



**THE DATASHEET OF
NS12565T151MN**



Specification

SMD Inductors Large Current Shield Type

NS12565 Type

| | | |
|--|----------------------|-------------|
| | Specification | (1 / 1 2) |
| | NS12565 Type | |

1. Scope

This specification applies to wire wound inductors for NS12565 series.

2. Part number

For example:

NS12565 T 100 M N
 (1) (2) (3) (4) (5) (6)

- (1) Type
- (2) External dimensions
- (3) Packaging (T: Tape and reel)
- (4) Nominal inductance
- (5) Inductance tolerance (M: ±20%, N: ±30%)
- (6) Internal code (N: Marking, standard)

3. Standard method of measurement

Inductance: LCR meter (Agilent 4285A or equivalent, 100KHz, 1V r.m.s.)
 DC resistance: DC resistance meter (HIOKI 3227 or equivalent)
 Self resonance frequency: Impedance material analyzer (Agilent 4291A or equivalent)

Standard test conditions :

Unless specified, Ambient temperature is 20±15°C and the Relative humidity is 65±20%.
 If there is any doubt about the test results, further measurement shall be had within the following limits:
 Ambient Temperature: 20±2°C Relative humidity: 65±5%
 Inductance value is based on our standard measurement systems.

- 4. Operating temperature range -40 °C to +125 °C (including self temperature rise)
- 5. Storage temperature range Component: -40 °C to +85 °C, Packaging: -5°C to +40°C
- 6. Electrical specification Table-1, Table-4
- 7. Dimensions and Shape Table-2
- 8. Top side marking formats Table-3
- 9. Physical characteristics tests Table-4
- 10. Environmental tests Table-4
- 11. Dimensions of tape and reel Table-5, Table-6
- 12. Packaging style Table-6
- 13. Reflow profile chart(ref.) Table-7

| | | |
|--|--------------------------|-------------|
| | Table-1 | (2 / 1 2) |
| | Electrical specification | |

| Part number | Nominal inductance [μH] | Inductance tolerance [%] | DC resistance ±20% [Ω] | Rated current *1 [A] | | SRF [MHz] Min. |
|---------------|----------------------------|-----------------------------|------------------------------|----------------------------|----------------------------------|----------------------|
| | | | | Saturation Current Idc1 | Temperature Rise current Idc2 | |
| NS12565T2R0NN | 2.0 | ±30 | 0.0080 | 13.91 | 7.60 | 82.3 |
| NS12565T4R2NN | 4.2 | ±30 | 0.0126 | 10.15 | 5.91 | 41.5 |
| NS12565T7R0NN | 7.0 | ±30 | 0.0162 | 7.93 | 5.21 | 24.6 |
| NS12565T100MN | 10 | ±20 | 0.0199 | 6.96 | 4.75 | 15.8 |
| NS12565T150MN | 15 | ±20 | 0.0237 | 5.84 | 4.33 | 14.4 |
| NS12565T220MN | 22 | ±20 | 0.0310 | 4.87 | 3.91 | 12.5 |
| NS12565T330MN | 33 | ±20 | 0.0390 | 3.89 | 3.22 | 9.1 |
| NS12565T470MN | 47 | ±20 | 0.0575 | 3.34 | 2.78 | 7.2 |
| NS12565T680MN | 68 | ±20 | 0.0775 | 2.78 | 2.30 | 6.7 |
| NS12565T101MN | 100 | ±20 | 0.123 | 2.23 | 1.81 | 5.5 |
| NS12565T151MN | 150 | ±20 | 0.173 | 1.84 | 1.54 | 4.8 |
| NS12565T221MN | 220 | ±20 | 0.273 | 1.39 | 1.18 | 3.6 |

*) The saturation current value (Idc1) is the DC current value having inductance decrease down to 30%.
(at 20°C)

*) The temperature rise current value (Idc2) is the DC current value having temperature increase up to 40°C.(at 20°C)

