NichTek

ITEM :MULTILAYER CHIP INDUCTOR

| ESTABLISHMENT | 2008. 08.13 | APPROVED | |
|---|---|---|---|
| REVISION | | Series NO:IT080813001 | |

# APPROVAL SHEET

## MULTILAYER CHIP INDUCTOR

CUSTOMER :

DATE :

You can reapprove only the changed quality request recorded in spec sheet.
And, We can decide other changed parts

## Features

1. Monolithic structure for highly reliable surface mount applications.
2. Excellent solderability and high heat resistance for either flow or reflow soldering.
3. No cross coupling between inductors due to magnetic shield. Ideal for high density installation.
4. Superior Q characteristics guaranteed over the wide frequency allow high frequency application.
5. Dimensions are suitable for automatic mounting.

## Ordering Information

| IT | 1608 | 47N | M |
|---|---|---|---|
| (1) | (2) | (3) | (4) |

**(1) Series**

IT : Multilayer Chip Inductor

**(2) Dimension**

First two digits : length(mm)

Last twodigits : width(mm)

**(3) Inductance**

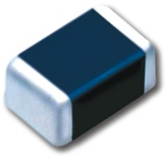
**(4) Tolerance**

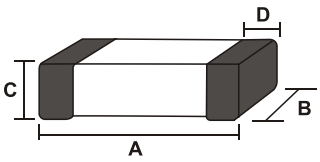
K = ±10% , M= ±20%

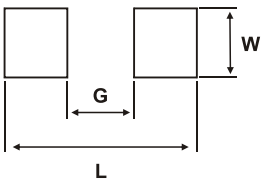
## Applications

Prevention of electromagnetic interference to signals on the secondary side of electric equipment.

## Shape and Dimensions / Recommended PC Board Pattern






Dimensions in mm (inch)

| TYPE | A | B | C | D | L | W | G |
|---|---|---|---|---|---|---|---|
| 160808 | 1.6±0.2 (0.063±0.008) | 0.8±0.2 (0.031±0.008) | 0.8±0.2 (0.031±0.008) | 0.3±0.2 (0.012±0.008) | 2.80 (0.110) | 1.00 (0.039) | 0.60 (0.024) |
| 201209 | 2.0±0.2 (0.079±0.008) | 1.2±0.2 (0.047±0.008) | 0.9±0.2 (0.035±0.008) | 0.5±0.3 (0.020±0.012) | 3.20 (0.126) | 1.50 (0.059) | 0.60 (0.024) |
| 201212 | 2.0±0.2 (0.079±0.008) | 1.2±0.2 (0.047±0.008) | 1.2±0.2 (0.047±0.008) | 0.5±0.3 (0.020±0.012) | 3.20 (0.126) | 1.50 (0.059) | 0.60 (0.024) |

