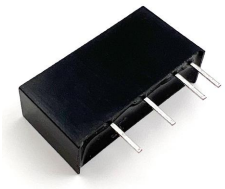
BETT POWER
Powering the future

2025/08/18 (A/2)

DRB1-xxSxxLS Series

DC-DC Converter | 1W | SIP6 | Fixed voltage input, Regulated Output | 1500VDC



Features

- SIP6 Package
- Operating Temperature Range: -40℃ ~ +85℃
- Isolation Voltage: 1500VDC
- Full Load Efficiency: up to 75% (typ.)
- Regulated Output, Voltage Accuracy 3% (MAX.)
- Designed to meet IEC/EN/BS EN/UL 62368

Product Description

Industrial Automate Power Security

The DRB1-xxSxxLS series is 1W regulated DC/DC converters that are an ideal and economical solutions for on-board power applications where an isolated voltage is required. Typical applications are digital interfaces, voltage conversion in distributed power systems, general low-frequency analog circuits, relay drive circuits, data exchange 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	DRB1-03S03LS	3.3 (3.135~3.465)	3.3	25	250	67	2400
	DRB1-03S05LS	3.3 (3.135~3.465)	5	20	200	69	2400
	DRB1-03S09LS	3.3 (3.135~3.465)	9	12	111	68	1000
	DRB1-03S12LS	3.3 (3.135~3.465)	12	9	84	68	560
	DRB1-03S15LS	3.3 (3.135~3.465)	15	7	67	68	560
	DRB1-05S03LS	5 (4.75~5.25)	3.3	25	250	67	2400
	DRB1-05S05LS	5 (4.75~5.25)	5	20	200	70	2400
	DRB1-05S09LS	5 (4.75~5.25)	9	12	111	71	1000
	DRB1-05S12LS	5 (4.75~5.25)	12	9	84	71	560
	DRB1-05S15LS	5 (4.75~5.25)	15	7	67	72	560
	DRB1-05S24LS	5 (4.75~5.25)	24	4	41	72	100
	DRB1-09S09LS	9 (8.55~9.45)	9	12	111	72	1000
	DRB1-12S03LS	12 (11.4~12.6)	3.3	25	250	67	2400
	DRB1-12S05LS	12 (11.4~12.6)	5	20	200	70	2400

Selection Guide

Certification	Part No.	Input Voltage	Output			Full Load	Capacitive
		Nominal (Range) (VDC)	Voltage (VDC)	Current (mA) Min.	Current (mA) Max.	Efficiency (%) Typ.	Load (μF) Max.
EN/UL Pending	DRB1-12S09LS	12 (11.4~12.6)	9	12	111	70	1000
	DRB1-12S12LS	12 (11.4~12.6)	12	9	84	73	560
	DRB1-12S15LS	12 (11.4~12.6)	15	7	67	73	560
	DRB1-15S05LS	15 (14.25~15.75)	5	20	200	73	2400
	DRB1-15S15LS	15 (14.25~15.75)	15	7	67	71	560
	DRB1-24S03LS	24 (22.8~25.2)	3.3	25	250	67	2400
	DRB1-24S05LS	24 (22.8~25.2)	5	20	200	72	2400
	DRB1-24S09LS	24 (22.8~25.2)	9	12	111	72	1000
	DRB1-24S12LS	24 (22.8~25.2)	12	9	84	73	560
	DRB1-24S15LS	24 (22.8~25.2)	15	7	67	75	560

