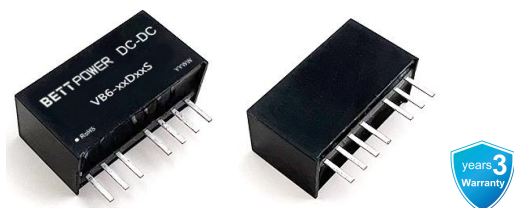


VB6-xxDxxS Series

DC-DC Converter | 6W | SIP8 | 4:1 Wide Input Voltage, Regulated Output | 1600VDC



Features

- SIP8 Package
- Operating Temperature Range: -40°C ~ +85°C
- 4:1 Wide Input Voltage Range
- Isolation Voltage: 1600VDC
- Full Load Efficiency: 87% (typ.)
- Input Under-voltage Protection, Output Short Circuit Protection, Over-current Protection
- Designed to meet IEC/EN/BS EN/UL 62368

Product Description



The VB6-xxDxxS series is an industrial-grade DC-DC converter module with 4:1 wide input voltage and regulated output. It features a compact SIP-8 plastic pin package, high efficiency, remote on/off control, and continuous short circuit protection. The small size and excellent cost design make this converter an ideal solution for applications in communication equipment, instrumentation, and industrial electronics.

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency (%) Typ.	Capacitive Load (μF) Max.
		Nominal (Range)	Max.	Output Voltage (VDC)	Max. Current (mA)		
EN/UL pending	VB6-12D03S	12 (4.5~18)	20	±3.3	±750	76	470
	VB6-12D05S	12 (4.5~18)	20	±5	±600	78	470
	VB6-12D09S	12 (4.5~18)	20	±09	±333	80	220
	VB6-12D12S	12 (4.5~18)	20	±12	±250	81	120
	VB6-12D15S	12 (4.5~18)	20	±15	±200	81	100
	VB6-12D24S	12 (4.5~18)	20	±24	±125	82	68
	VB6-24D03S	24 (9~36)	40	±3.3	±750	78	470
	VB6-24D05S	24 (9~36)	40	±5	±600	80	470
	VB6-24D09S	24 (9~36)	40	±9	±333	81	220
	VB6-24D12S	24 (9~36)	40	±12	±250	82	120
	VB6-24D15S	24 (9~36)	40	±15	±200	82	100
	VB6-24D24S	24 (9~36)	40	±24	±125	83	68

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency (%) Typ.	Capacitive Load (μF) Max.
		Nominal (Range)	Max.	Output Voltage (VDC)	Max. Current (mA)		
EN/UL pending	VB6-48D03S	48 (18~75)	80	±3.3	±750	78	470
	VB6-48D05S	48 (18~75)	80	±5	±600	80	470
	VB6-48D09S	48 (18~75)	80	±9	±333	81	220
	VB6-48D12S	48 (18~75)	80	±12	±250	82	120
	VB6-48D15S	48 (18~75)	80	±15	±200	82	100
	VB6-48D24S	48 (18~75)	80	±24	±125	83	68

Note:

- 1. The input voltage should not exceed the maximum value, otherwise it may cause permanent and irreparable damage;
- 2. The above efficiency values are measured at nominal input voltage and rated output load;
- 3. *The capacitive load for both positive and negative outputs is the same.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (Full Load/No-load)	12VDC Input	3.3V Output	--	543/12	560/30	mA
		5V Output	--	641/10	658/30	mA
		Others	--	618/10	633/30	mA
	24VDC Input	3.3V Output	--	264/5	271/12	mA
		5V Output	--	313/5	320/12	mA
		Others	--	308/5	316/12	mA
	48VDC Input	3.3V Output	--	132/5	136/12	mA
		5V Output	--	158/5	166/12	mA
		Others	--	146/5	156/12	mA
Reflected Ripple Current			--	50	--	mA
Surge Voltage (1sec.max.)	12VDC Input		-0.7	--	25	VDC
	24VDC Input		-0.7	--	50	VDC
	48VDC Input		-0.7	--	100	VDC
Start-up Voltage	12VDC Input		--	--	4.5	VDC
	24VDC Input		--	--	9	VDC
	48VDC Input		--	--	18	VDC
Input Under-voltage Protection	12VDC Input		3.5	4	--	VDC
	24VDC Input		5.5	6.5	--	VDC
	48VDC Input		12	15.5	--	VDC
Ctrl	Turn on module		Ctrl pin open or pulled high (TTL2.7-12VDC)			
	Turn off module		Ctrl pin pulled low to GND (0-1.2VDC)			
Input Filter Type			Capacitor Filter			
Hot Plug			Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	5%~100% Load	Vo1	--	±1.0	±3.0	%
		Vo2	--	±3.0	±5.0	%
Line Regulation	Full load, input voltage from low limit to high limit	Vo1	--	±0.5	±1.0	%
		Vo2	--	±1.0	±1.5	%
Load Regulation	5% to 100% Load	Vo1	--	±0.5	±1.5	%
		Vo2	--	±1.0	±1.5	%
Ripple & Noise	20MHz Bandwidth, 5% - 100% Load		--	50	100	mVp-p
Transient Recovery Time	25% Load Step Change		--	0.3	0.5	ms
Transient Response	25% Load Step Change	3.3, 5V Output	--	±5	±8	%