## Specifications

1608 Series

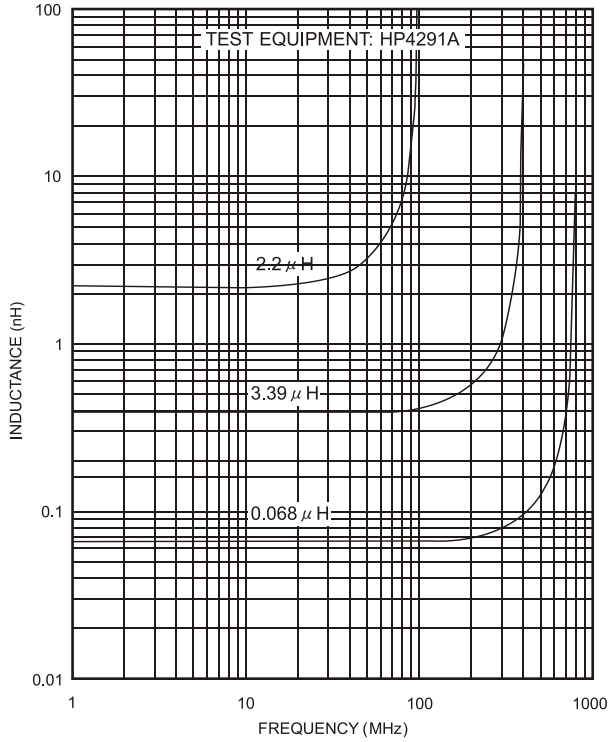
| Part Number | Inductance (μH) | Percent Tolerance | Test Freq. (MHz) | Q MIN. | SFR (MHz) MIN. | DC Resistance (Ω) MAX. | Rated Current (mA) MAX. |
|---|---|---|---|---|---|---|---|
| IT160847N ☐ | 0.047 | M | 50 | 10 | 260 | 0.30 | 50 |
| IT160868N ☐ | 0.068 | M | 50 | 10 | 250 | 0.30 | 50 |
| IT1608R10 ☐ | 0.10 | K | 25 | 15 | 240 | 0.50 | 50 |
| IT1608R12 ☐ | 0.12 | K | 25 | 15 | 205 | 0.50 | 50 |
| IT1608R15 ☐ | 0.15 | K | 25 | 15 | 180 | 0.60 | 50 |
| IT1608R18 ☐ | 0.18 | K | 25 | 15 | 165 | 0.60 | 50 |
| IT1608R22 ☐ | 0.22 | K | 25 | 15 | 150 | 0.80 | 50 |
| IT1608R27 ☐ | 0.27 | K | 25 | 15 | 136 | 0.80 | 50 |
| IT1608R33 ☐ | 0.33 | K | 25 | 15 | 125 | 0.85 | 35 |
| IT1608R39 ☐ | 0.39 | K | 25 | 15 | 110 | 1.00 | 35 |
| IT1608R47 ☐ | 0.47 | K | 25 | 15 | 105 | 1.35 | 35 |
| IT1608R56 ☐ | 0.56 | K | 25 | 15 | 95 | 1.55 | 35 |
| IT1608R68 ☐ | 0.68 | K | 25 | 15 | 90 | 1.70 | 35 |
| IT1608R82 ☐ | 0.82 | K | 25 | 15 | 85 | 2.10 | 35 |
| IT16081R0 ☐ | 1.0 | K | 10 | 35 | 75 | 0.60 | 25 |
| IT16081R2 ☐ | 1.2 | K | 10 | 35 | 65 | 0.80 | 25 |
| IT16081R5 ☐ | 1.5 | K | 10 | 35 | 60 | 0.80 | 25 |
| IT16081R8 ☐ | 1.8 | K | 10 | 35 | 55 | 0.95 | 25 |
| IT16082R2 ☐ | 2.2 | K | 10 | 35 | 50 | 1.15 | 15 |
| IT16082R7 ☐ | 2.7 | K | 10 | 35 | 45 | 1.35 | 15 |
| IT16083R3 ☐ | 3.3 | K | 10 | 35 | 40 | 1.55 | 15 |
| IT16083R9 ☐ | 3.9 | K | 10 | 35 | 35 | 1.70 | 15 |
| IT16084R7 ☐ | 4.7 | K | 10 | 35 | 33 | 2.10 | 15 |
| IT16085R6 ☐ | 5.6 | K | 4 | 35 | 22 | 1.55 | 5 |
| IT16086R8 ☐ | 6.8 | K | 4 | 35 | 20 | 1.70 | 5 |
| IT16088R2 ☐ | 8.2 | K | 4 | 35 | 18 | 2.10 | 5 |
| IT1608100 ☐ | 10 | K | 2 | 30 | 17 | 1.85 | 3 |
| IT1608120 ☐ | 12 | K | 2 | 30 | 15 | 2.10 | 3 |

