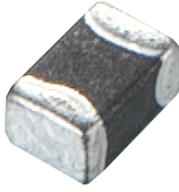


## CL Series



The SMD multi-layered ferrite chip inductors provide a cost-effective solution for densely packed PC board designs. CL series comes in 4 sizes and is suitable for low frequency applications.

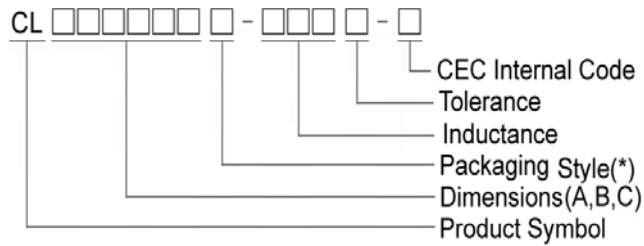
### Features

- RoHS compliant
- High mounting density of compact circuit due to crosstalk elimination that results from a closed magnetic flux in a ferrite material
- Suitable for flow and re-flow soldering
- Available in 5 sizes

### Applications

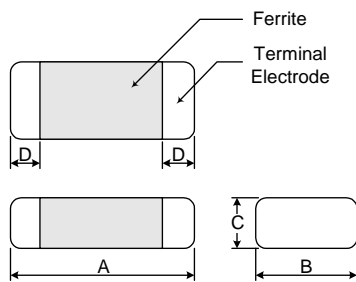
- Personal computers, HDDs, other various electronic devices
- Any portable device where compact size and high mounting densities are required

### Product Identification

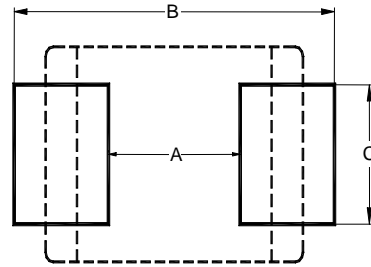


- Packaging : T : Tape and Reel ; B : Bulk

### Shape and Dimensions



### Recommended Pattern



Dimensions in mm

| TYPE     | A        | B         | C         | D        |
|----------|----------|-----------|-----------|----------|
| CL160808 | 1.6±0.20 | 0.80±0.20 | 0.80±0.20 | 0.3±0.20 |
| CL201209 | 2.0±0.20 | 1.25±0.20 | 0.90±0.20 | 0.5±0.30 |
| CL201212 | 2.0±0.20 | 1.25±0.20 | 1.25±0.20 | 0.5±0.30 |
| CL321611 | 3.2±0.20 | 1.60±0.20 | 1.10±0.20 | 0.5±0.30 |

Dimensions in mm

| TYPE     | A         | B         | C         |
|----------|-----------|-----------|-----------|
| CL160808 | 0.7 ~ 0.8 | 1.8 ~ 2.0 | 0.6 ~ 0.8 |
| CL201209 | 1.0 ~ 1.2 | 2.6 ~ 4.0 | 1.0 ~ 1.2 |
| CL201212 | 1.0 ~ 1.2 | 2.6 ~ 4.0 | 1.0 ~ 1.2 |
| CL321611 | 2.0       | 4.2 ~ 5.2 | 1.2       |

