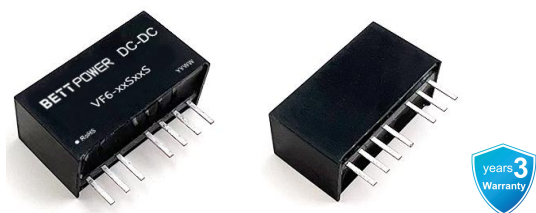


VF6-xxSxxS Series

DC-DC Converter | 6W | SIP8 | 4:1 Wide Input Voltage Regulated Output | 3000VDC



Features

- SIP8 Package
- Operating Temperature Range: -40°C ~ +85°C
- 4:1 Wide Input Voltage Range
- Isolation Voltage: 3000VDC
- 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



VF6-xxSxxS Series, this series is an industrial-grade DC-DC converter module with 4:1 wide input voltage and regulated output, featuring 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 communication equipment, instrumentation, and industrial electronics applications.

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	VF6-12S03S	12 (4.5~18)	20	3.3	1350	80	1800
	VF6-12S05S	12 (4.5~18)	20	5	1200	80	1000
	VF6-12S06S	12 (4.5~18)	20	6	1000	81	680
	VF6-12S09S	12 (4.5~18)	20	9	667	83	470
	VF6-12S12S	12 (4.5~18)	20	12	500	83	470
	VF6-12S15S	12 (4.5~18)	20	15	400	84	220
	VF6-12S24S	12 (4.5~18)	20	24	250	84	100
	VF6-24S03S	24 (9~36)	40	3.3	1350	80	1800
	VF6-24S05S	24 (9~36)	40	5	1200	82	1000
	VF6-24S06S	24 (9~36)	40	6	1000	82	680
	VF6-24S09S	24 (9~36)	40	9	667	84	470
	VF6-24S12S	24 (9~36)	40	12	500	86	470

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	VF6-24S15S	24 (9~36)	40	15	400	87	220
	VF6-24S24S	24 (9~36)	40	24	250	85	100
	VF6-48S03S	48 (18~75)	80	3.3	3000	78	1200
	VF6-48S05S	48 (18~75)	80	5	1200	82	680
	VF6-48S09S	48 (18~75)	80	9	667	84	470
	VF6-48S12S	48 (18~75)	80	12	500	83	330
	VF6-48S15S	48 (18~75)	80	15	400	84	150
	VF6-48S24S	48 (18~75)	80	24	250	82	68
	VF6-48S28S	48 (18~75)	80	28	214	82	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.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (Full Load/No-load)	12VDC Input	3.3V Output	--	465/10	476/30	mA
		5/6V Output	--	625/10	641/30	mA
		Others	--	596/10	610/30	mA
	24VDC Input	3.3V Output	--	238/5	248/12	mA
		5/6V Output	--	313/5	325/12	mA
		Others	--	305/5	315/12	mA
	48VDC Input	3.3V, 5V Output	--	158/5	166/12	mA
		Others	--	146/10	156/16	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			Capacitance Filtering			
Hot Plug			Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	5%~100% load		--	±1.0	±3.0	%
Line Regulation	Full load, input voltage from low limit to high limit		--	±0.5	±1.0	%
Load Regulation	5% to 100% load		--	±0.5	±1.5	%
	0% - 5% load		--	±0.5	±3	%
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 Deviation	25% load step change	3.3, 5, 6V output	--	±5	±8	%
	Nominal input voltage	Others	--	±3	±5	%
Temperature Coefficient	Full load		--	--	±0.03	%/°C
Over current Protection			110	160	--	%
Short Circuit Protection			Continuous short circuit, 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	3000	--	--	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
Safety Standard	Product design complies with: IEC/UL62368-1, IEC/EN60335-1, IEC/EN61558-1				
MTBF	MIL-HDBK-217F@25°C	>1000Kh			

Mechanical Specifications

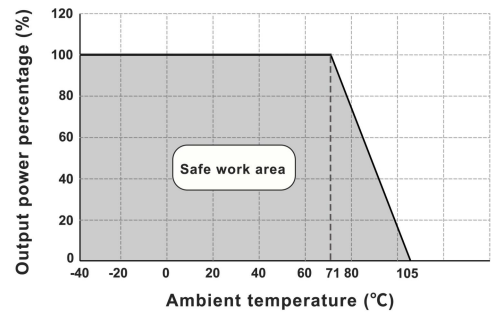
Case Material	Black flame-retardant and heat-resistant plastic (UL94V-0)
Mechanical Dimensions	22.00 * 9.50 * 12.00mm
Weight	4.8g (typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

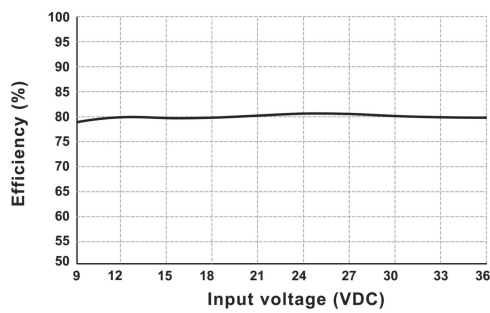
EMI	CE	CISPR32/EN55032 CLASS B (Recommended circuit see Figure 2-②)	
	RE	CISPR32/EN55032 CLASS B (Recommended circuit see Figure 2-②)	
EMS	ESD	IEC/EN61000-4-2 Contact±4KV	perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4 ±2KV (Recommended circuit see Figure 2-①)	perf. Criteria B
	Surge	IEC/EN61000-4-5 line to line ±1KV (Recommended circuit see Figure 2-①)	perf. Criteria B
	CS	IEC/EN61000-4-6 3Vr.m.s	perf. Criteria A