Deviation	Nominal Input Voltage	Other Voltage Outputs	--	±3	±5	%
Temperature Coefficient	Full Load		--	--	±0.03	%/°C
Over current Protection			110	160	--	%
Short Circuit Protection			Continuous Short Circuit, Self-Recovery			

Note:

- Under 0%-100% load conditions, the load regulation index is ±3%
- The ripple and noise test method adopts the industry-standard parallel line test method, and the ripple & noise at 0%-5% load is ≤ 150mV.
- 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	1600	--	--	VDC
Insulation Resistance	Input-Output, Insulation Voltage 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-Output, 100KHz/0.1V	--	1000	--	pF
Operating Temperature	See: Temperature Derating Curve	-40	--	85	°C
Storage Temperature		-55	--	125	°C
Storage Humidity	No condensation	5	--	95	%RH
Soldering Profile	Wave soldering	260±5°C; Time: 5 - 10s			
	Manual soldering	360±10°C; Time: 3-5s			
Switching Frequency	Full load, nominal input voltage	--	300	--	kHz
Product Certification	Product design complies with: UL-62368-1; CB-62368-1; CE-62368-1				
Safety Standard	Product design complies with: IEC/UL62368-1, IEC/EN60335-1, IEC/EN61558-1				
MTBF	MIL-HDBK-217F@25°C	>1000Kh			

Mechanical Specifications

Case Material	Black flame-retardant and heat-resistant plastic (UL94V-0)
Mechanical Dimensions	22.00 * 9.50 * 12.00mm
Weight	4.8g (typ.)
Cooling Method	Free air convection

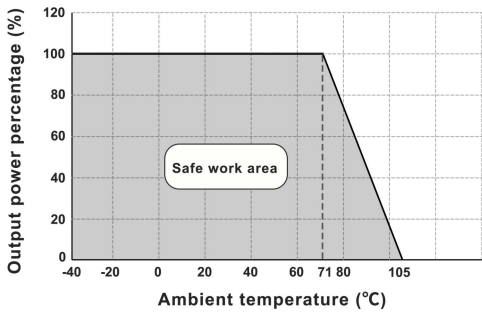
Electromagnetic Compatibility (EMC)

EMI	CE	CISPR32/EN55032 CLASS B (Recommended circuit see Figure 2-②)			
	RE	CISPR32/EN55032 CLASS B (Recommended circuit see Figure 2-②)			
EMS	ESD	IEC/EN61000-4-2 Contact±4KV			perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m			perf. Criteria A
	EFT	IEC/EN61000-4-4 ±2KV (Recommended circuit see Figure 2-①)			perf. Criteria B

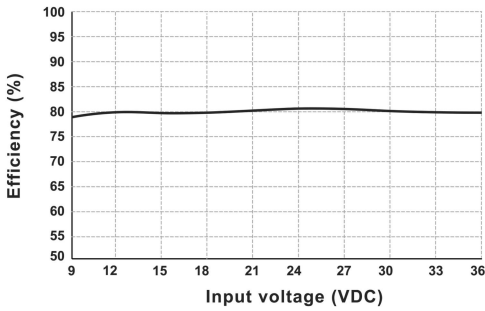
Surge	IEC/EN61000-4-5 line to line $\pm 1\text{KV}$ (Recommended circuit see Figure 2-①)	perf. Criteria B
CS	IEC/EN61000-4-6 3Vr.m.s	perf. Criteria A

Product Characteristic Curve

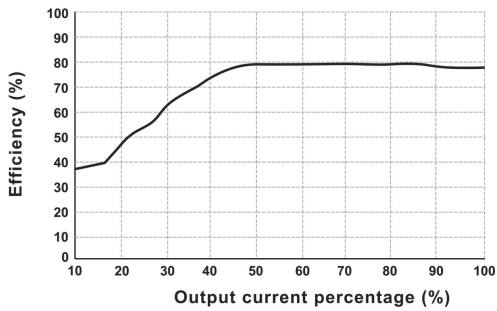
Temperature Derating Curve



Efficiency VS Input Voltage (Full Load, VB6-24D15S)

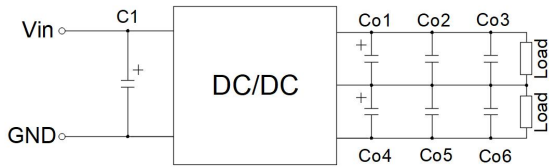


Efficiency VS Output Load (Vin=24V, VB6-24D15S)



Design Reference - Application circuit

Application circuit



(Figure 1)

