

MBW-3W Series

3W 4:1 Regulated Single & Dual output

Features

- Highest Power Density In SIP6 Package
- Wide 4:1 Input Range
- Smallest Footprint 3W Converter
- Full SMD Technology
- 1600 VDC Isolation
- Continuous Short Circuit Protection
- Under Voltage Lock-Out Circuit
- Efficiency up to 84%
- Operation Temperature Range -40 ~ 76°C max.



c  [®] US CB CE UK CA

PART NUMBER STRUCTURE

MBW - **24** **05** **S** **3**

(1) (2) (3) (4) (5)

(1) Series

(2) Input Voltage Range

12 - 4.5-18 V
24 - 9-36 V
48 - 18-75 V

(4) Output Type

S - Single Output
D - Dual Output

(5) Watt

(3) Output Voltage

3R3 - 3.3 V
05 - 5.0 V
12 - 12 V
15 - 15 V

ALL SPECIFICATIONS ARE TYPICAL AT 25°C, NOMINAL INPUT AND FULL LOAD UNLESS OTHERWISE NOTED

Model Number	Input Voltage Range (VDC)	Input Current		Output Voltage (VDC)	Output Current		Efficiency @FL (% , typ.)	Capacitive Load (μF, max.)
		No-Load (mA, max.)	Full Load (mA, typ.)		Min. load (mA)	Full load (mA)		
MBW-123R3S3	4.5-18	45	257	3.3	0	700	75	3300
MBW-1205S3	4.5-18	45	309	5	0	600	81	1680
MBW-1212S3	4.5-18	50	301	12	0	250	83	820
MBW-1215S3	4.5-18	50	301	15	0	200	83	680
MBW-1205D3	4.5-18	40	313	±5	0	±300	80	±1000
MBW-1212D3	4.5-18	50	305	±12	0	±125	82	±470
MBW-1215D3	4.5-18	50	301	±15	0	±100	83	±330
MBW-243R3S3	9-36	25	128	3.3	0	700	75	3300
MBW-2405S3	9-36	25	152	5	0	600	82	1680
MBW-2412S3	9-36	35	149	12	0	250	84	820
MBW-2415S3	9-36	35	151	15	0	200	83	680
MBW-2405D3	9-36	30	154	±5	0	±300	81	±1000
MBW-2412D3	9-36	35	151	±12	0	±125	83	±470
MBW-2415D3	9-36	40	151	±15	0	±100	83	±330
MBW-483R3S3	18-75	15	64	3.3	0	700	75	3300
MBW-4805S3	18-75	15	78	5	0	600	80	1680
MBW-4812S3	18-75	15	76	12	0	250	82	820
MBW-4815S3	18-75	20	76	15	0	200	82	680
MBW-4805D3	18-75	15	79	±5	0	±300	79	±1000
MBW-4812D3	18-75	20	76	±12	0	±125	82	±470
MBW-4815D3	18-75	30	77	±15	0	±100	81	±330

INPUT SPECIFICATIONS						
Parameter	Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	12V Input		4.5	12	18	VDC
	24V Input		9	24	36	
	48V Input		18	48	75	
Under Voltage Protection	12V Input	Module ON		4.2		VDC
		Module OFF		3.5		
	24V Input	Module ON		8.5		
		Module OFF		7.0		
	48V Input	Module ON		17.5		
		Module OFF		15.5		
Input Filter			Capacitor			
Input Reflected Ripple Current (1)				20		mApk-pk
Start up Time	Nominal Vin and constant resistive load			30		ms
Remote ON/OFF Control	Module ON		open or high impedance			
	Module OFF		2-4mA input current (via 1kΩ)			
	OFF idle current				2.5	mA
Recommended input fuse (slow blow)	12V Input		1.8			A
	24V Input		0.9			
	48V Input		0.4			
Note :						
1. Measured with a simulated source inductance of 27μH and a source capacitor Cin (47μF, ESR<1.0Ω at 100kHz).						

