SPECIFICATIONS

Customer	
Product Name	**Wire Wound SMD Power Inductor**
Sunlord Part Number	**SWPA3012S Series**
Customer Part Number	

[☒New Released, ☐Revised] **SPEC No.:SWPA120000**

【This SPEC is total 11 pages.】

【ROHS Compliant Parts】

Approved By	Checked By	Issued By

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【For Customer approval Only】 Date:_____

Qualification Status: ☐ Full ☐ Restricted ☐ Rejected

Approved By	Verified By	Re-checked By	Checked By

Comments:

_____

【Version change history】

Rev.	Effective Date	Changed Contents	Change Reasons	Approved By
01	/	New release	/	Qintian Hou

1 Scope

This specification applies to the SWPA3012S Series of wire wound SMD power inductor.

2 Product Description and Identification (Part Number)

1) Description:

SWPA3012S series of Wire wound SMD power inductor.

2) Product Identification (Part Number)

SWPA	3012	S	□□□	□	T	□□□
①	②	③	④	⑤	⑥	⑦

① Type	
SWPA	Wire wound SMD power inductor

② External Dimensions(L×W×H) [mm]	
3012	3.0X3.0X 1.2

③ Feature type	
S	Standard Type

④ Nominal Inductance	
Example	Example
1R0	1.0uH
100	10uH
101	100uH

⑤ Inductance Tolerance	
N	±30%
M	±20%

⑥ Packing	
T	Tape Carrier Package

⑦ Special Process code	
□□□	Special Process code
* Standard product is blank	

3 Electrical Characteristics

Please refer to **Item 12**.

1) Operating and storage temperature range (individual chip without packing): -40°C ~ +125°C（Including Self-heating）
2) Storage temperature range (packaging conditions): -10°C~+40°C and RH 70% (Max.)

4 Test and Measurement Procedures

4.1 Test Conditions

4.1.1 Unless otherwise specified, the standard atmospheric conditions for measurement/test as:

a. Ambient Temperature: 20±15°C
b. Relative Humidity: 65±20%
c. Air Pressure: 86kPa to 106kPa

4.1.2 If any doubt on the results, measurements/tests should be made within the following limits:

a. Ambient Temperature: 20±2°C
b. Relative Humidity: 65±5%
c. Air Pressure: 86kPa to 106kPa

4.2 Visual Examination

Inspection Equipment: 10X microscope

4.3 Electrical Test

4.3.1 Inductance (L)

a. Refer to **Item 12**.Test equipment:WK3260B LCR meter or equivalent.
b. Test Frequency and Voltage: refers to **Item 12.**

4.3.2 Direct Current Resistance (DCR)

a. Refer to **Item 12**.
b. Test equipment: HIOKI 3540 or equivalent.

4.3.3 Saturation Current (Isat)

a. Refer to Item 12.
b. Test equipment: WK3260B LCR meter or equivalent.
c. Definition of saturation current (Isat): DC current at which the inductance drops approximate 30% from its value without current.

4.3.4 Temperature rise current (Irms)

a. Refer to **Item 12**.
b. Test equipment (**see Fig. 4.3.4-1, Fig. 4.3.4-2)**: Electric Power, Electric current meter, Thermometer.
c. Measurement method
   1. Set test current to be 0 mA.
   2. Measure initial temperature of choke surface.
   3. Gradually increase current and measure choke temperature for corresponding current.
   4. Definition of Temperature rise current: DC current that causes the temperature rise (△T =40°C) from 20°C ambient

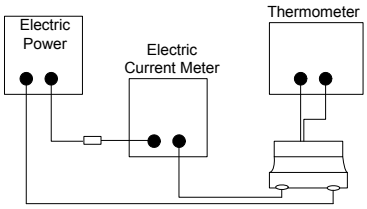


Fig. 4.3.4-1

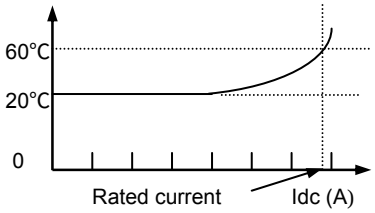


Fig. 4.3.4-2

5 Shape and Dimensions

Dimensions and recommended PCB pattern for reflow soldering, please see **Fig.5-1**, **Fig. 5-2** and **Table 5-1.**

