

## MSB\_D-3W Series

*WIDE INPUT ISOLATED & REGULATED  
3W OUTPUT SINGLE OUTPUT  
24 DIP PACKAGE*

**RoHS**

multi-country patent protection

### FEATURES

- Wide (2:1) Input Range
- Efficiency Up To 82%
- Operating Temperature: -40°C~+85°C
- 1.5KVDC Isolation
- Single Output
- UL94-V0 Package
- No Heat Sink Required
- Industry Standard Pin out
- MTBF>1,000,000 hours
- RoHS Compliance

### APPLICATIONS

The MSB\_D-3W Series are specially designed for applications where a wide range input voltage power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

These products apply to:

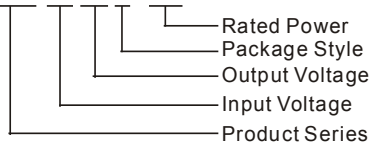
- 1) Where the voltage of the input power supply is wide range (voltage range: 2:1);
- 2) Where isolation is necessary between input and output (isolation voltage =1500VDC);
- 3) Where the regulation of the output voltage and the output ripple noise are demanded.

These products don't apply to:

- 1) Where the input voltage is required to be more than 2:1;
- 2) Where the isolation voltage between input and output is required to be >1500VDC;
- 3) The output load's actual power consumption is less than 1W, otherwise our company's MSB\_D-2W series are recommended.

### MODEL SELECTION

MSB0509D-3W



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### PRODUCT PROGRAM

Part Number	Input			Output			Efficiency (% Typ)	Package Style
	Voltage (VDC)			Voltage (VDC)	Current (mA)			
	Nominal	Range	Max*		Max	Min		
MSB0505D-2W5	5	4.5~9VDC	11	5	500	50	65	DIP
MSB0509D-3W	5	4.5~9VDC	11	9	333	34	67	DIP
MSB0512D-3W	5	4.5~9VDC	11	12	250	25	70	DIP
MSB0515D-3W	5	4.5~9VDC	11	15	200	20	70	DIP
MSB1205D-2W5	12	9~18VDC	22	5	500	50	70	DIP
MSB1209D-3W	12	9~18VDC	22	9	333	34	73	DIP
MSB1212D-3W	12	9~18VDC	22	12	250	25	78	DIP
MSB1215D-3W	12	9~18VDC	22	15	200	20	78	DIP
MSB1505D-2W5	15	12~24VDC	30	5	500	50	75	DIP
MSB1509D-3W	15	12~24VDC	30	9	333	34	79	DIP
MSB1512D-3W	15	12~24VDC	30	12	250	25	80	DIP
MSB1515D-3W	15	12~24VDC	30	15	200	20	81	DIP
MSB2405D-2W5	24	18~36VDC	40	5	500	50	78	DIP
MSB2409D-3W	24	18~36VDC	40	9	333	34	80	DIP
MSB2412D-3W	24	18~36VDC	40	12	250	25	81	DIP
MSB2415D-3W	24	18~36VDC	40	15	200	20	82	DIP
MSB4805D-2W5	48	36~72VDC	80	5	500	50	76	DIP
MSB4809D-3W	48	36~72VDC	80	9	333	34	81	DIP
MSB4812D-3W	48	36~72VDC	80	12	250	25	81	DIP
MSB4815D-3W	48	36~72VDC	80	15	200	20	82	DIP

### ISOLATION SPECIFICATIONS

Item	Test conditions	Min	Typ	Max	Units
Isolation voltage	Flash tested for 60 seconds	1500			VDC
Isolation resistance	Test at 500VDC	1000			MΩ

### OUTPUT SPECIFICATIONS

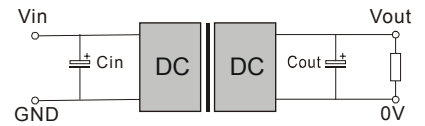
Item	Test conditions	Min	Typ	Max	Units
3W output power	See below products program	0.3		3	W
Voltage accuracy	Refer to recommended circuit		±1	±3	%
Load regulation	From 10% to 100% load		±0.5	±0.75	
Line regulation	Input Voltage From Low to High		±0.2	±0.5	
Temperature drift (Vout)	Refer to recommended circuit			0.03	%/°C
Ripple	20Hz-300KHz bandwidth		30	60	mVD-p
Noise	DC-20MHz bandwidth		80	150	
Switching frequency	100% load, nominal input voltage		80	200	KHz
	10% load, nominal input voltage		250	600	

Note:

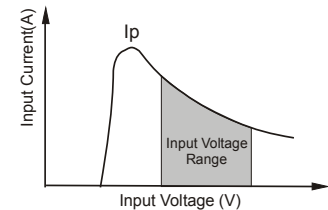
1. All specifications measured at T<sub>A</sub>=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
2. See below recommended circuits for more details.

