

SMD POWER INDUCTOR

SPS252012D SERIES

1. PART NO. EXPRESSION :

S P S 2 5 2 0 1 2 D R 4 7 M F
 (a) (b) (c) (d) (e)(f)

(a) Series code

(d) Inductance code : R47 = 0.47 μ H

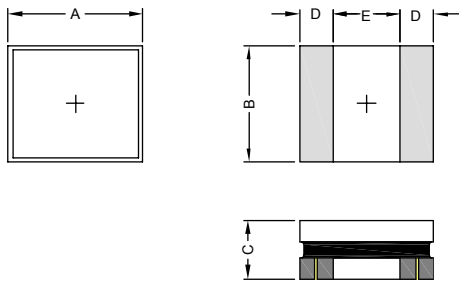
(b) Dimension code

(e) Tolerance code : M=±20%

(c) Material code

(f) F : RoHS Compliant

2. CONFIGURATION & DIMENSIONS :

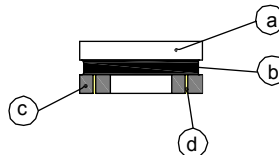


Unit: m/m

A	B	C	D	E
2.5 ^{+0.3} _{-0.1}	2.0 ^{+0.35} _{-0.05}	1.2 Max.	0.85 Ref.	0.80 Ref.

3. MATERIALS :

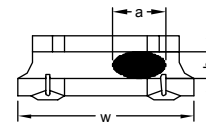
- (a) Core : Ferrite Core
- (b) Coating : Epoxy with magnetic powder
- (c) Termination : Tin Pb Free
- (d) Wire : Enameled Copper Wire



Exposed wire tolerance limit of coating resin part on product side.

Size of exposed wire occurring to coating resin is specified below.

1. Width direction (dimension a) : Acceptable when $a \leq w/2$
 Nonconforming when $a > w/2$
2. Length direction (dimension b) : Dimension b is not specified.
3. The total area of exposed wire occurring to each sides is not greater than 50% of coating resin area, and is acceptable.



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4. ELECTRICAL CHARACTERISTICS :

Part Number	Inductance (μ H)	Tolerance (%)	Test Frequency (Hz)	DCR (Ω) Typ.	DCR (Ω) Max.	Isat (A) Typ.	Isat (A) Max.	Irms (A) Typ.	Irms (A) Max.
SPS252012DR47MF	0.47	$\pm 20\%$	0.1V/1M	0.029	0.039	4.70	3.80	3.90	3.30
SPS252012DR68MF	0.68	$\pm 20\%$	0.1V/1M	0.042	0.055	4.40	3.70	3.50	2.90
SPS252012D1R0MF	1.0	$\pm 20\%$	0.1V/1M	0.047	0.062	3.80	3.00	3.00	2.70
SPS252012D2R2MF	2.2	$\pm 20\%$	0.1V/1M	0.098	0.117	2.30	2.00	2.20	1.90

5. GENERAL SPECIFICATION :

- (a) ambient temp. : 25°C
- (b) Isat : Based on inductance change ($\Delta L/L0 : \leq -30\%$)
- (c) Irms : Based on temperature rise ($\Delta T : 40^\circ\text{C}$)
- (d) Operating Temperature : -40~+85°C (For products in unopened tape package, less than 40°C)



