2025/08/18 (A/2)

DB2-xxDxxXT Series

DC-DC Converter | 2W | SMD10 | Fixed voltage input, unregulated output | 1500VDC

Features

- Compact SMD10 Package
- Operating Temperature Range: -40℃ ~ +105℃
- Isolation Voltage: 1500VDC
- Full Load Efficiency: up to 88% (typ.)
- Continuous Short Circuit Protection
- Designed to meet IEC/EN/BS EN/UL 62368

Product Description

Power Industrial Automotive Telecom Network Security Automate

The DB2-xxDxxXT series is 2W unregulated DC/DC converters that are 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	DB2-03D03XT	3.3 (2.97~3.63)	±3.3	±30	±303	76	1000
	DB2-03D05XT	3.3 (2.97~3.63)	±5	±20	±200	83	1000
	DB2-05D03XT	5 (4.5~5.5)	±3.3	±30	±303	81	1000
	DB2-05D05XT	5 (4.5~5.5)	±5	±20	±200	86	1000
	DB2-05D09XT	5 (4.5~5.5)	±9	±11	±111	86	470
	DB2-05D12XT	5 (4.5~5.5)	±12	±8	±84	85	220
	DB2-05D15XT	5 (4.5~5.5)	±15	±6	±67	86	220
	DB2-05D24XT	5 (4.5~5.5)	±24	±4	±42	85	100
	DB2-12D03XT	12 (10.8~13.2)	±3.3	±30	±303	82	1000
	DB2-12D05XT	12 (10.8~13.2)	±5	±20	±200	83	1000
	DB2-12D09XT	12 (10.8~13.2)	±9	±11	±111	84	470
	DB2-12D12XT	12 (10.8~13.2)	±12	±8	±84	87	220
	DB2-12D15XT	12 (10.8~13.2)	±15	±6	±67	87	220

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	DB2-12D24XT	12 (10.8~13.2)	±24	±4	±42	87	100
	DB2-15D03XT	15 (13.5~16.5)	±3.3	±30	±303	82	1000
	DB2-15D05XT	15 (13.5~16.5)	±5	±20	±200	83	1000
	DB2-15D09XT	15 (13.5~16.5)	±9	±11	±111	85	470
	DB2-15D12XT	15 (13.5~16.5)	±12	±8	±84	87	220
	DB2-15D15XT	15 (13.5~16.5)	±15	±6	±67	88	220
	DB2-15D24XT	15 (13.5~16.5)	±24	±4	±42	88	100
	DB2-24D03XT	24 (21.60~26.40)	±3.3	±30	±303	82	1000
	DB2-24D05XT	24 (21.60~26.40)	±5	±20	±200	84	1000
	DB2-24D09XT	24 (21.60~26.40)	±9	±11	±111	85	470
	DB2-24D12XT	24 (21.60~26.40)	±12	±8	±84	88	220
	DB2-24D15XT	24 (21.60~26.40)	±15	±6	±67	88	220
	DB2-24D24XT	24 (21.60~26.40)	±24	±4	±42	88	100

Note:

1. *The capacitive load of the two outputs for positive and negative output is the same.
2. 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	--	797/10	842/15	mA
		5VDC Output	--	730/10	768/15	mA
	5VDC Input	3.3VDC Output	--	494/8	520/15	mA
		5/9/12/15VDC Output	--	470/10	494/15	mA
		24VDC Output	--	470/25	494/35	mA
	12VDC Input	3.3VDC Output	--	203/7	214/15	mA
		5/9VDC Output	--	200/7	211/15	mA
		Others	--	191/8	201/15	mA
	15VDC Input	3.3/5VDC Output	--	162/6	171/15	mA
		9VDC Output	--	157/6	165/15	mA
		Others	--	153/6	161/15	mA
	24VDC Input	3.3VDC Output	--	102/4	107/15	mA
		5/9VDC Output	--	99/4	105/15	mA
		Others	--	94/5	100/15	mA
Reflected Ripple Current			--	15	--	mA
Surge Voltage	3.3VDC Input		-0.7	--	5	VDC
	5VDC Input		-0.7	--	9	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	Rated Load	3.3V	--	±1.5	--	%
		Others	--	±1.2	--	%
Load Regulation	10%~100% Load	3.3VDC Output	--	12	--	%
		5VDC Output	--	12	--	%
		9VDC Output	--	8	--	%
		12VDC Output	--	8	--	%
		15VDC Output	--	8	--	%
		24VDC Output	--	6	--	%
Ripple & Noise	20MHz Bandwidth (Peak-to-Peak)		--	60	120	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	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	--	25	--	℃
Storage Humidity	Non-condensing	5	--	95	%RH
Reflow Soldering Temperature	Peak Temperature Tc≤245℃, Maximum 60s above 217℃				
Switching Frequency	Full Load, Nominal Input Voltage	--	220	--	kHz
MTBF	MIL-HDBK-217F@25℃	>3500Kh			

