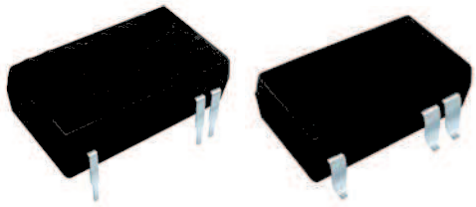
DC/DC Converter

SH_RN-2W & SH_LT-2W Series

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



FEATURES

- Continuous short-circuit protection
- Operating temperature range: -40℃ to +105℃
- High efficiency up to 85%
- DIP/SMD package
- Isolation voltage: 6KVDC
- International standard pin-out

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

1. *Where the voltage of the input power supply is stable (voltage variation: ±10%Vin);*
2. *Where isolation between input and output is necessary (isolation voltage ≤6000VDC);*
3. *Where the output voltage regulation is not strictly required;*
4. *Typical application: preceding-stage interference isolation condition; ground-interference canceled condition; digit circuit condition; Voltage-isolation converting condition; normal low-frequency artificial circuit condition; relay drive circuit condition, etc.*

Selection Guide

Part No.	Input Voltage (VDC)	Output		Efficiency (%,Min./Typ.) @ Full Load	Max. Capacitive Load (μF)
	Nominal (Range)	Output Voltage (VDC)	Output Current (mA)(Max./Min.)		
SH0505LT-2W	5 (4.5-5.5)	5	400/40	71/75	220
SH0503RN-2W		3.3	600/60	68/72	
SH0505RN-2W		5	400/40	71/75	
SH0509RN-2W		9	222/22	73/77	
SH0512RN-2W		12	167/17	74/78	
SH0515RN-2W		15	133/14	74/78	
SH1205LT-2W	12 (10.8-13.2)	5	400/40	75/79	
SH1209LT-2W		9	222/22	78/82	
SH1212LT-2W		12	167/17	80/84	
SH1215LT-2W		15	133/14	81/85	
SH1205RN-2W		5	400/40	75/79	
SH1206RN-2W		6	333/34	76/80	
SH1212RN-2W		12	167/17	80/84	
SH1215RN-2W		15	133/14	81/85	
SH2403LT-2W	24 (21.6-26.4)	3.3	400/40	70/74	
SH2405LT-2W		5	400/40	76/80	
SH2409LT-2W		9	222/22	75/79	
SH2412LT-2W		12	167/17	74/78	
SH2415LT-2W		15	133/14	80/84	
SH2405RN-2W		5	400/40	76/80	
SH2412RN-2W		12	167/17	74/78	
SH2415RN-2W		15	133/14	80/84	

DC/DC Converter

SH_RN-2W & SH_LT-2W Series

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	5V input	--	513/40	--/70	mA
	12V input	--	206/15	--/45	
	24V input	--	104/10	--/35	
Reflected Ripple Current*	5V input	--	15	--	mA
	Others input	--	5	--	
Surge Voltage (1sec. max.)	5V input	-0.7	--	9	VDC
	12V input	-0.7	--	18	
	24V input	-0.7	--	30	
Input Filter		Filter capacitor			
Hot Plug		Unavailable			

Note:*The measuring method of reflected ripple current, please see DC-DC Converter Application Notes for specific operation.

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy			See tolerance envelope curve(Fig. 1)			
Line Regulation	Input voltage change: ±1%	3.3VDC output	--	--	±1.5	--
		Other outputs	--	--	±1.2	
Load Regulation	10%-100% load	3.3VDC output	--	--	25	%
		Others output	--	--	15	
Ripple & Noise*	20MHz bandwidth		--	150	250	mVp-p
Temperature Coefficient	Full load		--	--	±0.03	%/℃
Short Circuit Protection			Continuous, self-recovery			

Note: * Ripple and noise are measured by "parallel cable" method, please see DC-DC Converter Application Notes for specific operation.