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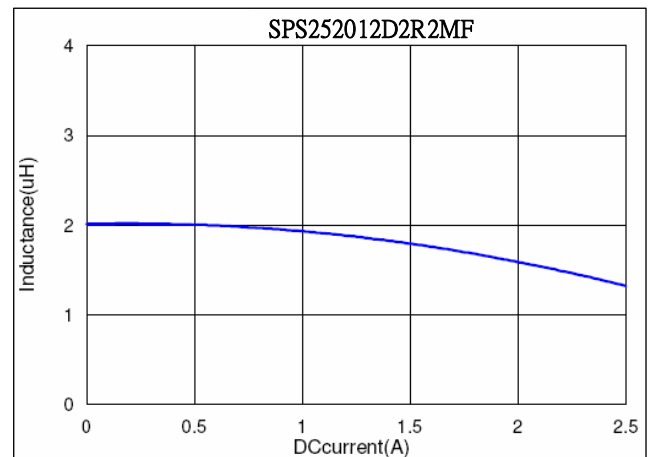
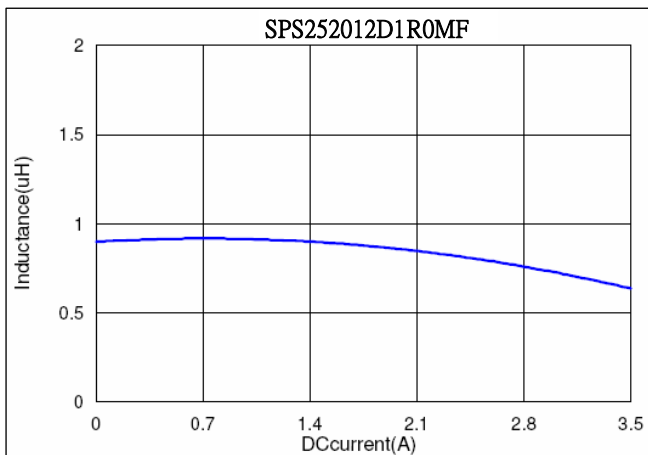
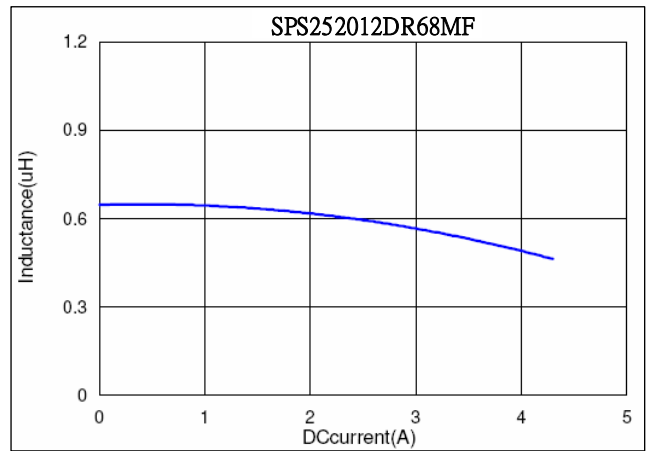
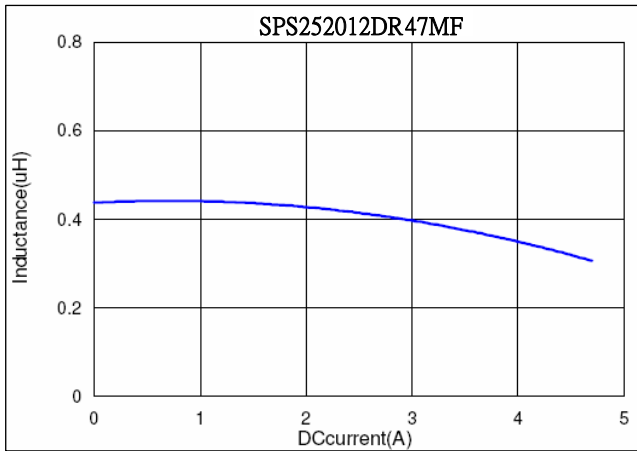
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6. CHARACTERISTIC CURVES :



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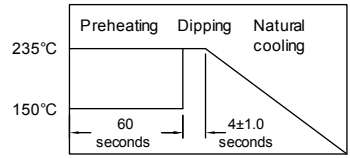


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7. RELIABILITY AND TEST CONDITION:

ITEM	PERFORMANCE	TEST CONDITION											
Electrical Characteristics Test													
Inductance L	Refer to standard electrical characteristics list	Agilent-4291, Agilent-4287											
Q													
SRF		Agilent-4291											
DC Resistance		Agilent-4338											
Rated Current	Base on temp. rise & $\Delta L/L0A \leq 30\%$.	Saturation DC Current (Isat) will cause L0 to drop approximately $\Delta L(\%)$.											
Temperature Rise Test	$\Delta T 40^{\circ}C_{Max}$	Heat Rated Current (Irms) will cause the coil temperature rise approximately $\Delta T(^{\circ}C)$ without core loss. 1. Applied the allowed DC current. 2. Temperature measured by digital surface thermometer											
Mechanical Performance Test													
Resistance to Soldering Heat MIL-STD-202 METHOD 210	1. Inductors shall be no evidence of electrical and mechanical damage. 2. Inductance : within $\pm 10\%$ of initial value	Temp.: $260 \pm 5^{\circ}C$ Time: 10 ± 1.0 Sec											
Solderability Test ANSI/J-STD-002	More than 95% of terminal electrode should be covered with solder.	 <p>After fluxing, component shall be dipped in a melted solder bath at $235 \pm 5^{\circ}C$ for 4 ± 1 seconds.</p>											
Reliability Test													
Humidity Test MIL-STD-202 METHOD 103	1. Visual examination : No mechanical damage 2. Inductance : within $\pm 10\%$ of initial value	Temperature : $40 \pm 2^{\circ}C$ Humidity : 90-95% Time : 500 ± 8 hrs Measured at room temperature after placing for 2 to 3hrs											
Thermal Shock Test MIL-STD-202 METHOD 107		<p>Conditions for 1 cycle.</p> <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature ($^{\circ}C$)</th> <th>Times (min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55 ± 2</td> <td>30 ± 3</td> </tr> <tr> <td>2</td> <td>Room Temperature</td> <td>Within 5</td> </tr> <tr> <td>3</td> <td>85 ± 5</td> <td>30 ± 3</td> </tr> </tbody> </table> <p>Total: 100 cycles Measured at room temperature after placing for 2 to 3 hrs</p>	Step	Temperature ($^{\circ}C$)	Times (min.)	1	-55 ± 2	30 ± 3	2	Room Temperature	Within 5	3	85 ± 5
Step	Temperature ($^{\circ}C$)	Times (min.)											
1	-55 ± 2	30 ± 3											
2	Room Temperature	Within 5											
3	85 ± 5	30 ± 3											



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7. RELIABILITY & TEST CONDITION :

ITEM	PERFORMANCE	TEST CONDITION
High Temperature Life Test MIL-STD-202 METHOD 108	1.Visual examination : No mechanical damage 2.Inductance : within±10% of initial value	Temperature : 85±2°C Duration : 500±8 hrs. Measured at room temperature after placing for 2 to 3 hrs
Low Temperature Storage Test JESD22-A119		Temperature : -40±2°C Time:500±8hr. Measured at room temperature after placing for 2 to 3 hrs
Humidity Resistance Test MIL-STD-202 METHOD 103		Temperature:40±2°C Humidity:90~ 95% Time:500±8hr. Recovery:2 to 3hrs of recovery under the standard condition after the removal from test chamber.
Random Vibration Test MIL-STD-202 Method 204	Appearance: Cracking, shipping and any other defects harmful to the characteristics should not be allowed. Inductance : within±10%	Frequency: 10-55-10Hz for 15 min. Amplitude: 1.52mm Directions and times: X, Y, Z directions for 15 min. This cycle shall be performed 12 times in each of three mutually perpendicular directions (Total 9hours).



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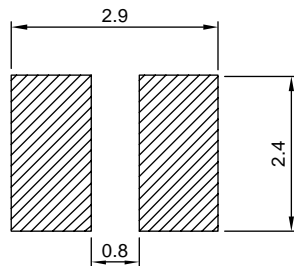
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8. SOLDERING AND MOUNTING :

8-1. Recommended PC Board Pattern



9-2. Soldering

Mildly activated rosin fluxes are preferred. The minimum amount of solder can lead to damage from the stresses caused by the difference in coefficients of expansion between solder, chip and substrate. The terminations are suitable for all wave and re-flow soldering systems. If hand soldering cannot be avoided, the preferred technique is the utilization of hot air soldering tools.

9-2.1 Lead Free Solder Re-flow :

Recommended temperature profiles for re-flow soldering in Figure 1.

9-2.2 Soldering Iron (Figure 2) :

Products attachment with soldering iron is discouraged due to the inherent process control limitations. In the event that a soldering iron must be employed the following precautions are recommended.

