

有关本公司产品的注意事项

请务必在使用本公司产品目录之前阅读。

注意事项

■ 本产品目录中记载的内容是至2013年10月的内容。本产品目录记载的内容由于产品的改良等原因发生变更时，恕不另行通知。在您订购我司产品之前请确认最新的产品信息。

当您计划在本产品目录记载内容，或是《交货规格书》的规定范围以外使用我司产品时，由于使用我司产品引起的该应用设备的瑕疵我司将不承担任何责任。

■ 有关详细的产品规格我们准备有《交货规格书》，请向我司咨询相关事宜。

■ 在您使用我司产品时，请务必进行应用设备实装状态以及应用产品实际使用环境下的测评。

■ 本产品目录中记载的电子元器件，电路产品等产品适用于一般电子设备。

『AV设备，OA设备，家电及办公设备，信息/通讯设备（手机，电脑等）』

当您计划把本产品目录中记载的产品使用于可能会危及第三方生命安全的应用设备时，请务必提前与我公司取得联系，针对产品信息加以确认。

【运输用设备（火车控制设备，船舶控制设备等），交通用信号设备，防灾设备，医疗用设备，公共性高的信息通信设备等（电话程控交换机，电话，无线电，电视信号等基地局）】

另外，请不要在要求高度安全性，可靠性的应用设备上使用本产品目录中记载的产品。【航天设备，航空设备，核控制设备，用于海底的设备，军事设备等】

同时，应用于安全性，可靠性要求较高的一般电子设备/电路时，请充分进行安全性测评，必要时请在设计过程中追加保护电路。

■ 本产品目录中所记载的内容适用于通过我司营业所，销售子公司，销售代理店（即正规销售渠道）购买的我司产品。通过其他渠道购买的我司产品不在适用范围之内。

■ 由于使用本产品目录记载的产品引起的有关第三方知识产权的冲突，我司概不负责。本产品目录不代表相关权利的实施许诺。

■ 有关出口的注意事项

本产品目录中记载的产品中，部分产品在出口时会被归为“外汇及外贸管理法，美国出口管理法规”的管制货物，请及时实施相关手续，依据相关法律法规进行出口。需确认时，可向我司咨询。

多层共模模式扼流线圈（MC 系列F 型）



回流焊

■ 型号标示法

※使用温度范围: -40~+85℃

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | C | F | 0 | 8 | 0 | 6 | 2 | G | 1 | 2 | 0 | - | T | △ |
| ① | | | ② | | | | ③ | ④ | | | ⑤ | | ⑥ | ⑦ |

△=空格

①类型

| 代码 | 类型 |
|-----|------------|
| MCF | 多层共模模式扼流线圈 |

②尺寸

| 代码 | 尺寸[mm] |
|------|-------------|
| 0605 | 0.65 × 0.50 |
| 0806 | 0.85 × 0.65 |
| 1210 | 1.25 × 1.0 |
| 2010 | 2.0 × 1.0 |

③匝数

| 代码 | 匝数 |
|----|-----|
| 2 | 2 线 |
| 4 | 4 线 |

④材料

| 代码 | 材料 |
|----|----------------|
| G | 材料不同时，阻抗值也有所变化 |
| E | |

⑤标称共模阻抗值

| 代码(例) | 标称共模阻抗值 |
|-------|---------|
| 120 | 12 |
| 900 | 90 |

⑥包装

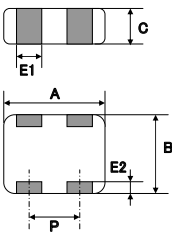
| 代码 | 包装 |
|----|------|
| -T | 卷盘带装 |

⑦本公司管理记号

| 代码 | 本公司管理记号 |
|----|---------|
| △ | 标准品 |

■ 标准外型尺寸／标准数量／等价电路

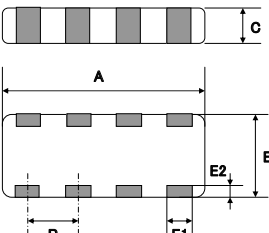
2 线



Equivalent Circuit

•No polarity

4 线



Equivalent Circuit

•No polarity

| Type | A | B | C | E1 | E2 | P | 标准数量 [pcs] 卷盘带装 |
|---------|----------------------------|----------------------------|----------------------------|--|---|----------------------------|-----------------------|
| MCF0605 | 0.65±0.05 (0.026±0.002) | 0.50±0.05 (0.020±0.002) | 0.30±0.05 (0.012±0.002) | 0.15±0.1 (0.006±0.004) | 0.12±0.1 (0.005±0.004) | 0.40±0.10 (0.016±0.004) | 15000 |
| MCF0806 | 0.85±0.05 (0.033±0.002) | 0.65±0.05 (0.026±0.002) | 0.40±0.05 (0.016±0.002) | 0.27±0.1 (0.011±0.004) | 0.2 +0.05/-0.1 (0.008 +0.002/-0.004) | 0.50±0.10 (0.020±0.004) | 10000 |
| MCF1210 | 1.0±0.15 (0.039±0.006) | 1.25±0.15 (0.049±0.006) | 0.55±0.1 (0.022±0.004) | 0.3±0.1 (0.012±0.004) | 0.2±0.1 (0.008±0.004) | 0.55±0.10 (0.022±0.004) | 5000 |
| MCF2010 | 2.0±0.15 (0.079±0.006) | 1.0±0.15 (0.039±0.006) | 0.45±0.1 (0.018±0.004) | 0.25 +0.15/-0.1 (0.010 +0.006/-0.004) | 0.25±0.15 (0.010±0.006) | 0.50±0.10 (0.020±0.004) | 4000 |

▶ 本产品目录根据版面大小，仅记载了代表性产品规格，若考虑使用本公司产品时，请确认供货规格型号明细表中的详细规格。
有关各商品的详细信息(特性图、可靠性信息、使用时的注意事项等)，请参阅本公司网站(<http://www.ty-top.com/>)。

■ 型号一览

● MCF0605型

| 型号 | EHS | 匝数 | 共模阻抗 [Ω] | 测试频率 [MHz] | 直流电阻 [Ω] (max.) | 额定电流 [A] (max.) | 额定电压 [V] | 绝缘阻抗 [MΩ] (min.) |
|-----------------|------|----|-------------|---------------|--------------------|--------------------|-------------|---------------------|
| MCF0605 2G120-T | RoHS | 2 | 12±5 | 100 | 2.5 | 0.05 | 5 | 100 |
| MCF0605 2G350-T | RoHS | 2 | 35±20% | 100 | 6.5 | 0.05 | 5 | 100 |
| MCF0605 2E600-T | RoHS | 2 | 60±25% | 100 | 4.75 | 0.05 | 5 | 100 |
| MCF0605 2E900-T | RoHS | 2 | 90±25% | 100 | 6.5 | 0.05 | 5 | 100 |

● MCF0806型

| 型号 | EHS | 匝数 | 共模阻抗 [Ω] | 测试频率 [MHz] | 直流电阻 [Ω] (max.) | 额定电流 [A] (max.) | 额定电压 [V] | 绝缘阻抗 [MΩ] (min.) |
|-----------------|------|----|-------------|---------------|--------------------|--------------------|-------------|---------------------|
| MCF0806 2G120-T | RoHS | 2 | 12±5 | 100 | 2.5 | 0.13 | 5 | 100 |
| MCF0806 2G330-T | RoHS | 2 | 33±20% | 100 | 2.5 | 0.10 | 5 | 100 |
| MCF0806 2G470-T | RoHS | 2 | 47±20% | 100 | 5.0 | 0.10 | 5 | 100 |
| MCF0806 2G900-T | RoHS | 2 | 90±20% | 100 | 6.5 | 0.10 | 5 | 100 |

● MCF1210型

| 型号 | EHS | 匝数 | 共模阻抗 [Ω] | 测试频率 [MHz] | 直流电阻 [Ω] (max.) | 额定电流 [A] (max.) | 额定电压 [V] | 绝缘阻抗 [MΩ] (min.) |
|-----------------|------|----|-------------|---------------|--------------------|--------------------|-------------|---------------------|
| MCF1210 2G400-T | RoHS | 2 | 40±25% | 100 | 2.5 | 0.10 | 5 | 100 |
| MCF1210 2G900-T | RoHS | 2 | 90±25% | 100 | 4.5 | 0.10 | 5 | 100 |

● MCF2010型

| 型号 | EHS | 匝数 | 共模阻抗 [Ω] | 测试频率 [MHz] | 直流电阻 [Ω] (max.) | 额定电流 [A] (max.) | 额定电压 [V] | 绝缘阻抗 [MΩ] (min.) |
|-----------------|------|----|-------------|---------------|--------------------|--------------------|-------------|---------------------|
| MCF2010 4G900-T | RoHS | 4 | 90±25% | 100 | 4.5 | 0.10 | 5 | 100 |

Multilayer chip inductors

Multilayer chip inductors for high frequency, Multilayer chip bead inductors

Multilayer common mode choke coils (MC series F type)

PACKAGING

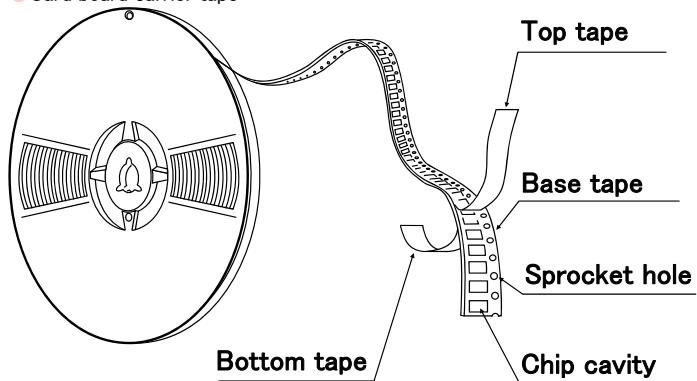
① Minimum Quantity

● Tape & Reel Packaging

| Type | Thickness mm (inch) | Standard Quantity [pcs] | |
|-----------------|------------------------|-------------------------|---------------|
| | | Paper Tape | Embossed Tape |
| CK1608 (0603) | 0.8 (0.031) | 4000 | — |
| CK2125 (0805) | 0.85 (0.033) | 4000 | — |
| | 1.25 (0.049) | — | 2000 |
| CKS2125 (0805) | 0.85 (0.033) | 4000 | — |
| | 1.25 (0.049) | — | 2000 |
| CKP1608 (0603) | 0.8 (0.031) | 4000 | — |
| CKP2012 (0805) | 0.9 (0.035) | — | 3000 |
| CKP2016 (0806) | 0.9 (0.035) | — | 3000 |
| CKP2520 (1008) | 0.7 (0.028) | — | 3000 |
| | 0.9 (0.035) | — | 3000 |
| | 1.1 (0.043) | — | 2000 |
| NM2012 (0805) | 0.9 (0.035) | — | 3000 |
| NM2520 (1008) | 0.9 (0.035) | — | 3000 |
| | 1.1 (0.043) | — | 2000 |
| LK1005 (0402) | 0.5 (0.020) | 10000 | — |
| LK1608 (0603) | 0.8 (0.031) | 4000 | — |
| | 0.85 (0.033) | 4000 | — |
| LK2125 (0805) | 1.25 (0.049) | — | 2000 |
| | — | — | — |
| HK0402 (01005) | 0.2 (0.008) | 20000 | — |
| HK0603 (0201) | 0.3 (0.012) | 15000 | — |
| HK1005 (0402) | 0.5 (0.020) | 10000 | — |
| HK1608 (0603) | 0.8 (0.031) | 4000 | — |
| HK2125 (0805) | 0.85 (0.033) | — | 4000 |
| | 1.0 (0.039) | — | 3000 |
| HKQ0402 (01005) | 0.2 (0.008) | 20000 | 40000 |
| HKQ0603W (0201) | 0.3 (0.012) | 15000 | — |
| HKQ0603C (0201) | 0.3 (0.012) | 15000 | — |
| HKQ0603S (0201) | 0.3 (0.012) | 15000 | — |
| HKQ0603U (0201) | 0.3 (0.012) | 15000 | — |
| AQ105 (0402) | 0.5 (0.020) | 10000 | — |
| BK0402 (01005) | 0.2 (0.008) | 20000 | — |
| BK0603 (0201) | 0.3 (0.012) | 15000 | — |
| BK1005 (0402) | 0.5 (0.020) | 10000 | — |
| BKH0603 (0201) | 0.3 (0.012) | 15000 | — |
| BKH1005 (0402) | 0.5 (0.020) | 10000 | — |
| BK1608 (0603) | 0.8 (0.031) | 4000 | — |
| BK2125 (0805) | 0.85 (0.033) | 4000 | — |
| | 1.25 (0.049) | — | 2000 |
| BK2010 (0804) | 0.45 (0.018) | 4000 | — |
| BK3216 (1206) | 0.8 (0.031) | — | 4000 |
| BKP0603 (0201) | 0.3 (0.012) | 15000 | — |
| BKP1005 (0402) | 0.5 (0.020) | 10000 | — |
| BKP1608 (0603) | 0.8 (0.031) | 4000 | — |
| BKP2125 (0805) | 0.85 (0.033) | 4000 | — |
| MCF0605 (0202) | 0.3 (0.012) | 15000 | — |
| MCF0806 (0302) | 0.4 (0.016) | — | 10000 |
| MCF1210 (0504) | 0.55 (0.022) | — | 5000 |
| MCF2010 (0804) | 0.45 (0.018) | — | 4000 |

②Taping material

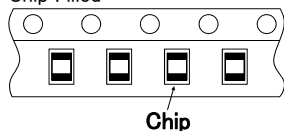
● Card board carrier tape



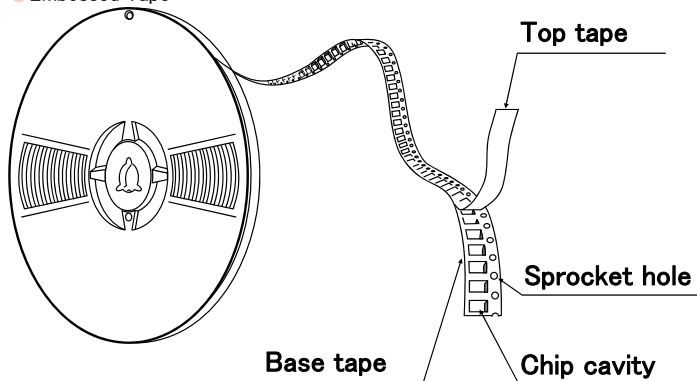
| | |
|-----|------|
| CK | 1608 |
| CKP | 1608 |
| CK | 2125 |
| CKS | 2125 |
| LK | 1005 |
| LK | 1608 |
| LK | 2125 |
| HK | 0402 |
| HK | 0603 |
| HK | 1005 |
| HK | 1608 |
| HKQ | 0402 |
| HKQ | 0603 |
| AQ | 105 |

| | |
|-----|------|
| BK | 0402 |
| BK | 0603 |
| BK | 1005 |
| BK | 1608 |
| BK | 2125 |
| BK | 2010 |
| BKP | 0603 |
| BKP | 1005 |
| BKP | 1608 |
| BKP | 2125 |
| BKH | 0603 |
| BKH | 1005 |
| MCF | 0605 |

Chip Filled



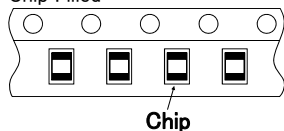
● Embossed Tape



| | |
|-----|------|
| CK | 2125 |
| CKS | 2125 |
| CKP | 2012 |
| CKP | 2016 |
| CKP | 2520 |
| NM | 2012 |
| NM | 2520 |
| LK | 2125 |
| HKQ | 0402 |
| HK | 2125 |

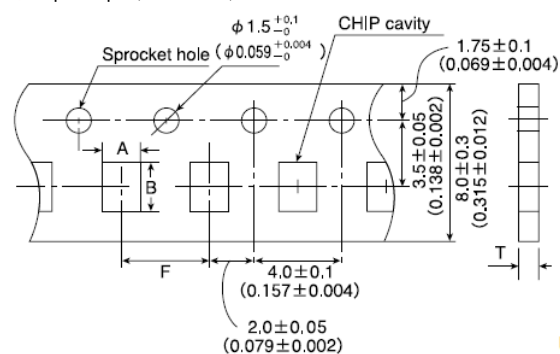
| | |
|-----|------|
| BK | 2125 |
| BK | 3216 |
| MCF | 0806 |
| MCF | 1210 |
| MCF | 2010 |

Chip Filled



③Taping Dimensions

● Paper tape (8mm wide)

