

General Multilayer Ceramic Capacitor(SAMSUNG)

Multilayer Ceramic Capacitor(MLCC) is an electronic part that temporarily stores an electrical charge and the most prevalent type of capacitor today. New technologies have enabled the MLCC manufacturers to follow the trend dictated by smaller and smaller electronic devices such as Cellular telephone, Computers, DSC, DVC, GPS

General Features

- *Miniature Size
- *Wide Capacitance and Voltage Range
- *Tape a & Reel for Surface Mount Assembly
- *Low ESR

Applications

- *General Electronic circuit

Part Numbering

CL 10 B 104 K B 8 N N N C
(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11)

- (1) Samsung Multilayer Ceramic Capacitor
- (2) Size(mm)
- (3) Temperature Characteristic
- (4) Nominal Capacitance
- (5) Capacitance Tolerance
- (6) Rated Voltage
- (7) Thickness option
- (8) Product and Plating Method
- (9) Samsung Control Code
- (10) Reserved For Future Use
- (11) Packaging Style

(1) Samsung Multilayer Ceramic Capacitor

(2) Size(mm)

| Code | EIA code | Size(mm) |
|------|----------|----------|
| 03 | 0201 | 0.6×0.3 |
| 05 | 0402 | 1.0×0.5 |
| 10 | 0603 | 1.6×0.8 |
| 21 | 0805 | 2.0×1.25 |
| 31 | 1206 | 3.2×1.6 |
| 32 | 1210 | 3.2×2.5 |
| 43 | 1812 | 4.5×3.2 |
| 55 | 2220 | 5.7×5.0 |

(3)CAPACITANCE TEMPERATURE CHARATERISTIC

| Code | Temperature Charateristic | | | Temperature Range | |
|------|---------------------------|---------|-----|-------------------|------------|
| C | CLASS 1 | C0G | C△ | 0±30(ppm/°C) | -55~+125°C |
| P | | P2H | P△ | -150±60 | |
| R | | R2H | R△ | -220±60 | |
| S | | S2H | S△ | -330±60 | |
| T | | T2H | T△ | -470±60 | |
| U | | U2J | U△ | -750±60 | |
| L | | S2L | S△ | +350~-1000 | |
| A | | CLASS 2 | X5R | X5R | |
| B | X7R | | X7R | ±15% | -55~+125°C |
| X | X6S | | X6S | ±22% | -55~+105°C |
| F | Y5V | | Y5V | +22~-82% | -30~+85°C |

※Temperature Charateristic

| Temp Characteristic | Below 2.0pF | 2.2~3.9pF | Above 4.0pF | Above 10pF |
|---------------------|-------------|-----------|-------------|------------|
| C△ | C0G | C0G | C0G | C0G |
| P△ | ~ | P2J | P2J | P2J |
| R△ | ~ | R2J | R2J | R2J |
| S△ | ~ | S2J | S2J | S2J |
| T△ | ~ | T2J | T2J | T2J |
| U△ | ~ | U2J | U2J | U2J |

J:±120ppm/°C, H:±60ppm/°C, G:±30ppm/°C

(4)NOMINAL CAPACITANCE

Nominal capacitance is identified by three digits;

The first and second digits identify the first and second significant figures of the capacitance

The third digit identifies the multiplier.

R identifies a decimal point

※For example

| Code | Nominal capacitance |
|------|----------------------|
| 1R5 | 1.5pF |
| 103 | 10000pF,10nF,0.01uF |
| 104 | 100000pF,100nF,0.1uF |

(5)CAPACITANCE TOLERANCE

| Code | Tolerance | Nominal Capacitance |
|------|---------------------|------------------------------------|
| A | $\pm 0.05\text{pF}$ | Less than 10pF (Including 10pF) |
| B | $\pm 0.1\text{pF}$ | |
| C | $\pm 0.25\text{pF}$ | |
| D | $\pm 0.5\text{pF}$ | |
| F | $\pm 1\text{pF}$ | |
| F | $\pm 1\%$ | More than 10pF |
| G | $\pm 2\%$ | |
| J | $\pm 5\%$ | |
| K | $\pm 10\%$ | |
| M | $\pm 20\%$ | |
| Z | +80,-20% | |

(6)RATED VOLTAGE

| Code | Rate Voltage |
|------|--------------|
| R | 4.0V |
| Q | 6.3V |
| P | 10V |
| O | 16V |
| A | 25V |
| L | 35V |
| B | 50V |
| C | 100V |
| D | 200V |
| E | 250V |
| G | 500V |
| H | 630V |
| I | 1000V |
| J | 2000V |
| K | 3000V |

(7)THICKNESS OPTION

| Size | Code | Thickness(T)(In mm) |
|------------|------|---------------------|
| 0201(0603) | 3 | 0.3±0.03 |
| 0402(1005) | 5 | 0.5±0.05 |
| 0603(1608) | 8 | 0.8±0.1 |
| 0805(2012) | A | 0.65±0.1 |
| | C | 0.85±0.1 |
| | F | 1.25±0.1 |
| | Q | 1.25±0.15 |
| 1206(3216) | C | 0.85±0.1 |
| | F | 1.25±0.1 |
| | H | 1.60±0.20 |
| 1210(3225) | F | 1.25±0.20 |
| | H | 1.60±0.20 |
| | I | 2.0±0.20 |
| | J | 2.5±0.20 |
| | V | 2.5±0.30 |
| 1812(4532) | F | 1.25±0.20 |
| | H | 1.60±0.20 |
| | I | 2.0±0.20 |
| | J | 2.5±0.20 |
| | L | 3.2±0.30 |
| 2220(5750) | F | 1.25±0.20 |
| | H | 1.60±0.20 |
| | I | 2.0±0.20 |
| | J | 2.5±0.20 |
| | L | 3.2±0.30 |

