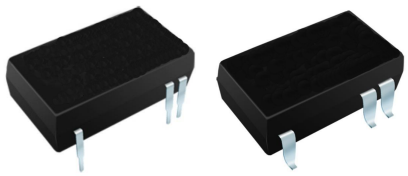
DC/DC Converter

SH_RN-2W & SH_LT-2W Series

2W, Fixed input voltage, isolated & unregulated single output



Patent Protection RoHS CE

FEATURES

- Continuous short circuit protection
- Efficiency up to 80%
- Operating temperature range: -40℃ to +85℃
- Isolation voltage: 6K VDC
- DIP/SMD package
- Internal surface mounted design
- International standard pin-out

SH_RN-2W & SH_LT-2W series is specially designed for applications where an isolated voltage is required in a distributed power supply system. It is suitable for

1.Where the voltage of the input power supply is stable (voltage variation: ±10%Vin);

2.Where isolation is necessary between input and output (isolation voltage ≤6000VDC);

3.Where do not has high requirement of line regulation , load regulation and the ripple & noise of the output voltage;

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

Selection Guide

Part No.	Input Voltage (VDC)	Output		Efficiency (%,Min./Typ.) @ Full Load	Max. Capacitive Load (μF)	Certification
	Nominal (Range)	Output Voltage (VDC)	Output Current (mA)(Max./Min.)			
SH0503RN-2W	5 (4.5-5.5)	3.3	600/60	67/71	220	
SH0505RN-2W		5	400/40	74/78		CE
SH0509RN-2W		9	223/22	76/78		CE
SH0512RN-2W		12	167/17	74/78		CE
SH0515RN-2W		15	133/13	74/78		CE
SH0505LT-2W		5	400/40	74/78		CE
SH0512LT-2W		12	167/17	74/78		CE
SH0515LT-2W		15	133/33	74/78		CE
SH1205RN-2W	12 (10.8-13.2)	5	400/40	75/79		CE
SH1206RN-2W		6	334/34	75/79		
SH1212RN-2W		9	223/22	75/79		CE
SH1215RN-2W		15	133/13	76/80		CE
SH1205LT-2W		5	400/40	75/79		CE
SH1212LT-2W		12	167/17	75/79		CE
SH1215LT-2W		15	133/33	76/80		CE
SH2405RN-2W	24 (21.6-26.4)	5	400/40	73/77		CE
SH2415RN-2W		15	133/13	76/80		CE
SH2403LT-2W		3.3	400/40	69/73		
SH2405LT-2W		5	400/40	73/77		CE
SH2415LT-2W		15	133/13	76/80		CE

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	5V input	--	564/65	--	mA
	12V input	--	210/30	--	
	24V input	--	109/10	--	
Surge Voltage (1sec. max.)	5V input	-0.7	--	9	VDC
	12V input	-0.7	--	18	
	24V input	-0.7	--	30	
Reflected Ripple Current	3.3V/5V input	--	20	--	mA
	Other input	--	5	--	
Input Filter		Capacitor filter			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy			See tolerance envelope graph (Fig. 1)			
Line Regulation	Input voltage change: ±1%	3.3V output	--	--	±1.5	--
		Other output	--	--	±1.2	
Load Regulation	10%-100% load	3.3VDC output	--	15	20	%
		5V/6VDC output	--	12	15	
		9VDC output	--	9		
		12VDC output	--	8		
		15VDC output	--	7		
Ripple & Noise*	20MHz bandwidth		--	150	200	mVp-p
Temperature Drift Coefficient	100% load		--	--	±0.03	%/℃
Output Short Circuit Protection			Continuous, self-recovery			

Note: * Ripple and noise tested with "parallel cable" method, please see *DC-DC Converter Application Notes* for specific operation methods.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, with the test time of 1 minute and the leak current lower than 1mA	6000	--	--	VDC
Isolation Resistance	Input-output, isolation voltage 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V	--	10	--	pF
Operating Temperature	Derating if the temperature ⩾85° C, (see Fig. 2)	-40	--	85	° C
Storage Temperature		-55	--	125	
Casing Temperature Rise	Ta=25° C	--	15	25	
Pin Welding Resistance Temperature	Welding spot is 1.5mm away from the casing, 10 seconds	--	--	300	
Reflow Soldering Temperature		Peak temp.≤245℃, maximum duration time≤60s at 217℃. For actual application, please refer to IPC/JEDEC J-STD-020D.1.			
Storage Humidity	Non-condensing	--	--	95	%
Switching Frequency	100% load, nominal input voltage	--	80	--	KHz
MTBF	MIL-HDFK-217F@25° C	3500	--	--	K hours

