SG_S-1W & SH_S-1W Series

1W, FIXED INPUT, 6000V ISOLATED & UNREGULATED DUAL/SINGLE OUTPUT DC-DC CONVERTER

FEATURES

6KVDC Isolation
SIP Package
Temperature Range: -40°C to +85°C
No Heatsink Required
Low Isolation Capacitance
Internal SMD Construction
Industry Standard Pinout
RoHS Compliance

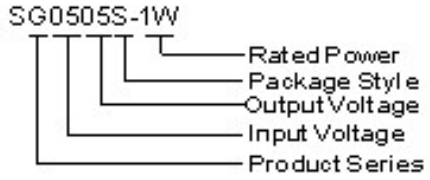
APPLICATIONS

The SG_S-1W & SH_S-1W Series are specially designed for applications where a group of polar power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.
These products apply to:

1) Where the voltage of the input power supply is fixed (voltage variation ≤ ±10%);
2) Where isolation is necessary between input and output (isolation voltage ≤6000VDC);
3) Where the regulation of the output voltage and the output ripple noise are not demanding.

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

MODEL SELECTION



PRODUCT PROGRAM

Part Number	Input		Output			Efficiency (%, Typ)
	Voltage (VDC)		Voltage (VDC)	Current (mA)		
	Nominal	Range		Max	Min	
SH0505S-1W	5	4.5~5.5	5	200	20	70
SH0509S-1W			9	111	12	72
SH0512S-1W			12	84	9	73
SH0515S-1W			15	67	7	74
SG0505S-1W			±5	±100	±10	70
SG0509S-1W			±9	±56	±6	72
SG0512S-1W			±12	±42	±5	73
SG0515S-1W			±15	±33	±4	75
SH1205S-1W	12	10.8~13.2	5	200	20	70
SH1209S-1W			9	111	12	71
SH1212S-1W			12	84	9	72
SH1215S-1W			15	67	7	74
SG1205S-1W			±5	±100	±10	70
SG1209S-1W			±9	±56	±6	71
SG1212S-1W			±12	±42	±5	72
SG1215S-1W			±15	±33	±4	75

Note: SG/SH_S-1W Series:UL-60950-1 Pending.

OUTPUT SPECIFICATIONS

Item	Test Conditions		Min	Typ	Max	Units
Output power			0.1		1	W
Line regulation	For Vin change of 1%				±1.2	%
Load regulation	10% to 100% load	(5V output)		12.8	15	%
		(9V output)		8.3	15	
		(12V output)		6.8	15	
		(15V output)		6.3	15	
Output voltage accuracy			See tolerance envelope graph			
Temperature drift	100% full load				0.03	%/°C
Ripple & Noise*	20MHz Bandwidth			150	200	mVp-p
Switching frequency	Full load, nominal input	(5V input)		250		KHz
		(12V input)		50		

*Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

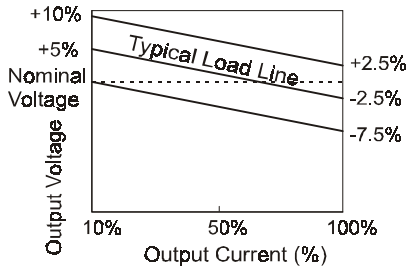
Note:
1.All specifications measured at TA=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
2.Dual output models unbalanced load: ±0.5%.

