

1. PART NO. EXPRESSION :

$\frac{S}{(a)} \frac{P}{(b)} \frac{S}{(c)} \frac{2}{(d)} \frac{5}{(e)} \frac{2}{(f)} \frac{0}{(g)} \frac{1}{(h)} \frac{2}{(i)} \frac{E}{(j)} \frac{1}{(k)} \frac{R}{(l)} \frac{0}{(m)} \frac{M}{(n)} \frac{F}{(o)}$

(a) Series code

(b) Dimension code

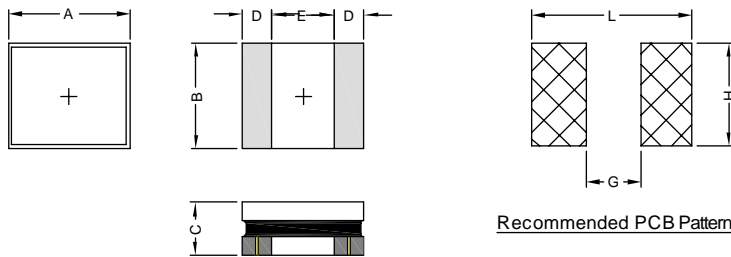
(c) Material code

(d) Inductance code : 1R0 = 1.0uH

(e) Tolerance code : M = $\pm 20\%$

(f) F : RoHS Compliant

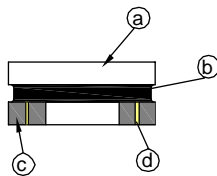
2. CONFIGURATION & DIMENSIONS :



Unit: m/m

A	B	C	D	E	L	G	H
2.5 -0.1/+0.2	2.0 -0.05/+0.35	1.2 Max.	0.85 Ref.	0.80 Ref.	2.9 Ref.	0.8 Ref.	2.4 Ref.

3. MATERIALS :



(a) Core : Ferrite Core

(b) Coating : Epoxy with magnetic powder

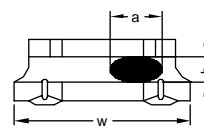
(c) Termination : Tin Pb Free

(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.

- Width direction (dimension a) : Acceptable when $a \leq w/2$
Nonconforming when $a > w/2$
- Length direction (dimension b) : Dimension b is not specified.
- 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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PG. 1

4. GENERAL SPECIFICATION :

- a) ambient temp. : 25° C
- b) Isat : Based on inductance change ($\Delta L/L0 : \leq -30\%$)
- c) Irms : Based on temperature rise ($\Delta T : 40^{\circ}\text{C}$) Max
- d) Operating temp. : -55° C to 125° C (for products in unopened tape package, less than 40° C)

5. ELECTRICAL CHARACTERISTICS :

Part No.	Inductance (uH)	Test Frequency (Hz)	DCR (Ω)Typ.	DCR (Ω)Max.	Isat (A) Typ.	Isat (A) Max.	Irms (A) Typ.
SPS252012ER24MF	0.24± 20%	0.1V/1M	0.020	0.024	8.00	6.50	4.70
SPS252012ER33MF	0.33± 20%	0.1V/1M	0.027	0.032	5.70	4.60	4.50
SPS252012ER47MF	0.47± 20%	0.1V/1M	0.027	0.032	5.50	4.50	4.40
SPS252012ER68MF	0.68± 20%	0.1V/1M	0.036	0.043	4.50	3.80	3.60
SPS252012E1R0MF	1.0± 20%	0.1V/1M	0.045	0.057	3.90	3.40	3.50
SPS252012E1R5MF	1.5± 20%	0.1V/1M	0.080	0.096	3.00	2.60	2.50
SPS252012E2R2MF	2.2± 20%	0.1V/1M	0.085	0.102	2.70	2.30	2.30



