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# RADIAL LEADED INDUCTORS



WAVE

## ■ PARTS NUMBER

\*Operating Temp. : -25~+105°C (Including self-generated heat)

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | H | △ | L | △ | 0 | 8 | T | B | 1 | 0 | 1 | K | △ | △ | △ |
| ① |   |   | ② |   | ③ |   | ④ |   | ⑤ |   | ⑥ |   | ⑦ |   |   |

△=Blank space

### ① Series name

| Code | Series name            |
|------|------------------------|
| LH△  | Radial leaded inductor |

### ② Characteristics

| Code | Characteristics                |
|------|--------------------------------|
| L△   | Standard type Taping available |
| LC   | High current type              |

### ③ Dimensions (D)

| Code | Dimensions (D) [mm max.] |
|------|--------------------------|
| 08   | 9.0                      |
| 10   | 11.0                     |

### ④ Packaging

| Code | Packaging            |
|------|----------------------|
| NB   | Bulk (LHL)           |
| TB   | Ammo packaging (LHL) |

### ⑤ Nominal inductance

| Code (example) | Nominal inductance [μH] |
|----------------|-------------------------|
| 1R0            | 1.0                     |
| 150            | 15                      |
| 102            | 1000                    |

※R=Decimal point

### ⑥ Inductance tolerance

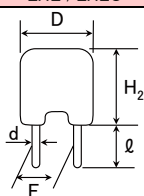
| Code | Inductance tolerance |
|------|----------------------|
| J    | ±5%                  |
| K    | ±10%                 |
| M    | ±20%                 |
| N    | ±30%                 |

### ⑦ Internal code

| Code | Internal code |
|------|---------------|
| △△△  | Standard      |

## ■ STANDARD EXTERNAL DIMENSIONS / STANDARD QUANTITY

### LHL / LHLC



| Type    | D           | H <sub>2</sub> | ℓ             | F             | φ d           | Standard quantity [pcs] |      |        |
|---------|-------------|----------------|---------------|---------------|---------------|-------------------------|------|--------|
|         |             |                |               |               |               | Box                     | Bulk | Taping |
| LH L 08 | 9.0 max     | 9.5 max        | 5.0±1.0       | 5.0±1.0       | 0.6±0.05      | —                       | 100  | 1000   |
| LH LC08 | (0.354 max) | (0.374 max)    | (0.197±0.039) | (0.197±0.039) | (0.024±0.002) | —                       | 100  | 1000   |
| LH L 10 | 11.0 max    | 14.0 max       | 5.0±1.0       | 5.0±1.0       | 0.6±0.05      | —                       | 50   | 500    |
| LH LC10 | (0.433 max) | (0.551 max)    | (0.197±0.039) | (0.197±0.039) | (0.024±0.002) | —                       | 50   | 500    |

Unit : mm (inch)

## ● LHL08

| Parts number | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance<br>tolerance | Q<br>(min.) | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] (max.) | Rated current<br>[A] (max.) | Measuring frequency<br>[MHz] |
|--------------|------|----------------------------------|-------------------------|-------------|--------------------------------------------|--------------------------------------|-----------------------------|------------------------------|
| LH L 08□1R0N | RoHS | 1.0                              | ±30%                    | 40          | 76                                         | 0.013                                | 4.7                         | 7.96                         |
| LH L 08□1R5M | RoHS | 1.5                              | ±20%                    | 40          | 65                                         | 0.014                                | 4.4                         | 7.96                         |
| LH L 08□2R2M | RoHS | 2.2                              | ±20%                    | 40          | 56                                         | 0.017                                | 4.1                         | 7.96                         |
| LH L 08□2R7M | RoHS | 2.7                              | ±20%                    | 40          | 48                                         | 0.019                                | 3.5                         | 7.96                         |
| LH L 08□3R3M | RoHS | 3.3                              | ±20%                    | 40          | 41                                         | 0.021                                | 3.2                         | 7.96                         |
| LH L 08□3R9M | RoHS | 3.9                              | ±20%                    | 40          | 33                                         | 0.024                                | 3.1                         | 7.96                         |
| LH L 08□4R7M | RoHS | 4.7                              | ±20%                    | 40          | 30                                         | 0.025                                | 3.0                         | 7.96                         |
| LH L 08□5R6M | RoHS | 5.6                              | ±20%                    | 40          | 23                                         | 0.028                                | 2.9                         | 7.96                         |
| LH L 08□6R8M | RoHS | 6.8                              | ±20%                    | 40          | 21                                         | 0.030                                | 2.8                         | 7.96                         |
| LH L 08□8R2M | RoHS | 8.2                              | ±20%                    | 40          | 19                                         | 0.034                                | 2.5                         | 7.96                         |
| LH L 08□100K | RoHS | 10                               | ±10%                    | 65          | 17                                         | 0.041                                | 2.4                         | 2.52                         |
| LH L 08□120K | RoHS | 12                               | ±10%                    | 65          | 16                                         | 0.044                                | 2.3                         | 2.52                         |
| LH L 08□150K | RoHS | 15                               | ±10%                    | 50          | 13                                         | 0.053                                | 2.0                         | 2.52                         |
| LH L 08□180K | RoHS | 18                               | ±10%                    | 50          | 12                                         | 0.060                                | 1.9                         | 2.52                         |
| LH L 08□220K | RoHS | 22                               | ±10%                    | 50          | 11                                         | 0.068                                | 1.8                         | 2.52                         |
| LH L 08□270K | RoHS | 27                               | ±10%                    | 50          | 10                                         | 0.091                                | 1.5                         | 2.52                         |
| LH L 08□330K | RoHS | 33                               | ±10%                    | 40          | 8.8                                        | 0.10                                 | 1.4                         | 2.52                         |
| LH L 08□390K | RoHS | 39                               | ±10%                    | 40          | 8.4                                        | 0.12                                 | 1.3                         | 2.52                         |
| LH L 08□470K | RoHS | 47                               | ±10%                    | 40          | 8.2                                        | 0.15                                 | 1.2                         | 2.52                         |
| LH L 08□560K | RoHS | 56                               | ±10%                    | 40          | 7.9                                        | 0.17                                 | 1.1                         | 2.52                         |
| LH L 08□680K | RoHS | 68                               | ±10%                    | 35          | 7.0                                        | 0.20                                 | 1.0                         | 2.52                         |
| LH L 08□820K | RoHS | 82                               | ±10%                    | 35          | 6.5                                        | 0.22                                 | 0.90                        | 2.52                         |
| LH L 08□101K | RoHS | 100                              | ±10%                    | 25          | 5.7                                        | 0.32                                 | 0.79                        | 0.796                        |
| LH L 08□121K | RoHS | 120                              | ±10%                    | 25          | 5.2                                        | 0.36                                 | 0.70                        | 0.796                        |
| LH L 08□151K | RoHS | 150                              | ±10%                    | 20          | 4.7                                        | 0.41                                 | 0.64                        | 0.796                        |
| LH L 08□181K | RoHS | 180                              | ±10%                    | 35          | 4.2                                        | 0.66                                 | 0.60                        | 0.796                        |
| LH L 08□221K | RoHS | 220                              | ±10%                    | 35          | 3.7                                        | 0.73                                 | 0.53                        | 0.796                        |
| LH L 08□271K | RoHS | 270                              | ±10%                    | 25          | 3.5                                        | 0.85                                 | 0.51                        | 0.796                        |
| LH L 08□331K | RoHS | 330                              | ±10%                    | 25          | 3.2                                        | 0.97                                 | 0.44                        | 0.796                        |
| LH L 08□391K | RoHS | 390                              | ±10%                    | 20          | 2.9                                        | 1.1                                  | 0.41                        | 0.796                        |
| LH L 08□471K | RoHS | 470                              | ±10%                    | 25          | 2.4                                        | 1.3                                  | 0.38                        | 0.796                        |
| LH L 08□561K | RoHS | 560                              | ±10%                    | 25          | 2.2                                        | 1.5                                  | 0.35                        | 0.796                        |
| LH L 08□681K | RoHS | 680                              | ±10%                    | 25          | 2.0                                        | 1.8                                  | 0.32                        | 0.796                        |
| LH L 08□821K | RoHS | 820                              | ±10%                    | 30          | 1.6                                        | 2.3                                  | 0.30                        | 0.796                        |
| LH L 08□102J | RoHS | 1000                             | ±5%                     | 55          | 1.5                                        | 2.7                                  | 0.25                        | 0.252                        |
| LH L 08□122J | RoHS | 1200                             | ±5%                     | 45          | 1.4                                        | 3.2                                  | 0.22                        | 0.252                        |
| LH L 08□152J | RoHS | 1500                             | ±5%                     | 55          | 1.3                                        | 4.1                                  | 0.20                        | 0.252                        |
| LH L 08□182J | RoHS | 1800                             | ±5%                     | 55          | 1.2                                        | 4.8                                  | 0.19                        | 0.252                        |
| LH L 08□222J | RoHS | 2200                             | ±5%                     | 55          | 1.1                                        | 5.6                                  | 0.16                        | 0.252                        |
| LH L 08□272J | RoHS | 2700                             | ±5%                     | 55          | 1.0                                        | 7.5                                  | 0.15                        | 0.252                        |
| LH L 08□332J | RoHS | 3300                             | ±5%                     | 55          | 0.85                                       | 8.5                                  | 0.14                        | 0.252                        |
| LH L 08□392J | RoHS | 3900                             | ±5%                     | 55          | 0.78                                       | 9.7                                  | 0.11                        | 0.252                        |
| LH L 08□472J | RoHS | 4700                             | ±5%                     | 65          | 0.68                                       | 14                                   | 0.10                        | 0.252                        |
| LH L 08□562J | RoHS | 5600                             | ±5%                     | 65          | 0.62                                       | 16                                   | 0.093                       | 0.252                        |
| LH L 08□682J | RoHS | 6800                             | ±5%                     | 65          | 0.61                                       | 18                                   | 0.092                       | 0.252                        |
| LH L 08□822J | RoHS | 8200                             | ±5%                     | 65          | 0.60                                       | 20                                   | 0.084                       | 0.252                        |
| LH L 08□103J | RoHS | 10000                            | ±5%                     | 60          | 0.48                                       | 32                                   | 0.070                       | L:1kHz, Q:0.0796MHz          |
| LH L 08□123J | RoHS | 12000                            | ±5%                     | 60          | 0.44                                       | 36                                   | 0.064                       | L:1kHz, Q:0.0796MHz          |
| LH L 08□153J | RoHS | 15000                            | ±5%                     | 60          | 0.35                                       | 62                                   | 0.051                       | L:1kHz, Q:0.0796MHz          |
| LH L 08□183J | RoHS | 18000                            | ±5%                     | 60          | 0.30                                       | 72                                   | 0.048                       | L:1kHz, Q:0.0796MHz          |
| LH L 08□223J | RoHS | 22000                            | ±5%                     | 60          | 0.28                                       | 82                                   | 0.044                       | L:1kHz, Q:0.0796MHz          |
| LH L 08□273J | RoHS | 27000                            | ±5%                     | 60          | 0.25                                       | 90                                   | 0.042                       | L:1kHz, Q:0.0796MHz          |
| LH L 08□333J | RoHS | 33000                            | ±5%                     | 60          | 0.23                                       | 100                                  | 0.040                       | L:1kHz, Q:0.0796MHz          |