## Electrical Characteristics

| Part Number      | Inductance<br>( $\mu$ H) | Tolerance<br>( $\pm$ %) | Q<br>Min | Test<br>Frequency<br>(MHz) | SRF<br>(MHz) Min | RDC<br>( $\Omega$ ) Max | IDC<br>(mA) Max |
|------------------|--------------------------|-------------------------|----------|----------------------------|------------------|-------------------------|-----------------|
| CL160808T-10N□-N | 0.010                    | 20                      | 15       | 50                         | 300              | 0.2                     | 50              |
| CL160808T-33N□-N | 0.033                    | 20                      | 15       | 50                         | 270              | 0.2                     | 50              |
| CL160808T-47N□-N | 0.047                    | 20                      | 15       | 50                         | 260              | 0.3                     | 50              |
| CL160808T-56N□-N | 0.056                    | 20                      | 15       | 50                         | 255              | 0.3                     | 50              |
| CL160808T-68N□-N | 0.068                    | 20                      | 15       | 50                         | 250              | 0.3                     | 50              |
| CL160808T-82N□-N | 0.082                    | 20                      | 15       | 50                         | 245              | 0.3                     | 50              |
| CL160808T-R10□-N | 0.10                     | 20 / 15 / 10            | 25       | 25                         | 240              | 0.5                     | 50              |
| CL160808T-R12□-N | 0.12                     | 20 / 15 / 10            | 25       | 25                         | 205              | 0.5                     | 50              |
| CL160808T-R15□-N | 0.15                     | 20 / 15 / 10            | 25       | 25                         | 180              | 0.6                     | 50              |
| CL160808T-R18□-N | 0.18                     | 20 / 15 / 10            | 25       | 25                         | 165              | 0.6                     | 50              |
| CL160808T-R22□-N | 0.22                     | 20 / 15 / 10            | 25       | 25                         | 150              | 0.8                     | 50              |
| CL160808T-R27□-N | 0.27                     | 20 / 15 / 10            | 25       | 25                         | 136              | 0.8                     | 50              |
| CL160808T-R33□-N | 0.33                     | 20 / 15 / 10            | 25       | 25                         | 125              | 0.85                    | 35              |
| CL160808T-R39□-N | 0.39                     | 20 / 15 / 10            | 25       | 25                         | 110              | 1.00                    | 35              |
| CL160808T-R47□-N | 0.47                     | 20 / 15 / 10            | 25       | 25                         | 105              | 1.35                    | 35              |
| CL160808T-R56□-N | 0.56                     | 20 / 15 / 10            | 25       | 25                         | 95               | 1.50                    | 35              |
| CL160808T-R68□-N | 0.68                     | 20 / 15 / 10            | 25       | 25                         | 85               | 1.70                    | 35              |
| CL160808T-R82□-N | 0.82                     | 20 / 15 / 10            | 25       | 25                         | 75               | 2.10                    | 35              |
| CL160808T-1R0□-N | 1.0                      | 20 / 15 / 10            | 35       | 10                         | 65               | 0.60                    | 25              |
| CL160808T-1R2□-N | 1.2                      | 20 / 15 / 10            | 35       | 10                         | 60               | 0.80                    | 25              |
| CL160808T-1R5□-N | 1.5                      | 20 / 15 / 10            | 35       | 10                         | 55               | 0.80                    | 25              |
| CL160808T-1R8□-N | 1.8                      | 20 / 15 / 10            | 35       | 10                         | 50               | 0.95                    | 25              |
| CL160808T-2R2□-N | 2.2                      | 20 / 15 / 10            | 35       | 10                         | 45               | 1.00                    | 15              |
| CL160808T-2R7□-N | 2.7                      | 20 / 15 / 10            | 35       | 10                         | 40               | 1.15                    | 15              |
| CL160808T-3R3□-N | 3.3                      | 20 / 15 / 10            | 35       | 10                         | 38               | 1.30                    | 15              |
| CL160808T-3R9□-N | 3.9                      | 20 / 15 / 10            | 35       | 10                         | 36               | 1.50                    | 15              |
| CL160808T-4R7□-N | 4.7                      | 20 / 15 / 10            | 35       | 10                         | 33               | 1.60                    | 15              |
| CL160808T-5R6□-N | 5.6                      | 20 / 15 / 10            | 35       | 4                          | 22               | 1.10                    | 5               |
| CL160808T-6R8□-N | 6.8                      | 20 / 15 / 10            | 35       | 4                          | 20               | 1.30                    | 5               |
| CL160808T-8R2□-N | 8.2                      | 20 / 15 / 10            | 30       | 4                          | 18               | 1.50                    | 5               |
| CL160808T-100□-N | 10                       | 20 / 15 / 10            | 30       | 2                          | 17               | 1.70                    | 5               |
| CL160808T-120□-N | 12                       | 20 / 15 / 10            | 30       | 2                          | 15               | 1.80                    | 3               |
| CL160808T-150□-N | 15                       | 20 / 15 / 10            | 20       | 1                          | 14               | 1.50                    | 1               |
| CL160808T-220□-N | 22                       | 20 / 15 / 10            | 20       | 1                          | 11               | 1.70                    | 1               |

