

PRODUCT SPECIFICATION

SPEC. NO: T-0622-002z

DATE: Aug. 21, 2018

CUSTOMER'S PRODUCT NAME:

EMTEK PRODUCT NAME:

LCF1210-Series

THIS SPECIFICATION IS:

- FULLY ACCEPTED
- DENIED
- ACCEPTED UNDER THE FOLLOWING CONDITIONS



SIGNATURE: _____

DATE: _____

NAME(PRINT): _____

TITLE: _____

 **EMTEK CO., LTD.**

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1. Scope

This specification applies Ferrite Chip Inductance LCF1210-Series to be delivered to user.

2. Product Identification

LCF 1210 - 100 □ - T

(1) (2) (3) (4) (5)

(1) Product name

(2) Shapes and dimensions

(3) Inductance

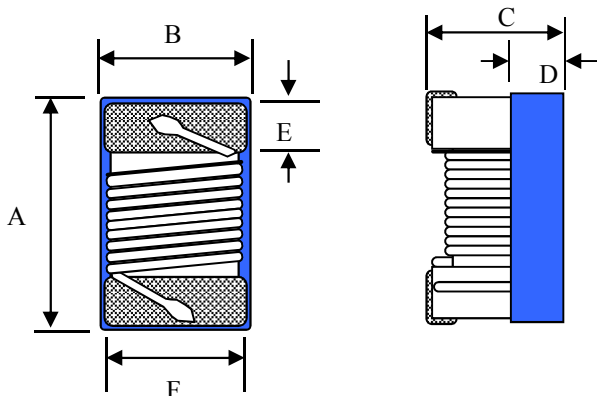
100 : 10 uH

(4) Tolerance

J=±5% , K=±10%

(5) Taping Type

3. Shapes and Dimensions



A max. : 3.60 mm

B max. : 2.90 mm

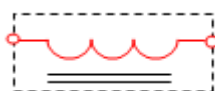
C max. : 2.50 mm

D ref. : 1.10 mm

E : 0.5 ± 0.1 mm

F ref. : 2.40 mm

Equivalent circuit



No Polarity

| Drawn by | Checked by | Approved by |
|----------------------|-----------------------|-------------------|
| Cindy Jun.11.2018 | Zherry Jun.11.2018 | Su Jun.11.2018 |

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4. Electrical Characteristics

| Customer Part Number | Our Product Part Number | Inductance (uH)/MHz | Inductance Tolerance | Q/MHz Min. | SRF(Min.) (MHz) | Rdc (Ω)Max. | Isat Max. (mA) | Irms Typ. (mA) | Color Coding | | |
|----------------------|-------------------------|---------------------|----------------------|------------|-----------------|-------------|----------------|----------------|--------------|--------|-------|
| | | | | | | | | | 1st | 2nd | 3rd |
| | LCF1210-R27□-T | 0.27/25 | J K | 40/25 | 500 | 0.080 | 3900 | 3400 | Red | Violet | Brown |
| | LCF1210-R33□-T | 0.33/25 | K | 40/25 | 500 | 0.090 | 3400 | 2600 | Orange | Orange | Brown |
| | LCF1210-R39□-T | 0.39/25 | J K | 40/25 | 500 | 0.090 | 3100 | 2200 | Orange | White | Brown |
| | LCF1210-R47□-T | 0.47/25 | J K | 40/25 | 500 | 0.090 | 3200 | 2400 | Yellow | Violet | Brown |
| | LCF1210-R56□-T | 0.56/25 | K | 40/25 | 500 | 0.100 | 2900 | 2300 | Green | Blue | Brown |
| | LCF1210-R68□-T | 0.68/25 | J K | 40/25 | 450 | 0.120 | 2500 | 2300 | Blue | Gray | Brown |
| | LCF1210-R82□-T | 0.82/25 | J K | 40/25 | 450 | 0.105 | 2400 | 2300 | Gray | Red | Brown |
| | LCF1210-R91□-T | 0.91/25 | J K | 45/25 | 410 | 0.165 | 2100 | 1600 | White | Brown | Brown |
| | LCF1210-1R0□-T | 1.0/7.9 | J K | 35/7.9 | 340 | 0.125 | 2400 | 1750 | Brown | Black | Red |
| | LCF1210-1R2□-T | 1.2/7.9 | K | 35/7.9 | 280 | 0.135 | 2400 | 1650 | Brown | Red | Red |
| | LCF1210-1R5□-T | 1.5/7.9 | K | 30/7.9 | 160 | 0.145 | 2100 | 1750 | Brown | Green | Red |
| | LCF1210-1R8□-T | 1.8/7.9 | J K | 30/7.9 | 120 | 0.160 | 2100 | 1450 | Brown | Gray | Red |
| | LCF1210-2R0□-T | 2.0/7.9 | J K | 30/7.9 | 110 | 0.165 | 1800 | 1450 | Red | Black | Red |
| | LCF1210-2R2□-T | 2.2/7.9 | J K | 30/7.9 | 100 | 0.170 | 1800 | 1450 | Red | Red | Red |
| | LCF1210-2R5□-T | 2.5/7.9 | J K | 30/7.9 | 80 | 0.190 | 1700 | 1400 | Red | Green | Red |
| | LCF1210-2R7□-T | 2.7/7.9 | J K | 30/7.9 | 75 | 0.185 | 1500 | 1300 | Red | Violet | Red |
| | LCF1210-3R3□-T | 3.3/7.9 | J K | 30/7.9 | 70 | 0.210 | 1600 | 1300 | Orange | Orange | Red |
| | LCF1210-4R7□-T | 4.7/7.9 | J K | 28/7.9 | 55 | 0.300 | 1300 | 1100 | Yellow | Violet | Red |

