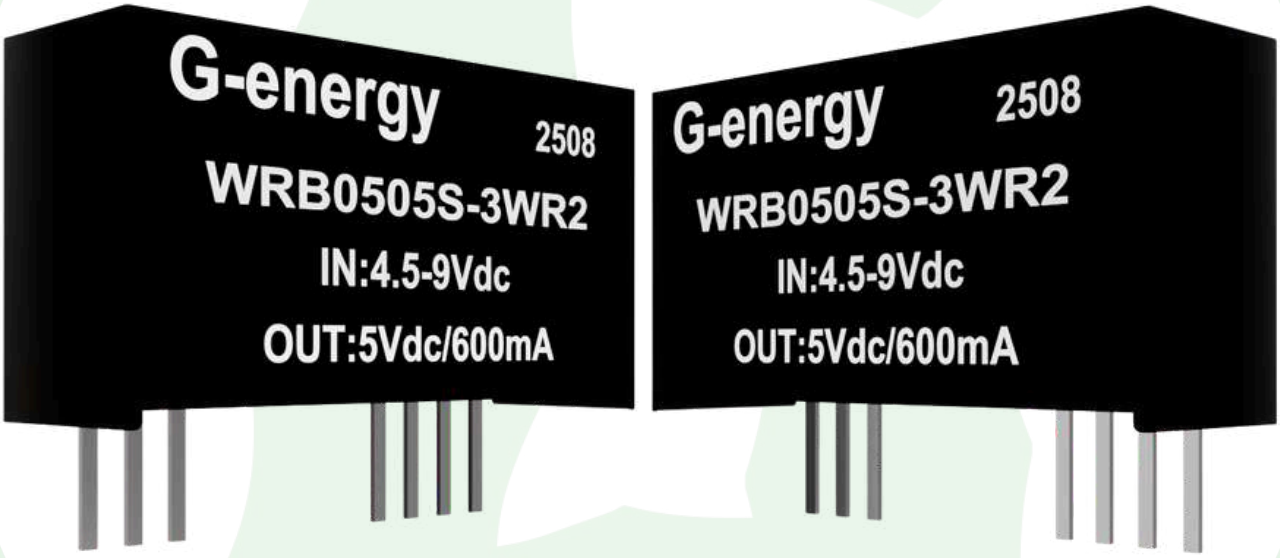
Typical performance

- Ultra-compact SIP form factor
- Broad 2:1 input voltage range
- Wide operating ambient temperature range: –40 °C to +85 °C
- Input-to-output isolation test voltage up to 1.5 kV DC
- Low output ripple and noise levels
- Built-in short-circuit protection with automatic recovery
- Remote enable/disable (On/Off) control
- High power density design
- Compliant with EN60950 safety standards

3W isolated DC/DC power module with wide input range, available in both single and dual positive/negative outputs.



Isolated regulated output/RoHS

The WRA_S-3WR2 and WRB_S-3WR2 series are 3 W isolated DC-DC converters designed with a wide 2:1 input voltage range and 1500 VDC input-to-output isolation. These converters are housed in a compact SIP-8 plastic package and deliver high efficiency performance. They support operation over a wide ambient temperature range from –40 °C to +85 °C, offer remote On/Off control, and include continuous short-circuit protection. Thanks to their small form factor and cost-efficient design, these converters are well suited for applications in communications, instrumentation, and industrial electronics.

Product List

Certificate	Product Module number①	Input Voltage range (Vdc)		Output Voltage/Current		Efficiency @ full load	Maximum capacitive load
		Nominal value② (range value)	Max value	Output voltage (Vdc)	Output current (mA) (Max.Min.)	% (Min./Typ.)	uF
	WRA0505S-3WR2	5 (4.5-9)V	11V	±5	±250/±13	72/74	1000
	WRA0512S-3WR2			±12	±104/±5	75/77	470
	WRA0515S-3WR2			±15	±83/±4	75/77	330
	WRA0524S-3WR2			±24	±52/±3	74/76	220
	WRB0503S-3WR2			3.3	758/38	66/68	1800
	WRB0505S-3WR2			5	500/25	71/73	2200
	WRB0509S-3WR2			9	278/14	72/74	1000
	WRB0512S-3WR2			12	208/10	75/77	680
	WRB0515S-3WR2			15	167/8	72/74	470
	WRB0524S-3WR2			24	104/5	74/76	330
	WRA1205S-3WR2	12 (9-18)V	20V	±5	±300/±15	76/78	1000
	WRA1209S-3WR2			±9	±167/±8	76/78	680
	WRA1212S-3WR2			±12	±125/±6	77/79	470
	WRA1215S-3WR2			±15	±100/±5	78/80	330

