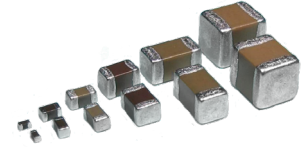


# Multilayer Ceramic Chip Capacitors

## How to Order

### ■ Features

- Kyocera's series of Multilayer Ceramic Chip Capacitors are designed to meet a wide variety of needs. We offer a complete range of products for both general and specialized applications.
- We have a network worldwide in order to supply our global customer bases quickly and efficiently.
- All our products are highly reliable due to their monolithic structure of high-purity and superfine uniform ceramics and their integral internal electrodes.
- Our stringent quality control in every phase of production from material procurement to shipping ensures consistent manufacturing and superior quality.
- Kyocera components are available in a wide choice of dimensions, temperature characteristics, rated voltages, and terminations to meet specific configurational requirements.



e.g.)

**KGM** **03** **C** **R5** **0J** **225** **M** **H** □□□□  
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ Option Code (When needed)

- ① Series : KGM Series(General)  
② Size (EIA) : 0201  
③ Thickness (max.) : 0.39mm  
④ Dielectric : Operating Temperature Range: -55 to 85°C/  
ΔC max.: ±15%/ Standard Temperature: 25°C  
⑤ Rated Voltage : 6.3Vdc  
⑥ Capacitance : 2.2μF  
⑦ Tolerance : ±20%  
⑧ Packaging : Taping Material Paper/ Taping Width 8mm/  
Cavity Pitch 2mm/ Reel Size φ180

#### ① Series Code

| CODE | Type                      |
|------|---------------------------|
| KGM  | General                   |
| KGT  | Low Profile               |
| KGU  | High-Q                    |
| KAM  | Automotive                |
| KGN  | Three Terminal Capacitors |

#### ② Size Code

| CODE | EIA   | JIS  |
|------|-------|------|
| 02   | 01005 | 0402 |
| 03   | 0201  | 0603 |
| 05   | 0402  | 1005 |
| 15   | 0603  | 1608 |
| 21   | 0805  | 2012 |
| 31   | 1206  | 3216 |
| 32   | 1210  | 3225 |

#### ③ Thickness (max.)

| CODE | EIA   | JIS  | Thickness Code | Thickness(max.) |
|------|-------|------|----------------|-----------------|
| 02   | 01005 | 0402 | A              | 0.22            |
| 03   | 0201  | 0603 | A              | 0.33            |
|      |       |      | B              | 0.35            |
|      |       |      | C              | 0.39            |
|      |       |      | D              | 0.55            |
|      |       |      | Y              | 0.22            |
| 05   | 0402  | 1005 | A              | 0.55            |
|      |       |      | B              | 0.65            |
|      |       |      | C              | 0.7             |
|      |       |      | D              | 0.8             |
|      |       |      | X              | 0.22            |
| 15   | 0603  | 1608 | Y              | 0.33            |
|      |       |      | Z              | 0.5             |
|      |       |      | A              | 0.9             |
|      |       |      | C              | 1.0             |
|      |       |      | A              | 1.45            |
| 21   | 0805  | 2012 | C              | 0.95            |
|      |       |      | A              | 1.8             |
|      |       |      | F              | 1.75            |
|      |       |      | H              | 1.9             |
|      |       |      | L              | 0.95            |
| 31   | 1206  | 3216 | A              | 2.7             |
| 32   | 1210  | 3225 | A              | 2.7             |

#### ④ Dielectric Code

| Temperature Compensation Type |                       |        |     |
|-------------------------------|-----------------------|--------|-----|
| CODE                          | Temperature Range(°C) | ppm/°C |     |
| CG                            | -55 ~ 125             | 0      | ±30 |
| CH                            |                       |        | ±60 |

- All parts of COG will be marked as "CG" but will conform to the above table.
- Temperature coefficients are determined by calculation based on measurement at 20°C and 85°C.

| High Dielectric Constant Type |                       |         |                   |
|-------------------------------|-----------------------|---------|-------------------|
| CODE                          | Temperature Range(°C) | ΔC (%)  | Reference Temp.°C |
| R5                            | -55 ~ 85              | ±15     | 25                |
| S6                            | -55 ~ 105             | ±22     |                   |
| T6                            |                       | +22/-33 |                   |
| R7                            | -55 ~ 125             | ±15     |                   |
| K7*                           |                       | ±15     |                   |
| S7                            |                       | ±22     |                   |
| T7                            |                       | +22/-33 |                   |

\*Special spec: Change in capacitance under 50% of rated voltage applied.

Measurement conditions for temperature characteristics K7.

Applied voltage and Temperature step

| Step | C  | Applying Voltage     | Temperature°C        |
|------|----|----------------------|----------------------|
| 1    | C0 | No bias              | Reference Temp.      |
| 2    | —  | 50% of Rated voltage | Reference Temp.      |
| 3    | C1 |                      | Min. Operating Temp. |
| 4    | C2 |                      | Reference Temp.      |
| 5    | C1 |                      | Max. Operating Temp. |

$$\Delta C/C(\%) = (C1 - C2)/C0 \times 100$$

C0:Capacitance value at step 1

C1:Capacitance value from step 3 to 5

C2:Capacitance value at step 4

#### ⑧ Packaging Code

| CODE | Size Code | Material | Width | Pitch | Reel size |
|------|-----------|----------|-------|-------|-----------|
| T    | 15 to 31  | Paper    | 8mm   | 4mm   | φ180      |
| H    | 02 to 05  | Paper    | 8mm   | 2mm   |           |
| Q    | 03        | Paper    | 8mm   | 1mm   |           |
| U    | 21 to 32  | Plastic  | 8mm   | 4mm   |           |
| P    | 02        | Plastic  | 4mm   | 1mm   |           |
| M    | 15 / 21   | Paper    | 8mm   | 4mm   | φ330      |
| N    | 02 to 05  | Paper    | 8mm   | 2mm   |           |
| W    | 03        | Paper    | 8mm   | 1mm   |           |
| L    | 21 to 32  | Plastic  | 8mm   | 4mm   |           |