Product Characteristic Curve

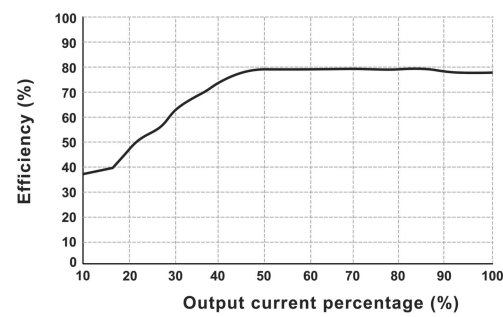
Temperature Derating Curve



Efficiency VS Input Voltage Curve (Full Load, Vin=24V)

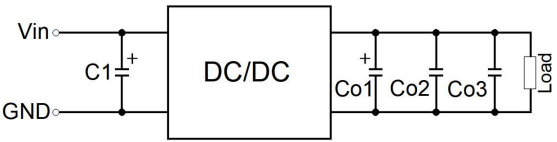


Efficiency VS Output Load Curve (Vin=24V)



Design Reference - Application Circuit

Application circuit



(Figure 1)

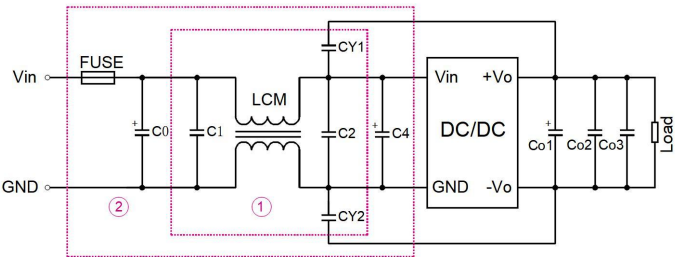
Recommended Capacitive Load Value Table

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

All DC/DC converters in this series are tested before shipment according to the test circuit recommended in (Figure 1). If further reduction of input and output ripple is required, 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)

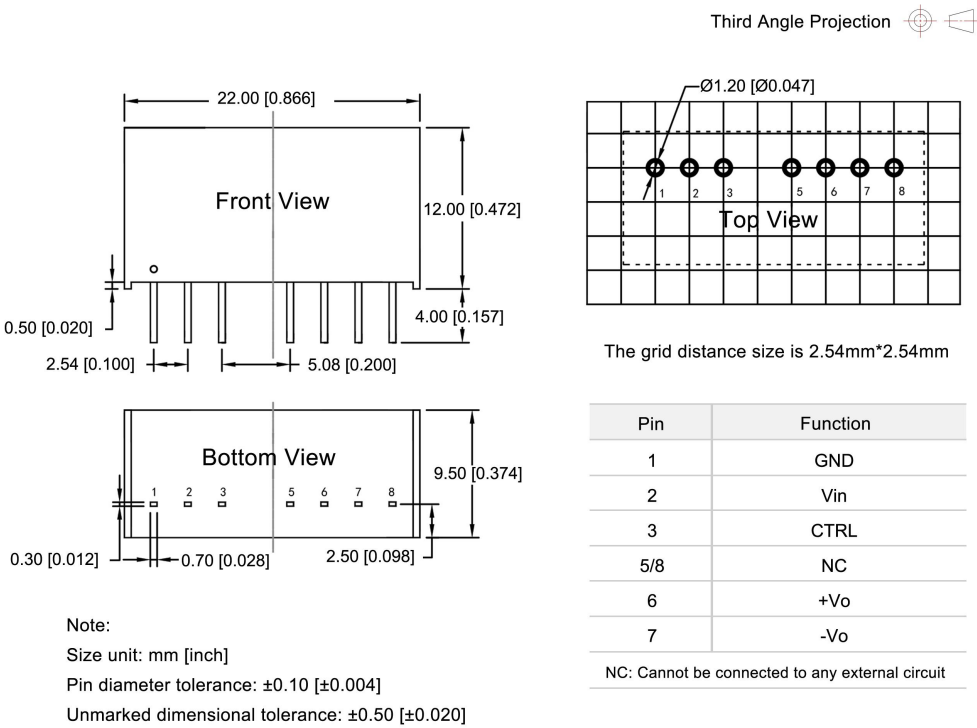
Recommended Parameter Table

Input Voltage	Vin:12V	Vin:24V	Vin:48V
FUSE	Select according to the actual input current		
C0, C4	330uF/25V	330uF/50V	220uF/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 is used for EMC testing;
Part ② is used for EMI filtering, selectable based on requirements.

Dimensions and Recommended Layout

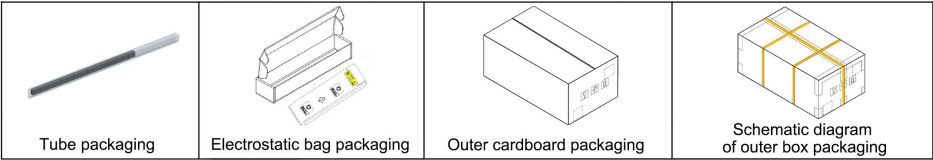
VF6-xxSxxS Dimensions and Recommended Layout



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)
VF6-xxSxxS	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

Bettpower Guangzhou Electronic Technology Co., Ltd.

Website: www.bettpower.com

Telephone: +86 - 020 - 32166256

Email: info@bettpower.com

Address: Room 2514-2515, Building A1,1 Doutang Road, Huangpu District, Guangzhou, China

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