	WRB1203S-3WR2	12 (9-18)V	20V	3.3	758/38	73/75	2700
	WRB1205S-3WR2			5	600/30	74/76	2200
	WRB1206S-3WR2			6	500/25	77/79	1800
	WRB1209S-3WR2			9	333/17	77/79	1000
	WRB1212S-3WR2			12	250/13	80/82	680
	WRB1215S-3WR2			15	200/10	81/83	470
	WRB1224S-3WR2			24	125/6	79/81	330
	WRA2405S-3WR2	24 (18-36)V	40V	±5	±300/±15	77/79	1000
	WRA2409S-3WR2			±9	±167/±8	79/81	680
	WRA2412S-3WR2			±12	±125/±6	81/83	470
	WRA2415S-3WR2			±15	±100/±5	81/83	330
	WRB2403S-3WR2			3.3	758/38	72/74	2700
	WRB2405S-3WR2			5	600/30	79/81	2200
	WRB2409S-3WR2			9	333/17	81/83	1000
	WRB2412S-3WR2	24 (18-36)V	40V	12	250/13	81/83	680
	WRB2415S-3WR2			15	200/10	81/83	470
	WRB2424S-3WR2			24	125/6	81/83	330

	WRA4805S-3WR2	48 (36-75)V	80V	±5	±300/±15	77/79	1000
	WRA4812S-3WR2			±12	±125/±6	80/82	470
	WRA4815S-3WR2			±15	±100/±5	80/82	330
	WRB4803S-3WR2			3.3	758/38	73/75	2700
	WRB4805S-3WR2			5	600/30	74/76	2200
	WRB4812S-3WR2			12	250/13	78/80	680
	WRB4815S-3WR2			15	200/10	82/84	470
	WRB4824S-3WR2			24	125/6	80/82	330

Note:

1. **Applying an input voltage beyond the rated maximum may result in permanent damage to the device.**
2. **The maximum allowable capacitive load is the same for both positive and negative outputs.**

Note: The items shown above represent only a selection of typical models. If you require products not included in this list, please get in touch with our sales team at info@genergy.in or +91 9667827726.
The maximum capacitive load refers to the highest capacitance that can be connected to +Vo or −Vo. Exceeding this limit may prevent the module from starting properly.

Test Conditions: Unless otherwise specified, all parameters are measured at nominal input voltage, with a purely resistive rated load, and at an ambient temperature of 25°C.

Input Features

Item	Operating Condition		Min	Typ	Max	Unit
Input Current (full load /no-load)	5VDC Input	3.3V Output	--	735/40	758/85	mA
		Others	--	805/40	846/85	
	12VDC Input	3.3V Output	--	278/30	286/40	
		Others	--	314/30	338/40	
	24VDC Input	3.3V Output	--	140/20	145/40	
		Others	--	154/20	163/40	
	48VDC Input	3.3V Output	--	69/5	72/15	
		Others	--	78/5	85/15	
Reflected Ripple Current	5VDC Input		--	20	--	mA
	12VDC Input		--	20	--	
	24VDC Input		--	55	--	
	48VDC Input		--	55	--	
Surge Voltage (1sec. max.)	5VDC Input		-0.7	--	12	VDC
	12VDC Input		-0.7	--	25	
	24VDC Input		-0.7	--	50	
	48VDC Input		-0.7	--	100	

Start-up Voltage	5VDC Input	--	--	4.5	VDC
	12VDC Input	--	--	9	
	24VDC Input	--	--	18	
	48VDC Input	--	--	36	
Input Filter		Capacitor filter			
Hot Plug		Unavailable			
Ctrl *	Module on	Ctrl pin open (high resistance)			
	Module off	Ctrl pin pulled high (current 5-10mA typ. intoCtrl.)			
Note: *For use of Ctrl, please refer to the “design reference” in this manual.					