#### ⑤ Voltage Code

| CODE | Rated Voltage | CODE | Rated Voltage |
|------|---------------|------|---------------|
| 0E   | 2.5Vdc        | 1E   | 25Vdc         |
| 0G   | 4Vdc          | 1V   | 35Vdc         |
| 0J   | 6.3Vdc        | 1H   | 50Vdc         |
| 1A   | 10Vdc         | 2A   | 100Vdc        |
| 1C   | 16Vdc         |      |               |

#### ⑥ Capacitance Code

Capacitance expressed in pF.  
Two significant digits plus number of zeros.  
For Values < 10pF, Letter R denotes decimal point,

(Example)

| CODE | Capacitance | CODE | Capacitance |
|------|-------------|------|-------------|
| R50  | 0.5pF       | 103  | 10000pF     |
| 1R0  | 1pF         | 104  | 0.1μF       |
| 100  | 10pF        | 105  | 1μF         |
| 101  | 100pF       | 106  | 10μF        |
| 102  | 1000pF      | 107  | 100μF       |

#### ⑦ Tolerance Code

| Temperature Compensation Type(CG/CH) |           |
|--------------------------------------|-----------|
| CODE                                 | Tolerance |
| A                                    | ±0.05pF   |
| B                                    | ±0.1pF    |
| C                                    | ±0.25pF   |
| D                                    | ±0.5pF    |
| G                                    | ±2%       |
| J                                    | ±5%       |
| K                                    | ±10%      |

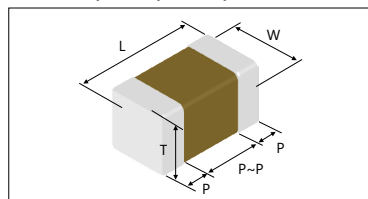
| High Dielectric Constant Type (R5/S6/T6/R7/K7/S7/T7) |           |
|------------------------------------------------------|-----------|
| CODE                                                 | Tolerance |
| J*                                                   | ±5%       |
| K                                                    | ±10%      |
| M                                                    | ±20%      |

\* : Option

# Multilayer Ceramic Chip Capacitors

## Dimension

### ■KGM/KGT/KGU/KAM Series (Two Terminal Capacitors)



### ■Packaging Code

20kp (E 8 / 2)

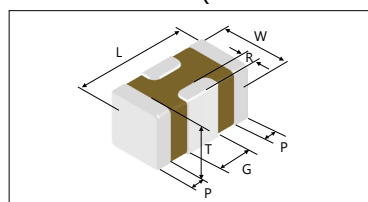
kp means 1000 pieces

| Taping Material |          | Taping Width |       | Pitch |       |
|-----------------|----------|--------------|-------|-------|-------|
| Code            | Material | Code         | Width | Code  | Pitch |
| E               | Plastic  | 4            | 4mm   | 1     | 1mm   |
| P               | Paper    | 8            | 8mm   | 2     | 2mm   |
|                 |          |              |       | 4     | 4mm   |

| Size | Code     |           | Thickness<br>Code | Dimension (mm) |          |           |        |        |            | Quantity per reel |             |
|------|----------|-----------|-------------------|----------------|----------|-----------|--------|--------|------------|-------------------|-------------|
|      | EIA      | JIS       |                   | L              | W        | T         | P min. | P max. | P ~ P min. | φ180 Reel         | φ330 Reel   |
| 02   | 01005    | 0402      | A                 | 0.4±0.02       | 0.2±0.02 | 0.2±0.02  | 0.07   | 0.14   | 0.13       | 40kp(E4/1)        | —           |
| 03   | 0201     | 0603      | Y                 | 0.6±0.03       | 0.3±0.03 | 0.22 max. | 0.1    | 0.2    | 0.2        | 30kp(P8/1)        | 150kp(P8/1) |
|      |          |           | A                 |                |          | 0.3±0.03  |        |        |            |                   |             |
|      |          |           | B                 |                |          | 0.3±0.05  |        |        |            |                   |             |
|      |          |           | Y*                | 0.6±0.09       | 0.3±0.09 | 0.22 max. | 0.13   | 0.23   | 0.19       | 15kp(P8/2)        | 50kp(P8/2)  |
|      |          |           | C                 |                |          | 0.3±0.09  |        |        |            |                   |             |
|      |          |           | D                 |                |          | 0.5±0.05  |        |        |            |                   |             |
|      |          |           | D*                |                |          |           |        |        |            |                   |             |
| 05   | 0402     | 1005      | Y                 | 1.0±0.05       | 0.5±0.05 | 0.33 max. | 0.15   | 0.35   | 0.3        | 10kp(P8/2)        | 50kp(P8/2)  |
|      |          |           | A                 |                |          | 0.5±0.05  |        |        |            |                   |             |
|      |          |           | X                 | 1.0±0.1        | 0.5±0.05 | 0.22 max. |        |        |            | 10kp(P8/2)        | 50kp(P8/2)  |
|      |          |           | B                 | 1.0±0.15       | 0.5±0.15 | 0.5±0.15  |        |        |            | 10kp(P8/2)        | 40kp(P8/2)  |
|      |          |           | Y*                | 1.0±0.2        | 0.5±0.2  | 0.33 max. |        |        |            | 10kp(P8/2)        | —           |
|      |          |           | Z                 |                |          | 0.5 max.  |        |        |            | 10kp(P8/2)        | 50kp(P8/2)  |
|      |          |           | A*                |                |          | 0.55 max. |        |        |            | 10kp(P8/2)        | 50kp(P8/2)  |
|      |          |           | C                 |                |          | 0.5±0.2   |        |        |            | 10kp(P8/2)        | 40kp(P8/2)  |
|      |          |           | D                 |                |          | 0.8 max.  |        |        |            | 10kp(P8/2)        | 30kp(P8/2)  |
|      |          |           |                   |                |          |           |        |        |            |                   |             |
| 15   | 0603     | 1608      | A                 | 1.6±0.1        | 0.8±0.1  | 0.8±0.1   | 0.2    | 0.6    | 0.5        | 4kp(P8/4)         | 10kp(P8/4)  |
| C    | 1.6±0.2  | 0.8±0.2   | 0.8±0.2           |                |          |           |        |        |            |                   |             |
| 21   | 0805     | 2012      | C                 | 2.0±0.2        | 1.25±0.2 | 0.95 max. | 0.2    | 0.75   | 0.7        | 4kp(P8/4)         | 10kp(P8/4)  |
| A    | 1.25±0.2 | 3kp(E8/4) | 10kp(E8/4)        |                |          |           |        |        |            |                   |             |
| 31   | 1206     | 3216      | L                 | 3.2±0.2        | 1.6±0.2  | 0.95 max. | 0.3    | 0.85   | 1.4        | 4kp(P8/4)         | —           |
|      |          |           | F                 | 3.2±0.2        | 1.6±0.15 | 1.6±0.15  |        |        |            | 2.5kp(E8/4)       | 5kp(E8/4)   |
|      |          |           | A                 |                | 1.6±0.2  | 1.6±0.2   |        |        |            |                   |             |
|      |          |           | H                 | 3.2±0.3        | 1.6±0.3  | 1.6±0.3   |        |        |            |                   |             |
| 32   | 1210     | 3225      | A                 | 3.2±0.3        | 2.5±0.2  | 2.5±0.2   | 0.3    | 1.0    | 1.4        | 1kp(E8/4)         | 4kp(E8/4)   |

