2025/08/18 (A/2)

DRB1-xxSxxXT Series

DC-DC Converter | 1W | SMD10 | Fixed voltage input, Regulated Output | 1500VDC

Features

- Compact SMD10 Package
- Operating Temperature Range: -40℃ ~ +105℃
- Full Load Efficiency: up to 73% (typ.)
- Isolation Voltage: 1500VDC
- Continuous Short Circuit Protection
- Designed to meet IEC/EN/BS EN/UL 62368

Product Description

The DRB1-xxSxxXT 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. For automated SMD production lines, this series can be supplied in standard tape and reel package.

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	DRB1-05S03XT	5 (4.75~5.25)	3.3	0	250	67	2400
	DRB1-05S05XT	5 (4.75~5.25)	5	0	200	70	2400
	DRB1-05S09XT	5 (4.75~5.25)	9	0	56	71	560
	DRB1-05S12XT	5 (4.75~5.25)	12	0	84	72	560
	DRB1-05S15XT	5 (4.75~5.25)	15	0	67	73	560
	DRB1-05S24XT	5 (4.75~5.25)	24	0	41	72	100
	DRB1-12S03XT	12 (11.4~12.6)	3.3	0	250	67	2400
	DRB1-12S05XT	12 (11.4~12.6)	5	0	200	70	2400
	DRB1-12S12XT	12 (11.4~12.6)	12	0	83	72	560
	DRB1-24S03XT	24 (22.8~25.2)	3.3	0	250	67	2400
	DRB1-24S05XT	24 (22.8~25.2)	5	0	200	72	2400
	DRB1-24S12XT	24 (22.8~25.2)	12	0	83	73	560
	DRB1-24S15XT	24 (22.8~25.2)	15	0	67	73	560

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (Full Load/No-load)	5VDC Input	--	286/15	305/--	mA
	12VDC Input	--	115/8	121/--	mA
	24VDC Input	--	59/4	65/--	mA
Reflected Ripple Current		--	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 ± 1%		--	--	±0.25	%
Load Regulation	10%~100% Load	3.3VDC Output	--	--	±3	%
		Others	--	--	±2	%
Ripple & Noise	20MHz Bandwidth (Peak-to-Peak)	24VDC Output	--	50	120	mVp-p
		Others	--	30	80	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 ≥ 85℃ Derating (See Temperature derating curve chart)	-40	--	105	℃
Storage Temperature		-55	--	125	℃
Case Temperature Rise	Ta=25℃, nominal input, full load output	--	25	--	℃
Storage Humidity	No condensation	--	--	95	%RH
Soldering Profile	Welding point distance from case 1.5mm, 10 seconds	--	--	300	℃
Switching Frequency	Full load, nominal input voltage	--	220	--	kHz
MTBF	MIL-HDBK-217F@25℃	>3500Kh			

Mechanical Specifications

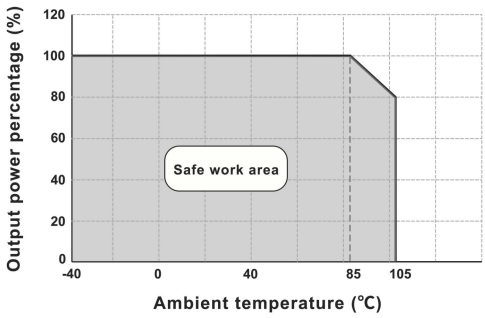
Case Material	Black flame-retardant heat-resistant plastic (UL94V-0)
Mechanical Dimensions	15.24 * 11.40 * 7.25 mm
Weight	1.3g (typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

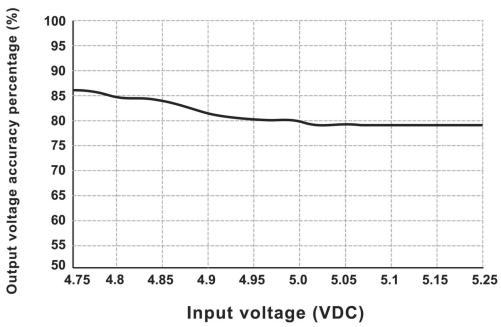
EMI	CE	CISPR32/EN55032 CLASS B (EMC recommended circuit see Fig. 2)	
	RE	CISPR32/EN55032 CLASS B (EMC recommended circuit see Fig. 2)	
EMS	ESD	IEC/EN61000-4-2 Contact ±8KV	Perf. Criteria B

Product Characteristic Curve

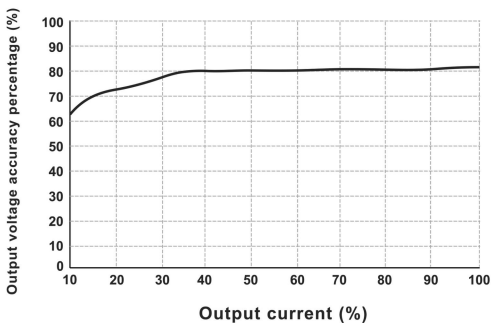
Temperature Derating Curve



Efficiency vs. Input Voltage (Full Load, DRB1-05S05XT)

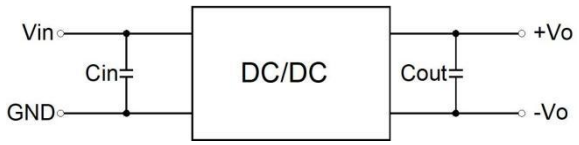


Efficiency vs. Output Load (Vin=5V, DRB1-05S05XT)



Design Reference - Application circuit

Application circuit



(Figure 1)

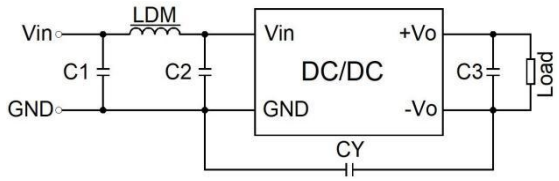
Recommended Capacitive Load Value Table			
Vin	Cin	Vo	Cout
5VDC	4.7uF/16V	3.3/5VDC	10uF/16V
12VDC	2.2uF/25V	9VDC	2.2uF/16V
24VDC	1.0uF/50V	12VDC	2.2uF/25V
--	--	15/24VDC	1.0uF/50V

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

2. 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 sum of the resistor's power dissipation and the actual usage power should be greater than or equal to 10% of the rated power).