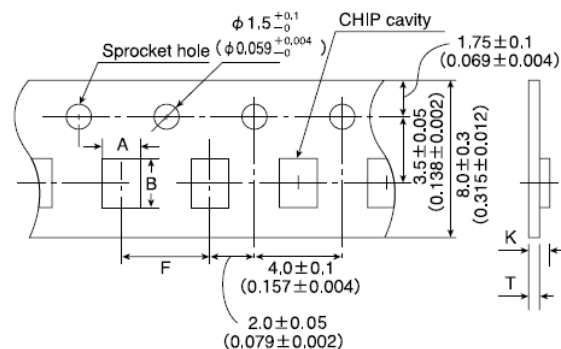


Unit : mm (inch)

| Type | Thickness mm (inch) | Chip cavity | | Insertion Pitch | Tape Thickness |
|-----------------|------------------------|----------------------------|----------------------------|---------------------------|-----------------------|
| | | A | B | F | T |
| CK1608 (0603) | 0.8 (0.031) | 1.0±0.2 (0.039±0.008) | 1.8±0.2 (0.071±0.008) | 4.0±0.1 (0.157±0.004) | 1.1max (0.043max) |
| CK2125 (0805) | 0.85 (0.033) | 1.5±0.2 (0.059±0.008) | 2.3±0.2 (0.091±0.008) | 4.0±0.1 (0.157±0.004) | 1.1max (0.043max) |
| CKS2125 (0805) | 0.85 (0.033) | 1.5±0.2 (0.059±0.008) | 2.3±0.2 (0.091±0.008) | 4.0±0.1 (0.157±0.004) | 1.1max (0.043max) |
| CKP1608 (0603) | 0.8 (0.031) | 1.0±0.2 (0.039±0.008) | 1.8±0.2 (0.071±0.008) | 4.0±0.1 (0.157±0.004) | 1.1max (0.043max) |
| LK1005 (0402) | 0.5 (0.020) | 0.65±0.1 (0.026±0.004) | 1.15±0.1 (0.045±0.004) | 2.0±0.05 (0.079±0.002) | 0.8max (0.031max) |
| LK1608 (0603) | 0.8 (0.031) | 1.0±0.2 (0.039±0.008) | 1.8±0.2 (0.071±0.008) | 4.0±0.1 (0.157±0.004) | 1.1max (0.043max) |
| LK2125 (0805) | 0.85 (0.033) | 1.5±0.2 (0.059±0.008) | 2.3±0.2 (0.091±0.008) | 4.0±0.1 (0.157±0.004) | 1.1max (0.043max) |
| HK0402 (01005) | 0.2 (0.008) | 0.25±0.04 (0.010±0.002) | 0.45±0.04 (0.018±0.002) | 2.0±0.05 (0.079±0.002) | 0.36max (0.014max) |
| HK0603 (0201) | 0.3 (0.012) | 0.40±0.06 (0.016±0.002) | 0.70±0.06 (0.028±0.002) | 2.0±0.05 (0.079±0.002) | 0.45max (0.018max) |
| HK1005 (0402) | 0.5 (0.020) | 0.65±0.1 (0.026±0.004) | 1.15±0.1 (0.045±0.004) | 2.0±0.05 (0.079±0.002) | 0.8max (0.031max) |
| HK1608 (0603) | 0.8 (0.031) | 1.0±0.2 (0.039±0.008) | 1.8±0.2 (0.071±0.008) | 4.0±0.1 (0.157±0.004) | 1.1max (0.043max) |
| HKQ0402 (01005) | 0.2 (0.008) | 0.25±0.04 (0.010±0.002) | 0.45±0.04 (0.018±0.002) | 2.0±0.05 (0.079±0.002) | 0.36max (0.014max) |
| HKQ0603W (0201) | 0.3 (0.012) | 0.40±0.06 (0.016±0.002) | 0.70±0.06 (0.028±0.002) | 2.0±0.05 (0.079±0.002) | 0.45max (0.018max) |
| HKQ0603C (0201) | 0.3 (0.012) | 0.40±0.06 (0.016±0.002) | 0.70±0.06 (0.028±0.002) | 2.0±0.05 (0.079±0.002) | 0.45max (0.018max) |
| HKQ0603S (0201) | 0.3 (0.012) | 0.40±0.06 (0.016±0.002) | 0.70±0.06 (0.028±0.002) | 2.0±0.05 (0.079±0.002) | 0.45max (0.018max) |
| HKQ0603U (0201) | 0.3 (0.012) | 0.40±0.06 (0.016±0.002) | 0.70±0.06 (0.028±0.002) | 2.0±0.05 (0.079±0.002) | 0.45max (0.018max) |
| AQ105 (0402) | 0.5 (0.020) | 0.75±0.1 (0.030±0.004) | 1.15±0.1 (0.045±0.004) | 2.0±0.05 (0.079±0.002) | 0.8max (0.031max) |
| BK0402 (01005) | 0.2 (0.008) | 0.25±0.04 (0.010±0.002) | 0.45±0.04 (0.018±0.002) | 2.0±0.05 (0.079±0.002) | 0.36max (0.014max) |
| BK0603 (0201) | 0.3 (0.012) | 0.40±0.06 (0.016±0.002) | 0.70±0.06 (0.028±0.002) | 2.0±0.05 (0.079±0.002) | 0.45max (0.018max) |
| BK1005 (0402) | 0.5 (0.020) | 0.65±0.1 (0.026±0.004) | 1.15±0.1 (0.045±0.004) | 2.0±0.05 (0.079±0.002) | 0.8max (0.031max) |
| BK1608 (0603) | 0.8 (0.031) | 1.0±0.2 (0.039±0.008) | 1.8±0.2 (0.071±0.008) | 4.0±0.1 (0.157±0.004) | 1.1max (0.043max) |
| BK2125 (0805) | 0.85 (0.033) | 1.5±0.2 (0.059±0.008) | 2.3±0.2 (0.091±0.008) | 4.0±0.1 (0.157±0.004) | 1.1max (0.043max) |
| BK2010 (0804) | 0.45 (0.018) | 1.2±0.1 (0.047±0.004) | 2.17±0.1 (0.085±0.004) | 4.0±0.1 (0.157±0.004) | 0.8max (0.031max) |
| BKP0603 (0201) | 0.3 (0.012) | 0.40±0.06 (0.016±0.002) | 0.70±0.06 (0.028±0.002) | 2.0±0.05 (0.079±0.002) | 0.45max (0.018max) |
| BKP1005 (0402) | 0.5 (0.020) | 0.65±0.1 (0.026±0.004) | 1.15±0.1 (0.045±0.004) | 2.0±0.05 (0.079±0.002) | 0.8max (0.031max) |
| BKP1608 (0603) | 0.8 (0.031) | 1.0±0.2 (0.039±0.008) | 1.8±0.2 (0.071±0.008) | 4.0±0.1 (0.157±0.004) | 1.1max (0.043max) |
| BKP2125 (0805) | 0.85 (0.033) | 1.5±0.2 (0.059±0.008) | 2.3±0.2 (0.091±0.008) | 4.0±0.1 (0.157±0.004) | 1.1max (0.043max) |
| BKH0603 (0201) | 0.3 (0.012) | 0.40±0.06 (0.016±0.002) | 0.70±0.06 (0.028±0.002) | 2.0±0.05 (0.079±0.002) | 0.45max (0.018max) |
| BKH1005 (0402) | 0.5 (0.020) | 0.65±0.1 (0.026±0.004) | 1.15±0.1 (0.045±0.004) | 2.0±0.05 (0.079±0.002) | 0.8max (0.031max) |
| MCF0605 (0202) | 0.3 (0.012) | 0.62±0.03 (0.024±0.001) | 0.77±0.03 (0.030±0.001) | 2.0±0.05 (0.079±0.002) | 0.45max (0.018max) |

Unit : mm (inch)

● Embossed Tape (8mm wide)

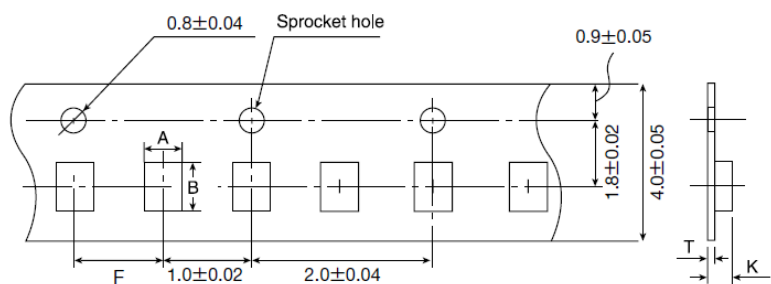


Unit : mm (inch)

| Type | Thickness mm (inch) | Chip cavity | | Insertion Pitch F | Tape Thickness | |
|----------------|------------------------|------------------------------------|------------------------------------|-----------------------------------|-----------------|----------------|
| | | A | B | | K | T |
| CK2125 (0805) | 1.25 (0.049) | 1.5 ± 0.2 (0.059 ± 0.008) | 2.3 ± 0.2 (0.091 ± 0.008) | 4.0 ± 0.1 (0.157 ± 0.004) | 2.0 (0.079) | 0.3 (0.012) |
| CKS2125 (0805) | 1.25 (0.049) | 1.5 ± 0.2 (0.059 ± 0.008) | 2.3 ± 0.2 (0.091 ± 0.008) | 4.0 ± 0.1 (0.157 ± 0.004) | 2.0 (0.079) | 0.3 (0.012) |
| CKP2012 (0805) | 0.9 (0.035) | 1.55 ± 0.2 (0.061 ± 0.008) | 2.3 ± 0.2 (0.091 ± 0.008) | 4.0 ± 0.1 (0.157 ± 0.004) | 1.3 (0.051) | 0.3 (0.012) |
| CKP2016 (0806) | 0.9 (0.035) | 1.8 ± 0.1 (0.071 ± 0.004) | 2.2 ± 0.1 (0.087 ± 0.004) | 4.0 ± 0.1 (0.157 ± 0.004) | 1.3 (0.051) | 0.25 (0.01) |
| CKP2520 (1008) | 0.7 (0.028) | 2.3 ± 0.1 (0.091 ± 0.004) | 2.8 ± 0.1 (0.110 ± 0.004) | 4.0 ± 0.1 (0.157 ± 0.004) | 1.4 (0.055) | 0.3 (0.012) |
| | 0.9 (0.035) | | | | 1.4 (0.055) | |
| | 1.1 (0.043) | | | | 1.7 (0.067) | |
| NM2012 (0805) | 0.9 (0.035) | 1.55 ± 0.2 (0.061 ± 0.008) | 2.3 ± 0.2 (0.091 ± 0.008) | 4.0 ± 0.1 (0.157 ± 0.004) | 1.3 (0.051) | 0.3 (0.012) |
| NM2520 (1008) | 0.9 (0.035) | 2.3 ± 0.1 (0.091 ± 0.004) | 2.8 ± 0.1 (0.110 ± 0.004) | 4.0 ± 0.1 (0.157 ± 0.004) | 1.4 (0.055) | 0.3 (0.012) |
| | 1.1 (0.043) | | | | 1.7 (0.067) | |
| LK2125 (0805) | 1.25 (0.049) | 1.5 ± 0.2 (0.059 ± 0.008) | 2.3 ± 0.2 (0.091 ± 0.008) | 4.0 ± 0.1 (0.157 ± 0.004) | 2.0 (0.079) | 0.3 (0.012) |
| HK2125 (0805) | 0.85 (0.033) | 1.5 ± 0.2 (0.059 ± 0.008) | 2.3 ± 0.2 (0.091 ± 0.008) | 4.0 ± 0.1 (0.157 ± 0.004) | 1.5 (0.059) | 0.3 (0.012) |
| | 1.0 (0.039) | | | | 2.0 (0.079) | |
| BK2125 (0805) | 1.25 (0.049) | 1.5 ± 0.2 (0.059 ± 0.008) | 2.3 ± 0.2 (0.091 ± 0.008) | 4.0 ± 0.1 (0.157 ± 0.004) | 2.0 (0.079) | 0.3 (0.012) |
| BK3216 (1206) | 0.8 (0.031) | 1.9 ± 0.1 (0.075 ± 0.004) | 3.5 ± 0.1 (0.138 ± 0.004) | 4.0 ± 0.1 (0.157 ± 0.004) | 1.4 (0.055) | 0.3 (0.012) |
| MCF0806 (0302) | 0.4 (0.016) | 0.75 ± 0.05 (0.030 ± 0.002) | 0.95 ± 0.05 (0.037 ± 0.002) | 2.0 ± 0.05 (0.079 ± 0.002) | 0.55 (0.022) | 0.3 (0.012) |
| MCF1210 (0504) | 0.55 (0.022) | 1.15 ± 0.05 (0.045 ± 0.002) | 1.40 ± 0.05 (0.055 ± 0.002) | 4.0 ± 0.1 (0.157 ± 0.004) | 0.65 (0.026) | 0.3 (0.012) |
| MCF2010 (0804) | 0.45 (0.018) | 1.1 ± 0.1 (0.043 ± 0.004) | 2.3 ± 0.1 (0.091 ± 0.004) | 4.0 ± 0.1 (0.157 ± 0.004) | 0.85 (0.033) | 0.3 (0.012) |

Unit : mm (inch)

● Embossed Tape (4mm wide)

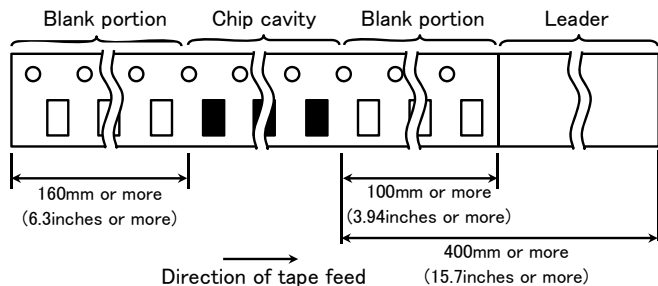


Unit : mm

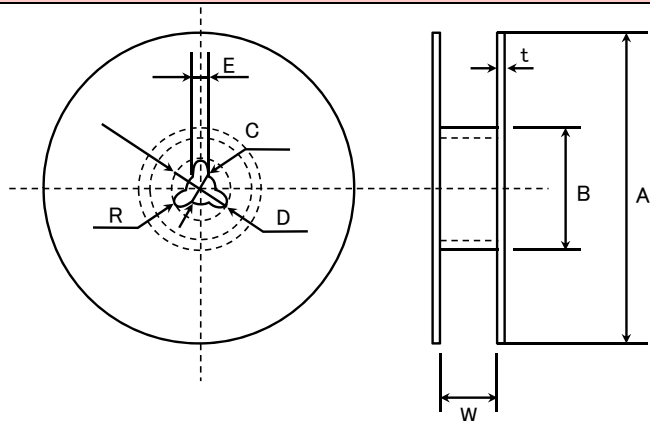
| Type | Thickness mm (inch) | Chip cavity | | Insertion Pitch F | Tape Thickness | |
|-----------------|------------------------|-------------|------|----------------------|----------------|----------|
| | | A | B | | K | T |
| HKQ0402 (01005) | 0.2 (0.008) | 0.23 | 0.43 | 1.0 ± 0.02 | 0.5max. | 0.25max. |

Unit : mm

④ LEADER AND BLANK PORTION



⑤ Reel Size



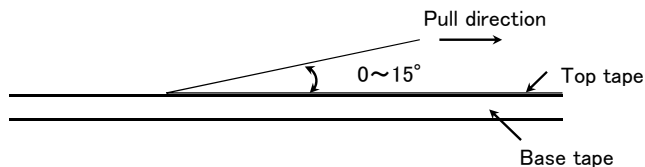
| A | B | C | D | E | R |
|--------------------|-------------------|---------------------|---------------------|---------------|-----|
| $\phi 178 \pm 2.0$ | $\phi 50$ or more | $\phi 13.0 \pm 0.2$ | $\phi 21.0 \pm 0.8$ | 2.0 ± 0.5 | 1.0 |

| | t | W |
|----------------|---------|--------------|
| 4mm width tape | 1.5max. | 5 ± 1.0 |
| 8mm width tape | 2.5max. | 10 ± 1.5 |

(Unit : mm)

⑥ Top tape strength

The top tape requires a peel-off force of 0.1~0.7N in the direction of the arrow as illustrated below.



Multilayer chip inductors

Multilayer chip inductors for high frequency, Multilayer chip bead inductors

Multilayer common mode choke coils (MC series F type)

RELIABILITY DATA

1. Operating Temperature Range

| | | |
|-----------------|--|--------------|
| Specified Value | BK0402 | -55 ~ +125°C |
| | BK0603 | |
| | BK1005 | |
| | BKH0603 | |
| | BKH1005 | |
| | BK1608 | |
| | BK2125 | |
| | ARRAY | |
| | BK2010 | -55 ~ +85°C |
| | BK3216 | |
| | BKP0603 | |
| | BKP1005 | |
| | BKP1608 | |
| | BKP2125 | |
| | MCF 0605 | -40 ~ +85°C |
| | MCF 0806 | |
| | MCF 1210 | |
| | MCF 2010 | |
| | CK1608 | -40 ~ +85°C |
| | CK2125 | |
| | CKS2125 | |
| | CKP1608 | |
| | CKP2012 | |
| | CKP2016 | |
| | CKP2520 | |
| | NM2012 | |
| | NM2520 | |
| | LK1005 | |
| | LK1608 | |
| | LK2125 | |
| | HK0402/HKQ0402 | -55 ~ +125°C |
| | HK0603 | |
| | HK1005 | |
| | HK1608 | -40 ~ +85°C |
| | HK2125 | |
| | HKQ0603W/HKQ0603C/HKQ0603S/ HKQ0603U/ | -55 ~ +125°C |
| | AQ105 | |

| 2. Storage Temperature Range | | |
|------------------------------|--|--------------|
| Specified Value | BK0402 | -55 ~ +125°C |
| | BK0603 | |
| | BK1005 | |
| | BKH0603 | |
| | BKH1005 | |
| | BK1608 | |
| | BK2125 | |
| | ARRAY | |
| | BK2010 | -55 ~ +85°C |
| | BK3216 | |
| | BKP0603 | |
| | BKP1005 | |
| | BKP1608 | -40 ~ +85°C |
| | BKP2125 | |
| | MCF 0605 | |
| | MCF 0806 | |
| | MCF 1210 | -40 ~ +85°C |
| | MCF 2010 | |
| | CK1608 | |
| | CK2125 | |
| | CKS2125 | -40 ~ +85°C |
| | CKP1608 | |
| | CKP2012 | |
| | CKP2016 | |
| | CKP2520 | |
| | NM2012 | |
| | NM2520 | |
| | LK1005 | |
| | LK1608 | |
| | LK2125 | |
| | HK0402/HKQ0402 | -55 ~ +125°C |
| | HK0603 | |
| | HK1005 | |
| | HK1608 | -40 ~ +85°C |
| | HK2125 | |
| | HKQ0603W/HKQ0603C/HKQ0603S/ HKQ0603U/ | -55 ~ +125°C |
| | AQ105 | |