\* □ Please specify the packaging code. (TB: Taping, NB: Bulk)

## LHL10

| Parts number | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance<br>tolerance | Q<br>(min.) | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] (max.) | Rated current<br>[A] (max.) | Measuring frequency<br>[MHz] |
|--------------|------|----------------------------------|-------------------------|-------------|--------------------------------------------|--------------------------------------|-----------------------------|------------------------------|
| LH L 10□3R3M | RoHS | 3.3                              | ±20%                    | 50          | 46                                         | 0.019                                | 4.2                         | 7.96                         |
| LH L 10□3R9M | RoHS | 3.9                              | ±20%                    | 50          | 40                                         | 0.022                                | 4.1                         | 7.96                         |
| LH L 10□4R7M | RoHS | 4.7                              | ±20%                    | 50          | 38                                         | 0.024                                | 4.0                         | 7.96                         |
| LH L 10□5R6M | RoHS | 5.6                              | ±20%                    | 50          | 34                                         | 0.025                                | 3.8                         | 7.96                         |
| LH L 10□6R8M | RoHS | 6.8                              | ±20%                    | 50          | 30                                         | 0.028                                | 3.4                         | 7.96                         |
| LH L 10□8R2M | RoHS | 8.2                              | ±20%                    | 50          | 24                                         | 0.031                                | 3.3                         | 7.96                         |
| LH L 10□100K | RoHS | 10                               | ±10%                    | 90          | 19                                         | 0.034                                | 3.2                         | 2.52                         |
| LH L 10□120K | RoHS | 12                               | ±10%                    | 90          | 16                                         | 0.038                                | 2.8                         | 2.52                         |
| LH L 10□150K | RoHS | 15                               | ±10%                    | 90          | 12                                         | 0.042                                | 2.6                         | 2.52                         |
| LH L 10□180K | RoHS | 18                               | ±10%                    | 90          | 9.2                                        | 0.046                                | 2.4                         | 2.52                         |
| LH L 10□220K | RoHS | 22                               | ±10%                    | 60          | 8.6                                        | 0.061                                | 2.1                         | 2.52                         |
| LH L 10□270K | RoHS | 27                               | ±10%                    | 60          | 7.1                                        | 0.069                                | 2.0                         | 2.52                         |
| LH L 10□330K | RoHS | 33                               | ±10%                    | 60          | 6.8                                        | 0.078                                | 1.9                         | 2.52                         |
| LH L 10□390K | RoHS | 39                               | ±10%                    | 60          | 6.7                                        | 0.085                                | 1.8                         | 2.52                         |
| LH L 10□470K | RoHS | 47                               | ±10%                    | 50          | 6.2                                        | 0.093                                | 1.7                         | 2.52                         |
| LH L 10□560K | RoHS | 56                               | ±10%                    | 50          | 5.2                                        | 0.10                                 | 1.6                         | 2.52                         |
| LH L 10□680K | RoHS | 68                               | ±10%                    | 40          | 4.9                                        | 0.12                                 | 1.5                         | 2.52                         |
| LH L 10□820K | RoHS | 82                               | ±10%                    | 40          | 4.7                                        | 0.13                                 | 1.4                         | 2.52                         |
| LH L 10□101K | RoHS | 100                              | ±10%                    | 40          | 3.8                                        | 0.18                                 | 1.2                         | 0.796                        |
| LH L 10□121K | RoHS | 120                              | ±10%                    | 40          | 3.2                                        | 0.25                                 | 1.0                         | 0.796                        |
| LH L 10□151K | RoHS | 150                              | ±10%                    | 40          | 2.9                                        | 0.29                                 | 0.95                        | 0.796                        |
| LH L 10□181K | RoHS | 180                              | ±10%                    | 40          | 2.6                                        | 0.40                                 | 0.80                        | 0.796                        |
| LH L 10□221K | RoHS | 220                              | ±10%                    | 40          | 2.3                                        | 0.44                                 | 0.75                        | 0.796                        |
| LH L 10□271K | RoHS | 270                              | ±10%                    | 30          | 2.1                                        | 0.50                                 | 0.70                        | 0.796                        |
| LH L 10□331K | RoHS | 330                              | ±10%                    | 30          | 2.0                                        | 0.56                                 | 0.68                        | 0.796                        |
| LH L 10□391K | RoHS | 390                              | ±10%                    | 30          | 1.8                                        | 0.62                                 | 0.63                        | 0.796                        |
| LH L 10□471K | RoHS | 470                              | ±10%                    | 30          | 1.7                                        | 0.84                                 | 0.57                        | 0.796                        |
| LH L 10□561K | RoHS | 560                              | ±10%                    | 30          | 1.5                                        | 0.93                                 | 0.52                        | 0.796                        |
| LH L 10□681K | RoHS | 680                              | ±10%                    | 30          | 1.4                                        | 1.0                                  | 0.48                        | 0.796                        |
| LH L 10□821K | RoHS | 820                              | ±10%                    | 30          | 1.3                                        | 1.4                                  | 0.42                        | 0.796                        |
| LH L 10□102J | RoHS | 1000                             | ±5%                     | 50          | 1.2                                        | 1.8                                  | 0.41                        | 0.252                        |
| LH L 10□122J | RoHS | 1200                             | ±5%                     | 50          | 0.87                                       | 2.3                                  | 0.33                        | 0.252                        |
| LH L 10□152J | RoHS | 1500                             | ±5%                     | 50          | 0.83                                       | 2.7                                  | 0.30                        | 0.252                        |
| LH L 10□182J | RoHS | 1800                             | ±5%                     | 50          | 0.75                                       | 3.0                                  | 0.29                        | 0.252                        |
| LH L 10□222J | RoHS | 2200                             | ±5%                     | 50          | 0.70                                       | 3.9                                  | 0.25                        | 0.252                        |
| LH L 10□272J | RoHS | 2700                             | ±5%                     | 50          | 0.67                                       | 4.3                                  | 0.24                        | 0.252                        |
| LH L 10□332J | RoHS | 3300                             | ±5%                     | 50          | 0.56                                       | 5.8                                  | 0.21                        | 0.252                        |
| LH L 10□392J | RoHS | 3900                             | ±5%                     | 50          | 0.54                                       | 6.4                                  | 0.20                        | 0.252                        |
| LH L 10□472J | RoHS | 4700                             | ±5%                     | 50          | 0.49                                       | 7.1                                  | 0.19                        | 0.252                        |
| LH L 10□562J | RoHS | 5600                             | ±5%                     | 50          | 0.41                                       | 9.0                                  | 0.17                        | 0.252                        |
| LH L 10□682J | RoHS | 6800                             | ±5%                     | 50          | 0.38                                       | 10                                   | 0.16                        | 0.252                        |
| LH L 10□822J | RoHS | 8200                             | ±5%                     | 50          | 0.36                                       | 12                                   | 0.15                        | 0.252                        |
| LH L 10□103J | RoHS | 10000                            | ±5%                     | 60          | 0.29                                       | 19                                   | 0.12                        | L: 1kHz, Q: 0.0796MHz        |
| LH L 10□123J | RoHS | 12000                            | ±5%                     | 60          | 0.27                                       | 21                                   | 0.11                        | L: 1kHz, Q: 0.0796MHz        |
| LH L 10□153J | RoHS | 15000                            | ±5%                     | 60          | 0.24                                       | 34                                   | 0.090                       | L: 1kHz, Q: 0.0796MHz        |
| LH L 10□183J | RoHS | 18000                            | ±5%                     | 60          | 0.21                                       | 38                                   | 0.081                       | L: 1kHz, Q: 0.0796MHz        |
| LH L 10□223J | RoHS | 22000                            | ±5%                     | 60          | 0.20                                       | 43                                   | 0.075                       | L: 1kHz, Q: 0.0796MHz        |
| LH L 10□273J | RoHS | 27000                            | ±5%                     | 40          | 0.15                                       | 67                                   | 0.060                       | L: 1kHz, Q: 0.0796MHz        |
| LH L 10□333J | RoHS | 33000                            | ±5%                     | 40          | 0.14                                       | 76                                   | 0.056                       | L: 1kHz, Q: 0.0796MHz        |
| LH L 10□393J | RoHS | 39000                            | ±5%                     | 40          | 0.13                                       | 84                                   | 0.053                       | L: 1kHz, Q: 0.0796MHz        |
| LH L 10□473J | RoHS | 47000                            | ±5%                     | 40          | 0.12                                       | 96                                   | 0.050                       | L: 1kHz, Q: 0.0796MHz        |
| LH L 10□563J | RoHS | 56000                            | ±5%                     | 30          | 0.10                                       | 170                                  | 0.036                       | L: 1kHz, Q: 0.0796MHz        |
| LH L 10□683J | RoHS | 68000                            | ±5%                     | 30          | 0.095                                      | 200                                  | 0.035                       | L: 1kHz, Q: 0.0796MHz        |
| LH L 10□823J | RoHS | 82000                            | ±5%                     | 30          | 0.088                                      | 210                                  | 0.033                       | L: 1kHz, Q: 0.0796MHz        |
| LH L 10□104J | RoHS | 100000                           | ±5%                     | 30          | 0.085                                      | 240                                  | 0.031                       | L: 1kHz, Q: 0.0252MHz        |
| LH L 10□124J | RoHS | 120000                           | ±5%                     | 30          | 0.070                                      | 260                                  | 0.030                       | L: 1kHz, Q: 0.0252MHz        |
| LH L 10□154J | RoHS | 150000                           | ±5%                     | 30          | 0.069                                      | 300                                  | 0.028                       | L: 1kHz, Q: 0.0252MHz        |

□ Please specify the packaging code. (TB: Taping, NB: Bulk)