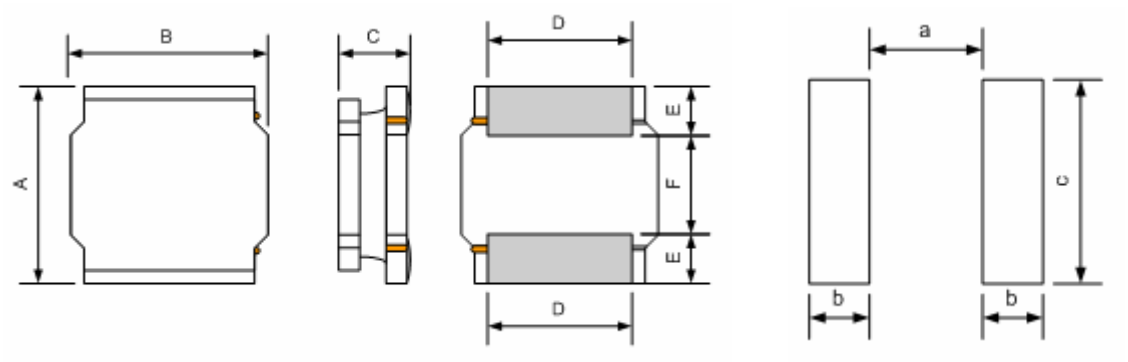


Fig.5-1

[Table 5-1] (Unit: mm)

Series	A	B	C	D	E	F	a	b	c
SWPA3012S	3.0±0.2	3.0±0.2	1.2Max.	2.5±0.2	0.75±0.2	1.5±0.2	1.5Typ.	0.8Typ.	2.7Typ.

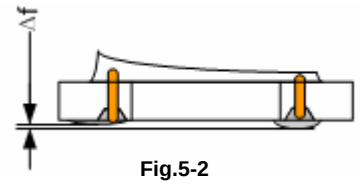


Fig.5-2

Δf: Clearance between terminal and the surface of plate must be 0.1mm max when coil is placed on a flat plate.

6 Structure

The structure of SWPA3012S product, please refer to **Fig.6-1** and **Table 6-1**.

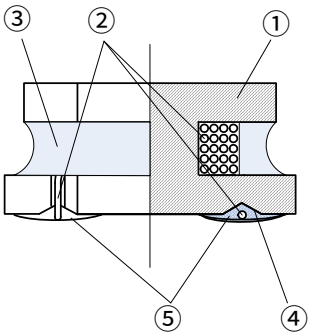


Fig. 6-1

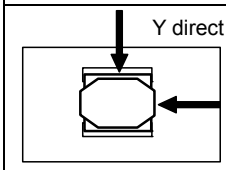
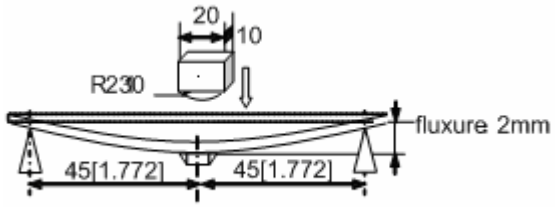
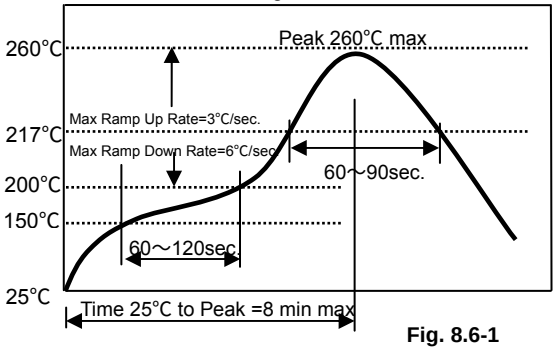
[Table 6-1]

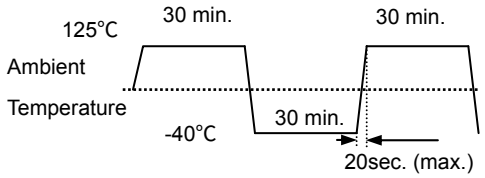
No.	Components	Material
①	Ferrite Core	Ni-Zn Ferrite
②	Wire	Polyurethane system enameled copper wire
③	Magnetic Glue	Epoxy resin and magnetic powder
④	Plating Electrodes	Plating: Ag/Ni/Sn
⑤	Outer Electrodes	Top surface solder coating:Sn96.5%/Ag3.0%/Cu0.5%