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| Customer Part Number | Our Product Part Number | Inductance (uH)/MHz | Inductance Tolerance | Q/MHz Min. | SRF(Min.) (MHz) | Rdc (Ω)Max. | Isat Max. (mA) | Irms Typ. (mA) | Color Coding | | |
|----------------------|-------------------------|---------------------|----------------------|------------|-----------------|-------------|----------------|----------------|--------------|--------|--------|
| | | | | | | | | | 1st | 2nd | 3rd |
| | LCF1210-5R6□-T | 5.6/7.9 | J K | 28/7.9 | 50 | 0.350 | 1100 | 1000 | Green | Blue | Red |
| | LCF1210-6R8□-T | 6.8/7.9 | J K | 28/7.9 | 45 | 0.370 | 1100 | 1000 | Blue | Gray | Red |
| | LCF1210-8R2□-T | 8.2/7.9 | J K | 28/7.9 | 45 | 0.470 | 940 | 900 | Gray | Red | Red |
| | LCF1210-100□-T | 10/2.5 | J K | 22/2.5 | 47 | 0.500 | 990 | 800 | Brown | Black | Orange |
| | LCF1210-120□-T | 12/2.5 | J K | 22/2.5 | 42 | 0.680 | 770 | 700 | Brown | Red | Orange |
| | LCF1210-150□-T | 15/2.5 | J K | 22/2.5 | 34 | 0.720 | 740 | 660 | Brown | Green | Orange |
| | LCF1210-180□-T | 18/2.5 | J K | 22/2.5 | 28 | 0.950 | 630 | 600 | Brown | Gray | Orange |
| | LCF1210-220□-T | 22/2.5 | J K | 22/2.5 | 25 | 1.100 | 640 | 550 | Red | Red | Orange |
| | LCF1210-270□-T | 27/2.5 | J K | 20/2.5 | 18 | 1.250 | 600 | 510 | Red | Violet | Orange |
| | LCF1210-330□-T | 33/2.5 | J K | 20/2.5 | 13 | 1.370 | 490 | 420 | Orange | Orange | Orange |
| | LCF1210-390□-T | 39/2.5 | J K | 20/2.5 | 13 | 1.850 | 400 | 400 | Orange | White | Orange |
| | LCF1210-470□-T | 47/2.5 | J K | 20/2.5 | 12 | 1.880 | 470 | 410 | Yellow | Violet | Orange |
| | LCF1210-560□-T | 56/2.5 | J K | 22/2.5 | 10 | 2.750 | 360 | 340 | Green | Blue | Orange |
| | LCF1210-680□-T | 68/2.5 | J K | 22/2.5 | 10 | 3.000 | 380 | 330 | Blue | Gray | Orange |
| | LCF1210-820□-T | 82/2.5 | J K | 22/2.5 | 10 | 4.100 | 300 | 280 | Gray | Red | Orange |
| | LCF1210-101□-T | 100/1.0 | J K | 15/1.0 | 8 | 4.682 | 310 | 260 | Brown | Black | Yellow |
| | LCF1210-121□-T | 120/1.0 | J K | 15/1.0 | 7 | 5.800 | 220 | 240 | Brown | Red | Yellow |
| | LCF1210-151□-T | 150/1.0 | J K | 13/1.0 | 7 | 6.102 | 260 | 230 | Brown | Green | Yellow |