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 when operating temperature up to 85℃, (see Fig. 2)	-40	--	105	℃
Storage Temperature		-55	--	125	
Casing Temperature Rise	Ta=25℃, nominal input, full load output	--	25	60	
Pin Welding Resistance Temperature	Welding spot is 1.5mm away from the casing, 10 seconds	--	--	300	
Storage Humidity	Non-condensing	--	--	95	%RH
Reflow Soldering Temperature		Peak temp.≤245℃, maximum duration time≤60s at 217℃. For actual application, please refer to IPC/JEDEC J-STD-020D.1.			
Switching Frequency	Full load, nominal input voltage	--	70	--	KHz
MTBF	MIL-HDFK-217F@25℃	3500	--	--	K hours

Physical Specifications

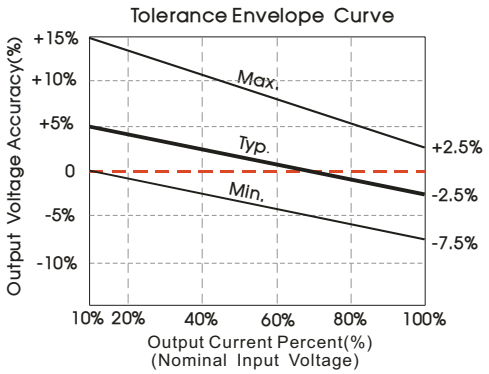
Casing Material	Epoxy resin (UL94-V0)	
Dimensions	SH_LT-2W	23.86*18.10*8.00mm
	SH_RN-2W	23.86*18.00*7.80mm
Weight	5.5g(Typ.)	
Cooling Method	Free convection	

EMC Specifications

EMI	CE	CISPR22/EN55022	CLASS B (see Fig. 5 for recommended circuit)
	RE	CISPR22/EN55022	CLASS B (see Fig. 5 for recommended circuit)
EMS	ESD	IEC/EN61000-4-2	Contact ±6KV perf. Criteria B

Product Characteristic Curve

3.3VDC/5VDC output



Other output

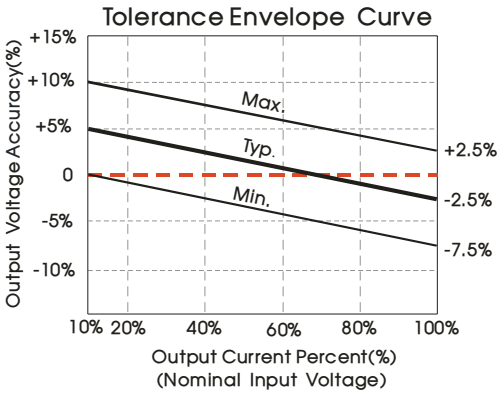


Fig. 1

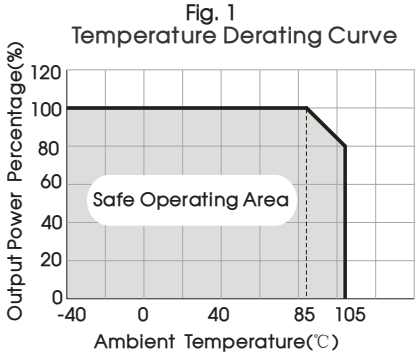
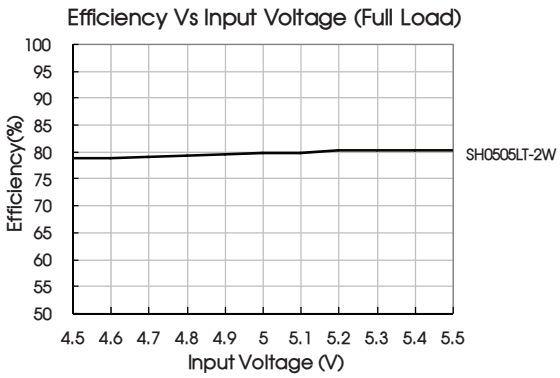
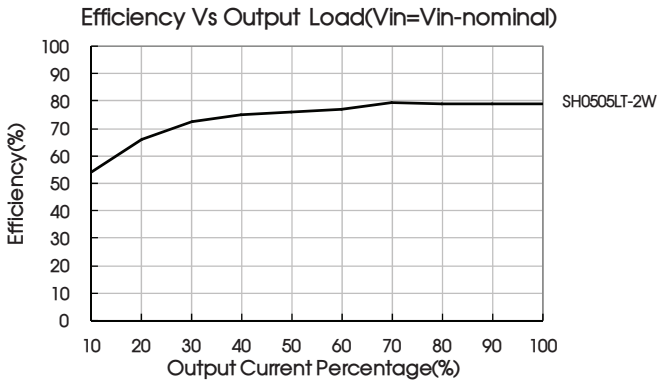
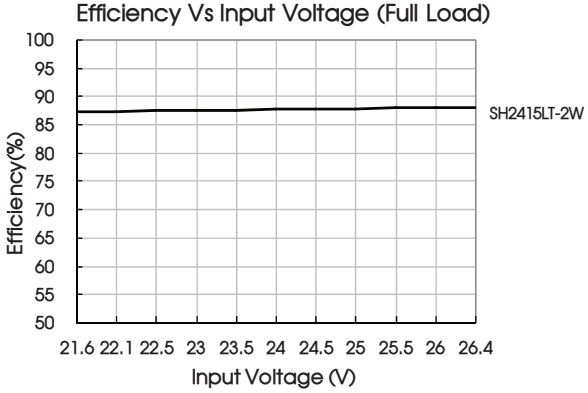
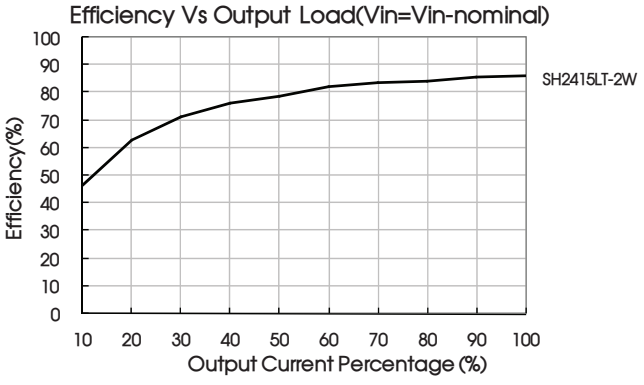


