



#### ◆ Features

- 1、Magnetic-resin shielded construction reduces buzz noise to ultra-low levels;
- 2、Metallization on ferrite core results in excellent shock resistance and damage-free durability;
- 3、Closed magnetic circuit design reduces leakage flux and Electro Magnetic Interference (EMI);
- 4、30% higher current rating than conventional inductors of equal size;
- 5、Take up less PCB real estate and save more power.



#### ◆ Applications

- 1、LED Lighting;
- 2、Mobile devices with multifunction such as adding color TV and camera;
- 3、Flat-screen TVs, blue-ray disc recorders, set top boxes;
- 4、Notebooks, desktop computers, servers, graphic cards;
- 5、Portable gaming devices, personal navigation systems, personal multimedia devices;
- 6、Automotive systems
- 7、Telecomm base stations

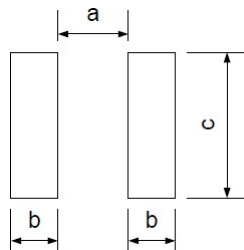
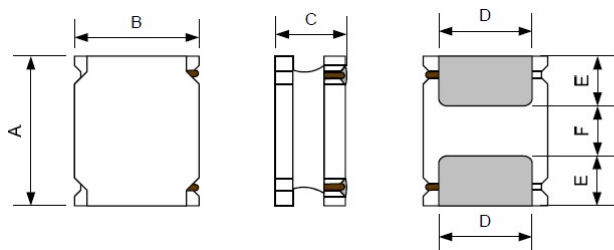
#### ◆ Lead Free Part Numbering

| INNER | 5020 | S   | 100 | M   | T   |
|-------|------|-----|-----|-----|-----|
| (1)   | (2)  | (3) | (4) | (5) | (6) |

- (1) Series Type
- (2) Dimension: L X H
- (3) Material Code
- (4) Inductance: 2R2=2.2μH;  
100=10μH; 101=100μH
- (5) Inductance Tolerance: M=±20%, N=±30%
- (6) Packaging: Tape Carrier Package

#### ◆ Dimensions

Recommended Land Pattern



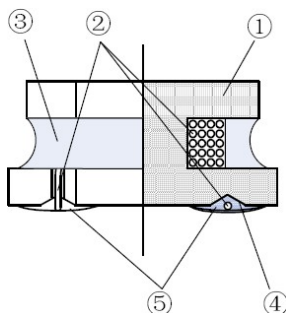
Unit:mm

| Series     | A       | B       | C       | D       | E        | F        | a Typ. | b Typ. | c Typ. |
|------------|---------|---------|---------|---------|----------|----------|--------|--------|--------|
| INNER5020F | 5.0±0.2 | 5.0±0.2 | 2.0Max. | 4.0±0.2 | 1.25±0.2 | 2.50±0.2 | 2.1    | 1.5    | 4.4    |

### ◆ Electrical Characteristics

- 1) Operating temperature range (Including self-heating):  $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$
- 2) Storage temperature range (packaging conditions):  $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$  and RH 70% (Max.)