※ If there is a "\*" in the thickness code indicates the same thickness (T-dimension) but different L/W or P-dimension. Please refer to the part number list for details.

### ■KGN Series (Three Terminal Capacitors)



| Size   | Code |      | Thickness Code | Dimension (mm) |          |          |         |          |       | Quantity per reel |           |
|--------|------|------|----------------|----------------|----------|----------|---------|----------|-------|-------------------|-----------|
|        | EIA  | JIS  |                | L              | W        | T        | G       | P        | R     | φ180 Reel         | φ330 Reel |
| KGN 05 | 0402 | 1005 | Z              | 1.0±0.1        | 0.5±0.2  | 0.5 max. | 0.3±0.1 | 0.15±0.1 | ≥0.05 | 10kp(P8/2)        | —         |
|        |      |      | B              | 1.0±0.15       | 0.5±0.15 | 0.5±0.15 |         |          |       |                   |           |
|        |      |      | C              | 1.0±0.2        | 0.5±0.2  | 0.5±0.2  |         |          |       |                   |           |

# Multilayer Ceramic Chip Capacitors

General

## KGM Series

### ■Features

We offer a diverse product line ranging from ultra-compact (0.4×0.2mm) to large (3.2×2.5mm) components configured for a variety of temperature characteristics, rated voltages, and packages. We offer the choice and flexibility for almost any applications.

### ■Applications

This standard type is ideal for use in a wide range of applications, from commercial to industrial equipment.

### Temperature Compensation Dielectric



#### ●Capacitance chart ■ Standard Spec.1

| Capacitance       | 1R0 | 1R5   | 2R0 | 3R0 | 4R0 | 5R0 | 6R0 | 7R0 | 8R0 | 9R0 | 100  | 120  | 150  | 180  | 220  | 270  | 330  | 390  | 470  | 560  | 680  | 820  | 101   | 121   | 151   | 181   | 221   |  |
|-------------------|-----|-------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|--|
| Size/Voltage(Vdc) | 1pF | 1.5pF | 2pF | 3pF | 4pF | 5pF | 6pF | 7pF | 8pF | 9pF | 10pF | 12pF | 15pF | 18pF | 22pF | 27pF | 33pF | 39pF | 47pF | 56pF | 68pF | 82pF | 100pF | 120pF | 150pF | 180pF | 220pF |  |
| KGM02<br>(01005)  | 16  |       |     |     |     |     |     |     |     |     |      |      |      |      | A    |      |      |      |      |      |      |      |       |       |       |       |       |  |
|                   | 25  |       |     |     |     |     |     |     |     |     |      |      |      |      | A    |      |      |      |      |      |      |      |       |       |       |       |       |  |
|                   | 50  |       |     |     |     |     |     |     |     |     |      |      |      |      | A    |      |      |      |      |      |      |      |       |       |       |       |       |  |

Please contact for capacitance value other than standard.

Please refer to [here](#) for the test method and specifications of Standard Specification 1.

The code in the capacity range table means product thickness (T-dimension). For details of the above lineup, please refer to the parts number list below.

(Example) In case of "A" for KGM02;  
T: 0.2±0.02mm

#### Parts number list General KGM02 Series Temperature Characteristic: CA: CG/CH Tolerance □: B: ±0.1 pF/ C: ±0.25 pF/ D: ± 0.5 pF/ J: ± 5%/ K: ±10%

