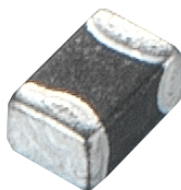


## CL Series

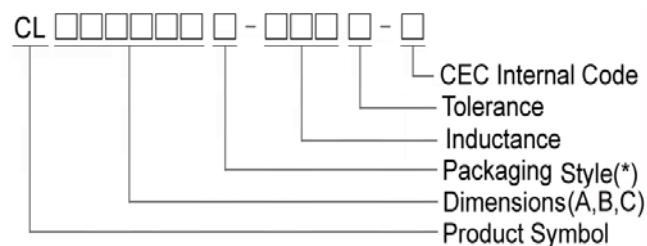


The SMD multi-layered ferrite chip inductors provide a cost-effective solution for densely packed PC board designs. CL series comes in 5 sizes and is suitable for low frequency applications.

### 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

### Product Identification

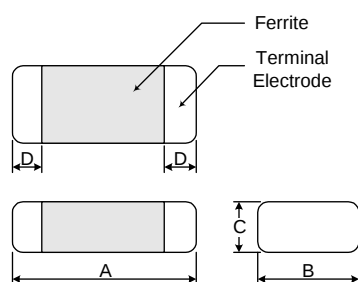


### Applications

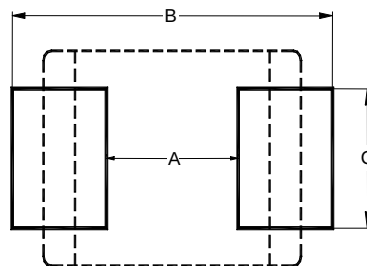
- Personal computers, HDDs, other various electronic devices
- Any portable device where compact size and high mounting densities are required

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

### Shape and Dimensions



### Recommended Pattern



Dimensions in mm

| TYPE     | A        | B         | C         | D         |
|----------|----------|-----------|-----------|-----------|
| CL100505 | 1.0±0.10 | 0.50±0.10 | 0.50±0.10 | 0.25±0.10 |
| 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         |
|----------|-----------|-----------|-----------|
| CL100505 | 0.4       | 1.2 ~ 1.4 | 0.5       |
| 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       |

## SMD Multilayer Ferrite Chip Inductors – CL Series

### Electrical Characteristics

| Part Number      | Inductance<br>( $\mu$ H) | Tolerance<br>( $\pm$ %) | Q<br>Min | Test<br>Frequency<br>(MHz) | SRF<br>(MHz) Min | DC Resistance<br>( $\Omega$ ) Max | IDC<br>(mA) Max |
|------------------|--------------------------|-------------------------|----------|----------------------------|------------------|-----------------------------------|-----------------|
| CL100505T-10NM-N | 0.010                    | 20                      | 8        | 50                         | 500              | 0.45                              | 50              |
| CL100505T-12NM-N | 0.012                    | 20                      | 8        | 50                         | 500              | 0.45                              | 50              |
| CL100505T-47NM-N | 0.047                    | 20                      | 10       | 50                         | 500              | 0.45                              | 50              |
| CL100505T-68NM-N | 0.068                    | 20                      | 10       | 50                         | 480              | 0.45                              | 50              |
| CL100505T-82NM-N | 0.082                    | 20                      | 10       | 50                         | 480              | 0.45                              | 50              |
| CL100505T-R10□-N | 0.10                     | 20 / 10                 | 15       | 25                         | 450              | 0.60                              | 50              |
| CL100505T-R12□-N | 0.12                     | 20 / 10                 | 15       | 25                         | 400              | 0.70                              | 25              |
| CL100505T-R15□-N | 0.15                     | 20 / 10                 | 15       | 25                         | 350              | 0.80                              | 25              |
| CL100505T-R18□-N | 0.18                     | 20 / 10                 | 15       | 25                         | 320              | 0.90                              | 25              |
| CL100505T-R22□-N | 0.22                     | 20 / 10                 | 15       | 25                         | 290              | 1.10                              | 25              |
| CL100505T-R27□-N | 0.27                     | 20 / 10                 | 15       | 25                         | 260              | 1.30                              | 25              |
| CL100505T-R33□-N | 0.33                     | 20 / 10                 | 15       | 25                         | 230              | 1.50                              | 25              |
| CL100505T-R39□-N | 0.39                     | 20 / 10                 | 25       | 10                         | 210              | 0.41                              | 10              |
| CL100505T-R47□-N | 0.47                     | 20 / 10                 | 20       | 10                         | 190              | 0.65                              | 10              |
| CL100505T-R56□-N | 0.56                     | 20 / 10                 | 20       | 10                         | 170              | 0.70                              | 10              |
| CL100505T-R68□-N | 0.68                     | 20 / 10                 | 20       | 10                         | 150              | 0.80                              | 10              |
| CL100505T-R82□-N | 0.82                     | 20 / 10                 | 20       | 10                         | 130              | 0.90                              | 10              |
| CL100505T-1R0□-N | 1.00                     | 20 / 10                 | 20       | 10                         | 120              | 1.00                              | 15              |
| CL100505T-1R2□-N | 1.20                     | 20 / 10                 | 20       | 10                         | 110              | 1.10                              | 15              |
| CL100505T-1R5□-N | 1.50                     | 20 / 10                 | 20       | 10                         | 100              | 1.20                              | 10              |
| CL100505T-1R8□-N | 1.80                     | 20 / 10                 | 20       | 10                         | 90               | 1.30                              | 10              |
| CL100505T-2R2□-N | 2.20                     | 20 / 10                 | 20       | 10                         | 80               | 1.40                              | 10              |