Physical Specifications

Casing Material	Black flame-retardant heat-proof epoxy resin (UL94-V0)	
Package Dimensions	SH_RN-2W	23.86*18.00*7.80mm
	SH_LT-2W	23.86*18.10*8.00mm
Weight	5.5g (Typ.)	
Cooling Method	Free air convection	

Product Characteristic Curve

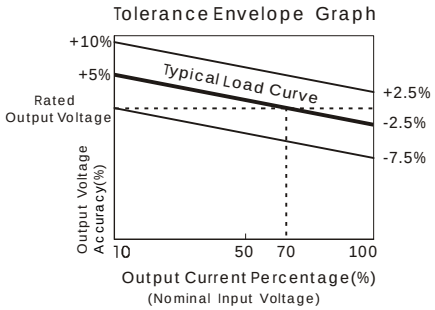


Fig. 1

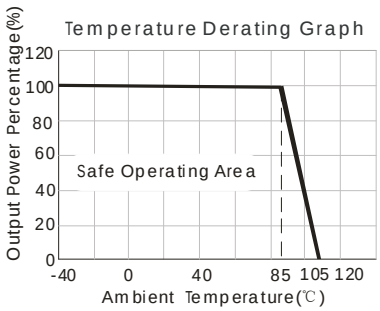


Fig. 2

Design Reference

1. Typical application

If it is required to further reduce input and output ripple, a filter capacitor can be connected to the input and output terminals, see Fig.3. Moreover, choosing suitable filter capacitor is very important, start-up problems may be caused by too large capacitance. To ensured the modules running well, the recommended capacitive load values as shown in Table 1.

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 (Fig.4).

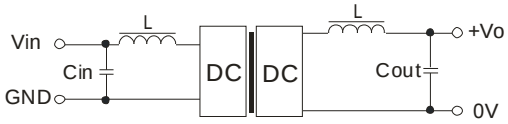


Fig.3

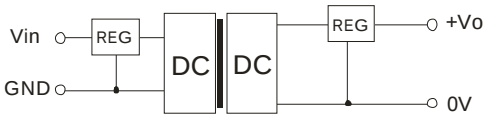


Fig.4

Recommended capacitive load value table (Table 1)

Vin (VDC)	Cin (μF)	Vout (VDC)	Cout (μF)
5	4.7	3.3/5	10
12	2.2	9	4.7
24	1	12	2.2
--	--	15	1

It is not recommended to connect any external capacitor when output power is less than 0.5W.

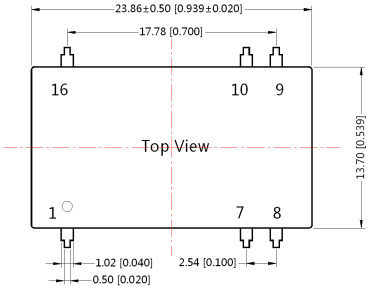
2. Output load requirements

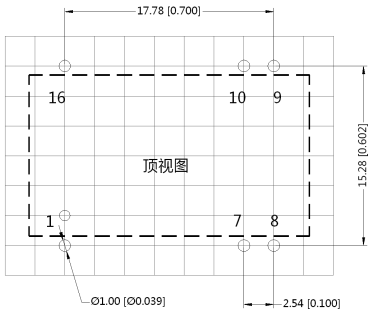
To ensure the module work efficiently and reliably, during the operation, the min. output load should be no less than 10% of the full load. If the actual output power is low, please connect a resister to the output terminal in parallel, with a recommenced resistance which is 10% of the rated power, and derating is required during operation.