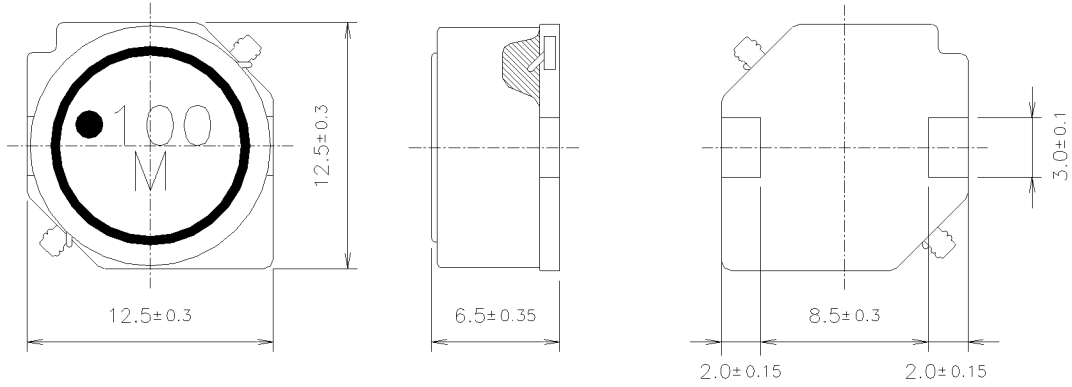
*) The rated current value is following either Idc1 or Idc2, which is the lower one.

Table-2

Dimensions and shape

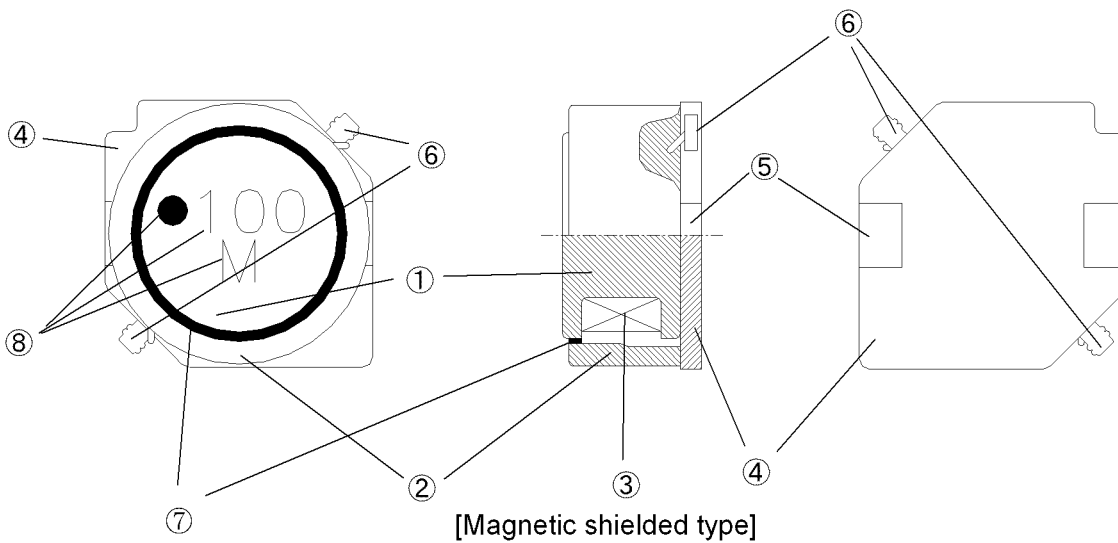
(3 / 12)

1. Dimensions



Unit: mm

2. Shape



- | | |
|----------------|---------------------------|
| ① Drum core | Ferrite(Ni-Zn) |
| ② Ring core | Ferrite(Ni-Zn) |
| ③ Winding wire | Polyurethane copper wire |
| ④ Base | Liquid crystal polymer |
| ⑤ Terminal | Copper (Ni and Sn plated) |
| ⑥ Solder | Lead free (Sn 99.99 %) |
| ⑦ Adhesive | Epoxy resin |
| ⑧ Ink | Phenol resin |

| | | |
|--|--------------------------|-------------|
| | Table-3 | |
| | Top side marking formats | (4 / 1 2) |

