BETT POWER
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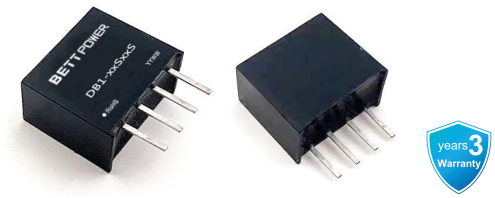
2025/08/28 (A/2)

DB1-xxSxxS Series

DC-DC Converter | 1W | SIP4 | Fixed voltage input, unregulated output | 1500VDC



Features

- Compact SIP4 Package
- Operating Temperature Range: -40℃ to +105℃
- Isolation Voltage: 1500VDC
- Full Load Efficiency: up to 89% (typ.)
- Continuous Short Circuit Protection
- Designed to meet IEC/EN/BS EN/UL 62368

Product Description

Industrial Automate Power Security

The DB1-xxSxxS series is 1W unregulated DC/DC converters that are typically used in cost sensitive general purpose power isolation and voltage matching applications. Typical applications are digital interfaces, voltage conversion in distributed powersy stems, general low-frequency analog circuits, relay drive circuits, data switching circuits etc.

Selection Guide

Certification	Part No.	Input Voltage	Output			Full Load Efficiency (%)	Capacitive Load (μF)
		Nominal (Range) (VDC)	Voltage (VDC)	Current (mA) Min.	Current (mA) Max.	Typ.	Max.
EN/UL Pending	DB1-03S03S	3.3 (2.97~3.63)	3.3	30	303	82	2400
	DB1-03S05S	3.3 (2.97~3.63)	5	20	200	83	2400
	DB1-03S09S	3.3 (2.97~3.63)	9	11	111	84	1000
	DB1-03S12S	3.3 (2.97~3.63)	12	8	84	85	560
	DB1-03S15S	3.3 (2.97~3.63)	15	7	67	85	560
	DB1-03S24S	3.3 (2.97~3.63)	24	4	42	85	220
	DB1-05S03S	5 (4.5~5.5)	3.3	30	303	82	2400
	DB1-05S05S	5 (4.5~5.5)	5	20	200	84	2400
	DB1-05S09S	5 (4.5~5.5)	9	11	111	86	1000
	DB1-05S12S	5 (4.5~5.5)	12	8	84	88	560
	DB1-05S15S	5 (4.5~5.5)	15	7	67	88	560
	DB1-05S24S	5 (4.5~5.5)	24	4	42	89	220
	DB1-09S09S	9 (8.1~9.9)	9	11	111	87	1000
	DB1-12S03S	12 (10.8~13.2)	3.3	30	303	84	2400

Selection Guide

Certification	Part No.	Input Voltage	Output			Full Load Efficiency (%)	Capacitive Load(μF)
		Nominal(Range) (VDC)	Voltage (VDC)	Current (mA) Min.	Current (mA) Max.	Typ.	Max.
EN/UL pending	DB1-12S05S	12 (10.8~13.2)	5	20	200	88	2400
	DB1-12S09S	12 (10.8~13.2)	9	11	111	87	1000
	DB1-12S12S	12 (10.8~13.2)	12	8	84	89	560
	DB1-12S15S	12 (10.8~13.2)	15	7	67	88	560
	DB1-12S24S	12 (10.8~13.2)	24	4	42	89	220
	DB1-15S03S	15 (13.5~16.5)	3.3	30	303	82	2400
	DB1-15S05S	15 (13.5~16.5)	5	20	200	85	2400
	DB1-15S09S	15 (13.5~16.5)	9	11	111	88	1000
	DB1-15S12S	15 (13.5~16.5)	12	8	84	89	560
	DB1-15S15S	15 (13.5~16.5)	15	7	67	89	560
	DB1-15S24S	15 (13.5~16.5)	24	4	42	89	220
	DB1-24S03S	24 (21.6~26.4)	3.3	30	303	84	2400
	DB1-24S05S	24 (21.6~26.4)	5	20	200	87	2400
	DB1-24S09S	24 (21.6~26.4)	9	11	111	89	1000
	DB1-24S12S	24 (21.6~26.4)	12	8	84	88	560
	DB1-24S15S	24 (21.6~26.4)	15	7	67	89	560
	DB1-24S24S	24 (21.6~26.4)	24	4	42	89	220