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4. Electrical Characteristics

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|----------------------|-------------------------|---------------------|----------------------|------------|-----------------|-------------|----------------|----------------|--------------|--------|--------|
| | | | | | | | | | 1st | 2nd | 3rd |
| | LCF1210-181□-T | 180/1.0 | J K | 13/1.0 | 3 | 7.100 | 250 | 210 | Brown | Gray | Yellow |
| | LCF1210-221□-T | 220/1.0 | J K | 13/1.0 | 3 | 7.650 | 220 | 190 | Red | Red | Yellow |
| | LCF1210-271□-T | 270/1.0 | J K | 13/1.0 | 3 | 12.520 | 150 | 170 | Red | Violet | Yellow |
| | LCF1210-331□-T | 330/1.0 | J K | 13/1.0 | 3 | 12.62 | 170 | 160 | Orange | Orange | Yellow |
| | LCF1210-391□-T | 390/1.0 | J K | 13/1.0 | 3 | 23.00 | 120 | 140 | Orange | White | Yellow |
| | LCF1210-471□-T | 470/1.0 | J K | 13/1.0 | 3 | 25.00 | 135 | 130 | Yellow | Violet | Yellow |
| | LCF1210-501□-T | 500/1.0 | J K | 13/1.0 | 2 | 25.90 | 100 | 95 | Green | Black | Yellow |
| | LCF1210-561□-T | 560/1.0 | J K | 13/1.0 | 2 | 27.00 | 100 | 95 | Green | Blue | Yellow |
| | LCF1210-681□-T | 680/1.0 | J K | 13/1.0 | 2 | 31.00 | 100 | 95 | Blue | Gray | Yellow |
| | LCF1210-821□-T | 820/1.0 | J K | 10/1.0 | 2 | 42.00 | 100 | 95 | Gray | Red | Yellow |
| | LCF1210-102□-T | 1000/1.0 | J K | 10/1.0 | 2 | 46.00 | 95 | 95 | Brown | Black | Red |

1. When ordering, please specify tolerance and packaging codes. Ex: LCF1210-4R7K-T

Tolerance : J = ±5% , K = ±10%

Packaging : Clear tape and reel { standard }.

2. L , Q : Agilent/HP E4991A+ Agilent/HP16197A

(The electrical specification test by the smallest gap position) or HP16193A

3. SRF : Agilent/HP E4991A+ Agilent/HP 16197A

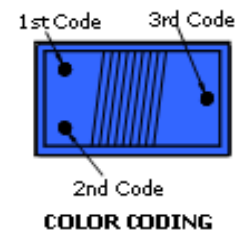
(The electrical specification test by the smallest gap position) or HP16193A