| Thickness code | Part Number     | Capacitance | Tolerance □ | Voltage [V] | Dimension[mm] |          |          | Packaging: # |      |      |      |      |      |      |     |
|----------------|-----------------|-------------|-------------|-------------|---------------|----------|----------|--------------|------|------|------|------|------|------|-----|
|                |                 |             |             |             |               |          |          | Φ180         |      |      |      | Φ330 |      |      |     |
|                |                 |             |             |             | L             | W        | T        | code         | QTY  | code | QTY  | code | QTY  | code | QTY |
| A              | KGM02ACΔ1H1R0□# | 1pF         | B/C         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H1R5□# | 1.5pF       | B/C         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H2R0□# | 2pF         | B/C         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H3R0□# | 3pF         | B/C         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H4R0□# | 4pF         | B/C         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H5R0□# | 5pF         | B/C         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H6R0□# | 6pF         | C/D         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H7R0□# | 7pF         | C/D         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H8R0□# | 8pF         | C/D         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H9R0□# | 9pF         | C/D         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H100□# | 10pF        | J/K         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H120□# | 12pF        | J/K         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H150□# | 15pF        | J/K         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H180□# | 18pF        | J/K         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H220□# | 22pF        | J/K         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H270□# | 27pF        | J/K         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H330□# | 33pF        | J/K         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H390□# | 39pF        | J/K         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H470□# | 47pF        | J/K         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H560□# | 56pF        | J/K         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H680□# | 68pF        | J/K         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H820□# | 82pF        | J/K         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H101□# | 100pF       | J/K         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H121□# | 120pF       | J/K         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H151□# | 150pF       | J/K         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H181□# | 180pF       | J/K         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1H221□# | 220pF       | J/K         | 50          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |

# Multilayer Ceramic Chip Capacitors

General

## KGM Series

Parts number list General KGM02 Series Temperature Characteristic: CA: CG/CH Tolerance □: B: ±0.1 pF/ C: ±0.25 pF/ D: ± 0.5 pF/ J: ± 5%/ K: ±10%

| Thickness code | Part Number     | Capacitance | Tolerance □ | Voltage [V] | Dimension[mm] |          |          | Packaging: # |      |      |      |      |      |      |     |
|----------------|-----------------|-------------|-------------|-------------|---------------|----------|----------|--------------|------|------|------|------|------|------|-----|
|                |                 |             |             |             |               |          |          | Φ180         |      |      |      | Φ330 |      |      |     |
|                |                 |             |             |             | L             | W        | T        | code         | QTY  | code | QTY  | code | QTY  | code | QTY |
| A              | KGM02ACΔ1E1R0□# | 1pF         | B/C         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E1R5□# | 1.5pF       | B/C         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E2R0□# | 2pF         | B/C         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E3R0□# | 3pF         | B/C         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E4R0□# | 4pF         | B/C         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E5R0□# | 5pF         | B/C         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E6R0□# | 6pF         | C/D         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E7R0□# | 7pF         | C/D         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E8R0□# | 8pF         | C/D         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E9R0□# | 9pF         | C/D         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E100□# | 10pF        | J/K         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E120□# | 12pF        | J/K         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E150□# | 15pF        | J/K         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E180□# | 18pF        | J/K         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E220□# | 22pF        | J/K         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E270□# | 27pF        | J/K         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E330□# | 33pF        | J/K         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E390□# | 39pF        | J/K         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E470□# | 47pF        | J/K         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E560□# | 56pF        | J/K         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E680□# | 68pF        | J/K         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E820□# | 82pF        | J/K         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E101□# | 100pF       | J/K         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E121□# | 120pF       | J/K         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E151□# | 150pF       | J/K         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E181□# | 180pF       | J/K         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1E221□# | 220pF       | J/K         | 25          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C1R0□# | 1pF         | B/C         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C1R5□# | 1.5pF       | B/C         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C2R0□# | 2pF         | B/C         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C3R0□# | 3pF         | B/C         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C4R0□# | 4pF         | B/C         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C5R0□# | 5pF         | B/C         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C6R0□# | 6pF         | C/D         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C7R0□# | 7pF         | C/D         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C8R0□# | 8pF         | C/D         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C9R0□# | 9pF         | C/D         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C100□# | 10pF        | J/K         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C120□# | 12pF        | J/K         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C150□# | 15pF        | J/K         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C180□# | 18pF        | J/K         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C220□# | 22pF        | J/K         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C270□# | 27pF        | J/K         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C330□# | 33pF        | J/K         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C390□# | 39pF        | J/K         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C470□# | 47pF        | J/K         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C560□# | 56pF        | J/K         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C680□# | 68pF        | J/K         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C820□# | 82pF        | J/K         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C101□# | 100pF       | J/K         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C121□# | 120pF       | J/K         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C151□# | 150pF       | J/K         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C181□# | 180pF       | J/K         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A              | KGM02ACΔ1C221□# | 220pF       | J/K         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |

# Multilayer Ceramic Chip Capacitors

General **KGM Series**



## R5 Dielectric

● Capacitance chart    ■ Standard Spec.1    ■ Standard Spec.2    ▨ Optional Spec.

| Capacitance       | 101   | 151   | 221   | 331   | 471   | 681   | 102    | 152    | 222    | 332    | 472    | 682    | 103     | 153     | 223     | 333     | 473     | 683     | 104   | 224    | 474    |
|-------------------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|-------|--------|--------|
| Size/Voltage(Vdc) | 100pF | 150pF | 220pF | 330pF | 470pF | 680pF | 1000pF | 1500pF | 2200pF | 3300pF | 4700pF | 6800pF | 10000pF | 15000pF | 22000pF | 33000pF | 47000pF | 68000pF | 0.1μF | 0.22μF | 0.47μF |
| KGM02 (01005)     | 6.3   |       |       |       |       |       |        |        |        |        |        |        |         |         |         |         |         |         |       |        |        |
|                   | 10    |       |       |       |       |       |        |        |        |        |        |        |         |         |         |         |         |         |       |        |        |
|                   | 16    |       |       |       |       |       |        |        |        |        |        |        |         |         |         |         |         |         |       |        |        |

| Capacitance       | 223     | 333     | 473     | 683     | 104   | 224    | 474    | 105 | 225   | 475   | 106  | 156  | 226  | 476  | 107   |
|-------------------|---------|---------|---------|---------|-------|--------|--------|-----|-------|-------|------|------|------|------|-------|
| Size/Voltage(Vdc) | 22000pF | 33000pF | 47000pF | 68000pF | 0.1μF | 0.22μF | 0.47μF | 1μF | 2.2μF | 4.7μF | 10μF | 15μF | 22μF | 47μF | 100μF |
| KGM03 (0201)      | 4       |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 6.3     |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 10      |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 16      |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 25      |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
| KGM05 (0402)      | 4       |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 6.3     |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 10      |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 16      |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 25      |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 35      |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
| KGM15 (0603)      | 4       |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 6.3     |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 10      |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 16      |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 25      |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 35      |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
| KGM21 (0805)      | 4       |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 6.3     |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 10      |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 16      |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 25      |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
| KGM31 (1206)      | 16      |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 25      |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 50      |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 100     |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
| KGM32 (1210)      | 16      |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 25      |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 35      |         |         |         |       |        |        |     |       |       |      |      |      |      |       |
|                   | 50      |         |         |         |       |        |        |     |       |       |      |      |      |      |       |

Please contact for capacitance value other than standard.

