

## Double Loop isolated output High Voltage DC/DC Power Module

6KVDC DC-DC Converter with high isolation and double loop high voltage output:GRE series

### Product features:

- Low cost and small size SIP 12PIN packaging meets UL94V-0 standard of flame retardant packaging.
- There is 6KVD isolation between the input and output of this module, And also 6KV isolation between the output loop one and loop two.
- 2: 1 DC wide voltage input range, isolated regulated DC high voltage output .
- Output voltage: 50VDC ~ 400VDC voltage value is for you optional.
- Output power: 1W ~ 5W optional .
- Two-way high voltage output circuits have self-recovery overload short-circuit protection.
- Working under natural air cooling conditions, needn't any cooling device, conversion efficiency: 60% ~ 80% .
- Industrial temperature range: -40 ~ + 85 °C .

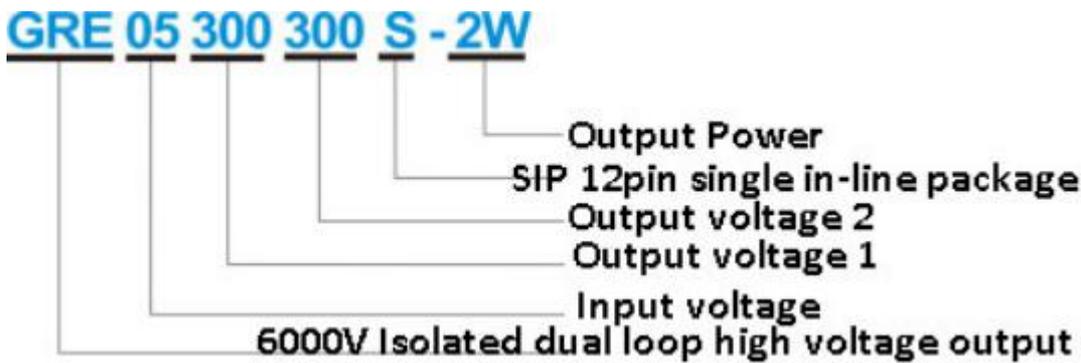


### Product description:

SunYuan the newly developed GRE series of low cost, small size, wide voltage input isolation and regulated dual loop output high voltage module power is an high voltage DC-DC converter in the leading position of the field. This item can operate safely in a wide range of unstable power supply voltage input environment, and can generate isolated and regulated DC high voltage dual loop output through the internal adjustment circuit of the module. GRE series new products adopt SIP 12Pin (single row 12 feet) small size module design, low cost integrated technical solutions make the product have higher DC/DC conversion efficiency and self-recovery overload short circuit protection voltage regulator output function. The wide creepage distance of product's internal and new isolation technology design solution make this high voltage module power supply with 6KVDC isolation between the input and output. And 6KVDC isolation between output loop 1 and loop 2 , this technology can effectively isolate the influence of the common mode interference signal from the primary device on the control system , also can effectively isolate the ground loop circulation crosstalk between the primary and secondary ends of the power supply, it can effectively protect the safety threats of equipment and operators by the high voltage potential difference between different ground terminal in power equipment and medical instruments. Products are widely used in power equipment, medical instruments, laser power supplies, ultrasonic instruments, communication facilities, petrochemical industry and mine explosion-proof equipment etc.

SunYuan the newest product GRE series dc dc converter with low cost, small volume, wide voltage input isolation high voltage dual loop output which is widely used in the following instruments and equipments: nuclear testing instruments, electronic anesthesia machines, medical blood analysis, medical X-ray, medical CT, medical Imaging PET and MRI bone density testing, PM2.5 environmental monitoring, 3D printing, automatic test equipment, capacitor charge and discharge, chromatograph, mass spectrometer, carbon dioxide laser, cathode ray tube, photomultiplier tube, insulation breakdown test, electron beam exposure , Capillary gel electrophoresis, protein extraction, DNA sequencing, electrostatic chuck, display driver, flight simulation experiment, micro-channel plate, electrostatic coating, electrostatic flocking, electrostatic precipitator, oil fume and air purification, electrostatic spray (spraying, painting ), Image intensifier, industrial color printing, luggage inspection, food inspection, PCB inspection, nondestructive inspection, thickness gauge, focused ion beam microscope for photomask repair, ion implantation, magnetron, klystron, neutron generator , Spectrometer, agricultural demisting and dew production increase ...At present, Sunyuan Technology Co., Ltd. is efforts to continuously improve the isolated high-voltage power supply product line to meet the growing demands of power, medical, scientific research and other industries.