**Note: When ordering, please specify tolerance code. Tolerance : K= $\pm$ 10% , L= $\pm$ 15% , M= $\pm$ 20%**

- Operating temperature range - 40°C ~ 125°C(Including self - temperature rise)
- IDC : Applied the current to coils, the inductance shall be less than 10% initial value
- Measure Equipment :
  - L & Q : HP4291A
  - SRF : Agilent HP8753D/Agilent E4991A
  - RDC : HP4338B or CHEN HWA 502

## Electrical Characteristics

| Part Number      | Inductance<br>( $\mu$ H) | Tolerance<br>( $\pm$ %) | Q<br>Min | Test Frequency<br>(MHz) | SRF<br>(MHz) Min | RDC<br>( $\Omega$ ) Max | IDC<br>(mA) Max |
|------------------|--------------------------|-------------------------|----------|-------------------------|------------------|-------------------------|-----------------|
| CL201209T-22N□-N | 0.022                    | 20                      | 20       | 50                      | 320              | 0.20                    | 300             |
| CL201209T-33N□-N | 0.033                    | 20 / 15                 | 20       | 50                      | 320              | 0.20                    | 300             |
| CL201209T-47N□-N | 0.047                    | 20 / 15                 | 20       | 50                      | 320              | 0.20                    | 300             |
| CL201209T-56N□-N | 0.056                    | 20 / 15                 | 20       | 50                      | 320              | 0.20                    | 300             |
| CL201209T-68N□-N | 0.068                    | 20 / 15                 | 20       | 50                      | 280              | 0.20                    | 300             |
| CL201209T-82N□-N | 0.082                    | 20 / 15                 | 20       | 50                      | 255              | 0.20                    | 300             |
| CL201209T-R10□-N | 0.10                     | 20 / 15 / 0             | 25       | 25                      | 235              | 0.30                    | 250             |
| CL201209T-R12□-N | 0.12                     | 20 / 15 / 10            | 25       | 25                      | 220              | 0.30                    | 250             |
| CL201209T-R15□-N | 0.15                     | 20 / 15 / 10            | 25       | 25                      | 200              | 0.40                    | 250             |
| CL201209T-R18□-N | 0.18                     | 20 / 15 / 10            | 25       | 25                      | 185              | 0.40                    | 250             |
| CL201209T-R22□-N | 0.22                     | 20 / 15 / 10            | 25       | 25                      | 170              | 0.50                    | 250             |
| CL201209T-R27□-N | 0.27                     | 20 / 15 / 10            | 25       | 25                      | 150              | 0.50                    | 250             |
| CL201209T-R33□-N | 0.33                     | 20 / 15 / 10            | 25       | 25                      | 145              | 0.55                    | 250             |
| CL201209T-R39□-N | 0.39                     | 20 / 15 / 10            | 25       | 25                      | 135              | 0.65                    | 250             |
| CL201209T-R47□-N | 0.47                     | 20 / 15 / 10            | 25       | 25                      | 125              | 0.65                    | 250             |
| CL201209T-R56□-N | 0.56                     | 20 / 15 / 10            | 25       | 25                      | 115              | 0.75                    | 150             |
| CL201209T-R68□-N | 0.68                     | 20 / 15 / 10            | 25       | 25                      | 105              | 0.80                    | 150             |
| CL201209T-R82□-N | 0.82                     | 20 / 15 / 10            | 25       | 25                      | 100              | 1.00                    | 150             |
| CL201209T-1R0□-N | 1.0                      | 20 / 15 / 10            | 45       | 10                      | 75               | 0.40                    | 50              |
| CL201209T-1R2□-N | 1.2                      | 20 / 15 / 10            | 45       | 10                      | 65               | 0.50                    | 50              |
| CL201209T-1R5□-N | 1.5                      | 20 / 15 / 10            | 45       | 10                      | 60               | 0.50                    | 50              |
| CL201209T-1R8□-N | 1.8                      | 20 / 15 / 10            | 45       | 10                      | 55               | 0.60                    | 50              |
| CL201209T-2R2□-N | 2.2                      | 20 / 15 / 10            | 45       | 10                      | 50               | 0.65                    | 30              |