Please refer to [here](#) for the test method and specifications of Standard Specification 1.

Please refer to [here](#) for the test method and specifications of Standard Specification 2.

Please refer to [here](#) of the parts number list for "\*\*".

The code in the capacity range table means product thickness (T-dimension) and Tan delta.

For details about T dimensions, please refer to the Dimension section in the parts number list below.

For Tan delta, please refer to the list on the right.

(Example) In case of "A7" for KGM03;

T: 0.3±0.03mm, Tanδ: 10.0% max.

| Tan δ Code | Tan δ      |
|------------|------------|
| 3          | 5.0% max.  |
| 7          | 10.0% max. |
| 8          | 12.5% max. |
| 9          | 15.0% max. |
| 10         | 20.0% max. |

### Parts number list General KGM02 Series Temperature Characteristic: R5 Tolerance □: K: ±10%/ M: ±20%

| Thickness code | Part Number     | Capacitance | Tolerance :□ | Voltage [V] | Dimension[mm] |          |          | Packaging: # |      |      |      |      |      |      |     |
|----------------|-----------------|-------------|--------------|-------------|---------------|----------|----------|--------------|------|------|------|------|------|------|-----|
|                |                 |             |              |             |               |          |          | Φ180         |      |      |      | Φ330 |      |      |     |
|                |                 |             |              |             | L             | W        | T        | code         | QTY  | code | QTY  | code | QTY  | code | QTY |
| A8             | KGM02AR51C101□# | 100pF       | K/M          | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A8             | KGM02AR51C151□# | 150pF       | K/M          | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A8             | KGM02AR51C221□# | 220pF       | K/M          | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A8             | KGM02AR51C331□# | 330pF       | K/M          | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A8             | KGM02AR51C471□# | 470pF       | K/M          | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A8             | KGM02AR51C681□# | 680pF       | K/M          | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A8             | KGM02AR51C102□# | 1000pF      | K/M          | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A8             | KGM02AR51C152□# | 1500pF      | K/M          | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A8             | KGM02AR51C222□# | 2200pF      | K/M          | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A8             | KGM02AR51C332□# | 3300pF      | K/M          | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A8             | KGM02AR51C472□# | 4700pF      | K/M          | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A8             | KGM02AR51C682□# | 6800pF      | K/M          | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |
| A8             | KGM02AR51C103□# | 10000pF     | K/M          | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —   |

# Multilayer Ceramic Chip Capacitors

## General KGM Series

Parts number list General KGM02~03 Series Temperature Characteristic: R5 Tolerance □: K: ±10%/ M: ± 20%

