

Wide input voltage and isolated single output, DIP package, Super-Capacitor group two-way balanced, DC-DC converter



## FEATURES

- Two-way charging power supply
- Wide 2:1 input voltage range
- Two-way efficiency up to 79%
- I/O isolation test voltage 1.0kVDC
- Input under-voltage protection
- Operating ambient temperature range -40°C to +85°C
- Super-Capacitor or battery power supply

MBP24/4803YMD-3A, a two-way switching power supply with isolation voltage 1000VDC, which can be used in occasion of voltage balance between super capacitor, super capacitor group and system bus or battery.

Selection	Guide							
	n Part No.	Working Status	Input Voltage Vin (VDC)		Output Voltage Vo (VDC)		Efficiency <sup>3</sup> (%)	
Certification			Nominal (Range)	Max. <sup>®</sup>	Nominal (Range)	Max.®	Тур.	
	MBP2403YMD-3A	/MD-3A Reverse	24 (16-32)	40	2.5 (2.0-3.65)	5.5	79	
ENI			24 (16-32)	40	3.5 (2.0-3.65)	5.5		
EN	MBP4803YMD-3A		Forward	48 (30-60)	65	2.5 (2.0-3.65)	5.5	70
		Reverse	48 (30-60)	65	3.5 (2.0-3.65)	5.5	14	

Note:

①Exceeding the maximum input voltage may cause permanent damage ;

②Exceeding the maximum output voltage may cause permanent damage ;

③Efficiency is measured at Vin=nominal input voltag, Vo=3.65VDC.

Control Specifications					
Working Status	Working Status Describe	EN Pin	CD Pin		
Static Working	No charge /discharge on module	Open	Open or connect to input GND		
Forward	Input end (Vin) charge output end (Vo)	Connect to input GND	Open		
Reverse	Output end (Vo) discharge input end (Vin)	Connect to input GND	Connect to input GND		

Note: For electrical connection diagram, refer to Fig 3. In any case, CY1 capacitance needs to be increased, and products without CY1 have no output .

Input Specifications						
ltem	Operating Conditions		Min.	Тур.	Max.	Unit
	Forward	Vin=24VDC, Vo=2.5VDC		400		mA
		Vin=48VDC, Vo=2.5VDC		200		
Input Current (IIn)	Reverse	Vin=24VDC, Vo=3.5VDC		-320		
		Vin=48VDC, Vo=3.5VDC		-160		
	Forward 24	24VDC nominal input series			16	
Start-up Voltage		48VDC nominal input series			30	
Under-voltage Protection	24VDC nominal input series		10	13		VDC
	48VDC nominal input series		18	22		

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# DC/DC Converter MBP24/4803YMD-3A

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Output Specifications						
Item	Operating Conditions		Min.	Тур.	Max.	Unit
	Forward	Vin=24VDC, Vo=2.5VDC		3000		mA
		Vin=48VDC, Vo=2.5VDC		3000		
Oulpui Culterii (10)	Reverse	Vin=24VDC, Vo=3.5VDC		-2700		
		Vin=48VDC, Vo=3.5VDC		-2700		
Start-up Voltage	Reverse				2	VDC

General Specification	ons				
Item	Operating Conditions		Тур.	Max.	Unit
holation	Input-output Electric Strength test for 1 minute with a leakage current of 1mA max.				
	Input and output to out-case Electric Strength test for 1 minute with a leakage current of 1mA max.	1000			VDC
Insulation Resistance	Input-output Resistance at 500VDC	1000			MΩ
Static Working Current <sup>®</sup> Under static working			20	40	uA
Operating Temperature	See Fig. 1	-40		+85	Ŷ
Storage Temperature		-55		+125	C
Storage Humidity Non-condensing		5		95	%RH
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds			+300	°C
Vibration		2G, 10-55Hz, 30min., along X, Y and Z		Y and Z	
Switching Frequency	PWM mode		300		kHz
MTBF MIL-HDBK-217F@25°C		1000			k hours
Hot Plug		Unavailable			

Note: ①Static working current including input and output under static working.

Mechanical Specifications				
Case Material	Aluminum alloy			
Dimension	25.40 x 25.40 x 11.70 mm			
Weight	13.5g (Тур.)			
Cooling method	100LFM			

## Typical Performance Curves



Reverse Working Temperature Derating Curve

Fig. 1

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### **Design Reference**

#### 1. Model Testing Circuit

All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2.



Notes: Increased CY1 capacitance is required in any case. Fig. 2

Parameter	description
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•						
CY1 10nF   Cin 100uF   Cout 100uF		10nF	pressure-tolerant≥1000V			
		100uF	pressure-tolerant≥100V			
		100uF	pressure-tolerant≥25V			
			Tab.1			



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#### 2. Model Control recommended circuit

When the working direction is trigger Ctrl signal, we suggest that the current through R1 and R2 is 5 mA.

If the input and output super capacitor groups or the super capacitor is far from the module, add a super capacitor to the input and output terminals of the module. Tab. 1 lists the specifications of the super capacitor.



#### 3. System application recommended circuit

For MBP2403YMD-3A, we suggest that the super-Capacitor group is less than 8 when connect to the input; For MBP4803YMD-3A, we suggest that the super-Capacitor group is less than 16 when connect to the input; The 0V, output ground of the last super capacitor Cn, must be shorted to the input ground GND; The capacitor CY1 must withstand voltage at least 1000VDC based on application requirements; CY1 can be shorted directly if the primary side pressure resistance is not considered.



### 4. The products do not support output without load and hot plug, support parallel connection.

5. For additional information please refer to DC-DC converter application notes on <u>www.mornsun-power.com</u>

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## DC/DC Converter MBP24/4803YMD-3A

### **Dimensions and Recommended Layout**





	Pin-	Out					
PIN FUNCTION PIN FUNCTION							
1	EN	5	+Vo				
2	GND	6	No Pin				
3	+Vin	7	No Pin				
4 CD		8	No Pin				
		9	0V				

Note: Unit: mm[inch] Pin diameter tolerances: ±0.10[±0.004] General tolerances: ±0.50[±0.020]

Note:

- 1. For additional information on Product Packaging please refer to <u>www.mornsun-power.com</u>. Packaging bag number: 58210003;
- 2. Unless otherwise specified, data in this datasheet should be tested under the conditions of Ta=25°C, humidity<75%RH with nominal input voltage and rated output load;
- 3. All index testing methods in this datasheet are based on our company corporate standards;
- 4. We can provide product customization service, please contact our technicians directly for specific information;
- 5. Products are related to laws and regulations: see "Features";
- 6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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