Marking formats

〈Example〉

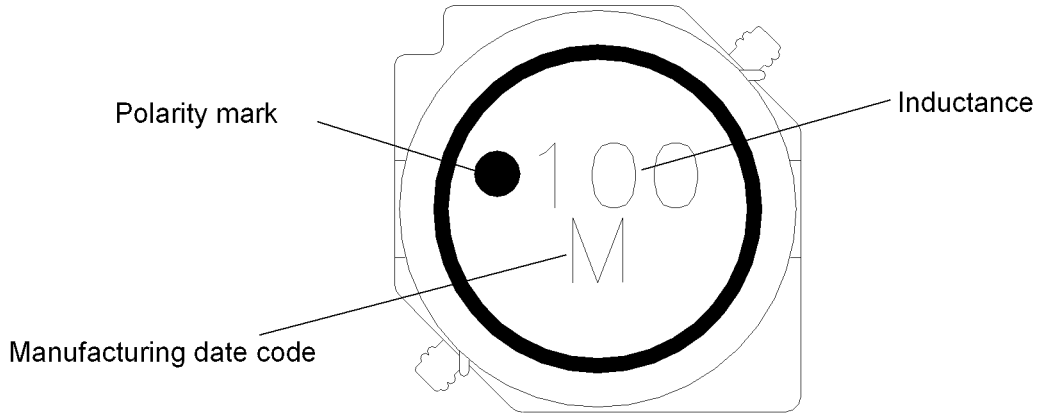


Table: Manufacturing date code

| Year \ Month | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|--------------|------|---|---|---|---|---|---|---|---|---|----|----|----|
| | | | | | | | | | | | | | |
| 2009 | 2013 | A | B | C | D | E | F | G | H | J | K | L | M |
| 2010 | 2014 | N | P | Q | R | S | T | U | V | W | X | Y | Z |
| 2011 | 2015 | a | b | c | d | e | f | g | h | j | k | l | m |
| 2012 | 2016 | n | p | q | r | s | t | u | v | w | x | y | z |

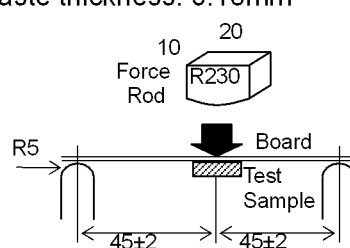
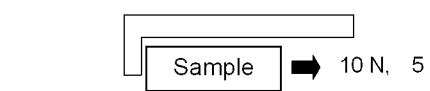
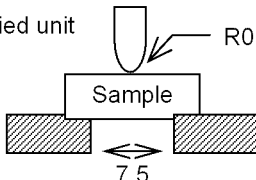
* Capitals A-Z and small letters a-z indicate production month which go round in 4 years.

* It may differ from actual printing font.

Table-4

Electric characteristics tests,
Physical characteristics tests and Environmental tests

(5 / 1 2)

| | Item | Spec. | Test method |
|----------------------------------|------------------------------------|-----------------------------------|--|
| Electrical characteristics tests | Inductance | Table-1 | LCR meter (Agilent 4285A or equivalent, 100KHz, 1V r.m.s.) |
| | DC resistance | Table-1 | DC resistance meter (HIOKI 3227 or equivalent) |
| | Rated current | Table-1 | The less value which is Idc1 or Idc2 |
| | SRF | Table-1 | Impedance material analyzer (Agilent 4291A or equivalent) |
| | Insulation resistance | 100MΩ minimum | DC 100V voltage shall be applied for 1 minute between the top side of sample and the terminal. |
| | Dielectric withstanding voltage | No break of insulation | AC 100V voltage shall be applied for 1 minute between the top side of sample and the terminal. |
| | Short time over load | No damage such as smoke or spark | 2 times the rated current for 5 minutes. |
| | Temperature characteristics | Inductance change: Within±15 % | Measurement of inductance shall be taken at temperature range within -40 °C to +125 °C. With reference to inductance value at +20 °C, change rate shall be calculated. |
| Physical characteristics tests | Resistance to flexure of substrate | No damage | <p>The test samples shall be soldered to the test board by the reflow soldering conditions show in Table 7. As illustrated below, apply force in the direction of the arrow indicating until deflection of the test board reaches to 2 mm.</p> <p>Test board size : 100mm×40mm×1.0mm Test board material: glass epoxy-resin Solder paste thickness: 0.15mm</p>  <p align="right">Unit : mm</p> |
| | Terminal strength | Shall not come off PC board | <p>The test samples shall be soldered to the test board by the reflow soldering conditions shown in Table 7.</p> <p>Applied force: 10 N to X and Y directions. Duration: 5 s. Solder paste thickness: 0.15 mm</p>  |
| | Body strength | No damage | <p>Applied force: 30 N Duration: 10 s</p>  <p align="right">Unit : mm</p> |