3. Rated Current

| | | | |
|-----------------|----------|--------|--|
| Specified Value | BK0402 | | 150~750mA DC |
| | BK0603 | | 100~500mA DC |
| | BK1005 | | 120~1000mA DC |
| | BKH0603 | | 115~160mA DC |
| | BKH1005 | | 200~300mA DC |
| | BK1608 | | 150~1500mA DC |
| | BK2125 | | 200~1200mA DC |
| | ARRAY | BK2010 | 100mA DC |
| | | BK3216 | 100~200mA DC |
| | BKP0603 | | 0.8~1.8A DC |
| | BKP1005 | | 0.8~2.4A DC |
| | BKP1608 | | 1.0~3.0A DC |
| | BKP2125 | | 1.5~4.0A DC |
| | MCF 0605 | | 0.05A DC |
| | MCF 0806 | | 0.1~0.13A DC |
| | MCF 1210 | | 0.1A DC |
| | MCF 2010 | | 0.1A DC |
| | CK1608 | | 50~60mA DC |
| | CK2125 | | 60~500mA DC |
| | CKS2125 | | 110~280mA DC |
| | CKP1608 | | 0.35~0.9A DC |
| | CKP2012 | | 0.7~1.2A DC |
| | CKP2016 | | 0.9~1.6A DC |
| | CKP2520 | | 1.1~1.8A DC |
| | NM2012 | | 1.0~1.2A DC |
| | NM2520 | | 0.9~1.2A DC |
| | LK1005 | | 20~25mA DC |
| | LK1608 | | 1~150mA DC |
| | LK2125 | | 5~300mA DC |
| | HK0402 | | 160~380mA DC |
| | HK0603 | | 60~470mA DC |
| | HK1005 | | 110~300mA DC (-55~+125°C) 200~900mA DC (-55~+85°C) |
| | HK1608 | | 150~300mA DC |
| | HK2125 | | 300mA DC |
| | HKQ0402 | | 90~500mA DC |
| | HKQ0603W | | 100~850mA DC |
| | HKQ0603C | | 160~850mA DC |
| | HKQ0603S | | 130~600mA DC |
| | HKQ0603U | | 190~900mA DC |
| | AQ105 | | 280~710mA DC |

Definition of rated current:

- In the CK, CKS and BK Series, the rated current is the value of current at which the temperature of the element is increased within 20°C.
- In the BK Series P type and CK Series P type, NM Series the rated current is the value of current at which the temperature of the element is increased within 40°C.
- In the LK, HK, HKQ, and AQ Series, the rated current is either the DC value at which the internal L value is decreased within 5% with the application of DC bias, or the value of current at which the temperature of the element is increased within 20°C.

| 4. Impedance | | | |
|-----------------------------|---|--------|--|
| Specified Value | BK0402 | | 10～180 Ω ±5 Ω (10 Ω), ±25%(Other) |
| | BK0603 | | 10～600 Ω ±25% |
| | BK1005 | | 10～1800 Ω ±25% |
| | BKH0603 | | 600～1500 Ω ±25% |
| | BKH1005 | | 600～1800 Ω ±25% |
| | BK1608 | | 22～2500 Ω ±25% |
| | BK2125 | | 15～2500 Ω ±25% |
| | ARRAY | BK2010 | 5～1000 Ω ±25% |
| | | BK3216 | 60～1000 Ω ±25% |
| | BKP0603 | | 10～120 Ω ±5 Ω (10 Ω), ±25%(Other) |
| | BKP1005 | | 10～330 Ω ±5 Ω (EM100), ±25%(Other) |
| | BKP1608 | | 33～470 Ω ±25% |
| | BKP2125 | | 33～330 Ω ±25% |
| | MCF 0605 | | 12～90 Ω ±5 Ω (12 Ω), ±20%(35 Ω), ±25%(Other) |
| | MCF 0806 | | 12～90 Ω ±5 Ω (12 Ω), ±20%(Other) |
| | MCF 1210 | | 40～90 Ω ±25% |
| | MCF 2010 | | 90 Ω ±25% |
| | CK1608 | | — |
| | CK2125 | | |
| | CKS2125 | | |
| | CKP1608 | | |
| | CKP2012 | | |
| | CKP2016 | | |
| | CKP2520 | | |
| | NM2012 | | |
| | NM2520 | | |
| | LK1005 | | |
| | LK1608 | | |
| | LK2125 | | |
| | HK0402/HKQ0402 | | |
| | HK0603 | | |
| | HK1005 | | |
| | HK1608 | | |
| | HK2125 | | |
| | HKQ0603W/HKQ0603C/HKQ0603S/ HKQ0603U | | |
| | AQ105 | | |
| Test Methods and Remarks | BK0402Series Measuring frequency : 100±1MHz Measuring equipment : E4991A (or its equivalent) Measuring jig : 16197A (or its equivalent) | | |
| | BK0603Series, BKP0603Series Measuring frequency : 100±1MHz Measuring equipment : 4291A (or its equivalent) Measuring jig : 16193A (or its equivalent) | | |
| | BK1005Series, BKP1005Series ,BKH1005Series Measuring frequency : 100±1MHz Measuring equipment : 4291A (or its equivalent) Measuring jig : 16192A (or its equivalent), 16193A (or its equivalent) | | |
| | BK1608・2125Series, BKP1608・2125Series Measuring frequency : 100±1MHz Measuring equipment : 4291A (or its equivalent), 4195A (or its equivalent) Measuring jig : 16092A (or its equivalent) or 16192A (or its equivalent) /HW | | |
| | BK2010・3216Series, MCFSeries Measuring frequency : 100±1MHz Measuring equipment : 4291A (or its equivalent), 4195A (or its equivalent) Measuring jig : 16192A (or its equivalent) | | |

5. Inductance

| | | |
|--------------------------|--------------------------|--|
| Specified Value | BK0402 | |
| | BK0603 | |
| | BK1005 | |
| | BKH0603 | |
| | BKH1005 | |
| | BK1608 | |
| | BK2125 | |
| | ARRAY | BK2010 BK3216 |
| | BKP0603 | |
| | BKP1005 | |
| | BKP1608 | |
| | BKP2125 | |
| | MCF 0605 | |
| | MCF 0806 | |
| | MCF 1210 | |
| | MCF 2010 | |
| | CK1608 | 4.7~10.0 μ H: \pm 20% |
| | CK2125 | 0.1~10.0 μ H: \pm 20% |
| | CKS2125 | 1.0~10.0 μ H: \pm 20% |
| | CKP1608 | 0.33~2.2 μ H: \pm 20% |
| | CKP2012 | 0.47~4.7 μ H: \pm 20% |
| | CKP2016 | 0.47~4.7 μ H: \pm 20% |
| | CKP2520 | 0.47~4.7 μ H: \pm 20% |
| | NM2012 | 0.82~1.0 μ H: \pm 20% |
| | NM2520 | 1.0~2.2 μ H: \pm 20% |
| | LK1005 | 0.12~2.2 μ H: \pm 10 or 20% |
| | LK1608 | 0.047~33.0 μ H: \pm 20% 0.10~12.0 μ H: \pm 10% |
| | LK2125 | 0.047~33.0 μ H: \pm 20% 0.10~12.0 μ H: \pm 10% |
| | HK0402 | 1.0~5.6nH: \pm 0.3nH 6.8~12nH: \pm 5% |
| | HK0603 | 1.0~6.2nH: \pm 0.3nH 6.8~100nH: \pm 5% |
| | HK1005 | 1.0~6.2nH: \pm 0.3nH 6.8~270nH: \pm 5% |
| | HK1608 | 1.0~5.6nH: \pm 0.3nH 6.8~470nH: \pm 5% |
| | HK2125 | 1.5~5.6nH: \pm 0.3nH 6.8~470nH: \pm 5% |
| | HKQ0402 | 0.5~3.9nH: \pm 0.1 or 0.2 or 0.3nH 4.3~5.6nH: \pm 0.3nH or 3% 6.2~27nH: \pm 3 or 5% |
| | HKQ0603W | 0.6~3.9nH: \pm 0.1 or 0.2 or 0.3nH 4.3~6.2nH: \pm 0.2 or 0.3nH or 3 or 5% 6.8~100nH: \pm 3 or 5% |
| | HKQ0603C | 0.6~3.9nH: \pm 0.1 or 0.2 or 0.3nH 4.3~6.2nH: \pm 0.2 or 0.3nH 6.8~22nH: \pm 3 or 5% |
| | HKQ0603S | 0.6~6.2nH: \pm 0.2 or 0.3nH 6.8~22nH: \pm 3 or 5% |
| | HKQ0603U | 0.6~4.2nH: \pm 0.1 or 0.2 or 0.3nH 4.3~6.5nH: \pm 0.2 or 0.3nH 6.8~22nH: \pm 3 or 5% |
| | AQ105 | 1.0~6.2nH: \pm 0.3nH 6.8~15nH: \pm 5% |
| Test Methods and Remarks | CK、LK、CKP、NM Series | |
| | Measuring frequency | : 2~4MHz (CK1608) |
| | Measuring frequency | : 2~25MHz (CK2125) |
| | Measuring frequency | : 2~10MHz (CKS2125) |
| | Measuring frequency | : 10~25MHz (LK1005) |
| | Measuring frequency | : 1~50MHz (LK1608) |
| | Measuring frequency | : 0.4~50MHz (LK2125) |
| | Measuring frequency | : 1MHz (CKP1608・CKP2012・CKP2016・CKP2520・NM2012・NM2520) |
| | Measuring equipment /jig | : 4194A+16085B+16092A (or its equivalent) •4195A+41951+16092A (or its equivalent) •4294A+16192A (or its equivalent) •4291A+16193A (or its equivalent) /LK1005 •4285A+42841A+42842C+42851—61100 (CKP1608・CKP2012・CKP2016・CKP2520・NM2012・NM2520) |
| | Measuring current | : 1mA rms (0.047~4.7 μ H) •0.1mA rms (5.6~33 μ H) |
| | HK、HKQ、AQ Series | |
| | Measuring frequency | : 100MHz (HK0402・HK0603・HK1005・AQ105) |
| | Measuring frequency | : 50/100MHz (HK1608・HK2125) |
| | Measuring frequency | : 500MHz (HKQ0603C・HKQ0603S・HKQ0603U) |
| | Measuring frequency | : 300/500MHz (HKQ0603W) |
| | Measuring frequency | : 100/500MHz (HKQ0402) |
| | Measuring equipment /jig | : 4291A+16197A (or its equivalent) /HK0603・AQ105 •4291A+16193A (or its equivalent) /HK1005 •E4991A+16197A (or its equivalent) /HKQ0603S・HKQ0603U・HKQ0603W・HKQ0603C •4291A+16092A + in-house made jig (or its equivalent) /HK1608・HK2125 •E4991A+16196D (or its equivalent) /HK0402・HKQ0402 |

| | | |
|--------------------------|--------------------------|--|
| Specified Value | BK0402 | — |
| | BK0603 | |
| | BK1005 | |
| | BKH0603 | |
| | BKH1005 | |
| | BK1608 | |
| | BK2125 | |
| | ARRAY | |
| | BK2010 | |
| | BK3216 | |
| | BKP0603 | |
| | BKP1005 | |
| | BKP1608 | |
| | BKP2125 | |
| | MCF 0605 | |
| | MCF 0806 | |
| | MCF 1210 | |
| | MCF 2010 | |
| | CK1608 | — |
| | CK2125 | |
| | CKS2125 | |
| | CKP1608 | |
| | CKP2012 | |
| | CKP2016 | |
| | CKP2520 | |
| | NM2012 | |
| | NM2520 | |
| | LK1005 | 10~20 min. |
| | LK1608 | 10~35 min. |
| | LK2125 | 15~50 min. |
| | HK0402 | 3 min. |
| | HK0603 | 4~5 min. |
| | HK1005 | 8 min. |
| | HK1608 | 8~12 min. |
| | HK2125 | 10~18 min. |
| | HKQ0402 | 3~8 min. |
| | HKQ0603W | 6~15 min. |
| | HKQ0603C | 14~15 min. |
| | HKQ0603S | 10~13 min. |
| | HKQ0603U | 14 min. |
| | AQ105 | 8 min. |
| Test Methods and Remarks | LKSeries | |
| | Measuring frequency | : 10~25MHz (LK1005) |
| | Measuring frequency | : 1~50MHz (LK1608) |
| | Measuring frequency | : 0.4~50MHz (LK2125) |
| | Measuring equipment /jig | • 4194A + 16085B + 16092A (or its equivalent) |
| | | • 4195A + 41951 + 16092A (or its equivalent) |
| | | • 4294A + 16192A (or its equivalent) |
| | | • 4291A + 16193A (or its equivalent) /LK1005 |
| | Measuring current | • 1mA rms (0.047~4.7 μ H) |
| | | • 0.1mA rms (5.6~33 μ H) |
| | HK、HKQ、AQ Series | |
| | Measuring frequency | : 100MHz (HK0402・HK0603・HK1005・AQ105) |
| | Measuring frequency | : 50/100MHz (HK1608・HK2125) |
| | Measuring frequency | : 500MHz (HKQ0603C・HKQ0603S・HKQ0603U) |
| | Measuring frequency | : 300/500MHz (HKQ0603W) |
| | Measuring frequency | : 100/500MHz (HKQ0402) |
| | Measuring equipment /jig | • 4291A + 16197A (or its equivalent) /HK0603・AQ105 |
| | | • 4291A + 16193A (or its equivalent) /HK1005 |
| | | • E4991A + 16197A (or its equivalent) /HKQ0603S・HKQ0603U・HKQ0603W・HKQ0603C |
| | | • 4291A + 16092A + in-house made jig (or its equivalent) /HK1608, HK2125 |
| | | • E4991A + 16196D (or its equivalent) HK0402・HKQ0402 |

| 7. DC Resistance | | | |
|--|----------|--------|---------------------|
| Specified Value | BK0402 | | 0.07~0.75 Ω max. |
| | BK0603 | | 0.065~1.50 Ω max. |
| | BK1005 | | 0.03~0.90 Ω max. |
| | BKH0603 | | 1.50~3.20 Ω max. |
| | BKH1005 | | 0.85~2.00 Ω max. |
| | BK1608 | | 0.05~1.10 Ω max. |
| | BK2125 | | 0.05~0.75 Ω max. |
| | ARRAY | BK2010 | 0.10~0.90 Ω max. |
| | | BK3216 | 0.15~0.80 Ω max. |
| | BKP0603 | | 0.030~0.180 Ω max. |
| | BKP1005 | | 0.0273~0.220 Ω max. |
| | BKP1608 | | 0.025~0.18 Ω max. |
| | BKP2125 | | 0.020~0.075 Ω max. |
| | MCF 0605 | | 2.5~6.5 Ω max |
| | MCF 0806 | | 2.5~6.5 Ω max. |
| | MCF 1210 | | 2.5~4.5 Ω max. |
| | MCF 2010 | | 4.5 Ω max. |
| | CK1608 | | 0.45~0.85 Ω (±30%) |
| | CK2125 | | 0.16~0.65 Ω max. |
| | CKS2125 | | 0.12~0.52 Ω max. |
| | CKP1608 | | 0.15~0.35 Ω max. |
| | CKP2012 | | 0.08~0.28 Ω max. |
| | CKP2016 | | 0.075~0.20 Ω max |
| | CKP2520 | | 0.05~0.16 Ω max. |
| | NM2012 | | 0.10~0.15 Ω max. |
| | NM2520 | | 0.11~0.22 Ω max. |
| | LK1005 | | 0.41~1.16 Ω max. |
| | LK1608 | | 0.2~2.2 Ω max. |
| | LK2125 | | 0.1~1.1 Ω max. |
| | HK0402 | | 0.18~0.99 Ω max. |
| | HK0603 | | 0.11~3.74 Ω max. |
| | HK1005 | | 0.08~4.8 Ω max. |
| | HK1608 | | 0.05~2.6 Ω max. |
| | HK2125 | | 0.10~1.5 Ω max. |
| | HKQ0402 | | 0.08~2.24 Ω max. |
| | HKQ0603W | | 0.07~4.1 Ω max. |
| | HKQ0603C | | 0.07~1.6 Ω max. |
| | HKQ0603S | | 0.06~1.29 Ω max. |
| | HKQ0603U | | 0.06~1.29 Ω max. |
| | AQ105 | | 0.07~0.45 Ω max. |
| Test Methods and Remarks | | | |
| Measuring equipment: VOAC-7412, VOAC-7512, VOAC-7521 (made by Iwasaki Tsushinki) | | | |

| 8. Self Resonance Frequency (SRF) | | | | |
|-----------------------------------|---------------------|--|--------------------|----------------|
| Specified Value | BK0402 | | — | |
| | BK0603 | | | |
| | BK1005 | | | |
| | BKH0603 | | | |
| | BKH1005 | | | |
| | BK1608 | | | |
| | BK2125 | | | |
| | ARRAY | BK2010 | | |
| | | BK3216 | | |
| | BKP0603 | | | |
| | BKP1005 | | | |
| | BKP1608 | | | |
| | BKP2125 | | | |
| | MCF 0605 | | | |
| | MCF 0806 | | | |
| | MCF 1210 | | | |
| | MCF 2010 | | | |
| | CK1608 | | | 17～25MHz min. |
| | CK2125 | | | 24～235MHz min. |
| | CKS2125 | | 24～75MHz min. | |
| | CKP1608 | | — | |
| | CKP2012 | | | |
| | CKP2016 | | | |
| | CKP2520 | | | |
| | NM2012 | | | |
| | NM2520 | | | |
| | LK1005 | | 40～180MHz min. | |
| | LK1608 | | 9～260MHz min. | |
| | LK2125 | | 13～320MHz min. | |
| | HK0402 | | 2900～10000MHz min. | |
| | HK0603 | | 900～10000MHz min. | |
| | HK1005 | | 400～10000MHz min. | |
| | HK1608 | | 300～10000MHz min. | |
| | HK2125 | | 200～4000MHz min. | |
| HKQ0402 | | 1700～10000MHz min. | | |
| HKQ0603W | | 800～10000MHz min. | | |
| HKQ0603C | | 2500～10000MHz min. | | |
| HKQ0603S | | 1900～10000MHz min. | | |
| HKQ0603U | | 1900～10000MHz min. | | |
| AQ105 | | 2300～10000MHz min. | | |
| Test Methods and Remarks | LK、CK Series : | | | |
| | Measuring equipment | : 4195A (or its equivalent) | | |
| | Measuring jig | : 41951 + 16092A (or its equivalent) | | |
| | HK、HKQ、AQ Series : | | | |
| | Measuring equipment | : 8719C (or its equivalent)・8753D (or its equivalent) / HK2125 | | |

| 9. Temperature Characteristic | | | |
|-------------------------------|------------------------------|--------|--------------------------------|
| Specified Value | BK0402 | | — |
| | BK0603 | | |
| | BK1005 | | |
| | BKH0603 | | |
| | BKH1005 | | |
| | BK1608 | | |
| | BK2125 | | |
| | ARRAY | BK2010 | |
| | | BK3216 | |
| | BKP0603 | | |
| | BKP1005 | | |
| | BKP1608 | | |
| | BKP2125 | | |
| | MCF 0605 | | |
| | MCF 0806 | | |
| | MCF 1210 | | |
| | MCF 2010 | | |
| | CK1608 | | |
| | CK2125 | | |
| | CKS2125 | | |
| | CKP1608 | | |
| | CKP2012 | | |
| | CKP2016 | | |
| | CKP2520 | | |
| | NM2012 | | |
| | NM2520 | | |
| | LK1005 | | |
| | LK1608 | | |
| | LK2125 | | |
| | HK0402 | | |
| | HK0603 | | |
| | HK1005 | | |
| | HK1608 | | |
| | HK2125 | | |
| HKQ0402 | | | |
| HKQ0603W | | | |
| HKQ0603C | | | |
| HKQ0603S | | | |
| HKQ0603U | | | |
| AQ105 | | | |
| Test Methods and Remarks | HK、HKQ、AQ Series: | | Inductance change: Within ±10% |
| | Temperature range : -30~+85℃ | | |
| | Reference temperature : +20℃ | | |
| | | | |