Note: The above efficiency is measured at nominal input voltage and rated output load.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (Full Load/No-load)	3.3VDC Input	3.3VDC Output	--	370/10	385/15	mA
		Others	--	356/12	365/18	mA
	5VDC Input	3.3VDC Output	--	244/10	250/15	mA
		15/24VDC Output	--	225/18	230/25	mA
		Others	--	227/10	241/15	mA
	12VDC Input	3.3/5VDC Output	--	96/8	100/15	mA
		Others	--	94/8	98/15	mA
	15VDC Input	3.3/5VDC Output	--	78/8	88/15	mA
		Others	--	75/8	85/15	mA
	24VDC Input	3.3/5VDC Output	--	47/5	50/15	mA
		Others	--	46/5	48/15	mA
Reflected Ripple Current			--	15	--	mA
Surge Voltage	3.3VDC Input		-0.7	--	5	VDC
	5VDC Input		-0.7	--	9	VDC
	9VDC Input		-0.7	--	15	VDC
	12VDC Input		-0.7	--	18	VDC
	15VDC Input		-0.7	--	21	VDC
	24VDC Input		-0.7	--	30	VDC
Input Filter Type			Capacitance Filter			
Hot Plug			Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy			See Output Regulation Curve			
Line Regulation	Input Voltage Variation: ±1%	3.3V Output	--	±1.5	--	%
		Others	--	±1.2	--	%
Load regulation	10%~100% load	3.3VDC Output	--	10	--	%
		5VDC Output	--	10	--	%
		9VDC Output	--	8	--	%
		12VDC Output	--	8	--	%
		15VDC Output	--	8	--	%
		24VDC Output	--	6	--	%
Ripple & noise	20MHz bandwidth (peak-to-peak)		--	45	120	mV
Temperature coefficient	Full load		--	±0.02	--	%/℃
Short circuit protection			Continuous, self-recovery			

Note: Ripple & noise are measured at 20MHz of bandwidth with a 10uF electrolytic capacitor and a 1uF ceramic capacitor connected inparallel at the output.

General specifications

Item	Operating conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, test time 1 minute, leakage current less than 1mA	1500	--	--	VDC
Insulation Resistance	Input-output, insulated voltage 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-Output,100KHz/0.1V	--	20	--	pF
Operating Temperature	Derating when operating temperature≥85℃ (See Temperature derating curve chart)	-40	--	105	℃
Storage Temperature		-55	--	125	℃
Case Temperature Rise	Ta=25℃, Nominal Input, Full Load	--	15	--	℃
Storage Humidity	Non-condensing	5	--	95	%RH
Soldering Profile	Wave soldering	260±5℃; Time: 5-10s			
	Manual soldering	360±10℃; Time: 3-5s			
Switching Frequency	Full load, nominal input voltage	--	220	--	kHz
MTBF	MIL-HDBK-217F@25℃	>3500Kh			

Mechanical Specifications

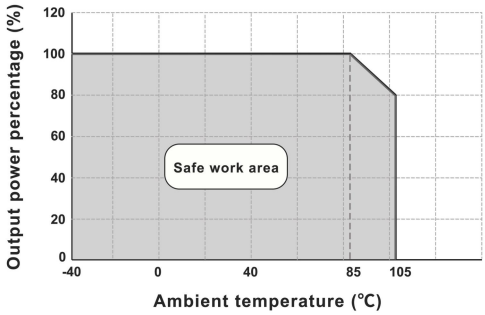
Case Material	Black flame-retardant heat-resistant plastic (UL94V-0)
Mechanical Dimensions	11.6 * 6.00 * 10.20mm
Weight	1.3g(typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

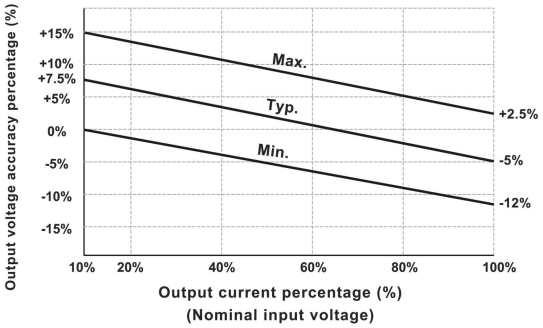
EMI	CE	CISPR32/EN55032 CLASS B (EMC recommended circuit see Fig. 2)	
	RE	CISPR32/EN55032 CLASS B (EMC recommended circuit see Fig. 2)	
EMS	ESD	IEC/EN61000-4-2 Contact ±6KV/Air ±8KV	perf. Criteria B