Output Features

Item	Operating Conditions		Min	Typ	Max	Unit
Voltage Accuracy	5%-100% load, input voltage range		--	±1	±3	%
Linear Regulation	Input voltage variation from low to high at full load	Main road	--	±0.2	±0.5	
		Side road	--	--	±2	
Load Regulation	5%-100% load	Main road	--	±0.6	±1	
		Side road	--	--	±3	

Transient Recovery Time	25% load step change		--	0.5	3	ms
Transient Response Deviation	25% load step change		--	±2.5	±5	%
Temperature Coefficient	Full load		--	±0.02	±0.03	%/℃
Ripple & Noise	20MHz bandwidth	WRB1212S-3WR2 WRB1215S-3WR2 WRB4824S-3WR2	--	70	100	mVp-p
		WRB1224S-3WR2 WRB2415S-3WR2 WRB2424S-3WR2 WRA4805S-3WR2 WRB4803S-3WR2	--	100	150	
		Others	--	40	75	
Short-circuit Protection			Continuous, self-recovery			

Note:

1. With a load range of 5% to 100%, the maximum output voltage accuracy of the auxiliary output for models WRA1209S-3WR2, WRA2405S-3WR2, and WRA2415S-3WR2 is ±4%.
2. At full load (100%), the line regulation of the main output for models WRA1209S-3WR2, WRA2405S-3WR2, and WRA2415S-3WR2 is ±1%, while the auxiliary output line regulation increases to ±2.5%.
3. Ripple and noise measurements are performed using the “parallel cable” test method. For detailed procedures, refer to the DC-DC Converter Application Notes.

General characteristics

Item	Working conditions	Min.	Typ.	Max.	Unit
Isolation	Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max	1500	--	--	VDC
Insulation Resistance	Input-output resistance at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	--	120	--	pF
Operating Temperature	See Fig. 1	-40	--	+85	℃
Storage Temperature		-55	--	+125	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	+300	
Storage Humidity	Non-condensing	--	--	95	%RH
Switching Frequency (PFM Mode)	Full load, nominal input voltage	--	250	--	kHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	khours

Product characteristic curve

Case Material	Black plastic; flame-retardant and heat-resistant
Dimensions	22.00 × 9.50 × 12.00 mm
Weight	4.5g(Typ.)
Cooling Method	Free air convection