| | | |
|---|--|-------------|
| Table-4 | | (6 / 1 2) |
| Electric characteristics tests, Physical characteristics tests and Environmental tests | | |

| | Item | Spec. | Test method |
|--------------------------------|---------------------------------------|--|--|
| Physical characteristics tests | Resistance to vibration | Inductance change: Within±10 % No significant abnormality in appearance. | The test samples shall be soldered to the test board by the reflow soldering conditions shown in Table 7. Then it shall be submitted to below test conditions. Frequency range :10Hz to 55Hz Total Amplitude :1.5mm (May not exceed acceleration 196 m/S ²) Sweeping Method :10Hz to 55Hz to 10 Hz for 1 min. Time :For 2 hours on each X, Y, and Z axis. |
| | Resistance to shock | Inductance change: Within±10 % No significant abnormality in appearance. | The test samples shall be soldered to the test board by the reflow soldering conditions shown in Table 7. Then it shall be submitted to below test conditions. Acceleration :1000m/s ² Duration :6msec (Half sine pulse) Direction :+X、+Y、+Z、-X、-Y、-Z Number of time :Each 3 times, Total 18 times |
| | Resistance to soldering heat (Reflow) | Inductance change: Within±10 % No significant abnormality in appearance. | The test sample shall be exposed to reflow oven at 230±5°C for 40 seconds, with peak temperature at 260±5°C for 5 seconds, 2 times. Test board thickness :1.0 mm Test board material :glass epoxy-resin |
| | Solderability | At least 90 % of surface of terminal electrode is covered by new solder. | The test samples shall be dipped in flux, and then immersed in molten solder as shown in below table. Flux: Methanol solution containing rosin 25 %. Solder :Pb free (Sn-3Ag-0.5Cu) Solder temperature :245±5°C Immersing time :5±1.0sec Immersing speed :25mm/s |
| Environmental tests | Thermal shock | Inductance change: Within±10 % No significant abnormality in appearance. | The test samples shall be soldered to the test board by the reflow soldering conditions shown in Table 7. The test samples shall be placed at specified temperature and specified time by following condition. The temperature cycle shall be repeated 100 cycles. 1 cycle condition :-40°C/30min ⇔ 85°C/30min |
| | Low temperature Life test | Inductance change: Within±10 % No significant abnormality in appearance. | The test samples shall be soldered to the test board by the reflow soldering conditions shown in Table 7. The test samples shall be placed in thermostatic oven set at specified temperature and applied the rated current continuously as shown in below table. Temperature :-40±3°C Time :500+24/-0 hours |

| | | |
|--|---|-------------|
| | Table-4 | (7 / 1 2) |
| | Electric characteristics tests, Physical characteristics tests and Environmental tests | |

