MORNSUN®

MSA_(M)D-3W & MSB_(M)D-3W Series

3W, WIDE INPUT, ISOLATED & REGULATED DUAL/SINGLE OUTPUT DIP DC-DC CONVERTER

Patent Protection

RoHS

FEATURES

- Wide (2:1) input range
- Efficiency up to 82%
- Operating temperature: -40°C ~ +85°C
- 1500VDC isolation
- Short circuit protection(Automatic recovery)
- Internal SMD construction
- No heat sink required
- No external component required
- UL94-V0 package
- Industry standard pinout
- MTBF>1,000,000 hours
- RoHS Compliance

APPLICATIONS

The MSA_(M)D-3W &MSB_(M)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.

MODEL SELECTION

MSA2405MD-3W

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

MORNSUN Science & Technology Co.,Ltd.
Address: No. 5, Kehui St. 1, Kehui development center, Science Ave., Guangzhou Science City, Luogang district, Guangzhou,P.R.China.
Tel: 86-20-28203030
Fax:86-20-28203068
Http://www.mornsun-power.com

PRODUCT PROGRAM

Part Number	Input			Output			Efficiency (%, Typ)	Certificate
	Voltage (VDC)			Voltage (VDC)	Current (mA)			
	Nominal	Range	Max*		Max.	Min.		
MSA0505(M)D-3W	5	4.5-9	11	±5	±300	±30	68	
MSA0512(M)D-3W				±12	±125	±12	72	
MSA0515(M)D-3W				±15	±100	±10	73	
MSB0505(M)D-3W				5	600	60	68	
MSB0509(M)D-3W				9	333	33	70	
MSB0512(M)D-3W				12	250	25	72	
MSB0515(M)D-3W				15	200	20	73	
MSA1205(M)D-3W	12	9-18	22	±5	±300	±30	76	
MSA1212(M)D-3W				±12	±125	±12	79	
MSA1215(M)D-3W				±15	±100	±10	80	
MSB1205(M)D-3W				5	600	60	76	
MSB1209(M)D-3W				9	333	33	78	
MSB1212(M)D-3W				12	250	25	80	
MSB1215(M)D-3W				15	200	20	81	
MSB1224(M)D-3W				24	125	12	82	
MSA2405(M)D-3W	24	18-36	40	±5	±300	±30	76	
MSA2412(M)D-3W				±12	±125	±12	80	
MSA2415(M)D-3W				±15	±100	±10	81	
MSB2403(M)D-3W				3.3	909	90	74	UL
MSB2405(M)D-3W				5	600	60	76	UL
MSB2409(M)D-3W				9	333	33	78	UL
MSB2412(M)D-3W				12	250	25	81	UL
MSB2415(M)D-3W				15	200	20	80	UL
MSB2424(M)D-3W				24	125	12	82	UL
MSA4805(M)D-3W	48	36-72	80	±5	±300	±30	76	
MSA4812(M)D-3W				±12	±125	±12	80	
MSA4815(M)D-3W				±15	±100	±10	81	
MSB4803(M)D-3W				3.3	909	90	74	
MSB4805(M)D-3W				5	600	60	76	
★MSB4809(M)D-3W				9	333	33	78	
MSB4812(M)D-3W				12	250	25	81	
MSB4815(M)D-3W				15	200	20	80	
★MSB4824(M)D-3W				24	125	12	82	

* Input voltage over it may cause permanent damage to the device. ★Designing.
Note: Metal package style's series is MSA_MD-3W & MSB_MD-3W.

ISOLATION SPECIFICATIONS

Item	Test conditions	Min.	Typ.	Max.	Units
Isolation voltage	Tested for 1 minute and 1mA max	1500			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation capacitance	Input/Output, 100KHz/1V		80		pF

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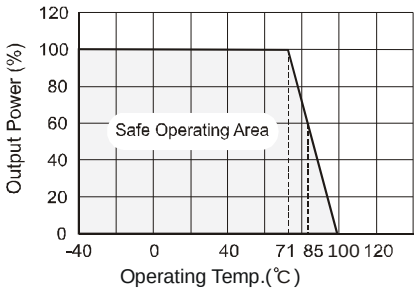
OUTPUT SPECIFICATIONS

Item	Test conditions	Min.	Typ.	Max.	Units
Output power	See above products program	0.3		3	W
Positive voltage accuracy	Refer to recommended circuit		±1	±3	%
Negative voltage accuracy	Refer to recommended circuit		±3	±5	
Load regulation	From 10% to 100% load		±0.5	±1*	
Line regulation	Input voltage from low to high		±0.2	±0.5	
Temperature drift(Vout)	Refer to recommended circuit			±0.03	%/°C
Ripple & Noise**	20MHz Bandwidth		50	100	mVp-p
Switching frequency	100% load, nominal input voltage		300		KHz

*Dual output models unbalanced load: ±5%.
**Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