☐ Tolerance：K = ±10%, M = ±20%

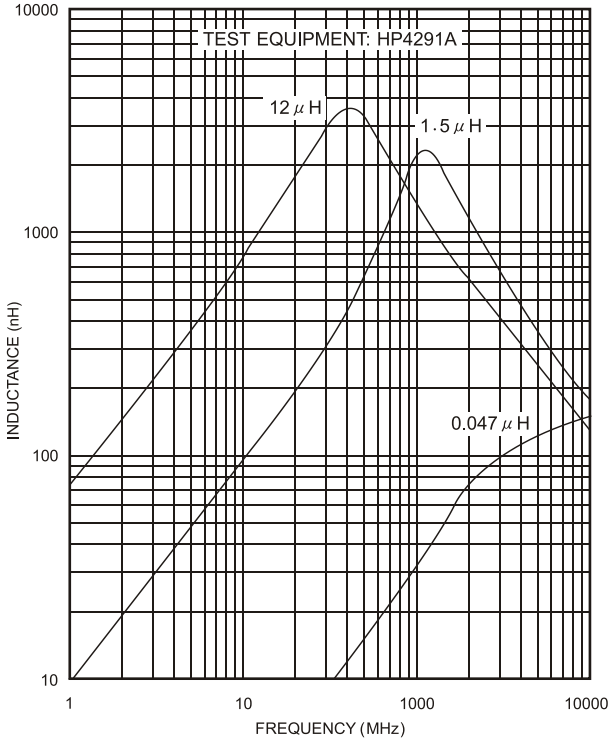
## Electrical Characteristics

### 1608 Series

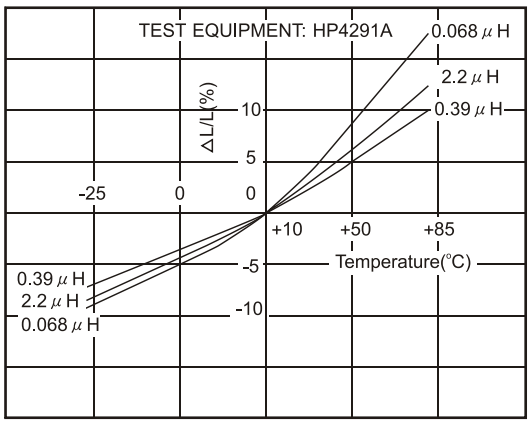
**Inductance VS. Frequency**



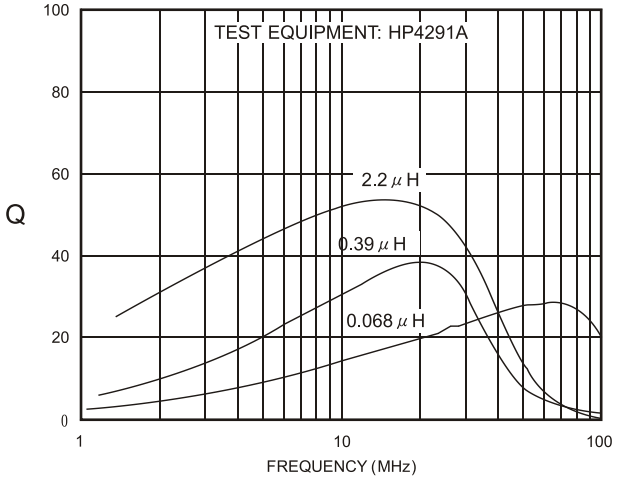

**Impedance VS. Frequency**




**Inductance VS. Frequency**




**Q VS. Frequency**



## Specifications

2012 Series

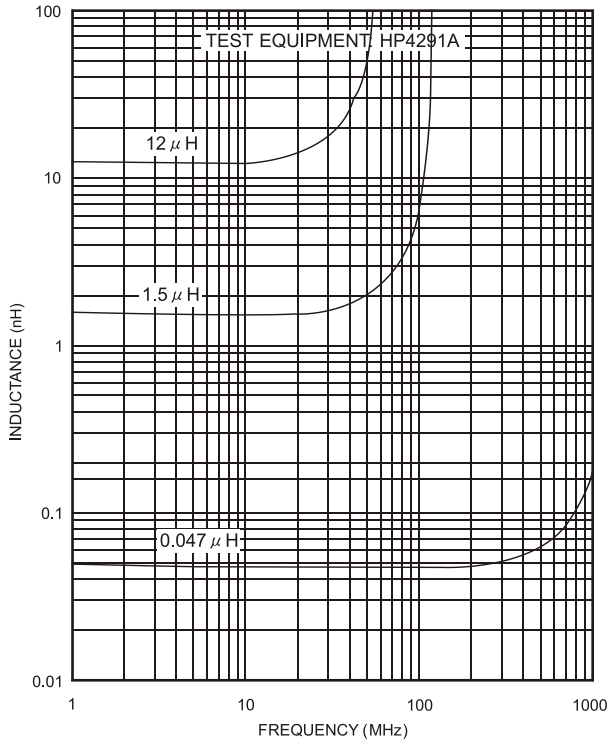
| Part Number | Inductance (μH) | Percent Tolerance | Test Freq. (MHz) | Q MIN. | SFR (MHz) MIN. | DC Resistance (Ω) MAX. | Rated Current (mA) MAX. |
|---|---|---|---|---|---|---|---|
| IT201247N ☐ | 0.047 | M | 50 | 15 | 320 | 0.20 | 300 |
| IT201268N ☐ | 0.068 | M | 50 | 15 | 280 | 0.20 | 300 |
| IT2012R10 ☐ | 0.10 | K | 25 | 20 | 235 | 0.30 | 250 |
| IT2012R12 ☐ | 0.12 | K | 25 | 20 | 220 | 0.30 | 250 |
| IT2012R15 ☐ | 0.15 | K | 25 | 20 | 200 | 0.40 | 250 |
| IT2012R18 ☐ | 0.18 | K | 25 | 20 | 185 | 0.40 | 250 |
| IT2012R22 ☐ | 0.22 | K | 25 | 20 | 170 | 0.50 | 250 |
| IT2012R27 ☐ | 0.27 | K | 25 | 20 | 150 | 0.50 | 250 |
| IT2012R33 ☐ | 0.33 | K | 25 | 20 | 145 | 0.55 | 250 |
| IT2012R39 ☐ | 0.39 | K | 25 | 25 | 135 | 0.65 | 200 |
| IT2012R47 ☐ | 0.47 | K | 25 | 25 | 125 | 0.65 | 200 |
