Isolation Type DC/DC High Voltage Power Module

6KV High isolated DC boost module dc-dc conveter：GRF Series

Product Features:

- Low cost and small volume SIP 12Pin flame retardant package which meets UL94V-0 standard
- 6000VDC high isolation between DC boost module power input and output
- 2: 1 DC wide voltage input range, isolated regulated DC high voltage output
- Output voltage: 50VDC ~ 500VDC for optional
- Output power: 1W ~ 5W for optional
- High-voltage output&circuit output with self-recovery short-circuit protection
- Efficiency up to 60% ~ 80%
- Industrial temperature range: -40 ~ + 85 ℃

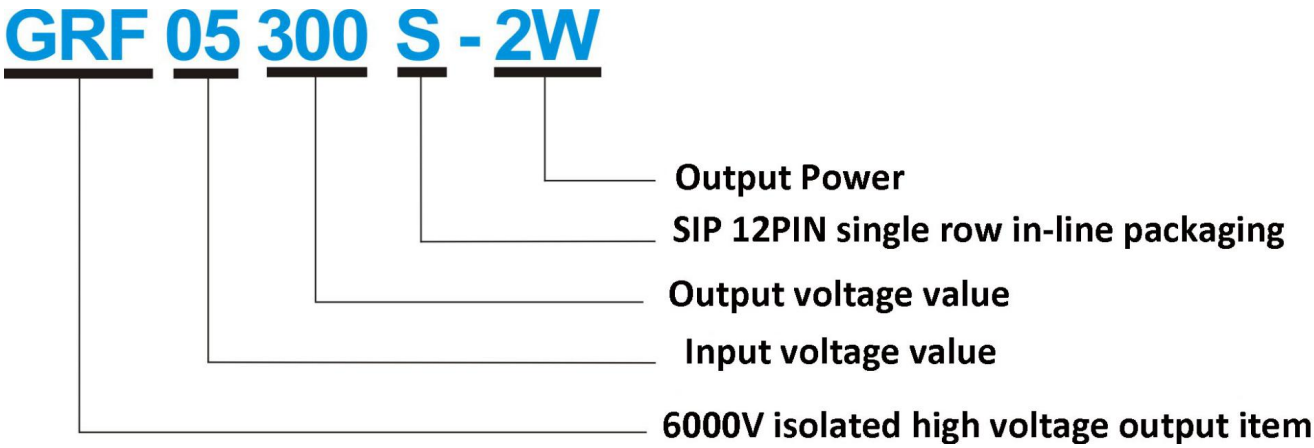
Product Description:

Sunyuan the newest developed GRF series isolated high voltage module dc-dc conveter with low cost ,small volume & wide voltage input. it is a high isolated regulated DC-DC high voltage converter in the industry and can be operates in a wide range of unstable voltage input environments. Also can generate isolated and stabilized DC high voltage output through the internal adjustment circuit of the module.The new GRF series item adopt SIP 12Pin (single row 12 pin) small volume modular design, makes the product have higher DC / DC conversion efficiency with low cost integrated technology solution,The wide creepage distance and the design of new isolation material technology solutions of this product's internal make this high-voltage module power supply have 6000VDC high isolation characteristics of input and output and self-recovery overload short-circuit protection regulated output function.The design of high isolation technology used in the module power supply can effectively isolate the influence of common mode interference from the primary terminal equipment on the control system and can also effectively isolate the ground loop current of the primary terminal and the secondary terminal or the high voltage potential difference between the ground terminal in the system The safety impact of equipment and personnel. The products are widely used in blood analysis of medical equipment, petrochemical industry, laboratory instruments, ultrasonic instruments, power meters, communication facilities and other fields. With good DC high voltage output characteristics and high withstand voltage isolation design technology can solve most of the user's application problems.

The latest developed GRF series item by SunYuan with low cost, small size, wide voltage input isolation high voltage module dc dc converter can be used in the following instrumentation equipmens: Accelerator, 3D printing, X-ray tube, X-ray analysis, energy dispersion, wavelength dispersion, X-ray fluorescence analyzer, chemical analysis electronic spectrometer,Automatic test equipment, capacitor charge and discharge, chromatograph, mass spectrometer, carbon dioxide laser, cathode ray tube, display, flight simulation experiment, detector, ray, microchannel plate, photomultiplier tube, insulation breakdown test, electron beam exposure, capillary Gel electrophoresis, protein extraction, DNA sequencing, electrostatic suction cups, copiers, coatings, electrostatic flocking, electrostatic precipitators, fume purification, air purification, electrostatic spraying (plastic spraying, paint spraying),

image intensifiers, industrial color printing, luggage Inspection, food inspection, radiology, PCB inspection, nondestructive testing, thickness gauge, test tube, focused ion beam microscope for photomask repair, ion implantation, lithotripsy, medical imaging PET, MRI, medical oncology, X-ray medical CT, bone density Tests, chest radiography, magnetrons, klystrons, neutron generators, nuclear testing instruments, instruments, marine power supply equipment, electron microscopes, medical blood analysis, PM2.5 environmental monitoring, spectrometers, agricultural defogging and dew production, Pressure testing, surface analysis, water purification equipment ...Now Sunyuan Technology is stepping up efforts to improve the isolated high-voltage power supply product line to meet the growing needs of medical, industrial and scientific research industries.