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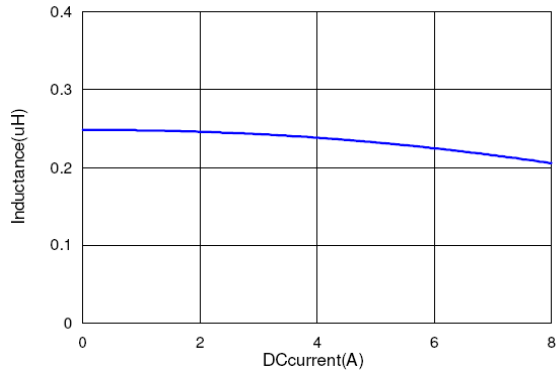


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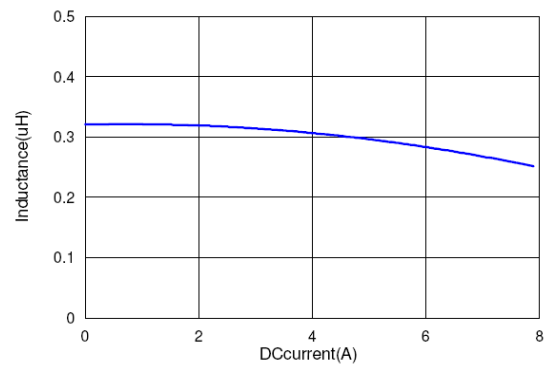
PG. 2

6. CHARACTERISTICS CURVES :

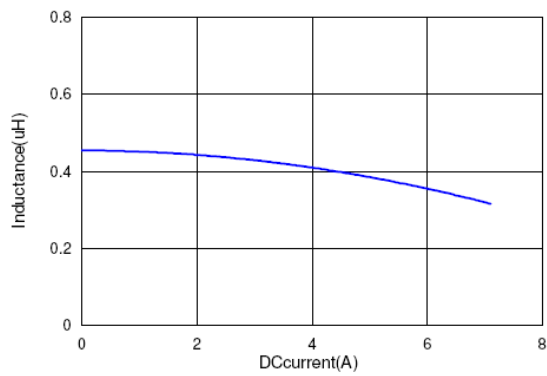
SPS252012ER24MF



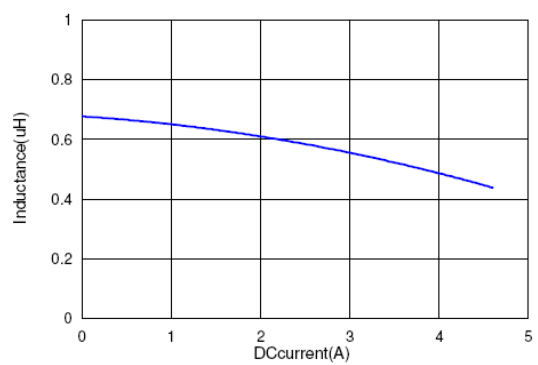
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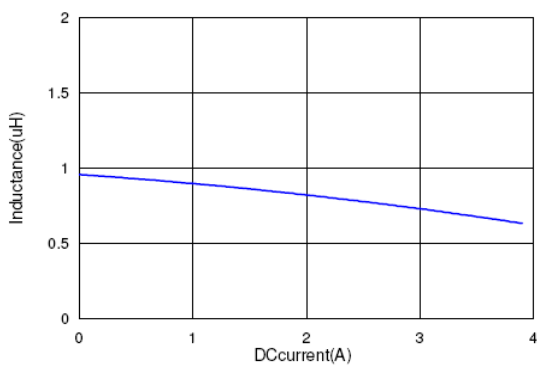
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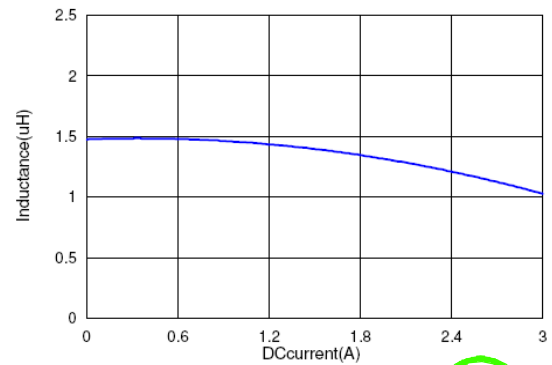
SPS252012ER68MF