Mechanical Specifications

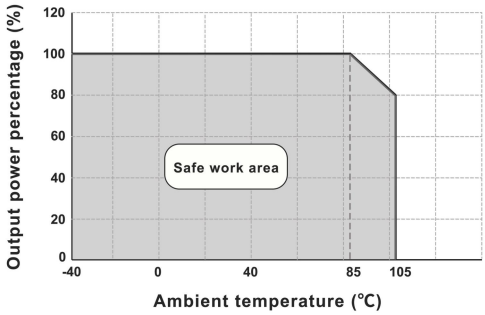
Case Material	Black flame-retardant heat-resistant plastic (UL94V-0)
Package Dimensions	15.24 * 11.40 * 7.25 mm
Weight	1.35g(typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

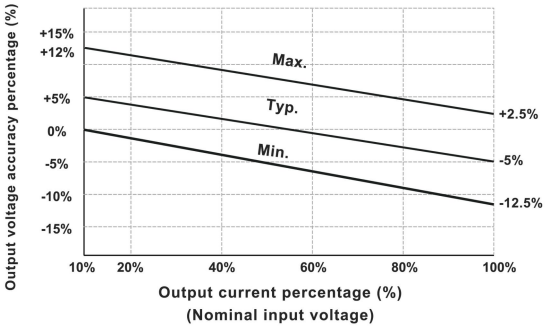
EMI	CE	CISPR32/EN55032 CLASS B (EMC recommended circuit see Fig. 2)	
	RE	CISPR32/EN55032 CLASS B (EMC recommended circuit see Fig. 2)	
EMS	ESD	IEC/EN61000-4-2 Contact ±6KV	perf. Criteria B

Product Characteristic Curve

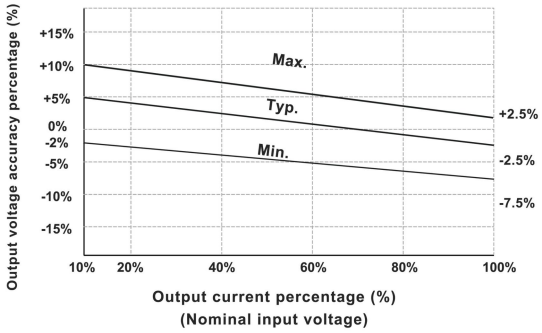
Temperature Derating Curve



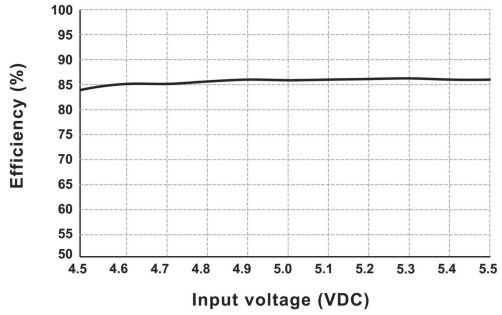
Output Regulation Curve (3.3V Output)



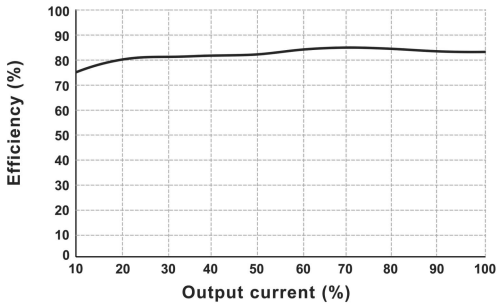
Output Regulation Curve (Others)



Efficiency VS Input Voltage (Full Load,DB2-05D05XT)

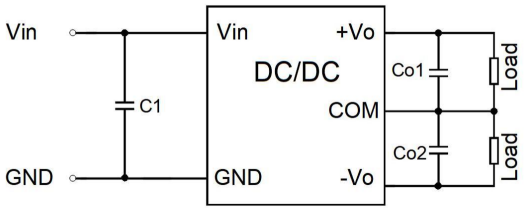


Efficiency VS Output Load (Vin=5V,DB2-05D05XT)



Design Reference - Application circuit

Application circuit



(Figure 1)

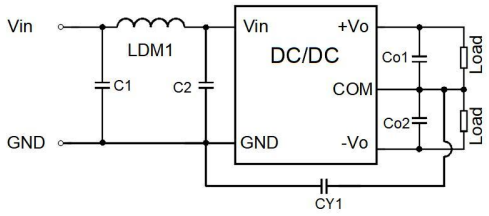
Recommended Capacitive Load Value Table

Vin	C1	Vo	Co1/Co2
3.3/5VDC	10uF/16V	3.3/5VDC	10uF/16V
12VDC	4.7uF/25V	9/12VDC	2.2uF/25V
15VDC	2.2uF/25V	15VDC	1.0uF/25V
24VDC	1.0uF/50V	24VDC	1.0uF/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 capacitors C1, Co1/Co2 at the input and output terminal can be increased in value, or capacitors with low equivalent series impedance can be selected. For each output, under safe and reliable operating conditions, the maximum capacitance of the filter capacitor must not exceed the product's maximum capacitive load.