Fig. 2









Design Reference

1. Typical application circuit

If it is required to further reduce input and output ripple, a filter capacitor may be connected to the input and output terminals, see Fig.3. Moreover, choosing a suitable filter capacitor is very important, start-up problems may be caused if the capacitance is too large. Under the condition of safe and reliable operation, the recommended capacitive load values are 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

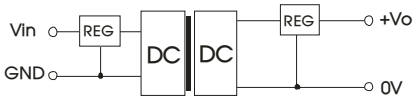


Fig.4

Recommended capacitive load value table (Table 1)

Vin (VDC)	Cin (μF)	Vout (VDC)	Cout (μF)
5	4.7	3.3/5/6	10
12	2.2	12	2.2
24	1	15	1

2. EMC solution-recommended circuit (CLASS B)

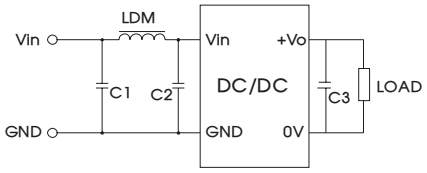


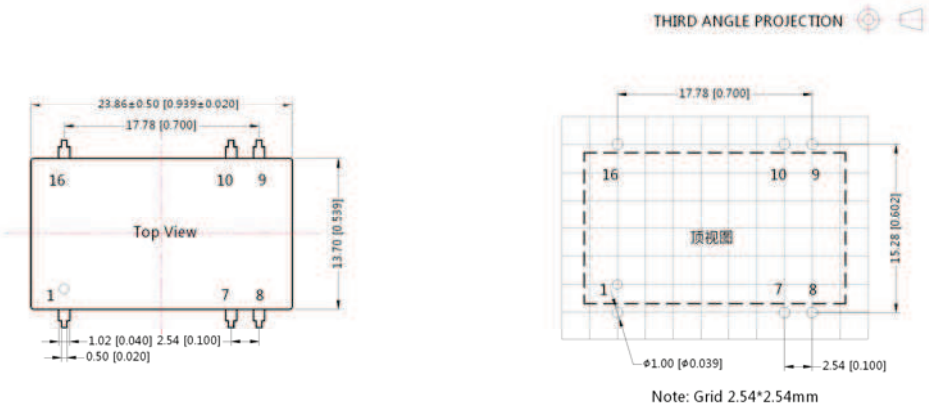
Fig. 4

Input voltage (V)		5/12/24
EMI	C1, C2	4.7μF /50V
	C3	Refer to the Cout in Fig.3
	LDM	6.8μH

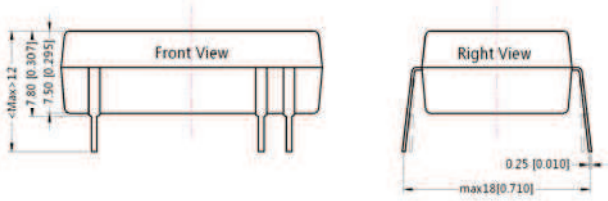
3. Output load requirements

When using, the minimum load of the module output should not be less than 10% of the nominal load. In order to meet the performance parameters of this datasheet, please connect a 10% dummy load in parallel at the output end, the dummy load is generally a resistor, Please note that the resistor needs to be used in derating.