## ● LHLCO8

| Parts number | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance<br>tolerance | Q<br>(min.) | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] (max.) | Rated current<br>[A] (max.) | Measuring frequency<br>[MHz] |
|--------------|------|----------------------------------|-------------------------|-------------|--------------------------------------------|--------------------------------------|-----------------------------|------------------------------|
| LH LC08□1R0N | RoHS | 1.0                              | ±30%                    | 40          | 76                                         | 0.013                                | 5.4                         | 7.96                         |
| LH LC08□1R5M | RoHS | 1.5                              | ±20%                    | 40          | 65                                         | 0.014                                | 5.2                         | 7.96                         |
| LH LC08□2R2M | RoHS | 2.2                              | ±20%                    | 40          | 56                                         | 0.017                                | 4.8                         | 7.96                         |
| LH LC08□2R7M | RoHS | 2.7                              | ±20%                    | 40          | 48                                         | 0.019                                | 4.2                         | 7.96                         |
| LH LC08□3R3M | RoHS | 3.3                              | ±20%                    | 40          | 41                                         | 0.021                                | 3.8                         | 7.96                         |
| LH LC08□3R9M | RoHS | 3.9                              | ±20%                    | 40          | 33                                         | 0.024                                | 3.7                         | 7.96                         |
| LH LC08□4R7M | RoHS | 4.7                              | ±20%                    | 40          | 30                                         | 0.025                                | 3.6                         | 7.96                         |
| LH LC08□5R6M | RoHS | 5.6                              | ±20%                    | 40          | 23                                         | 0.028                                | 3.5                         | 7.96                         |
| LH LC08□6R8M | RoHS | 6.8                              | ±20%                    | 40          | 21                                         | 0.030                                | 3.4                         | 7.96                         |
| LH LC08□8R2M | RoHS | 8.2                              | ±20%                    | 40          | 19                                         | 0.034                                | 3.0                         | 7.96                         |
| LH LC08□100K | RoHS | 10                               | ±10%                    | 65          | 17                                         | 0.041                                | 2.9                         | 2.52                         |
| LH LC08□120K | RoHS | 12                               | ±10%                    | 65          | 16                                         | 0.044                                | 2.8                         | 2.52                         |
| LH LC08□150K | RoHS | 15                               | ±10%                    | 50          | 13                                         | 0.053                                | 2.6                         | 2.52                         |
| LH LC08□180K | RoHS | 18                               | ±10%                    | 50          | 12                                         | 0.060                                | 2.4                         | 2.52                         |
| LH LC08□220K | RoHS | 22                               | ±10%                    | 50          | 11                                         | 0.068                                | 2.3                         | 2.52                         |
| LH LC08□270K | RoHS | 27                               | ±10%                    | 50          | 10                                         | 0.091                                | 2.0                         | 2.52                         |
| LH LC08□330K | RoHS | 33                               | ±10%                    | 40          | 8.8                                        | 0.10                                 | 1.9                         | 2.52                         |
| LH LC08□390K | RoHS | 39                               | ±10%                    | 40          | 8.4                                        | 0.12                                 | 1.7                         | 2.52                         |
| LH LC08□470K | RoHS | 47                               | ±10%                    | 40          | 8.2                                        | 0.15                                 | 1.5                         | 2.52                         |
| LH LC08□560K | RoHS | 56                               | ±10%                    | 40          | 7.9                                        | 0.17                                 | 1.4                         | 2.52                         |
| LH LC08□680K | RoHS | 68                               | ±10%                    | 35          | 7.0                                        | 0.20                                 | 1.3                         | 2.52                         |
| LH LC08□820K | RoHS | 82                               | ±10%                    | 35          | 6.5                                        | 0.22                                 | 1.2                         | 2.52                         |
| LH LC08□101K | RoHS | 100                              | ±10%                    | 25          | 5.7                                        | 0.32                                 | 1.0                         | 0.796                        |
| LH LC08□121K | RoHS | 120                              | ±10%                    | 25          | 5.2                                        | 0.36                                 | 0.96                        | 0.796                        |
| LH LC08□151K | RoHS | 150                              | ±10%                    | 20          | 4.7                                        | 0.41                                 | 0.88                        | 0.796                        |
| LH LC08□181K | RoHS | 180                              | ±10%                    | 35          | 4.2                                        | 0.66                                 | 0.71                        | 0.796                        |
| LH LC08□221K | RoHS | 220                              | ±10%                    | 35          | 3.7                                        | 0.73                                 | 0.66                        | 0.796                        |
| LH LC08□271K | RoHS | 270                              | ±10%                    | 25          | 3.5                                        | 0.85                                 | 0.63                        | 0.796                        |
| LH LC08□331K | RoHS | 330                              | ±10%                    | 25          | 3.2                                        | 0.97                                 | 0.59                        | 0.796                        |
| LH LC08□391K | RoHS | 390                              | ±10%                    | 20          | 2.9                                        | 1.1                                  | 0.55                        | 0.796                        |
| LH LC08□471K | RoHS | 470                              | ±10%                    | 25          | 2.4                                        | 1.3                                  | 0.49                        | 0.796                        |
| LH LC08□561K | RoHS | 560                              | ±10%                    | 25          | 2.2                                        | 1.5                                  | 0.47                        | 0.796                        |
| LH LC08□681K | RoHS | 680                              | ±10%                    | 25          | 2.0                                        | 1.8                                  | 0.44                        | 0.796                        |
| LH LC08□821K | RoHS | 820                              | ±10%                    | 30          | 1.6                                        | 2.3                                  | 0.38                        | 0.796                        |
| LH LC08□102J | RoHS | 1000                             | ±5%                     | 55          | 1.5                                        | 2.7                                  | 0.35                        | 0.252                        |
| LH LC08□122J | RoHS | 1200                             | ±5%                     | 45          | 1.4                                        | 3.2                                  | 0.31                        | 0.252                        |
| LH LC08□152J | RoHS | 1500                             | ±5%                     | 55          | 1.3                                        | 4.1                                  | 0.29                        | 0.252                        |
| LH LC08□182J | RoHS | 1800                             | ±5%                     | 55          | 1.2                                        | 4.8                                  | 0.26                        | 0.252                        |
| LH LC08□222J | RoHS | 2200                             | ±5%                     | 55          | 1.1                                        | 5.6                                  | 0.23                        | 0.252                        |
| LH LC08□272J | RoHS | 2700                             | ±5%                     | 55          | 1.0                                        | 7.5                                  | 0.21                        | 0.252                        |
| LH LC08□332J | RoHS | 3300                             | ±5%                     | 55          | 0.85                                       | 8.5                                  | 0.19                        | 0.252                        |
| LH LC08□392J | RoHS | 3900                             | ±5%                     | 55          | 0.78                                       | 9.7                                  | 0.18                        | 0.252                        |
| LH LC08□472J | RoHS | 4700                             | ±5%                     | 65          | 0.68                                       | 14                                   | 0.16                        | 0.252                        |
| LH LC08□562J | RoHS | 5600                             | ±5%                     | 65          | 0.62                                       | 16                                   | 0.15                        | 0.252                        |
| LH LC08□682J | RoHS | 6800                             | ±5%                     | 65          | 0.61                                       | 18                                   | 0.14                        | 0.252                        |
| LH LC08□822J | RoHS | 8200                             | ±5%                     | 65          | 0.60                                       | 20                                   | 0.13                        | 0.252                        |
| LH LC08□103J | RoHS | 10000                            | ±5%                     | 60          | 0.48                                       | 32                                   | 0.11                        | L:1kHz, Q:0.0796MHz          |
| LH LC08□123J | RoHS | 12000                            | ±5%                     | 60          | 0.44                                       | 36                                   | 0.084                       | L:1kHz, Q:0.0796MHz          |
| LH LC08□153J | RoHS | 15000                            | ±5%                     | 60          | 0.35                                       | 62                                   | 0.068                       | L:1kHz, Q:0.0796MHz          |
| LH LC08□183J | RoHS | 18000                            | ±5%                     | 60          | 0.30                                       | 72                                   | 0.066                       | L:1kHz, Q:0.0796MHz          |
| LH LC08□223J | RoHS | 22000                            | ±5%                     | 60          | 0.28                                       | 82                                   | 0.057                       | L:1kHz, Q:0.0796MHz          |
| LH LC08□273J | RoHS | 27000                            | ±5%                     | 60          | 0.25                                       | 90                                   | 0.054                       | L:1kHz, Q:0.0796MHz          |
| LH LC08□333J | RoHS | 33000                            | ±5%                     | 60          | 0.23                                       | 100                                  | 0.053                       | L:1kHz, Q:0.0796MHz          |

□ Please specify the packaging code. (TB: Taping, NB: Bulk)