4. Rdc : DIGITAL MILLIOHM METER Chroma 16502, or equivalent.

5. Isat: Idc obtained when Inductance drop 35% from its value without current.

6. Irms for 40°C rise from 25°C ambient.

7. Operating temperature range from -25°C to 105°C.



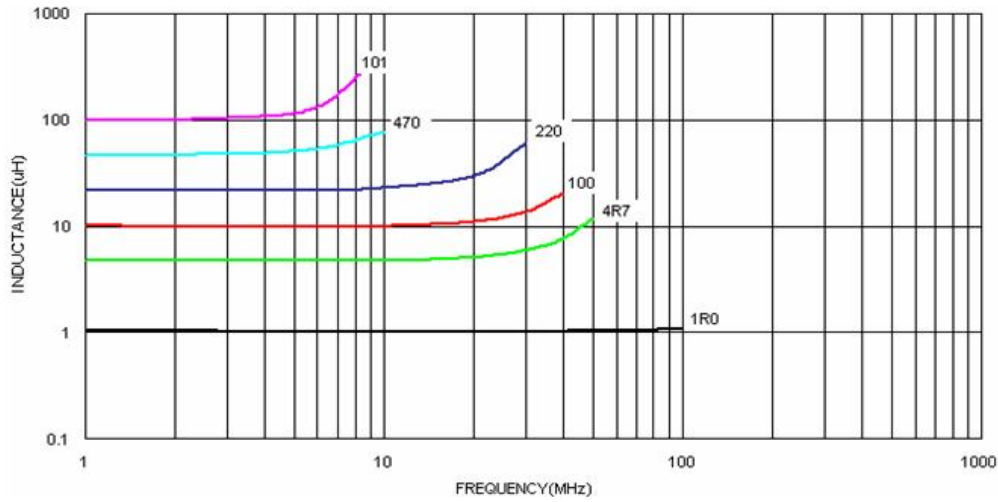
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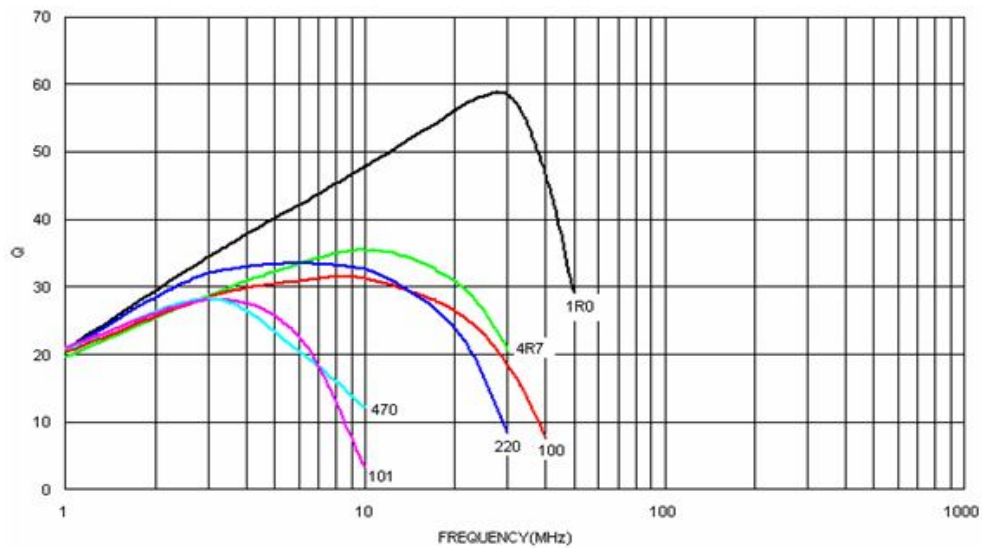
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Inductance v.s. Frequency



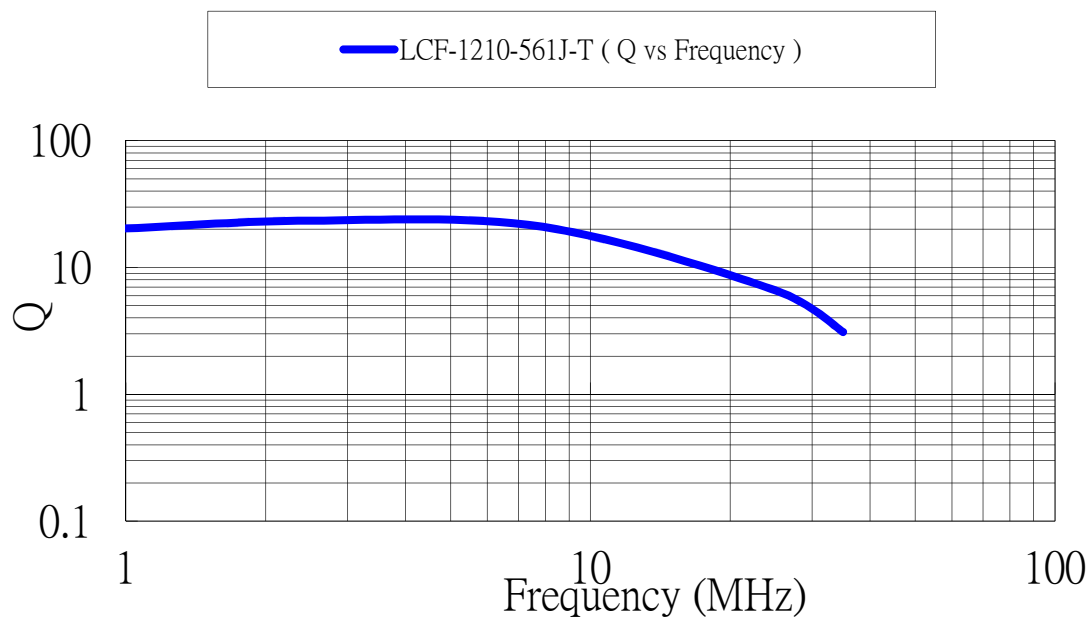
Q v.s. Frequency



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5. Material list

| Item | Material |
|-------|--------------|
| Core | Ferrite core |
| Wire | Copper wire |
| Epoxy | UV Epoxy |