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	--	373/10	410/--	mA
		5/9/12VDC Output	--	445/16	474/--	mA
		15VDC Output	--	448/20	474/--	mA
	5VDC Input	3.3/5VDC Output	--	286/10	303/--	mA
		9/12VDC Output	--	284/12	299/--	mA
		15/24VDC Output	--	279/18	290/--	mA
	9VDC Input	9VDC Output	--	154/10	158/--	mA
	12VDC Input	3.3/5/9/12VDC Output	--	119/10	122/--	mA
		15VDC Output	--	114/10	121/--	mA
	15VDC Input	5VDC Output	--	91/10	97/--	mA
		15VDC Output	--	94/10	97/--	mA
	24VDC Input	3.3VDC Output	--	51/10	65/--	mA
		5/9/12/15VDC Output	--	58/10	63/--	mA
Reflected Ripple Current	3.3VDC Input		--	30	--	mA
	Others		--	15	--	mA
Input Filter Type			Capacitance Filter			
Hot Plug			Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy			--	--	±3	%
Line Regulation	Input voltage variation ±5%		--	--	±0.5	%
	Input voltage variation ±1%		--	--	±0.25	%
Load Regulation	10%~100% load	3.3V Output	--	--	±3	%
		Other output voltages	--	--	±2	%
Ripple & Noise	20MHz bandwidth (peak-to-peak), 3.3VDC input		--	50	90	mVp-p
	20MHz Bandwidth (Peak-to-Peak) 5VDC Input	Others	--	30	mV	mVp-p
		24VDC Output	--	50	mV	mVp-p
	20MHz Bandwidth (Peak-to-Peak) 9/12/15/24VDC Input	3.3/5/9/12VDC Output	--	30	mV	mVp-p
		15VDC Output	--	80	mV	mVp-p
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	Temperature ≥ 71℃ Derating (See Temperature derating curve chart)		-40	--	85	℃
Storage Temperature			-55	--	125	℃
Case Temperature Rise	Ta=25℃, nominal input, full load output	3.3VDC Output	--	30	--	℃
		Others	--	25	--	
Storage Humidity	No condensation	3.3VDC Output	--	--	95	%RH
		Others	5	--	95	
Soldering Profile	Manual soldering, welding point distance from case 1.5mm, 10 seconds		--	--	300	℃
	Wave soldering, max 10 seconds		255	260	265	
Switching Frequency	Full load, nominal input voltage		--	250	--	kHz
MTBF	MIL-HDBK-217F@25℃		>3500Kh			

Mechanical Specifications

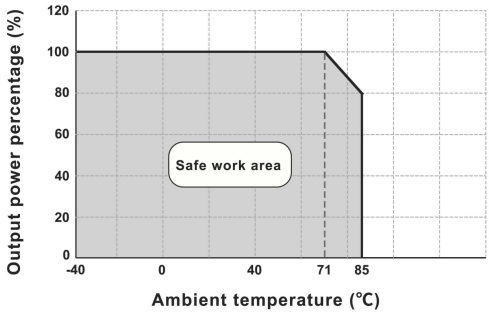
Case Material	Black flame-retardant and heat-resistant plastic (UL94V-0)
Mechanical Dimensions	19.60 * 6.00 *10.10mm
Weight	2.0g (typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

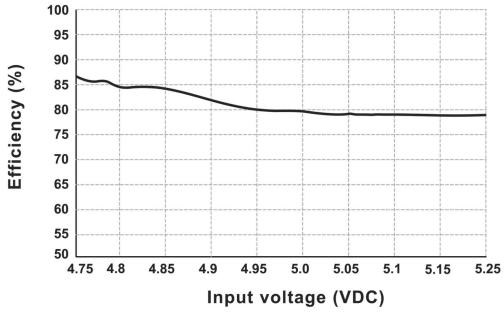
EMI	CE	CISPR32/EN55032 CLASS B (EMC recommended circuit see Fig. 2)	
	RE	CISPR32/EN55032 CLASS B (EMC recommended circuit see Fig. 2)	
EMS	ESD	IEC/EN61000-4-2 Contact ±6KV Air ±8KV	perf. Criteria B

Product Characteristic Curve

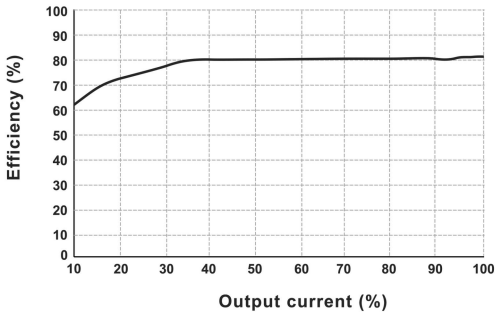
Temperature Derating Curve



Efficiency VS Input Voltage (Full load, DRB1-05S05LS)

