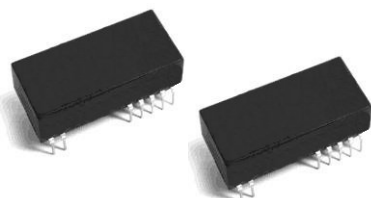


SCHMID-M

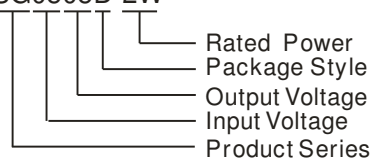
SG_D-2W & SH_D-2W Series

**2W, FIXED INPUT, 6000V ISOLATED & UNREGULATED
DUAL/SINGLE OUTPUT DC-DC CONVERTER**



PART NUMBER SYSTEM

SG0505D-2W



FEATURES

- Efficiency up to 81%
- Up to 6KVDC Isolation
- DIP Package
- Low Isolation Capacitance
- Operating Temperature Range: -40°C to +85°C
- Low Temperature Rise
- No External Component Required
- Continuous short circuit protection
- Industry Standard Pinout
- Certificate UL

APPLICATIONS

The SG_D-2W & SH_D-2W Series are designed for application where isolated output is required from a distributed power system.

These products apply to where:

- 1) Input voltage variation $\leq \pm 10\%$;
- 2) 6KVDC input and output isolation;
- 3) Regulated and low ripple noise is not required.

Such as: digital circuits, low frequency analog circuits, and IGBT power device driving circuits.

SELECTION GUIDE

Model Number	Input Voltage(VDC)	Output Voltage (VDC)	Output Current (mA)		Input Current (mA)(typ.)		Reflected Ripple Current (mA,typ.)	Max. Capacitive Load [#] (μF)	Efficiency (% , typ.) @Max. Load	Approval
	Nominal (Range)		Max.	Min.	@Max. Load	@No Load				
SH0505D-2W	5 (4.5-5.5)	5	400	40	547	60.3	60.6	220	75	UL
SH0509D-2W		9	222	23	492	52.1	72.5		76	UL
SH0512D-2W		12	167	17	504	58.1	71.2		78	UL
SH0515D-2W		15	133	13	505	54.9	70.3		77	UL
SG0505D-2W		±5	±200	±20	533	57.7	68.7	100	75	UL
SG0509D-2W		±9	±111	±12	498	52.6	88.1		77	UL
SG0512D-2W		±12	±84	±9	512	59.9	78.1		79	UL
SG0515D-2W		±15	±67	±7	502	53.3	68.7		78	UL
SH1205D-2W	12 (10.8-13.2)	5	400	40	217	20.5	54	220	75	UL
SH1209D-2W		9	222	23	215	26.9	79		78	UL
SH1212D-2W		12	167	17	204	25.4	69		80	UL
SH1215D-2W		15	133	14	214	24.3	89.5		78	UL
SG1205D-2W		±5	±200	±20	215	23.2	79	100	76	UL
SG1209D-2W		±9	±111	±12	207	22.8	94		78	UL
SG1212D-2W		±12	±84	±9	206	22.9	37.5		80	UL
SG1215D-2W		±15	±67	±7	212	26.9	90		78	UL
SH1505D-2W	15 (13.5-16.5)	5	400	40	170	20.6	64.4	220	75	
SH1515D-2W		15	133	14	165	15.4	62.5	81		
SG1515D-2W		±15	±67	±7	166	15.5	76.8	100	77	
SH2405D-2W	24 (21.6-26.4)	5	400	40	109	10.8	158.9	220	77	
SH2409D-2W		9	222	23	101	10.1	62.5		78	
SH2412D-2W		12	167	17	100	9.3	155.6		81	
SH2415D-2W		15	133	14	100	9.1	137.5		80	
SG2405D-2W		±5	±200	±20	104	16.6	86.7	100	77	
SG2409D-2W		±9	±111	±12	99	9.6	98.5		78	

Model Number	Input Voltage(VDC)	Output Voltage (VDC)	Output Current (mA)		Input Current (mA)(typ.)		Reflected Ripple Current (mA,typ.)	Max. Capacitive Load [#] (μF)	Efficiency (% , typ.) @Max. Load	Approval
	Nominal (Range)		Max.	Min.	@Max. Load	@No Load				
SG2412D-2W	24 (21.6-26.4)	±12	±84	±9	99	9.3	102.7	100	81	
SG2415D-2W		±15	±67	±7	100	9.2	113.6		80	

Note:1.Models listed with strike-through text have been officially discontinued.
2. # For each output.
3.The SG_D-1W/SH_D-1W series also are available in our company.

INPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (1sec. max.)	5VDC input	-0.7	--	9	VDC
	12VDC input	-0.7	--	18	
	15VDC input	-0.7	--	21	
	24VDC input	-0.7	--	30	
Input Filter		Capacitance Filter			

OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Output Power		0.2	--	2	W
Output Voltage Accuracy		See tolerance envelope curve			
Output Voltage Balance	Dual Output, Balanced Loads	--	±0.5	±1	%
Line Regulation	For Vin change of ±1%	--	--	±1.2	
Load Regulation	10% to 100% load	5VDC output	10	15	
		9VDC output	8.3	15	
		12VDC output	6.8	15	
		15VDC output	6.3	15	
Temperature Drift	100% load	--	--	±0.03	%/°C
Ripple & Noise*	20MHz Bandwidth	--	150	250	mVp-p
Short Circuit Protection		Continuous			

Note: 1. Dual output models unbalanced load: ±5%.
2.*Ripple and noise tested by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Tested for 1 minute and leakage current less than 1 mA	6000	--	--	VDC
Isolation Resistance	Test at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input/Output, 100KHz/1V	--	3.5	--	pF
Switching Frequency	Full load, nominal input	5VDC input	--	35	KHz
		Others	--	50	
MTBF	MIL-HDBK-217F@25°C	3500	--	--	K hours
Case Material		Plastic (UL94-V0)			
Weight		--	8.2	--	g

ENVIRONMENTAL SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage Humidity	Non condensing	--	--	95	%
Operating Temperature	Power derating (above 85°C)	-40	--	85	°C
Storage Temperature		-55	--	125	
Temp. rise at full load		--	25	--	
Lead Temperature	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			

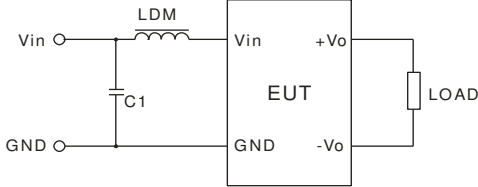
EMC SPECIFICATIONS

EMI	CE	CISPR22/EN55022 CLASS A (External Circuit Refer to Figure1,2)
EMS	ESD	IEC/EN61000-4-2 Contact $\pm 8KV$ perf. Criteria B

EMC RECOMMENDED CIRCUIT

SG15XXD-2W,SG24XXD- 2W and SH15XXD-2W already meet CLASS A, for other models following Figure 1,2.

EMI Recommended External Circuit:

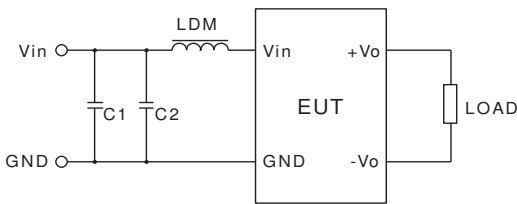


(Figure 1)

SG_D-2W Series

Recommended external circuit parameters:

- Vin: 5V
 ① C1: 4.7 μ F/50V
 ② LDM: 6.8 μ H
 Vin: 12V
 ① C1: 1 μ F/50V
 ② LDM: 4.7 μ H



(Figure 2)

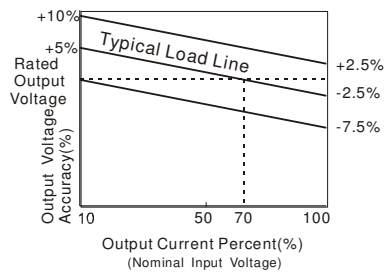
SH_D-2W Series

Recommended external circuit parameters:

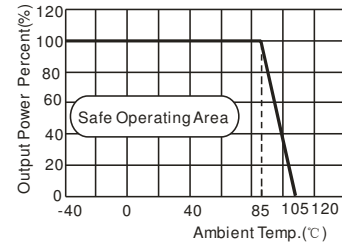
- Vin: 5V
 ① C1: 4.7 μ F/50V
 ② LDM: 6.8 μ H
 Vin: 12V
 C1: 4.7 μ F/50V
 Vin: 24V
 ① C1、C2: 4.7 μ F/50V
 ② LDM: 6.8 μ H