Model and Definition:



GRF Series and model examples:

(The bellow data is the detection value of the product after 8 hours of continuous full load aging)

Model Number	Input voltage Vin(VDC)		Output voltage/Current		No-load power consumption (mW)	Full load efficiency(%)
	Nominal value Vin(VDC)	Range Vin(VDC)	Output current Full load (mA)	Output voltage Vout(VDC)		
GRF05050S-1W	5	4.5~9	20	50	300	61
GRF05100S-1W			10	100		62
GRF05150S-1W			6.7	150		60
GRF05200S-1W			5	200		65
GRF05250S-1W			4	250		63
GRF05300S-1W			3.4	300		65
GRF05400S-1W			2.5	400		66
GRF05500S-1W			2	500		68
GRF05050S-2W	5	4.5~9	40	50	300	60
GRF05100S-2W			20	100		61

GRF05150S-2W			13.4	150		63
GRF05200S-2W			10	200		62
GRF05250S-2W			8	250		64
GRF05300S-2W			6.7	300		62
GRF05400S-2W			5	400		63
GRF05500S-2W			4	500		65
GRF12050S-3W	12	9~18	60	50	300	73
GRF12100S-3W			30	100		76
GRF12150S-3W			20	150		77
GRF12200S-3W			15	200		75
GRF12250S-3W			12	250		79
GRF12300S-3W			10	300		82
GRF12400S-3W			7.5	400		80
GRF12500S-3W			6	500		79
GRF12050S-4W	12	9~18	80	50	300	72
GRF12100S-4W			40	100		73
GRF12150S-4W			26.7	150		75
GRF12200S-4W			20	200		77
GRF12250S-4W			16	250		76
GRF12300S-4W			13.4	300		81
GRF12400S-4W			10	400		80
GRF12500S-4W			8	500		79
GRF24050S-5W	24	18~28	100	50	300	72
GRF24100S-5W			50	100		73
GRF24150S-5W			33.4	150		75
GRF24200S-5W			25	200		77
GRF24250S-5W			20	250		76
GRF24300S-5W			16.7	300		78
GRF24400S-5W			12.5	400		76
GRF24500S-5W			10	500		74

Remarks: If you need other non-standard output voltage signal, please contact and confirm with sales

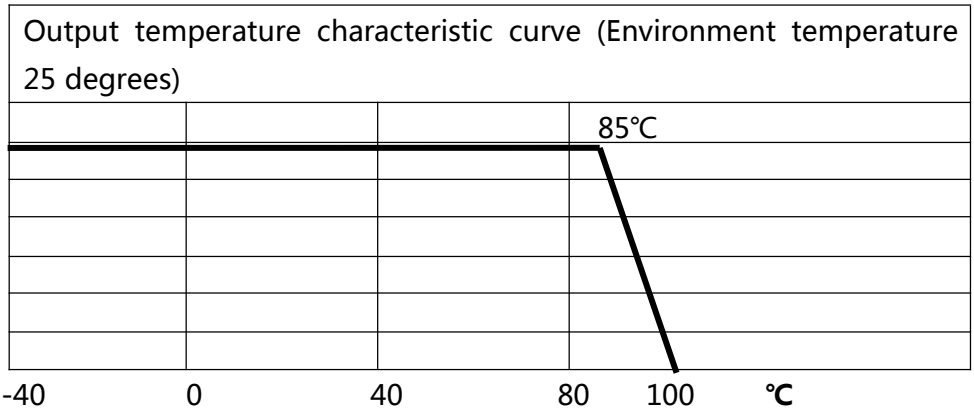
Technical parameters and characteristics:

Project	Working condition	Min	Typic value	Max value	Unit
Output regulated-voltage accuracy	1%-100% Load range		±2		%
Load adjustment rate	Nominal voltage input, load from 10% to 100%		±1		%
Linear adjustment rate	Input voltage range, full load		±1		%