Dimensions and Recommended Layout (SH_RN-2W)



Note: Grid 2.54*2.54mm

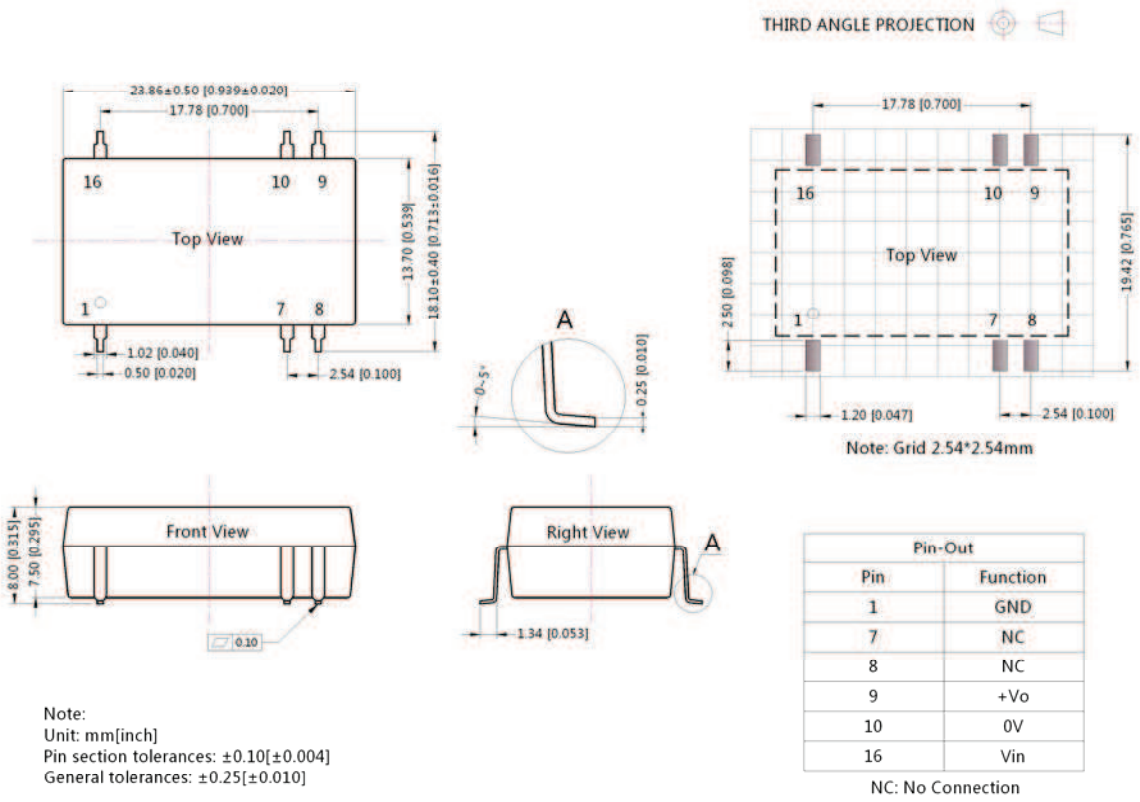


Pin-Out	
Pin	Function
1	GND
7	NC
8	NC
9	+Vo
10	0V
16	Vin

NC: No Connection

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

Dimensions and Recommended Layout (SH_LT-2W)



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:

Packing bag number: 58210019/58200027;

2. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
3. The maximum capacitive load offered were tested at nominal input voltage and full load;
4. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75% with nominal input voltage and rated output load;
5. All index testing methods in this datasheet are based on our Company's corporate standards;
6. The performance parameters of the product models listed in this manual are as above, but some parameters of non-standard model products may exceed the requirements mentioned above. Please contact our technicians directly for specific information;
7. We can provide product customization service;
8. Specifications are subject to change without prior notice.