OUTPUT SPECIFICATIONS						
Parameter	Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy			-1.0		+1.0	%
Line Regulation			-0.2		+0.2	%
Load Regulation	From 0% to 100% Load		-1.0		+1.0	%
Cross Regulation	Asymmetrical Load 25% / 100% for Dual Output		-5		+5	%
Ripple & Noise (1)	20MHz bandwidth	Single Output			150	mVpk-pk
		Dual Output			100	
Short Circuit Protection			Indefinite (Automatic Recovery)			
Temperature Coefficient			-0.02		+0.02	%/°C
Maximum Capacitive Load	Minimum Vin and constant resistive load		See Table			
Transient Recovery Time	Nominal Vin and 25% load step change (75%-50%-25% of Io)	For All models		500		µs
Transient Response Deviation		Single 3.3V & 5V	-5		+5	%
		Other Output	-3		+3	
Note :						
1. Measured with a 0.1µF MLCC and 10µF electrolytic capacitor.						

ABSOLUTE MAXIMUM RATINGS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (100 ms)	12V Input			25	VDC
	24V Input			50	
	48V Input			100	
Soldering Temperature	1.5mm from case 10sec max.			260	°C
Note : These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.					

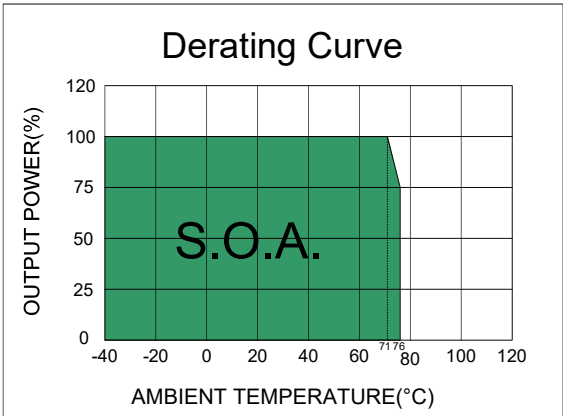
GENERAL SPECIFICATIONS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, and rated for 60sec	1600			VDC
Isolation Resistance	Input-output	1000			MΩ
Isolation Capacitance	Input-output			40	pF
Switching Frequency		100			kHz
MTBF	MIL-HDBK-217 F @ 25°C	956			k hours
Safety Approval	IEC / EN / UL 62368-1	DK-108524-UL, E252573			
Environmental compliance		RoHS			

ENVIRONMENT SPECIFICATIONS					
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating Ambient Temperature	See the Derating Curve	-40		76	°C
Maximum Case Temperature				100	°C
Thermal Impedance		37.2			°C/W
Storage Humidity				95	% rel. H
Storage Temperature		-55		125	°C
Cooling	Natural Convection	30-65 LFM			

EMC SPECIFICATIONS			
Parameter	Standard	Condition	Criterion
Conducted Emissions	EN55032	with external components	A
Radiated Emissions	EN55032	with external components	A
ESD	IEC 61000-4-2	Air: ±8kV / Indirect: ±6kV	A
RS	IEC 61000-4-3	10V/m	A
EFT	IEC 61000-4-4	±2kV with external components	A
Surge	IEC 61000-4-5	±2kV with external components	A
CS	IEC 61000-4-6	10Vrms	A
PFMF	IEC 61000-4-8	100A/m	A

PHYSICAL SPECIFICATIONS	
Parameter	Value
Case Material	Nonconductive Black Plastic (UL94V-0 rated)
Pin Material	Tinned copper
Potting Material	Epoxy (UL94V-0 rated)
Weight	3.85 g, typ.
Dimensions	0.69" x 0.40" x 0.48"

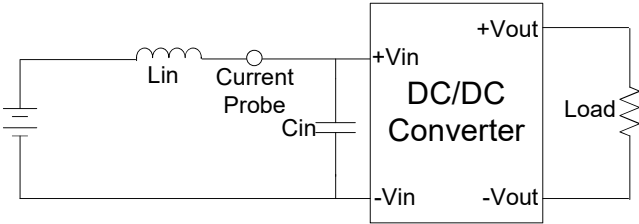
ELECTRICAL CHARACTERISTIC CURVES



TEST CONFIGURATIONS

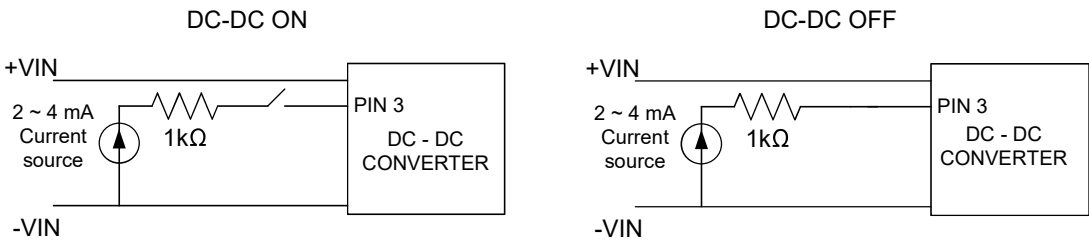
Input Reflected Ripple Current Test Step