## ● LHLC10

| Parts number | EHS  | Nominal inductance<br>[ $\mu$ H] | Inductance<br>tolerance | Q<br>(min.) | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[ $\Omega$ ] (max.) | Rated current<br>[A] (max.) | Measuring frequency<br>[MHz] |
|--------------|------|----------------------------------|-------------------------|-------------|--------------------------------------------|--------------------------------------|-----------------------------|------------------------------|
| LH LC10□3R3M | RoHS | 3.3                              | ±20%                    | 50          | 46                                         | 0.019                                | 5.0                         | 7.96                         |
| LH LC10□3R9M | RoHS | 3.9                              | ±20%                    | 50          | 40                                         | 0.022                                | 4.8                         | 7.96                         |
| LH LC10□4R7M | RoHS | 4.7                              | ±20%                    | 50          | 38                                         | 0.024                                | 4.7                         | 7.96                         |
| LH LC10□5R6M | RoHS | 5.6                              | ±20%                    | 50          | 34                                         | 0.025                                | 4.5                         | 7.96                         |
| LH LC10□6R8M | RoHS | 6.8                              | ±20%                    | 50          | 30                                         | 0.028                                | 4.1                         | 7.96                         |
| LH LC10□8R2M | RoHS | 8.2                              | ±20%                    | 50          | 24                                         | 0.031                                | 3.9                         | 7.96                         |
| LH LC10□100K | RoHS | 10                               | ±10%                    | 90          | 19                                         | 0.034                                | 3.6                         | 2.52                         |
| LH LC10□120K | RoHS | 12                               | ±10%                    | 90          | 16                                         | 0.038                                | 3.4                         | 2.52                         |
| LH LC10□150K | RoHS | 15                               | ±10%                    | 90          | 12                                         | 0.042                                | 3.2                         | 2.52                         |
| LH LC10□180K | RoHS | 18                               | ±10%                    | 90          | 9.2                                        | 0.046                                | 3.0                         | 2.52                         |
| LH LC10□220K | RoHS | 22                               | ±10%                    | 60          | 8.6                                        | 0.061                                | 2.8                         | 2.52                         |
| LH LC10□270K | RoHS | 27                               | ±10%                    | 60          | 7.1                                        | 0.069                                | 2.7                         | 2.52                         |
| LH LC10□330K | RoHS | 33                               | ±10%                    | 60          | 6.8                                        | 0.078                                | 2.6                         | 2.52                         |
| LH LC10□390K | RoHS | 39                               | ±10%                    | 60          | 6.7                                        | 0.085                                | 2.4                         | 2.52                         |
| LH LC10□470K | RoHS | 47                               | ±10%                    | 50          | 6.2                                        | 0.093                                | 2.3                         | 2.52                         |
| LH LC10□560K | RoHS | 56                               | ±10%                    | 50          | 5.2                                        | 0.10                                 | 2.1                         | 2.52                         |
| LH LC10□680K | RoHS | 68                               | ±10%                    | 40          | 4.6                                        | 0.12                                 | 2.0                         | 2.52                         |
| LH LC10□820K | RoHS | 82                               | ±10%                    | 40          | 4.7                                        | 0.13                                 | 1.8                         | 2.52                         |
| LH LC10□101K | RoHS | 100                              | ±10%                    | 40          | 3.8                                        | 0.18                                 | 1.5                         | 0.796                        |
| LH LC10□121K | RoHS | 120                              | ±10%                    | 40          | 3.2                                        | 0.25                                 | 1.3                         | 0.796                        |
| LH LC10□151K | RoHS | 150                              | ±10%                    | 40          | 2.9                                        | 0.29                                 | 1.2                         | 0.796                        |
| LH LC10□181K | RoHS | 180                              | ±10%                    | 40          | 2.6                                        | 0.40                                 | 1.0                         | 0.796                        |
| LH LC10□221K | RoHS | 220                              | ±10%                    | 40          | 2.3                                        | 0.44                                 | 0.97                        | 0.796                        |
| LH LC10□271K | RoHS | 270                              | ±10%                    | 30          | 2.1                                        | 0.50                                 | 0.90                        | 0.796                        |
| LH LC10□331K | RoHS | 330                              | ±10%                    | 30          | 2.0                                        | 0.56                                 | 0.86                        | 0.796                        |
| LH LC10□391K | RoHS | 390                              | ±10%                    | 30          | 1.8                                        | 0.62                                 | 0.75                        | 0.796                        |
| LH LC10□471K | RoHS | 470                              | ±10%                    | 30          | 1.7                                        | 0.84                                 | 0.65                        | 0.796                        |
| LH LC10□561K | RoHS | 560                              | ±10%                    | 30          | 1.5                                        | 0.93                                 | 0.61                        | 0.796                        |
| LH LC10□681K | RoHS | 680                              | ±10%                    | 30          | 1.4                                        | 1.0                                  | 0.57                        | 0.796                        |
| LH LC10□821K | RoHS | 820                              | ±10%                    | 30          | 1.3                                        | 1.4                                  | 0.50                        | 0.796                        |
| LH LC10□102J | RoHS | 1000                             | ±5%                     | 50          | 1.2                                        | 1.8                                  | 0.48                        | 0.252                        |
| LH LC10□122J | RoHS | 1200                             | ±5%                     | 50          | 0.87                                       | 2.3                                  | 0.40                        | 0.252                        |
| LH LC10□152J | RoHS | 1500                             | ±5%                     | 50          | 0.83                                       | 2.7                                  | 0.37                        | 0.252                        |
| LH LC10□182J | RoHS | 1800                             | ±5%                     | 50          | 0.75                                       | 3.0                                  | 0.36                        | 0.252                        |
| LH LC10□222J | RoHS | 2200                             | ±5%                     | 50          | 0.70                                       | 3.9                                  | 0.32                        | 0.252                        |
| LH LC10□272J | RoHS | 2700                             | ±5%                     | 50          | 0.67                                       | 4.3                                  | 0.30                        | 0.252                        |
| LH LC10□332J | RoHS | 3300                             | ±5%                     | 50          | 0.56                                       | 5.8                                  | 0.26                        | 0.252                        |
| LH LC10□392J | RoHS | 3900                             | ±5%                     | 50          | 0.54                                       | 6.4                                  | 0.25                        | 0.252                        |
| LH LC10□472J | RoHS | 4700                             | ±5%                     | 50          | 0.49                                       | 7.1                                  | 0.24                        | 0.252                        |
| LH LC10□562J | RoHS | 5600                             | ±5%                     | 50          | 0.41                                       | 9.0                                  | 0.21                        | 0.252                        |
| LH LC10□682J | RoHS | 6800                             | ±5%                     | 50          | 0.38                                       | 10                                   | 0.20                        | 0.252                        |
| LH LC10□822J | RoHS | 8200                             | ±5%                     | 50          | 0.36                                       | 12                                   | 0.18                        | 0.252                        |
| LH LC10□103J | RoHS | 10000                            | ±5%                     | 60          | 0.29                                       | 19                                   | 0.14                        | L: 1kHz, Q: 0.0796MHz        |
| LH LC10□123J | RoHS | 12000                            | ±5%                     | 60          | 0.27                                       | 21                                   | 0.13                        | L: 1kHz, Q: 0.0796MHz        |
| LH LC10□153J | RoHS | 15000                            | ±5%                     | 60          | 0.24                                       | 34                                   | 0.11                        | L: 1kHz, Q: 0.0796MHz        |
| LH LC10□183J | RoHS | 18000                            | ±5%                     | 60          | 0.21                                       | 38                                   | 0.10                        | L: 1kHz, Q: 0.0796MHz        |
| LH LC10□223J | RoHS | 22000                            | ±5%                     | 60          | 0.20                                       | 43                                   | 0.095                       | L: 1kHz, Q: 0.0796MHz        |
| LH LC10□273J | RoHS | 27000                            | ±5%                     | 40          | 0.15                                       | 67                                   | 0.076                       | L: 1kHz, Q: 0.0796MHz        |
| LH LC10□333J | RoHS | 33000                            | ±5%                     | 40          | 0.14                                       | 76                                   | 0.068                       | L: 1kHz, Q: 0.0796MHz        |
| LH LC10□393J | RoHS | 39000                            | ±5%                     | 40          | 0.13                                       | 84                                   | 0.065                       | L: 1kHz, Q: 0.0796MHz        |
| LH LC10□473J | RoHS | 47000                            | ±5%                     | 40          | 0.12                                       | 96                                   | 0.061                       | L: 1kHz, Q: 0.0796MHz        |
| LH LC10□563J | RoHS | 56000                            | ±5%                     | 30          | 0.10                                       | 170                                  | 0.045                       | L: 1kHz, Q: 0.0796MHz        |
| LH LC10□683J | RoHS | 68000                            | ±5%                     | 30          | 0.095                                      | 200                                  | 0.043                       | L: 1kHz, Q: 0.0796MHz        |
| LH LC10□823J | RoHS | 82000                            | ±5%                     | 30          | 0.088                                      | 210                                  | 0.041                       | L: 1kHz, Q: 0.0796MHz        |
| LH LC10□104J | RoHS | 100000                           | ±5%                     | 30          | 0.085                                      | 240                                  | 0.038                       | L: 1kHz, Q: 0.0252MHz        |
| LH LC10□124J | RoHS | 120000                           | ±5%                     | 30          | 0.070                                      | 260                                  | 0.037                       | L: 1kHz, Q: 0.0252MHz        |
| LH LC10□154J | RoHS | 150000                           | ±5%                     | 30          | 0.069                                      | 300                                  | 0.035                       | L: 1kHz, Q: 0.0252MHz        |

□ Please specify the packaging code. (TB: Taping, NB: Bulk)

# RADIAL LEADED INDUCTORS

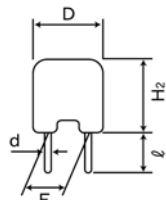
## PACKAGING

### ① Minimum Quantity

| Type (EIA) | Standard quantity [pcs] |       |
|------------|-------------------------|-------|
|            | Bulk                    | Taped |
| LHL 08     | 100                     | 1000  |
| LHL 10     | 50                      | 500   |
| LHLC08     | 100                     | 1000  |
| LHLC10     | 50                      | 500   |

### ② Bulk dimensions

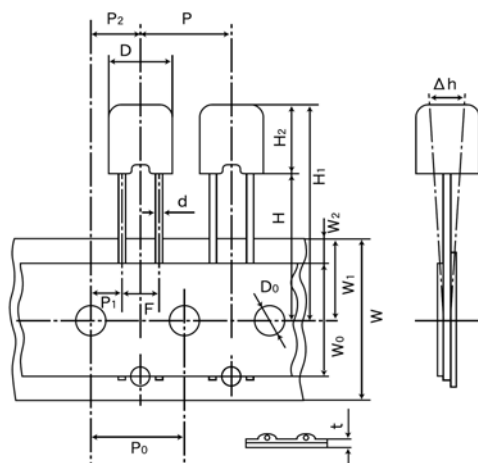
#### LHL08, LHL10



| Type  | Dimensions      |                 |                                        |                                        |                                         |
|-------|-----------------|-----------------|----------------------------------------|----------------------------------------|-----------------------------------------|
|       | $\phi D$ (max)  | $H_2$ (max)     | $F^*$                                  | $l$                                    | $\phi d$                                |
| LHL08 | 9.0<br>(0.354)  | 9.5<br>(0.374)  | $5.0 \pm 1.0$<br>( $0.197 \pm 0.039$ ) | $5.0 \pm 1.0$<br>( $0.197 \pm 0.039$ ) | $0.6 \pm 0.05$<br>( $0.024 \pm 0.002$ ) |
| LHL10 | 11.0<br>(0.433) | 14.0<br>(0.551) | $5.0 \pm 1.0$<br>( $0.197 \pm 0.039$ ) | $5.0 \pm 1.0$<br>( $0.197 \pm 0.039$ ) | $0.6 \pm 0.05$<br>( $0.024 \pm 0.002$ ) |

Unit : mm (inch)

\*Measured at the base of the leads.