Product characteristic curve

Temperature Derating Curve

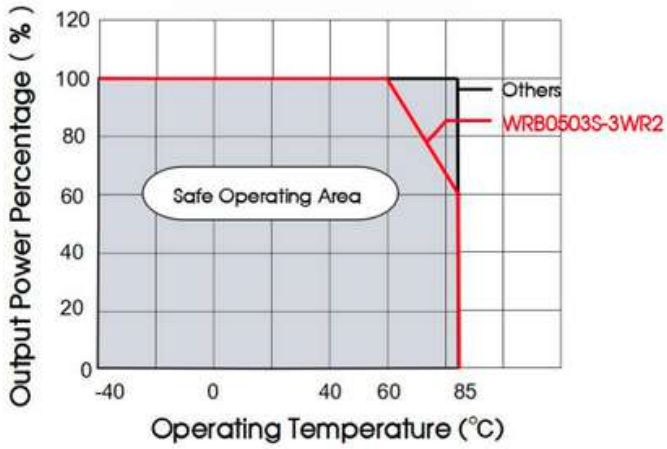
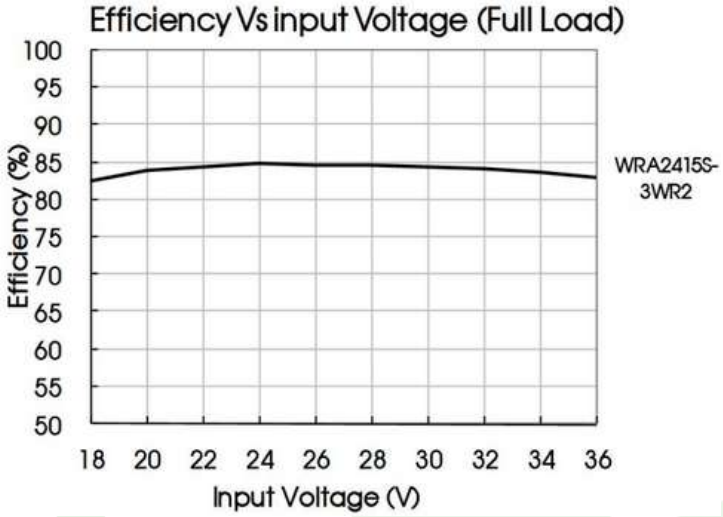
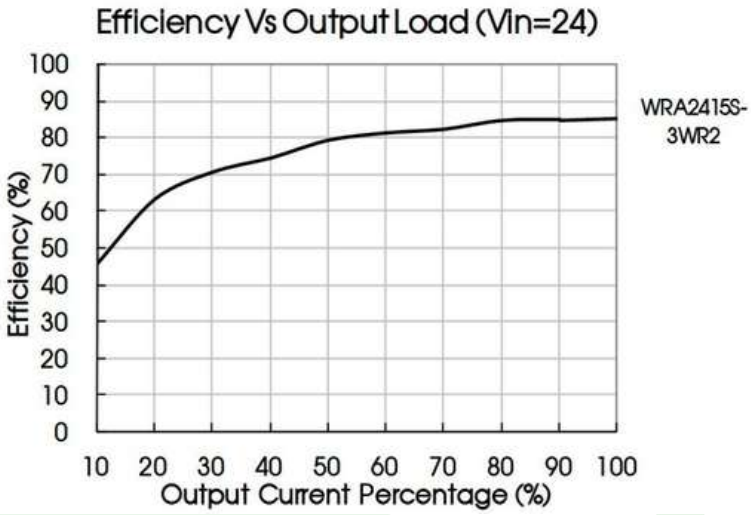
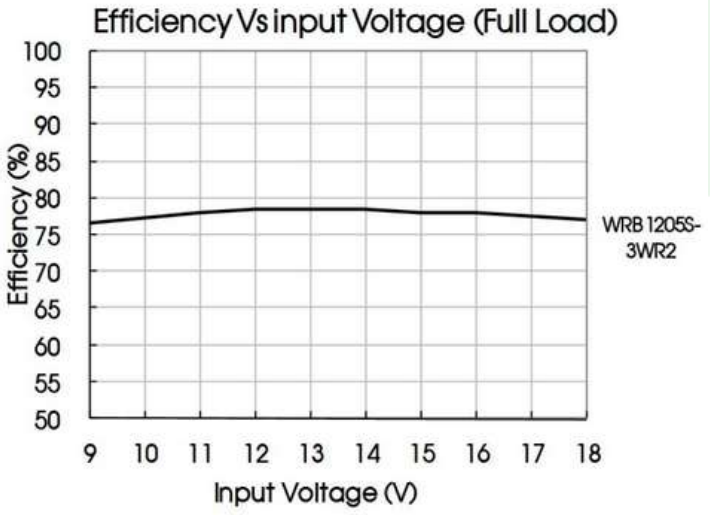
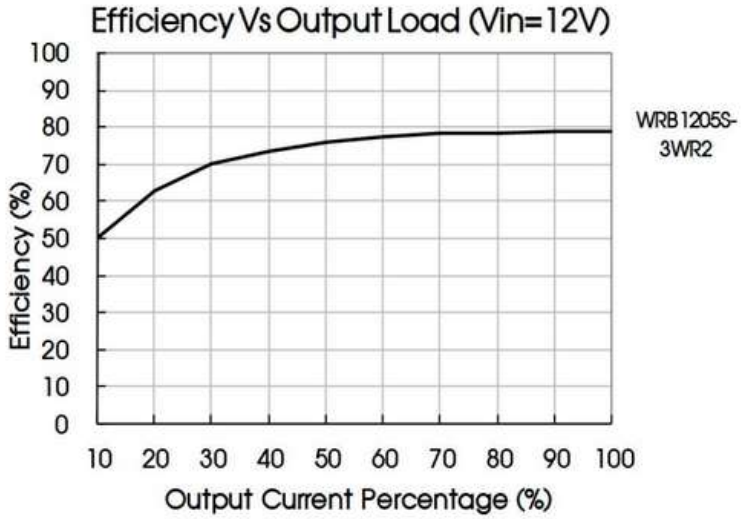