| IT2012R56 ☐ | 0.56 | K | 25 | 25 | 115 | 0.75 | 150 |
| IT2012R68 ☐ | 0.68 | K | 25 | 25 | 105 | 0.80 | 150 |
| IT2012R82 ☐ | 0.82 | K | 25 | 25 | 100 | 1.00 | 150 |
| IT20121R0 ☐ | 1.0 | K | 10 | 45 | 75 | 0.40 | 50 |
| IT20121R2 ☐ | 1.2 | K | 10 | 45 | 65 | 0.50 | 50 |
| IT20121R5 ☐ | 1.5 | K | 10 | 45 | 60 | 0.50 | 50 |
| IT20121R8 ☐ | 1.8 | K | 10 | 45 | 55 | 0.60 | 50 |
| IT20122R2 ☐ | 2.2 | K | 10 | 45 | 50 | 0.65 | 30 |
| IT20122R7 ☐ | 2.7 | K | 10 | 45 | 45 | 0.75 | 30 |
| IT20123R3 ☐ | 3.3 | K | 10 | 45 | 41 | 0.80 | 30 |
| IT20123R9 ☐ | 3.9 | K | 10 | 45 | 38 | 0.90 | 30 |
| IT20124R7 ☐ | 4.7 | K | 10 | 45 | 35 | 1.00 | 30 |
| IT20125R6 ☐ | 5.6 | K | 4 | 50 | 32 | 0.90 | 15 |
| IT20126R8 ☐ | 6.8 | K | 4 | 50 | 29 | 1.00 | 15 |
| IT20128R2 ☐ | 8.2 | K | 4 | 50 | 26 | 1.10 | 15 |
| IT2012100 ☐ | 10 | K | 2 | 50 | 24 | 1.15 | 15 |
| IT2012120 ☐ | 12 | K | 2 | 50 | 22 | 1.25 | 15 |
| IT2012150 ☐ | 15 | K | 1 | 35 | 19 | 0.80 | 5 |
| IT2012180 ☐ | 18 | K | 1 | 35 | 18 | 0.90 | 5 |
| IT2012220 ☐ | 22 | K | 1 | 35 | 16 | 1.10 | 5 |
| IT2012270 ☐ | 27 | K | 1 | 35 | 14 | 1.15 | 5 |
| IT2012330 ☐ | 33 | K | 1 | 35 | 13 | 1.25 | 5 |

