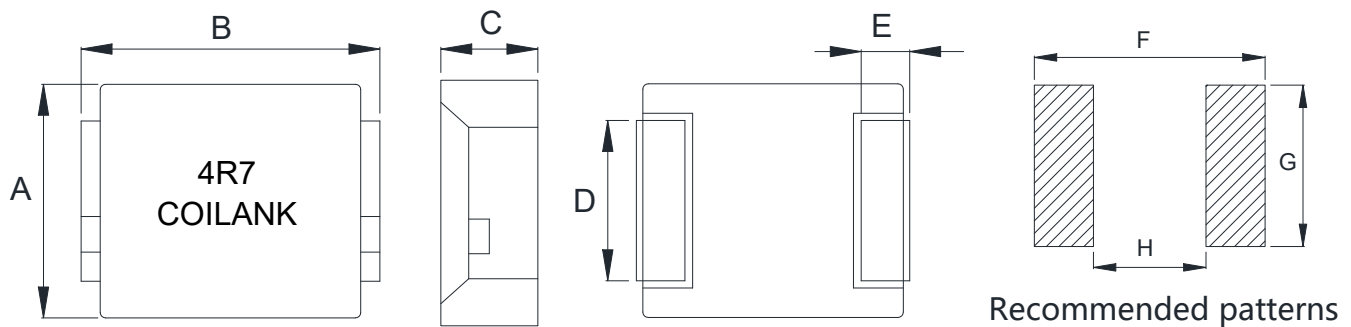


### 1. External Dimensions (Unit:m/m)



Type	A	B	C	D Typ.	E Typ.	F Typ.	G Typ.	H Typ.	Q'TY/Reel
APS13A65	12.6±0.3	13.9Max	6.5Max	3.85	2.0	14.5	5.5	8.0	500

### 2. Part Number Code

APS	13	A	65	M	4R7
Series Name	Dimensions: L*W	Materials	Dimensions: H	Tolerance ±20%	Inductance

### 3. Electrical Characteristics

Part Number	Inductance (uH)	Test Conditions	DC Resistance (mΩ) Max.	DC Current Irms(A) Typ.	DC Current Isat(A) Typ.
APS13A65M4R7	4.7	100K Hz/1V	8.5	16	24.5