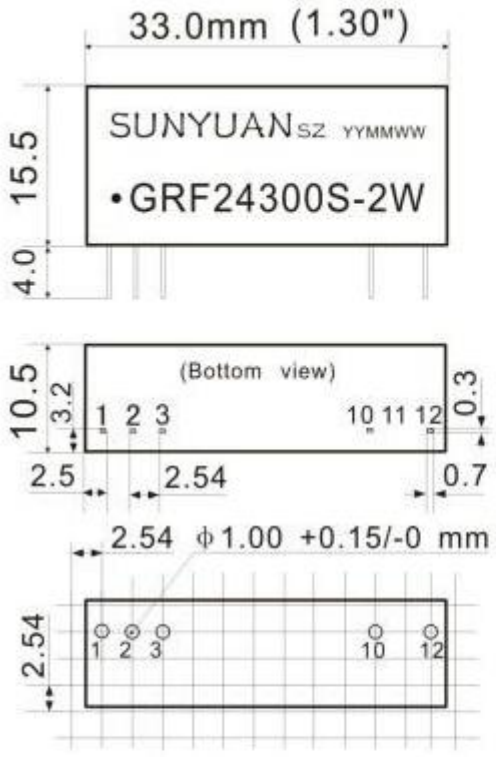
Ripple & Noise	20MHz bandwidth, parallel line test method		±1		%
switch frequency	Nominal voltage input, full load		200	400	KHz
Temperature Coefficient	Nominal voltage input, full load		0.02		%/℃
stability	After half an hour of booting, the hourly rate of change		0.001		%/Hr
Output short circuit protection	Output short circuit	Sustainable and Self-recoverable			
Isolated withstand voltage	Leakage current 1mA, time 60s		6000		VDC
Pin soldering temperature	Welding point from the shell≥1mm, 10s		+300		℃
Insulation resistance	Input/Output，500VDC,25℃,70%RH		1000		MΩ
Working Temperaturer		-40		+85	℃
storage temperature		-55		+105	℃
Storage humidity	No condensation			95	%RH
cooling method		Natural air cooling			
Hot swap		Not support			
MTBF	MIL-HDBK-217F@25℃	1000			KHours
Shell material		Plastic shell-PVC flame retardant material			
Package size	Length * width * height	33.0 x 10.5 x 15.5			mm
Weight			10		g

Temperature characteristic curve

OutPut (1W/5W)

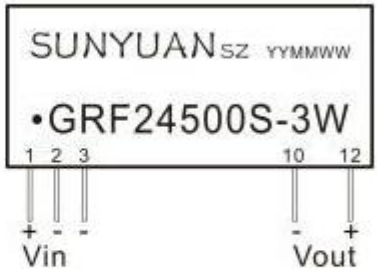


Shape dimension and pin function description



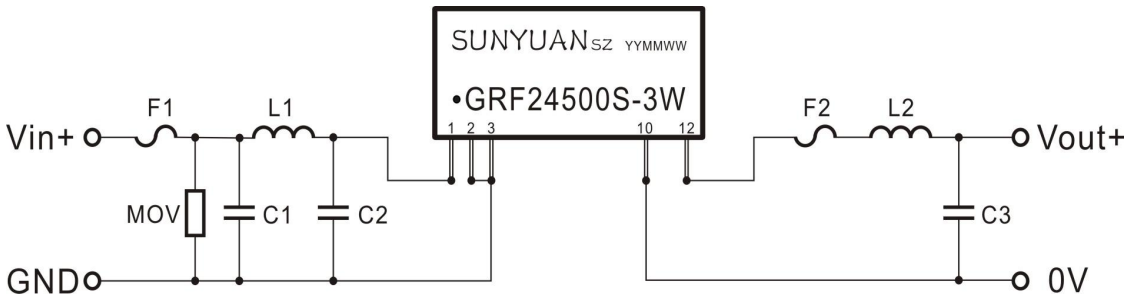
IC Packaging SIP 12PIN

Layout size reference



Pin	Pin function description	
1	Vin+	Input positive
2~3	GND	Input Ground
4~9	NC	Empty
10	0V	Output Ground
11	NC	Empty
12	Vout+	Output positive

External filter and protection circuit reference



F1	Input fuse, slow blow type	
MOV	14D220K	Nominal 5V input voltage
	14D390K	Nominal 12V input voltage
	14D560K	Nominal 24V input voltage
F2	Output fuse, slow blow or optional (PTC) self-recovery fuse	

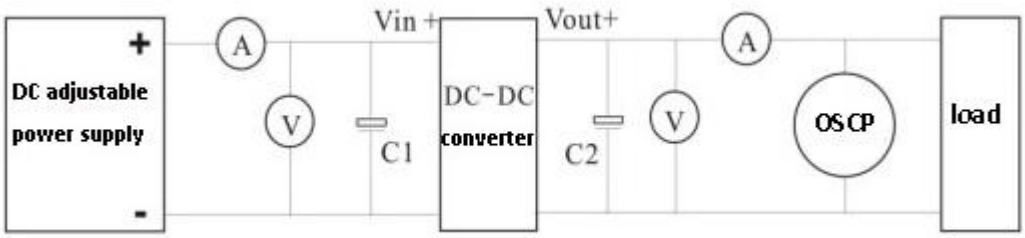
C1，C2	47uF/25V	Nominal 5V, 12V input voltage
	22uF/50V	Nominal 24V input voltage
L1，L2	2.2uH~10uH	
C3	1uF~10uF	

Remarks: If it is required to further reduce the input and output ripple, the parameters of the LC filter can be increased appropriately, but it should be noted that the external capacitor at the output cannot be selected too large and should be lower than the maximum capacitive load of the product.