| | Item | Spec. | Test method |
|---------------------|---------------------------------------|--|---|
| Environmental tests | Loading at high temperature life test | Inductance change: Within±10 % No significant abnormality in appearance. | The test samples shall be soldered to the test board by the reflow soldering conditions shown in Table 7. The test samples shall be placed in thermostatic oven set at specified temperature and applied the rated current continuously as shown in below table. Temperature :85±2°C Load current : Rated current (Refer to Table 1) Time :500+24/-0 hours |
| | Damp heat life test | Inductance change: Within±10 % No significant abnormality in appearance. | The test samples shall be soldered to the test board by the reflow soldering conditions shown in Table 7. The test samples shall be placed in thermostatic oven set at specified temperature and humidity as shown in below table. Temperature :60±2°C Relative humidity :90~95 %RH Time :500+24/-0 hours |
| | Loading under damp heat life test | Inductance change: Within±10 % No significant abnormality in appearance. | The test samples shall be soldered to the test board by the reflow soldering conditions shown in Table 7. The test samples shall be placed in thermostatic oven set at specified temperature and applied the rated current continuously as shown in below table. Temperature :60±2°C Relative humidity :90~95 %RH Load current : Rated current (Refer to Table 1) Time :500+24/-0 hours |

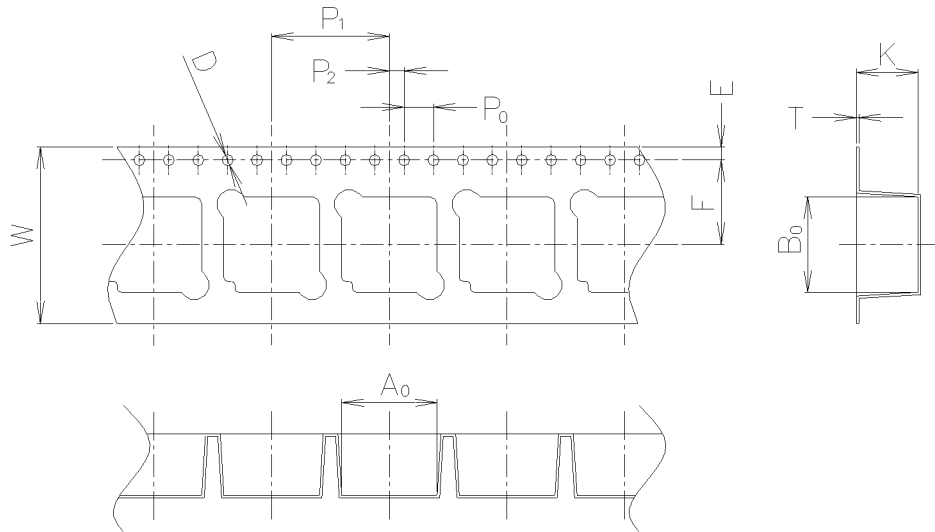
| | |
|------------------------------|--|
| Standard measuring condition | Unless otherwise specified, the test samples are placed at room temperature and humidity at least 2 hours, and measured within 48 hours after exposure to test conditions. |
|------------------------------|--|

Table-5

Dimensions of tape

(8 / 1 2)