Product Characteristic Curve

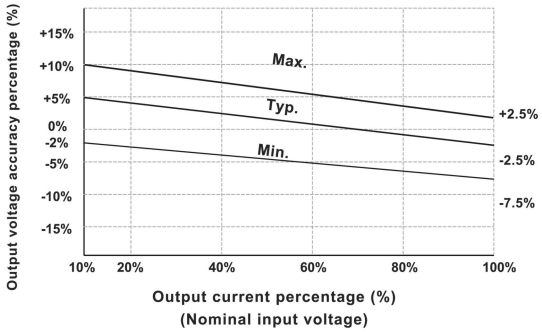
Temperature Derating Curve



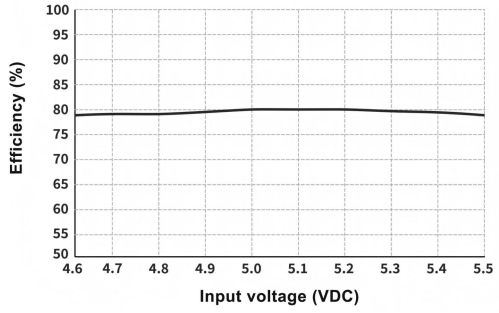
Output Regulation Curve (3.3V Output)



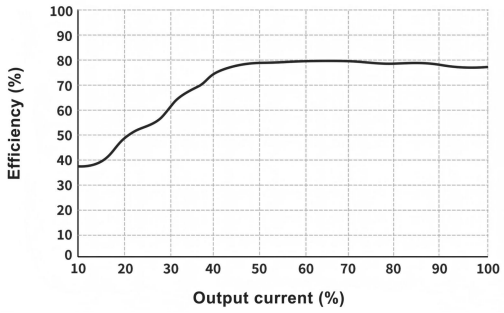
Output Regulation Curve (Others)



Efficiency VS Input Voltage (Full Load, DB1-05S05S)

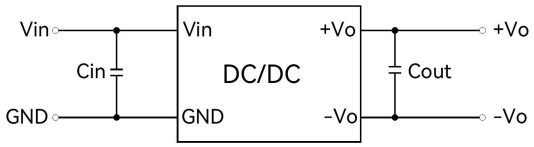


Efficiency VS Output Load (Vin=5V,DB1-05S05S)



Design Reference - Application circuit

Application circuit



(Figure 1)

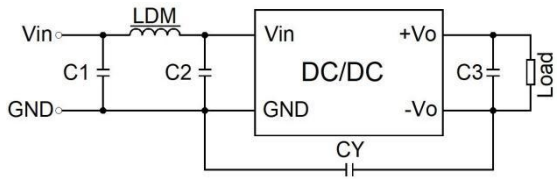
Recommended Capacitive Load Value Table

Vin	Cin	Vo	Cout
3.3/5VDC	4.7uF/16V	3.3/5VDC	10μF/16V
9VDC	2.2uF/25V	9VDC	4.7μF/16V
12VDC	2.2uF/25V	12VDC	4.7μF/16V
15VDC	1.0uF/25V	15VDC	1.0μF/25V
24VDC	1.0uF/50V	24VDC	0.47μF/50V

All DC/DC converters in this series are tested according to the recommended application circuit (Figure 1) before the shipment. If further reduction of input and output ripple is required, the external input and output capacitors Cin and Cout can be increased or capacitors with lower series equivalent impedance can be selected. For each output, under safe and reliable operating conditions, the maximum capacitance of the filter capacitor must not exceed the maximum capacitive load of the product.

Design Reference - EMC Solutions - Recommended Circuits

EMC Recommended Circuit Design and Application



(Figure 2)

Recommended Parameter Table

C1	4.7μF /50V
C2	4.7μF /50V
C3	Refer to Cout parameter in Figure 1
CY	1000pF/2kVDC
LDM	6.8μH

Note:

1. Typical Application

To further reduce input and output ripple, a Capacitance Filter network can be connected at the input and output terminals. The application circuit is shown in Figure 1. However, appropriate filter capacitors should be selected. If the capacitor is too large, it may cause startup issues. For each output, the recommended capacitive load values are detailed in the table, provided safe and reliable operation is ensured.