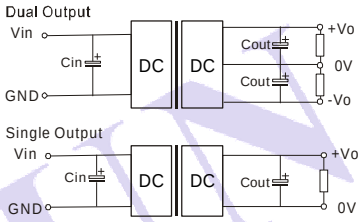
TYPICAL CHARACTERISTICS



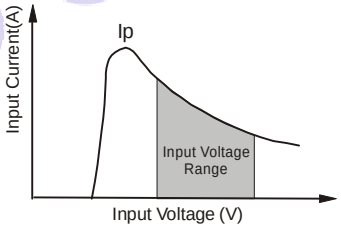
COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Units
Storage humidity				95	%
Operating temperature		-40		85	°C
Storage temperature		-55		125	
Temp. rise at full load			15		
Lead temperature	1.5mm from case for 10 seconds			300	
No-load Power consumption			0.2		W
Cooling	Free air convection				
Short circuit protection	Continuous, Automatic Recovery				
Case material	D: Plastic(UL94-V0), MD:Stainless steel				
MTBF		1000			K hours
Weight			15		g

RECOMMENDED CIRCUIT



(Figure 1)



(Figure 2)

Output External Capacitor Table(Table 1)

Single Vout (VDC)	Cout (uF)	Dual Vout (VDC)	Cout (uF)
3.3	2200	±5	680
5	1000	±12	330
9	680	±15	220
12	470	-	-
15	330	-	-
24	220	-	-

APPLICATION NOTE

Requirement On Output Load

In order to ensure the product operate efficiently and reliably, in addition to a max load (namely full load), a minimum load is specified for this kind of DC/DC converter. Make sure the specified range of input voltage is not exceeded, the minimum output load no less than 10% load. If the actual load is less than the specified minimum load, the output ripple may increase sharply while its efficiency and reliability will reduce greatly. If the actual output power is very small, please add an appropriate resistor as extra loading, or contact our company for other lower output power products.

Recommended Circuit

All the MSA_(M)D-3W & MSB_(M)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).

If you want to further decrease the input/output ripple, you can increase capacitance properly or choose capacitors with low ESR. 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 greatest capacitance of its filter capacitor sees (Table 1). Generally: If you want to use the products in high EMI, please choose our metal packaged products (MSA_MD-3W & MSB_MD- 3W). General:

Cin: 5V&12V 100μF
24V&48V 10μF-47μF
Cout: 10μF/100mA

Input Current

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

Ip ≤1.4*Iin-max

No parallel connection or plug and play

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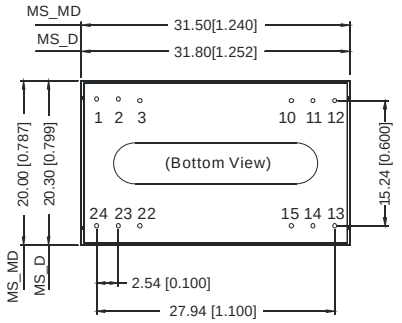
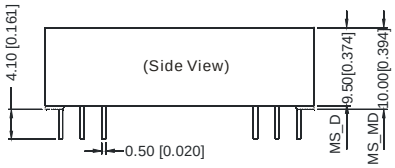
OUTLINE DIMENSIONS & PIN CONNECTIONS

MECHANICAL DIMENSIONS





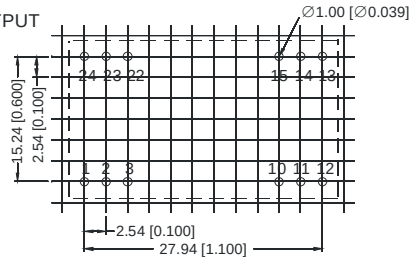
Note:
Unit:mm[inch]
Pin diameter tolerances:±0.10mm[±0.004inch]
General tolerances:±0.25mm[±0.010inch]

FOOTPRINT DETAILS		
Pin	Single	Dual
1,24	Vin	Vin
2,23	No Pin	-Vo
3,22	No Pin	0V
10,15	0V	0V
11,14	+Vo	+Vo
12,13	GND	GND

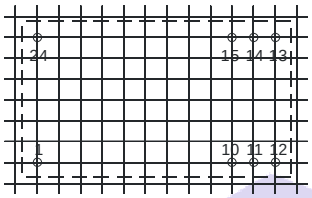
NC:No connection

RECOMMENDED FOOTPRINT

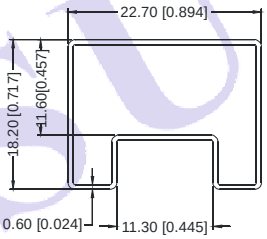
DUAL OUTPUT



SINGLE OUTPUT



TUBE OUTLINE DIMENSIONS



Note:
Unit :mm[inch]
General tolerances: ±0.50mm[±0.020inch]

L=530mm[20.866inch] Tube Quantity: 15pcs
L=220mm[8.661inch] Tube Quantity: 6pcs

Note:
1. The load shouldn't be less than 10%, otherwise ripple will increase dramatically.
2. Operation under 10% load will not damage the converter; However, they may not meet all specification listed.
3. All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
4. In this datasheet, all the test methods of indications are based on corporate standards.
5. Only typical models listed, other models may be different, please contact our technical person for more details.

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