**Note: When ordering, please specify tolerance code. Tolerance : K=±10% , L=±15% , M=±20%**

- Operating temperature range - 40°C ~ 125°C(Including self - temperature rise)
- IDC : Applied the current to coils, the inductance shall be less than 10% initial value
- Measure Equipment :  
L & Q : HP4291A  
SRF : Agilent HP8753D/Agilent E4991A  
RDC : HP4338B or CHEN HWA 502

## Electrical Characteristics

| Part Number      | Inductance<br>( $\mu$ H) | Tolerance<br>( $\pm$ %) | Q<br>Min | Test Frequency<br>(MHz) | SRF<br>(MHz) Min | RDC<br>( $\Omega$ ) Max | IDC<br>(mA) Max |
|------------------|--------------------------|-------------------------|----------|-------------------------|------------------|-------------------------|-----------------|
| CL201212T-2R7□-N | 2.7                      | 20 / 15 / 10            | 45       | 10                      | 45               | 0.75                    | 30              |
| CL201212T-3R3□-N | 3.3                      | 20 / 15 / 10            | 45       | 10                      | 41               | 0.80                    | 30              |
| CL201212T-3R9□-N | 3.9                      | 20 / 15 / 10            | 45       | 10                      | 38               | 0.90                    | 30              |
| CL201212T-4R7□-N | 4.7                      | 20 / 15 / 10            | 45       | 10                      | 35               | 1.00                    | 30              |
| CL201212T-5R6□-N | 5.6                      | 20 / 15 / 10            | 45       | 4                       | 32               | 0.90                    | 15              |
| CL201212T-6R8□-N | 6.8                      | 20 / 15 / 10            | 45       | 4                       | 29               | 1.00                    | 15              |
| CL201212T-8R2□-N | 8.2                      | 20 / 15 / 10            | 45       | 4                       | 26               | 1.10                    | 15              |
| CL201212T-100□-N | 10                       | 20 / 15 / 10            | 45       | 2                       | 24               | 1.10                    | 15              |
| CL201212T-120□-N | 12                       | 20 / 15 / 10            | 45       | 2                       | 22               | 1.20                    | 15              |
| CL201212T-150□-N | 15                       | 20 / 15 / 10            | 30       | 1                       | 19               | 0.80                    | 5               |
| CL201212T-180□-N | 18                       | 20 / 15 / 10            | 30       | 1                       | 18               | 0.90                    | 5               |
| CL201212T-220□-N | 22                       | 20 / 15 / 10            | 30       | 1                       | 16               | 1.1                     | 5               |

**Note: When ordering, please specify tolerance code. Tolerance : K=±10% , L=±15% , M=±20%**

- Operating temperature range - 40°C ~ 125°C(Including self - temperature rise)
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L & Q : HP4291A  
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RDC : HP4338B or CHEN HWA 502

Please be sure to request approval specifications that provide further details of the products. Kindly note that the content of these specifications are subject to change or may be discontinued without advance notice. Please contact our sales department before ordering.