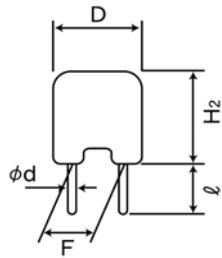
|          | LHL08                                                 | LHL10                                                 |
|----------|-------------------------------------------------------|-------------------------------------------------------|
| D        | $\phi 9.0$ max<br>( $\phi 0.354$ max)                 | $\phi 11.0$ max<br>( $\phi 0.433$ max)                |
| $H_1$    | 30.5 max<br>(1.20 max)                                | 34.0 max<br>(1.34 max)                                |
| H        | $18.0 + 2.0 / - 0.0$<br>( $0.709 + 0.079 / - 0.000$ ) | $18.0 + 2.0 / - 0.0$<br>( $0.709 + 0.079 / - 0.000$ ) |
| $H_2$    | 9.5 max<br>(0.374 max)                                | 14.0 max<br>(0.551 max)                               |
| P        | $12.7 \pm 1.0$<br>( $0.500 \pm 0.039$ )               | $12.7 \pm 1.0$<br>( $0.500 \pm 0.039$ )               |
| $P_0$    | $12.7 \pm 0.3^{※1}$<br>( $0.500 \pm 0.012$ )          | $12.7 \pm 0.3^{※1}$<br>( $0.500 \pm 0.012$ )          |
| $P_1$    | $3.85 \pm 0.7$<br>( $0.152 \pm 0.028$ )               | $3.85 \pm 0.7$<br>( $0.152 \pm 0.028$ )               |
| $P_2$    | $6.35 \pm 1.3$<br>( $0.250 \pm 0.051$ )               | $6.35 \pm 1.3$<br>( $0.250 \pm 0.051$ )               |
| F        | $5.0 + 0.8 / - 0.2$<br>( $0.197 + 0.031 / 0.008$ )    | $5.0 + 0.8 / - 0.2$<br>( $0.197 + 0.031 / - 0.008$ )  |
| h        | $0.0 \pm 2.0$<br>( $0.0 \pm 0.079$ )                  | $0.0 \pm 2.0$<br>( $0.0 \pm 0.079$ )                  |
| W        | $18.0 + 1.0 / - 0.5$<br>( $0.709 + 0.039 / - 0.020$ ) | $18.0 + 1.0 / - 0.5$<br>( $0.709 + 0.039 / - 0.020$ ) |
| $W_0$    | 12.5 min<br>(0.492 min)                               | 12.5 min<br>(0.492 min)                               |
| $W_1$    | $9.0 \pm 0.5$<br>( $0.354 \pm 0.020$ )                | $9.0 \pm 0.5$<br>( $0.354 \pm 0.020$ )                |
| $W_2$    | 3.0 max <sup>※2</sup><br>(0.118 max)                  | 3.0 max <sup>※2</sup><br>(0.118 max)                  |
| $D_0$    | $\phi 4.0 \pm 0.2$<br>( $\phi 0.158 \pm 0.008$ )      | $\phi 4.0 \pm 0.2$<br>( $\phi 0.158 \pm 0.008$ )      |
| $\phi d$ | $\phi 0.6 \pm 0.05$<br>( $\phi 0.024 \pm 0.002$ )     | $\phi 0.6 \pm 0.05$<br>( $\phi 0.024 \pm 0.002$ )     |
| t        | $0.6 \pm 0.3$<br>( $0.024 \pm 0.012$ )                | $0.6 \pm 0.3$<br>( $0.024 \pm 0.012$ )                |

Unit : mm (inch)

※1 Accumulated error for 20 pitches is 1mm.

※2 Bonding tape must not protrude from the base tape.

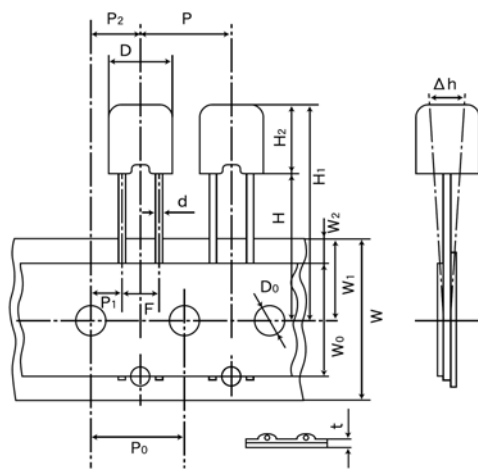
● LHLC08, LHLC10



| Type   | Dimensions      |                 |                                        |                                        |                                         |
|--------|-----------------|-----------------|----------------------------------------|----------------------------------------|-----------------------------------------|
|        | $\phi D$ (max)  | $H_2$ (max)     | $F^*$                                  | $\ell$                                 | $\phi d$                                |
| LHLC08 | 9.0<br>(0.354)  | 9.5<br>(0.374)  | $5.0 \pm 1.0$<br>( $0.197 \pm 0.039$ ) | $5.0 \pm 1.0$<br>( $0.197 \pm 0.039$ ) | $0.6 \pm 0.05$<br>( $0.024 \pm 0.002$ ) |
| LHLC10 | 11.0<br>(0.433) | 14.0<br>(0.551) | $5.0 \pm 1.0$<br>( $0.197 \pm 0.039$ ) | $5.0 \pm 1.0$<br>( $0.197 \pm 0.039$ ) | $0.6 \pm 0.05$<br>( $0.024 \pm 0.002$ ) |

Unit: mm (inch)

\*Measured at the base of the leads.



|          | LHLC08                                                | LHLC10                                                |
|----------|-------------------------------------------------------|-------------------------------------------------------|
| D        | $\phi 9.0 \text{max}$<br>( $\phi 0.354 \text{max}$ )  | $\phi 11.0 \text{max}$<br>( $\phi 0.433 \text{max}$ ) |
| $H_1$    | $30.5 \text{max}$<br>( $1.20 \text{max}$ )            | $34.0 \text{max}$<br>( $1.34 \text{max}$ )            |
| H        | $18.0 + 2.0 / - 0.0$<br>( $0.709 + 0.079 / - 0.000$ ) | $18.0 + 2.0 / - 0.0$<br>( $0.709 + 0.079 / - 0.000$ ) |
| $H_2$    | $9.5 \text{max}$<br>( $0.374 \text{max}$ )            | $14.0 \text{max}$<br>( $0.551 \text{max}$ )           |
| P        | $12.7 \pm 1.0$<br>( $0.500 \pm 0.039$ )               | $12.7 \pm 1.0$<br>( $0.500 \pm 0.039$ )               |
| $P_0$    | $12.7 \pm 0.3^{*1}$<br>( $0.500 \pm 0.012$ )          | $12.7 \pm 0.3^{*1}$<br>( $0.500 \pm 0.012$ )          |
| $P_1$    | $3.85 \pm 0.7$<br>( $0.152 \pm 0.028$ )               | $3.85 \pm 0.7$<br>( $0.152 \pm 0.028$ )               |
| $P_2$    | $6.35 \pm 1.3$<br>( $0.250 \pm 0.051$ )               | $6.35 \pm 1.3$<br>( $0.250 \pm 0.051$ )               |
| F        | $5.0 + 0.8 / - 0.2$<br>( $0.197 + 0.031 / - 0.008$ )  | $5.0 + 0.8 / - 0.2$<br>( $0.197 + 0.031 / - 0.008$ )  |
| H        | $0.0 \pm 2.0$<br>( $0.0 \pm 0.079$ )                  | $0.0 \pm 2.0$<br>( $0.0 \pm 0.079$ )                  |
| W        | $18.0 + 1.0 / - 0.5$<br>( $0.709 + 0.039 / - 0.020$ ) | $18.0 + 1.0 / - 0.5$<br>( $0.709 + 0.039 / - 0.020$ ) |
| $W_0$    | $12.5 \text{min}$<br>( $0.492 \text{min}$ )           | $12.5 \text{min}$<br>( $0.492 \text{min}$ )           |
| $W_1$    | $9.0 \pm 0.5$<br>( $0.354 \pm 0.020$ )                | $9.0 \pm 0.5$<br>( $0.354 \pm 0.020$ )                |
| $W_2$    | $3.0 \text{max}^{*2}$<br>( $0.118 \text{max}$ )       | $3.0 \text{max}^{*2}$<br>( $0.118 \text{max}$ )       |
| $D_0$    | $\phi 4.0 \pm 0.2$<br>( $\phi 0.158 \pm 0.008$ )      | $\phi 4.0 \pm 0.2$<br>( $\phi 0.158 \pm 0.008$ )      |
| $\phi d$ | $\phi 0.6 \pm 0.05$<br>( $\phi 0.024 \pm 0.002$ )     | $\phi 0.6 \pm 0.05$<br>( $\phi 0.024 \pm 0.002$ )     |
| t        | $0.6 \pm 0.3$<br>( $0.024 \pm 0.012$ )                | $0.6 \pm 0.3$<br>( $0.024 \pm 0.012$ )                |

Unit: mm (inch)

※1 Accumulated error for 20 pitches is 1mm.

※2 Bonding tape must not protrude from the base tape.



**AXIAL LEADED INDUCTORS (CAL Type)、  
RADIAL LEADED INDUCTORS (LH Type)、  
LEADED FERRITE BEAD INDUCTORS ( FB Series A Type/R Type)**

## RELIABILITY DATA

### 1. Operating temperature Range

|                          |            |                               |
|--------------------------|------------|-------------------------------|
| Specified Value          | CAL45 Type | -25~+ 105°C                   |
|                          | LHL□□□     |                               |
|                          | FBA/FBR    |                               |
| Test Methods and Remarks | CAL45 Type | Including self-generated heat |
|                          | LHL□□□     |                               |
|                          | FBA/FBR    |                               |

## 2. Storage temperature Range

|                 |            |                                          |
|-----------------|------------|------------------------------------------|
| Specified Value | CAL45 Type | -40~+ 85°C (Except for taping condition) |
|                 | LHL□□□     |                                          |
|                 | FBA/FBR    |                                          |

## 3. Rated current

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| of Rated current         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                |
| Specified Value          | CAL45 Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Within the specified tolerance |
|                          | LHL□□□                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                |
|                          | FBA/FBR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                |
| Test Methods and Remarks | CAL45 Type :<br>The maximum DC value having inductance within 10% and temperature increase within 40°C by the application of DC bias.                                                                                                                                                                                                                                                                                                                                                                                                                      |                                |
|                          | LHL□□□ :<br>The maximum DC value having inductance decrease within 10% (LHLC08, LHLC10: within 30%) and temperature increase within the following specified temperature by the application of DC bias.<br>Reference temperature : 25°C (LHL08, LHL10)<br>: 40°C (LHLC08, LHLC10)<br><br>FBA/FBR :<br>No disconnection or appearance abnormality by continuous current application for 30 min. Change after the application shall be within ±20% of the initial value.<br>This is not guaranteed for electrical characteristics during current application. |                                |

#### 4. Impedance

|                          |                                                                                                                                |                                |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| Specified Value          | CAL45 Type                                                                                                                     |                                |
|                          | LHL□□□                                                                                                                         |                                |
|                          | FBA/FBR                                                                                                                        | Within the specified tolerance |
| Test Methods and Remarks | FBA/FBR :<br>Measuring equipment : Impedance analyzer (HP4191A) or its equivalent<br>Measuring frequency : Specified frequency |                                |

## 5. Inductance

|                          |                                                                                                                                                                                                                                                                                                                             |                                |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| Specified Value          | CAL45 Type                                                                                                                                                                                                                                                                                                                  | Within the specified tolerance |
|                          | LHL□□□                                                                                                                                                                                                                                                                                                                      |                                |
|                          | FBA/FBR                                                                                                                                                                                                                                                                                                                     |                                |
| Test Methods and Remarks | CAL45 Type :<br>Measuring equipment : LCR meter (HP4285A + HP42851A or its equivalent)<br>Measuring frequency : Specified frequency<br>LHL□□□ :<br>Measuring equipment : LCR meter (HP4285A + HP42851A or its equivalent)<br>: LCR meter (HP4263A) or its equivalent (at 1kHz)<br>Measuring frequency : Specified frequency |                                |