10. Resistance to Flexure of Substrate

| | | | |
|--------------------------|---|--------|-----------------------|
| Specified Value | BK0402 | | No mechanical damage. |
| | BK0603 | | |
| | BK1005 | | |
| | BKH0603 | | |
| | BKH1005 | | |
| | BK1608 | | |
| | BK2125 | | |
| | ARRAY | BK2010 | |
| | | BK3216 | |
| | BKP0603 | | |
| | BKP1005 | | |
| | BKP1608 | | |
| | BKP2125 | | |
| | MCF 0605 | | |
| | MCF 0806 | | |
| | MCF 1210 | | |
| | MCF 2010 | | |
| | CK1608 | | |
| | CK2125 | | |
| | CKS2125 | | |
| | CKP1608 | | |
| | CKP2012 | | |
| | CKP2016 | | |
| | CKP2520 | | |
| | NM2012 | | |
| | NM2520 | | |
| | LK1005 | | |
| | LK1608 | | |
| | LK2125 | | |
| | HK0402 | | |
| | HK0603 | | |
| | HK1005 | | |
| | HK1608 | | |
| | HK2125 | | |
| | HKQ0402 | | |
| | HKQ0603W | | |
| | HKQ0603C | | |
| | HKQ0603S | | |
| | HKQ0603U | | |
| | AQ105 | | |
| Test Methods and Remarks | Warp : 2mm (BK Series without 0402size、BKP、BKH1005、CK、CKS、CKP、NM、LK、HK、HKQ0603S、HKQ0603U、AQ Series、MCF1210) : 1mm (BK0402、BKH0603、HK0402、HKQ0402、HKQ0603W、HKQ0603C Series、MCF Series without 1210 size、) | | |
| | Testing board : glass epoxy-resin substrate | | |
| | Thickness : 0.8mm | | |
| | <div><div><div>Board</div><div><div>20</div><div>R-230</div></div><div>Warp</div></div><div><div>45</div><div>45</div><div>Deviation±1</div></div><div>(Unit: mm)</div></div> | | |

| 11. Solderability | | | | |
|--------------------------|--------------------|------------------------------------|--|--|
| Specified Value | BK0402 | | At least 75% of terminal electrode is covered by new solder. | |
| | BK0603 | | | |
| | BK1005 | | | |
| | BKH0603 | | | |
| | BKH1005 | | | |
| | BK1608 | | | |
| | BK2125 | | | |
| | ARRAY | BK2010 | | |
| | | BK3216 | | |
| | BKP0603 | | | |
| | BKP1005 | | | |
| | BKP1608 | | | |
| | BKP2125 | | | |
| | MCF 0605 | | | |
| | MCF 0806 | | | |
| | MCF 1210 | | | |
| | MCF 2010 | | | |
| | CK1608 | | | At least 75% of terminal electrode is covered by new solder. |
| | CK2125 | | | |
| | CKS2125 | | | |
| | CKP1608 | | | |
| | CKP2012 | | | |
| | CKP2016 | | | |
| | CKP2520 | | | |
| | NM2012 | | | |
| | NM2520 | | | |
| | LK1005 | | | |
| | LK1608 | | | |
| | LK2125 | | | |
| | HK0402 | | | |
| | HK0603 | | | |
| | HK1005 | | | |
| | HK1608 | | | |
| | HK2125 | | | |
| | HKQ0402 | | | |
| | HKQ0603W | | | |
| | HKQ0603C | | | |
| | HKQ0603S | | | |
| | HKQ0603U | | | |
| | AQ105 | | | |
| Test Methods and Remarks | Solder temperature | : 230±5℃ (JIS Z 3282 H60A or H63A) | | |
| | Solder temperature | : 245±3℃ (Sn/3.0Ag/0.5Cu) | | |
| | Duration | : 4±1 sec. | | |

| 12. Resistance to Soldering | | | |
|-----------------------------|--------------------------|--|--|
| Specified Value | BK0402 | | Appearance: No significant abnormality Impedance change: Within ±30% |
| | BK0603 | | |
| | BK1005 | | |
| | BKH0603 | | |
| | BKH1005 | | |
| | BK1608 | | |
| | BK2125 | | |
| | ARRAY | BK2010 | |
| | | BK3216 | |
| | BKP0603 | | |
| | BKP1005 | | |
| | BKP1608 | | |
| | BKP2125 | | |
| | MCF 0605 | | Appearance: No significant abnormality Impedance change: Within ±20% |
| | MCF 0806 | | |
| | MCF 1210 | | |
| | MCF 2010 | | |
| | CK1608 | | No mechanical damage. Remaining terminal electrode: 70% min |
| | CK2125 | | |
| | CKS2125 | | |
| | CKP1608 | | Inductance change R10~4R7: Within ±10% 6R8~100: Within ±15% CKS2125 : Within ±20% CKP1608、CKP2012、CKP2016、CKP2520、NM2012、NM2520: Within ±30% |
| | CKP2012 | | |
| | CKP2016 | | |
| | CKP2520 | | |
| | NM2012 | | |
| | NM2520 | | |
| | LK1005 | | No mechanical damage. Remaining terminal electrode: 70% min. Inductance change: Within ±15% |
| | LK1608 | | |
| | LK2125 | | No mechanical damage. Remaining terminal electrode: 70% min. Inductance change 47N~4R7: Within ±10% 5R6~330: Within ±15% |
| | HK0402 | | |
| | HK0603 | | |
| | HK1005 | | No mechanical damage. Remaining terminal electrode: 70% min. Inductance change: Within ±5% |
| | HK1608 | | |
| | HK2125 | | |
| | HKQ0402 | | |
| | HKQ0603W | | |
| | HKQ0603C | | |
| | HKQ0603S | | |
| | HKQ0603U | | |
| | AQ105 | | |
| | Test Methods and Remarks | Solder temperature | : 260±5℃ |
| Duration | | : 10±0.5 sec. | |
| Preheating temperature | | : 150 to 180℃ | |
| Preheating time | | : 3 min. | |
| Flux | | : Immersion into methanol solution with colophony for 3 to 5 sec. | |
| Recovery | | : 2 to 3 hrs of recovery under the standard condition after the test. (See Note 1) | |

| 13. Thermal Shock | | | |
|--|------------------------|-------------------------------------|---|
| Specified Value | BK0402 | | Appearance:No significant abnormality Impedance change: Within ±30% |
| | BK0603 | | |
| | BK1005 | | |
| | BKH0603 | | |
| | BKH1005 | | |
| | BK1608 | | |
| | BK2125 | | |
| | ARRAY | BK2010 | |
| | | BK3216 | |
| | BKP0603 | | |
| | BKP1005 | | |
| | BKP1608 | | |
| | BKP2125 | | |
| | MCF 0605 | | Appearance:No significant abnormality Impedance change: Within ±20% |
| | MCF 0806 | | |
| | MCF 1210 | | |
| | MCF 2010 | | |
| | CK1608 | | No mechanical damage. |
| | CK2125 | | Inductance change:Within ±20% Q change:Within ±30% |
| | CKS2125 | | Inductance change:Within ±20% (CKS2125) |
| | CKP1608 | | No mechanical damage. Inductance change: Within ±30% |
| | CKP2012 | | |
| | CKP2016 | | |
| | CKP2520 | | |
| | NM2012 | | |
| | NM2520 | | No mechanical damage. Inductance change: Within ±10% Q change: Within ±30% |
| | LK1005 | | |
| | LK1608 | | |
| | LK2125 | | |
| | HK0402 | | No mechanical damage. Inductance change: Within ±10% Q change: Within ±20% |
| | HK0603 | | |
| | HK1005 | | |
| | HK1608 | | |
| | HK2125 | | |
| HKQ0402 | | | |
| HKQ0603W | | | |
| HKQ0603C | | | |
| HKQ0603S | | | |
| HKQ0603U | | | |
| AQ105 | | | |
| Test Methods and Remarks | Conditions for 1 cycle | | |
| | Step | temperature(°C) | time(min.) |
| | 1 | Minimum operating temperature +0/—3 | 30±3 |
| | 2 | Room temperature | 2~3 |
| | 3 | Maximum operating temperature +3/—0 | 30±3 |
| | 4 | Room temperature | 2~3 |
| | Number of cycles:5 | | |
| Recovery:2 to 3 hrs of recovery under the standard condition after the test.(See Note 1) | | | |
| (Note 1) When there are questions concerning measurement result;measurement shall be made after 48±2 hrs of recovery under the standard condition. | | | |

| 14. Damp Heat (Steady state) | | | |
|-------------------------------|--|--------|---|
| Specified Value | BK0402 | | Appearance:No significant abnormality Impedance change: Within ±30% |
| | BK0603 | | |
| | BK1005 | | |
| | BKH0603 | | |
| | BKH1005 | | |
| | BK1608 | | |
| | BK2125 | | |
| | ARRAY | BK2010 | |
| | | BK3216 | |
| | BKP0603 | | |
| | BKP1005 | | |
| | BKP1608 | | |
| | BKP2125 | | |
| | MCF 0605 | | |
| | MCF 0806 | | Appearance:No significant abnormality Impedance change: Within ±20% |
| | MCF 1210 | | |
| | MCF 2010 | | |
| | CK1608 | | |
| | CK2125 | | Inductance change: Within ±20% Q change: Within ±30% |
| | CKS2125 | | Inductance change: Within ±20% |
| | CKP1608 | | No mechanical damage. Inductance change: Within ±30% |
| | CKP2012 | | |
| | CKP2016 | | |
| | CKP2520 | | |
| | NM2012 | | |
| | NM2520 | | |
| | LK1005 | | No mechanical damage. |
| | LK1608 | | Inductance change: Within ±10% Q change: Within ±30% |
| | LK2125 | | No mechanical damage. Inductance change: Within ±20% Q change: Within ±30% |
| | HK0402 | | No mechanical damage. Inductance change: Within ±10% Q change: Within ±20% |
| | HK0603 | | |
| | HK1005 | | |
| | HK1608 | | |
| | HK2125 | | |
| | HKQ0402 | | |
| | HKQ0603W | | |
| | HKQ0603C | | |
| | HKQ0603S | | |
| | HKQ0603U | | |
| | AQ105 | | |
| Test Methods and Remarks | BK、BKP、BKH Series、MCF Series: Temperature :40±2℃ Humidity :90 to 95%RH Duration :500+24/—0 hrs Recovery :2 to 3 hrs of recovery under the standard condition after the removal from test chamber.(See Note 1) | | |
| | LK、CK、CKS、CKP、NM、HK、HKQ、AQ Series: Temperature :40±2℃(LK、CK、CKS、CKP、NM Series) :60±2℃(HK、HKQ、AQ Series) Humidity :90 to 95%RH Duration :500±12 hrs Recovery :2 to 3 hrs of recovery under the standard condition after the removal from test chamber.(See Note 1) | | |

| 15. Loading under Damp Heat | | | | |
|--|---|---|---|-----------------------|
| Specified Value | BK0402 | | Appearance: No significant abnormality Impedance change: Within ±30% | |
| | BK0603 | | | |
| | BK1005 | | | |
| | BKH0603 | | | |
| | BKH1005 | | | |
| | BK1608 | | | |
| | BK2125 | | | |
| | ARRAY | BK2010 | | |
| | | BK3216 | | |
| | BKP0603 | | | |
| | BKP1005 | | | |
| | BKP1608 | | | |
| | BKP2125 | | | |
| | CK1608 | | | No mechanical damage. |
| | CK2125 | | Inductance change: Within ±20% Q change: Within ±30% | |
| | CKS2125 | | No mechanical damage. | |
| | | | Inductance change: Within ±20% | |
| | CKP1608 | | No mechanical damage. Inductance change: Within ±30% | |
| | CKP2012 | | | |
| | CKP2016 | | | |
| | CKP2520 | | | |
| | NM2012 | | | |
| | NM2520 | | | |
| | LK1005 | | No mechanical damage. Inductance change: Within ±10% Q change: Within ±30% | |
| | LK1608 | | No mechanical damage. Inductance change: 0.047~12.0 μH: Within ±10% 15.0~33.0 μH: Within ±15% Q change: Within ±30% | |
| | LK2125 | | No mechanical damage. Inductance change: Within ±20% Q change: Within ±30% | |
| | HK0402 | | No mechanical damage. Inductance change: Within ±10% Q change: Within ±20% | |
| | HK0603 | | | |
| | HK1005 | | | |
| | HK1608 | | | |
| | HK2125 | | | |
| | HKQ0402 | | | |
| | HKQ0603W | | | |
| | HKQ0603C | | | |
| | HKQ0603S | | | |
| | HKQ0603U | | | |
| | AQ105 | | | |
| | Test Methods and Remarks | BK, BKP, BKH Series: | | |
| Temperature | | : 40±2℃ | | |
| Humidity | | : 90 to 95%RH | | |
| Applied current | | : Rated current | | |
| Duration | | : 500+24/—0 hrs | | |
| Recovery | | : 2 to 3 hrs of recovery under the standard condition after the removal from test chamber. (See Note 1) | | |
| LK, CK, CKS, CKP, NK, HK, HKQ, AQ Series: | | | | |
| Temperature | | : 40±2℃ (LK, CK, CKS, CKP, NM Series) | | |
| | | : 60±2℃ (HK, HKQ, AQ Series) | | |
| Humidity | | : 90 to 95%RH | | |
| Applied current | | : Rated current | | |
| Duration | | : 500±12 hrs | | |
| Recovery | : 2 to 3 hrs of recovery under the standard condition after the removal from test chamber. (See Note 1) | | | |
| Note on standard condition: “standard condition” referred to herein is defined as follows: 5 to 35℃ of temperature, 45 to 85% relative humidity, and 86 to 106kPa of air pressure. When there are questions concerning measurement results: In order to provide correlation data, the test shall be conducted under condition of 20±2℃ of temperature, 60 to 70% relative humidity, and 86 to 106kPa of air pressure. Unless otherwise specified, all the tests are conducted under the “standard condition.” (Note 1) Measurement shall be made after 48±2 hrs of recovery under the standard condition. | | | | |

| 16. Loading at High Temperature | | | | |
|---|--|--------|---|-----------------------|
| Specified Value | BK0402 | | Appearance: No significant abnormality Impedance change: Within ±30% | |
| | BK0603 | | | |
| | BK1005 | | | |
| | BKH0603 | | | |
| | BKH1005 | | | |
| | BK1608 | | | |
| | BK2125 | | | |
| | ARRAY | BK2010 | | |
| | | BK3216 | | |
| | BKP0603 | | | |
| | BKP1005 | | | |
| | BKP1608 | | | |
| | BKP2125 | | | |
| | MCF 0605 | | | |
| | MCF 0806 | | Appearance: No significant abnormality Impedance change: Within ±20% | |
| | MCF 1210 | | | |
| | MCF 2010 | | | |
| | CK1608 | | | No mechanical damage. |
| | CK2125 | | Inductance change: Within ±20% Q change: Within ±30% | |
| | CKS2125 | | No mechanical damage. Inductance change: Within ±20% | |
| | CKP1608 | | No mechanical damage. Inductance change: Within ±30% | |
| | CKP2012 | | | |
| | CKP2016 | | | |
| | CKP2520 | | | |
| | NM2012 | | | |
| | NM2520 | | | |
| | LK1005 | | No mechanical damage. Inductance change: Within ±10% Q change: Within ±30% | |
| | LK1608 | | No mechanical damage. Inductance change: 0.047~12.0 μH: Within ±10% 15.0~33.0 μH: Within ±15% Q change: Within ±30% | |
| | LK2125 | | No mechanical damage. Inductance change: Within ±20% Q change: Within ±30% | |
| | HK0402 | | No mechanical damage. Inductance change: Within ±10% Q change: Within ±20% | |
| | HK0603 | | | |
| | HK1005 | | | |
| | HK1608 | | | |
| HK2125 | | | | |
| HKQ0402 | | | | |
| HKQ0603W | | | | |
| HKQ0603C | | | | |
| HKQ0603S | | | | |
| HKQ0603U | | | | |
| AQ105 | | | | |
| Test Methods and Remarks | BK, BKH, BKP Series、MCF Series: Temperature : 125±3℃ (BK, BKH Series) : 85±3℃ (BKP, MCF Series) Applied current : Rated current Duration : 500+24/—0 hrs Recovery : 2 to 3 hrs of recovery under the standard condition after the removal from test chamber. (See Note 1) | | | |
| | LK, CK, CKS, CKP, NM, HK, HKQ, AQ Series: Temperature : 85±2℃ (LK, CK, CKS, CKP, NM Series) : 85±2℃ (HK1608, 2125) : 85±2℃ (HK1005, AQ105 operating temperature range—55~+85℃) : 125±2℃ (HK0402, HKQ0402, HK0603, HK1005, HKQ0603S, HKQ0603U, HKQ0603W, HKQ0603C, AQ105 operating temperature range—55~+125℃) Applied current : Rated current Duration : 500±12 hrs Recovery : 2 to 3 hrs of recovery under the standard condition after the test. (See Note 1) | | | |
| Note on standard condition: "standard condition" referred to herein is defined as follows: 5 to 35℃ of temperature, 45 to 85% relative humidity, and 86 to 106kPa of air pressure. When there are questions concerning measurement results: In order to provide correlation data, the test shall be conducted under condition of 20±2℃ of temperature, 60 to 70% relative humidity, and 86 to 106kPa of air pressure. Unless otherwise specified, all the tests are conducted under the "standard condition." (Note 1) Measurement shall be made after 48±2 hrs of recovery under the standard condition. | | | | |

Precautions on the use of Multilayer chip inductors

Multilayer chip inductors for high frequency, Multilayer chip bead inductors

Multilayer common mode choke coils(MC series F type)

PRECAUTIONS

1. Circuit Design

Precautions

- ◆Verification of operating environment, electrical rating and performance
 1. A malfunction in medical equipment, spacecraft, nuclear reactors, etc. may cause serious harm to human life or have severe social ramifications.
As such, any inductors to be used in such equipment may require higher safety and/or reliability considerations and should be clearly differentiated from components used in general purpose applications.
- ◆Operating Current (Verification of Rated current)
 1. The operating current for inductors must always be lower than their rated values.
 2. Do not apply current in excess of the rated value because the inductance may be reduced due to the magnetic saturation effect.