7 Product Marking

N/A

8 Reliability Test

Items	Requirements	Test Methods and Remarks
8.1 Terminal Strength	No removal or split of the termination or other defects shall occur.  **Fig.8.1-1**	① Solder the inductor to the testing jig (glass epoxy board shown in **Fig.8.1-1**) using eutectic solder. Then apply a force in the direction of the arrow. ② 10N force. ③ Keep time: 5s
8.2 Resistance to Flexure	No visible mechanical damage.  **Fig.8.2-1**	① Solder the chip to the test jig (glass epoxy board) using eutectic solder. Then apply a force in the direction shown as **Fig.8.2-1**. ② Flexure: 2mm ③ Pressurizing Speed: 0.5mm/sec ④ Keep time: 30±1s ⑤ Test board size: 100X40X1.0 ⑥ Land dimension: Please see **Fig. 5-1**
8.3 Vibration	① No visible mechanical damage. ② Inductance change: Within ±10%	① Solder the chip to the testing jig (glass epoxy board shown as the following figure) using eutectic solder. ② The chip shall be subjected to a simple harmonic motion having total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55 Hz. ③ The frequency range from 10 to 55 Hz and return to 10 Hz shall be traversed in approximately 1 minute. This motion shall be applied for a period of 2 hours in each 3 mutually perpendicular directions (total of 6 hours).
8.4 Temperature coefficient	Inductance change: Within ±20%	① Temperature: -40°C~+125°C ② With a reference value of +20°C, change rate shall be calculated
8.5 Solderability	90% or more of electrode area shall be coated by new solder.	① The test samples shall be dipped in flux, and then immersed in molten solder. ② Solder temperature: 245±5°C ③ Duration: 5±1 sec. ④ Solder: Sn/3.0Ag/0.5Cu ⑤ Flux: 25% resin and 75% ethanol in weight ⑥ Immersion depth: all sides of mounting terminal shall be immersed
8.6 Resistance to Soldering Heat	① No visible mechanical damage. ② Inductance change: Within ±10%	① Re-flowing Profile: Please refer to **Fig. 8.6-1**. ② Test board thickness: 1.0mm ③ Test board material: glass epoxy resin ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring  **Fig. 8.6-1**

8.7 Thermal Shock	① No visible mechanical damage. ② Inductance change: Within ±10%  **Fig.8.7-1**	① Temperature and time: -40±3°C for 30±3 min→125°C for 30±3min, please refer to **Fig. 8.7-1**. ② Transforming interval: Max. 20 sec ③ Tested cycle: 100 cycles ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring
8.8 Resistance to Low Temperature	① No visible mechanical damage ② Inductance change: Within ±10%	① Temperature: -40±3°C ② Duration: $1000^{\pm 24}$ hours ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring
8.9 Resistance to High Temperature	① No mechanical damage. ② Inductance change: Within ±10%	① Temperature:125±2°C ② Duration: $1000^{\pm 24}$ hours ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
8.10 Damp Heat	① No mechanical damage. ② Inductance change: Within ±10%	① Temperature: 60±2°C ② Humidity: 90% to 95%RH ③ Duration: $1000^{\pm 24}$ hours ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring
8.11 Loading Under Damp Heat	① No mechanical damage. ② Inductance change: Within ±10%	① Temperature: 60±2°C ② Humidity: 90% to 95% RH ③ Applied current: Rated current ④ Duration:$1000^{\pm 24}$ hours ⑤ The chip shall be stabilized at normal condition for 1~2 hours before measuring
8.12 Loading at High Temperature	① No mechanical damage. ② Inductance change: Within ±10%	① Temperature: 85±2°C ② Applied current: Rated current ③ Duration: $1000^{\pm 24}$ hours ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring

9 Packaging and Storage

9.1 Tape and Reel Packaging Dimensions

9.1.1Taping Dimensions (Unit: mm)

Please refer to **Fig. 9.1.1** and **Table 9.1.1**.

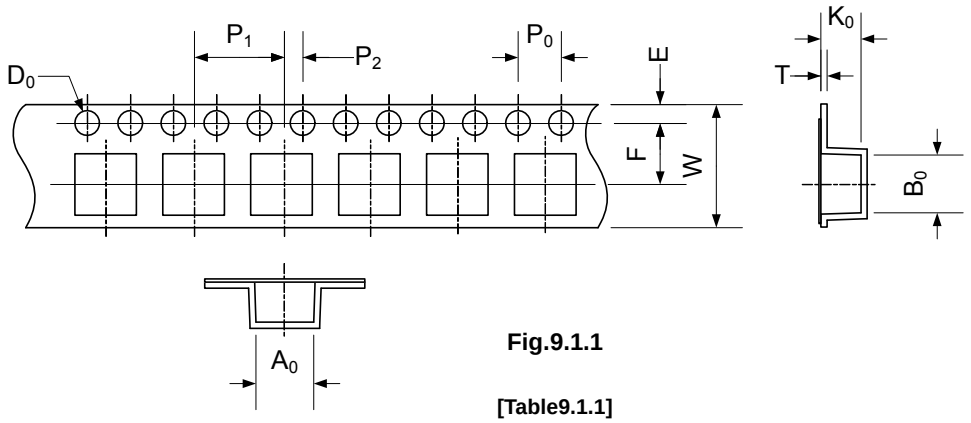


Fig.9.1.1

[Table9.1.1]