Design Reference - EMC Solutions - Recommended Circuits

EMC Recommended Circuit Design and Application



(Figure 2)

Recommended Parameter Table

C1/C2	4.7μF /50V
Co1/Co2	Refer to Co1/Co2 parameters in Figure 1
CY1	1000pF/3kVDC
LDM1	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, 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, the recommended capacitive load values are detailed in the table.

2. EMC Recommended Circuit: See Figure 2

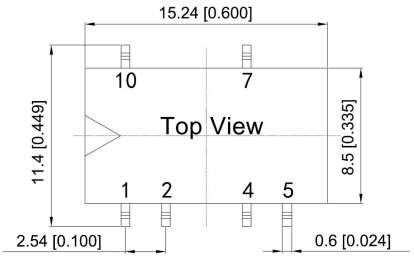
3. Output Load Requirements

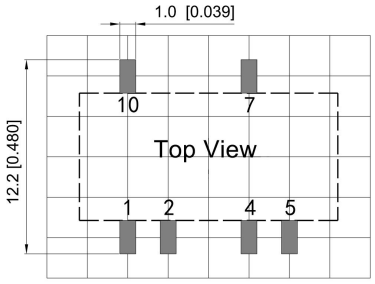
To ensure efficient and reliable operation of the module, the minimum output load during use must not be less than 10% of the rated load. If the required power is indeed small, connect a resistor in parallel at the output terminal (the sum of the resistor's power dissipation and the actual used power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

Dimensions and Recommended Layout

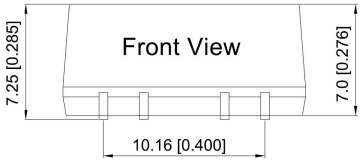
DB2-xxDxxXT Dimensions and Recommended Layout

Third Angle Projection





The grid distance size is 2.54mm*2.54mm



Pin	Function
1	GND
2	Vin
4	COM
5	-Vo
7	+Vo
10	NC

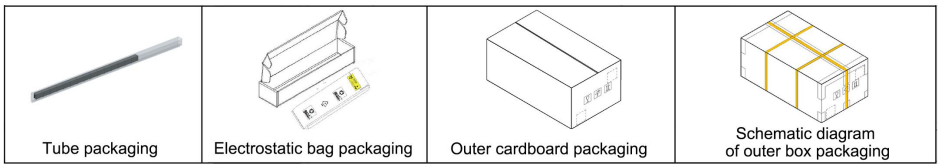
NC: Cannot be connected to any external circuit

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

Packaging Information

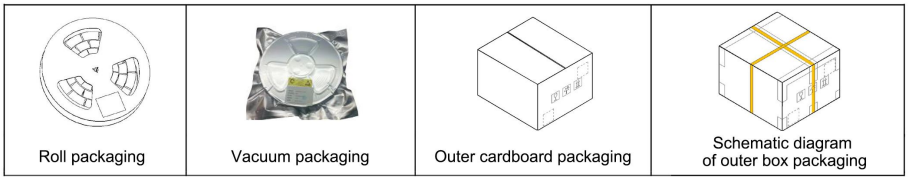
Model series (Tube packaging)	Quantity per tube (pcs/ tube)	Quantity of electrostatic bag (pcs/ bag)	Quantity of inner box (pcs/ box)	Full box Quantity (pcs)
DB2-xxDxxXT	38	760	3040	12160

The schematic diagram of tube packaging is shown below:

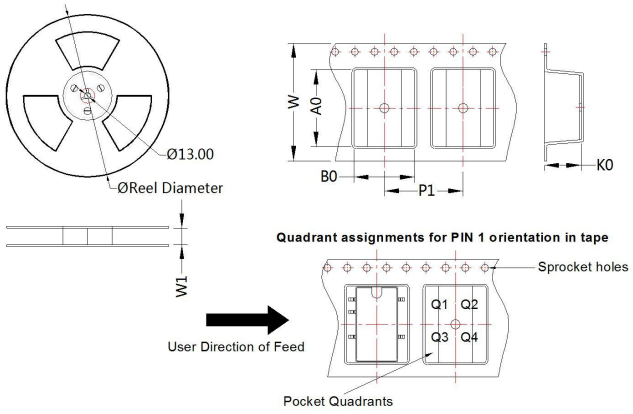


Model series (Reel packaging)	Quantity of products carried (pcs/ROLL)	Quantity of electrostatic bag (pcs/ bag)	Quantity of inner box (pcs/ box)	Full box Quantity (pcs)
DB2-xxDxxXT	500	500	1500	3000

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



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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