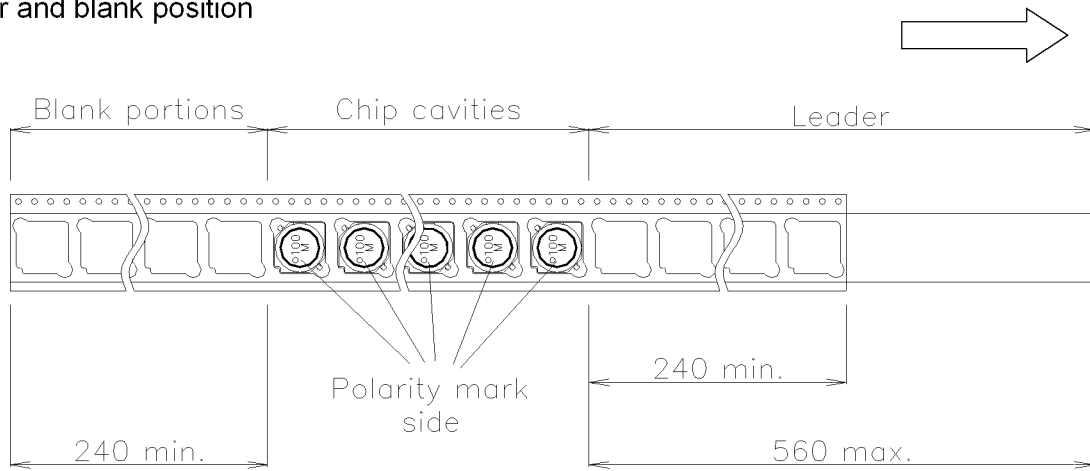
1. Taping dimensions



Unit: mm

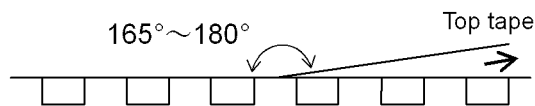
| A ₀ | B ₀ | W | F | E | P ₁ | P ₂ | P ₀ | D | T | K |
|----------------|----------------|--------------|--------------|--------------|----------------|----------------|----------------|--------------------|-------------|-------------|
| 13.0 ±0.1 | 13.0 ±0.1 | 24.0 ±0.3 | 11.5 ±0.1 | 1.75 ±0.1 | 16.0 ±0.1 | 2.0 ±0.1 | 4.0 ±0.1 | φ1.5 +0.1 -0 | 0.4 ±0.1 | 7.1 ±0.1 |

2. Leader and blank position



Unit: mm

3. Top tape strength



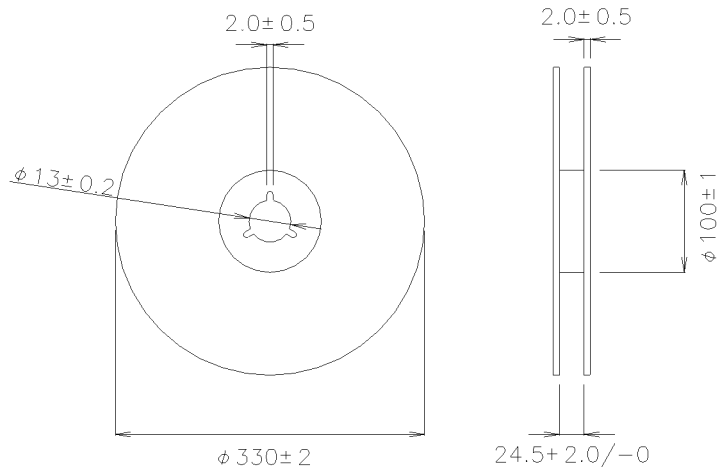
Peel-off force : 0.1 N ~ 1.3 N
 Peel-off angle : 165° ~ 180°
 Peel-off speed : 300 mm/min

Table-6

Dimensions of reel and packaging style

(9 / 1 2)

1. Dimension of reel



Unit: mm

2. Quantity 500pcs/ reel

3. The allowable number of empty chip cavities

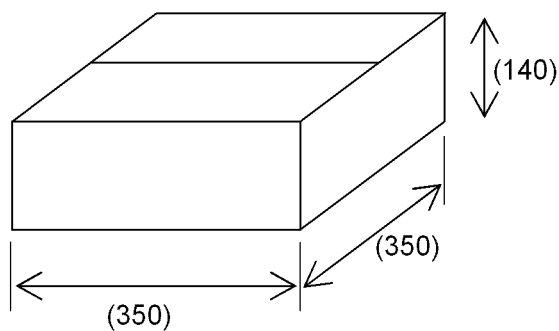
Maximum two (2) chip cavities missing product may exist in a reel but they may not be consecutive two cavities.

4. Marking

The following items shall be marked legibly on per tape & reel package.

- (1) Part number of Taiyo Yuden Co., Ltd.
- (2) Supplier name (Taiyo Yuden Co., Ltd.)
- (3) Lot number
- (4) Date (stamp)
- (5) Quantity
- (6) Country of origin