- When ordering, please specify tolerance and packaging codes.
- Tolerance: K =  $\pm$  10%    M =  $\pm$  20%

## SMD Multilayer Ferrite Chip Inductors – CL Series

### Electrical Characteristics

| Part Number      | Inductance<br>( $\mu$ H) | Tolerance<br>( $\pm$ %) | Q<br>Min | Test<br>Frequency<br>(MHz) | SRF<br>(MHz) Min | DC Resistance<br>( $\Omega$ ) Max | IDC<br>(mA) Max |
|------------------|--------------------------|-------------------------|----------|----------------------------|------------------|-----------------------------------|-----------------|
| CL160808T-10N□-N | 0.010                    | 20 / 15                 | 15       | 50                         | 300              | 0.2                               | 50              |
| CL160808T-33N□-N | 0.033                    | 20 / 15                 | 15       | 50                         | 270              | 0.2                               | 50              |
| CL160808T-47N□-N | 0.047                    | 20 / 15                 | 15       | 50                         | 260              | 0.3                               | 50              |
| CL160808T-56N□-N | 0.056                    | 20 / 15                 | 15       | 50                         | 255              | 0.3                               | 50              |
| CL160808T-68N□-N | 0.068                    | 20 / 15                 | 15       | 50                         | 250              | 0.3                               | 50              |
| CL160808T-82N□-N | 0.082                    | 20 / 15                 | 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-180□-N | 18                       | 20 / 15 / 10            | 20       | 1                          | 13               | 1.60                              | 1               |
| CL160808T-220□-N | 22                       | 20 / 15 / 10            | 20       | 1                          | 11               | 1.70                              | 1               |

- When ordering, please specify tolerance and packaging codes.
- Tolerance : K =  $\pm$  10%   L =  $\pm$  15%   M =  $\pm$  20%

## SMD Multilayer Ferrite Chip Inductors – CL Series

### Electrical Characteristics

| Part Number      | Inductance<br>( $\mu$ H) | Tolerance<br>( $\pm$ %) | Q<br>Min | Test Frequency<br>(MHz) | SRF<br>(MHz) Min | DC Resistance<br>( $\Omega$ ) Max | IDC<br>(mA) Max |
|------------------|--------------------------|-------------------------|----------|-------------------------|------------------|-----------------------------------|-----------------|
| CL201209T-22N□-N | 0.022                    | 20 / 15                 | 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-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              |

- When ordering, please specify tolerance and packaging codes
- Tolerance : K =  $\pm$  10%   L =  $\pm$  15%   M =  $\pm$  20%

### Electrical Characteristics

| Part Number      | Inductance<br>( $\mu$ H) | Tolerance<br>( $\pm$ %) | Q<br>Min | Test Frequency<br>(MHz) | SRF<br>(MHz) Min | DC Resistance<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               |

- When ordering, please specify tolerance and packaging codes
- Tolerance : K =  $\pm$  10%   L =  $\pm$  15%   M =  $\pm$  20%

## SMD Multilayer Ferrite Chip Inductors – CL Series

### Electrical Characteristics

| Part Number      | Inductance<br>( $\mu$ H) | Tolerance<br>( $\pm$ %) | Q<br>Min | Test<br>Frequency<br>(MHz) | SRF<br>(MHz) Min | DC Resistance<br>( $\Omega$ ) Max | IDC<br>(mA) Max |
|------------------|--------------------------|-------------------------|----------|----------------------------|------------------|-----------------------------------|-----------------|
| CL321611T-47N□-N | 0.047                    | 20 / 15                 | 20       | 50                         | 320              | 0.15                              | 300             |
| CL321611T-68N□-N | 0.068                    | 20 / 15                 | 20       | 50                         | 280              | 0.25                              | 300             |
| CL321611T-82N□-N | 0.082                    | 20 / 15                 | 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               |