## COMMON SPECIFICATION

Output Short Circuit Protection	Continuous
Temperature Rise at Full Load	30°C (TYP)
Cooling	Free Air Convection
No-load Power Consumption	100mW (typical)
Operating Temperature Range	-40°C~+85°C
Storage Temperature Range	-55°C ~+125°C
Lead Temperature***	300°C (1.5mm from case for 10 seconds)
Storage Humidity Range	≤ 95%
Case Material	Plastic (UL94-V0)
MTBF	>1,000,000 hours
***Lead Temperature 1.5mm from case for 10 seconds.	



(Figure 1)



(Figure 2)

supply and the rippled voltage do not exceed the module standard. Input current of power supply should afford the startup current of this kind of DC/DC module. (See figure 2)

### External Capacitor

Although this series of DC/DC converter can work without external capacitor, in order to keep an optimum performance, however, it needs external capacitor. (See Table 1)

### Requirement on Output Load

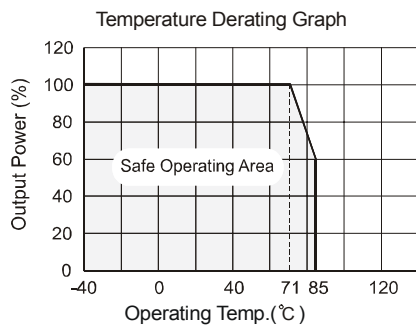
To ensure this module operate efficiently and reliably, a minimum load is specified for this kind of DC/DC converter in addition to a maximum load (namely full load). During operation, make sure the specified range of input voltage is not exceeded, the minimum out put load is not less than 10% Of the full load, and that this product **should never be operated under no load!!!** If the actual load is less below the specified minimum load, the output ripple of this type of DC/DC converter will increase drastically and at the same time efficiency & reliability of the circuit will decrease deeply .If the actual output power from the load in your circuit is very small, please connect a resistor with proper resistance at the output end to in parallel to increase the load, or use our company's other products with a lower rated output power.

**The products cannot be used in parallel and in plug and play.**

### External Capacitor Table (Table 1)

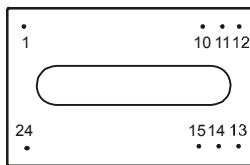
Vin	Cin	Cout (0+70°C)	Cout (-40+85°C)
5V & 12V	100uF	100uF (electrolytic capacitor)	47uF (tantalum capacitor)
24V & 48V	10uF		

## TYPICAL CHARECTERISTICS



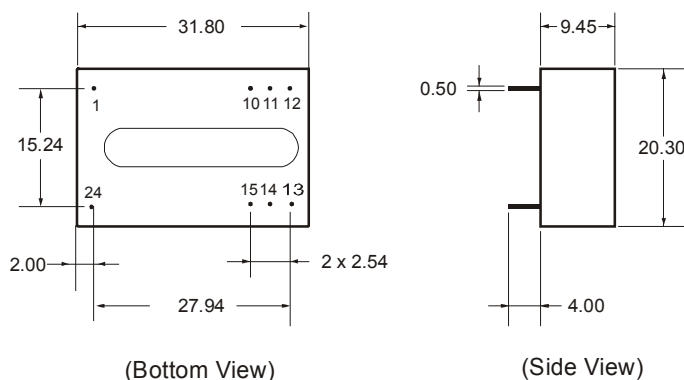
## FOOTPRINT DETAILS

### Bottom View



Pin	Function
1,24	Vin
12,13	GND
11,14	+Vo
10,15	0V

## OUTLINE DIMENSIONS & RECOMMENDED FOOTPRINT



Note: All Pins on a 2.54mm pitch; All Pin diameters are 0.50 mm (Tolerance:±0.10);

## APPLICATION NOTE

### Recommended Circuit

All the MSB\_D-3W Series have been tested according to the following recommended testing circuit before leaving factory. This series should be tested under load. Never be tested under no load (See Figure 1 & 2). If you want to further decrease the input/output ripple, you can increase capacitance properly or choose capacitors with low ESR. However, the capacitance should not be too high.(See table 1).If you want to use the products in high EMI, please choose our metal packaged products.

### Input Current

When it is used in unregulated power supply, be sure that the fluctuating range of the power



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