| Thickness code | Part Number     | Capacitance | Tolerance □ | Voltage [V] | Dimension[mm] |          |          | Packaging: # |      |      |      |      |      |      |       |
|----------------|-----------------|-------------|-------------|-------------|---------------|----------|----------|--------------|------|------|------|------|------|------|-------|
|                |                 |             |             |             | L             | W        | T        | Φ180         |      |      |      | Φ330 |      |      |       |
|                |                 |             |             |             |               |          |          | code         | QTY  | code | QTY  | code | QTY  | code | QTY   |
| A8             | KGM02AR51A101□# | 100pF       | K/M         | 10          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —     |
| A8             | KGM02AR51A151□# | 150pF       | K/M         | 10          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —     |
| A8             | KGM02AR51A221□# | 220pF       | K/M         | 10          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —     |
| A8             | KGM02AR51A331□# | 330pF       | K/M         | 10          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —     |
| A8             | KGM02AR51A471□# | 470pF       | K/M         | 10          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —     |
| A8             | KGM02AR51A681□# | 680pF       | K/M         | 10          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —     |
| A8             | KGM02AR51A102□# | 1000pF      | K/M         | 10          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —     |
| A8             | KGM02AR51A152□# | 1500pF      | K/M         | 10          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —     |
| A8             | KGM02AR51A222□# | 2200pF      | K/M         | 10          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —     |
| A8             | KGM02AR51A332□# | 3300pF      | K/M         | 10          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —     |
| A8             | KGM02AR51A472□# | 4700pF      | K/M         | 10          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —     |
| A8             | KGM02AR51A682□# | 6800pF      | K/M         | 10          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —     |
| A8             | KGM02AR51A103□# | 10000pF     | K/M         | 10          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —     |
| A8             | KGM02AR51A104□# | 0.1μF       | K/M         | 10          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —     |
| A8             | KGM02AR50J153□# | 15000pF     | K/M         | 6.3         | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —     |
| A8             | KGM02AR50J223□# | 22000pF     | K/M         | 6.3         | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —     |
| A8             | KGM02AR50J333□# | 33000pF     | K/M         | 6.3         | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —     |
| A8             | KGM02AR50J473□# | 47000pF     | K/M         | 6.3         | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —     |
| A8             | KGM02AR50J683□# | 68000pF     | K/M         | 6.3         | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —     |
| A8             | KGM02AR50J104□# | 0.1μF       | K/M         | 6.3         | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —     |
| A8             | KGM02AR50J224□# | 0.22μF      | K/M         | 6.3         | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —     |
| A8             | KGM02AR50J474M# | 0.47μF      | M           | 6.3         | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp | P    | 40kp | N    | 80kp | —    | —     |
| C8             | KGM03CR51E224□# | 0.22μF      | K/M         | 25          | 0.6±0.09      | 0.3±0.09 | 0.3±0.09 | H            | 15kp | —    | —    | N    | 50kp | —    | —     |
| C8             | KGM03CR51C224□# | 0.22μF      | K/M         | 16          | 0.6±0.09      | 0.3±0.09 | 0.3±0.09 | H            | 15kp | —    | —    | N    | 50kp | —    | —     |
| C10            | KGM03CR51C105□# | 1μF         | K/M         | 16          | 0.6±0.09      | 0.3±0.09 | 0.3±0.09 | H            | 15kp | —    | —    | N    | 50kp | —    | —     |
| A7             | KGM03AR51A223□# | 22000pF     | K/M         | 10          | 0.6±0.03      | 0.3±0.03 | 0.3±0.03 | H            | 15kp | Q    | 30kp | N    | 50kp | W    | 150kp |
| A7             | KGM03AR51A333□# | 33000pF     | K/M         | 10          | 0.6±0.03      | 0.3±0.03 | 0.3±0.03 | H            | 15kp | Q    | 30kp | N    | 50kp | W    | 150kp |
| A7             | KGM03AR51A473□# | 47000pF     | K/M         | 10          | 0.6±0.03      | 0.3±0.03 | 0.3±0.03 | H            | 15kp | Q    | 30kp | N    | 50kp | W    | 150kp |
| A7             | KGM03AR51A683□# | 68000pF     | K/M         | 10          | 0.6±0.03      | 0.3±0.03 | 0.3±0.03 | H            | 15kp | Q    | 30kp | N    | 50kp | W    | 150kp |
| A7             | KGM03AR51A104□# | 0.1μF       | K/M         | 10          | 0.6±0.03      | 0.3±0.03 | 0.3±0.03 | H            | 15kp | Q    | 30kp | N    | 50kp | W    | 150kp |
| A7             | KGM03AR51A224□# | 0.22μF      | K/M         | 10          | 0.6±0.03      | 0.3±0.03 | 0.3±0.03 | H            | 15kp | Q    | 30kp | N    | 50kp | W    | 150kp |
| C10            | KGM03CR51A105□# | 1μF         | K/M         | 10          | 0.6±0.09      | 0.3±0.09 | 0.3±0.09 | H            | 15kp | —    | —    | N    | 50kp | —    | —     |
| B8             | KGM03BR51A105□# | 1μF         | K/M         | 10          | 0.6±0.05      | 0.3±0.05 | 0.3±0.05 | H            | 15kp | Q    | 30kp | N    | 50kp | W    | 150kp |
| C9             | KGM03CR51A225□# | 2.2μF       | K/M         | 10          | 0.6±0.09      | 0.3±0.09 | 0.3±0.09 | H            | 15kp | —    | —    | N    | 50kp | —    | —     |
| A8             | KGM03AR50J474□# | 0.47μF      | K/M         | 6.3         | 0.6±0.03      | 0.3±0.03 | 0.3±0.03 | H            | 15kp | Q    | 30kp | N    | 50kp | W    | 150kp |
| B8             | KGM03BR50J105□# | 1μF         | K/M         | 6.3         | 0.6±0.05      | 0.3±0.05 | 0.3±0.05 | H            | 15kp | Q    | 30kp | N    | 50kp | W    | 150kp |
| C8             | KGM03CR50J225□# | 2.2μF       | K/M         | 6.3         | 0.6±0.09      | 0.3±0.09 | 0.3±0.09 | H            | 15kp | —    | —    | N    | 50kp | —    | —     |
| B8             | KGM03BR50J225M# | 2.2μF       | M           | 6.3         | 0.6±0.05      | 0.3±0.05 | 0.3±0.05 | H            | 15kp | Q    | 30kp | N    | 50kp | W    | 150kp |
| D9             | KGM03DR50J475MH | 4.7μF       | M           | 6.3         | 0.6±0.09      | 0.3±0.09 | 0.5±0.05 | H            | 10kp | —    | —    | —    | —    | —    | —     |
| C8             | KGM03CR50G475M# | 4.7μF       | M           | 4           | 0.6±0.09      | 0.3±0.09 | 0.3±0.09 | H            | 15kp | —    | —    | N    | 50kp | —    | —     |
| D*7            | KGM03DR50G106MH | 10μF        | M           | 4           | 0.6±0.09      | 0.3±0.09 | 0.5±0.05 | H            | 10kp | —    | —    | —    | —    | —    | —     |



# Multilayer Ceramic Chip Capacitors

## General KGM Series

Parts number list General KGM05~32 Series Temperature Characteristic: R5 Tolerance □: K: ±10%/ M: ± 20%

