# WIRE WOUND CHIP INDUCTORS
# LPI SERIES

## INTRODUCTION

Product : LPI Miniature SMD Inductor For Power Line
Size : 0603 / 0805 /1210
The LPI series are low profile inductor used in notebooks, PC, cellular phone backlight, inverter and etc.
The devices are designed smallest possible sizes and highest performance.

## FEATURES

* Operating temperature -40 to +85°C.
* Excellent solderability and resistance to soldering heat .
* Suitable for reflow soldering.
* High reliability and easy surface mount assembly.
* Wide range of inductance values are available for flexible needs.

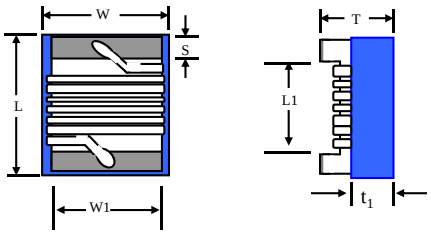
## PART NUMBER

**LPI 0603 F T 1R0 J - □□**

**1 2 3** Taping **4 5 Internal Code**

**1 Product Type**

**2 Chip Dimension**




| Size (inch) mm | Length (L) (inch) mm | Width (W) (inch) mm | Thickness (T) (inch) mm | Terminal (S) (inch) mm | L1 (Ref.) mm | W1 (Ref.) mm | ($t_1$) (Ref.) mm |
|---|---|---|---|---|---|---|---|
| 0603<br>1608 | (0.063 ± 0.008)<br>1.60 ± 0.20 | (0.041 ± 0.008)<br>1.05 ± 0.20 | (0.041 ± 0.004)<br>1.05 ± 0.10 | (0.014 ± 0.004)<br>0.35 ± 0.10 | 0.80 | 0.95 | 0.50 |
| 0805<br>2012 | (0.080 ± 0.008)<br>2.00 ± 0.20 | (0.050 ± 0.008)<br>1.25 ± 0.20 | (0.047 max.)<br>(1.20 max.) | (0.016 ± 0.004)<br>0.40 ± 0.10 | 1.20 | 1.20 | 0.60 |
| 1210<br>3225 | (0.126 ± 0.008)<br>3.20 ± 0.20 | (0.098 ± 0.008)<br>2.50 ± 0.20 | (0.047 max.)<br>(1.20 max.) | (0.020 ± 0.004)<br>0.50 ± 0.10 | 2.20 | 2.40 | 0.80 |

**3 Material Type**

F : Ferrite Material

**4 Inductance Value**

1R0 = 1.0 uH
100 = 10 uH

**5 Tolerance**

K = ± 10 % M = ± 20 %

# CHIP INDUCTOR SPECIFICATIONS

## 1 Scope

This specification applies to miniature wire wound inductors for power line of the following types used in electronics equipment :

## 2 Construction

*Configuration & Dimension : Please refer to the attached figures and tables.

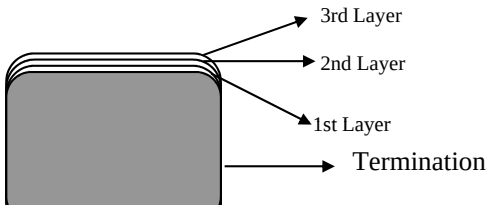
*Terminals : LPI series terminals shall consist of PdAg alloy followed by Nickel, then solder platting for easier soldering.

## 3 Operating Temperature Range

Operating Temperature Range is the scope of ambient temperature at which the inductor can be operated continuously at rated current.

*Temp. Range : Ferrite Material : - 40°C to + 85°C

## 4 Ingredient of terminals electrode.




a) 1st layer : Ag/Pd
b) 2nd layer : Nickel
c) 3rd layer : Sn

## 5 Characteristics

Standard Atmospheric Conditions

Unless otherwise specified, the standard range of atmospheric conditions for making measurements and tests are as follows :