☐ Tolerance : K = ±10%, M = ±20%

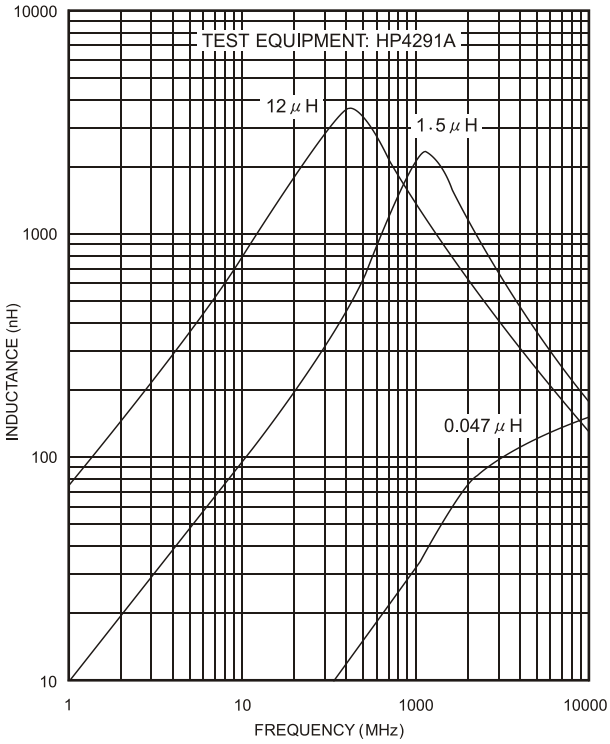
## Electrical Characteristics

### 2012 Series

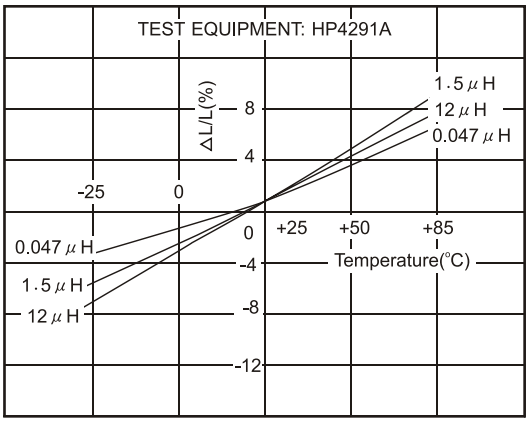
#### Inductance VS. Frequency



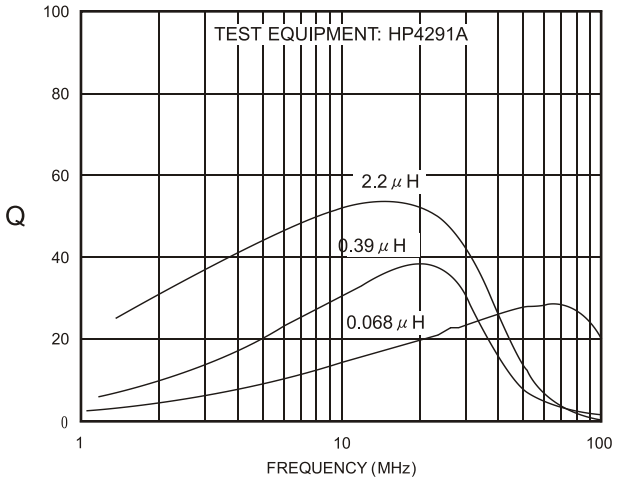

#### Impedance VS. Frequency



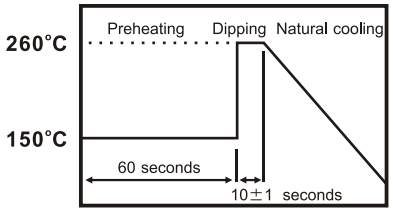
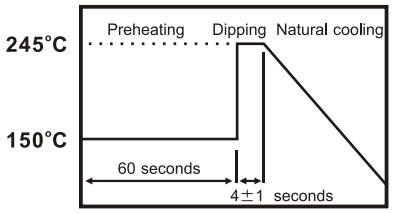
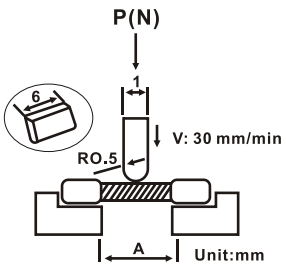