► This catalog contains the typical specification only due to the limitation of space. When you consider the purchase of our products, please check our specification. For details of each product (characteristics graph, reliability information, precautions for use, and so on), see our Web site (<http://www.tv-to.com/>).

|                                                                                                                                                                                  |                                                                                                                                                                                    |                               |                                                |              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------|--------------|
| 6. Q                                                                                                                                                                             |                                                                                                                                                                                    |                               |                                                |              |
| Specified Value                                                                                                                                                                  | CAL45 Type                                                                                                                                                                         |                               |                                                |              |
|                                                                                                                                                                                  | LHL□□□                                                                                                                                                                             |                               | Within the specified tolerance                 |              |
|                                                                                                                                                                                  | FBA/FBR                                                                                                                                                                            |                               |                                                |              |
| Test Methods and Remarks                                                                                                                                                         | LHL□□□<br>Measuring equipment : LCR meter (HP4285A + HP42851A or its equivalent)<br>: LCR meter (HP4263A) or its equivalent (at 1kHz)<br>Measuring frequency : Specified frequency |                               |                                                |              |
|                                                                                                                                                                                  |                                                                                                                                                                                    |                               |                                                |              |
| 7. DC Resistance                                                                                                                                                                 |                                                                                                                                                                                    |                               |                                                |              |
| Specified Value                                                                                                                                                                  | CAL45 Type                                                                                                                                                                         |                               |                                                |              |
|                                                                                                                                                                                  | LHL□□□                                                                                                                                                                             |                               | Within the specified tolerance                 |              |
|                                                                                                                                                                                  | FBA/FBR                                                                                                                                                                            |                               |                                                |              |
| Test Methods and Remarks                                                                                                                                                         | Measuring equipment : DC ohmmeter                                                                                                                                                  |                               |                                                |              |
|                                                                                                                                                                                  |                                                                                                                                                                                    |                               |                                                |              |
| 8. Self resonance frequency                                                                                                                                                      |                                                                                                                                                                                    |                               |                                                |              |
| Specified Value                                                                                                                                                                  | CAL45 Type                                                                                                                                                                         |                               |                                                |              |
|                                                                                                                                                                                  | LHL□□□                                                                                                                                                                             |                               | Within the specified tolerance                 |              |
|                                                                                                                                                                                  | FBA/FBR                                                                                                                                                                            |                               |                                                |              |
| Test Methods and Remarks                                                                                                                                                         | LHL□□□<br>Measuring equipment : (HP4191A, 4192A) its equivalent                                                                                                                    |                               |                                                |              |
|                                                                                                                                                                                  |                                                                                                                                                                                    |                               |                                                |              |
| 9. Temperature characteristic                                                                                                                                                    |                                                                                                                                                                                    |                               |                                                |              |
| Specified Value                                                                                                                                                                  | CAL45 Type                                                                                                                                                                         |                               |                                                |              |
|                                                                                                                                                                                  | LHL□□□                                                                                                                                                                             |                               | ΔL/L : Within ±7%                              |              |
|                                                                                                                                                                                  | FBA/FBR                                                                                                                                                                            |                               |                                                |              |
| Test Methods and Remarks                                                                                                                                                         | Change of maximum inductance deviation in step 1 to 5                                                                                                                              |                               |                                                |              |
|                                                                                                                                                                                  | Step                                                                                                                                                                               | Temperature (°C)              |                                                |              |
|                                                                                                                                                                                  |                                                                                                                                                                                    | LHL□□□                        |                                                |              |
|                                                                                                                                                                                  | 1                                                                                                                                                                                  | 20                            |                                                |              |
|                                                                                                                                                                                  | 2                                                                                                                                                                                  | Minimum operating temperature |                                                |              |
|                                                                                                                                                                                  | 3                                                                                                                                                                                  | 20 (Standard temperature)     |                                                |              |
|                                                                                                                                                                                  | 4                                                                                                                                                                                  | Maximum operating temperature |                                                |              |
|                                                                                                                                                                                  | 5                                                                                                                                                                                  | 20                            |                                                |              |
|                                                                                                                                                                                  |                                                                                                                                                                                    |                               |                                                |              |
| 10. Tensile strength test                                                                                                                                                        |                                                                                                                                                                                    |                               |                                                |              |
| Specified Value                                                                                                                                                                  | CAL45 Type                                                                                                                                                                         |                               |                                                |              |
|                                                                                                                                                                                  | LHL□□□                                                                                                                                                                             |                               | No abnormality such as cut lead, or looseness. |              |
|                                                                                                                                                                                  | FBA/FBR                                                                                                                                                                            |                               |                                                |              |
| Test Methods and Remarks                                                                                                                                                         | CAL45 Type : Apply the stated tensile force progressively in the direction to draw terminal.                                                                                       |                               |                                                |              |
|                                                                                                                                                                                  | force (N)                                                                                                                                                                          |                               | duration (s)                                   |              |
|                                                                                                                                                                                  | 10                                                                                                                                                                                 |                               | 10                                             |              |
|                                                                                                                                                                                  | LHL□□□ : Apply the stated tensile force progressively in the direction to draw terminal.                                                                                           |                               |                                                |              |
|                                                                                                                                                                                  | Nominal wire diameter tensile ϕd (mm)                                                                                                                                              |                               | force (N)                                      | duration (s) |
|                                                                                                                                                                                  | 0.3 < ϕd ≤ 0.5                                                                                                                                                                     |                               | 5                                              | 30 ± 5       |
|                                                                                                                                                                                  | 0.5 < ϕd ≤ 0.8                                                                                                                                                                     |                               | 10                                             |              |
|                                                                                                                                                                                  | 0.8 < ϕd ≤ 1.2                                                                                                                                                                     |                               | 25                                             |              |
| FBA/FBR : The body of a component shall be fixed and a tensile force of 20 ± 1N shall be applied to the lead wire in the axial direction of the component during 10 ± 1 seconds. |                                                                                                                                                                                    |                               |                                                |              |

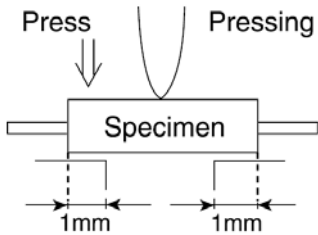
| 11. Over current         |                                                                                                                     |                                                                                          |
|--------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Specified Value          | CAL45 Type                                                                                                          | No emission of smoke no firing.                                                          |
|                          | LHL□□□                                                                                                              | There shall be no scorch or short of wire.<br>LHLC08, LHLC10 : There shall be no firing. |
|                          | FBA/FBR                                                                                                             |                                                                                          |
| Test Methods and Remarks | LHL□□□・CAL45 Type :<br>Measuring current : Rated current × 2<br>Duration : 5 min.<br>Number of measuring : one time |                                                                                          |

| 12. Terminal strength : bending                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                      |                       |                                                |                               |               |                       |                 |     |      |                 |   |      |                 |    |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------|-------------------------------|---------------|-----------------------|-----------------|-----|------|-----------------|---|------|-----------------|----|-----|
| Specified Value                                                                                                                                                                                                                                                       | CAL45 Type                                                                                                                                                                                                                                                                                           |                       | No abnormality such as cut lead, or looseness. |                               |               |                       |                 |     |      |                 |   |      |                 |    |     |
|                                                                                                                                                                                                                                                                       | LHL□□□                                                                                                                                                                                                                                                                                               |                       |                                                |                               |               |                       |                 |     |      |                 |   |      |                 |    |     |
|                                                                                                                                                                                                                                                                       | FBA/FBR                                                                                                                                                                                                                                                                                              |                       |                                                |                               |               |                       |                 |     |      |                 |   |      |                 |    |     |
| Test Methods and Remarks                                                                                                                                                                                                                                              | CAL45 Type :                                                                                                                                                                                                                                                                                         |                       |                                                |                               |               |                       |                 |     |      |                 |   |      |                 |    |     |
|                                                                                                                                                                                                                                                                       | Suspend a weight of specified mass at the end of the terminals and incline the body through the angle of 90 degrees and return it to the initial position. This operation is done over a period of 2-3 sec. Then second bend in the opposite direction shall be made.                                |                       |                                                |                               |               |                       |                 |     |      |                 |   |      |                 |    |     |
|                                                                                                                                                                                                                                                                       | Number of bends : Two times.                                                                                                                                                                                                                                                                         |                       |                                                |                               |               |                       |                 |     |      |                 |   |      |                 |    |     |
|                                                                                                                                                                                                                                                                       | <table><tr><td>Nominal wire diameter tensile</td><td>Bending force</td><td>Mass reference weight</td></tr><tr><td>0.3 &lt; ϕ d ≤ 0.5</td><td>2.5</td><td>0.25</td></tr><tr><td>0.5 &lt; ϕ d ≤ 0.8</td><td>5</td><td>0.50</td></tr></table>                                                           |                       |                                                | Nominal wire diameter tensile | Bending force | Mass reference weight | 0.3 < ϕ d ≤ 0.5 | 2.5 | 0.25 | 0.5 < ϕ d ≤ 0.8 | 5 | 0.50 |                 |    |     |
|                                                                                                                                                                                                                                                                       | Nominal wire diameter tensile                                                                                                                                                                                                                                                                        | Bending force         | Mass reference weight                          |                               |               |                       |                 |     |      |                 |   |      |                 |    |     |
|                                                                                                                                                                                                                                                                       | 0.3 < ϕ d ≤ 0.5                                                                                                                                                                                                                                                                                      | 2.5                   | 0.25                                           |                               |               |                       |                 |     |      |                 |   |      |                 |    |     |
|                                                                                                                                                                                                                                                                       | 0.5 < ϕ d ≤ 0.8                                                                                                                                                                                                                                                                                      | 5                     | 0.50                                           |                               |               |                       |                 |     |      |                 |   |      |                 |    |     |
| LHL□□□・FBA/FBR :                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                      |                       |                                                |                               |               |                       |                 |     |      |                 |   |      |                 |    |     |
| Suspend a weight of specified mass at the end of the terminals and incline the body through the angle of 90 degrees and return it to the initial position. This operation is done over a period of 2-3 sec. Then second bend in the opposite direction shall be made. |                                                                                                                                                                                                                                                                                                      |                       |                                                |                               |               |                       |                 |     |      |                 |   |      |                 |    |     |
| Number of bends : Two times.                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                      |                       |                                                |                               |               |                       |                 |     |      |                 |   |      |                 |    |     |
|                                                                                                                                                                                                                                                                       | <table><tr><td>Nominal wire diameter tensile</td><td>Bending force</td><td>Mass reference weight</td></tr><tr><td>0.3 &lt; ϕ d ≤ 0.5</td><td>2.5</td><td>0.25</td></tr><tr><td>0.5 &lt; ϕ d ≤ 0.8</td><td>5</td><td>0.5</td></tr><tr><td>0.8 &lt; ϕ d ≤ 1.2</td><td>10</td><td>1.0</td></tr></table> |                       |                                                | Nominal wire diameter tensile | Bending force | Mass reference weight | 0.3 < ϕ d ≤ 0.5 | 2.5 | 0.25 | 0.5 < ϕ d ≤ 0.8 | 5 | 0.5  | 0.8 < ϕ d ≤ 1.2 | 10 | 1.0 |
| Nominal wire diameter tensile                                                                                                                                                                                                                                         | Bending force                                                                                                                                                                                                                                                                                        | Mass reference weight |                                                |                               |               |                       |                 |     |      |                 |   |      |                 |    |     |
| 0.3 < ϕ d ≤ 0.5                                                                                                                                                                                                                                                       | 2.5                                                                                                                                                                                                                                                                                                  | 0.25                  |                                                |                               |               |                       |                 |     |      |                 |   |      |                 |    |     |
| 0.5 < ϕ d ≤ 0.8                                                                                                                                                                                                                                                       | 5                                                                                                                                                                                                                                                                                                    | 0.5                   |                                                |                               |               |                       |                 |     |      |                 |   |      |                 |    |     |
| 0.8 < ϕ d ≤ 1.2                                                                                                                                                                                                                                                       | 10                                                                                                                                                                                                                                                                                                   | 1.0                   |                                                |                               |               |                       |                 |     |      |                 |   |      |                 |    |     |