| Thickness code | Part Number     | Capacitance | Tolerance □ | Voltage [V] | Dimension[mm] |          |          | Packaging: # |       |      |     |      |      |      |     |
|----------------|-----------------|-------------|-------------|-------------|---------------|----------|----------|--------------|-------|------|-----|------|------|------|-----|
|                |                 |             |             |             | L             | W        | T        | Φ180         |       |      |     | Φ330 |      |      |     |
|                |                 |             |             |             |               |          |          | code         | QTY   | code | QTY | code | QTY  | code | QTY |
| A7             | KGM05AR51V105□# | 1μF         | K/M         | 35          | 1.0±0.05      | 0.5±0.05 | 0.5±0.05 | H            | 10kp  | —    | —   | N    | 50kp | —    | —   |
| C8             | KGM05CR51V225M# | 2.2μF       | M           | 35          | 1.0±0.2       | 0.5±0.2  | 0.5±0.2  | H            | 10kp  | —    | —   | N    | 40kp | —    | —   |
| A3             | KGM05AR51E104□# | 0.1μF       | K/M         | 25          | 1.0±0.05      | 0.5±0.05 | 0.5±0.05 | H            | 10kp  | —    | —   | N    | 50kp | —    | —   |
| A7             | KGM05AR51E105□# | 1μF         | K/M         | 25          | 1.0±0.05      | 0.5±0.05 | 0.5±0.05 | H            | 10kp  | —    | —   | N    | 50kp | —    | —   |
| C8             | KGM05CR51E225M# | 2.2μF       | M           | 25          | 1.0±0.2       | 0.5±0.2  | 0.5±0.2  | H            | 10kp  | —    | —   | N    | 40kp | —    | —   |
| A*8            | KGM05AR51E225□# | 2.2μF       | K/M         | 25          | 1.0±0.2       | 0.5±0.2  | 0.55max. | H            | 10kp  | —    | —   | N    | 50kp | —    | —   |
| C8             | KGM05CR51E475M# | 4.7μF       | M           | 25          | 1.0±0.2       | 0.5±0.2  | 0.5±0.2  | H            | 10kp  | —    | —   | N    | 40kp | —    | —   |
| A8             | KGM05AR51C474□# | 0.47μF      | K/M         | 16          | 1.0±0.05      | 0.5±0.05 | 0.5±0.05 | H            | 10kp  | —    | —   | N    | 50kp | —    | —   |
| A7             | KGM05AR51C105□# | 1μF         | K/M         | 16          | 1.0±0.05      | 0.5±0.05 | 0.5±0.05 | H            | 10kp  | —    | —   | N    | 50kp | —    | —   |
| A8             | KGM05AR51C225□# | 2.2μF       | K/M         | 16          | 1.0±0.05      | 0.5±0.05 | 0.5±0.05 | H            | 10kp  | —    | —   | N    | 50kp | —    | —   |
| C8             | KGM05CR51C475M# | 4.7μF       | M           | 16          | 1.0±0.2       | 0.5±0.2  | 0.5±0.2  | H            | 10kp  | —    | —   | N    | 40kp | —    | —   |
| A8             | KGM05AR51A474□# | 0.47μF      | K/M         | 10          | 1.0±0.05      | 0.5±0.05 | 0.5±0.05 | H            | 10kp  | —    | —   | N    | 50kp | —    | —   |
| A7             | KGM05AR51A105□# | 1μF         | K/M         | 10          | 1.0±0.05      | 0.5±0.05 | 0.5±0.05 | H            | 10kp  | —    | —   | N    | 50kp | —    | —   |
| A8             | KGM05AR51A225□# | 2.2μF       | K/M         | 10          | 1.0±0.05      | 0.5±0.05 | 0.5±0.05 | H            | 10kp  | —    | —   | N    | 50kp | —    | —   |
| C8             | KGM05CR51A475M# | 4.7μF       | M           | 10          | 1.0±0.2       | 0.5±0.2  | 0.5±0.2  | H            | 10kp  | —    | —   | N    | 40kp | —    | —   |
| B8             | KGM05BR51A475M# | 4.7μF       | M           | 10          | 1.0±0.15      | 0.5±0.15 | 0.5±0.15 | H            | 10kp  | —    | —   | N    | 40kp | —    | —   |
| C8             | KGM05CR51A106□# | 10μF        | K/M         | 10          | 1.0±0.2       | 0.5±0.2  | 0.5±0.2  | H            | 10kp  | —    | —   | N    | 40kp | —    | —   |
| A8             | KGM05AR50J225□# | 2.2μF       | K/M         | 6.3         | 1.0±0.05      | 0.5±0.05 | 0.5±0.05 | H            | 10kp  | —    | —   | N    | 50kp | —    | —   |
| C8             | KGM05CR50J106M# | 10μF        | M           | 6.3         | 1.0±0.2       | 0.5±0.2  | 0.5±0.2  | H            | 10kp  | —    | —   | N    | 40kp | —    | —   |
| B8             | KGM05BR50J156M# | 15μF        | M           | 6.3         | 1.0±0.15      | 0.5±0.15 | 0.5±0.15 | H            | 10kp  | —    | —   | N    | 40kp | —    | —   |
| C8             | KGM05CR50J226M# | 22μF        | M           | 6.3         | 1.0±0.2       | 0.5±0.2  | 0.5±0.2  | H            | 10kp  | —    | —   | N    | 40kp | —    | —   |
| D8             | KGM05DR50J226M# | 22μF        | M           | 6.3         | 1.0±0.2       | 0.5±0.2  | 0.8max.  | H            | 10kp  | —    | —   | N    | 30kp | —    | —   |
| B8             | KGM05BR50G156M# | 15μF        | M           | 4           | 1.0±0.15      | 0.5±0.15 | 0.5±0.15 | H            | 10kp  | —    | —   | N    | 40kp | —    | —   |
| C8             | KGM05CR50G226M# | 22μF        | M           | 4           | 1.0±0.2       | 0.5±0.2  | 0.5±0.2  | H            | 10kp  | —    | —   | N    | 40kp | —    | —   |
| C8             | KGM15CR51V475□# | 4.7μF       | K/M         | 35          | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp   | —    | —   | M    | 10kp | —    | —   |
| C9             | KGM15CR51V106M# | 10μF        | M           | 35          | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp   | —    | —   | M    | 10kp | —    | —   |
| C8             | KGM15CR51E475□# | 4.7μF       | K/M         | 25          | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp   | —    | —   | M    | 10kp | —    | —   |
| C9             | KGM15CR51E106□# | 10μF        | K/M         | 25          | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp   | —    | —   | M    | 10kp | —    | —   |
| C8             | KGM15CR51E226M# | 22μF        | M           | 25          | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp   | —    | —   | M    | 10kp | —    | —   |
| C9             | KGM15CR51C106□# | 10μF        | K/M         | 16          | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp   | —    | —   | M    | 10kp | —    | —   |
| C8             | KGM15CR51C226M# | 22μF        | M           | 16          | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp   | —    | —   | M    | 10kp | —    | —   |
| C8             | KGM15CR51A226M# | 22μF        | M           | 10          | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp   | —    | —   | M    | 10kp | —    | —   |
| C8             | KGM15CR50J476M# | 47μF        | M           | 6.3         | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp   | —    | —   | M    | 10kp | —    | —   |
| C8             | KGM15CR50G476M# | 47μF        | M           | 4           | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp   | —    | —   | M    | 10kp | —    | —   |
| A8             | KGM21AR51E226M# | 22μF        | M           | 25          | 2.0±0.2       | 1.25±0.2 | 1.25±0.2 | U            | 3kp   | —    | —   | L    | 10kp | —    | —   |
| A8             | KGM21AR51C106□# | 10μF        | K/M         | 16          | 2.0±0.2       | 1.25±0.2 | 1.25±0.2 | U            | 3kp   | —    | —   | L    | 10kp | —    | —   |
| A8             | KGM21AR51C226M# | 22μF        | M           | 16          | 2.0±0.2       | 1.25±0.2 | 1.25±0.2 | U            | 3kp   | —    | —   | L    | 10kp | —    | —   |
| A8             | KGM21AR51A226M# | 22μF        | M           | 10          | 2.0±0.2       | 1.25±0.2 | 1.25±0.2 | U            | 3kp   | —    | —   | L    | 10kp | —    | —   |
| A7             | KGM21AR50J476M# | 47μF        | M           | 6.3         | 2.0±0.2       | 1.25±0.2 | 1.25±0.2 | U            | 3kp   | —    | —   | L    | 10kp | —    | —   |
| A8             | KGM21AR50J107M# | 100μF       | M           | 6.3         | 2.0±0.2       | 1.25±0.2 | 1.25±0.2 | U            | 3kp   | —    | —   | L    | 10kp | —    | —   |
| A8             | KGM21AR50G107M# | 100μF       | M           | 4           | 2.0±0.2       | 1.25±0.2 | 1.25±0.2 | U            | 3kp   | —    | —   | L    | 10kp | —    | —   |
| A3             | KGM31AR52A225□# | 2.2μF       | K/M         | 100         | 3.2±0.2       | 1.6±0.2  | 1.6±0.2  | U            | 2.5kp | —    | —   | L    | 5kp  | —    | —   |
| A3             | KGM31AR51H475□# | 4.7μF       | K/M         | 50          | 3.2±0.2       | 1.6±0.2  | 1.6±0.2  | U            | 2.5kp | —    | —   | L    | 5kp  | —    | —   |
| F3             | KGM31FR51E225□# | 2.2μF       | K/M         | 25          | 3.2±0.2       | 1.6±0.15 | 1.6±0.15 | U            | 2.5kp | —    | —   | L    | 5kp  | —    | —   |
| A8             | KGM31AR51E106□# | 10μF        | K/M         | 25          | 3.2±0.2       | 1.6±0.2  | 1.6±0.2  | U            | 2.5kp | —    | —   | L    | 5kp  | —    | —   |
| A8             | KGM31AR51C226□# | 22μF        | K/M         | 16          | 3.2±0.2       | 1.6±0.2  | 1.6±0.2  | U            | 2.5kp | —    | —   | L    | 5kp  | —    | —   |
| A3             | KGM32AR51H106□# | 10μF        | K/M         | 50          | 3.2±0.3       | 2.5±0.2  | 2.5±0.2  | U            | 1kp   | —    | —   | L    | 4kp  | —    | —   |
| A3             | KGM32AR51V106□# | 10μF        | K/M         | 35          | 3.2±0.3       | 2.5±0.2  | 2.5±0.2  | U            | 1kp   | —    | —   | L    | 4kp  | —    | —   |
| A8             | KGM32AR51E106□# | 10μF        | K/M         | 25          | 3.2±0.3       | 2.5±0.2  | 2.5±0.2  | U            | 1kp   | —    | —   | L    | 4kp  | —    | —   |
| A3             | KGM32AR51C106□# | 10μF        | K/M         | 16          | 3.2±0.3       | 2.5±0.2  | 2.5±0.2  | U            | 1kp   | —    | —   | L    | 4kp  | —    | —   |