#### Inductance VS. Frequency



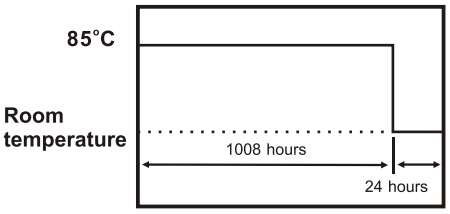
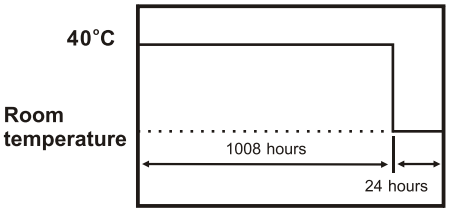
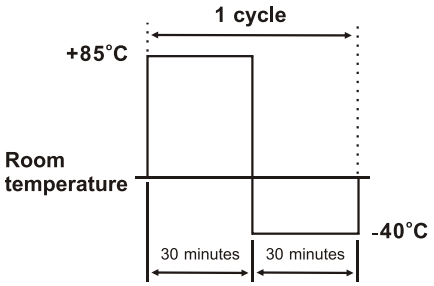
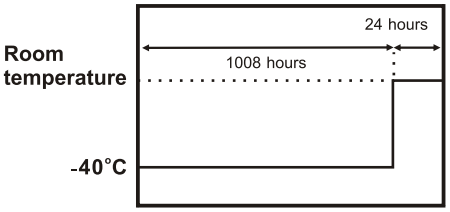

#### Q VS. Frequency



## Reliability Test

| Item | Performance | Test condition |
|---|---|---|
| Operating temperature range | -55 °C to + 125 °C | |
| Storage temperature and umidity ranges | 40 °C MAX., 70% RH MAX. | |
| Soldering heat resistance | The chip shall not be cracks.<br>More than 75% of terminal electrode shall be covered with solder. | Preheat: 150 °C, 60 seconds<br>Solder temperature : 260±5 °C<br>Flux: Rosin<br>Dip time: 10±1 seconds<br>  |
| Solderability | More than 90% of the terminal electrode shall be covered with new solder. | Preheat: 150 °C, 60 seconds<br>Solder temperature: 245±5 °C<br>Flux: Rosin<br>Dip time: 4±1 seconds<br>  |
| Terminal strength | The terminal electrode and the body shall not be damaged by the forces applied on the right conditions.<br>  | <table><tr><th>Type</th><th>P(kgf)</th><th>Time(s)</th></tr><tr><td>IT1608</td><td>0.5</td><td rowspan="3">30±5</td></tr><tr><td rowspan="2">IT2012</td><td>0.6</td></tr><tr><td>0.8</td></tr></table> |
| Bending strength | The body shall not be damaged by the forces applied on the right conditions.<br>  | <table><tr><th>Type</th><th>A(mm)</th><th>P(kgf)</th></tr><tr><td>IT1608</td><td>1.0</td><td>0.5</td></tr><tr><td rowspan="2">IT2012</td><td>1.4</td><td>1.0</td></tr><tr><td>1.4</td><td>1.2</td></tr></table> |

## Reliability Test

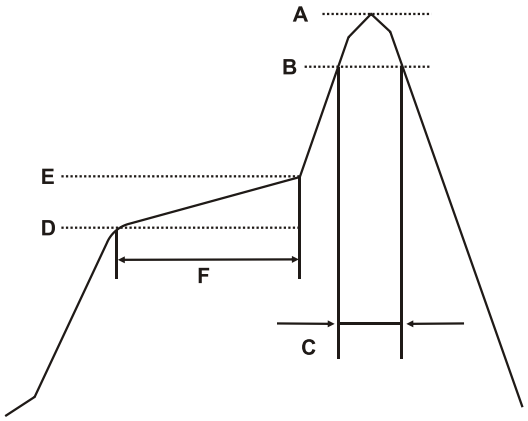
| Item | Performance | Test condition |
|---|---|---|
| High temperature resistance | Appearance: Ferrite shall not be damaged.<br>Inductance: Within±10% of the initial value.<br>Q: Within±30% of the initial value. | Temperature: 85±2 °C<br>Testing time: 1008±12 hours<br>Measurement: After placing for 24 hours min.<br>  |
| Humidity resistance | Appearance: Ferrite shall not be damaged.<br>Inductance: Within±10% of the initial value<br>Q: Within±30 % of the initial value. | Humidity: 90 to 95% RH<br>Temperature: 40±2 °C<br>Testing time: 1008±12 hours<br>Measurement: After placing for 24 hours min.<br>  |
| Thermal Shock | Appearance: Cracking, chipping or any other defects harmful to the characteristics shall Not be allowed.<br>Inductance: Within±10% of the initial value<br>Q: Within±30% of the initial value. | Temperature: -40 °C, +85 °C, kept stabilized for 30 minutes each<br>Cycle: 100 cycles<br>Measurement: After placing for 24 hours min.<br>  |
| Low temperature storage life test | Appearance: Cracking, chipping or any other defects harmful to the characteristics shall not be allowed.<br>Inductance: Within±10% of the initial value.<br>Q: Within±30% of the initial value. | Temperature: -40±2 °C<br>Testing time: 1008±12 hours Measurement: After placing for 24 hours min.<br>  |