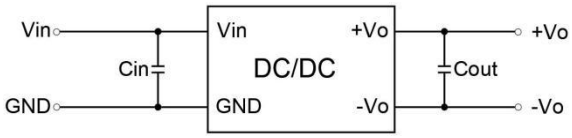


Efficiency VS Output Load (Vin=5V, DRB1-05S05LS)



Design Reference - Application circuit

Application circuit



(Figure 1)

Recommended Capacitive Load Value Table

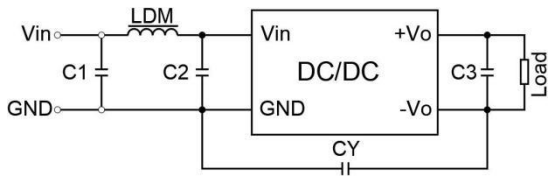
Vin	Cin	Vo	Cout
3.3VDC	4.7uF/16V	3.3/5VDC	10uF/16V
5VDC	4.7uF/16V	9VDC	2.2uF/16V
9/12/15VDC	2.2uF/25V	12VDC	2.2uF/25V
24VDC	1.0uF/50V	15/24VDC	1.0uF/50V

1. If further reduction of input and output ripple is required, a Capacitance Filter network can be connected at the input and output terminals. The application circuit is shown in Figure 1. However, care should be taken to select the appropriate filter capacitor. If the capacitor is too large, it may cause startup issues. For each output, under conditions ensuring safe and reliable operation, the recommended capacitive load values are detailed in the table;

2. To ensure the module operates efficiently and reliably, 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 resistor's power dissipation and the actual used power must be greater than or equal to 10% of the rated power).

Design Reference - EMC Solutions - Recommended Circuits

EMC Recommended Circuit Design and Application



(Figure 2)

Recommended parameter values

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

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, under conditions ensuring safe and reliable operation, the recommended capacitive load values are detailed in the table.

2. Typical EMC Recommended Circuit: See Figure 2

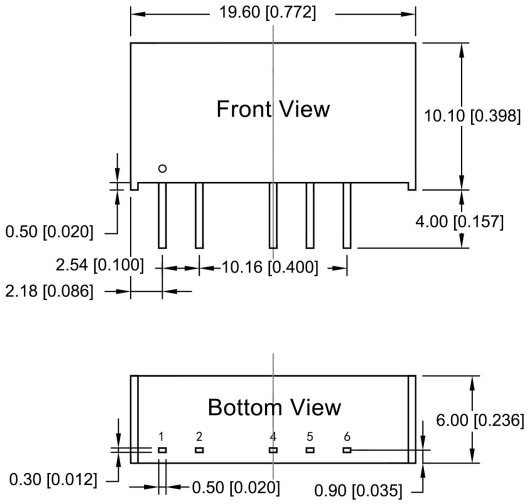
3. Output Load Requirements

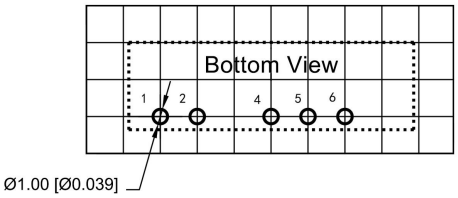
To ensure efficient and reliable operation of the module, the minimum output load during use must not be less than 10% of the rated load. If the required power is indeed small, please connect a resistor in parallel at the output end (the power consumed by the resistor plus the actual usage power is greater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

Dimensions and Recommended Layout

DRB1-xxSxxLS Dimensions and Recommended Layout

Third Angle Projection





The grid distance size is 2.54mm*2.54mm

Pin	Function (Single Output)
1	Vin
2	GND
4	-Vo
5	No Pin
6	+Vo

Note:

Size unit: mm [inch]

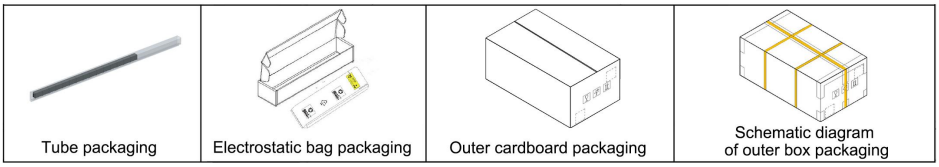
Pin diameter tolerance: ±0.10 [±0.004]

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)
DRB1-xxSxxLS	26	416	1664	6656

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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