Dimensions and Recommended Layout

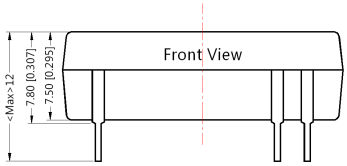
SH_RN-2W series

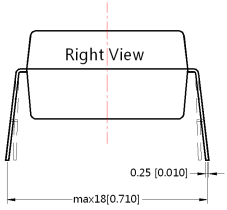
THIRD ANGLE PROJECTION





Note: Grid 2.54*2.54mm



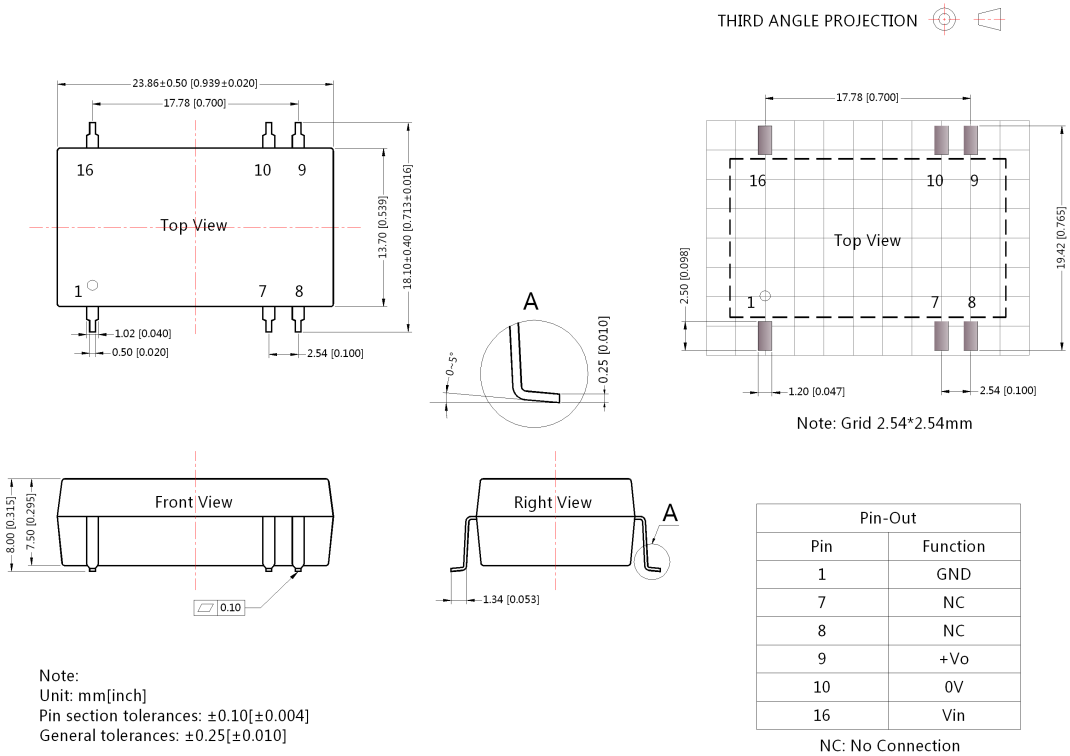


Pin-Out	
Pin	Function
1	GND
7	NC
8	NC
9	+Vo
10	0V
16	Vin

NC: No Connection

Note:
Unit: mm[inch]
Pin section tolerances: ±0.10[±0.004]
General tolerances: ±0.25[±0.010]

SH_LT-2W series



Note: Grid 2.54*2.54mm

Note:
Unit: mm[inch]
Pin section tolerances: ±0.10[±0.004]
General tolerances: ±0.25[±0.010]

Pin-Out	
Pin	Function
1	GND
7	NC
8	NC
9	+Vo
10	0V
16	Vin

NC: No Connection

Notes:

1. If the product is operated under the min. required load, the product performance cannot be guaranteed to comply with all performance indexes in this datasheet;
2. The max. capacitive load should be tested within the input voltage range and under full load conditions;
3. Unless otherwise specified, data in this data sheet should be tested under the conditions of Ta=25° C, humidity<75% when inputting nominal voltage and outputting rated load;
4. All index testing methods in this datasheet are based on our Company's corporate standards;
5. The performance indexes of the product models listed in this manual are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, and please directly contact our technicians for specific information;
6. We can provide product customization service;
7. Specifications of this product are subject to changes without prior notice.