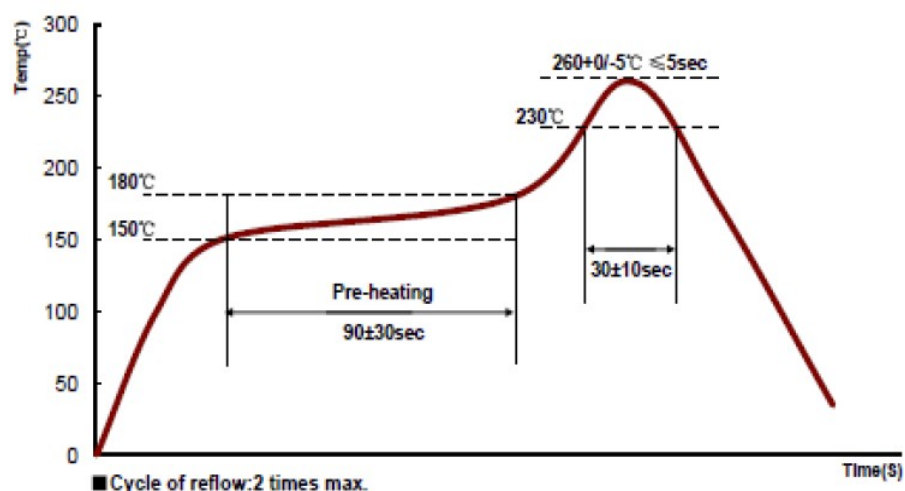
### ◆ Construction and material



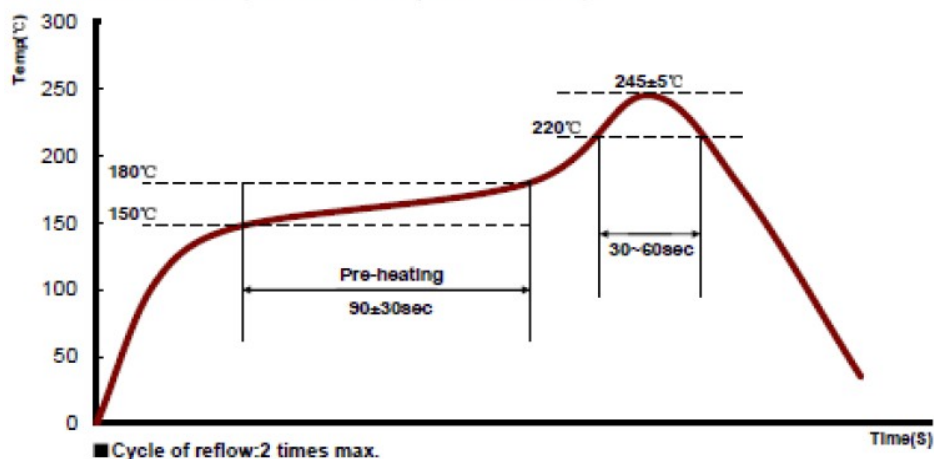
| Code | Part Name          | Material Name                            |
|------|--------------------|------------------------------------------|
| ①    | Ferrite Core       | Ni-Zn Ferrite                            |
| ②    | Wire               | Polyurethane system enameled copper wire |
| ③    | Magnetic Glue      | Epoxy resin and magnetic powder          |
| ④    | Plating Electrodes | Ag                                       |
|      |                    | Ni                                       |
|      |                    | Sn                                       |
| ⑤    | Outer Electrodes   | Top surface solder coating Sn, Ag, Cu    |

### ◆ REFLOW-PROFILE

**Limit Profile**



**Standard Profile (for EOC Solder paste S70G-HF)**



### ◆ Specification

| Part Number      | Inductance<br>@100KHz,1V<br>(μH) | DC Resistance<br>±20% (Ω) | Min.Self-resonant<br>Frequency (MHz) | Saturation<br>Current(A) | Heat Rating<br>Current (A) |
|------------------|----------------------------------|---------------------------|--------------------------------------|--------------------------|----------------------------|
|                  |                                  | DCR                       | S.R.F                                | Isat                     | Irms                       |
| INNR5020F Series |                                  |                           |                                      |                          |                            |
| INNR5020FR47NST  | 0.47±30%                         | 0.013                     | 160                                  | 6.15                     | 4.60                       |
| INNR5020FR68NST  | 0.68±30%                         | 0.017                     | 120                                  | 5.50                     | 4.00                       |
| INNR5020F1R0MT   | 1.0±20%                          | 0.020                     | 97                                   | 4.33                     | 3.70                       |
| INNR5020F1R5MT   | 1.5±20%                          | 0.026                     | 80                                   | 3.85                     | 3.20                       |
| INNR5020F2R2MT   | 2.2±20%                          | 0.035                     | 61                                   | 3.85                     | 2.90                       |
| INNR5020F3R3MT   | 3.3±20%                          | 0.044                     | 46                                   | 3.25                     | 2.40                       |
| INNR5020F4R7MT   | 4.7±20%                          | 0.057                     | 33                                   | 2.50                     | 2.25                       |
| INNR5020F5R6MT   | 5.6±20%                          | 0.064                     | 33                                   | 2.30                     | 2.05                       |
| INNR5020F6R8MT   | 6.8±20%                          | 0.087                     | 30                                   | 1.80                     | 1.70                       |
| INNR5020F100MT   | 10±20%                           | 0.110                     | 24                                   | 1.79                     | 1.50                       |
| INNR5020F150MT   | 15±20%                           | 0.165                     | 20                                   | 1.44                     | 1.25                       |
| INNR5020F220MT   | 22±20%                           | 0.235                     | 16                                   | 1.18                     | 1.05                       |
| INNR5020F330MT   | 33±20%                           | 0.370                     | 13                                   | 0.97                     | 0.83                       |
| INNR5020F470MT   | 47±20%                           | 0.525                     | 11                                   | 0.81                     | 0.70                       |
| INNR5020F680MT   | 68±20%                           | 0.885                     | 8.8                                  | 0.70                     | 0.53                       |
| INNR5020F101MT   | 100±20%                          | 1.060                     | 7.6                                  | 0.57                     | 0.49                       |
| INNR5020F151MT   | 150±20%                          | 1.625                     | 5.6                                  | 0.41                     | 0.40                       |