#### Notes:

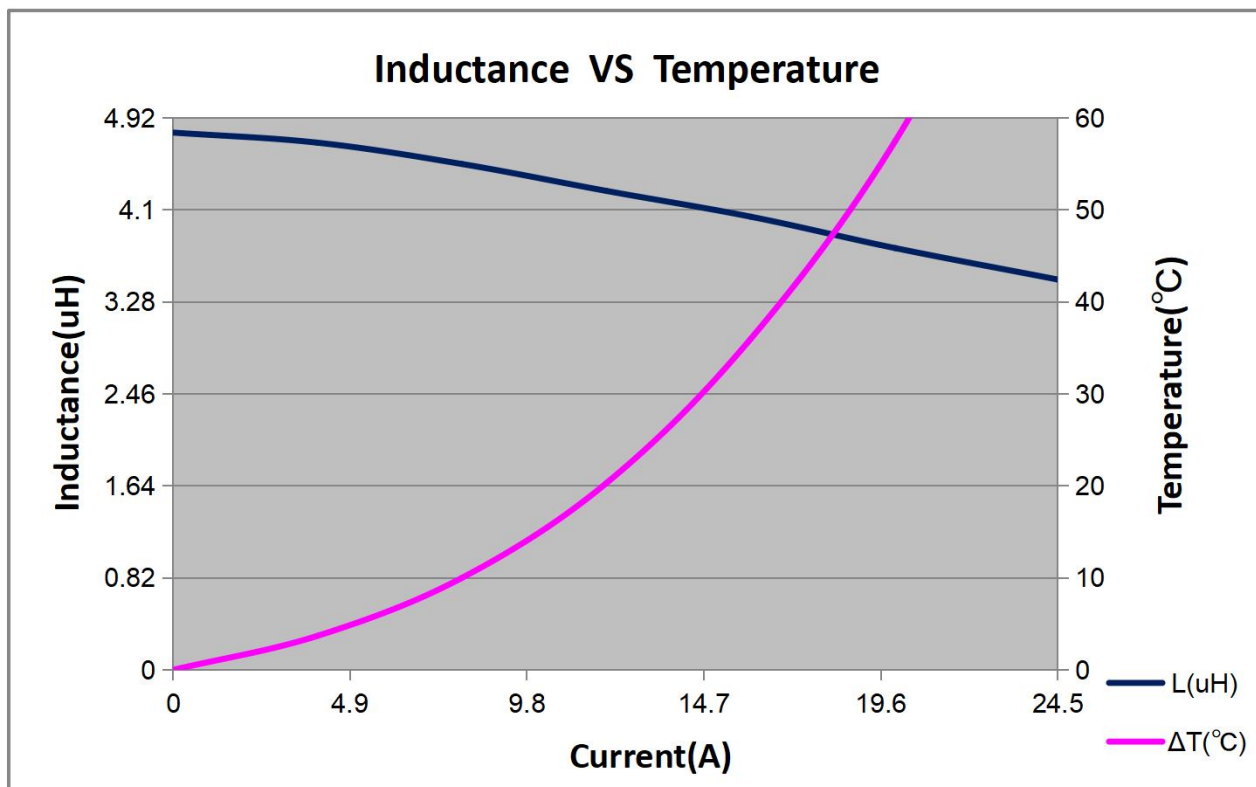
- 1) All test data is referenced to 25°C ambient.
- 2) Absolute maximum voltage 30V DC.
- 3) Operating temperature range -40°C to +125°C (Including self - temperature rise).
- 4) Irms :DC current(A) that will cause an approximate  $\Delta T$  of 40°C.
- 5) Isat :DC current(A) that will cause  $I_o$  to drop approximately 40%.
- 6) The part temperature (ambient + temp rise) should not exceed 125°C under worst case operating conditions. Circuit design and other cooling provisions all affect the part temperature, part temperature should be verified in the end application.

### 4. Test Data

ELECTRICAL CHARACTERISTIC				MECHANICAL DIMENSIONS			
SPEC	$L_0(\mu\text{H})$	$L_{\text{Isat}}(\mu\text{H})$	DCR(m $\Omega$ )	A(mm)	B(mm)	C(mm)	D(mm)
TOL	4.7	$(L_0 - L_{\text{Isat}})/L_0$	8.5	12.6 $\pm$ 0.3	13.9Max	6.5Max	3.85Typ
No.	$\pm 20\%$		$\approx 40\%$				
1	4.60	3.27	7.27	12.72	13.49	6.27	OK
2	4.27	3.09	7.17	12.67	13.52	6.31	OK
3	4.54	3.31	7.26	12.73	13.55	6.25	OK
4	4.38	3.10	7.18	12.71	13.55	6.25	OK
5	4.47	3.15	7.15	12.74	13.52	6.30	OK
6	4.47	3.26	7.22	12.72	13.54	6.32	OK
7	4.45	3.24	7.15	12.67	13.55	6.26	OK
8	4.32	3.12	7.25	12.68	13.47	6.27	OK
9	4.37	3.09	7.18	12.66	13.51	6.28	OK
10	4.37	3.19	7.25	12.69	13.49	6.26	OK

Test Equipments: IM3536,VR126,VR7210,Calipers

### Curve:



## 5. Test and Measurement Procedures

### 5.1 Test Conditions

- 5.1.1 Unless otherwise specified, the standard atmospheric conditions for measurement/test as:
- Ambient Temperature:  $20 \pm 15^\circ\text{C}$
  - Relative Humidity:  $65\% \pm 20\%$
  - Air Pressure: 86KPa to 106KPa
- 5.1.2 If any doubt on the results, measurements/tests should be made within the following limits:
- Ambient Temperature:  $20 \pm 2^\circ\text{C}$
  - Relative Humidity:  $65\% \pm 5\%$
  - Air Pressure: 86KPa to 106Kpa