*Ambient Temperature : 25 °C ± 2 °C

*Relative Humidity : 60% to 70%

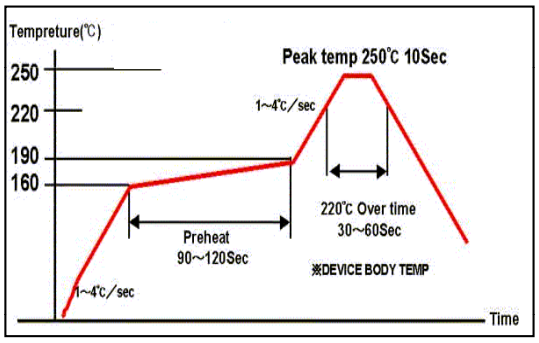
*Air Pressure : 86 Kpa to 106 Kpa

# CHIP INDUCTOR SPECIFICATIONS

## TEMPERATURE PROFILE

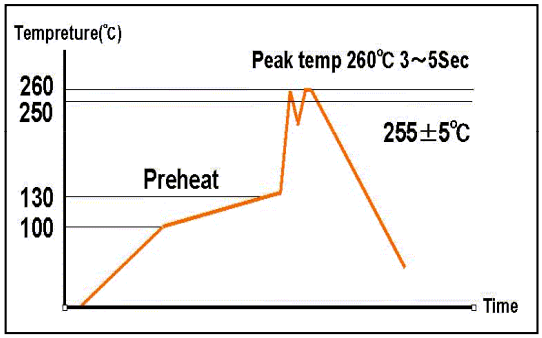
a Reflow temperature profile

(Temperature of the mounted parts surface on the printed circuit board)



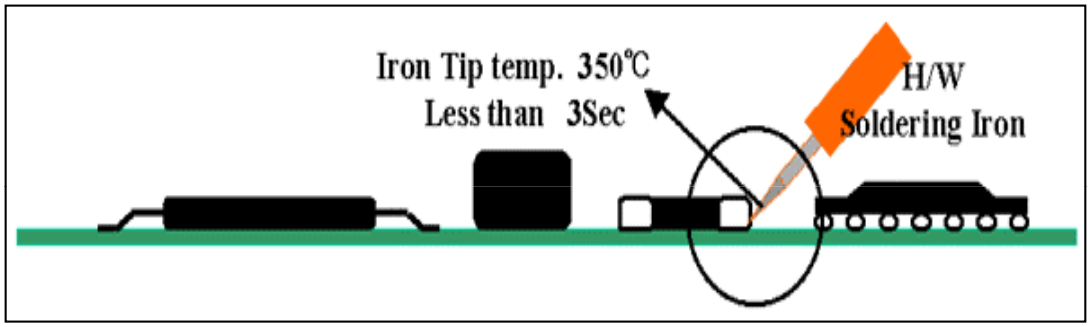

Recommended Peak Temperature：250℃ Max
250℃ up /within 10secs
Max. Reflow temperature : 260°C.
Gradient of temperature rise：av 1-4℃/sec
Preheat：160-190℃/within 90-120secs
220℃ up /within 30-60secs
Composition of solder Sn-3Ag-0.5Cu

b Dip temperature




Solder bathtub temperature: 260℃ max
within 5secs.
Preheating temperature: 100～130℃
deposit solder temperature.
Composition of solder Sn-3Ag-0.5Cu

c Soldering iron tip temperature : 350°C max / within 3 seconds.