Input reflected ripple current is measured with a source inductor L_{in} ($27\mu H$) and a source capacitor C_{in} ($47\mu F$, $ESR < 1.0\Omega$ at $100kHz$) at nominal input and full load.



DESIGN & FEATURE CONFIGURATIONS

Remote Module ON / OFF

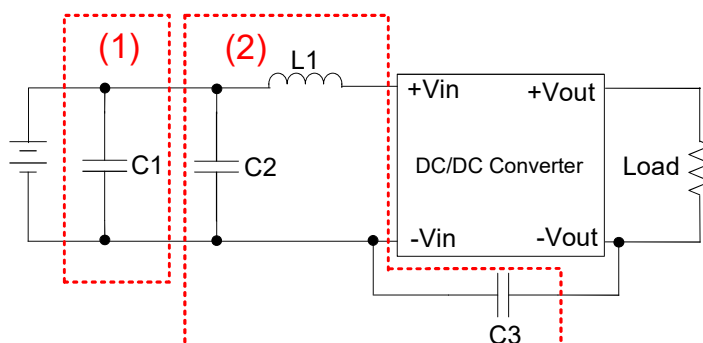


Remote fuction description				
	Remote	Ctrl pin applied current via 1kΩ	Output Voltage	Converter Input current
Converter on	Off	Open or High Impedance	See module	See module
Converter off	On	Input current (2 ~ 4 mA)	No Output Voltage	2.5mA,Typ.

DESIGN & FEATURE CONFIGURATIONS

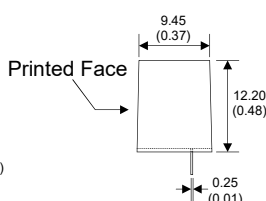
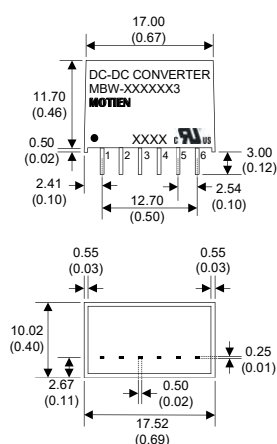
EMC Filter

The part (1) Circuit is used to meet Surge & EFT test, and the part (2) Circuit is used to meet EMI test.



	C1	C2	L1	C3
MBW-12XXX3	NIPPON	MLCC 10 μ F, 35V	2.2 μ H	MLCC 100pF, 2kV
MBW-24XXX3	Chemi-con	MLCC 2.2 μ F, 100V	10 μ H	
MBW-48XXX3	KY series 220 μ F, 100V	MLCC 4.7 μ F, 100V	18 μ H	

MECHANICAL SPECIFICATIONS



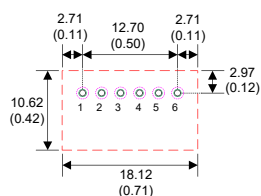
Notes : All dimensions are typical in millimeters (inches).

1. Pin dimension tolerance: ± 0.05 (± 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)

PIN CONNECTIONS		
PIN NUMBER	SINGLE	DUAL
1	-Vin	-Vin
2	+Vin	+Vin
3	CTRL	N.P.
4	N.P.	+Vout.
5	+Vout	COM
6	-Vout	-Vout

*N.P. : No PIN

RECOMMENDED FOOTPRINT DETAILS



Notes : 1. All dimensions are typical in millimeters (inches).

Through hole (black) 1 ~ 6: $\varnothing 0.80$ (0.031)

Top view pad (green) 1 ~ 6: $\varnothing 1.00$ (0.039)

Bottom view pad (pink) 1 ~ 6: $\varnothing 1.60$ (0.063)