Series	A_0	B_0	W	E	F	P_0	P_1	P_2	D_0	T	K_0
SWPA3012S	3.3±0.1	3.3±0.1	8.0±0.3	1.75±0.1	3.5±0.05	4.0±0.1	4.0±0.1	2.0±0.1	1.5+0.1/-0.0	0.25±0.03	1.6±0.1

9.1.2 Direction of rolling

Please refer to **Fig. 9.1.2**

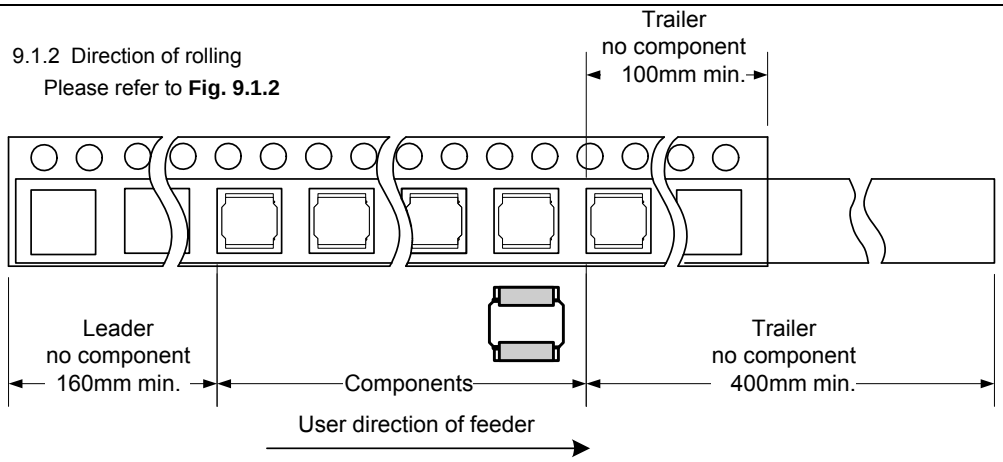


Fig. 9.1.2

9.1.3 Reel Dimensions (Unit: mm)

Please refer to **Fig. 9.1.3**.

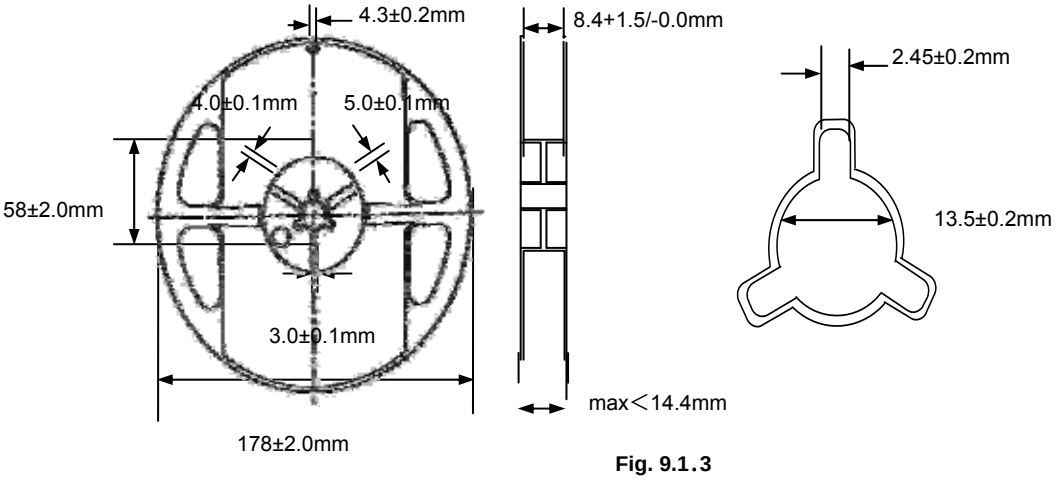


Fig. 9.1.3

9.1.4 Top tape strength

Peel-off strength: 10~100gf.

Peel-off angle: 165°~180°, refers to **Fig.9.1.4**

Peel-off speed: 300mm/min.

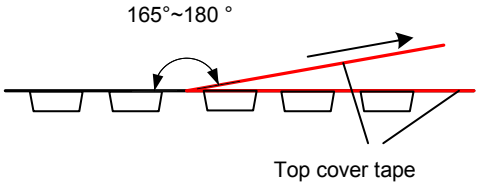


Fig. 9.1.4

9.1.5 The number of components

A tape & reel package contains 2000 inductors.