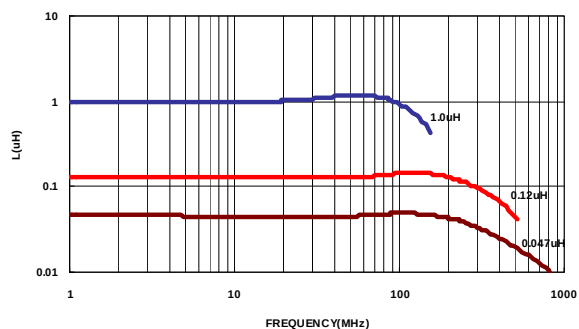
- When ordering, please specify tolerance and packaging codes.
- Tolerance : K =  $\pm 10\%$  / L =  $\pm 15\%$  / M =  $\pm 20\%$

## SMD Multilayer Ferrite Chip Inductors – CL Series

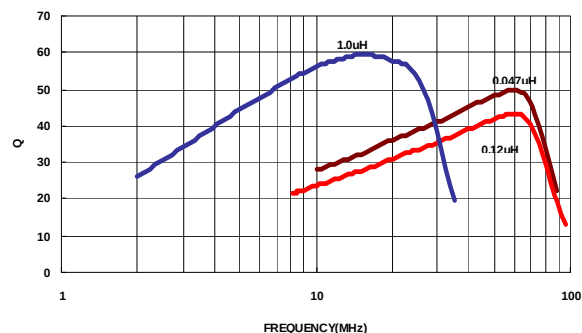
Test Instruments : Agilent E4991A Impedance / Material Analyzer

CL100505

INDUCTANCE vs. FREQUENCY CHARACTERISTICS

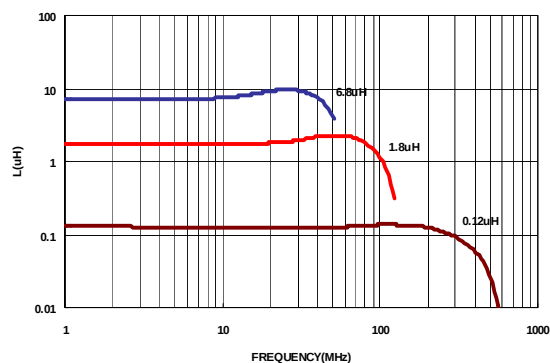


Q vs. FREQUENCY CHARACTERISTICS

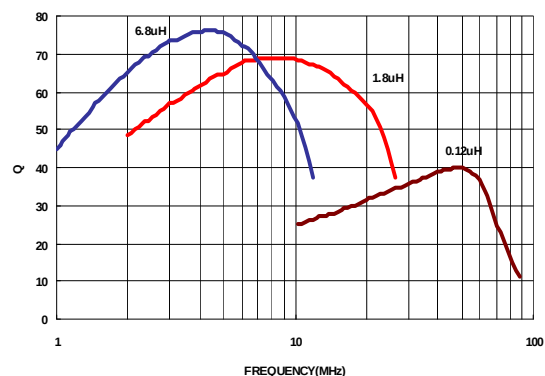


CL160808

INDUCTANCE vs. FREQUENCY CHARACTERISTICS

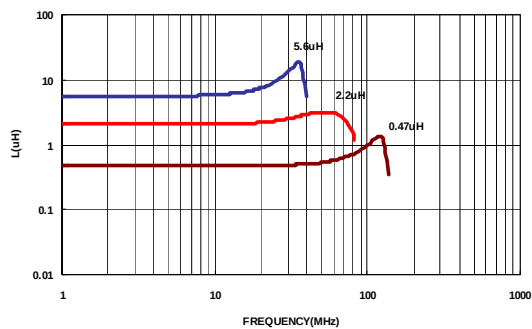


Q vs. FREQUENCY CHARACTERISTICS



CL201209

INDUCTANCE vs. FREQUENCY CHARACTERISTICS

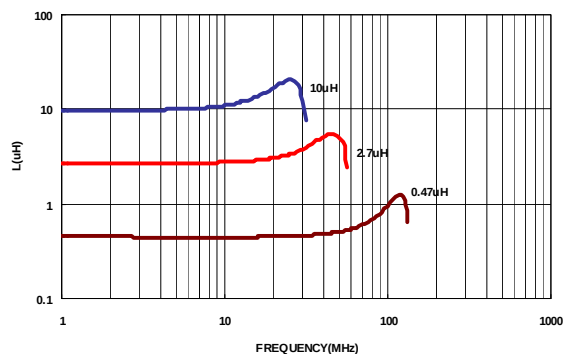


Q vs. FREQUENCY CHARACTERISTICS



CL321611

INDUCTANCE vs. FREQUENCY CHARACTERISTICS



Q vs. FREQUENCY CHARACTERISTICS