SPS252012E1R0MF



SPS252012E1R5MF



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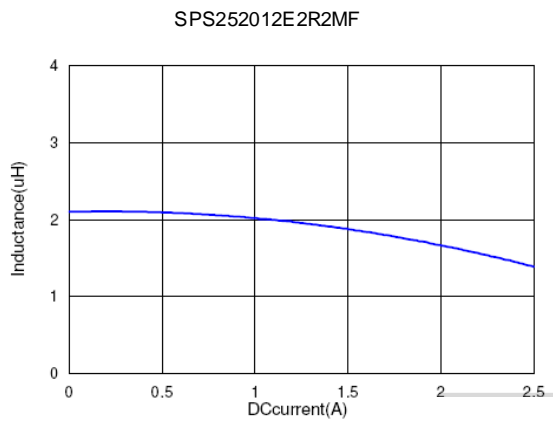
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7. RELIABILITY AND TEST CONDITION :

ITEM	PERFORMANCE	TEST CONDITION								
Electrical Characteristics Test										
Inductance L	Refer to standard electrical characteristics list	Agilent-4291, Agilent-4287								
Q		Agilent-4192, Agilent-4285								
SRF		Agilent-4291								
DC Resistance		Agilent-4338								
Rated Current	Base on temp. rise & $\Delta L/L_0 \cong 30\%$.	Saturation DC Current (Isat) will cause L0 to drop approximately $\Delta L(\%)$.								
Temperature Rise Test	$\Delta T 40^\circ\text{CMax}$	Heat Rated Current (Irms) will cause the coil temperature rise approximately $\Delta T(^\circ\text{C})$ without core loss. 1. Applied the allowed DC current. 2. Temperature measured by digital surface thermometer								
Mechanical Performance Test										
Solder Heat Resistance	Appearance : No damage. Inductance : within $\pm 10\%$ of initial value Q : Shall not exceed the specification value. RDC : within $\pm 15\%$ of initial value and shall not exceed the specification value	<table border="1"> <thead> <tr> <th>Temperature ($^\circ\text{C}$)</th> <th>Time (s)</th> <th>Temperature ramp/immersion and emersion rate</th> <th>Number of heat cycles</th> </tr> </thead> <tbody> <tr> <td>260\pm5 (solder temp)</td> <td>10\pm1</td> <td>25mm/s\pm6 mm/s</td> <td>1</td> </tr> </tbody> </table> <p>Depth: completely cover the termination</p>	Temperature ($^\circ\text{C}$)	Time (s)	Temperature ramp/immersion and emersion rate	Number of heat cycles	260 \pm 5 (solder temp)	10 \pm 1	25mm/s \pm 6 mm/s	1
Temperature ($^\circ\text{C}$)	Time (s)	Temperature ramp/immersion and emersion rate	Number of heat cycles							
260 \pm 5 (solder temp)	10 \pm 1	25mm/s \pm 6 mm/s	1							
Solderability Test	More than 95% of terminal electrode should be covered with solder.	Preheat : 150 $^\circ\text{C}$, 60sec Solder : Sn99.5%-Cu0.5% Temperature : 245 \pm 5 $^\circ\text{C}$ Flux for lead free : Rosin. 9.5% Dip time : 4 \pm 1sec Depth : completely cover the termination								
Reliability Test										
Life Test	Appearance : No damage. Inductance : within $\pm 10\%$ of initial value Q : Shall not exceed the specification value. RDC : within $\pm 15\%$ of initial value and shall not exceed the specification value	Preconditioning: Run through IR reflow for 2 times. (IPC/ JEDEC J-STD-020D Classification Reflow Profiles Temperature : 85 \pm 2 $^\circ\text{C}$ (Inductor) Applied current : rated current Duration : 1000 \pm 12hrs Measured at room temperature after placing for 24 \pm 2 hrs								
Thermal shock		Preconditioning: Run through IR reflow for 2 times. (IPC/ JEDEC J-STD-020D Classification Reflow Profiles Step1 : -40 \pm 2 $^\circ\text{C}$ 30 \pm 5min Step2 : 25 \pm 2 $^\circ\text{C}$ \cong 0.5min Step3 : 105 \pm 2 $^\circ\text{C}$ 30 \pm 5min Number of cycles : 500 Measured at room temperature after placing for 24 \pm 2 hrs								
Humidity Resistance Test		Preconditioning: Run through IR reflow for 2 times. (IPC/ JEDEC J-STD-020D Classification Reflow Profiles Humidity : 85 \pm 2% R.H Temperature : 85 $^\circ\text{C}$ \pm 2 $^\circ\text{C}$ Duration : 1000hrs Min. with 100% rated current Measured at room temperature after placing for 24 \pm 2 hrs								
Vibration Test		Preconditioning: Run through IR reflow for 2 times. (IPC/ JEDEC J-STD-020D Classification Reflow Profiles Oscillation Frequency : 10~2K~10Hz for 20 minutes Equipment : Vibration checker Total Amplitude : 1.52mm \pm 10% Testing Time : 12 hours (20 minutes, 12 cycles each of 3 orientations)								