一. The main parameter detection method of DC-DC module power supply products

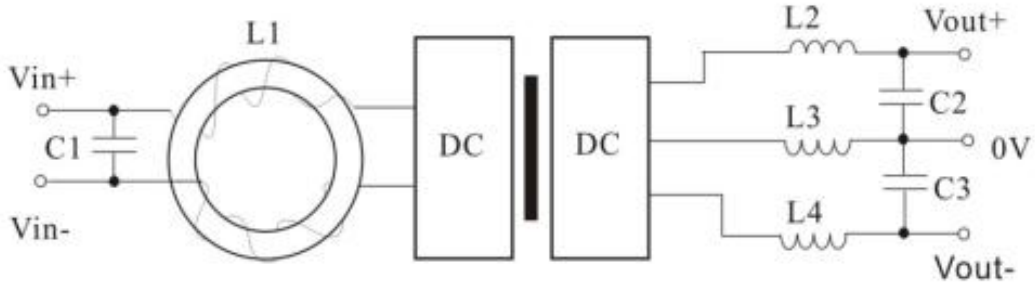
Adopt standard Kelvin four-terminal input and rated load test (as picture)

Test conditions: room temperature TA = 25 degrees Celsius, temperature: less than 75% of nominal input and rated load.

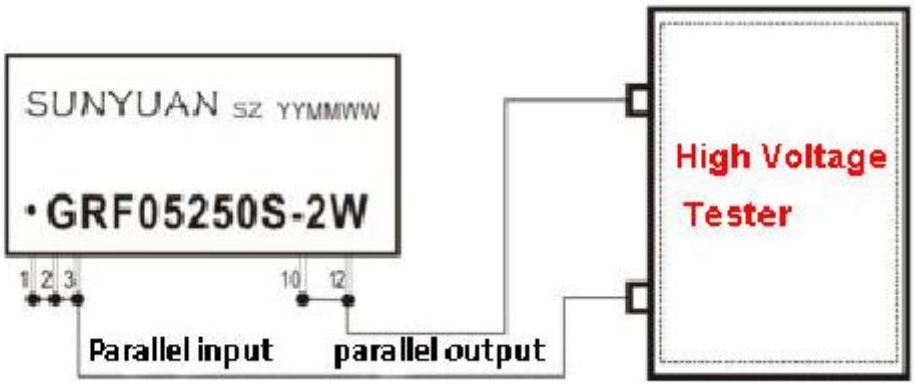


二. Reference method for reducing noise common mode interference in the use of DC-DC module converter.

The module power supply will generate common mode and differential mode noise at the switching frequency. The way to reduce the text wave and noise is to add a passive LC or RC (large loss) filter network at the input and output ends. The self-resonant frequency of L is much higher than the switching frequency of the module. The current value allowed to pass is preferably selected to be more than twice the maximum input current of the module. The internal resistance should be small to reduce DC loss.



三.DC-DC module converter isolation withstand voltage test method



Safety precautions and conventional methods of product high voltage isolation test:

1、As show above picture 1: Set the rated high voltage value according to the product isolation voltage specifications. Please pay attention to personal safety when testing and beware of electric shock!

Test condition: room temperature TA = 25 ℃, humidity <75%

2、The operator of the withstand voltage test must wear rubber insulation (insulation voltage> 10KV) gloves, and place insulation pads on the workbench and seat floor to prevent high voltage electric shock.

3、The pressure tester instrument must be reliably grounded and cannot be detected in a high temperature, humid and dusty environment.

4、When the withstand voltage tester is connected to the test object, it cannot be operated with power on, and the output voltage value of the high voltage tester must be zero.

5、When the instrument is in the startup state or the high voltage is not released, it must not touch the measured object, test line or high voltage test line and test fixture.

6、The product test method like above picture 1: all pins of the input and output terminals are connected in parallel, and the test is performed for 1 minute according to the isolation voltage value given by the product。

7、According to the test standard for withstand voltage, the withstand voltage value is gradually adjusted upward from 0. When the withstand voltage value is adjusted to the set maximum withstand voltage and maintained at the highest withstand value for one minute.

8、The pressure test itself is a destructive test. The fewer times the product should be done, the better. If the customer needs multiple tests, the general requirements are: the first measurement is based on the voltage value of the specification, and the voltage value should be reduced accordingly for each subsequent test, otherwise the product performance will be reduced or directly damaged.