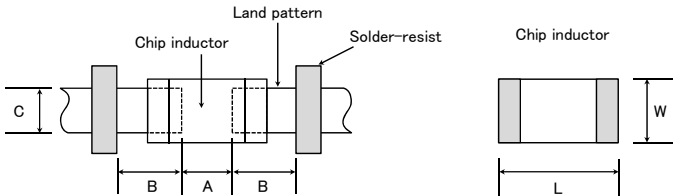
2. PCB Design

Precautions

- ◆Pattern configurations (Design of Land-patterns)
 1. When inductors are mounted on a PCB, the size of land patterns and the amount of solder used (size of fillet) can directly affect inductor performance.
Therefore, the following items must be carefully considered in the design of solder land patterns:
 - (1) The amount of solder applied can affect the ability of chips to withstand mechanical stresses which may lead to breaking or cracking. Therefore, when designing land-patterns it is necessary to consider the appropriate size and configuration of the solder pads which in turn determines the amount of solder necessary to form the fillets.
 - (2) When more than one part is jointly soldered onto the same land or pad, the pad must be designed so that each component's soldering point is separated by solder-resist.
 - (3) The larger size of land patterns and amount of solder, the smaller Q value after mounting on PCB. It makes higher the Q value to design land patterns smaller than terminal electrode of chips.
- ◆Pattern configurations (Inductor layout on panelized[breakaway] PC boards)
 1. After inductors have been mounted on the boards, chips can be subjected to mechanical stresses in subsequent manufacturing processes (PCB cutting, board inspection, mounting of additional parts, assembly into the chassis, wave soldering the reflow soldered boards etc.) For this reason, planning pattern configurations and the position of SMD inductors should be carefully performed to minimize stress.

Technical considerations

- ◆Pattern configurations (Design of Land-patterns)
 1. The following diagrams and tables show some examples of recommended patterns to prevent excessive solder amounts (larger fillets which extend above the component end terminations). Examples of improper pattern designs are also shown.
 - (1) Recommended land dimensions for a typical chip inductor land patterns for PCBs



Recommended land dimensions for wave-soldering (Unit: mm)

| Type | | 1608 | 2012 | 2125 | 2016 | 2520 | 3216 |
|------|---|---------|---------|---------|---------|---------|---------|
| Size | L | 1.6 | 2.0 | 2.0 | 2.0 | 2.5 | 3.2 |
| | W | 0.8 | 1.25 | 1.25 | 1.6 | 2.0 | 1.6 |
| A | | 0.8~1.0 | 1.0~1.4 | 1.0~1.4 | 1.0~1.4 | 1.0~1.4 | 1.8~2.5 |
| B | | 0.5~0.8 | 0.8~1.5 | 0.8~1.5 | 0.8~1.5 | 0.6~1.0 | 0.8~1.7 |
| C | | 0.6~0.8 | 0.9~1.2 | 0.9~1.2 | 1.3~1.6 | 1.6~2.0 | 1.2~1.6 |

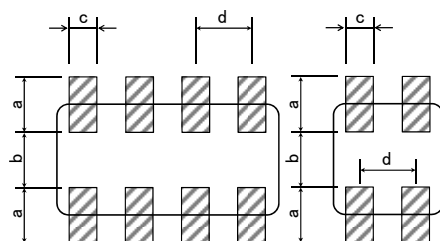
Recommended land dimensions for reflow-soldering (Unit: mm)

| Type | | 0402 | 0603 | 1005 | 105 | 1608 | 2012 |
|------|---|-----------|-----------|-----------|-----------|---------|---------|
| Size | L | 0.4 | 0.6 | 1.0 | 1.0 | 1.6 | 2.0 |
| | W | 0.2 | 0.3 | 0.5 | 0.6 | 0.8 | 1.25 |
| A | | 0.15~0.25 | 0.20~0.30 | 0.45~0.55 | 0.50~0.55 | 0.8~1.0 | 0.8~1.2 |
| B | | 0.10~0.20 | 0.20~0.30 | 0.40~0.50 | 0.30~0.40 | 0.6~0.8 | 0.8~1.2 |
| C | | 0.15~0.30 | 0.25~0.40 | 0.45~0.55 | 0.60~0.70 | 0.6~0.8 | 0.9~1.6 |

| Type | | 2125 | 2016 | 2520 | 3216 |
|------|---|---------|---------|---------|---------|
| Size | L | 2.0 | 2.0 | 2.5 | 3.2 |
| | W | 1.25 | 1.6 | 2.0 | 1.6 |
| A | | 0.8~1.2 | 0.8~1.2 | 1.0~1.4 | 1.8~2.5 |
| B | | 0.8~1.2 | 0.8~1.2 | 0.6~1.0 | 0.6~1.5 |
| C | | 0.9~1.6 | 1.2~2.0 | 1.8~2.2 | 1.2~2.0 |

► 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/>) .

Excess solder can affect the ability of chips to withstand mechanical stresses. Therefore, please take proper precautions when designing land-patterns.



Recommended land dimension for Reflow-soldering

| Type | | 3216 | 2010 | 1210 | 0806 | 0605 |
|------|---|---------|---------|-----------|-----------|-----------|
| Size | L | 3.2 | 2.0 | 1.25 | 0.85 | 0.65 |
| | W | 1.6 | 1.0 | 1.0 | 0.65 | 0.50 |
| a | | 0.7~0.9 | 0.5~0.6 | 0.45~0.55 | 0.25~0.35 | 0.27~0.33 |
| b | | 0.8~1.0 | 0.5~0.6 | 0.7~0.8 | 0.25~0.35 | 0.17~0.23 |
| c | | 0.4~0.5 | 0.2~0.3 | 0.25~0.35 | 0.25~0.35 | 0.20~0.26 |
| d | | 0.8 | 0.5 | 0.55 | 0.5 | 0.4 |

(Unit: mm)

((2) Examples of good and bad solder application

| Item | Not recommended | Recommended |
|---|-----------------|-------------|
| Mixed mounting of SMD and leaded components | | |
| Component placement close to the chassis | | |
| Hand-soldering of leaded components near mounted components | | |
| Horizontal component placement | | |

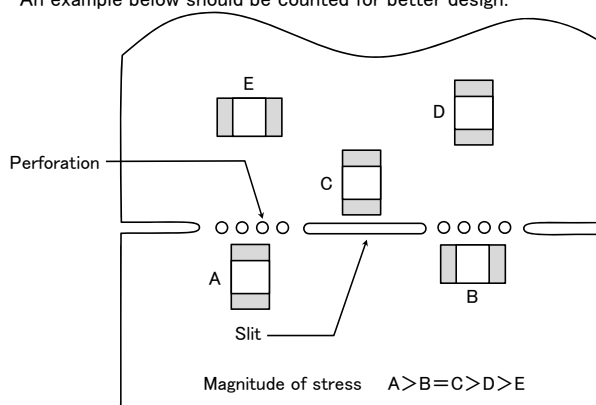
◆Pattern configurations (Inductor layout on panelized[breakaway] PC boards)

1-1. The following are examples of good and bad inductor layout; SMD inductors should be located to minimize any possible mechanical stresses from board warp or deflection.

| Item | Not recommended | Recommended |
|-------------------------|-----------------|---|
| Deflection of the board | | Position the component at a right angle to the direction of the mechanical stresses that are anticipated. |

1-2. To layout the inductors for the breakaway PC board, it should be noted that the amount of mechanical stresses given will vary depending on inductor layout.

An example below should be counted for better design.



1-3. When breaking PC boards along their perforations, the amount of mechanical stress on the inductors can vary according to the method used. The following methods are listed in order from least stressful to most stressful: push-back, slit, V-grooving, and perforation. Thus, any ideal SMD inductor layout must also consider the PCB splitting procedure.

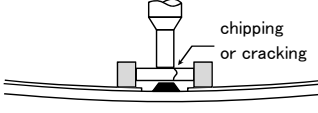
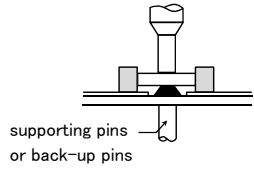
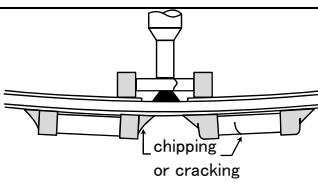
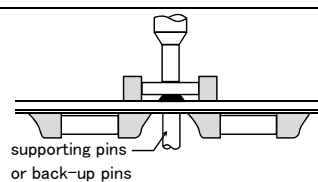
3. Considerations for automatic placement

Precautions

- ◆ Adjustment of mounting machine
 1. Excessive impact load should not be imposed on the inductors when mounting onto the PC boards.
 2. The maintenance and inspection of the mounter should be conducted periodically.
- ◆ Selection of Adhesives
 1. Mounting inductors with adhesives in preliminary assembly, before the soldering stage, may lead to degraded inductor characteristics unless the following factors are appropriately checked; the size of land patterns, type of adhesive, amount applied, hardening temperature and hardening period. Therefore, it is imperative to consult the manufacturer of the adhesives on proper usage and amounts of adhesive to use.

Technical considerations

- ◆ Adjustment of mounting machine
 1. If the lower limit of the pick-up nozzle is low, too much force may be imposed on the inductors, causing damage. To avoid this, the following points should be considered before lowering the pick-up nozzle:
 - (1) The lower limit of the pick-up nozzle should be adjusted to the surface level of the PC board after correcting for deflection of the board.
 - (2) The pick-up pressure should be adjusted between 1 and 3N static loads.
 - (3) To reduce the amount of deflection of the board caused by impact of the pick-up nozzle, supporting pins or back-up pins should be used under the PC board. The following diagrams show some typical examples of good pick-up nozzle placement:

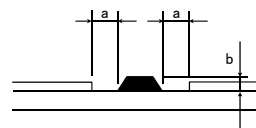
| Item | Improper method | Proper method |
|-----------------------|---|---|
| Single-sided mounting |  |  |
| Double-sided mounting |  |  |

2. As the alignment pin wears out, adjustment of the nozzle height can cause chipping or cracking of the inductors because of mechanical impact on the inductors. To avoid this, the monitoring of the width between the alignment pin in the stopped position, and maintenance, inspection and replacement of the pin should be conducted periodically.
- ◆ Selection of Adhesives
 1. Some adhesives may cause reduced insulation resistance. The difference between the shrinkage percentage of the adhesive and that of the inductors may result in stresses on the inductors and lead to cracking. Moreover, too little or too much adhesive applied to the board may adversely affect component placement, so the following precautions should be noted in the application of adhesives.
 - (1) Required adhesive characteristics
 - a. The adhesive should be strong enough to hold parts on the board during the mounting & solder process.
 - b. The adhesive should have sufficient strength at high temperatures.
 - c. The adhesive should have good coating and thickness consistency.
 - d. The adhesive should be used during its prescribed shelf life.
 - e. The adhesive should harden rapidly.
 - f. The adhesive must not be contaminated.
 - g. The adhesive should have excellent insulation characteristics.
 - h. The adhesive should not be toxic and have no emission of toxic gasses.
 - (2) When using adhesives to mount inductors on a PCB, inappropriate amounts of adhesive on the board may adversely affect component placement. Too little adhesive may cause the inductors to fall off the board during the solder process. Too much adhesive may cause defective soldering due excessive flow of adhesive on to the land or solder pad.

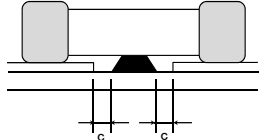
[Recommended conditions]

| Figure | 0805 case sizes as examples |
|--------|-----------------------------|
| a | 0.3mm min |
| b | 100~120 μ m |
| c | Area with no adhesive |

Amount of adhesives



After inductors are bonded



4. Soldering

Precautions

- ◆ Selection of Flux
 1. Since flux may have a significant effect on the performance of inductors, it is necessary to verify the following conditions prior to use;
 - (1) Flux used should be with less than or equal to 0.1 wt% (Chlorine conversion method) of halogenated content. Flux having a strong acidity content should not be applied.
 - (2) When soldering inductors on the board, the amount of flux applied should be controlled at the optimum level.
 - (3) When using water-soluble flux, special care should be taken to properly clean the boards.
- ◆ Soldering
 1. Temperature, time, amount of solder, etc. are specified in accordance with the following recommended conditions, and please contact us about peak temperature when you use lead-free paste.

◆ Selection of Flux

- 1-1. When too much halogenated substance (Chlorine, etc.) content is used to activate the flux, or highly acidic flux is used, an excessive amount of residue after soldering may lead to corrosion of the terminal electrodes or degradation of insulation resistance on the surface of the Inductor.
- 1-2. Flux is used to increase solderability in flow soldering, but if too much is applied, a large amount of flux gas may be emitted and may detrimentally affect solderability. To minimize the amount of flux applied, it is recommended to use a flux-bubbling system.
- 1-3. Since the residue of water-soluble flux is easily dissolved by water content in the air, the residue on the surface of Inductor in high humidity conditions may cause a degradation of insulation resistance and therefore affect the reliability of the components. The cleaning methods and the capability of the machines used should also be considered carefully when selecting water-soluble flux.

◆ Soldering

1-1. Preheating when soldering

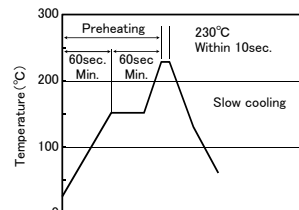
Heating: Chip inductor components should be preheated to within 100 to 130°C of the soldering. Cooling: The temperature difference between the components and cleaning process should not be greater than 100°C.

Chip inductors are susceptible to thermal shock when exposed to rapid or concentrated heating or rapid cooling. Therefore, the soldering process must be conducted with a great care so as to prevent malfunction of the components due to excessive thermal shock.

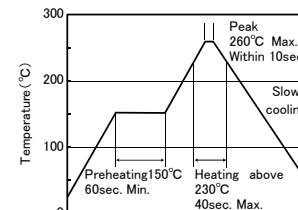
Recommended conditions for soldering

[Reflow soldering]

Temperature profile



Pb free soldering

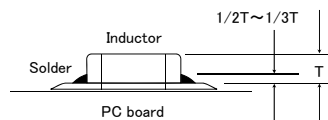


※Ceramic chip components should be preheated to within 100 to 130°C of the soldering.

※Assured to be reflow soldering for 2 times.

Caution

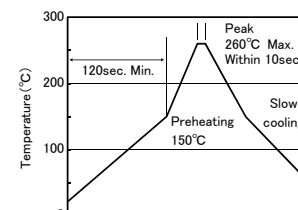
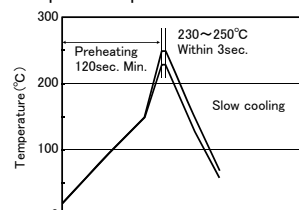
1. The ideal condition is to have solder mass (fillet) controlled to 1/2 to 1/3 of the thickness of the inductor, as shown below:



2. Because excessive dwell times can detrimentally affect solderability, soldering duration should be kept as close to recommended times as possible.

[Wave soldering]

Temperature profile



※Ceramic chip components should be preheated to within 100 to 130°C of the soldering.

※Assured to be wave soldering for 1 time.

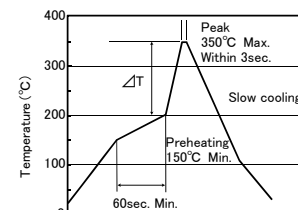
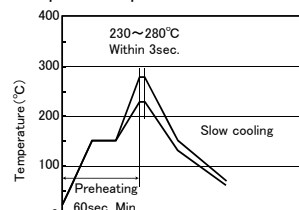
※Except for reflow soldering type.

Caution

1. Make sure the inductors are preheated sufficiently.
2. The temperature difference between the inductor and melted solder should not be greater than 100 to 130°C.
3. Cooling after soldering should be as gradual as possible.
4. Wave soldering must not be applied to the inductors designated as for reflow soldering only.

[Hand soldering]

Temperature profile



(※ $\Delta T \leq 190^\circ\text{C}$ (3216 Type max), $\Delta T \leq 130^\circ\text{C}$ (3225 Type min)

※It is recommended to use 20W soldering iron and the tip is 1 φ or less.

※The soldering iron should not directly touch the components.

※Assured to be soldering iron for 1 time.

Note: The above profiles are the maximum allowable soldering condition, therefore these profiles are not always recommended.