PRODUCT TYPICAL CURVE

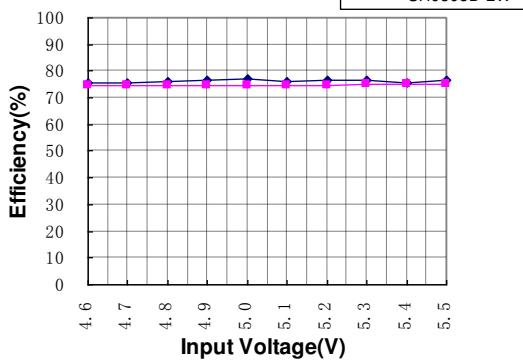
Tolerance Envelope Curve



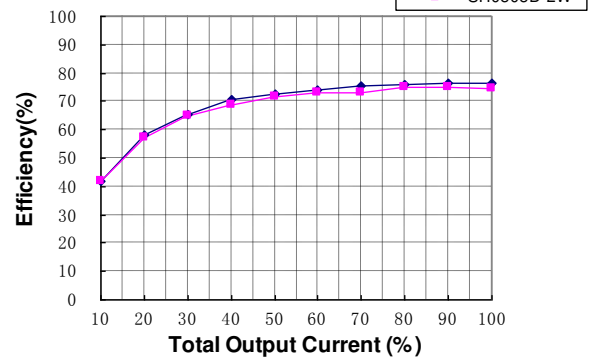
Temperature Derating Curve



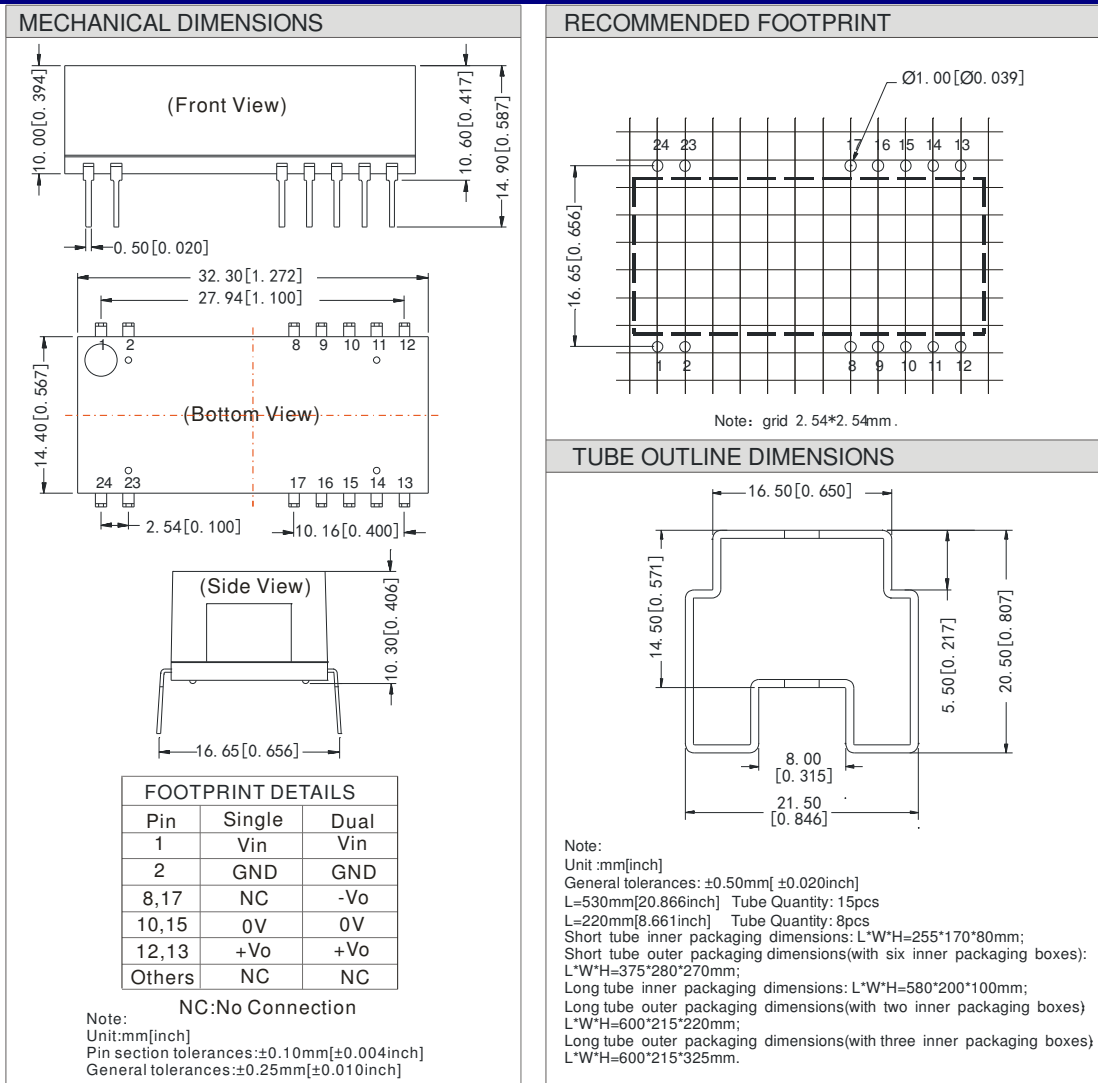
Efficiency VS Input Voltage curve (Full Load)



