MORNSUN
Industrial DC&AC converter professional



FB_N-1W Series

1W, FIXED INPUT, 5200V ISOLATED & UNREGULATED SINGLE OUTPUT DC-DC CONVERTER

multi-country patent protection **RoHS**

FEATURES

5.2KVDC Isolation
DIP Package,small footprint
Temperature Range: -40°C to +85°C
Continuous Short circuit protection
No Heatsink Required
No External Component Required
Industry Standard Pinout
RoHS Compliance

APPLICATIONS

The FB_N-1W Series are specially designed for applications where a group of polar 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 fixed (voltage variation ≤ ±10%);
2) Where isolation is necessary between input and output (isolation voltage ≤5200VDC);
3) Where the regulation of the output voltage and the output ripple noise are not demanding.

Such as: purely digital circuits, ordinary low frequency analog circuits, and IGBT power device driving circuits.

These products don't apply to:

1) Where the input supply voltage is varied (variation≥±10%), otherwise our company's WRA series is recommended;
2) Circuits in which the output voltage regulation is demanding, otherwise our company's IA Series or WRA Series are recommended;

MODEL SELECTION

FB0505N-1W

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

PRODUCT PROGRAM

Part Number	Input		Output			Efficiency (%, Typ)
	Voltage (VDC)		Voltage (VDC)	Current (mA)		
	Nominal	Range		Max	Min	
FB0505N-1W	5	4.5-5.5	5	200	20	71
FB0509N-1W*			9	111	11	72
FB0512N-1W*			12	83	8.3	73
FB0515N-1W*			15	67	6.7	74
FB1205N-1W*	12	10.8-13.2	5	200	20	70
FB1209N-1W*			9	111	11	74
FB1212N-1W*			12	83	8.3	76
FB1215N-1W*			15	67	6.7	76
FB2405N-1W*	24	21.6-26.4	5	200	20	73
FB2409N-1W*			9	111	11	74
FB2412N-1W*			12	83	8.3	77
FB2415N-1W*			15	67	6.7	77

*Designing.

COMMON SPECIFICATIONS

Item	Test Conditions	Min	Typ	Max	Units
Storage humidity range				95	%
Operating temperature		-40		85	°C
Storage temperature		-55		125	
Lead temperature	1.5mm from case for 10 seconds			300	
Temp. rise at full load			15	30	
Cooling	Free air convection				
Isolation voltage	Tested for 1 minute and 1mA max	5200			VDC
Isolation resistance	Test at 1000VDC	1000			MΩ
Short circuit protection		Continuous			
Case material		Epoxy Resin(UL94-V0)			
MTBF		3500			K Hours
Weigh			4.75		g

Note:
1.All specifications measured at TA=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
2.Dual output models unbalanced load: ±0.5%

MORNSUN Science& Technology Ltd.
Address: 2th floor 6th building, Hangzhou Industrial District, Guangzhou, China
Tel: 86-20-38601850
Fax: 86-20-38601272
http://www.mornsun-power.com

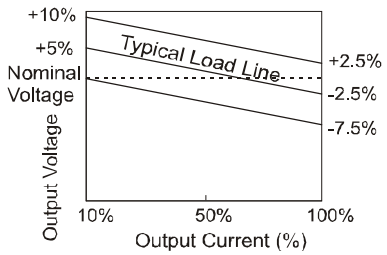
OUTPUT SPECIFICATIONS

Item	Test conditions		Min	Typ	Max	Units
Output power			0.1		1	W
Line regulation	For Vin change of ±1%				±1.2	%
Load regulation	10% to 100% load	(5V output)		10	15	%
		(9V output)		8.3	15	
		(12V output)		6.8	15	
		(15V output)		6.3	15	
Output voltage accuracy			See tolerance envelope graph			
Temperature drift	100% full load				0.03	%/°C
Ripple & Noise*	20MHz Bandwidth			150	200	mVp-p
Switching frequency	Full load, nominal input			50		KHz