### 5.2 Visual Examination

- Inspection Equipment: 10X magnifier

### 5.3 Electrical Test

- 5.3.1 Inductance (L)
- Refer to the third item.
  - Test equipment: IM3536 LCR meter or equivalent.
  - Test Frequency and Voltage: Refer to the third item.
- 5.3.2 Direct Current Resistance (DCR)
- Refer to the third item.
  - Test equipment: VR126 or equivalent.
- 5.3.3 Saturation Current ( $I_{\text{sat}}$ )
- Refer to the third item.
  - Test equipment: Saturation current meter
  - Definition of saturation current ( $I_{\text{sat}}$ ): DC current at which the inductance drops approximate 40% from its value without current.
- 5.3.4 Temperature rise current ( $I_{\text{rms}}$ )
- Refer to the third item.
  - Test equipment (see Fig.5.3.4-1): Electric Power, Electric current meter, Thermometer.
  - Measurement method (see Fig. 5.3.4-1):
    - Set test current to be 0mA.
    - Measure initial temperature of choke surface.
    - Gradually increase current and measure choke temperature for corresponding current.
    - Definition of Temperature rise current: DC current that causes the temperature rise ( $\Delta T = 40^\circ\text{C}$ ) from  $20^\circ\text{C}$  ambient (see Fig. 5.3.4-2).

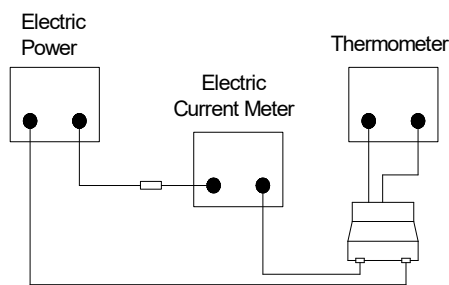


Fig.5.3.4-1

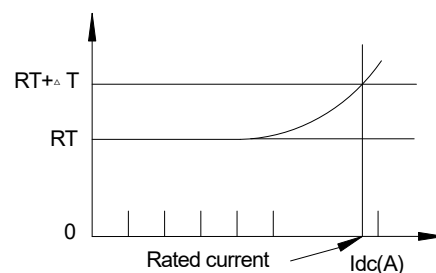
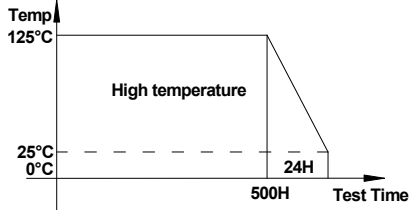
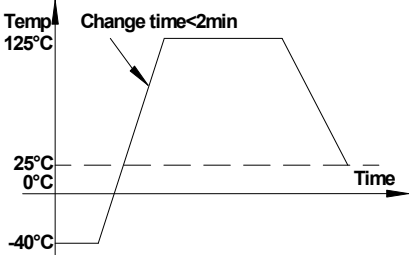
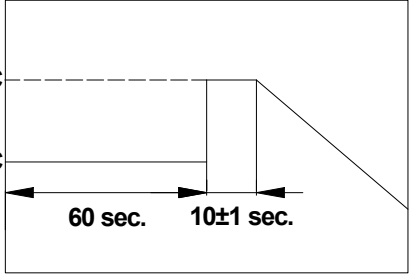
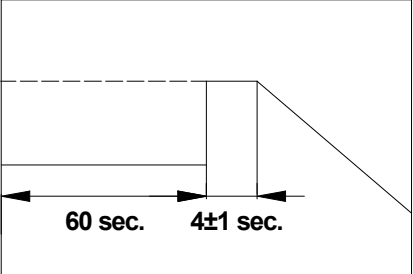