### ◆ Note

1. All test data is referenced to 20°C ambient; 2.

Rated current: Isat or Irms, whichever is smaller;

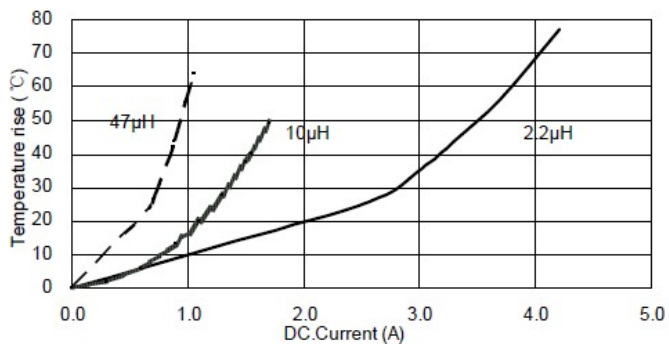
3. Isat: DC current at which the inductance drops approximate 30% from its value without current; 4. Irms:

DC current that causes the temperature rise ( $\Delta T = 40^\circ\text{C}$ ) from 20°C ambient.

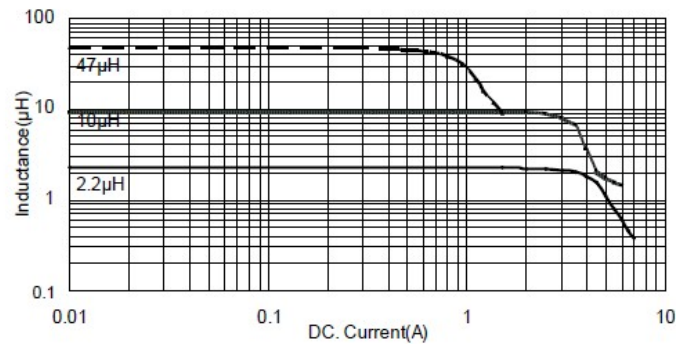
### ◆ TYPICAL ELECTRICAL CHARACTERISTICS

#### INNER5020F Series

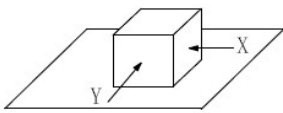
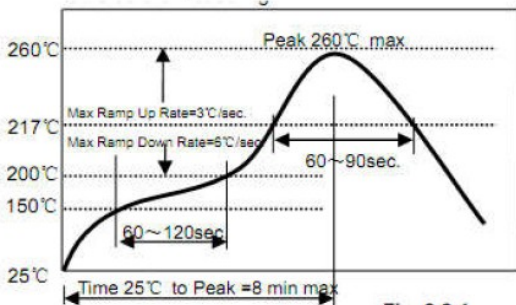
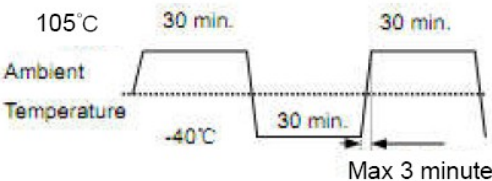
Temperature vs. DC Current Characteristics