**Model number and definition:**



**GRExxxxS Series Model Number Example:** ( The bellow data is the detection value of the product after 8 hours of continuous full load aging )

Model Number	Input volt Vin(VDC)		Output Volt/Current		No-load power consumption(mW)	Full load efficiency (%)
	Nominal value Vin(VDC)	Range Vin(VDC)	Output current Full load (mA)	Output Volt Vout(VDC)		
GRE05050050S-1W	5	4.5~9	10/10	50/50	350	61
GRE05100100S-1W			5/5	100/100		62
GRE05150150S-1W			3.4/3.4	150/150		60
GRE05200200S-1W			2.5/2.5	200/200		65
GRE05250250S-1W			2/2	250/250		63
GRE05300300S-1W			1.67/1.67	300/300		65
GRE05400400S-1W			1.25/1.25	400/400		64
GRE05050050S-2W	5V	4.5~9	20/20	50/50	350	60
GRE05100100S-2W			10/10	100/100		61
GRE05150150S-2W			6.7/6.7	150/150		63
GRE05200200S-2W			5/5	200/200		62
GRE05250250S-2W			4/4	250/250		64
GRE05300300S-2W			3.4/3.4	300/300		62
GRE05400400S-2W			2.5/2.5	400/400		64
GRE12050050S-3W	12	9~18	30/30	50/50	350	73
GRE12100100S-3W			15/15	100/100		76
GRE12150150S-3W			10/10	150/150		77
GRE12200200S-3W			7.5/7.5	200/200		75
GRE12250250S-3W			6/6	250/250		79
GRE12300300S-3W			5/5	300/300		80
GRE12400400S-3W			3.75/3.75	400/400		75
GRE12050050S-4W	12	9~18	40/40	50/50	350	72
GRE12100100S-4W			20/20	100/100		73
GRE12150150S-4W			13.4/13.4	150/150		75

GRE12200200S-4W			10/10	200/200		77
GRE12250250S-4W			8/8	250/250		76
GRE12300300S-4W			6.7/6.7	300/300		80
GRE12400400S-4W			5/5	400/400		78
GRE24050050S-5W	24	18~28	50/50	50/50	350	72
GRE24100100S-5W			25/25	100/100		73
GRE24150150S-5W			16.7/16.7	150/150		75
GRE24200200S-5W			12.5/12.5	200/200		77
GRE24250250S-5W			10/10	250/250		76
GRE24300300S-5W			8.4/8.4	300/300		78
GRE12400400S-5W			6.25/6.25	400/400		75

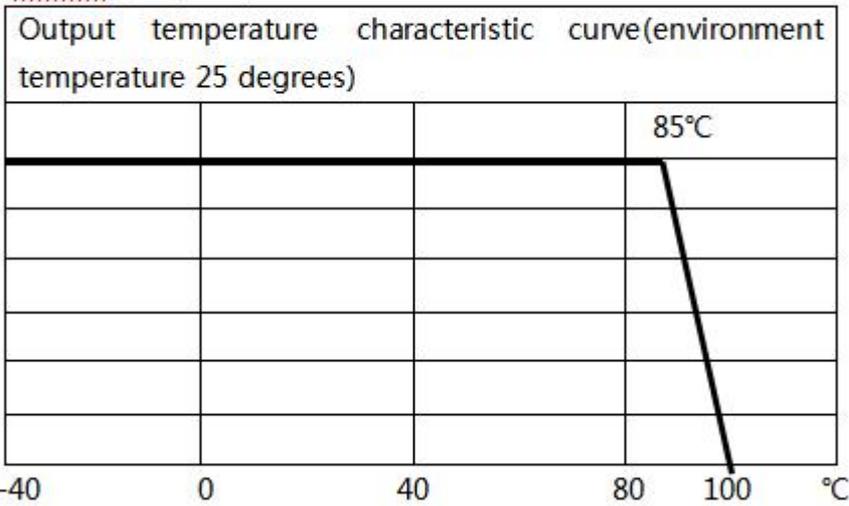
Remarks: If you need other non-standard output voltage parameters, please contact with Shunyuan Technology Co., Ltd.