5. Dimensions of packing box



Unit: mm

2 000pcs/ carton
4 reels/ carton

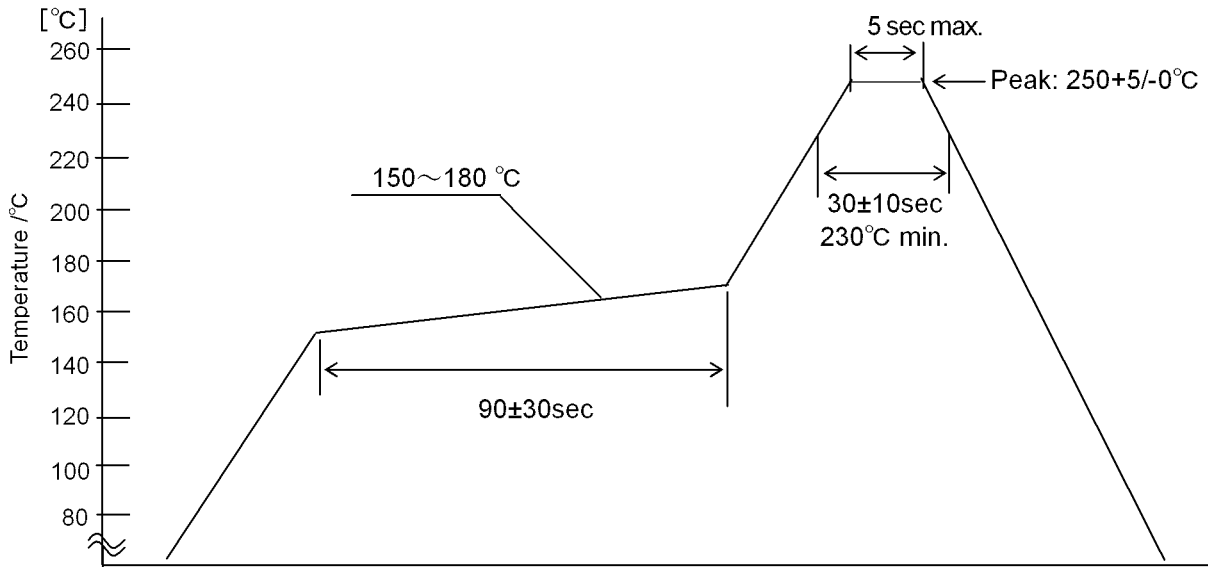
6. Unit of minimum order 2000pcs (1 carton)

Table-7

Reflow profile (reference)

(10/12)

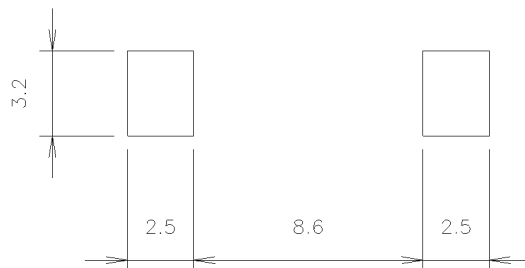
Reflow condition(Pb free solder)



The products may be exposed to reflow soldering process of above profile up to two times.

1. Surface mounting

- Mounting and soldering conditions should be checked beforehand.
- Applicable soldering process to this products is reflow soldering only.
- Recommended Land-Pattern :



Unit: mm

2. Handling

- 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.

3. Storage

To prevent deterioration of the solderability of terminal electrodes and/or the packing materials of the products, please store the products under following storage conditions.

| | |
|---------------------------|-----------------|
| Ambient temperature range | -5°C to 40°C |
| Humidity | 70 % RH maximum |

Even under the ideal storage conditions, solderability of inductor's electrode deteriorates as time passes, so inductors should be used within 6 months after the delivery time.

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.

5. RoHS compliance

This product conforms to "RoHS compliance".

6. Country of origin

China or Philippine

(UNITED ELECTRONICS CO., LTD. DONGGUAN TAIYO YUDEN CO., LTD.

TAIYO YUDEN (TIANJIN) ELECTRONICS CO., LTD.)

(TAIYO YUDEN (PHILIPPINES) INC.)

7. Guarantee

The operating conditions for the guarantee of this product are as shown in the drawing for specification.

Please note that Taiyo Yuden Co., Ltd. shall not be responsible for a failure and /or abnormality which is caused by use under the conditions other than the aforesaid operating conditions.

Precautions

(1 2 / 1 2)



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