Fig.5.3.4-2

### 5.4 Reliability Test

Item	Specifications	Test conditions
<p>5.4.1 High temperature storage test</p>	<p>Inductance change: Within <math>\pm 10\%</math> Without distinct damage in visual</p>	<p>Temperature: <math>125\pm 2^\circ\text{C}</math>. Duration: 500hrs. Measured at room temperature after placing for <math>24\pm 4</math> hrs.</p> 
<p>5.4.2 Temperature cycling test</p>	<p>No visible mechanical damage. Inductance change: Within <math>\pm 10\%</math>.</p>	<p>Condition for 1 cycle. Step1: <math>-40\pm 2^\circ\text{C}</math> 30min Min. Step2: <math>125\pm 2^\circ\text{C}</math>, transition time 2min Max. Step3: <math>125\pm 2^\circ\text{C}</math> 30min Min. Step4: Low temp, transition time 2min Max. Number of cycles: 100. Measured at room temperature after placing for <math>24\pm 4</math> hrs.</p> 
<p>5.4.3 Biased humidity test</p>	<p>No visible mechanical damage. Inductance change: Within <math>\pm 10\%</math>.</p>	<p>Humidity : <math>85\% \pm 3</math> RH. Temperature: <math>60^\circ\text{C} \pm 2^\circ\text{C}</math>. Duration : 500hrs. Measured at room temperature after placing for <math>24\pm 4</math> hrs.</p>
<p>5.4.4 Operational life test</p>	<p>No visible mechanical damage. Inductance change: Within <math>\pm 10\%</math>.</p>	<p>Temperature: <math>85\pm 2^\circ\text{C}</math>. Duration : 500hrs. Measured at room temperature after placing for <math>24\pm 4</math> hrs.</p>
<p>5.4.5 Resistance to solvent test</p>	<p>No visible mechanical damage. Inductance change: Within <math>\pm 10\%</math>.</p>	<p>Add aqueous wash chemical - OKEM clean or equivalent.</p>
<p>5.4.6 Vibration test</p>	<p>No visible mechanical damage. Inductance change: Within <math>\pm 10\%</math>.</p>	<p>The sample shall be soldered onto the printed circuit board and when a vibration having an amplitude of 1.52mm and a frequency of from 10 to 55Hz/1 minute repeated should be applied to the 3 directions (X,Y,Z) for 2 hours each.(A total of 6 hours)</p>

Item	Specifications	Test conditions
<p>5.4.7 Resistance to soldering heat test</p>	<p>No visible mechanical damage. Inductance change: Within <math>\pm 10\%</math>.</p>	<p>Temperature (<math>^{\circ}\text{C}</math>): <math>260 \pm 5</math> (solder temp). Time (s): <math>10 \pm 1</math>. ramp/immersion and emersion rate: <math>25\text{mm/s} \pm 6 \text{ mm/s}</math>. Number of heat cycles:1.</p> 
<p>5.4.8 Solderability test</p>	<p>More than 95% of the terminal electrode should be covered with solder.</p>	<p>Steam Aging: 8 hours <math>\pm</math> 15 min. Preheat: <math>150^{\circ}\text{C}</math>, 60sec. Solder: Sn99.5%-Cu0. 5%. Temperature: <math>245 \pm 5^{\circ}\text{C}</math>. Flux for lead free: Rosin. 9.5%. Dip time: <math>4 \pm 1</math> sec. Depth: completely cover the termination.</p> 
<p>5.4.9 Terminal strength (SMD) test</p>	<p>No visible mechanical damage.</p>	<p>With the component mounted on a PCB with the device to be tested, apply a 10 N force to the side of a device being tested. This force shall be applied for <math>10 \pm 1</math> seconds. Also the force shall be applied radually as not to apply a shock to the component being tested.</p>

