

Low Cost Isolated High Voltage Output Module Power Supply

1KV Isolated DC boost module power supply: GRC series

Product Features:

- Low cost and small size (50.8mm×25.4mm×10.5mm) flame retardant package
- There is 1500VDC isolation between the input and output of the DC boost module power supply.
- 2: 1 DC wide voltage input range, isolated regulated DC high voltage output
- Output Voltage: 50VDC~500VDC voltage for optional
- Metal screening package, standard pin output power: 1W ~ 6W for optional
- High voltage output and loop output has self-recovery short circuit protection function
- The efficiency reach to 70% ~ 80%
- Industrial temperature range: -40~+85 °C



Summarize:

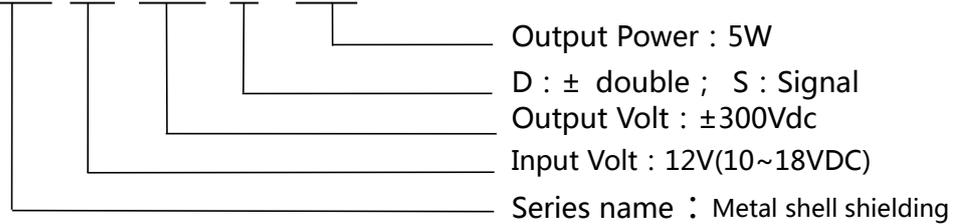
The newest developed GRC series of low cost, small size, wide voltage input isolated high voltage power module developed by Sunyuan is an industry leading isolated regulated DC-DC high voltage converter. It can operate in a wide range of unstable voltage input environment and can generate isolated and regulated DC high voltage output through the internal adjustment circuit of the module. The product shell adopts aluminum shell spray plastic anti-corrosion design to achieve the internal and external electric-magnetic radiation shielding and better air-cooling cooling effect of the product under the working state. Low cost integrated technology solutions enable products to have higher DC / DC conversion efficiency. The wide creepage distance inside the product and the technical design of the new isolation material make this high voltage module power supply have 1500VDC isolation characteristics between the input&output, also self-recovery overload short-circuit protection regulated output function. The design of the isolation technology adopted by the module power supply can effectively isolate the influence of the common mode interference brought by the primary end equipment on the control system. It can also effectively isolate the ground loop current of the primary end and the secondary end or the high voltage potential difference of the ground end in the system to affect the safety of equipment and personnel. The products are widely used in the fields of blood analysis, petrochemical industry, laboratory instruments, ultrasonic instruments, power instruments, 3D printing and other fields of medical equipment. Good DC high voltage output characteristics and high withstand voltage isolation design technology can solve the problems of user field application.

The newest developed GRC series of low cost, small volume, wide voltage input isolation high voltage module power supply products developed by Sunyuan are commonly used in the bellow instrumentation equipments:

Nuclear testing equipment, electronic anesthesia machine, 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, microchannel plate, electrostatic coating, electrostatic flocking, electrostatic precipitator, lampblack and air purification, Electrostatic spraying (plastic spraying, paint spraying), image intensifiers, industrial color printing, luggage inspection, food inspection, PCB inspection, non-destructive testing, 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 stepping up 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 definition:

GRC 12 300 D - 5W

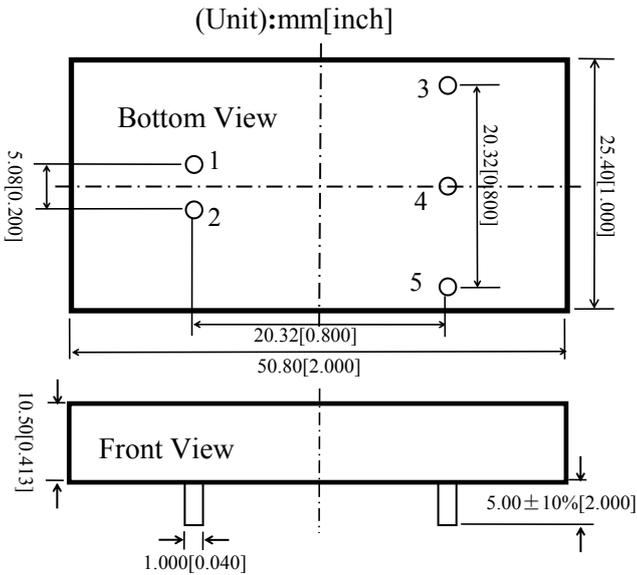


Packaging Isolation type

Product selection examples:

Model number	Input volt/VDC		Output volt/current		Typical efficiency %	Max capacitive load/uF
	Nominal value	Range	Volt/VDC	Current/mA		
GRC1250S-4W	12	10 ~ 18	50	100	78	100
GRC12100S-4W			100	40	76	100
GRC12200S-5W			200	25	75	68
GRC12300S-5W			300	16.7	74	47
GRC12400S-6W			400	15	73	33
GRC12500S-6W			500	12	72	22
GRC12600S-6W			600	10	70	10
GRC24100S-5W	24	18 ~ 36	100	50	78	100
GRC24200S-5W			200	25	77	68
GRC24300S-6W			300	20	75	47
GRC24400S-6W			400	15	74	33
GRC24500S-6W			500	12	73	22
GRC24600S-6W			600	10	71	10
GRC1250D-4W	12	10 ~ 18	±50	±40	76	100
GRC12100D-5W			±100	±25	75	68
GRC12150D-5W			±150	±16.7	74	47
GRC12200D-6W			±200	±15	73	33
GRC12250D-6W			±250	±12	72	22
GRC12300D-6W			±300	±10	70	10
GRC2450D-4W			24	18 ~ 36	±50	±40
GRC24100D-5W	±100	±25			77	68
GRC24150D-6W	±150	±20			75	47
GRC24200D-6W	±200	±15			74	33
GRC24250D-6W	±250	±12			73	22
GRC24300D-6W	±300	±10			71	10

Dimensions and pin description:



Pin	Single way	Double way
1	VIN	VIN
2	GND	GND
3	VOUT	VO+
4	NC	0V
5	0V	VO-

Remarks: NC can not be connected to any circuit at the floating end

Electrical characteristics:

Item	Working Condition	Min value	Typical value	Max value	Unit
Output voltage accuracy	Within the input voltage range	—	±2	—	%
Load adjustment rate	Nominal voltage input, load from 10% to 100%	—	±1	—	%
Ripple & noise	20MHz bandwidth, parallel line test method	—	±1	—	%
switch frequency	100% load, nominal voltage input	—	220	—	kHz
Output short circuit protection		Less than 60 seconds, self-recovery			
Temperature drift coefficient	Nominal voltage input, 100% load	—	—	0.03	%/°C
Shell temperature rise	Nominal voltage input, 100% load, Ta = + 25 ° C	—	35	—	°C
Pin soldering temperature	The welding point is 1.5mm from the edge of the shell, 10 seconds	—	—	300	°C
Working temperature		-40	—	85	°C
storage temperature		-40	—	105	°C
Storage humidity	No condensation	10	—	90	%RH
cooling method		Natural air cooling			
Isolation withstand voltage		1500	—	—	VDC
Insulation resistance	Input—output , 500VDC , 25°C , 70%RH	1000	—	—	MΩ
MTBF	MIL-HDBK-217F@25°C	100	—	—	Kh
Shell Material		Aluminum shell spray			
Weight		—	25	—	g

External filter and protection circuit for reference:



F1	Input fuse, slow blow	
MOV	390K	The input voltage is 12VDC
	560K	The input voltage is 24VDC
C1 , C2	100uF/25V	The input voltage is 12VDC
	47uF/50V	The input voltage is 24VDC
F2	Self-recovery output fuse (PTC)	
L1 , L2	2.2uH ~ 10uH	
C3	1.0uF ~ 10uF (High frequency and low resistance)	