Technical
considerations

| | | | | | | | |
|-----------------------------------|---|-------------------|-------------|----------------------|-------------|---------------------------|----------------|
| | <p>Caution</p> <ol style="list-style-type: none"> 1. Use a 20W soldering iron with a maximum tip diameter of 1.0 mm. 2. The soldering iron should not directly touch the inductor. | | | | | | |
| 5. Cleaning | | | | | | | |
| Precautions | <p>◆Cleaning conditions</p> <ol style="list-style-type: none"> 1. When cleaning the PC board after the Inductors are all mounted, select the appropriate cleaning solution according to the type of flux used and purpose of the cleaning (e.g. to remove soldering flux or other materials from the production process.) 2. Cleaning conditions should be determined after verifying, through a test run, that the cleaning process does not affect the inductor's characteristics. | | | | | | |
| Technical considerations | <p>◆Cleaning conditions</p> <ol style="list-style-type: none"> 1. The use of inappropriate solutions can cause foreign substances such as flux residue to adhere to the inductor, resulting in a degradation of the inductor's electrical properties (especially insulation resistance). 2. Inappropriate cleaning conditions (insufficient or excessive cleaning) may detrimentally affect the performance of the inductors. <ol style="list-style-type: none"> (1) Excessive cleaning <ol style="list-style-type: none"> a. In the case of ultrasonic cleaning, too much power output can cause excessive vibration of the PC board which may lead to the cracking of the inductor or the soldered portion, or decrease the terminal electrodes' strength. Thus the following conditions should be carefully checked; <table> <tr> <td>Ultrasonic output</td><td>Below 20W/l</td></tr> <tr> <td>Ultrasonic frequency</td><td>Below 40kHz</td></tr> <tr> <td>Ultrasonic washing period</td><td>5 min. or less</td></tr> </table> | Ultrasonic output | Below 20W/l | Ultrasonic frequency | Below 40kHz | Ultrasonic washing period | 5 min. or less |
| Ultrasonic output | Below 20W/l | | | | | | |
| Ultrasonic frequency | Below 40kHz | | | | | | |
| Ultrasonic washing period | 5 min. or less | | | | | | |
| 6. Post cleaning processes | | | | | | | |
| Precautions | <p>◆Application of resin coatings, moldings, etc. to the PCB and components.</p> <ol style="list-style-type: none"> 1. With some type of resins a decomposition gas or chemical reaction vapor may remain inside the resin during the hardening period or while left under normal storage conditions resulting in the deterioration of the inductor's performance. 2. When a resin's hardening temperature is higher than the inductor's operating temperature, the stresses generated by the excess heat may lead to inductor damage or destruction. 3. Stress caused by a resin's temperature generated expansion and contraction may damage inductors. <p>The use of such resins, molding materials etc. is not recommended.</p> | | | | | | |
| 7. Handling | | | | | | | |
| Precautions | <p>◆Breakaway PC boards (splitting along perforations)</p> <ol style="list-style-type: none"> 1. When splitting the PC board after mounting inductors and other components, care is required so as not to give any stresses of deflection or twisting to the board. 2. Board separation should not be done manually, but by using the appropriate devices. <p>◆General handling precautions</p> <ol style="list-style-type: none"> 1. Always wear static control bands to protect against ESD. 2. Keep the inductors away from all magnets and magnetic objects. 3. Use non-magnetic tweezers when handling inductors. 4. Any devices used with the inductors (soldering irons, measuring instruments) should be properly grounded. 5. Keep bare hands and metal products (i.e., metal desk) away from chip electrodes or conductive areas that lead to chip electrodes. 6. Keep inductors away from items that generate magnetic fields such as speakers or coils. <p>◆Mechanical considerations</p> <ol style="list-style-type: none"> 1. Be careful not to subject the inductors to excessive mechanical shocks. <ol style="list-style-type: none"> (1) If inductors are dropped on the floor or a hard surface they should not be used. (2) When handling the mounted boards, be careful that the mounted components do not come in contact with or bump against other boards or components. | | | | | | |
| 8. Storage conditions | | | | | | | |
| Precautions | <p>◆Storage</p> <ol style="list-style-type: none"> 1. To maintain the solderability of terminal electrodes and to keep the packaging material in good condition, care must be taken to control temperature and humidity in the storage area. Humidity should especially be kept as low as possible. <p>Recommended conditions</p> <p>Ambient temperature Below 40°C</p> <p>Humidity Below 70% RH</p> <p>The ambient temperature must be kept below 30°C. Even under ideal storage conditions inductor electrode solderability decreases as time passes, so inductors should be used within 6 months from the time of delivery.</p> <p>*The packaging material should be kept where no chlorine or sulfur exists in the air.</p> | | | | | | |
| Technical considerations | <p>◆Storage</p> <ol style="list-style-type: none"> 1. If the parts are stocked in 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. For this reason, components should be used within 6 months from the time of delivery. If exceeding the above period, please check solderability before using the inductors. | | | | | | |

SMD 共模模式扼流线圈（直流、信号线路用）

回流焊

■ 型号标示法

※使用温度范围: -25~+105℃ (包含产品本身发热)

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| B | U | 0 | 5 | M | C | △ | 0 | 1 | △ | T | △ |
| ① | | ② | | ③ | | | ④ | | ⑤ | | ⑥ |

△=空格

① 类型

| 代码 | 类型 |
|----|--------|
| BU | 共模扼流线圈 |

④ 试作代码

| 代码 | 试作代码 |
|---------|------|
| △01~△10 | 试作代码 |

② 磁芯外径尺寸

| 代码 | 磁芯外径尺寸[mm] |
|----|------------|
| 05 | 5.0 |

⑤ 包装

| 代码 | 包装 |
|----|------|
| △T | 卷盘带装 |

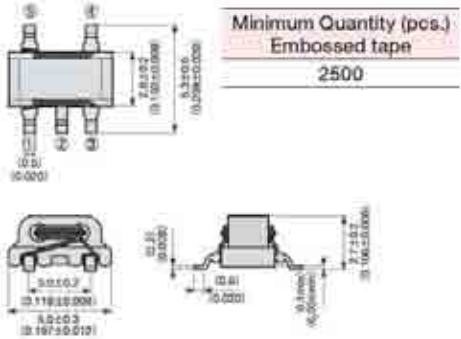
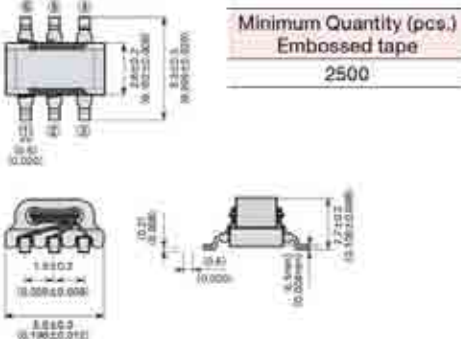
③ 外型

| 代码 | 外型 |
|----|-------|
| MC | 表面贴装型 |

⑥ 本公司管理记号

| 代码 | 本公司管理记号 |
|----|---------|
| △ | 标准品 |

■ 标准外型尺寸／最小订货单位数量

| BU05MC [2 Lines] type | BU05MC [3 Lines] type |
|--|---|
|  <p>Minimum Quantity (pcs.) Embossed tape 2500</p> |  <p>Minimum Quantity (pcs.) Embossed tape 2500</p> |

单位: mm(inch)

未标记公差数值仅供参考。

■ 型号一览

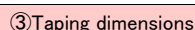
● BU05MC型

| 型号 | EHS | 匝数 | 阻抗值 [Ω] (typ.) | 测试频率 [MHz] | 直流电阻 [Ω] (max.) | 额定电流 [A] (max.) | 额定电压 [V] (D.C.) | 绝缘阻抗 [MΩ] (min.) |
|-------------|------|----|-------------------|---------------|--------------------|--------------------|--------------------|---------------------|
| BU05MC 01 T | RoHS | 2 | 1000 | 60 | 0.12 | 1.0 | 50 | 100 |
| BU05MC 08 T | RoHS | 3 | 700 | 60 | 0.11 | 0.5 | 50 | 100 |

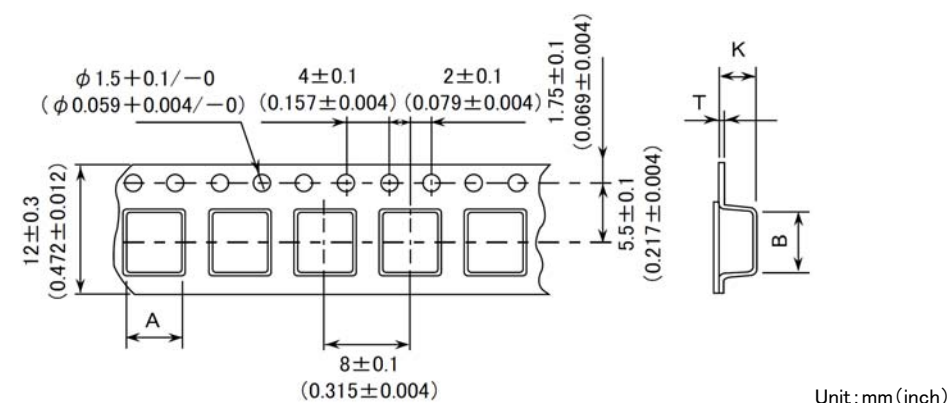
■ PACKAGING

| Type | Minimum Quantity [pcs] | |
|--------|------------------------|--------|
| | Box | Taping |
| BU05MC | — | 2500 |
| BU05MB | 200 | — |
| BU06MB | 150 | — |

● Embossed Tape

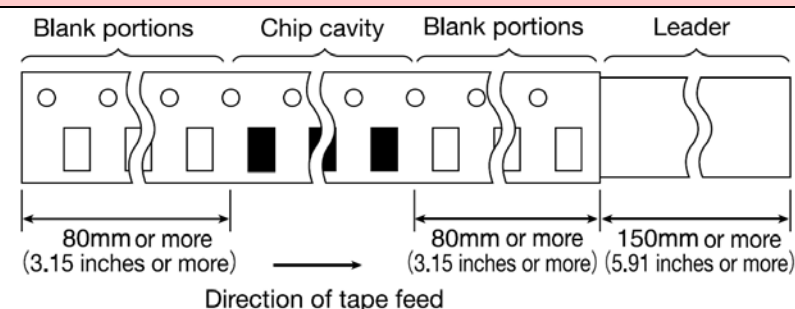


● Embossed tape 12mm wide (0.472 inches wide)



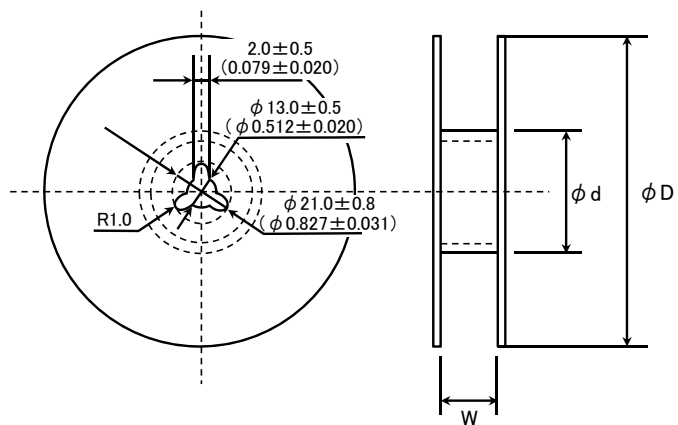
| Type | Insertion pitch | Chip cavity | | Tape thickness | |
|------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|
| | | A | B | K | T |
| BU05MC | 8.0±0.1 (0.315±0.004) | 5.2±0.1 (0.205±0.004) | 5.6±0.1 (0.220±0.004) | 3.2±0.1 (0.126±0.004) | 0.4±0.05 (0.016±0.002) |
| Unit : mm (inch) | | | | | |

④Leader and Blank portion



coil smd trans pack e-E02R01

⑤ Reel size

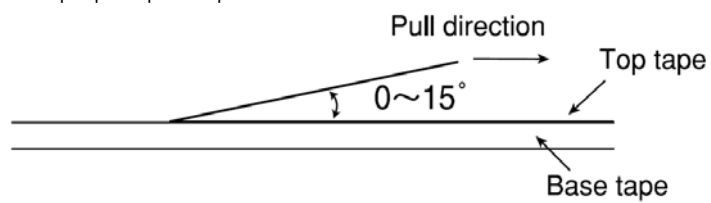


| Type | ϕD | ϕd | W |
|--------|--|--------------------------------------|--|
| BU05MC | 330 ± 2.0 (12.99 ± 0.079) | 80 ± 1.0 (3.15 ± 0.039) | 13.5 ± 1.0 (0.53 ± 0.039) |

Unit : mm (inch)

⑥ Top Tape Strength

The top tape requires a peel-off force of 0.1 to 0.7N in the direction of the arrow as illustrated below.



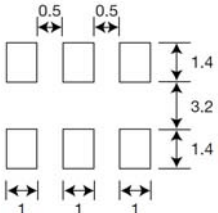
SMD COMMON MODE CHOKE COILS FOR DC AND SIGNAL LINES, BALUN TRANSFORMERS

■ 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>◆Land pattern design</p> <p>1. Please contact any of our offices for a land pattern, and refer to a recommended land pattern of specifications.</p> |
| Technical considerations | <p>◆Land pattern design</p> <p>Surface Mounting</p> <ul style="list-style-type: none"> Mounting and soldering conditions should be checked beforehand. Applicable soldering process to these products is reflow soldering only. Recommended Land Patterns <p>【BU05MC】</p>  <p>Unit: mm</p> |

3. Considerations for automatic placement

| | |
|--------------------------|--|
| Precautions | <p>◆Adjustment of mounting machine</p> <p>1. Excessive impact load should not be imposed on the products when mounting onto the PC boards.</p> <p>2. Mounting and soldering conditions should be checked beforehand.</p> |
| Technical considerations | <p>◆Adjustment of mounting machine</p> <p>1. When installing products, care should be taken not to apply distortion stress as it may deform the products.</p> |

4. Soldering

| | |
|--------------------------|--|
| Precautions | <p>◆Reflow soldering</p> <p>1. Please contact any of our offices for a reflow soldering, and refer to the recommended condition specified.</p> <p>2. This product can be used reflow soldering only.</p> <p>3. Please do not add any stress to a product until it returns in normal temperature after reflow soldering.</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> <p>【BU05MC】</p> <ul style="list-style-type: none"> Put the soldering iron on the land-pattern. Soldering iron's temperature – Below 350°C Duration – 3 seconds or less The soldering iron should not directly touch the inductor. |
| Technical considerations | <p>◆Reflow 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. Please contact any of our offices for a cleaning.</p> |
|-------------|---|

| 6. Handling | |
|--------------------------|--|
| Precautions | <ul style="list-style-type: none"> ◆ Handling <ol style="list-style-type: none"> 1. Keep the product away from all magnets and magnetic objects. ◆ Breakaway PC boards (splitting along perforations) <ol style="list-style-type: none"> 1. When splitting the PC board after mounting product, care should be taken not to give any stresses of deflection or twisting to the board. 2. Board separation should not be done manually, but by using the appropriate devices. ◆ Mechanical considerations <ol style="list-style-type: none"> 1. Please do not give the product any excessive mechanical shocks. 2. Please do not add any shock and power to a product in transportation. ◆ Pick-up pressure <ol style="list-style-type: none"> 1. Please do not push to add any pressure to a winding part. Please do not give any shock and push onto an exposed part of ferrite cores. ◆ Packing <ol style="list-style-type: none"> 1. Please avoid accumulation of a packing box as much as possible. |
| Technical considerations | <ul style="list-style-type: none"> ◆ Handling <ol style="list-style-type: none"> 1. There is a case that a characteristic varies with magnetic influence. ◆ Breakaway PC boards (splitting along perforations) <ol style="list-style-type: none"> 1. The position of the product on PCBs shall be carefully considered to minimize the stress caused from splitting of the PCBs. ◆ Mechanical considerations <ol style="list-style-type: none"> 1. There is a case to be damaged by a mechanical shock. 2. There is a case to be broken by the handling in transportation. ◆ Pick-up pressure <ol style="list-style-type: none"> 1. An excessive shock or stress may cause a damage to the product or a deterioration of a characteristic. ◆ Packing <ol style="list-style-type: none"> 1. If packing boxes are accumulated, that could cause a deformation on packing tapes or a damage on the products. |
| 7. Storage conditions | |
| Precautions | <ul style="list-style-type: none"> ◆ Storage <ol style="list-style-type: none"> 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"> • Recommended conditions <p style="margin-left: 40px;">Ambient temperature : 0~40°C, Humidity : Below 70% RH</p> <p style="margin-left: 40px;">The ambient temperature must be kept below 30°C. Even under ideal storage conditions, the solderability of electrodes may decrease gradually. For this reason, the products should be used within one year from the time of delivery. In case of storage over 6 months, solderability shall be checked before actual usage.</p> |
| Technical considerations | <ul style="list-style-type: none"> ◆ Storage <ol style="list-style-type: none"> 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. |



波峰焊

导线型共模模式扼流线圈（直流、信号线路用）

■型号标示法

※使用温度范围:-25~+105℃(包含产品本身发热)

【TLF Type】

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T | L | F | △ | 9 | U | B | H | 3 | 0 | 2 | W | K | 1 |
| ① | ② | ③ | ④ | ⑤ | ⑥ | | | | | | | | |

△=空格

①类型

| 代码 | 类型 |
|-----|--------|
| TLF | 共模扼流线圈 |

②磁芯外径尺寸

| 代码 | 磁芯外径尺寸[mm] |
|----|------------|
| △9 | 9 |

③外型

| 代码 | 外型 |
|-----|-------------|
| UB△ | U形磁芯、垂直分割绕线 |
| UBH | U形磁芯、水平分割绕线 |

④标称电感值

| 代码(例) | 标称电感值[μH] |
|-------|-----------|
| 302 | 3000 |
| 203 | 20000 |

⑤电感量公差

| 代码 | 电感量公差 |
|----|-----------|
| W | +100/-10% |

⑥本公司管理记号

| 代码 | 本公司管理记号 |
|----|---------|
| K1 | 粘合固定 |

【BU Type】

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| B | U | 0 | 8 | R | A | △ | 1 | 1 | △ |
| ① | ② | ③ | ④ | ⑤ | | | | | |

△=空格

①类型

| 代码 | 类型 |
|----|--------|
| BU | 共模扼流线圈 |

②磁芯尺寸

| 代码 | 磁芯尺寸[mm] |
|----|----------|
| 08 | 8.0 |

③外型

| 代码 | 外型 |
|----|-----|
| RA | 双导线 |

④试作代码

| 代码 | 试作代码 |
|---------|------|
| △01~△20 | 试作代码 |

⑤本公司管理记号

| 代码 | 本公司管理记号 |
|----|---------|
| △ | 标准品 |

■标准外型尺寸/最小订货单位数量

| TLF9UB Type | TLF9UB H Type | BU08RA Type |
|--|--|---|
| <p>Minimum Quantity (pcs.) Box 500</p> | <p>Minimum Quantity (pcs.) Box 500</p> | <p>Minimum Quantity (pcs.) Bulk 200</p> |