### 6. Packaging, Storage

#### 6.1 Tape and Reel Packaging Dimensions

##### 6.1.1 Taping Dimensions (Unit: mm)

Please refer to Fig. 6.1.1-1

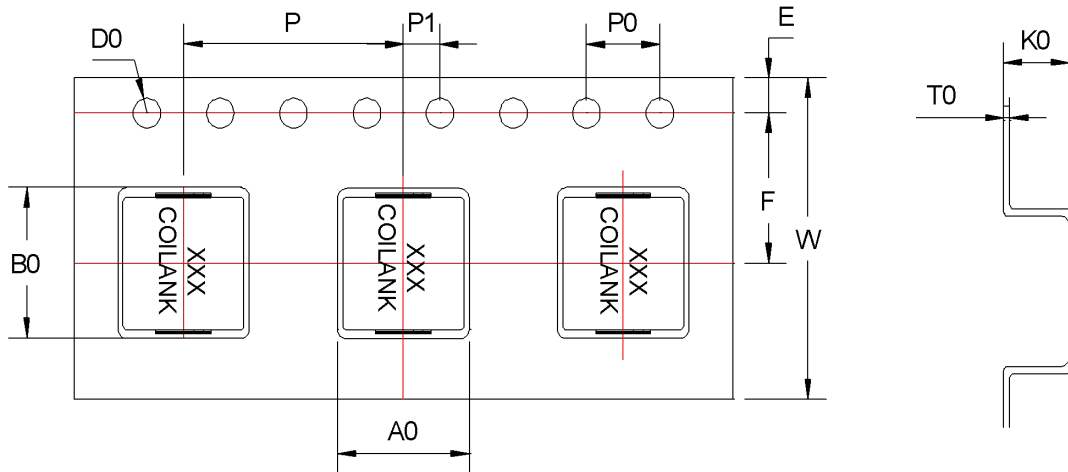


Fig.6.1.1-1

TYPE	A0	B0	W	E	F	P0	P	P1	D0	T0	K0
APS13A65	13.0±0.1	14.0±0.1	24.0±0.3	1.75±0.1	11.5±0.1	4.0±0.1	16.0±0.1	2.0±0.1	1.5±0.1	0.4±0.1	6.8±0.1

##### 6.1.2 Reel Dimensions (Unit: mm)

Please refer to Fig. 6.1.2-1.

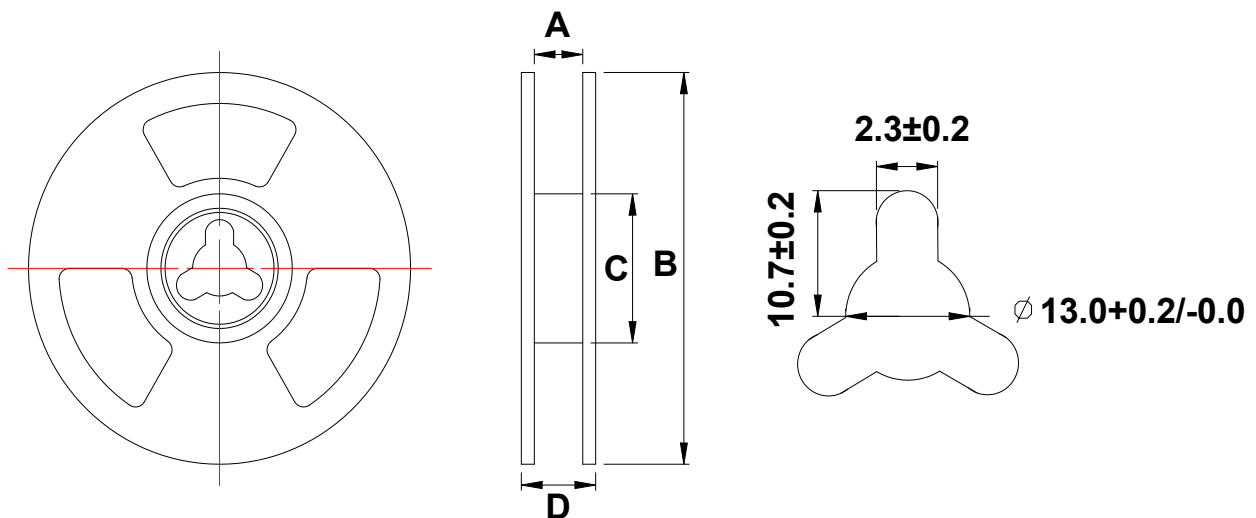


Fig. 6.1.2-1.