**Product technical parameters and characteristics:**

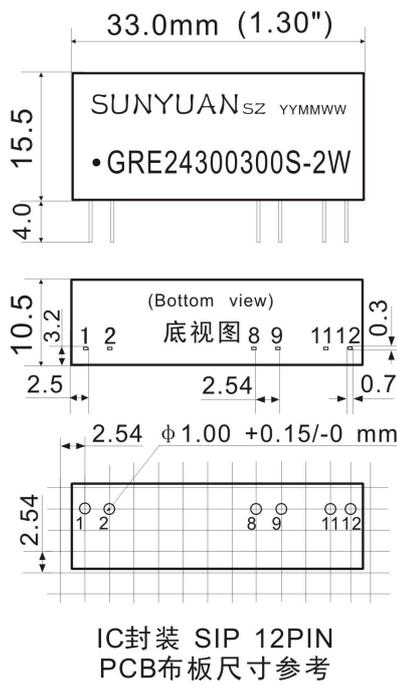
Project	Working Condition	Min	Typical value	Max	Unit
Output voltage accuracy	1%-100% load range		±2		%
Load Adjustment rate	Nominal voltage input, load from 10% to 100%		±1		%
Linear adjustment rate	Input voltage range, full load		±1		%
Ripple & Noise	20MHz bandwidth, parallel line test		±1		%
Switch frequency	Nominal voltage input, full load		200	400	KHz
Temperature Coefficient	Nominal voltage input, full load		0.02		%/°C
stability	After half an hour of booting, the hourly rate of change		0.001		%/Hr
Output short circuit protection	Output short circuit	Sustainable, Self-recovery			
Isolation withstand voltage	Leakage current 1mA, time 60s		6000		VDC
Pin soldering temperature	Welding point ≥1mm from the shell, 10s		+300		°C
Insulation resistance	Input/Output, 500VDC, 25°C, 70%RH		1000		MΩ
Working temperature		-40		+85	°C
storage		-55		+105	°C
Storage humidity	No condensation			95	%RH
cooling method		Natural air cooling			
Hot swap		Don't support			
MTBF	MIL-HDBK-217F@25°C	1000			KHours
Shell material		Plastic shell-PVC flame retardant material			
Packaging Size	Length * width * height	33.0 x 10.5 x 15.5			mm
Weight			10		g

**Temperature characteristic curve:**

OutPut ( 1W/5W )

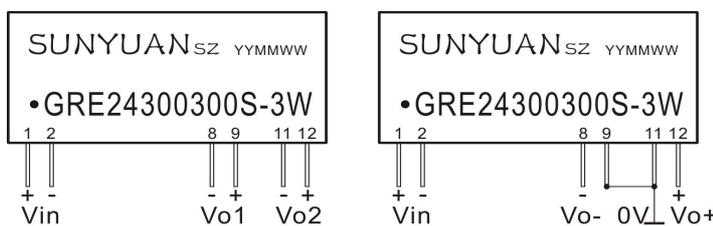


**Size and pin function description:**



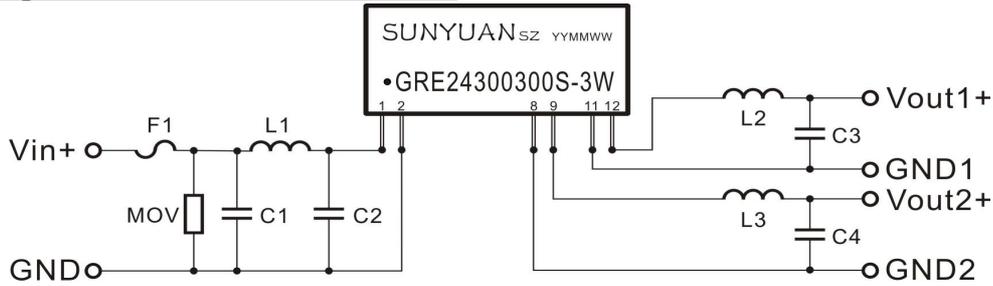
Pin	Pin function description	
1	Vin+	Input positive
2	GND	Input Ground
3~7	NC	empty
8	Vo1-	Output 1 negative
9	Vo1+	Output 1 positive
10	NC	empty
11	Vo2-	Output 2 negative
12	Vo2+	Output 2 positive

**Typical application:** Like the bellow picture: after connecting the positive and negative ends of the different output circuits of the high-voltage module, it becomes a positive and negative voltage value output.



