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## REMINDERS

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- Please conduct validation and verification of our products in actual condition of mounting and operating environment before using our products.
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Please do not incorporate our products into any equipment requiring high levels of safety and/or reliability (e.g., aerospace equipment, aviation equipment\*, medical equipment classified as Class IV by IMDRF, nuclear control equipment, undersea equipment, military equipment).

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When our products are used even for high safety and/or reliability-required devices or circuits of general electronic equipment, it is strongly recommended to perform a thorough safety evaluation prior to use of our products and to install a protection circuit as necessary.

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Some of our products listed in this catalog may require specific procedures for export according to "U.S. Export Administration Regulations", "Foreign Exchange and Foreign Trade Control Law" of Japan, and other applicable regulations. Should you have any questions on this matter, please contact our sales staff.

# 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<br>(0.354 max)  | 9.5 max<br>(0.374 max)  | 5.0±1.0<br>(0.197±0.039) | 5.0±1.0<br>(0.197±0.039) | 0.6±0.05<br>(0.024±0.002) | —                       | 100  | 1000   |
| LH L 10 | 11.0 max<br>(0.433 max) | 14.0 max<br>(0.551 max) | 5.0±1.0<br>(0.197±0.039) | 5.0±1.0<br>(0.197±0.039) | 0.6±0.05<br>(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>[μH] | Inductance<br>tolerance | Q<br>(min.) | Self-resonant<br>frequency<br>[MHz] (min.) | DC Resistance<br>[Ω] (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)

## LHLC08

| 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.

▶ 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.ty-top.com/>).

● LHLC08, LHLC10



| Type   | Dimensions      |                 |  |  |   |
|--------|-----------------|-----------------|--|--|---|
|        | $\phi D$ (max)  | $H_2$ (max)     | $F^*$                                  | $l$                                    | $\phi d$                                |
| 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>( $\phi 0.433 \text{max}$ ) |
| $H_1$    | 30.5max<br>(1.20max)                                  | 34.0max<br>(1.34max)                                  |
| H        | $18.0 + 2.0 / - 0.0$<br>( $0.709 + 0.079 / - 0.000$ ) | $18.0 + 2.0 / - 0.0$<br>( $0.709 + 0.079 / - 0.000$ ) |
| $H_2$    | 9.5max<br>(0.374max)                                  | 14.0max<br>(0.551max)                                 |
| 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>( $0.709 + 0.039 / - 0.020$ ) |
| $W_0$    | 12.5min<br>(0.492min)                                 | 12.5min<br>(0.492min)                                 |
| $W_1$    | $9.0 \pm 0.5$<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>(0.118max)                   | $3.0 \text{max}^{*2}$<br>(0.118max)                   |
| $D_0$    | $\phi 4.0 \pm 0.2$<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         |  |   |  |
|--------------------------|--|---|--|
| Specified Value          | CAL45 Type   | Within the specified tolerance  |  |
|                          | LHL□□□   |   |  |
|                          | FBA/FBR  |   |  |
| Test Methods and Remarks | CAL45 Type :   | The maximum DC value having inductance within 10% and temperature increase within 40°C by the application of DC bias. |  |
|                          | LHL□□□ :   |   | 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. |
|                          | Reference temperature  |   | : 25°C (LHL08, LHL10)  |
|                          |  |   | : 40°C (LHLC08, LHLC10)  |
| FBA/FBR :                | No disconnection or appearance abnormality by continuous current application for 30 min. Change after the application shall be within ±20% of the initial value. |   |  |
|                          | This is not guaranteed for electrical characteristics during current application.  |   |  |

| 4. Impedance             |            |   |
|--------------------------|------------|---|
| Specified Value          | CAL45 Type | Within the specified tolerance  |
|                          | LHL□□□     |   |
|                          | FBA/FBR    |   |
| Test Methods and Remarks | FBA/FBR :  | 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 : | Measuring equipment : LCR meter (HP4285A + HP42851A or its equivalent)<br>Measuring frequency : Specified frequency |   |
|                          | LHL□□□ :     |   | Measuring equipment : LCR meter (HP4285A + HP42851A or its equivalent)<br>Measuring frequency : LCR meter (HP4263A) or its equivalent (at 1kHz) |
|                          |              |   | Measuring frequency : Specified frequency   |
|                          |              |   |   |