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6. Reliability Test

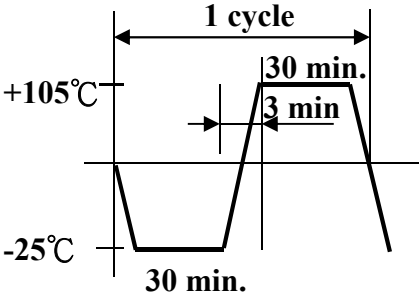
| Item | Specifications | Test conditions |
|--------------------------------|--|--|
| Solderability | The metalized area must have 90% minimum solder coverage. | Dip pads in flux and dip in solder pot(96.5 Sn/3.5 Ag solder) at 255°C ±5°C. |
| Resistance to soldering heat | There must be no case deformation or change in dimensions. Inductance must not change more than the stated tolerance. | Inductors shall be reflowed onto a PC board using 96.5 Sn/3.5 Ag solder paste. Solder process shall be at a maximum temperature of 260°C. For 96.5 Sn/3.5 Ag solder paste:>217°C for 90 seconds |
| Vibration | There must be no case deformation or change in dimensions. Inductance must not change more than the stated tolerance. | Solder specimen inductor on the test printed circuit board. Apply vibrations in each of the x,y and z directions for 2 hours for a total of 6 hours. Frequency : 10~50 Hz Amplitude : 1.5mm |
| High temperature resistance | There must be no case deformation or change in dimensions. Inductance must not change more than the stated tolerance. | Inductors shall be subjected to temperature 105±2°C for 500±12 hours. Measure the test items after leaving the inductors at room temperature and humidity for 2 hours. |
| Static Humidity | Inductors must not have a shorted or openwinding. | Inductors shall be subjected to temperature 85±2°C and 90 to 95%RH. for ten 24-hours. Measure the test items after leaving the inductors at room temperature and humidity for 2 hours. |
| Component adhesion (push test) | Inductors shall be subjected to 1.8Kg | Inductors shall be reflow soldered (255°C ±5°C for 10 seconds) to a tinned copper substrate. A force gauge shall be applied to the side of the component. The device must withstand the stated force without a failure of the termination. |

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| Item | Specifications | Test conditions |
|----------------------------|--|---|
| Low temperature resistance | There must be no case deformation or change in dimensions. Inductance must not change more than the stated tolerance. | Inductors shall be subjected to temperature $-25\pm 2^{\circ}\text{C}$ for 500 ± 12 hours. Measure the test items after leaving the inductors at room temperature and humidity for 1 to 2 hours. |
| Resistance to solvent | There must be no case deformation, change in dimensions, or obliteration of marking. | Inductors must withstand 6 minutes of alcohol or water. |
| Thermal Shock | There must be no case deformation or change in dimensions. Inductance must not change more than the stated tolerance. | Inductors shall be subjected to 10 cycles to the the following temperature cycle: <div style="text-align: center;">  <p>The diagram illustrates a temperature cycle. The vertical axis shows temperature in degrees Celsius, with +105°C at the top and -25°C at the bottom. The horizontal axis represents time. A single cycle is shown as a trapezoidal wave. It starts at a high temperature, drops to -25°C, stays there for 30 minutes, then ramps up to +105°C in 3 minutes, stays at +105°C for 30 minutes, and then ramps down. The total duration of one cycle is indicated as 1 cycle.</p> </div> Measure the test items after leaving the inductors at room temperature and humidity for 2 hours. |

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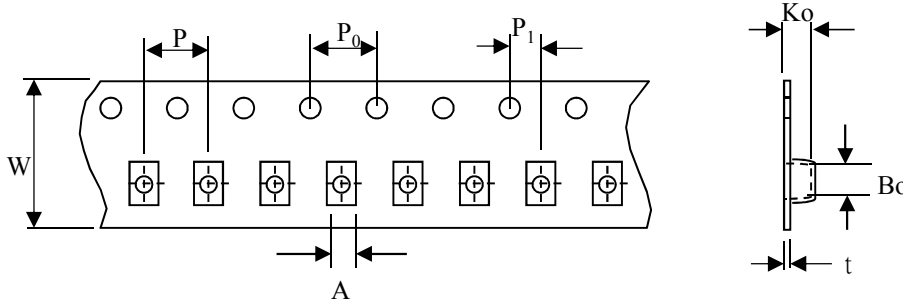
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7. Packaging

The packaging must be done not to receive any damage during transporting and storing.