9.1.6The allowable number of empty chip cavities

Maximum two (2) chip cavities missing product may exist in a reel but they may not be consecutive two cavities.

9.2 Packing Documents and Marking

9.2.1Packing Documents

Packing documents include the following:

1) Packaging list
2) Certificate of compliance (COC)

9.2.2Packing QTY.

1) Inner Box: 10 reels in each box.
2) Outer Box: 4 or 8 inner boxes in each outer case.
3) 40 or 80 reels in each outer case.

9.2.3Marking

1)Marking label information on reels includes (see **Fig.9.2.3-1**、 **Fig.9.2.3-2A/2B**):

a). Sunlord P/N.
b). Quantity per reel
c). Lot number
d). Inspection No.
e). Inspection stamp
f). MFG address as 'Made In China'

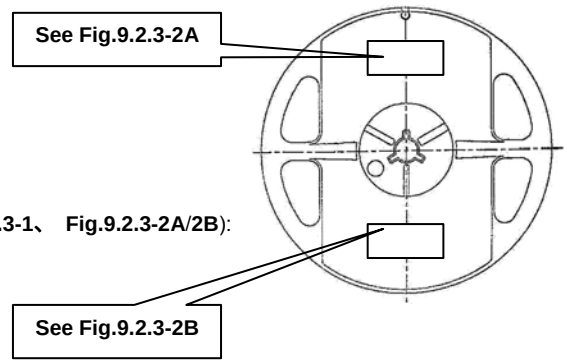


Fig.9.2.3-1

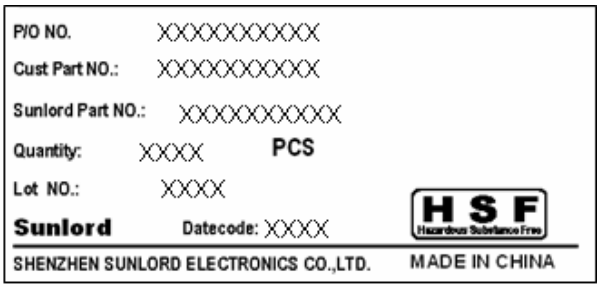


Fig.9.2.3-2A

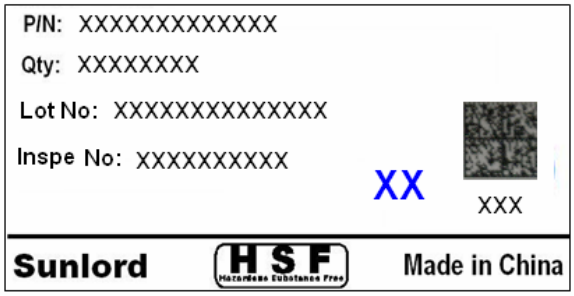


Fig.9.2.3-2B

2)Marking label information on inner box

a). Inner box please refers to **Fig.9.2.3-3**and **Table 9.2.3-1**

b). Marking Label on inner box(see **Fig.9.2.3-4**)

3)Marking on outer case (see **Fig.9.2.3-5~7**):

Out case size pleases reefers to **Table 9.2.3-2**.

a). Manufacturer: Sunlord ID:
"Shenzhen Sunlord Electronics Co., Ltd."

b). Packing label include the following:

i) Customer
ii) Manufacturer
iii) Date code
iv) C/No.

Example; "1/10" means that this case is the 1st one Of total 10 cases

v) P/O No.
vi) Customer Part No.
vii) Sunlord Part No.
viii) Quantity.
ix) Inspection Stamp.

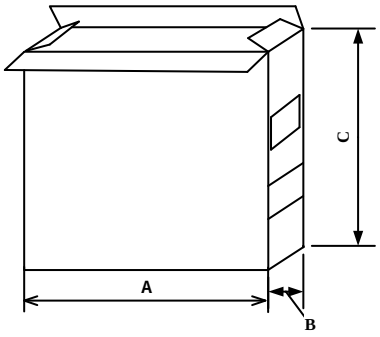


Fig.9.2.3-3

Packaging type	A(mm)	B(mm)	C(mm)
Inner box	180	120	180

[Table 9.2.3-1]

Packaging type	L(mm)	W(mm)	H(mm)
Type1	505	378	200
Type2	380	260	200

[Table 9.2.3-2]