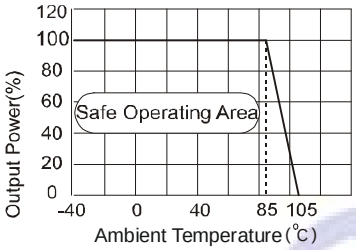
*Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

TYPICAL CHARACTERISTICS

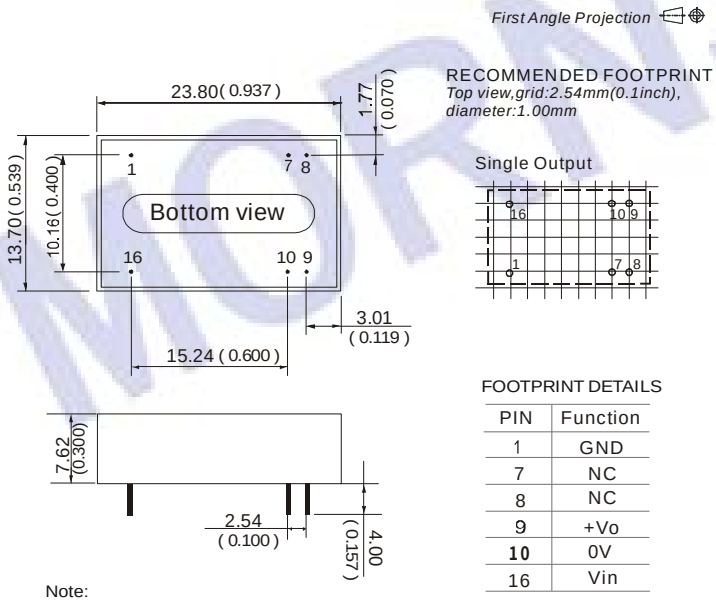
Tolerance Envelope Graph



Temperature Derating Graph



OUTLINE DIMENSIONS & PIN CONNECTIONS



RECOMMENDED FOOTPRINT
Top view,grid:2.54mm(0.1inch), diameter:1.00mm

Single Output

FOOTPRINT DETAILS

PIN	Function
1	GND
7	NC
8	NC
9	+Vo
10	0V
16	Vin

NC: no connection

Note:
Unit: mm(inch)
Pin diameter:0.50mm(0.020inch)
Pin tolernces:±0.05mm(±0.002inch)
General tolerances:±0.25mm (±0.010inch)

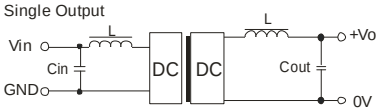
APPLICATION NOTE

Requirement on output load

To ensure this module can operate efficiently and reliably, During operation, the minimum output load is **not less than 10%** of the full load, and that **this product should never be operated under no load!** If the actual output power is very small, please connect a resistor with proper resistance at the output end in parallel to increase the load.

Recommended testing and application circuit

If you want to further decrease the input/output ripple, an "LC" filtering network may be connected to the input and output ends of the DC/DC converter, see (Figure 1).



(Figure 1)

It should also be noted that the inductance and the frequency of the "LC" filtering network should be staggered with the DC/DC frequency to avoid mutual interference. 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).

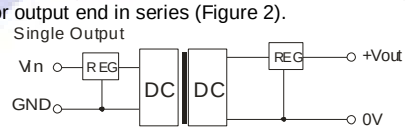
EXTERNAL CAPACITOR TABLE (Table 1)

Vin (VDC)	Cin (uF)	Single Vout (VDC)	Cout (uF)	Dual Vout (VDC)	Cou (uF)
5	4.7	5	10	±5	4.7
12	2.2	9	4.7	±9	2.2
24	1	12	2.2	±12	1
-	-	15	1	±15	1

It's not recommend to connect any external capacitor in the application field with less than 0.5 watt output.

Output Voltage Regulation and Over-voltage Protection Circuit

The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with overheat protection that is connected to the input or output end in series (Figure 2).



(Figure 2)

Overload Protection

Under normal operating conditions, the output circuit of these products has no protection against overload. The simplest method is to connect a self-recovery fuse in series at the input end or add a circuit breaker to the circuit.