Fig 1









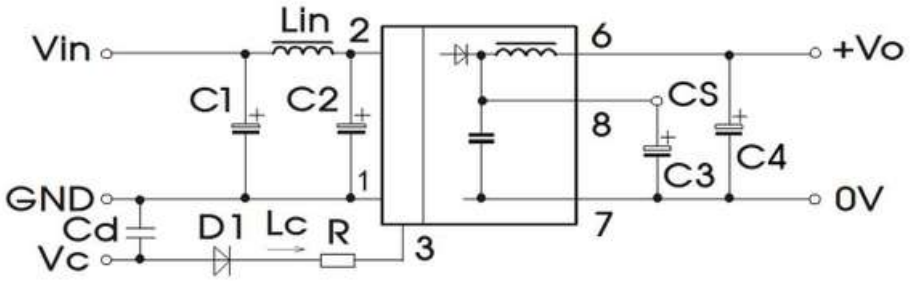
Design Reference

Normal application circuit

All DC-DC converters in this series are fully tested prior to shipment using the recommended test circuit shown in Figure 2. Input and/or output ripple can be further minimized by increasing the values of input and output capacitors C1, C2, C3, and C4, and/or by using capacitors with low equivalent series resistance (ESR). Capacitor C3 is specifically intended for ripple reduction and may be omitted if the ripple level already meets application requirements.

Careful selection of filter capacitance is important, as excessively large capacitance may lead to start-up issues. For each output, the filter capacitor value must remain below the maximum allowable capacitive load to ensure safe and reliable operation.

Single:



Dual:

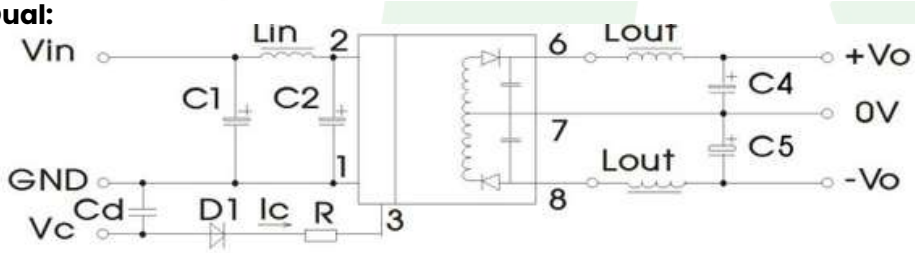


Fig:2

Vin	5VDC&12VDC	24VDC&48VDC
C1	100μF/25V	10μF/100V
C2	47μF/25V	1μF/100V
Lin	4.7μH-12μH	
C3	10μF/50V-22 μF/50V	
C4/C5	100μF/50V(Typ.)	
Lout	2.2μH-10μH	
Cd	47nF/100V	