Inductance vs. DC Current Characteristics

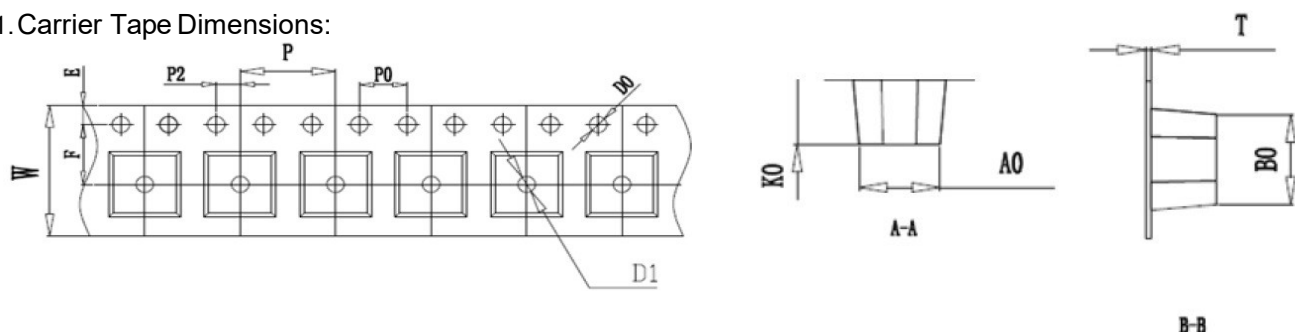


### ◆ Reliability Test

| Items                                       | Requirements                                                                                                                                                                       | Test Methods and Remarks                                                                                                                                                                                                                                                  |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A.<br>Terminal<br>Strength                  | <p>No removal or split of the termination or other defects shall occur.</p>  <p>Fig.7.1-1</p>     | <p>1) Solder the inductor to the testing jig (glass epoxy board shown in Fig.7.1-1) using eutectic solder. Then apply a force in the direction of the arrow.</p> <p>2) 10N force.</p> <p>3) Keep time: 5±2s</p>                                                           |
| B.<br>High<br>Temperature                   | <p>1. No visible mechanical damage.</p> <p>2. Inductance change: Within ±10%</p>                                                                                                   | <p>1) Storage Temperature :125+/-5℃</p> <p>2) Duration : 96 ±4 Hours</p> <p>3) Recovery : then measured at room ambient temperature after placing 24 hours.</p>                                                                                                           |
| C.<br>Low<br>Temperature                    | <p>1. No visible mechanical damage</p> <p>2. Inductance change: Within ±10%</p>                                                                                                    | <p>1) Temperature and time: -40±5℃</p> <p>2) Duration: 96±4 hours</p> <p>3) TRecovery : then measured at room ambient temperature after placing 24 hours.</p>                                                                                                             |
| D.<br>Vibration test                        | <p>1. No visible mechanical damage.</p> <p>2. Inductance change: Within ±10%</p>                                                                                                   | <p>1) Frequency range:10HZ~55HZ~10HZ</p> <p>2) Amplitude:1.5mm p-p</p> <p>3) Direction:X,Y,Z</p> <p>4) Time:1 minute/cycle,2hours per axis</p>                                                                                                                            |
| E.<br>High<br>Temperature<br>Storage Tested | <p>1. No visible mechanical damage.</p> <p>2. Inductance change: Within ±10%</p>                                                                                                   | <p>1) Storage Temperature :60+/-2℃</p> <p>2) Relative Humidity :90-95% RH</p> <p>3) Duration : 96 ±4 Hours</p> <p>4) Recovery : then measured at room ambient temperature after placing 24 hours.</p>                                                                     |
| F.<br>Resistance to<br>Soldering Heat       | <p>1. No visible mechanical damage.</p> <p>2. Inductance change: Within ±10%</p>  <p>Fig. 1</p> | <p>1) Re-flowing Profile: Please refer to Fig. 1</p> <p>2) Test board thickness: 1.0mm</p> <p>3) Test board material: glass epoxy resin</p> <p>4) The chip shall be stabilized at normal condition for 1~2 hours before measuring</p>                                     |
| G.<br>Thermal Shock                         | <p>1. No visible mechanical damage.</p> <p>2. Inductance change: Within ±10%</p>  <p>Fig. 2</p> | <p>1) Temperature and time: -40±3℃ for 30±3 min→105℃ for 30±3min, please refer to Fig. 2.</p> <p>2) Transforming interval: Max, 3 minute</p> <p>3) Tested cycle: 100 cycles</p> <p>4) The chip shall be stabilized at normal condition for 1~2 hours before measuring</p> |