改成正负双输出使用接线图

**External filter and protection circuit for reference:**



<b>F1</b>	Slow input fuse	
<b>MOV</b>	14D220K	Nominal 5V input voltage
	14D390K	Nominal 12V input voltage
	14D560K	Nominal 24V input voltage
<b>C1 , C2</b>	47uF/25V	Nominal 5V、 12V input voltage
	22uF/50V	Nominal 24V input voltage
<b>L1 , L2 , L3</b>	2.2uH~10uH	
<b>C3 , C4</b>	1uF~10uF	

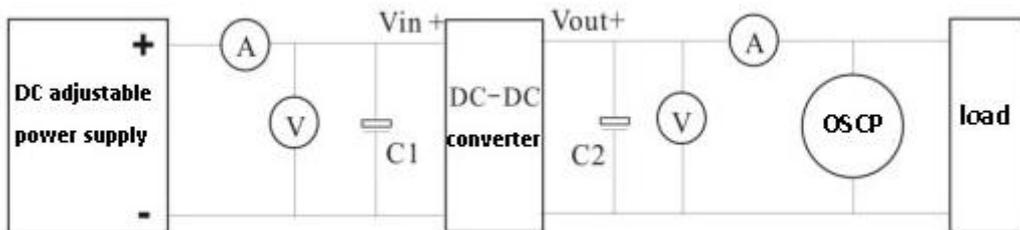
Remarks: If it is required to further reduce the input and output ripple, the parameters of the LC filter can be increased appropriately,

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

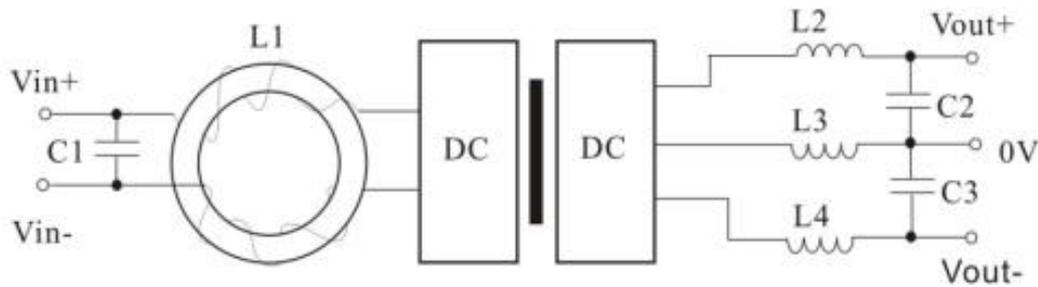
Adopt standard Kelvin four-terminal input and rated load test (as picture)

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

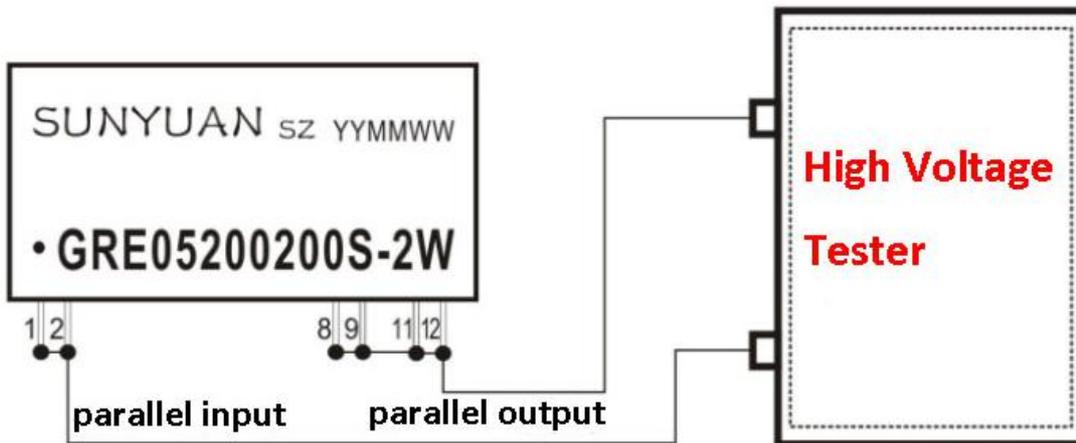


二. Reference method for reducing noise common mode interference in the use of DC-DC module converter.

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.



≡.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  $T_A = 25\text{ }^\circ\text{C}$ , humidity  $<75\%$
- 2、 The operator of the withstand voltage test must wear rubber insulation (insulation voltage  $> 10\text{KV}$ ) 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.