EMC typical application circuit

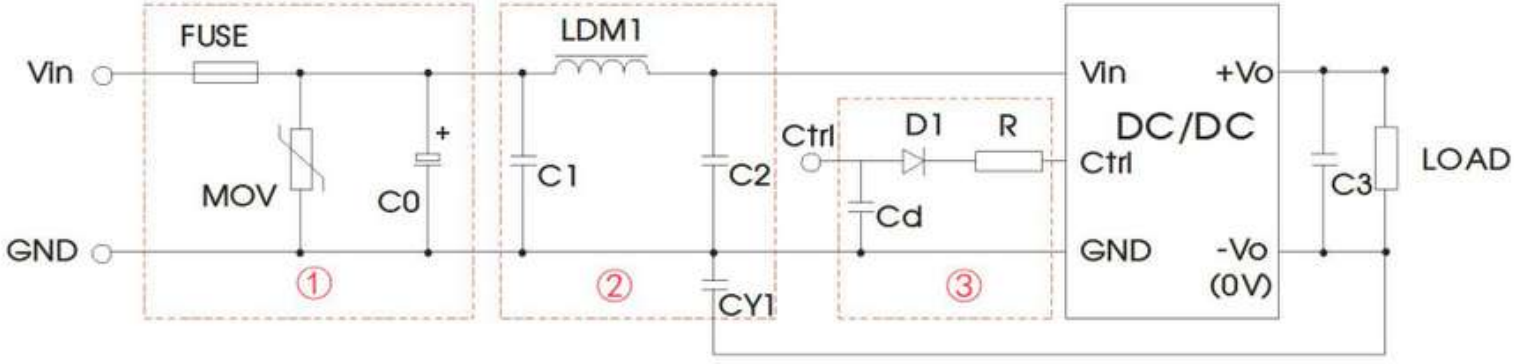


Fig. 3

Parameter description:

Model	Vin: 5VDC	Vin: 12VDC	Vin: 24VDC	Vin: 48VDC
FUSE	Slow-blow, selecting based on needs			
MOV	--	S14K20	S20K30	S14K60
C0	680μF/25V	680μF/25V	330μF/50V	330μF/100V
C1	4.7μF/50V			4.7μF/100V
LDM1	12μH			
C2	4.7μF/50V			4.7μF/100V
C3	Refer to the Cout in Fig.2			
CY1	1nF/2kV			
D1	RB160M-60V/1A			
R	In accordance with the formula: $R = \frac{V_C - V_D - 1.0}{I_C} - 300$			
Cd	47nF/100V			

Note:

1. During EMC testing, circuit section ① in Figure 3 is used for immunity tests, while section ② is used for emission tests. The appropriate configuration should be selected according to test requirements.
2. VC refers to the voltage at the control (Ctrl) pin with respect to the input ground. VD denotes the forward conduction voltage drop of diode D1. IC is the current flowing into the control pin, typically in the range of 5–10 mA. Refer to Figure 3-③ for the recommended external circuitry for the Ctrl pin.
3. If no specific parameter values are provided, external components are not required.

Ctrl terminal

The module operates normally when the Ctrl pin is left floating or connected through a high-impedance path. The module is disabled when a high-level signal (referenced to input ground) is applied to the Ctrl pin. The current flowing into the control pin must be limited to 5–10 mA; exceeding the maximum allowable current (typically 20 mA) may cause permanent damage to the module. The required value of resistor R can be calculated as follows: $R = \frac{V_C - V_D - 1.0}{I_C} - 300$

For detailed parameter, please refer to EMC compliance circuit in this manual.

Input current

When the module is powered by an unstable supply, ensure that the output voltage variation and ripple of the power source remain within the specified limits of the module. The input current capability of the power supply must be sufficient to handle the inrush (start-up surge) current of this DC/DC converter, as shown in Figure 4.

Generally:

Vin= 5V series Iave =1296mA
Vin=12V series Iave =631mA
Vin=24V series Iave =303mA
Vin=48V series Iave =157mA