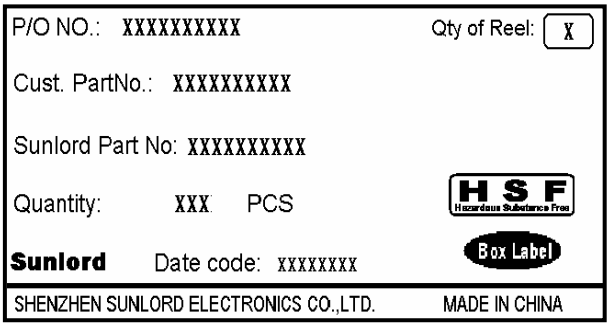


Fig.9.2.3-4

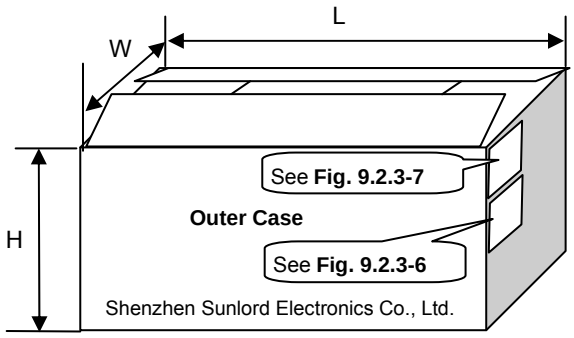


Fig. 9.2.3-5

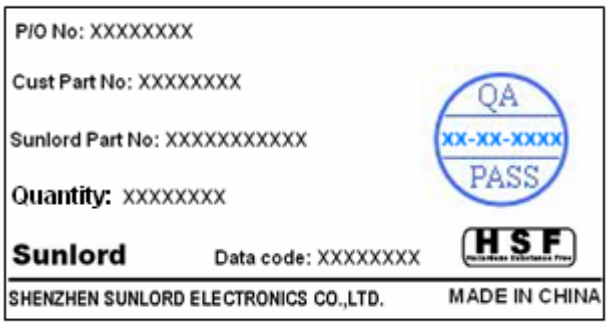


Fig.9.2.3-6

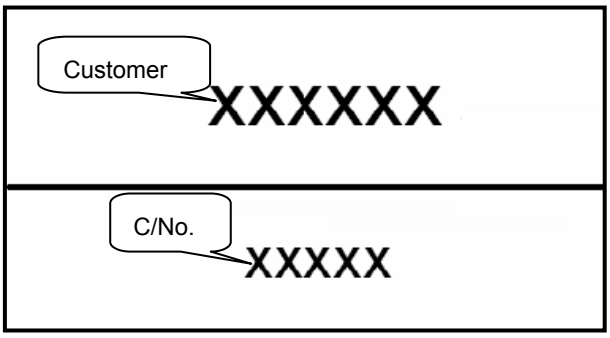
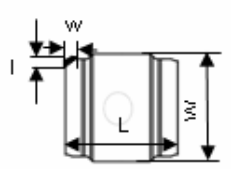
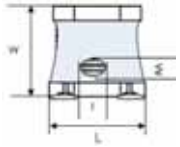
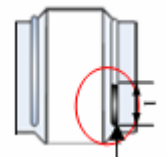
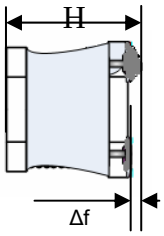
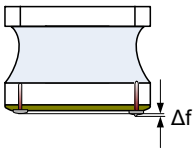


Fig.9.2.3-7

10 Visual inspection standard of product

File No:		Applied to Wire Wound SMD Power Inductor Series		REV:01
Effective date:				
No.	**Defect Item**	**Graphic**	**Rejection identification**	**Acceptance**
1	Core defect		The defect length/width (l or *w*) more than L/6 or W/6, NG.	AQL=0.65
2	Core crack		Visual cracks, NG.	AQL=0.65
3	Starvation		① Resin starved length, ***l***, more than L/2, NG. ② IF ***W***≥2mm, resin starved width, ***w***, more than W/2, NG. ③ IF ***W***≤2mm, resin starved width, ***w***, don't control.	AQL=0.65
4	Excessive glue		The length, width or height of product beyond specified value, NG.	AQL=0.65
5	Cold solder		① For SWPA252012S, cold solders ***l*** more than 0.5 mm, NG. ② For other series, cold solders ***l*** more than 1 mm, NG.	AQL=0.65
6	Solder icicle		① The height ***H*** of product beyond specified value, NG; ② The clearance ***Δf*** beyond specified value listed in **Item 5**, NG;	AQL=0.65
7	Electrode uneven		The clearance ***Δf*** beyond specified value listed in **Item 5**, NG;	AQL=0.65

11 Recommended Soldering Technologies

11.1Re-flowing Profile:

△ Preheat condition: 150 ~200°C/60~120sec.
△ Allowed time above 217C: 60~90sec.
△ Max temp: 260°C
△ Max time at max temp: 5sec.
Solder paste: Sn/3.0Ag/0.5Cu
△ Allowed Reflow time: 2x max
Please refer to Fig. 11.1-1.