单位: mm (inch)

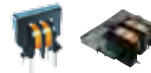
■型号一览

| 型号 | EHS | 匝数 | 电感值 [mH] | 电感量公差 | 直流电阻 [Ω] (max.) | 额定电流 [A] (max.) | 额定电压 [V] (D.C.) | 绝缘阻抗 [MΩ] (min.) |
|-----------------|------|----|-------------|-----------|--------------------|--------------------|--------------------|---------------------|
| TLF 9UBH302W K1 | RoHS | 2 | 3.0 | +100/-10% | 1.5 | 0.40 | 50 | 100 |
| TLF 9UB 302W K1 | RoHS | 2 | 3.0 | +100/-10% | 1.5 | 0.40 | 50 | 100 |
| TLF 9UBH802W K1 | RoHS | 2 | 8.0 | +100/-10% | 3.0 | 0.30 | 50 | 100 |
| TLF 9UB 802W K1 | RoHS | 2 | 8.0 | +100/-10% | 3.0 | 0.30 | 50 | 100 |
| TLF 9UBH203W K1 | RoHS | 2 | 20.0 | +100/-10% | 6.5 | 0.18 | 50 | 100 |
| TLF 9UB 203W K1 | RoHS | 2 | 20.0 | +100/-10% | 6.5 | 0.18 | 50 | 100 |

| 型号 | EHS | 匝数 | 电感值 [μH] | 电感值测试频率 [kHz] | 阻抗值 [Ω] (typ.) | 阻抗值 测试频率 [MHz] | 直流电阻 [Ω] (max.) | 额定电流 [A] (max.) | 额定电压 [V] (D.C.) | 绝缘阻抗 [MΩ] (min.) |
|-----------|------|----|-------------|------------------|-------------------|----------------------|--------------------|--------------------|--------------------|---------------------|
| BU08RA 11 | RoHS | 2 | 0.7~1.3 | 1 | 1000 | 250 | 0.013 | 4.0 | 50 | 100 |
| BU08RA 16 | RoHS | 2 | 1.19~2.21 | 1 | 1200 | 200 | 0.011 | 3.0 | 50 | 100 |

▶ 本产品目录根据版面大小, 仅记载了代表性产品规格, 若考虑使用本公司产品时, 请确认供货规格型号明细表中的详细规格。
有关各商品的详细信息(特性图、可靠性信息、使用时的注意事项等), 请参阅本公司网站(<http://www.ty-top.com/>)。

导线型共模模式扼流线圈（交流线路用）



波峰焊

■型号标示法

※使用温度范围: -25~+105°C (包含产品本身发热)

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T | L | F | 1 | 4 | C | B | △ | 1 | 0 | 3 | △ | 0 | R | 7 | K | 1 |
| ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | | | | | | | | | | |

△=空格

①类型

| 代码 | 类型 |
|-----|---------|
| TLF | 共模模式扼流圈 |
| TLH | 混合阻风门 |

②磁芯尺寸

| 代码 | 磁芯尺寸[mm] |
|----|----------|
| △9 | 9 |
| 10 | 10 |
| 14 | 14 |
| 24 | 24 |

③外型

| 代码 | 外型 |
|-----|--------------|
| UA△ | U形磁芯、垂直型 |
| UAH | U形磁芯、水平型 |
| UB△ | U形磁芯、垂直分割绕线型 |
| CB△ | □形磁芯、垂直分割绕线型 |
| CBH | □形磁芯、水平分割绕线型 |
| HB△ | 日形磁芯、垂直分割型 |
| HBH | 日形磁芯、水平分割型 |

④标称电感值

| 代码(例) | 标称电感值[μH] |
|-------|-----------|
| 102 | 1000 |
| 103 | 10000 |

⑤电感量公差

| 代码 | 电感量公差 |
|----|-----------|
| △ | 公称值以上 |
| W | +100/-10% |

⑥额定电流

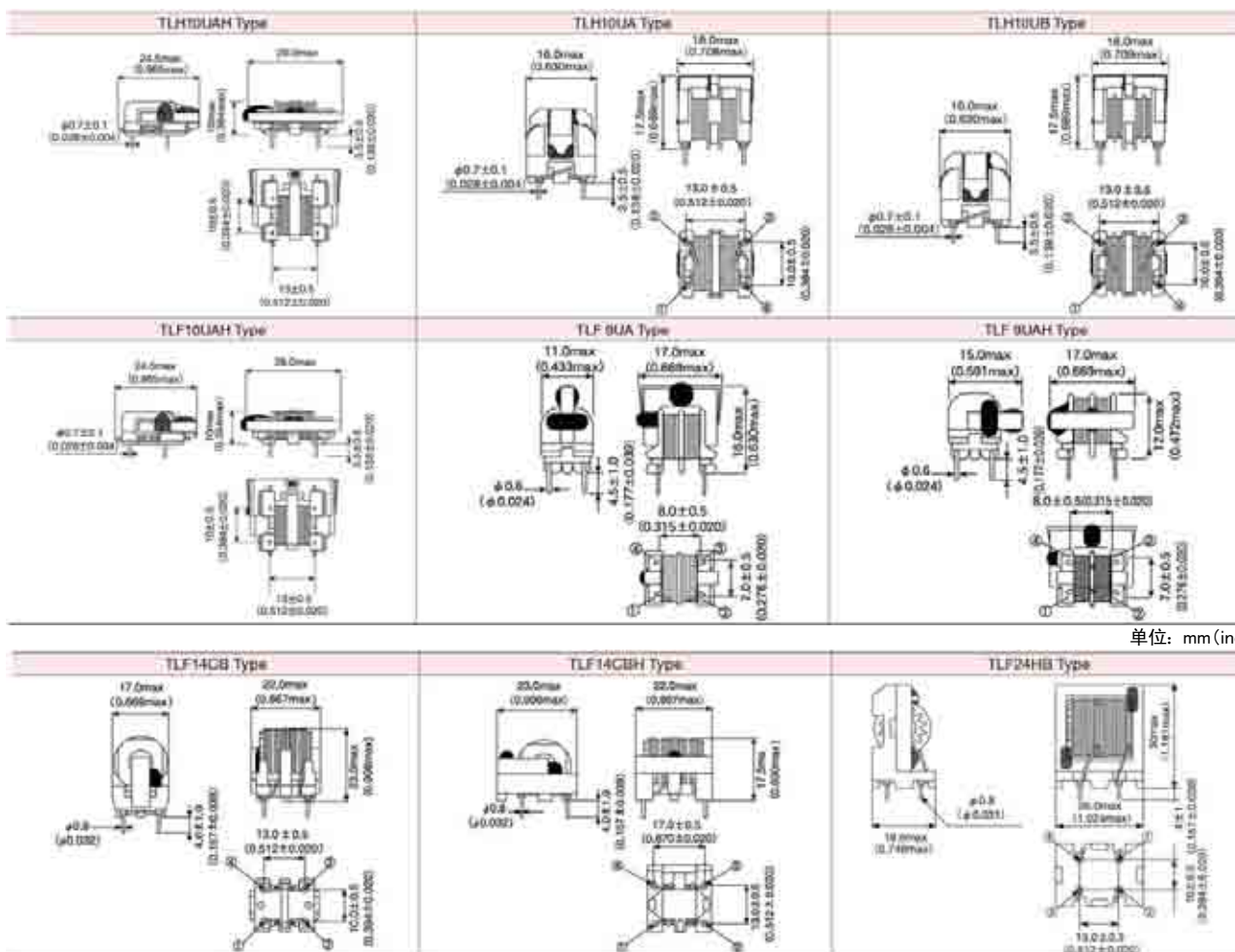
| 代码 | 额定电流[A] |
|-----|---------|
| R54 | 0.54 |
| 0R8 | 0.8 |

※R=小数点

⑦本公司管理记号

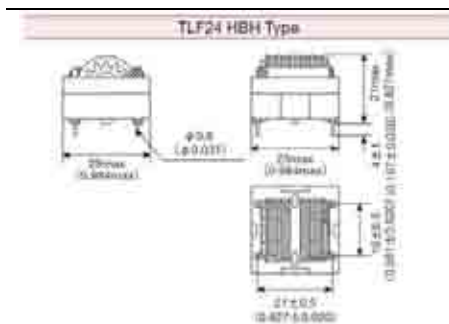
| 代码 | 本公司管理记号 |
|----|---------|
| K1 | 粘合固定 |

■标准外型尺寸/最小订货单位数量



单位: mm (inch)

▶ 本产品目录根据版面大小, 仅记载了代表性产品规格, 若考虑使用本公司产品时, 请确认供货规格型号明细表中的详细规格。有关各商品的详细信息(特性图、可靠性信息、使用时的注意事项等), 请参阅本公司网站(<http://www.ty-top.com/>)。



单位: mm (inch)

| Type | Minimum Quantity (pcs.) Box |
|----------|--------------------------------|
| TLH Type | 600 |
| TLF Type | |

■型号一览

●TLH10UAH型(混成式扼流圈)

| 型号 | EHS | 共模模式 电感值 [mH] | 电感值公差 | 正常模式 电感值 [mH] (typ.) | 直流电阻 [Ω] (max.) | 额定电流 [A] (max.) | 额定电压AC [V] (max.) |
|-----------------|------|---------------------|-------|----------------------------|--------------------|--------------------|----------------------|
| TLH10UAH872 0R7 | RoHS | 8.7 | min. | 0.70 | 1.00 | 0.7 | 250 |
| TLH10UAH992 0R6 | RoHS | 9.9 | min. | 0.85 | 1.35 | 0.6 | 250 |
| TLH10UAH123 0R5 | RoHS | 12 | min. | 1.06 | 1.60 | 0.5 | 250 |

●TLH10UA型(混成式扼流圈)

| 型号 | EHS | 共模模式 电感值 [mH] | 电感值公差 | 正常模式 电感值 [mH] (typ.) | 直流电阻 [Ω] (max.) | 额定电流 [A] (max.) | 额定电压AC [V] (max.) |
|-----------------|------|---------------------|-------|----------------------------|--------------------|--------------------|----------------------|
| TLH10UA 901 2R0 | RoHS | 0.9 | min. | 0.067 | 0.089 | 2.0 | 250 |
| TLH10UA 112 1R8 | RoHS | 1.1 | min. | 0.087 | 0.126 | 1.8 | 250 |
| TLH10UA 152 1R6 | RoHS | 1.5 | min. | 0.126 | 0.171 | 1.6 | 250 |
| TLH10UA 212 1R4 | RoHS | 2.1 | min. | 0.160 | 0.222 | 1.4 | 250 |
| TLH10UA 282 1R2 | RoHS | 2.8 | min. | 0.215 | 0.272 | 1.2 | 250 |
| TLH10UA 432 1R0 | RoHS | 4.3 | min. | 0.330 | 0.398 | 1.0 | 250 |
| TLH10UA 622 0R8 | RoHS | 6.2 | min. | 0.430 | 0.578 | 0.8 | 250 |
| TLH10UA 872 0R7 | RoHS | 8.7 | min. | 0.644 | 0.878 | 0.7 | 250 |
| TLH10UA 992 0R6 | RoHS | 9.9 | min. | 0.836 | 1.138 | 0.6 | 250 |
| TLH10UA 143 0R5 | RoHS | 14 | min. | 1.256 | 1.567 | 0.5 | 250 |

●TLH10UB型(混成式扼流圈)

| 型号 | EHS | 共模模式 电感值 [mH] | 电感值公差 | 正常模式 电感值 [mH] (typ.) | 直流电阻 [Ω] (max.) | 额定电流 [A] (max.) | 额定电压AC [V] (max.) |
|-----------------|------|---------------------|-------|----------------------------|--------------------|--------------------|----------------------|
| TLH10UB 701 2R0 | RoHS | 0.7 | min. | 0.056 | 0.097 | 2.0 | 250 |
| TLH10UB 112 1R7 | RoHS | 1.1 | min. | 0.068 | 0.133 | 1.7 | 250 |
| TLH10UB 142 1R4 | RoHS | 1.4 | min. | 0.113 | 0.214 | 1.4 | 250 |
| TLH10UB 232 1R2 | RoHS | 2.3 | min. | 0.150 | 0.274 | 1.2 | 250 |
| TLH10UB 352 1R0 | RoHS | 3.5 | min. | 0.232 | 0.422 | 1.0 | 250 |
| TLH10UB 442 0R8 | RoHS | 4.4 | min. | 0.328 | 0.624 | 0.8 | 250 |
| TLH10UB 872 0R7 | RoHS | 8.7 | min. | 0.580 | 0.982 | 0.7 | 250 |
| TLH10UB 972 0R6 | RoHS | 9.7 | min. | 0.735 | 1.314 | 0.6 | 250 |
| TLH10UB 113 0R5 | RoHS | 11 | min. | 0.877 | 1.577 | 0.5 | 250 |

●TLF10UAH型

| 型号 | EHS | 共模模式 电感值 [mH] | 电感值公差 | 直流电阻 [Ω] (max.) | 额定电流 [A] (max.) | 额定电压AC [V] (max.) |
|-----------------|------|---------------------|-------|--------------------|--------------------|----------------------|
| TLF10UAH872 0R7 | RoHS | 8.7 | min. | 1.00 | 0.7 | 250 |
| TLF10UAH992 0R6 | RoHS | 9.9 | min. | 1.35 | 0.6 | 250 |
| TLF10UAH123 0R5 | RoHS | 12 | min. | 1.60 | 0.5 | 250 |

●TLF 9UA型

| 型号 | EHS | 共模模式 电感值 [mH] | 电感值公差 | 直流电阻 [Ω] (max.) | 额定电流 [A] (max.) | 额定电压AC [V] (max.) |
|-------------------|------|---------------------|-----------|--------------------|--------------------|----------------------|
| TLF 9UA 102W0R8K1 | RoHS | 1.0 | +100/-10% | 0.5 | 0.80 | 250 |
| TLF 9UA 202WR54K1 | RoHS | 2.0 | +100/-10% | 1.0 | 0.54 | 250 |
| TLF 9UA 302WR42K1 | RoHS | 3.0 | +100/-10% | 1.5 | 0.42 | 250 |
| TLF 9UA 502WR32K1 | RoHS | 5.0 | +100/-10% | 2.5 | 0.32 | 250 |
| TLF 9UA 802WR25K1 | RoHS | 8.0 | +100/-10% | 4.0 | 0.25 | 250 |
| TLF 9UA 103WR23K1 | RoHS | 10 | +100/-10% | 4.5 | 0.23 | 250 |

●TLF 9UAH型

| 型号 | EHS | 共模模式 电感值 [mH] | 电感值公差 | 直流电阻 [Ω] (max.) | 额定电流 [A] (max.) | 额定电压AC [V] (max.) |
|-------------------|------|---------------------|-----------|--------------------|--------------------|----------------------|
| TLF 9UAH102W0R8K1 | RoHS | 1.0 | +100/-10% | 0.5 | 0.80 | 250 |
| TLF 9UAH202WR54K1 | RoHS | 2.0 | +100/-10% | 1.0 | 0.54 | 250 |
| TLF 9UAH302WR42K1 | RoHS | 3.0 | +100/-10% | 1.5 | 0.42 | 250 |
| TLF 9UAH502WR32K1 | RoHS | 5.0 | +100/-10% | 2.5 | 0.32 | 250 |
| TLF 9UAH802WR25K1 | RoHS | 8.0 | +100/-10% | 4.0 | 0.25 | 250 |
| TLF 9UAH103WR23K1 | RoHS | 10 | +100/-10% | 4.5 | 0.23 | 250 |

● TLF14CB型

| 型号 | EHS | 共模模式 电感值 [mH] | 电感值公差 | 直流电阻 [Ω] (max.) | 额定电流 [A] (max.) | 额定电压AC [V] (max.) |
|-------------------|------|---------------------|-------|--------------------|--------------------|----------------------|
| TLF14CB 102 1R5K1 | RoHS | 1.0 | min. | 0.10 | 1.5 | 250 |
| TLF14CB 222 1R2K1 | RoHS | 2.2 | min. | 0.18 | 1.2 | 250 |
| TLF14CB 332 1R0K1 | RoHS | 3.3 | min. | 0.32 | 1.0 | 250 |
| TLF14CB 472 1R0K1 | RoHS | 4.7 | min. | 0.38 | 1.0 | 250 |
| TLF14CB 562 0R8K1 | RoHS | 5.6 | min. | 0.42 | 0.8 | 250 |
| TLF14CB 682 0R8K1 | RoHS | 6.8 | min. | 0.60 | 0.8 | 250 |
| TLF14CB 103 0R7K1 | RoHS | 10 | min. | 0.85 | 0.7 | 250 |
| TLF14CB 223 0R4K1 | RoHS | 22 | min. | 1.7 | 0.4 | 250 |
| TLF14CB 333 0R3K1 | RoHS | 33 | min. | 2.7 | 0.3 | 250 |
| TLF14CB 473 0R2K1 | RoHS | 47 | min. | 3.6 | 0.2 | 250 |
| TLF14CB 563 0R2K1 | RoHS | 56 | min. | 5.0 | 0.2 | 250 |
| TLF14CB 683 0R2K1 | RoHS | 68 | min. | 6.5 | 0.2 | 250 |