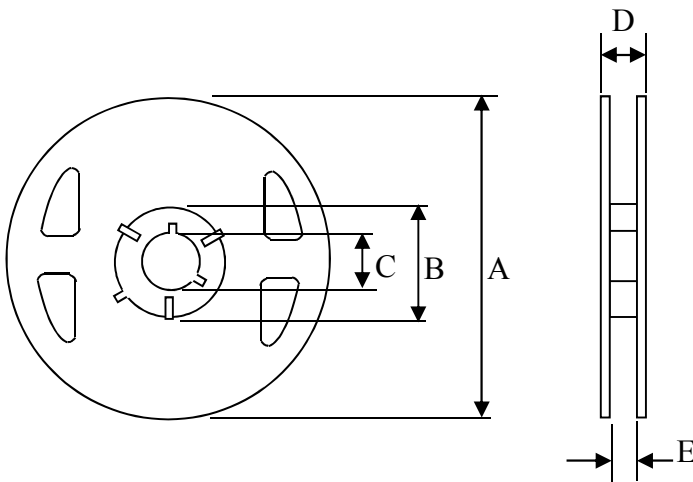
7-1 Tape dimensions



(Dimensions in mm; Tolerance : ± 0.1)

| Symbol | W | P | P ₀ | P ₁ | A _o | Bo | Ko | t |
|-----------|---|---|----------------|----------------|----------------|------|-----|------|
| Dimension | 8 | 4 | 4 | 2 | 2.88 | 3.72 | 2.5 | 0.26 |

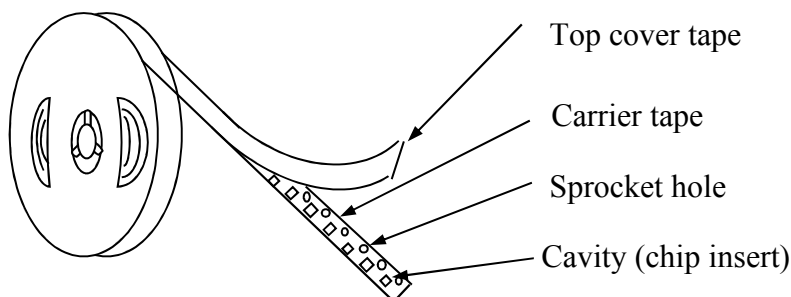
7-2 Reel dimensions



(Dimensions in mm)

| Symbol | T |
|--------|------|
| A | 180 |
| B | 60 |
| C | 13 |
| D | 14.4 |
| E | 8.4 |

7-3 Tapping figure



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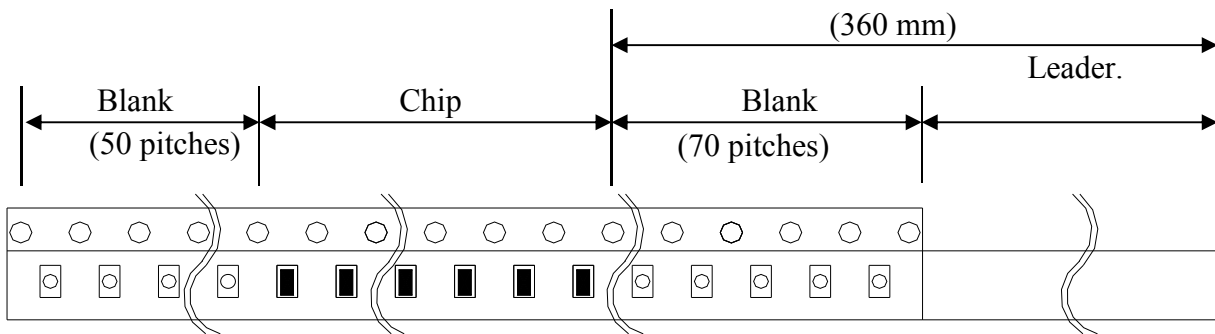
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7-4 Packaging Form

There shall not continuation more than two vacancies of the product.