| 13. Insulation resistance : between the terminals and body |                                                             |            |
|------------------------------------------------------------|-------------------------------------------------------------|------------|
| Specified Value                                            | CAL45 Type                                                  |            |
|                                                            | LHL□□□                                                      | 100MΩ min. |
|                                                            | FBA/FBR                                                     |            |
| Test Methods and Remarks                                   | LHL□□□ :<br>Applied voltage : 500 VDC<br>Duration : 60 sec. |            |

| 14. Insulation resistance : between terminals and core |                                                                |          |
|--------------------------------------------------------|----------------------------------------------------------------|----------|
| Specified Value                                        | CAL45 Type                                                     |          |
|                                                        | LHL□□□                                                         |          |
|                                                        | FBA/FBR                                                        | 1MΩ min. |
| Test Methods and Remarks                               | FBA/FBR :<br>Applied voltage : 100 VDC<br>Duration : 60±5 sec. |          |

| 15. Withstanding : between the terminals and body |                                                                                                                 |                                          |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|------------------------------------------|
| Specified Value                                   | CAL45 Type                                                                                                      |                                          |
|                                                   | LHL□□□                                                                                                          | No abnormality such as insulation damage |
|                                                   | FBA/FBR                                                                                                         |                                          |
| Test Methods and Remarks                          | LHL□□□ :<br>According to JIS C5101-1.<br>Metal global method<br>Applied voltage : 500 VDC<br>Duration : 60 sec. |                                          |

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| 16. DC bias characteristic  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                |
| Specified Value             | CAL45 Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | $\Delta L/L$ : Within $-10\%$                                                                  |
|                             | LHL□□□                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                |
|                             | FBA/FBR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                |
| Test Methods and Remarks    | CAL45 Type : Measure inductance with application of rated current using LCR meter to compare it with the initial value.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                |
|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                |
| 17. Body strength           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                |
| Specified Value             | CAL45 Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | No abnormality as damage.                                                                      |
|                             | LHL□□□                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                |
|                             | FBA/FBR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | No abnormality such as cracks on body.                                                         |
| Test Methods and Remarks    | <div>CAL45 Type :<br/>Applied force :50N<br/>Duration : 10 sec.<br/>Speed : Shall attain to specified force in 2 sec.</div> <div>FBA :<br/>Applied force : <math>50\pm 3</math>N<br/>Duration : <math>30\pm 1</math> sec.</div> <div><div>Press</div><div></div><div>Pressing jig</div></div>                                                                                                                                                                                            |                                                                                                |
|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                |
| 18. Resistance to vibration |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                |
| Specified Value             | CAL45 Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | $\Delta L/L$ : Within $\pm 5\%$                                                                |
|                             | LHL□□□                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Appearance : No abnormality<br>$\Delta L/L$ : Within $\pm 5\%$<br>Q change : Within $\pm 30\%$ |
|                             | FBA/FBR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Appearance : No abnormality<br>Impedance change : Within $\pm 20\%$                            |
| Test Methods and Remarks    | <div>CAL45 Type :<br/>Directions : 2 hrs each in X, Y and Z directions total : 6hrs.<br/>Frequency range : 10 to 55 to 10Hz (1min.)<br/>Amplitude : 1.5mm<br/>Mounting method : Soldering onto printed board.<br/>Recovery : At least 1hr of recovery under the standard condition after the test, followed by the measurement within 2hrs.</div> <div>LHL□□□・FBA/FBR :<br/>Directions : 2 hrs each in X, Y and Z directions total : 6hrs.<br/>Frequency range : 10 to 55 to 10Hz (1min.)<br/>Amplitude : 1.5mm<br/>Mounting method : Soldering onto printed board.</div> |                                                                                                |
|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                |
| 19. Resistance to shock     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                |
| Specified Value             | CAL45 Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | No significant abnormality in appearance                                                       |
|                             | LHL□□□                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                |
|                             | FBA/FBR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                |
| Test Methods and Remarks    | <div>CAL45 Type :<br/>Drop test<br/>Impact material : concrete or vinyl tile<br/>Height : 1m<br/>Total number of drops : 10 times</div>                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                |

| 20. Solderability        |                                                                                                                                                                                                                                                                                                                           |                                                              |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| Specified Value          | CAL45 Type                                                                                                                                                                                                                                                                                                                | At least 75% of terminal electrode is covered by new solder. |
|                          | LHL□□□                                                                                                                                                                                                                                                                                                                    | At least 75% of terminal electrode is covered by new solder. |
|                          | FBA/FBR                                                                                                                                                                                                                                                                                                                   | At least 90% of terminal electrode is covered by new solder. |
| Test Methods and Remarks | CAL45 Type :<br>Solder temperature : 230±5°C<br>Duration : 2±0.5 sec.<br>LHL□□□ :<br>Solder temperature : 235±5°C<br>Duration : 2±0.5 sec.<br>Immersion depth : Up to 1.5mm from bottom of case.<br>FBA/FBR :<br>Solder temperature : 230±5°C<br>Duration : 3±1 sec.<br>Immersion depth : Up to 1.5mm from terminal root. |                                                              |

| 21. Resistance to soldering heat |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                      |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Specified Value                  | CAL45 Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ΔL/L : Within ±5%                                                                                    |
|                                  | LHL□□□                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | No significant abnormality in appearance<br>Inductance change : Within ±5%<br>Q change : Within ±30% |
|                                  | FBA/FBR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | No significant abnormality in appearance<br>Impedance change : Within ±20%                           |
| Test Methods and Remarks         | CAL45 Type :<br>Solder temperature : 270±5°C<br>Duration : 5±0.5 sec. One time<br>Immersed conditions : Inserted into substrate with t=1.6mm<br>Recovery : At least 1hr of recovery under the standard condition after the test, followed by the measurement within 2hrs.<br>LHL□□□ :<br>Solder bath method :<br>Solder temperature : 260±5°C<br>Duration : 10±1 sec.<br>: Up to 1.5mm from the bottom of case.<br>Manual soldering :<br>Solder temperature : 350±10°C (At the tip of soldering iron)<br>Duration : 5±1 sec.<br>: Up to 1.5mm from the bottom of case.<br>Caution : No excessive pressing shall be applied to terminals.<br>Recovery : 1 to 2hrs of recovery under the standard condition after the test.<br>FBA/FBR :<br>Solder bath method:<br>Condition 1 :<br>Solder temperature : 260±5°C<br>Duration : 10±1 sec.<br>Immersion depth : Up to 1.5mm from the terminal root.<br>Condition 2 :<br>Solder temperature : 350±5°C<br>Duration : 3±1 sec.<br>Immersion depth : Up to 1.5mm from the terminal root.<br>Recovery : 3hrs of recovery under the standard condition after the test. |                                                                                                      |

| 22. Resistance to solvent |                                                                                                                                                                          |                                                                            |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| Specified Value           | CAL45 Type                                                                                                                                                               | Please avoid the ultrasonic cleaning of this product.                      |
|                           | LHL□□□                                                                                                                                                                   |                                                                            |
|                           | FBA/FBR                                                                                                                                                                  | No significant abnormality in appearance<br>Impedance change : Within ±20% |
| Test Methods and Remarks  | FBA/FBR :<br>Solvent temperature : 20~25°C<br>Duration : 30±5 sec.<br>Solvent type : Acetone<br>Recovery : 3hrs of recovery under the standard condition after the test. |                                                                            |

23. Thermal shock

|                 |            |                                                                                                      |
|-----------------|------------|------------------------------------------------------------------------------------------------------|
| Specified Value | CAL45 Type | $\Delta L/L$ : Within $\pm 10\%$                                                                     |
|                 | LHL□□□     | Appearance : No abnormality<br>Inductance change : Within $\pm 10\%$<br>Q change : Within $\pm 30\%$ |
|                 | FBA/FBR    | Appearance : No abnormality<br>Impedance change : Within $\pm 20\%$                                  |

|                                                                                                        |                                                                                                                                                |                  |                 |
|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----------------|
| Test Methods and Remarks                                                                               | CAL45 Type: Conditions for 1 cycle                                                                                                             |                  |                 |
|                                                                                                        | Step                                                                                                                                           | Temperature (°C) | Duration (min.) |
|                                                                                                        | 1                                                                                                                                              | $-25 \pm 0 / -3$ | $30 \pm 3$      |
|                                                                                                        | 2                                                                                                                                              | Room temperature | Within 3        |
|                                                                                                        | 3                                                                                                                                              | $+85 \pm 2 / -0$ | $30 \pm 3$      |
|                                                                                                        | 4                                                                                                                                              | Room temperature | Within 3        |
|                                                                                                        | Number of cycles : 5 cycles                                                                                                                    |                  |                 |
|                                                                                                        | Recovery : At least 1hr of recovery under the standard condition after the removal from test chamber, followed by the measurement within 2hrs. |                  |                 |
|                                                                                                        | LHL□□□・FBA/FBR: According to JIS C60068-2-14.                                                                                                  |                  |                 |
|                                                                                                        | Conditions for 1 cycle                                                                                                                         |                  |                 |
| Step                                                                                                   | Temperature (°C)                                                                                                                               | Duration (min.)  |                 |
| 1                                                                                                      | Minimum operating temperature                                                                                                                  | $30 \pm 3$       |                 |
| 2                                                                                                      | Room temperature                                                                                                                               | Within 3         |                 |
| 3                                                                                                      | Maximum operating temperature                                                                                                                  | $30 \pm 3$       |                 |
| 4                                                                                                      | Room temperature                                                                                                                               | Within 3         |                 |
| Number of cycles : 10 cycles [LHL□□□]                                                                  |                                                                                                                                                |                  |                 |
| Recovery : 5 cycles (FBA/ FBR)                                                                         |                                                                                                                                                |                  |                 |
| : 1 to 2hrs of recovery under the standard condition after the removal from the test chamber. [LHL□□□] |                                                                                                                                                |                  |                 |
| : 3hrs of recovery under the standard condition after the removal from the test chamber. (FBA/ FBR)    |                                                                                                                                                |                  |                 |