WIRE WOUND CHIP INDUCTOR

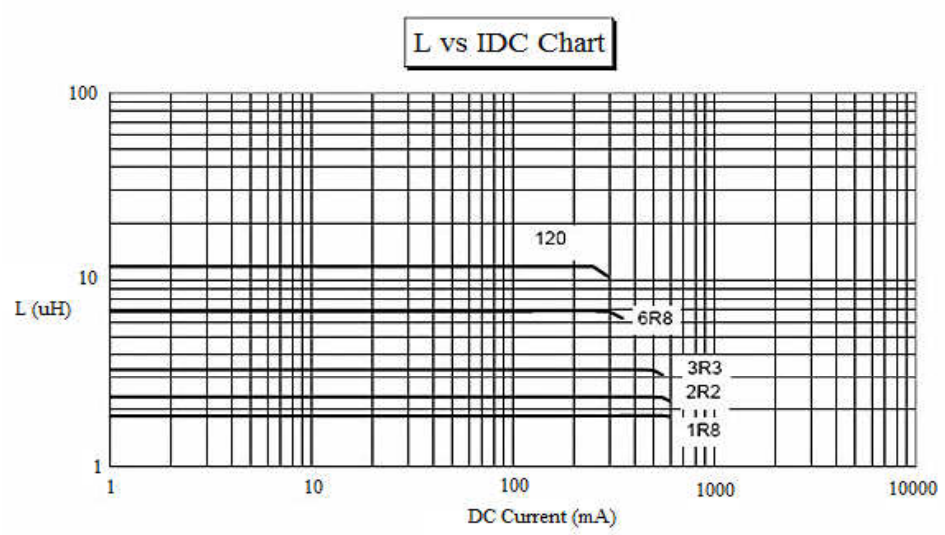
# LPI 0603 (1608) SERIES

| Part No. | Inductance [1] (uH) | Percent Tolerance | Q [2] Min | S.R.F. [3] Min (MHz) | RDC [4] Max (Ω) | IDC [5] Max (mA) |
|---|---|---|---|---|---|---|
| LPI 0603 FT 1R0 □-□□ | 1.0 @ 100 KHz | K, M | 6 @ 1MHz | 400 | 0.60 | 680 |
| LPI 0603 FT 1R2 □-□□ | 1.2 @ 100 KHz | K, M | 6 @ 1MHz | 300 | 0.65 | 650 |
| LPI 0603 FT 1R5 □-□□ | 1.5 @ 100 KHz | K, M | 6 @ 1MHz | 150 | 0.90 | 520 |
| LPI 0603 FT 1R8 □-□□ | 1.8 @ 100 KHz | K, M | 6 @ 1MHz | 120 | 0.95 | 480 |
| LPI 0603 FT 2R2 □-□□ | 2.2 @ 100 KHz | K, M | 7 @ 1MHz | 80 | 1.00 | 470 |
| LPI 0603 FT 2R7 □-□□ | 2.7 @ 100 KHz | K, M | 7 @ 1MHz | 80 | 1.10 | 460 |
| LPI 0603 FT 3R3 □-□□ | 3.3 @ 100 KHz | K, M | 7 @ 1MHz | 70 | 1.25 | 450 |
| LPI 0603 FT 3R9 □-□□ | 3.9 @ 100 KHz | K, M | 7 @ 1MHz | 65 | 1.35 | 430 |
| LPI 0603 FT 4R7 □-□□ | 4.7 @ 100 KHz | K, M | 8 @ 1MHz | 60 | 1.50 | 420 |
| LPI 0603 FT 5R6 □-□□ | 5.6 @ 100 KHz | K, M | 8 @ 1MHz | 55 | 2.10 | 270 |
| LPI 0603 FT 6R8 □-□□ | 6.8 @ 100 KHz | K, M | 8 @ 1MHz | 50 | 2.30 | 250 |
| LPI 0603 FT 8R2 □-□□ | 8.2 @ 100 KHz | K, M | 8 @ 1MHz | 28 | 2.50 | 230 |
| LPI 0603 FT 100 □-□□ | 10.0 @ 100 KHz | K, M | 10 @ 1MHz | 25 | 2.90 | 220 |
| LPI 0603 FT 120 □-□□ | 12.0 @ 100 KHz | K, M | 10 @ 1MHz | 20 | 3.10 | 190 |

1. Inductance is measured in HP-4284A /4285A RF LCR meter with SMD-A fixture.
2. Q is measured in HP-4284A / 4285A RF LCR meter with SMD-A fixture.
3. SRF is measured in ENA E5071B network analyzer.
4. RDC is measured in HP-4338B millohmeter.
5. For 25 °C Rise.

Unit weight = 0.0049g ( for ref. )

# LPI 0603 (1608) SERIES



# SPECIFICATION

| | ITEM | CONDITION | SPECIFICATION |
|---|---|---|---|
| **Mechanical Characteristics** | Inductance and Tolerance | Measuring Frequency : As shown in Product Table<br>Measuring Temperature : + 25 °C | Within Specified Tolerance |
| | Quality Factor | | |
| | Insulation Resistance | Measured at 100V DC between inductor terminals and center of case. | 1000 mega ohms minimum |
| | Dielectric Withstanding Voltage | Measured at 500V AC between inductor terminals and center of case for a maximum of 1 minute. | No damage occurs when the test voltage is applied. |
| | Temperature Coefficient of Inductance (TCL) | Over - 40 °C to + 85°C at frequency specified in Product Table. | + 25 to 500 ppm / °C<br>TCL = $\frac{L1 - L2}{L1(T1-T2)} \times 10^6$ (ppm /°C) |
| **Electrical Characteristics** | Component Adhesion (Push Test) | The component shall be reflow soldered onto a P. C. Board ( 240 °C ± 5°C for 20 seconds ). Then a dynometer force gauge shall be applied to any side of the component. | 0603 series - 0.40Kg<br>0805 & 1210 series-minimum 1Kg |
| | Drop Test | The inductor shall be dropped two times on the concrete floor or the vinyl tile from 1M naturally. | Change In Inductance: No more than 5%<br>Change In Q: No more than 10%<br>Change In Appearance: Without distinct damage |
| | Thermal Shock Test | Each cycle shall consist of 30 minutes at -40 °C followed by 30 minutes at +85 °C with a 20-second maximum transition time between temperature extremes. Test duration is 10 cycles. | |