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| 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□□□   | $\Delta L/L$ : Within $\pm 7\%$ |                  |        |   |    |   |                               |   |                           |   |                               |   |    |  |
|                               | FBA/FBR  |                                 |                  |        |   |    |   |                               |   |                           |   |                               |   |    |  |
| Test Methods and Remarks      | Change of maximum inductance deviation in step 1 to 5  |                                 |                  |        |   |    |   |                               |   |                           |   |                               |   |    |  |
|                               | <table border="1"> <thead> <tr> <th rowspan="2">Step</th> <th>Temperature (°C)</th> </tr> <tr> <th>LHL□□□</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>20</td> </tr> <tr> <td>2</td> <td>Minimum operating temperature</td> </tr> <tr> <td>3</td> <td>20 (Standard temperature)</td> </tr> <tr> <td>4</td> <td>Maximum operating temperature</td> </tr> <tr> <td>5</td> <td>20</td> </tr> </tbody> </table> | Step                            | Temperature (°C) | LHL□□□ | 1 | 20 | 2 | Minimum operating temperature | 3 | 20 (Standard temperature) | 4 | Maximum operating temperature | 5 | 20 |  |
| 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                    | <p>CAL45 Type : Apply the stated tensile force progressively in the direction to draw terminal.</p> <table border="1"> <thead> <tr> <th>force (N)</th> <th>duration (s)</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>10</td> </tr> </tbody> </table> <p>LHL□□□ : Apply the stated tensile force progressively in the direction to draw terminal.</p> <table border="1"> <thead> <tr> <th>Nominal wire diameter tensile <math>\phi d</math> (mm)</th> <th>force (N)</th> <th>duration (s)</th> </tr> </thead> <tbody> <tr> <td><math>0.3 &lt; \phi d \leq 0.5</math></td> <td>5</td> <td rowspan="3">30 <math>\pm</math> 5</td> </tr> <tr> <td><math>0.5 &lt; \phi d \leq 0.8</math></td> <td>10</td> </tr> <tr> <td><math>0.8 &lt; \phi d \leq 1.2</math></td> <td>25</td> </tr> </tbody> </table> <p>FBA/FBR : The body of a component shall be fixed and a tensile force of 20 <math>\pm</math> 1N shall be applied to the lead wire in the axial direction of the component during 10 <math>\pm</math> 1 seconds.</p> | force (N)                                      | duration (s) | 10 | 10 | Nominal wire diameter tensile $\phi d$ (mm) | force (N) | duration (s) | $0.3 < \phi d \leq 0.5$ | 5 | 30 $\pm$ 5 | $0.5 < \phi d \leq 0.8$ | 10 | $0.8 < \phi d \leq 1.2$ | 25 |  |
| force (N)                                   | duration (s)   |  |              |    |    |   |           |              |                         |   |            |                         |    |                         |    |  |
| 10  | 10   |  |              |    |    |   |           |              |                         |   |            |                         |    |                         |    |  |
| Nominal wire diameter tensile $\phi d$ (mm) | force (N)  | duration (s)                                   |              |    |    |   |           |              |                         |   |            |                         |    |                         |    |  |
| $0.3 < \phi d \leq 0.5$                     | 5  | 30 $\pm$ 5                                     |              |    |    |   |           |              |                         |   |            |                         |    |                         |    |  |
| $0.5 < \phi d \leq 0.8$                     | 10   |  |              |    |    |   |           |              |                         |   |            |                         |    |                         |    |  |
| $0.8 < \phi d \leq 1.2$                     | 25   |  |              |    |    |   |           |              |                         |   |            |                         |    |                         |    |  |

| 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 :<br>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.<br>Number of bends : Two times.                         |  |                               |               |                       |                         |     |      |                         |   |      |                         |    |     |
|   | <table border="1"> <thead> <tr> <th>Nominal wire diameter tensile</th> <th>Bending force</th> <th>Mass reference weight</th> </tr> </thead> <tbody> <tr> <td><math>0.3 &lt; \phi d \leq 0.5</math></td> <td>2.5</td> <td>0.25</td> </tr> <tr> <td><math>0.5 &lt; \phi d \leq 0.8</math></td> <td>5</td> <td>0.50</td> </tr> </tbody> </table> |  | Nominal wire diameter tensile | Bending force | Mass reference weight | $0.3 < \phi d \leq 0.5$ | 2.5 | 0.25 | $0.5 < \phi d \leq 0.8$ | 5 | 0.50 |                         |    |     |
|   | Nominal wire diameter tensile   | Bending force                                  | Mass reference weight         |               |                       |                         |     |      |                         |   |      |                         |    |     |
| $0.3 < \phi d \leq 0.5$   | 2.5   | 0.25   |                               |               |                       |                         |     |      |                         |   |      |                         |    |     |
| $0.5 < \phi d \leq 0.8$   | 5   | 0.50   |                               |               |                       |                         |     |      |                         |   |      |                         |    |     |
| LHL□□□·FBA/FBR :<br>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.<br>Number of bends : Two times.   |   |  |                               |               |                       |                         |     |      |                         |   |      |                         |    |     |
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| Nominal wire diameter tensile   | Bending force   | Mass reference weight                          |                               |               |                       |                         |     |      |                         |   |      |                         |    |     |
| $0.3 < \phi d \leq 0.5$   | 2.5   | 0.25   |                               |               |                       |                         |     |      |                         |   |      |                         |    |     |
| $0.5 < \phi d \leq 0.8$   | 5   | 0.5  |                               |               |                       |                         |     |      |                         |   |      |                         |    |     |
| $0.8 < \phi d \leq 1.2$   | 10  | 1.0  |                               |               |                       |                         |     |      |                         |   |      |                         |    |     |