(8)PRODUCT & PLATING METHOD

| Code | Electrode | Termination | Plating Type |
|------|-----------|-------------|--------------|
| A | Pd | Ag | Sn_100% |
| N | Ni | Cu | Sn_100% |
| G | Cu | Cu | Sn_100% |

(9)Samsung Control Code

| Code | Description of the Code |
|------|-------------------------|
| A | Array (2-Element) |
| B | Array (4-Element) |
| C | High-Q |
| N | Normal |
| L | Automotive |
| P | LICC |

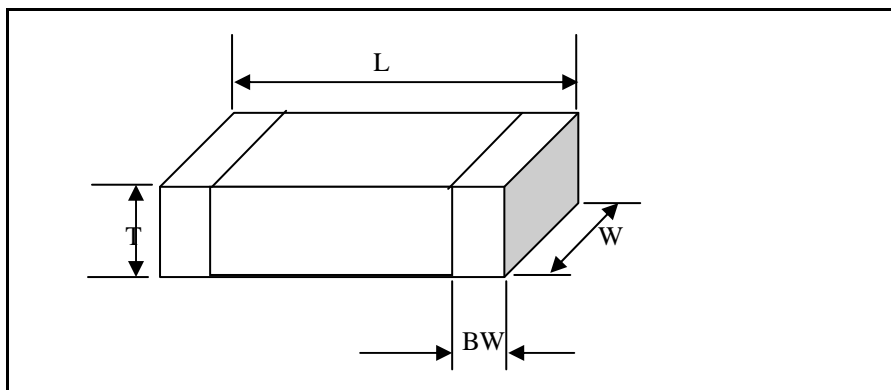
(10)RESERVED FOR FUTURE USE

| Code | Description of the Code |
|------|-------------------------|
| N | Reserved for future use |

(11)PACKAGING STYLE

| Code | Packaging Style |
|------|--------------------------|
| B | Bulk |
| P | Bulk Case |
| C | Paper 7" |
| D | Paper 13" (10,000EA) |
| E | Embossing 7" |
| F | Embossing 13" (10,000EA) |
| L | Paper 13" (15,000EA) |
| O | Paper 10" |
| S | Embossing 10" |

Appearance and Dimensions



| Code | EIA Code | Dimensions (in mm) | | | |
|------|----------|--------------------|----------|--------|---------------|
| | | L | W | T(MAX) | BW |
| 03 | 0201 | 0.6±0.03 | 0.3±0.03 | 0.33 | 0.15±0.05 |
| 05 | 0402 | 1.0±0.05 | 0.5±0.05 | 0.55 | 0.2+0.15/-0.1 |
| 10 | 0603 | 1.6±0.1 | 0.8±0.1 | 0.9 | 0.3±0.2 |
| 21 | 0805 | 2.0±0.1 | 1.25±0.1 | 1.35 | 0.5+0.2/-0.3 |
| 31 | 1206 | 3.2±0.15 | 1.6±0.15 | 1.4 | 0.5+0.2/-0.3 |
| 31 | 1206 | 3.2±0.20 | 1.6±0.2 | 1.8 | 0.5+0.2/-0.3 |
| 32 | 1210 | 3.2±0.30 | 2.5±0.2 | 2.7 | 0.6±0.3 |
| 32 | 1210 | 3.2±0.30 | 2.5±0.3 | 2.8 | 0.6±0.3 |
| 43 | 1812 | 4.5±0.40 | 3.2±0.3 | 3.5 | 0.8±0.3 |
| 55 | 2220 | 5.7±0.40 | 5.0±0.3 | 3.5 | 1.0±0.3 |

● Storage Condition

◆ Storage Environment

The electrical characteristic of MLCCs were degraded by the environment of high temperature or humidity. Therefore, the MLCCs shall be stored in the ambient temperature and the relative humidity of less than 40°C and 70%, respectively.

Guarantee storage period is within 6 months from the outgoing date of delivery.

◆ Corrosive Gases

Since the solderability of the end termination in MLCC was degraded by chemical atmosphere such as chlorine, acid and sulfide gases, MLCCs must be avoided from these gases.

◆ Temperature Fluctuations

Since dew condensation may occur by the differences in temperature when the MLCCs are taken out of

storage,it is important to maintain the temperature-controlled environment.

● Design of land pattern

When designing printed circuit boards,the shape and size of the lands must allow for the proper amount of solder on the capacitor.

The amount of solder at the end terminations has a direct effect on the crack.

The crack in MLCC will be easily occurred by the tensile stress which was due to too much amount of solder.In contrast,if too little solder is applied,the termination strength will be insufficiently.

※All specification are subject to change without notice.

※Conformity to RoHS Directive:This means that,in conformity with EU directive 2002/95/EC,lead,cadmium,mercury, hexavalent chromium,and specific bromine-based flame retardants,PBB and PBDE,have not been used,except for exempted applications.