Efficiency VS Output Load curve (Vin=Vin-nominal)



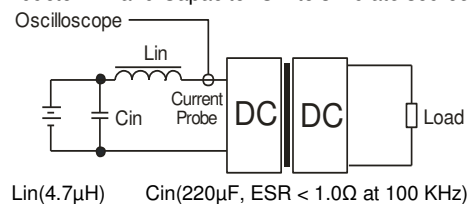
OUTLINE DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING



TEST CONFIGURATIONS

Input Reflected-Ripple Current Test Setup

Input reflected-ripple current is measured with an inductor L_{in} and Capacitor C_{in} to simulate source impedance.



DESIGN CONSIDERATIONS

1) Requirement on output load

To ensure this module can operate efficiently and reliably, During operation, the minimum output load **could not be less than 10% of the full load**. If the actual output power is very small, please connect a resistor with proper resistance at the output end in parallel to increase the load, or use our company's products with a lower rated output power (SG/SH_D-1Wseries).

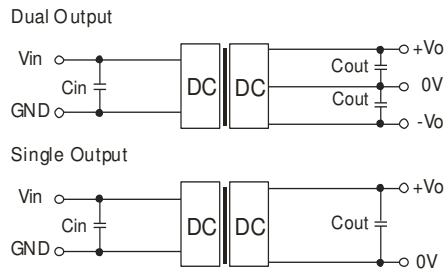
2) Overload Protection

Under normal operating conditions, the output circuit of these products has no protection against overload. The simplest method is add a circuit breaker to the circuit.

3) Recommended circuit

If you want to further decrease the input/output ripple, an capacitor filtering network may be connected to the input and output ends of the DC/DC converter, see (Figure 3).

It should also be noted that the capacitance of filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the recommended capacitance of its filter capacitor sees (Table 1).



(Figure 3)

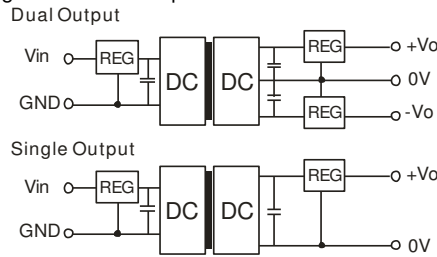
EXTERNAL CAPACITOR TABLE (TABLE 1)

Vin (VDC)	Cin (μF)	Single Vout (VDC)	Cout (μF)	Dual Vout (VDC)	Cout# (μF)
5	4.7	5	10	±5	4.7
12	2.2	9	4.7	±9	2.2
15	2.2	12	2.2	±12	1
24	1	15	1	±15	1

Note: # For each output. It's not recommended to connect any external capacitor in the application field with less than 0.5 watt output.

4) Output Voltage Regulation and Over-voltage Protection Circuit

The simplest device for output voltage regulation, over-voltage and over-current protection is a linear regulator and an capacitor filtering network with overheat protection that is connected to the input or output end in series (Figure 4), the recommended capacitance of its filter capacitor sees (Table 1), linear regulator based on the actual voltage and current required.



(Figure 4)

5) Cannot use in parallel and hot swap

Note:

1. Operation under minimum load will not damage the converter; However, they may not meet all specification listed.
2. Max. Capacitive Load tested at input voltage range and full load.
3. All data in the datasheet are measured according to nominal input voltage, rated output load, TA=25°C, humidity<75%, unless otherwise specified.
4. In this datasheet, all the test methods of indications are based on our corporate standards.
5. The performance in the datasheet is just fit for the part number in the selection guide, and may be different from the customer-designed product, you can get more details from SCHMID-M's FAE.
6. Contact us for your specific requirement.
7. Specifications subject to change without prior notice.