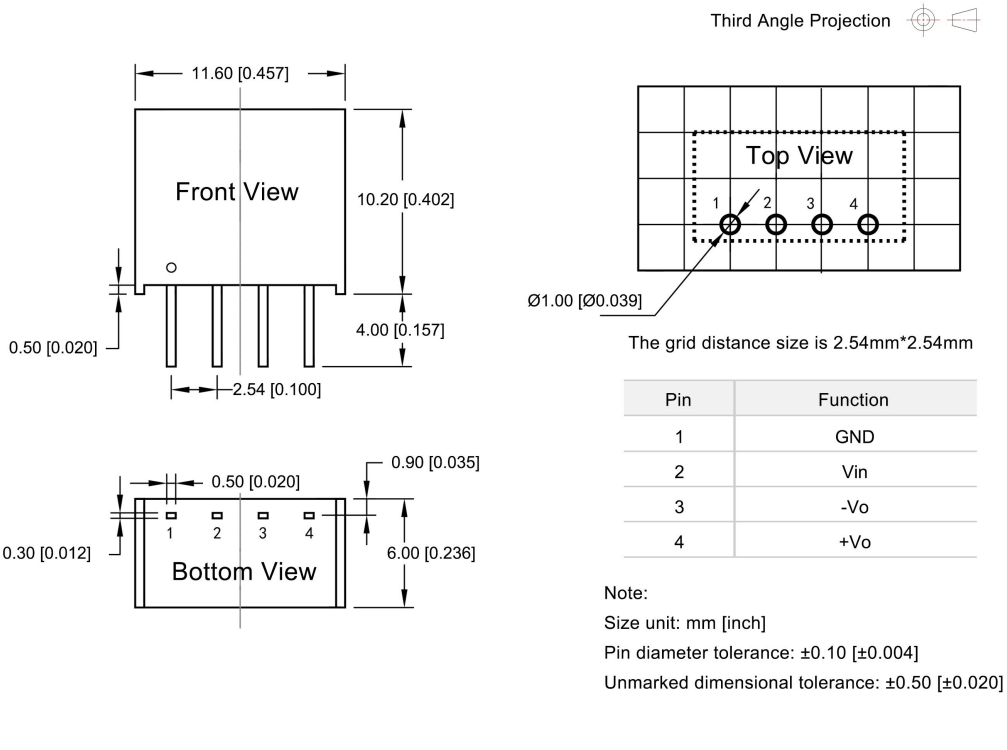
2.EMC Recommended Circuit: See Figure 2

3.Output Load Requirements

To ensure efficient and reliable operation of the module, the minimum output load during use must not be less than 10% of the rated load. If the required power is indeed small, please connect a resistor in parallel at the output (the sum of the power dissipated by the resistor and the actual used power should be greater than or equal to 10% of the rated power.

Dimensions and Recommended Layout

DB1-xxSxxS Dimensions and Recommended Layout



The grid distance size is 2.54mm*2.54mm

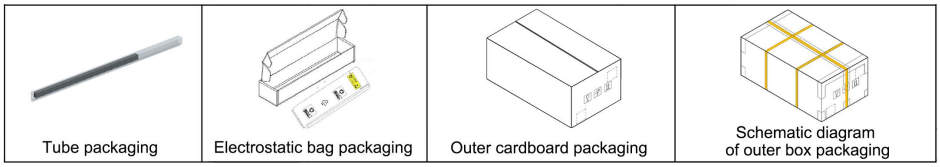
Pin	Function
1	GND
2	Vin
3	-Vo
4	+Vo

Note:
Size unit: mm [inch]
Pin diameter tolerance: ±0.10 [±0.004]
Unmarked dimensional tolerance: ±0.50 [±0.020]

Packaging Information

Model series (Tube packaging)	Quantity per tube (pcs/ tube)	Quantity of electrostatic bag (pcs/ bag)	Quantity of inner box (pcs/ box)	Full box Quantity (pcs)
DB1-xxSxxS	44	704	2816	11264

The schematic diagram of tube packaging is shown below:



Product precautions

1. The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage;
2. It is recommended to use at a load of over 5%. If the load is below 5%, the ripple index of the product may exceed the specifications, but it does not affect the reliability of the product;
3. The maximum capacitive load is tested within the input voltage range and under full load conditions;
4. Unless otherwise specified, all indicators in this manual are measured at Ta=25 ℃, humidity<75% RH, nominal input voltage, and output rated load;
5. All indicator testing methods in this manual are based on our company's corporate standards;
6. Our company can provide product customization, and specific requirements can be directly contacted by our technical personnel;
7. Product specifications are subject to change without prior notice.

Manufacturer contact information

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