● TLF14CBH型

| 型号 | EHS | 共模模式 电感值 [mH] | 电感值公差 | 直流电阻 [Ω] (max.) | 额定电流 [A] (max.) | 额定电压AC [V] (max.) |
|-------------------|------|---------------------|-------|--------------------|--------------------|----------------------|
| TLF14CBH102 1R5K1 | RoHS | 1.0 | min. | 0.10 | 1.5 | 250 |
| TLF14CBH222 1R2K1 | RoHS | 2.2 | min. | 0.18 | 1.2 | 250 |
| TLF14CBH332 1R0K1 | RoHS | 3.3 | min. | 0.32 | 1.0 | 250 |
| TLF14CBH472 1R0K1 | RoHS | 4.7 | min. | 0.38 | 1.0 | 250 |
| TLF14CBH562 0R8K1 | RoHS | 5.6 | min. | 0.42 | 0.8 | 250 |
| TLF14CBH682 0R8K1 | RoHS | 6.8 | min. | 0.60 | 0.8 | 250 |
| TLF14CBH103 0R7K1 | RoHS | 10 | min. | 0.85 | 0.7 | 250 |
| TLF14CBH223 0R4K1 | RoHS | 22 | min. | 1.7 | 0.4 | 250 |
| TLF14CBH333 0R3K1 | RoHS | 33 | min. | 2.7 | 0.3 | 250 |
| TLF14CBH473 0R2K1 | RoHS | 47 | min. | 3.6 | 0.2 | 250 |
| TLF14CBH563 0R2K1 | RoHS | 56 | min. | 5.0 | 0.2 | 250 |
| TLF14CBH683 0R2K1 | RoHS | 68 | min. | 6.5 | 0.2 | 250 |

● TLF24HB型

| 型号 | EHS | 共模模式 电感值 [mH] | 电感值公差 | 直流电阻 [Ω] (max.) | 额定电流 [A] (max.) | 额定电压AC [V] (max.) |
|-------------------|------|---------------------|-------|--------------------|--------------------|----------------------|
| TLF24HB 122 3R0K1 | RoHS | 1.2 | min. | 0.045 | 3.0 | 250 |
| TLF24HB 222 2R2K1 | RoHS | 2.2 | min. | 0.080 | 2.2 | 250 |
| TLF24HB 272 2R0K1 | RoHS | 2.7 | min. | 0.090 | 2.0 | 250 |
| TLF24HB 332 1R8K1 | RoHS | 3.3 | min. | 0.120 | 1.8 | 250 |
| TLF24HB 392 1R5K1 | RoHS | 3.9 | min. | 0.130 | 1.5 | 250 |
| TLF24HB 562 1R4K1 | RoHS | 5.6 | min. | 0.187 | 1.4 | 250 |
| TLF24HB 682 1R2K1 | RoHS | 6.8 | min. | 0.254 | 1.2 | 250 |
| TLF24HB 822 1R0K1 | RoHS | 8.2 | min. | 0.275 | 1.0 | 250 |
| TLF24HB 103 1R0K1 | RoHS | 10 | min. | 0.345 | 1.0 | 250 |
| TLF24HB 123 0R9K1 | RoHS | 12 | min. | 0.350 | 0.9 | 250 |
| TLF24HB 183 0R8K1 | RoHS | 18 | min. | 0.550 | 0.8 | 250 |
| TLF24HB 273 0R6K1 | RoHS | 27 | min. | 0.880 | 0.6 | 250 |
| TLF24HB 333 0R5K1 | RoHS | 33 | min. | 1.150 | 0.5 | 250 |

● TLF24HBH型

| 型号 | EHS | 共模模式 电感值 [mH] | 电感值公差 | 直流电阻 [Ω] (max.) | 额定电流 [A] (max.) | 额定电压AC [V] (max.) |
|-------------------|------|---------------------|-------|--------------------|--------------------|----------------------|
| TLF24HBH122 3R0K1 | RoHS | 1.2 | min. | 0.045 | 3.0 | 250 |
| TLF24HBH222 2R2K1 | RoHS | 2.2 | min. | 0.080 | 2.2 | 250 |
| TLF24HBH272 2R0K1 | RoHS | 2.7 | min. | 0.090 | 2.0 | 250 |
| TLF24HBH332 1R8K1 | RoHS | 3.3 | min. | 0.120 | 1.8 | 250 |
| TLF24HBH392 1R5K1 | RoHS | 3.9 | min. | 0.130 | 1.5 | 250 |
| TLF24HBH562 1R4K1 | RoHS | 5.6 | min. | 0.187 | 1.4 | 250 |
| TLF24HBH682 1R2K1 | RoHS | 6.8 | min. | 0.254 | 1.2 | 250 |
| TLF24HBH822 1R0K1 | RoHS | 8.2 | min. | 0.275 | 1.0 | 250 |
| TLF24HBH103 1R0K1 | RoHS | 10 | min. | 0.345 | 1.0 | 250 |
| TLF24HBH123 0R9K1 | RoHS | 12 | min. | 0.350 | 0.9 | 250 |
| TLF24HBH183 0R8K1 | RoHS | 18 | min. | 0.550 | 0.8 | 250 |
| TLF24HBH273 0R6K1 | RoHS | 27 | min. | 0.880 | 0.6 | 250 |
| TLF24HBH333 0R5K1 | RoHS | 33 | min. | 1.150 | 0.5 | 250 |

LEADED COMMON MODE CHOKE COILS FOR DC AND SIGNAL LINES

LEADED COMMON MODE CHOKE COILS FOR AC LINES

PACKAGING

① Minimum Quantity

● BU Type

| Type | Minimum Quantity[pcs] | |
|----------|-----------------------|------|
| | Box | Bulk |
| BU08RA□□ | — | 200 |

● TLH/TLF Type

| Type | Minimum Quantity[pcs] | |
|----------|-----------------------|--|
| | Box | |
| TLH10UA□ | 1000 | |
| TLH10UB | | |
| TLF10UAH | | |
| TLF9UA□ | 500 | |
| TLF9UB□ | | |
| TLF14CB□ | | |
| TLF24HB□ | | |

LEADED COMMON MODE CHOKE COILS FOR DC AND SIGNAL LINES, LEADED COMMON MODE CHOKE COILS FOR AC LINES

RELIABILITY DATA

| 1. Operating Temperature Range | | |
|------------------------------------|---|--------------------------------|
| Specified Value | BU—RA Type | −25~+ 105℃ |
| | TLH, TLF Type | |
| Test Method and Remarks | Including temperature rise due to self—generated heat. | |
| | | |
| 2. Storage temperature range | | |
| Specified Value | BU—RA Type | −40~+ 85℃ |
| | TLH, TLF Type | |
| | | |
| 3. Rated current | | |
| Specified Value | BU—RA Type | Within the specified range |
| | TLH, TLF Type | |
| Test Method and Remarks | TLH10U, TLF10UA : The maximum value of AC current within the temperature rise of 60℃ TLF9UA, 14CB、24HB : The maximum value of AC current within the temperature rise of 45℃ TLF9UB : The maximum value of DC current within the temperature rise of 45℃ | |
| | | |
| 4. Inductance | | |
| Specified Value | BU—RA Type | Within the specified tolerance |
| | TLH, TLF Type | |
| Test Method and Remarks | BU—RA Measuring equipment : HP4262A TLF9U : Measuring equipment : LCR meter 4284A or its equivalent Measuring frequency : 1kHz Measuring voltage : 1Vrms TLH、TLF (except TLF9U) : Measuring equipment : LCR meter 4284A or its equivalent Measuring frequency : 1kHz Measuring voltage : 0.1Vrms | |
| | | |
| 5. DC resistance | | |
| Specified Value | BU—RA Type | Within the specified tolerance |
| | TLH, TLF Type | |
| Test Method and Remarks | Measuring equipment : DC ohmmeter | |
| | | |
| 6. Terminal strength tensile force | | |
| Specified Value | BU—RA Type | No abnormality |
| | TLH, TLF Type | |
| Test Method and Remarks | BU—RA: Apply the stated tensile force gradually in the direction to draw terminal 5N、10±1sec. TLH10UA, TLH10UB, TLF9U : Apply the stated tensile force gradually in the direction to draw terminal. | |
| | force [N] | duration [s] |
| | 5 | 30±5 |
| | TLH10UAH, TLF (except TLF9U): Apply the stated tensile force gradually in the direction to draw terminal. | |
| | force [N] | duration [s] |
| | 10 | 30±5 |

| | | |
|--|--|--|
| 7. Insulation resistance between wires | | |
| Specified Value | BU—RA Type | 100MΩ min. |
| | TLH, TLF Type | |
| Test Method and Remarks | Applied voltage : 50VDC (BU—RA,) : 500VDC (TLH, TLF (except TLF9UB)) : 250VDC (TLF9UB) Duration : 60sec. | |
| | | |
| 8. Insulation resistance between wire and core | | |
| Specified Value | BU—RA Type | 100MΩ min.(except TLH, TLF10UAH Type) |
| | TLH, TLF Type | |
| Test Method and Remarks | TLF : Applied voltage : 500VDC (TLF (except TLF9UB)) : 250VDC (TLF9UB) Duration : 60 sec. | |
| | | |
| 9. Withstanding : between wires | | |
| Specified Value | BU—RA Type | No abnormality |
| | TLH, TLF Type | |
| Test Method and Remarks | Applied voltage : 250VDC (BU—RA) : 2000VAC (TLH, TLF (except TLF9UB)) : 500VDC (TLF9UB) Duration : 60sec. | |
| | | |
| 10. Withstanding : between wires and core | | |
| Specified Value | BU—RA Type | No abnormality(except TLH, TLF10UAH Type) |
| | TLH, TLF Type | |
| Test Method and Remarks | TLF : Applied voltage : 2000VAC (TLF (except TLF9UB)) : 500VDC (TLF9UB) Duration : 60sec. | |
| | | |
| 11. Rated voltage | | |
| Specified Value | BU—RA Type | Within the specified range |
| | TLH, TLF Type | |
| Test Method and Remarks | TLH, TLF (except TLF9UB) : 250VAC BU—RA,TLF9UB : 50VDC | |
| | | |
| 12. Resistance to vibration | | |
| Specified Value | BU—RA Type | TLF9U : Inductance change : Within ±5% TLH, TLF (except TLF9U) : Appearance is no abnormality and within the specified range |
| | TLH, TLF Type | |
| Test Method and Remarks | BU—RA,TLH, TLF : According to JIS C 0040 Direction : 2hrs each in X, Y and Z direction Total : 6hrs Frequency range : 10 to 55 to 10Hz (1 min.) Amplitude : 1.5mm (shall not exceed acceleration 196m/s ²) Mounting method : soldering onto PC board Recovery : At least 1hr of recovery under the standard condition after the removal from test chamber, followed by the measurement within 2hrs. (TLH, TLF) | |

| 13. Solderability | | |
|----------------------------------|---|--|
| Specified Value | BU—RA Type | At least 75% of terminal electrode is covered by new solder. |
| | TLH, TLF Type | At least 90% of terminal electrode is covered by new solder. |
| Test Method and Remarks | TLH, TLF : Solder temperature : 235±0.5℃ Duration : 2±0.5sec. Immersion depth : Up to 1.5 to 2.0mm from PBC mounted level. | |
| | TLH, TLF : Solder temperature : 245±5℃ Duration : 4±1sec. Immersion depth : Up to 1.0 to 1.5mm from PBC mounted level. | |
| 14. Resistance to soldering heat | | |
| Specified Value | BU—RA Type | Appearance : No abnormality Inductance change : Within ±15% |
| | TLH, TLF Type | TLF9UA : Inductance change : Within ±5% TLF14CB : Appearance is no abnormality and within the specified range |
| Test Method and Remarks | TLH, TLF : Solder temperature : 260±5℃ Duration : 5±0.5sec. Immersion depth : Up to 1.5 to 2.0mm from PBC mounted level. Recovery : At least 1hr of recovery under the standard condition after the removal from test chamber, followed by the measurement within 2hrs. | |
| | TLH, TLF : Solder temperature : 260±5℃ Duration : 10±1sec. Immersion depth : Up to 1.0 to 1.5mm from PBC mounted level. Recovery : At least 1hr of recovery under the standard condition after the removal from test chamber, followed by the measurement within 2hrs. | |
| 15. Thermal shock | | |
| Specified Value | BU—RA Type | Appearance : No abnormality Inductance change : Within ±15% |
| | TLH, TLF Type | TLF9UA : Inductance change : Within ±15% TLH, TLF (except TLF9UA) : Withstanding voltage : No abnormality Insulation resistance : No abnormality |
| Test Method and Remarks | BU—RA, TLH, TLF : According to JIS C 0025 Conditions for 1 cycle -25℃~+85℃、keep each 30min | |
| | Number of cycles : 10 Recovery : At least 1hr of recovery under the standard condition after the removal from test chamber, followed by the measurement within 2 hrs. | |
| 16. Damp heat | | |
| Specified Value | BU—RA Type | |
| | TLH, TLF Type | TLF9UA : Inductance change : Within ±15% TLH, TLF (except TLF9UA) : Withstanding voltage : No abnormality Insulation resistance : No abnormality |
| Test Method and Remarks | TLH, TLF : Temperature : 60±2℃ : 40±2℃ (※except TLF9U) | |
| | Humidity : 90~95%RH Duration : 500 hrs Recovery : At least 1hr of recovery under the standard removal from test chamber followed by the measurement within 2 hrs. | |

| 17. Loading under damp heat | | |
|-----------------------------|--|---|
| Specified Value | BU—RA Type | Appearance : No abnormality Inductance change : Within $\pm 15\%$ |
| | TLH, TLF Type | Withstanding voltage : No abnormality Insulation resistance : No abnormality |
| Test Method and Remarks | BU—RA : Temperature : $40 \pm 2^\circ\text{C}$ Humidity : $90 \sim 95\% \text{RH}$ Applied current : 500 hrs Apply rated current across windings (※except TLF9U) Recovery : At least 1hr of recovery under the standard removal from test chamber followed by the measurement within 2 hrs. | |
| | TLH, TLF : Temperature : $60 \pm 2^\circ\text{C}$: $40 \pm 2^\circ\text{C}$ (※except TLF9U) Humidity : $90 \sim 95\% \text{RH}$ Duration : 100 hrs : 500 hrs Apply rated current across windings (※except TLF9U) Applied voltage : Apply the following specified voltage between windings. <div style="display: flex; justify-content: center; border: 1px solid black; margin: 5px 0;"> <div style="border-right: 1px solid black; padding: 2px 10px;">TLF9UA</div> <div style="padding: 2px 10px;">250VAC</div> </div> <div style="display: flex; justify-content: center; border: 1px solid black; margin: 2px 0;"> <div style="border-right: 1px solid black; padding: 2px 10px;">TLF9UB</div> <div style="padding: 2px 10px;">50VDC</div> </div> Recovery : At least 1hr of recovery under the standard removal from test chamber followed by the measurement within 2 hrs. | |

| 18. Low temperature life test | | |
|-------------------------------|---|--|
| Specified Value | BU—RA Type | Appearance : No abnormality Inductance change : Within $\pm 15\%$ |
| | TLH, TLF Type | TLF9U : Inductance change : Within $\pm 15\%$ TLH, TLF (except TLF9U) : Withstanding voltage : No abnormality Insulation resistance : No abnormality |
| Test Method and Remarks | BU—RA, TLH, TLF : Temperature : $-25 \pm 2^\circ\text{C}$: $-40 \pm 2^\circ\text{C}$ (※TLF・TLH) Duration : 500 hrs Recovery : At least 1hr of recovery under the standard removal from test chamber followed by the measurement within 2 hrs. | |

| 19. High Temperature life test | | |
|--------------------------------|--|--|
| Specified Value | BU—RA Type | Appearance : No abnormality Inductance change : Within $\pm 15\%$ |
| | TLH, TLF Type | TLF9U : Inductance change : Within $\pm 15\%$ TLH, TLF (except TLF9U) : Withstanding voltage : No abnormality Insulation resistance : No abnormality |
| Test Method and Remarks | BU—RA, TLH, TLF : Temperature : $85 \pm 2^\circ\text{C}$ (※ BU—RA) : $105 \pm 3^\circ\text{C}$ (※ TLF・TLH) Duration : 500 hrs Recovery : At least 1hr of recovery under the standard removal from test chamber followed by the measurement within 2 hrs. | |

LEADED COMMON MODE CHOKE COILS FOR DC AND SIGNAL LINES, LEADED COMMON MODE CHOKE COILS FOR AC LINES

■ 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. Soldering | |
| Precautions | <p>◆Wave soldering</p> <p>1. Please refer to the specifications in the catalog for a wave soldering.</p> <p>2. Do not immerse the entire inductor in the flux during the soldering operation.</p> <p>◆Lead free soldering</p> <p>1. When using products with lead free soldering, we request to use them after confirming of adhesion, temperature of resistance to soldering heat, etc. sufficiently.</p> <p>◆Recommended conditions for using a soldering iron</p> <ul style="list-style-type: none"> Put the soldering iron on the land-pattern. Soldering iron's temperature – Below 350°C Duration – 3 seconds or less The soldering iron should not directly touch the product. |
| 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> |
| 4. Cleaning | |
| Precautions | <p>◆Cleaning conditions</p> <p>1. TLF type</p> <p>Please contact any of our offices for about a cleaning.</p> |
| 5. Handling | |
| Precautions | <p>◆Handling</p> <p>1. Keep the product away from all magnets and magnetic objects.</p> <p>◆Mechanical considerations</p> <p>1. Please do not give the product any excessive mechanical shocks.</p> <p>2. TLF type</p> <p>Please do not add any shock or power to a product in transportation.</p> <p>◆Packing</p> <p>1. Please do not give the product any excessive mechanical shocks.</p> <p>In loading, please pay attention to handling indication mentioned in a packing box (a loading direction / number of maximum loading / fragile item).</p> |
| Technical considerations | <p>◆Handling</p> <p>1. There is a case that a characteristic varies with magnetic influence.</p> <p>◆Mechanical considerations</p> <p>1. There is a case to be damaged by a mechanical shock.</p> <p>2. TLF type</p> <p>There is a case to be broken by a fall.</p> <p>◆Packing</p> <p>1. There is a case that a lead route turns at by a fall or an excessive shock.</p> |

▶ 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/>) .

| 6. Storage conditions | |
|--------------------------|--|
| Precautions | <p>◆Storage</p> <ol style="list-style-type: none"> 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"> Recommended conditions <ul style="list-style-type: none"> Ambient temperature : 0~40°C Humidity : Below 70% RH <p>The ambient temperature must be kept below 30°C. Even under ideal storage conditions, the solderability of electrodes decreases gradually, so the products should be mounted 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> |
| Technical considerations | <p>◆Storage</p> <ol style="list-style-type: none"> 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. |