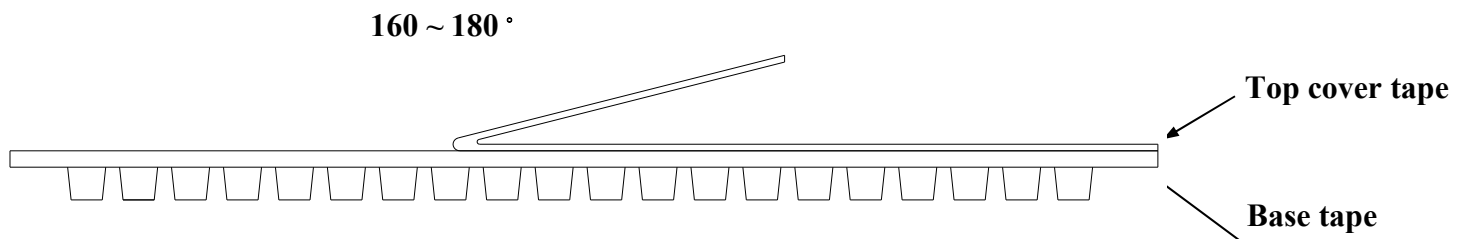
7-5 Cover Tape Peel Strength

The force for tearing off cover tape is 0.1~0.6(N) in the arrow direction at the following conditic

Temperature : 5 ~ 35°C

Humidity : 45 ~ 85%

Atmospheric pressure : 860 ~ 1060 hpa



7-6 Packing Quantity

φ180 mm reel type : 2,000 pcs./reel

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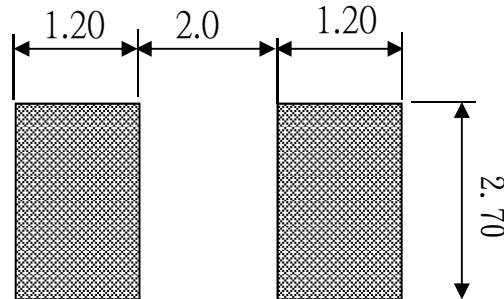
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8. Recommended Soldering Conditions

(Please use this product by reflow soldering)

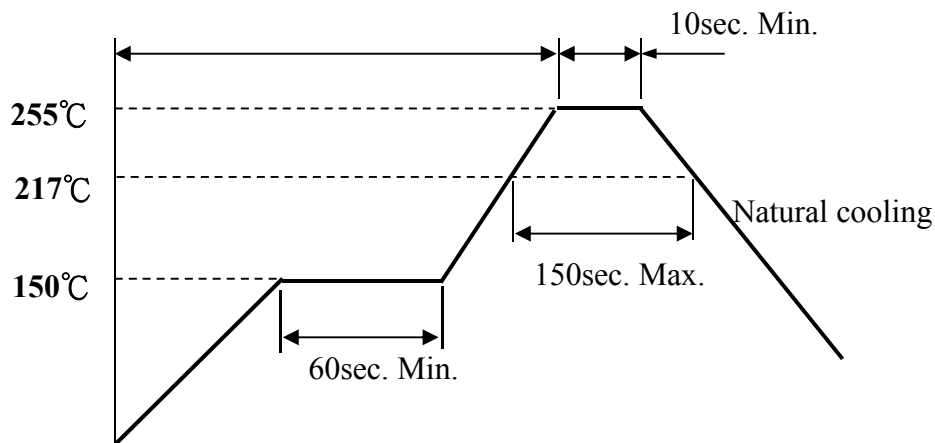
8-1 Recommended Footprint



Unit: mm

8-2 Recommended Reflow Pattern

Reflow at 260°C/3 Cycles



8-3 Iron Soldering

Use a solder iron of less than 30W when soldering, do not allow the soldering iron to directly touch the Ceramic body outside of terminal electrode.

5 seconds max. at 260°C.

9. Attention in Case of Using

In case of using product, please avoid following matters:

Splashing water or salt water

Dew condenses

Toxic gas (Hydrogen sulfide, Sulfurous acid, Chlorine, Ammon)

Vibrations or shocks which exceed the specified condition

Please be careful for the stress to this product by board flexure or something after the mounting.

10. Others

10-1 Operating temperature range : Ferrite Series : -25~+105°C

10-2 Storage condition : Temperature 20°~25°C, Relative Humidity 40%~60%

10-3 Recommended wire wound inductors should be used within 6 months from the time of delivery.