Design Reference - EMC Solutions - Recommended Circuits

EMC Recommended Circuit Design and Application

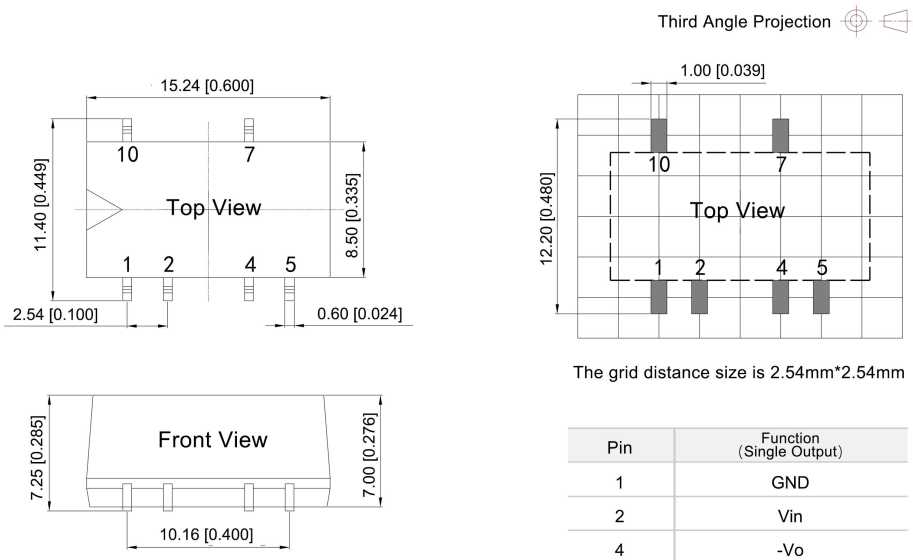


(Figure 2)

Recommended parameter values	
C1	4.7μF /50V
C2	4.7μF /50V
C3	Refer to Cout parameter in Figure 1
CY	1nF/4KV
LDM	6.8μH

Dimensions and Recommended Layout

DB1-xxSxxXT Dimensions and Recommended Layout



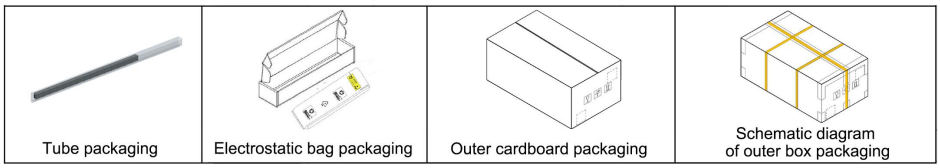
Pin	Function (Single Output)
1	GND
2	Vin
4	-Vo
5	-Vo
7	+Vo
10	NC

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

Packaging Information

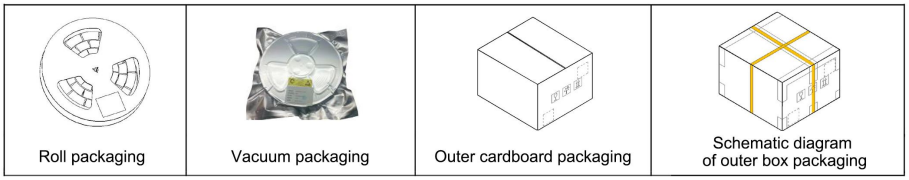
Model series (Tube packaging)	Quantity per tube (pcs/ tube)	Quantity of electrostatic bag (pcs/ bag)	Quantity of inner box (pcs/ box)	Full box Quantity (pcs)
DRB1-xxSxxXT	38	760	3040	12160

The schematic diagram of tube packaging is shown below:

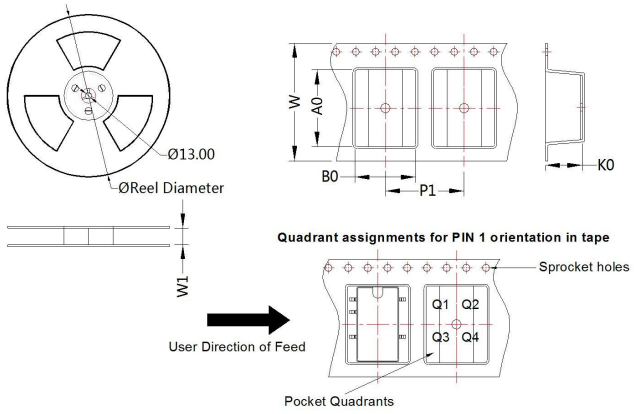


Model series (Reel packaging)	Quantity of products carried (pcs/ROLL)	Quantity of electrostatic bag (pcs/ bag)	Quantity of inner box (pcs/ box)	Full box Quantity (pcs)
DRB1-xxSxxXT	500	500	1500	3000

The schematic diagram of Reel packaging is shown below:



Package type	Pin	MPQ	Reel Diameter (mm)	Reel Width W1(mm)	A0(mm)	B0(mm)	K0(mm)	P1(mm)	W(mm)	Pin1 Quadrant
SMD	6	500	330	24.5	15.64	12.4	7.45	16	24	Q1



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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