## Electrical Characteristics

| Part Number      | Inductance<br>( $\mu$ H) | Tolerance<br>( $\pm$ %) | Q<br>Min | Test<br>Frequency<br>(MHz) | SRF<br>(MHz) Min | RDC<br>( $\Omega$ ) Max | IDC<br>(mA) Max |
|------------------|--------------------------|-------------------------|----------|----------------------------|------------------|-------------------------|-----------------|
| CL321611T-47N□-N | 0.047                    | 20                      | 20       | 50                         | 320              | 0.15                    | 300             |
| CL321611T-56N□-N | 0.056                    | 20                      | 20       | 50                         | 280              | 0.25                    | 300             |
| CL321611T-68N□-N | 0.068                    | 20                      | 20       | 50                         | 280              | 0.25                    | 300             |
| CL321611T-82N□-N | 0.082                    | 20                      | 20       | 50                         | 250              | 0.25                    | 300             |
| CL321611T-R10□-N | 0.10                     | 20 / 15 / 10            | 25       | 25                         | 235              | 0.25                    | 250             |
| CL321611T-R12□-N | 0.12                     | 20 / 15 / 10            | 25       | 25                         | 220              | 0.30                    | 250             |
| CL321611T-R15□-N | 0.15                     | 20 / 15 / 10            | 25       | 25                         | 200              | 0.30                    | 250             |
| CL321611T-R18□-N | 0.18                     | 20 / 15 / 10            | 25       | 25                         | 185              | 0.40                    | 250             |
| CL321611T-R22□-N | 0.22                     | 20 / 15 / 10            | 25       | 25                         | 170              | 0.40                    | 250             |
| CL321611T-R27□-N | 0.27                     | 20 / 15 / 10            | 25       | 25                         | 150              | 0.50                    | 250             |
| CL321611T-R33□-N | 0.33                     | 20 / 15 / 10            | 25       | 25                         | 145              | 0.60                    | 250             |
| CL321611T-R39□-N | 0.39                     | 20 / 15 / 10            | 25       | 25                         | 135              | 0.50                    | 200             |
| CL321611T-R47□-N | 0.47                     | 20 / 15 / 10            | 25       | 25                         | 125              | 0.60                    | 200             |
| CL321611T-R56□-N | 0.56                     | 20 / 15 / 10            | 25       | 25                         | 115              | 0.70                    | 150             |
| CL321611T-R68□-N | 0.68                     | 20 / 15 / 10            | 25       | 25                         | 105              | 0.80                    | 150             |
| CL321611T-R82□-N | 0.82                     | 20 / 15 / 10            | 25       | 25                         | 100              | 0.90                    | 150             |
| CL321611T-1R0□-N | 1.0                      | 20 / 15 / 10            | 45       | 10                         | 75               | 0.40                    | 100             |
| CL321611T-1R2□-N | 1.2                      | 20 / 15 / 10            | 45       | 10                         | 65               | 0.50                    | 100             |
| CL321611T-1R5□-N | 1.5                      | 20 / 15 / 10            | 45       | 10                         | 60               | 0.50                    | 80              |
| CL321611T-1R8□-N | 1.8                      | 20 / 15 / 10            | 45       | 10                         | 55               | 0.50                    | 70              |
| CL321611T-2R2□-N | 2.2                      | 20 / 15 / 10            | 45       | 10                         | 50               | 0.60                    | 60              |
| CL321611T-2R7□-N | 2.7                      | 20 / 15 / 10            | 45       | 10                         | 45               | 0.60                    | 60              |
| CL321611T-3R3□-N | 3.3                      | 20 / 15 / 10            | 45       | 10                         | 41               | 0.70                    | 60              |
| CL321611T-3R9□-N | 3.9                      | 20 / 15 / 10            | 45       | 10                         | 38               | 0.80                    | 50              |
| CL321611T-4R7□-N | 4.7                      | 20 / 15 / 10            | 45       | 10                         | 35               | 0.90                    | 50              |
| CL321611T-5R6□-N | 5.6                      | 20 / 15 / 10            | 45       | 4                          | 32               | 0.70                    | 25              |
| CL321611T-6R8□-N | 6.8                      | 20 / 15 / 10            | 45       | 4                          | 29               | 0.80                    | 25              |
| CL321611T-8R2□-N | 8.2                      | 20 / 15 / 10            | 45       | 4                          | 26               | 0.90                    | 25              |
| CL321611T-100□-N | 10                       | 20 / 15 / 10            | 45       | 2                          | 24               | 1.00                    | 25              |
| CL321611T-120□-N | 12                       | 20 / 15 / 10            | 45       | 2                          | 22               | 1.00                    | 15              |
| CL321611T-150□-N | 15                       | 20 / 15 / 10            | 35       | 1                          | 19               | 0.70                    | 5               |
| CL321611T-180□-N | 18                       | 20 / 15 / 10            | 35       | 1                          | 18               | 0.75                    | 5               |
| CL321611T-220□-N | 22                       | 20 / 15 / 10            | 35       | 1                          | 16               | 0.90                    | 5               |
| CL321611T-270□-N | 27                       | 20 / 15 / 10            | 35       | 1                          | 14               | 0.90                    | 5               |