## Soldering Profile

### Recommended Soldering Conditions

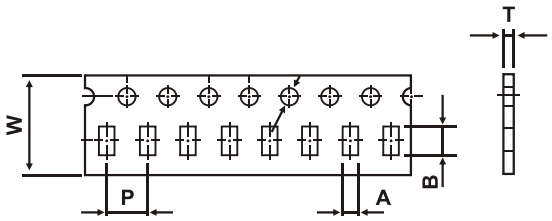
(Reflow Temperature Profile) Lead-Free

| | |
|---|---|
| A | 260±5 °C |
| B | 230±5 °C |
| C | 30±10 sec |
| D | 150 °C |
| E | 180 °C |
| F | 90 ±30 sec |

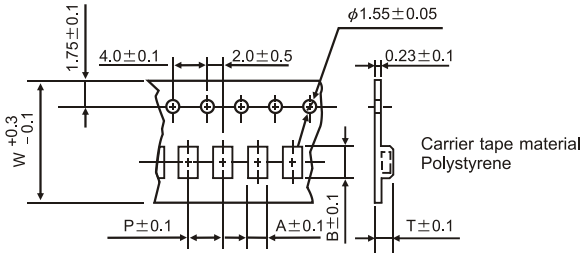



## Packaging

### Carrier tape material: Paper

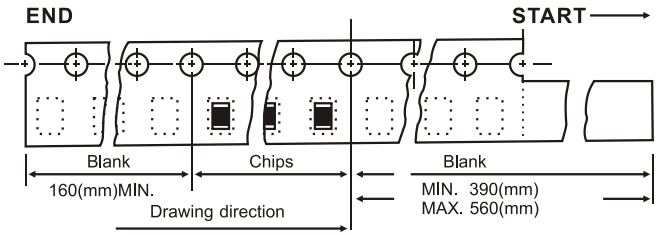



### Carrier tape material: Plastic




| Material: Paper ( Dimensions in mm) | | | | | | |
|---|---|---|---|---|---|---|
| TYPE | A | B | W | P | T | CHIPS / REEL |
| 1608 | 1.10 | 1.90 | 8 | 4 | 0.95 | 4000 |
| 2012 | 1.50 | 2.30 | 8 | 4 | 0.95 | 4000 |
| **Material: Plastic ( Dimensions in mm)** | | | | | | |
| TYPE | A | B | W | P | T | CHIPS / REEL |
| 1608 | 1.01 | 1.80 | 8 | 4 | 1.02 | 4000 |
| 2012 | 1.42 | 2.25 | 8 | 4 | 1.04 | 4000 |
| 2012* | 1.50 | 2.35 | 8 | 4 | 1.45 | 2000 |

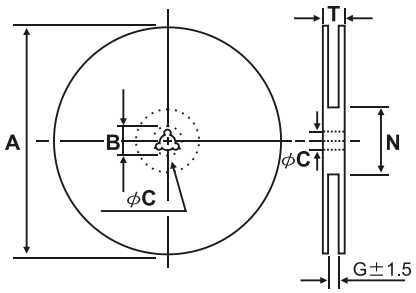
＊ : **Inductance** 2.7 - 33 μH



## Packaging

### Reel dimensions

Material: Plastic




Dimensions in mm

| TYPE | 8mm | 12mm |
|---|---|---|
| A | 178±2 | 178±2 |
| B | 21.0±0.8 | 21.0±0.8 |
| C | 13.0±0.8 | 13.0±0.8 |
| G | 10.0 | 14.0 |
| N | 75 | 75 |
| T | 12.5 | 16.5 |