TYPE	A	B	C	D
APS13A65	24.5±2.0	330.0±2.0	100.0±2.0	28.5±2.0

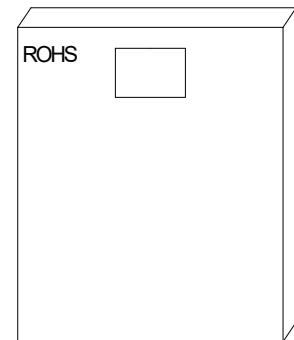
### 6.2 Packaging

6.2.1 The inner box specification: 350\*340\*40MM

Packing quantity: 500 PCS/ box

Bubble bag: 37\*45CM

Job description: putting the air bubble bag products placed inside the box, sealed with scotch tape.

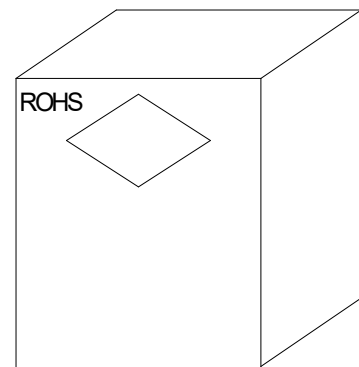


6.2.2 The outside box specification: 370\*360\*165MM

Packing quantity: 1500 PCS/ box

Job description: will be outside the box bottom sealed, inner box into the box.

- a. With transparent tape sealed box at the top.
- b. The specified location with a box labels in the outer box.
- c. If the mantissa box under a FCL with inner box for filling full.



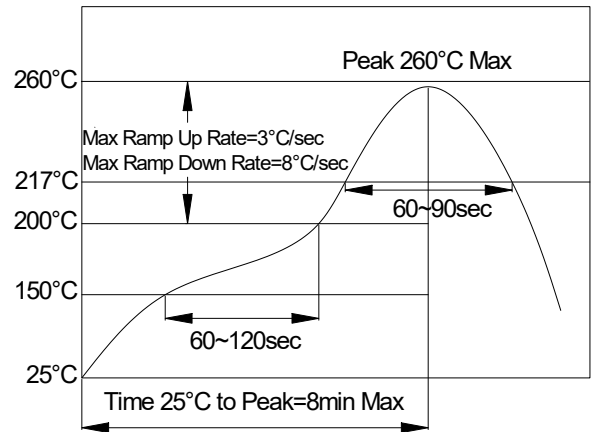
### 6.3 Storage

- a. 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.
- b. Recommended conditions: -10°C~40°C, 70%RH (Max).
- c. 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.
- d. In case of storage over one year, solderability shall be checked before actual usage.
- e. Products meet IPC/JEDEC J-STD-020E standard-MSL, level 1.

**7. Recommended Soldering Technologies**

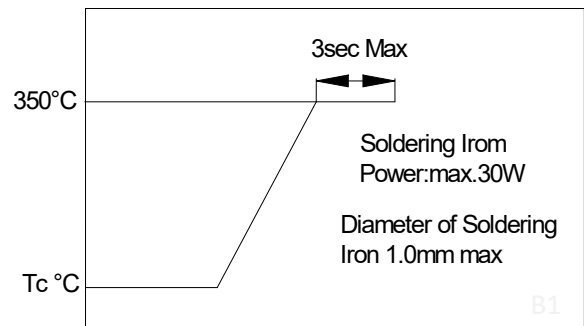
**7.1 Re-flowing Profile:**

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



**7.2 Iron Soldering Profile:**

- △ Iron soldering power: Max.30W
- △ Pre-heating: 150°C/60sec.
- △ Soldering Tip temperature: 350°CMax.
- △ Soldering time: 3sec Max.
- △ Solder paste: Sn/3.0Ag/0.5Cu
- △ Max.1 times for iron soldering



[Note: Take care not to apply the tip of the soldering iron to the terminal electrodes.]