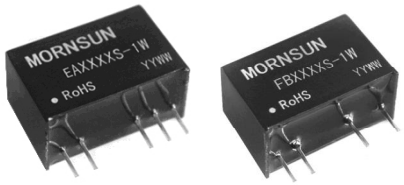
MORNSUN
Industrial DC&AC converter professional

EA_S-1W & FB_S-1W Series

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



multi-country patent protection **RoHS**

FEATURES

5.2KVDC Isolation
SIP Package
Temperature Range: -40°C to +85°C
No Heat Sink Required
Internal SMD Construction
Low Isolation Capacitance
No External Component Required
Industry Standard Pinout
RoHS Compliance

APPLICATIONS

The EA_S-1W & FB_S-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.

MODEL SELECTION

EA0505S-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	
EA0505S-1W	5	4.5-5.5	±5	±100	±10	70
EA0509S-1W			±9	±56	±6	71
EA0512S-1W			±12	±42	±5	72
EA0515S-1W			±15	±33	±4	74
FB0505S-1W			5	200	20	70
FB0509S-1W			9	111	12	71
FB0512S-1W			12	83	9	72
FB0515S-1W			15	67	7	74
EA1205S-1W	12	10.8-13.2	±5	±100	±10	70
EA1209S-1W			±9	±56	±6	72
EA1212S-1W			±12	±42	±5	74
EA1215S-1W			±15	±33	±4	75
FB1205S-1W			5	200	20	70
FB1209S-1W			9	111	12	72
FB1212S-1W			12	83	9	74
FB1215S-1W			15	67	7	75
EA2405S-1W	24	21.6-26.4	±5	±100	±10	72
EA2409S-1W			±9	±56	±6	74
EA2412S-1W			±12	±42	±5	76
EA2415S-1W			±15	±33	±4	78
FB2405S-1W			5	200	20	72
FB2409S-1W			9	111	12	74
FB2412S-1W			12	83	9	76
FB2415S-1W			15	67	7	78

ISOLATION SPECIFICATIONS

Item	Test Conditions	Min	Typ	Max	Units
Isolation voltage	Tested for 1 minute and 1mA max	5200			VDC
Isolation resistance	Test at 1000VDC	1000			MΩ
Isolation capacitance			10		pF

COMMON SPECIFICATIONS

Item	Test Conditions	Min	Typ	Max	Units
Storage humidity				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	25	
Short circuit protection*	5V input voltage			1	Second
	12V/24V input voltage	Continuous			
Cooling		Free air convection			
Case material		Plastic(UL94-V0)			
MTBF		3500			K hours
Weight			4.2		g

*supply voltage must be discontinued at the end of short circuit duration.

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OUTPUT SPECIFICATIONS

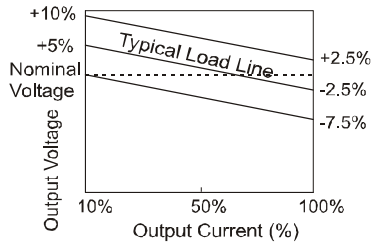
Item	Test conditions		Min	Typ	Max	Units
Output power			0.1		1	W
Line regulation	For Vin change of 1%				±1.2	%
Load regulation	10% to 100% load(5V output)			12.8	15	%
	10% to 100% load (9V output)			8.3	15	%
	10% to 100% load (12V output)			6.8	15	%
	10% to 100% load (15V output)			6.3	15	%
Output voltage 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	(5V input)		250		KHz
		(others input)		42		KHz

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

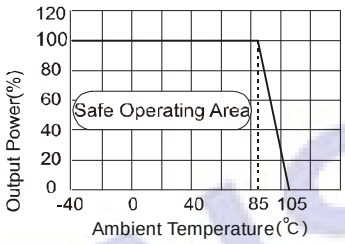
Note:
1. All specifications measured at TA=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
2. Dual output models unbalanced load: ±5%.

TYPICAL CHARACTERISTICS

Tolerance Envelope Graph



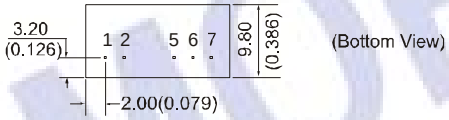
Temperature Derating Graph

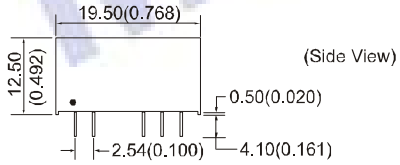


OUTLINE DIMENSIONS & PIN CONNECTIONS

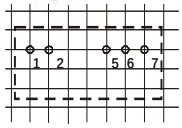
First Angle Projection

RECOMMENDED FOOTPRINT
Top view,grid:2.54mm(0.1inch)
diameter:1.00mm(0.039inch)

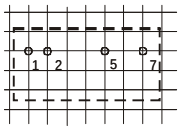




Dual Output



Single Output



FOOTPRINT DETAILS

Pin	Singles	Duals
1	Vin	Vin
2	GND	GND
5	0V	-Vo
6	No Pin	0V
7	+Vo	+Vo

Note:
Unit:mm(inch)
Pin section:0.50*0.30mm(0.020*0.012inch)
Pin tolerances:±0.10mm(±0.004inch)
General tolerances:±0.25mm(±0.010inch)

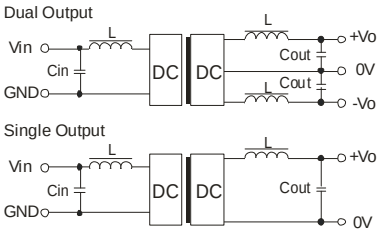
APPLICATION NOTE

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, or use our company's products with a lower rated output power.

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).

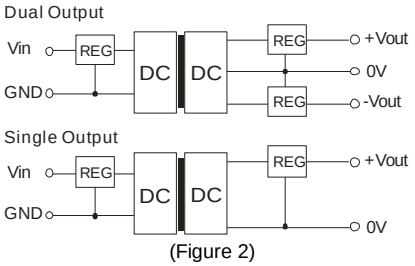
EXTERNAL CAPACITOR TABLE (TABLE 1)

Vin (VDC)	Cin (uF)	Single Vout (VDC)	Cout (uF)	Dual Vout (VDC)	Cout (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 recommended 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.

No parallel connection or plug and play.