[Note: The reflow profile in the above table is only for qualification and is not meant to specify board assembly profiles. Actual board assembly profiles must be based on the customer's specific board design, solder paste and process, and should not exceed the parameters as the Reflow profile shows.]

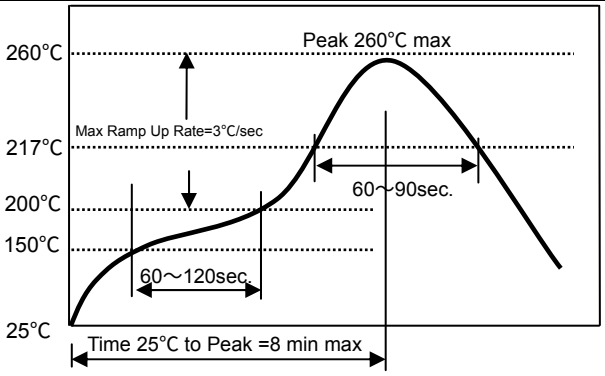


Fig. 11.1-1

11.2 Iron Soldering Profile

△ Iron soldering power: Max. 30W
△ Pre-heating: 150°C/60sec.
△ Soldering Tip temperature: 350°C Max.
△ Soldering time: 3sec. Max.
△ Solder paste: Sn/3.0Ag/0.5Cu
△ Max.1 times for iron soldering
Please refer to Fig. 11.2-1.
[Note: Take care not to apply the tip of the soldering iron to the terminal electrodes.]

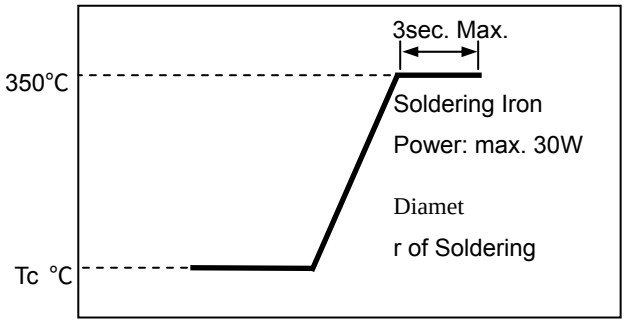


Fig. 11.2-1

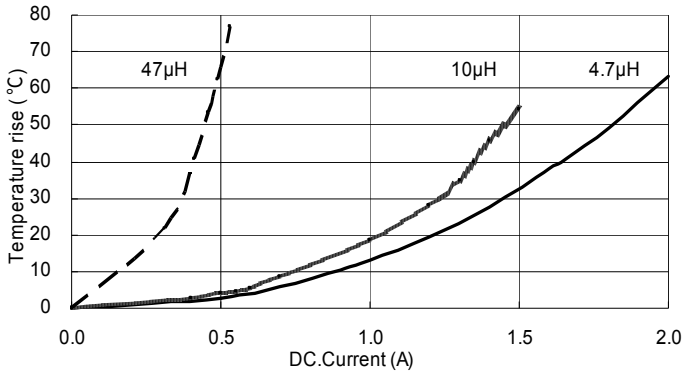
12 Electrical Characteristics

Part Number	Inductance	L Tolerance	Inductance Test Condition	DC Resistance (±30%)	Saturation Current	Temperature RiseCurrent	Min. Self-resonant frequency
Units	μH	-	-	Ω	A	A	MHz
Symbol	L	-	-	DCR	Isat	Irms	SRF
SWPA3012SR82NT	0.82	±30%	100K、1V	0.030	2.05	2.47	180
SWPA3012S1R0NT	1.0	±30%	100K、1V	0.040	1.87	2.20	120
SWPA3012S1R2NT	1.2	±30%	100K、1V	0.045	2.22	2.01	120
SWPA3012S1R5NT	1.5	±30%	100K、1V	0.045	1.62	2.01	110
SWPA3012S1R8NT	1.8	±30%	100K、1V	0.063	1.30	1.65	90
SWPA3012S2R2NT	2.2	±30%	100K、1V	0.075	1.20	1.55	84
SWPA3012S2R4NT	2.4	±30%	100K、1V	0.068	1.15	1.60	100
SWPA3012S2R7MT	2.7	±20%	100K、1V	0.085	1.14	1.48	65
SWPA3012S3R3MT	3.3	±20%	100K、1V	0.100	1.05	1.36	64
SWPA3012S3R9MT	3.9	±20%	100K、1V	0.145	1.00	1.24	61
SWPA3012S4R7MT	4.7	±20%	100K、1V	0.120	0.90	1.24	61
SWPA3012S6R8MT	6.8	±20%	100K、1V	0.190	0.75	0.98	61
SWPA3012S100MT	10	±20%	100K、1V	0.265	0.60	0.83	42
SWPA3012S120MT	12	±20%	100K、1V	0.345	0.48	0.73	32
SWPA3012S150MT	15	±20%	100K、1V	0.360	0.45	0.71	27
SWPA3012S180MT	18	±20%	100K、1V	0.545	0.43	0.58	25
SWPA3012S220MT	22	±20%	100K、1V	0.645	0.42	0.53	23
SWPA3012S270MT	27	±20%	100K、1V	0.870	0.35	0.47	21
SWPA3012S330MT	33	±20%	100K、1V	0.875	0.36	0.46	18
SWPA3012S360MT	36	±20%	100K、1V	0.950	0.34	0.44	18
SWPA3012S390MT	39	±20%	100K、1V	1.330	0.30	0.37	18