Note :

- a) Preheat circuit and products to 150°C.
- b) 355°C tip temperature (max)
- c) Never contact the ceramic with the iron tip
- d) 1.0mm tip diameter (max)
- e) Use a 20 watt soldering iron with tip diameter of 1.0mm
- f) Limit soldering time to 4-5 secs.

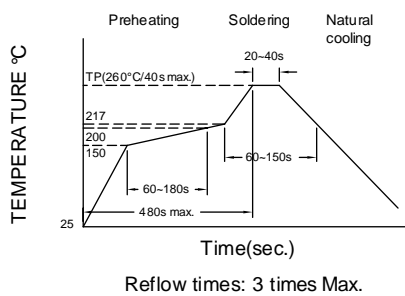


Fig.1

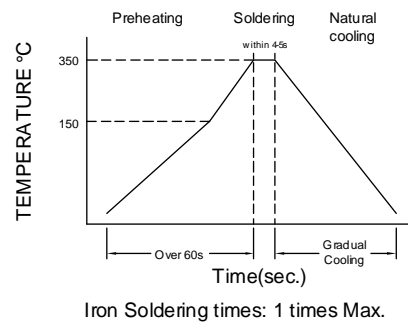


Fig.2



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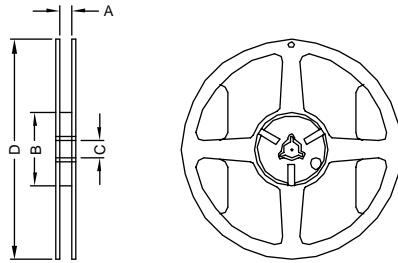
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9. PACKAGING INFORMATION :

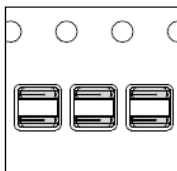
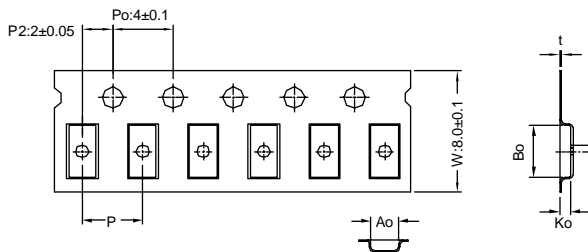
9-1. Reel Dimension



7" x 8mm

Type	A(mm)	B(mm)	C(mm)	D(mm)
7" x 8mm	8.4±1.0	50 Min.	13±0.8	178±2

9-2 Tape Dimension / 8mm



Bottom View

Series	Ao(mm)	Bo(mm)	Ko(mm)	P(mm)	t(mm)
SPS252012	2.45±0.1	3.10±0.1	1.40±0.1	4.0±0.1	0.23±0.05

9-3 Packaging Quantity

Series	SPS252012
Chip / Reel	2000



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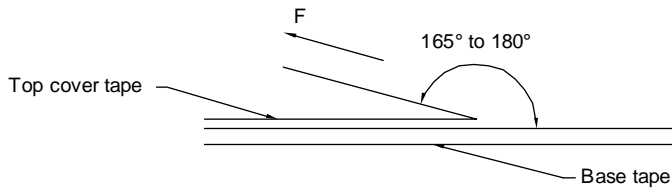
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9-4. Tearing Off Force



The force for tearing off cover tape is 15 to 80 grams in the arrow direction under the following conditions.

Room Temp. (°C)	Room Humidity (%)	Room atm (hPa)	Tearing Speed (mm/min)
5~35	45~85	860~1060	300

Application Notice

1. Storage Conditions :

To maintain the solderability of terminal electrodes :

- Temperature and humidity conditions : Less than 40°C and 60% RH.
- Recommended products should be used within 12 months from the time of delivery.
- The packaging material should be kept where no chlorine or sulfur exists in the air.

2. Transportation :

- Products should be handled with care to avoid damage or contamination from perspiration and skin oils.
- The use of tweezers or vacuum pick up is strongly recommended for individual components.
- Bulk handling should ensure that abrasion and mechanical shock are minimized.



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