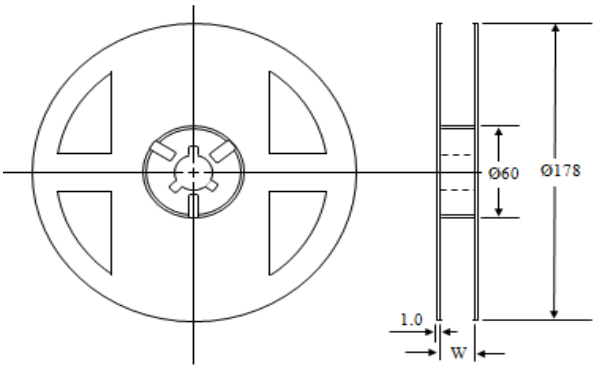
# SPECIFICATION

| | ITEM | CONDITION | SPECIFICATION |
|---|---|---|---|
| **Endurance Characteristics** | Solderability | Dip pads in flux and dip in solder pot containing lead free solder at 240 °C ± 5°C for 5 seconds. | A minimum of 80% of the metalized area must be covered with solder. |
| | Resistance to Soldering Heat | Dip the components into flux and dip into solder pot containing lead free solder at 260 °C ± 5 °C for 5 ± 2 seconds. | Change In Inductance: No more than 5%<br><br>Change In Q: No more than 10%<br><br>Change In Appearance : Without distinct damage |
| | Vibration (Random) | Inductors shall be randomly vibrated at amplitude of 1.5mm and frequency of 10 - 55 Hz: 0.04 G / Hz for a minimum of 15 minutes per axis for each of the three axes. | |
| | Cold Temperature Storage | Inductors shall be stored at temperature of -40 °C ± 2 °C for 1000hrs (+ 48 -0 hrs.) Then inductors shall be subjected to standard atmospheric conditions for 1 hour. After that, measurement shall be made. | |
| | High Temperature Storage | Inductors shall be stored at temperature of 85 °C ± 2 °C for 1000hrs (+48 - 0hrs.) Then inductors shall be subjected to standard atmospheric conditions for 1 hour. After that, measurement shall be made. | |
| | Moisture Resistance | Inductors shall be stored in the chamber at 45 °C at 90 - 95 R. H. for 1000 hours. Then inductors are to be tested after 2 hours at room temperature. | Inductors shall not have a shorted or open winding. |
| | High Temperature with Loaded | Inductors shall be stored in the chamber at +85 °C for 1000 hours with rated current applied. Inductors shall be tested at the beginning of test at 500 hours and 1000 hours. Then inductors are to be tested after 1 hour at room temperature. | |

# PACKAGING INFORMATION

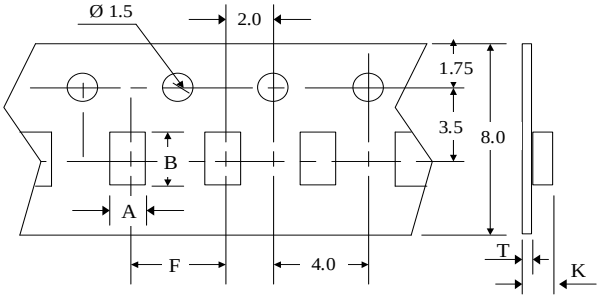
**Packing Quantity**

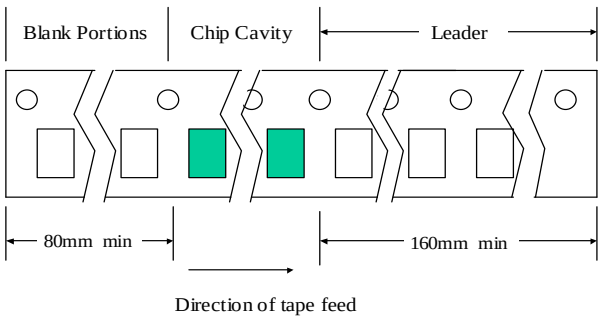
| Type | Pcs / Reel |
|---|---|
| LPI0603 | 3,000 |
| LPI0805 | 2,000 |
| LPI1210 | 2,000 |




**Dimensions (unit: m/m)**

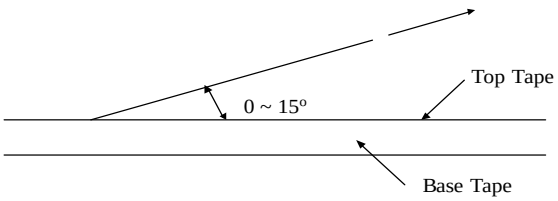
| Type | Chip Cavity | | Insert Pitch | Tape Thickness | | |
|---|---|---|---|---|---|---|
| | A | B | F | K | T | W |
| LPI0603 | 1.40 | 1.90 | 4.00 | 1.15 | 0.22 | 8.00 |
| LPI0805 | 1.50 | 2.35 | 4.00 | 1.45 | 0.22 | 8.00 |
| LPI1210 | 2.69 | 3.56 | 4.00 | 1.42 | 0.22 | 8.00 |




Top Tape Strength

The top tape requires a peel-off force of 0.2 to 0.7N in the direction of the arrow as illustrated below.




**Dimensions ( unit : m/m )**

| TYPE | A | B | C |
|---|---|---|---|
| LPI0603 | 1.90 | 0.65 | 1.20 |
| LPI0805 | 2.60 | 0.75 | 1.40 |
| LPI1210 | 4.00 | 1.70 | 2.82 |

**Recommended Pattern**