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8. SOLDERING AND MOUNTING :

8-1. Soldering

Mildly activated rosin fluxes are preferred. Our 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.

8-1.1 Lead Free Solder Re-flow :

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

8-1.2 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.

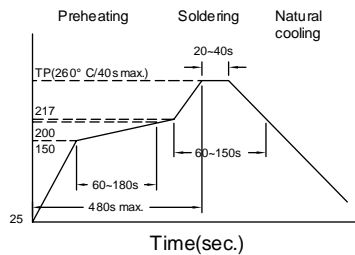


Figure 1. Re-flow Soldering : 3 times max.

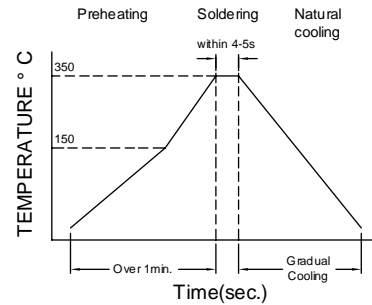


Figure 2. Iron Soldering : 1 times max.



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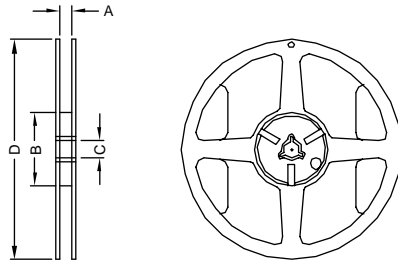
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9. PACKAGING INFORMATION :

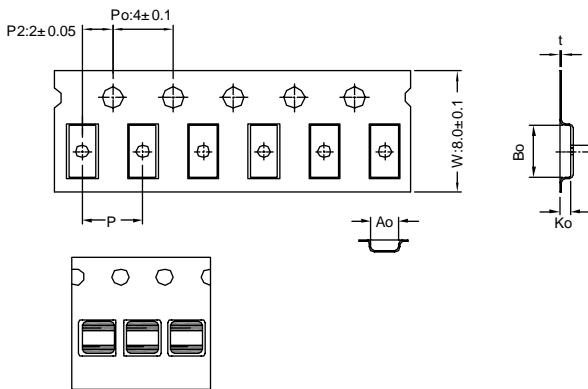
9-1. Reel Dimension



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)
SPS252012E	2.45± 0.1	2.85± 0.1	1.40± 0.1	4.0± 0.1	0.23± 0.05

9-3. Packaging Quantity

Size	SPS252012E
Chip / Reel	2000



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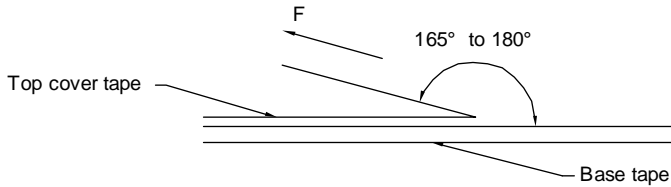
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9-4. Tearing Off Force



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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