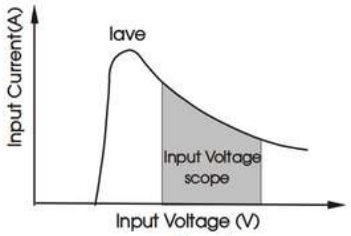


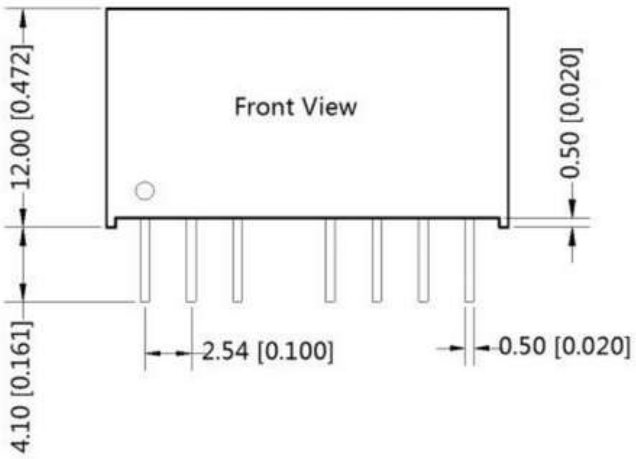
Fig. 4

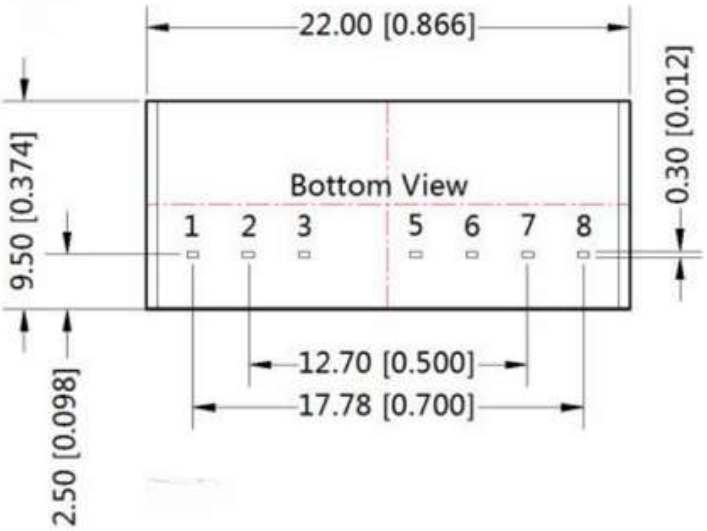
Output load requirements

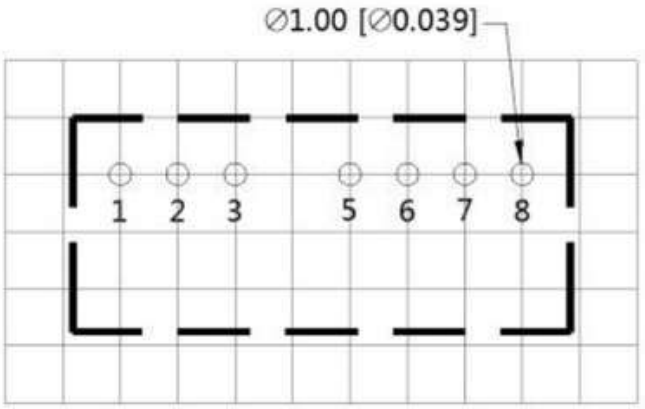
During operation, the output load of the module must not fall below 5% of the rated load. To ensure compliance with the performance specifications stated in this datasheet, a minimum 5% dummy load should be connected in parallel at the output. This dummy load is typically implemented using a resistor, which must be properly derated to ensure safe and reliable operation.

Package size and pin function diagram

1 Dimension(Unit:mm, Error: ±0.25mm







Note: Grid 2.54*2.54mm

Pin Out		
Pin	Single	Dual
1	GND	GND
2	Vin	Vin
3	Ctrl	Ctrl
4	NC	NC
5	+Vo	+Vo
6	0V	0V
7	CS	-Vo

NC: No Connection

Product application considerations

Note:

- For detailed information regarding product packaging, please refer to genergy.in.
- It is recommended to operate the module with a load of at least 5%. Operation below this level may result in output ripple exceeding the specified limits; however, this does not impact product reliability.
- For dual-output models, a load imbalance of ≤ ±5% is recommended. If the imbalance exceeds ±5%, compliance with the datasheet performance specifications cannot be guaranteed. Please contact our technical team for further guidance.
- The stated maximum capacitive load values were verified across the full input voltage range at rated load conditions.
- Unless otherwise noted, all parameters in this datasheet are measured at an ambient temperature of 25 °C, relative humidity below 75% RH, with nominal input voltage and rated output load.
- All test methods referenced in this datasheet follow the company's internal quality and performance standards.
- Product customization services are available. For specific requirements, please contact our technical support team.
- Product compliance with applicable laws and regulations is outlined in the "Features" and "EMC" sections.
- Products are classified and handled in accordance with ISO 14001 and relevant environmental regulations, and must be processed by authorized and qualified organizations.