| 13. Insulation resistance : between the terminals and body |   |             |
|--|---|-------------|
| Specified Value  | CAL45 Type  | 100M Ω min. |
|  | LHL□□□  |             |
|  | 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   | 1M Ω min. |
|  | LHL□□□   |           |
|  | FBA/FBR  |           |
| 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  | No abnormality such as insulation damage |
|   | LHL□□□  |  |
|   | 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. |  |

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| 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 | <p>CAL45 Type :</p> <p>Applied force : 50N<br/>Duration : 10 sec.<br/>Speed : Shall attain to specified force in 2 sec.</p> <p>FBA :</p> <p>Applied force : <math>50 \pm 3</math>N<br/>Duration : <math>30 \pm 1</math> sec.</p>  |  |

| 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    | <p>CAL45 Type :</p> <p>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.</p> <p>LHL□□□·FBA/FBR :</p> <p>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.</p> |  |

| 19. Resistance to shock  |   |  |
|--------------------------|---|--|
| Specified Value          | CAL45 Type  | No significant abnormality in appearance |
|                          | LHL□□□  |  |
|                          | FBA/FBR   |  |
| Test Methods and Remarks | <p>CAL45 Type :</p> <p>Drop test</p> <p>Impact material : concrete or vinyl tile<br/>Height : 1m<br/>Total number of drops : 10 times</p> |  |

| 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 : Solder temperature : 260±5°C<br>Duration : 10±1 sec.<br>: Up to 1.5mm from the bottom of case.<br>Manual soldering : 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 : Solder temperature : 260±5°C<br>Duration : 10±1 sec.<br>Immersion depth : Up to 1.5mm from the terminal root.<br>Condition 2 : 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. |  |

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| 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  |  |                  |                 |                               |            |           |                  |                  |          |                               |            |           |                  |                  |          |  |
|   | <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Duration (min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td><math>-25+0/-3</math></td> <td><math>30\pm 3</math></td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>Within 3</td> </tr> <tr> <td>3</td> <td><math>+85+2/-0</math></td> <td><math>30\pm 3</math></td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>Within 3</td> </tr> </tbody> </table> | Step   | Temperature (°C) | Duration (min.) | 1                             | $-25+0/-3$ | $30\pm 3$ | 2                | Room temperature | Within 3 | 3                             | $+85+2/-0$ | $30\pm 3$ | 4                | Room temperature | Within 3 |  |
|   | Step  | Temperature (°C)   | Duration (min.)  |                 |                               |            |           |                  |                  |          |                               |            |           |                  |                  |          |  |
|   | 1   | $-25+0/-3$   | $30\pm 3$        |                 |                               |            |           |                  |                  |          |                               |            |           |                  |                  |          |  |
|   | 2   | Room temperature   | Within 3         |                 |                               |            |           |                  |                  |          |                               |            |           |                  |                  |          |  |
| 3   | $+85+2/-0$  | $30\pm 3$  |                  |                 |                               |            |           |                  |                  |          |                               |            |           |                  |                  |          |  |
| 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.<br>Conditions for 1 cycle   |   |  |                  |                 |                               |            |           |                  |                  |          |                               |            |           |                  |                  |          |  |
| <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Duration (min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Minimum operating temperature</td> <td><math>30\pm 3</math></td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>Within 3</td> </tr> <tr> <td>3</td> <td>Maximum operating temperature</td> <td><math>30\pm 3</math></td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>Within 3</td> </tr> </tbody> </table> | 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         |          |  |
| 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)<br>: 1 to 2hrs of recovery under the standard condition after the removal from the test chamber. [LHL□□□]<br>: 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 :   |   |
|                          | Temperature  | : $40\pm 2^{\circ}\text{C}$   |
|                          | Humidity   | : 90~95%RH  |
|                          | Duration   | : 1000 hrs  |
|                          | Recovery   | : At least 1hr of recovery under the standard removal from test chamber, followed by the measurement within 2hrs. |
| FBA/FBR :                |  |   |
| Temperature              | : $60\pm 2^{\circ}\text{C}$  |   |
| Humidity                 | : 90~95%RH   |   |
| Duration                 | : 1000 hrs   |   |
| 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. |  |

▶ 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.ty-top.com/>).

# 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.<br/>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.<br/>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<br/>Please do not do cleaning by a supersonic wave.</p>  |
| Technical considerations                  | <p>◆Cleaning conditions</p> <p>1. CAL type, LH type,<br/>If washing by supersonic waves, supersonic waves may deform products.</p>   |

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



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:

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- 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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