| 24. Damp heat            |                                                                                                                                                                                                                                                    |                                                                   |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| Specified Value          | CAL45 Type                                                                                                                                                                                                                                         | $\Delta L/L$ : Within $\pm 10\%$                                  |
|                          | LHL□□□                                                                                                                                                                                                                                             |                                                                   |
|                          | FBA/FBR                                                                                                                                                                                                                                            | Appearance: No abnormality<br>Impedance change: Within $\pm 20\%$ |
| Test Methods and Remarks | CAL45 Type :<br>Temperature : $40 \pm 2^\circ\text{C}$<br>Humidity : $90 \sim 95\% \text{RH}$<br>Duration : 1000 hrs<br>Recovery : At least 1hr of recovery under the standard removal from test chamber, followed by the measurement within 2hrs. |                                                                   |
|                          | FBA/FBR :<br>Temperature : $60 \pm 2^\circ\text{C}$<br>Humidity : $90 \sim 95\% \text{RH}$<br>Duration : 1000 hrs<br>Recovery : 3hrs of recovery under the standard condition after the removal from the test chamber.                             |                                                                   |
|                          |                                                                                                                                                                                                                                                    |                                                                   |

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                      |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| 25. Loading under damp heat     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                      |
| Specified Value                 | CAL45 Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | $\Delta L/L$ : Within $\pm 10\%$                                                                     |
|                                 | LHL□□□                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Appearance : No abnormality<br>Inductance change : Within $\pm 10\%$<br>Q change : Within $\pm 30\%$ |
|                                 | FBA/FBR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                      |
| Test Methods and Remarks        | CAL45 Type :<br>Temperature : $40\pm 2^{\circ}\text{C}$<br>Humidity : $90\sim 95\%RH$<br>Duration : 1000 hrs<br>Applied current : Rated current<br>Recovery : At least 1hr of recovery under the standard removal from test chamber, followed by the measurement within 2hrs.<br>LHL□□□ :<br>Temperature : $40\pm 2^{\circ}\text{C}$<br>Humidity : $90\sim 95\%RH$<br>Duration : $1000+48/-0$ hrs<br>Applied current : Rated current<br>Recovery : 1 to 2hrs of recovery under the standard condition after the removal from the test chamber. |                                                                                                      |
| 26. Loading at high temperature |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                      |
| Specified Value                 | CAL45 Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | $\Delta L/L$ : Within $\pm 10\%$                                                                     |
|                                 | LHL□□□                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                      |
|                                 | FBA/FBR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                      |
| Test Methods and Remarks        | CAL45 Type :<br>Temperature : $85\pm 2^{\circ}\text{C}$<br>Duration : 1000 hrs<br>Applied current : Rated current<br>Recovery : At least 1hr of recovery under the standard removal from test chamber, followed by the measurement within 2hrs.                                                                                                                                                                                                                                                                                                |                                                                                                      |
| 27. Low temperature life test   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                      |
| Specified Value                 | CAL45 Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | $\Delta L/L$ : Within $\pm 10\%$                                                                     |
|                                 | LHL□□□                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Appearance : No abnormality<br>Inductance change : Within $\pm 10\%$<br>Q change : Within $\pm 30\%$ |
|                                 | FBA/FBR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                      |
| Test Methods and Remarks        | CAL45 Type :<br>Temperature : $-25\pm 2^{\circ}\text{C}$<br>Duration : 1000 hrs<br>Recovery : At least 1hr of recovery under the standard removal from test chamber, followed by the measurement within 2hrs.<br>LHL□□□ :<br>Temperature : $-40\pm 3^{\circ}\text{C}$<br>Duration : $1000+48/-0$ hrs<br>Recovery : 1 to 2hrs of recovery under the standard condition after the removal from the test chamber.                                                                                                                                 |                                                                                                      |
| 28. High temperature life test  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                      |
| Specified Value                 | CAL45 Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                      |
|                                 | LHL□□□                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Appearance : No abnormality<br>Inductance change : Within $\pm 10\%$<br>Q change : Within $\pm 30\%$ |
|                                 | FBA/FBR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                      |
| Test Methods and Remarks        | LHL□□□ :<br>Temperature : $105\pm 2^{\circ}\text{C}$<br>Duration : $1000+48/-0$ hrs<br>Recovery : 1 to 2hrs of recovery under the standard condition after the removal from the test chamber.                                                                                                                                                                                                                                                                                                                                                  |                                                                                                      |

# AXIAL LEADED INDUCTORS (CAL Type)、 RADIAL LEADED INDUCTORS (LH Type)、 LEADED FERRITE BEAD INDUCTORS (FB Series A Type/R Type)

## ■ PRECAUTIONS

| 1. Circuit Design                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Precautions                               | <p>◆ Operating environment</p> <p>1. The products described in this specification are intended for use in general electronic equipment, (office supply equipment, telecommunications systems, measuring equipment, and household equipment). They are not intended for use in mission-critical equipment or systems requiring special quality and high reliability (traffic systems, safety equipment, aerospace systems, nuclear control systems and medical equipment including life-support systems,) where product failure might result in loss of life, injury or damage. For such uses, contact TAIYO YUDEN Sales Department in advance.</p>                                                                                                                                                                                              |
| 2. PCB Design                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Precautions                               | <p>◆ Design</p> <p>1. Please design insertion pitches as matching to that of leads of the component on PCBs.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Technical considerations                  | <p>◆ Design</p> <p>1. When Inductors are mounted onto a PC board, hole dimensions on the board should match the lead pitch of the component, if not, it will cause breakage of the terminals or cracking of terminal roots covered with resin as excess stress travels through the terminal legs.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 3. Considerations for automatic placement |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Precautions                               | <p>◆ Adjustment of mounting machine</p> <p>1. Excessive impact load should not be imposed on the products when mounting onto the PC boards.</p> <p>2. Mounting and soldering conditions should be checked beforehand.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Technical considerations                  | <p>◆ Adjustment of mounting machine</p> <p>1. When installing products, care should be taken not to apply distortion stress as it may deform the products.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 4. Soldering                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Precautions                               | <p>◆ Wave soldering</p> <p>1. Please refer to the specifications in the catalog for a wave soldering.</p> <p>2. Do not immerse the entire inductor in the flux during the soldering operation.</p> <p>◆ Lead free soldering</p> <p>1. When using products with lead free soldering, we request to use them after confirming adhesion, temperature of resistance to soldering heat, soldering etc sufficiently.</p> <p>◆ Recommended conditions for using a soldering iron:</p> <ul style="list-style-type: none"> <li>• Put the soldering iron on the land-pattern.</li> <li>• Soldering iron's temperature – Below 350°C</li> <li>• Duration – 3 seconds or less</li> <li>• The soldering iron should not directly touch the inductor.</li> </ul> <p>◆ Reflow soldering</p> <p>1. As for reflow soldering, please contact our sales staff.</p> |
| Technical considerations                  | <p>◆ Lead free soldering</p> <p>1. If products are used beyond the range of the recommended conditions, heat stresses may deform the products, and consequently degrade the reliability of the products.</p> <p>◆ Recommended conditions for using a soldering iron</p> <p>If products are used beyond the range of the recommended conditions, heat stresses may deform the products, and consequently degrade the reliability of the products.</p>                                                                                                                                                                                                                                                                                                                                                                                            |
| 5. Cleaning                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Precautions                               | <p>◆ Cleaning conditions</p> <p>1. CAL type, LH type</p> <p>Please do not do cleaning by a supersonic wave.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Technical considerations                  | <p>◆ Cleaning conditions</p> <p>1. CAL type, LH type,</p> <p>If washing by supersonic waves, supersonic waves may deform products.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |



| 6. Handling              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Precautions              | <p>◆Handling</p> <ol style="list-style-type: none"> <li>1. Keep the inductors away from all magnets and magnetic objects.</li> </ol> <p>◆Mechanical considerations</p> <ol style="list-style-type: none"> <li>1. Please do not give the inductors any excessive mechanical shocks.</li> <li>2. LH type<br/>If inductors are dropped onto the floor or a hard surface they should not be used.</li> </ol> <p>◆Packing</p> <ol style="list-style-type: none"> <li>1. Please do not give the inductors any excessive mechanical shocks.<br/>In loading, please pay attention to handling indication mentioned in a packing box (a loading direction / number of maximum loading / fragile item).</li> </ol>                             |
| Technical considerations | <p>◆Handling</p> <ol style="list-style-type: none"> <li>1. There is a case that a characteristic varies with magnetic influence.</li> </ol> <p>◆Mechanical considerations</p> <ol style="list-style-type: none"> <li>1. There is a case to be damaged by a mechanical shock.</li> <li>2. LH type<br/>There is a case to be broken by a fall.</li> </ol> <p>◆Packing</p> <ol style="list-style-type: none"> <li>1. There is a case that a lead wire could be deformed by a fall or an excessive shock.</li> </ol>                                                                                                                                                                                                                     |
| 7. Storage conditions    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Precautions              | <p>◆Storage</p> <ol style="list-style-type: none"> <li>1. To maintain the solderability of terminal electrodes and to keep the packing material in good condition, temperature and humidity in the storage area should be controlled.<br/>Recommended conditions <ul style="list-style-type: none"> <li>•Ambient temperature 0~40°C</li> <li>•Humidity Below 70% RH</li> </ul> The ambient temperature must be kept below 30°C. Even under ideal storage conditions, solderability of products electrodes may decrease as time passes.<br/>For this reason, inductors should be used within one year from the time of delivery.<br/>In case of storage over 6 months, solderability shall be checked before actual usage.</li> </ol> |
| Technical considerations | <p>◆Storage</p> <ol style="list-style-type: none"> <li>1. Under a high temperature and humidity environment, problems such as reduced solderability caused by oxidation of terminal electrodes and deterioration of taping/packaging materials may take place.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                            |



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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