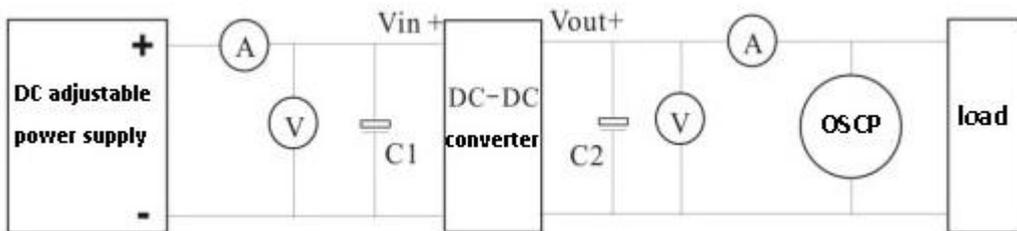
Remarks: If it is required to further reduce the input and output ripple, the parameters of the LC filter can be increased appropriately, but it should be noted that the external capacitor at the output cannot be selected too large and should be lower than the maximum capacitive load of the product.

- 1.Except for special instructions,the parameter test conditions are: input nominal voltage, output rated load, 25 °C ambient temperature
- 2.All parameter test methods are based on the company's corporate standards;
- 3.This product does not support hot-swap, and it does not support direct parallel use of output;
- 4.The final interpretation of this document belongs to Shenzhen Sunyuan Technology Co., Ltd., if it have updated, we will inform you in time .

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

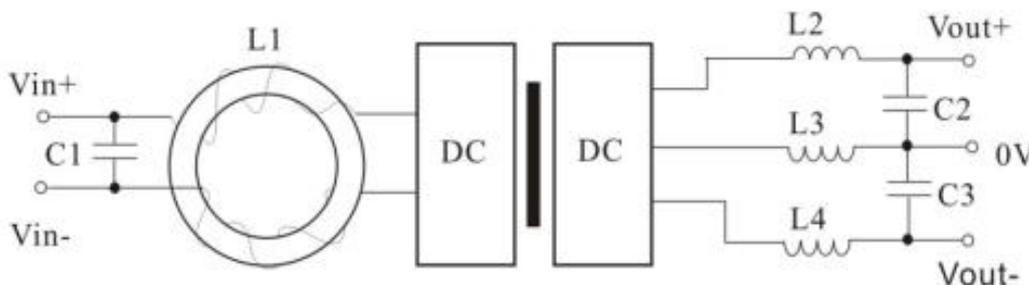
Adopt standard Kelvin four-terminal input and rated load test (as picture)

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

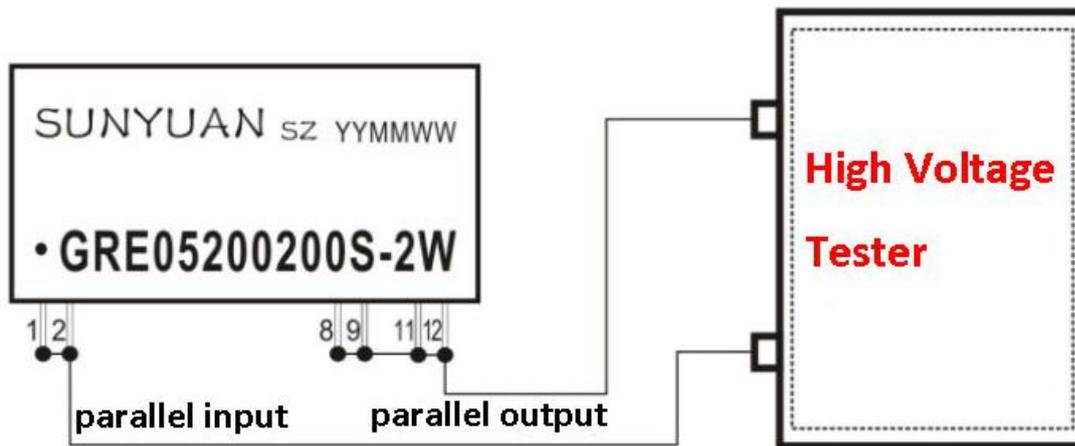


二. Reference method for reducing noise common mode interference in the use of DC-DC module converter.

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 shown above in 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.