COMMON SPECIFICATIONS

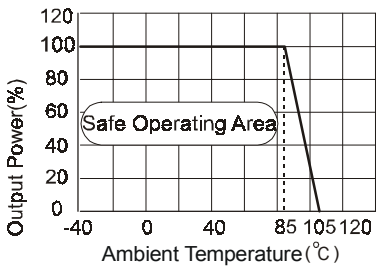
Item	Test conditions	Min	Typ	Max	Units
Storage humidity				95	%
Operating temperature		-40		85	°C
Storage temperature		-55		125	
Lead temperature	1.5mm from case for 10 seconds			300	
Temp. rise at full load			15	25	
Cooling		Free air convection			
Isolation voltage	Tested for 1 minute and 1mA max	6000			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Short circuit protection	5V input voltage	1 second(Max)			
	12V input voltage	Continuous			
Case material		Plastic(UL94-V0)			
MTBF		3500			K Hours
Weigh			4.2		g

TYPICAL CHARACTERISTICS

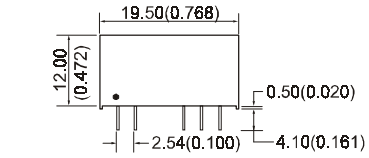
Tolerance Envelope Graph

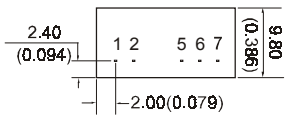


Temperature Derating Graph



OUTLINE DIMENSIONS & PIN CONNECTIONS



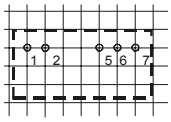


First Angle Projection

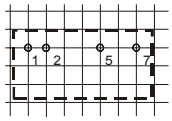
RECOMMENDED FOOTPRINT

Top view,grid:2.54mm(0.1inch), diameter:1.00mm

Dual Output



Single Output



FOOTPRINT DETAILS

Pin	Singles	Duals
1	Vin	Vin
2	GND	GND
5	0V	-V0
6	No Pin	0V
7	+Vo	+Vo

Note:
Unit:mm(inch)
Pin section:0.50*0.30mm(0.020*0.012inch)
Pin tolerances:±0.10mm(±0.004inch)
General tolerances:±0.25mm (±0.010inch)

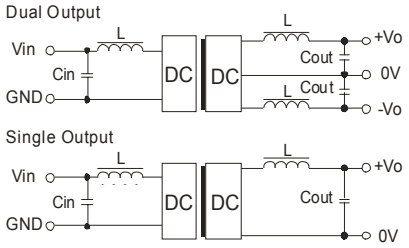
APPLICATION NOTE

Requirement on output load

To ensure this module can operate efficiently and reliably, During operation, the minimum output load is **not less than 10%** of the full load, and that **this product should never be operated under no 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.

Recommended testing and application circuit

If you want to further decrease the input/output ripple, an "LC" filtering network may be connected to the input and output ends of the DC/DC converter, see (Figure 1).



(Figure 1)

It should also be noted that the inductance and the frequency of the "LC" filtering network should be staggered with the DC/DC frequency to avoid mutual interference. However, the capacitance of the output 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 greatest capacitance of its filter capacitor sees (Table 1).

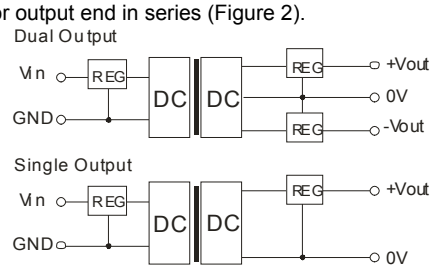
EXTERNAL CAPACITOR TABLE (Table 1)

Vin (VDC)	Cin (uF)	Single Vout (VDC)	Cout (uF)	Dual Vout (VDC)	Cou (uF)
5	4.7	5	10	±5	4.7
12	2.2	9	4.7	±9	2.2
-	-	12	2.2	±12	2.2
-	-	15	1	±15	1

It's not recommend to connect any external capacitor in the application field with less than 0.5 watt output.

Output Voltage Regulation and Over-voltage Protection Circuit

The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with overheat protection that is connected to the input or output end in series (Figure 2).



(Figure 2)

Overload Protection

Under normal operating conditions, the output circuit of these products has no protection against overload. The simplest method is to connect a self-recovery fuse in series at the input end or add a circuit breaker to the circuit.

No parallel connection or plug and play.