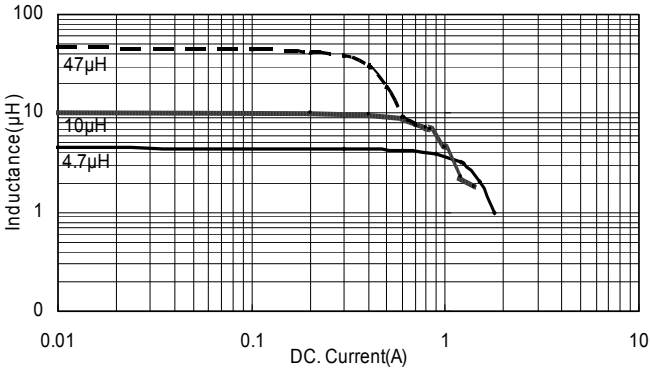
SWPA3012S470MT	47	±20%	100K、1V	1.450	0.27	0.35	14
SWPA3012S680MT	68	±20%	100K、1V	1.670	0.24	0.33	12
SWPA3012S820MT	82	±20%	100K、1V	2.540	0.17	0.27	12
SWPA3012S101MT	100	±20%	100K、1V	2.860	0.21	0.25	12

Typical Electrical Characteristics

Temperature vs. DC Current Characteristics



Inductance vs. DC Current Characteristics



13 Precautions

13.1 Surface mounting

- Mounting and soldering condition should be checked beforehand.
- Applicable soldering process to this product is reflow soldering only.
- Recommended conditions for repair by soldering iron:
  Preheat the circuit board with product to repair at 150°C for about 1 minute.
  Put soldering iron on the land-pattern.
  Soldering iron's temperature: 350°C maximum/Duration: 3 seconds maximum/1 time for each terminal.
  The soldering iron should not directly touch the inductor.
  Product once removes from the circuit board may not be used again.

13.2 Handing

- Keep the products away from all magnets and magnetic objects.
- Be careful not to subject the products to excessive mechanical shocks.
- Please avoid applying impact to the products after mounted on pc board.
- Avoid ultrasonic cleaning.

13.3 Storage

- To maintain the solderability of terminal electrodes and to keep the packing material in good condition, temperature and humidity in the storage area should be controlled.
- Recommended conditions: -10°C~40°C, 70%RH (Max.)
- Even under ideal storage conditions, solderability of products electrodes may decrease as time passes. For this reason, product should be used with one year from the time of delivery.
- In case of storage over 6 months, solderability shall be checked before actual usage.

13.4 Regarding Regulations

- Any Class- Ⅰ or Class- Ⅱ ozone-depleting substance (ODS) listed in the Clean Air Act in US for regulation is not included in the products or applied to the products at any stage of whose manufacturing processes.
- Certain brominated flame retardants (PBBs,PBDEs) are not used at all.
- The products of this specification are not subject to the Export Trade Control Order in China or the Export Administration Regulations in US.

13.5 Guarantee

- The guaranteed operating conditions of the products are in accordance with the conditions specified in this specification.
- Please note that Sunlord takes no responsibility for any failure and/or abnormality which is caused by use under other than the aforesaid operating conditions.

14 Supplier Information

14.1 Supplier:

Shenzhen Sunlord Electronics Co., Ltd.

14.2 Manufacturer:

Shenzhen Sunlord Electronics Co., Ltd.

14.3 Manufacturing Address:

Sunlord Industrial Park, Dafuyuan Industrial Zone, Guanlan, Shenzhen, China
Zip: 518110