**Note: When ordering, please specify tolerance code. Tolerance : K= $\pm$ 10% , L= $\pm$ 15% , M= $\pm$ 20%**

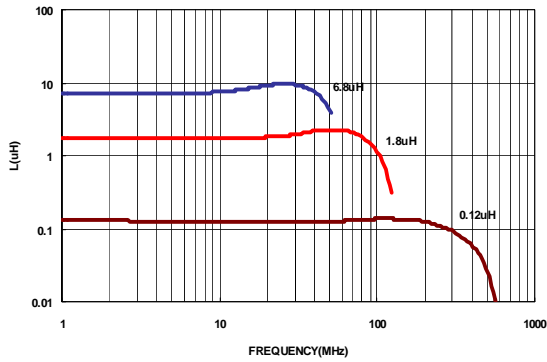
- Operating temperature range - 40°C ~ 125°C(Including self - temperature rise)
- IDC : Applied the current to coils, the inductance shall be less than 10% initial value
- Measure Equipment :  
 L & Q : HP4291A  
 SRF : Agilent HP8753D/Agilent E4991A  
 RDC : HP4338B or CHEN HWA 502

# SMD Multilayer Ferrite Chip Inductors - CL Series

Test Instruments : Agilent E4991A Impedance / Material Analyzer

**CL160808**

INDUCTANCE vs. FREQUENCY CHARACTERISTICS

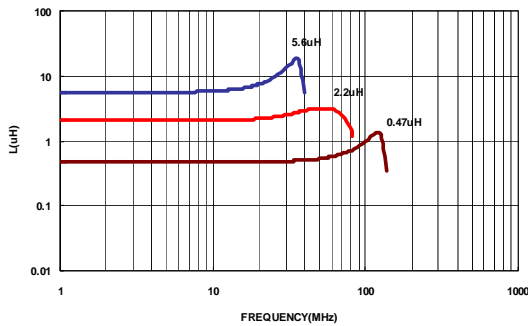


Q vs. FREQUENCY CHARACTERISTICS

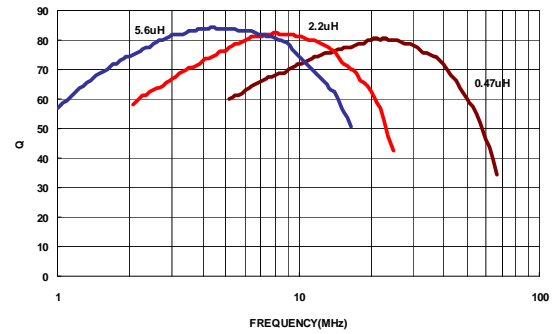


**CL201209**

INDUCTANCE vs. FREQUENCY CHARACTERISTICS

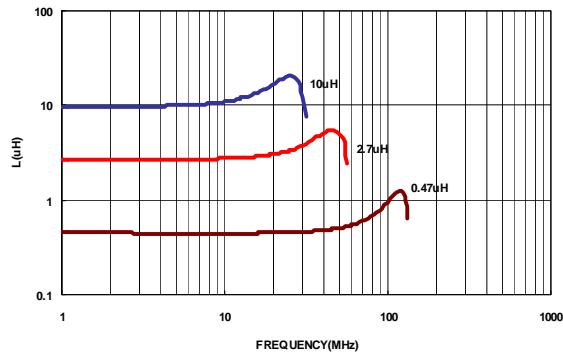


Q vs. FREQUENCY CHARACTERISTICS

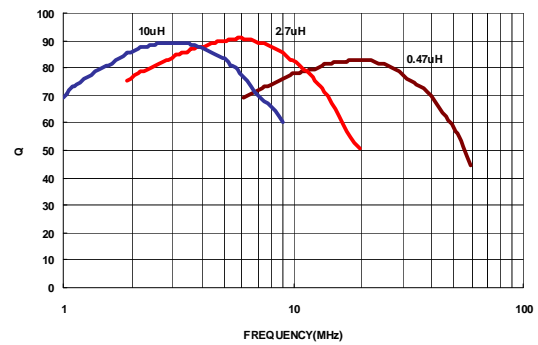


**CL321611**

INDUCTANCE vs. FREQUENCY CHARACTERISTICS

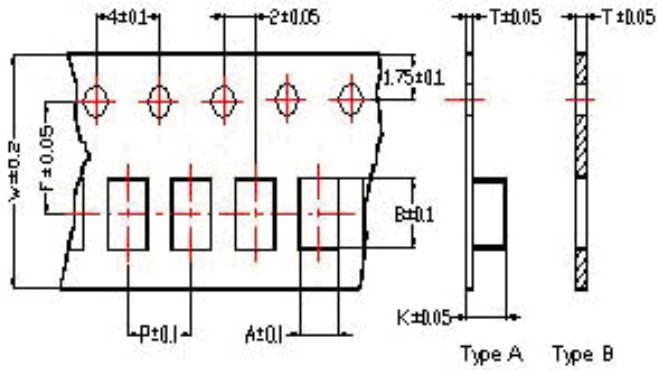


Q vs. FREQUENCY CHARACTERISTICS

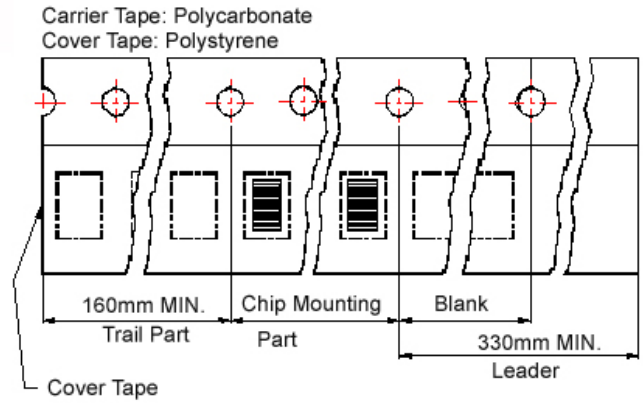


Packaging Specifications

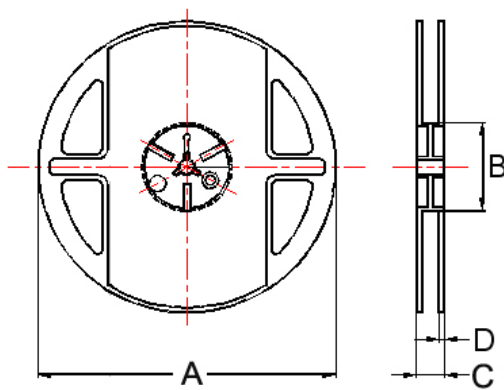
Tape Dimensions



Tape Material



Reel Dimensions



Dimensions in mm

| TYPE     | Tape Dimensions |      |      |     |     |     |      |   | Tape | Reel Dimensions |    |     |      | Quantity<br>PCS / Reel |
|----------|-----------------|------|------|-----|-----|-----|------|---|------|-----------------|----|-----|------|------------------------|
|          | A               | B    | T    | W   | P   | F   | K    | A |      | B               | C  | D   |      |                        |
| CL160808 | 1.05            | 1.85 | 0.95 | 8.0 | 4.0 | 3.5 | -    | B | 178  | 60              | 12 | 1.5 | 4000 |                        |
| CL201209 | 1.50            | 2.30 | 0.97 | 8.0 | 4.0 | 3.5 | -    | B | 178  | 60              | 12 | 1.5 | 4000 |                        |
| CL201212 | 1.35            | 2.25 | 0.22 | 8.0 | 4.0 | 3.5 | 1.35 | A | 178  | 60              | 12 | 1.5 | 3000 |                        |
| CL321611 | 1.88            | 3.50 | 0.22 | 8.0 | 4.0 | 3.5 | 1.27 | A | 178  | 60              | 12 | 1.5 | 3000 |                        |

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