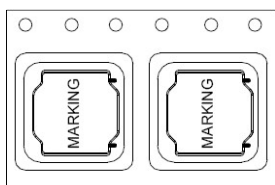
### ◆Packaging and Marking:

#### 1. Carrier Tape Dimensions:

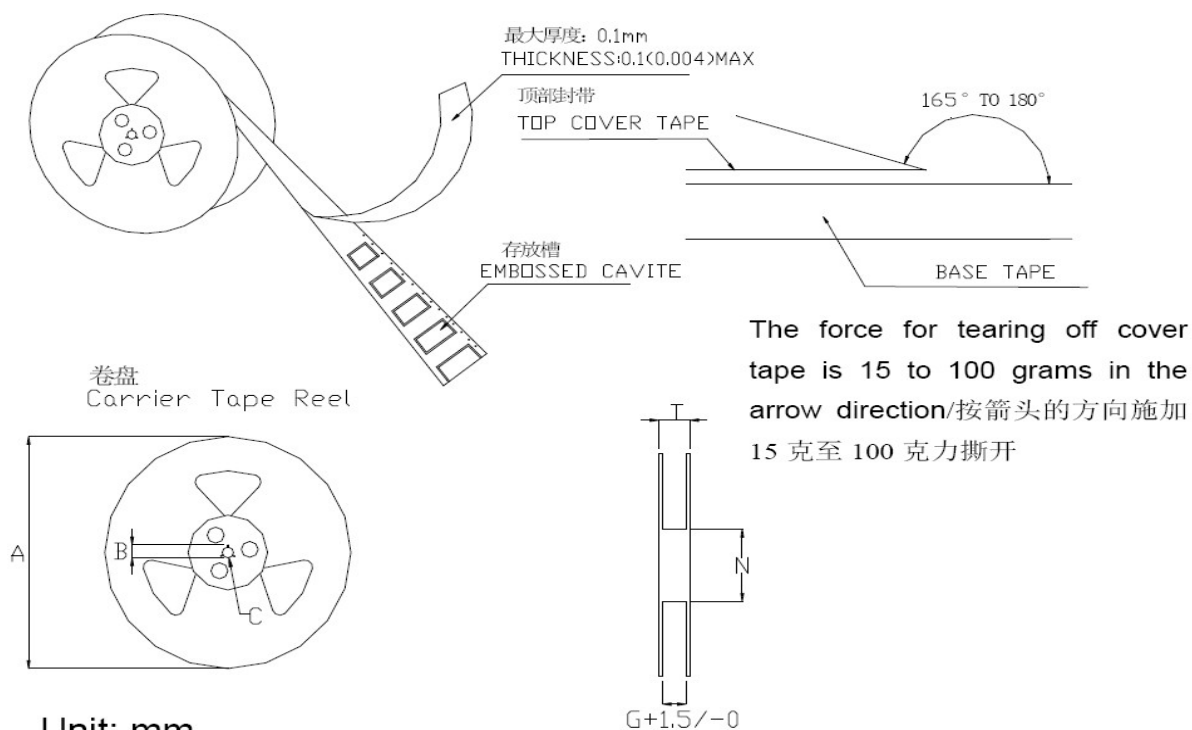


| ITEM | W     | A0   | B0   | K0   | P    | F     | E    | D0   | P0   | P2   | T     |
|------|-------|------|------|------|------|-------|------|------|------|------|-------|
| DIM  | 12.00 | 5.4  | 5.4  | 2.2  | 8.00 | 5.50  | 1.75 | 1.50 | 4.00 | 2.00 | 0.35  |
| TOLE | ±0.3  | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.15 | ±0.1 | +0.1 | ±0.1 | ±0.1 | ±0.05 |

#### 2. Taping Dimensions:



#### 3. Reel Dimensions:



Unit: mm

| Type | A   | B      | C      | G    | N   | T    |
|------|-----|--------|--------|------|-----|------|
| 12mm | 330 | 21±0.8 | 13±0.4 | 12.4 | 100 | 16.4 |

#### 4. Packaging Quantity:

Standard Packing Quantity. 2500 pcs/reel Or 3000 pcs/reel