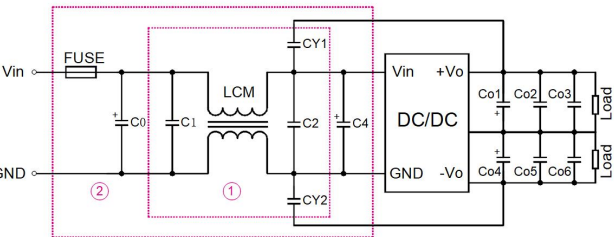
Recommended Capacitive Load Value Table

Vout	C1(uF)	Co1, Co4	Co2, Co5	Co3, Co6
3.3/5/6VDC	100μF/100V	100uF/16V	0.1uF/50V	10uF/50V
9/12/15VDC	100μF/100V	47μF/25V	0.1uF/50V	10μF/50V
24/28VDC	100μF/100V	47μF/50V	0.1uF/50V	10μF/50V

All DC/DC converters in this series are tested before shipment according to the recommended test circuit (Figure 1). To further reduce input and output ripple, the external input and output capacitors C1, Co1, Co2, Co3 can be increased or capacitors with lower series equivalent impedance can be selected, but the capacitance value must not exceed the maximum capacitive load of the product.

Design Reference - EMC Solutions - Recommended Circuits

EMC Recommended Circuit Design and Application



(Figure 2)

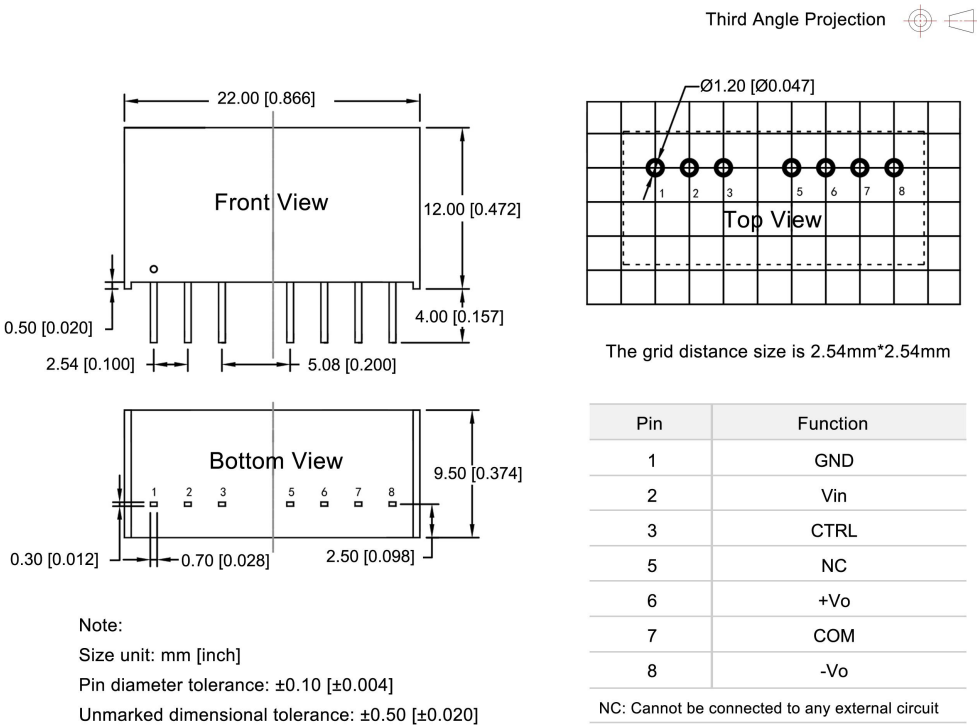
Recommended Parameter Table

Input Voltage	Vin:12V	Vin:24V	Vin:48V
FUSE	Select according to the actual input current		
C0, C4	330μF/25V	330μF/50V	220μF/100V
C1, C2	10μF/50V		
LCM	1.4-1.7mH		
Co1/Co2/Co3/Co4/Co5/Co6	Refer to capacitor parameters in Figure 1		
CY1, CY2	1nF/400VAC		

Part ① in the figure is used for EMC testing;
Part ② is used for EMI filtering, which can be selected as needed.

Dimensions and Recommended Layout

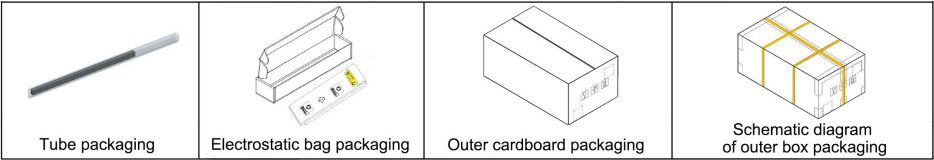
VB6-xxDxxS Dimensions and Recommended Layout



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)
VB6-xxDxxS	23	230	920	3680

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 $T_a=25\text{ }^{\circ}\text{C}$, 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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