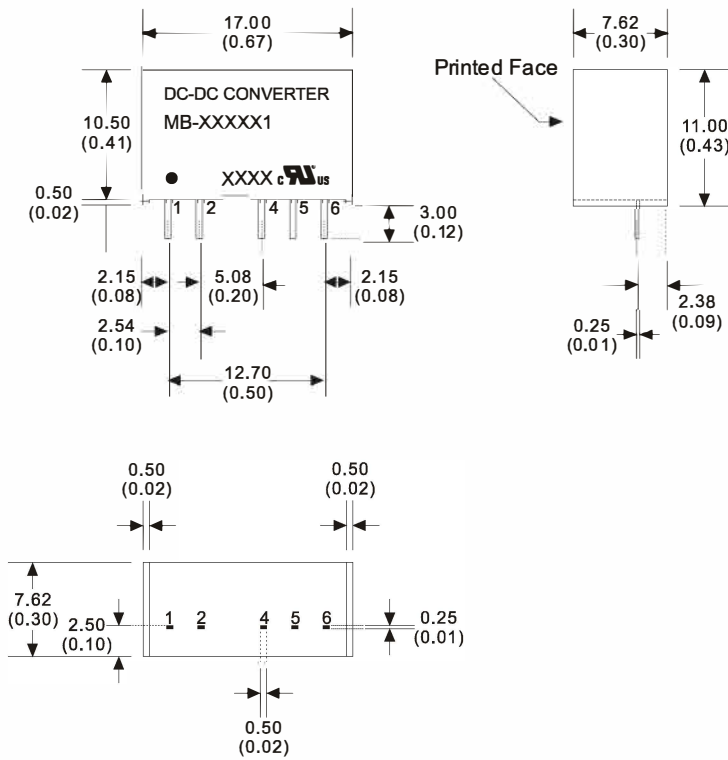
Input filter components ($C1, C2, L$) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



	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

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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)

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DRAWING:

APPROVED:

Last Update : 01.JUL.2020