# Multilayer Ceramic Chip Capacitors

General

KGM Series



## S6/T6 Dielectric

● Capacitance chart    ■ Standard Spec.2    ▨ Optional Spec.

| S6                               |                             |               |               |                   |                 |              |                            |             |             |              |
|----------------------------------|-----------------------------|---------------|---------------|-------------------|-----------------|--------------|----------------------------|-------------|-------------|--------------|
| Capacitance<br>Size/Voltage(Vdc) | 104<br>0.1μF                | 224<br>0.22μF | 474<br>0.47μF | 105<br>1μF        | 225<br>2.2μF    | 475<br>4.7μF | 106<br>10μF                | 226<br>22μF | 476<br>47μF | 107<br>100μF |
| KGM03<br>(0201)                  | 2.5<br>4<br>6.3<br>10       |               |               | C10<br>C10<br>C10 |                 | D9           |                            |             |             |              |
| KGM05<br>(0402)                  | 4<br>6.3<br>10<br>16<br>25  |               | A8<br>A8      | A8                | B8<br>C8<br>A*8 | C8           | D8                         |             |             |              |
| KGM15<br>(0603)                  | 2.5<br>4<br>6.3<br>10<br>16 |               |               |                   |                 |              | C8<br>C8<br>C8<br>C9<br>C9 |             | C8<br>C8    |              |
| KGM21<br>(0805)                  | 4<br>6.3<br>10<br>16<br>25  |               |               |                   |                 |              | A8<br>A8<br>A8<br>A8       | A7<br>A8    |             |              |

| T6                               |                |               |               |                |              |              |             |
|----------------------------------|----------------|---------------|---------------|----------------|--------------|--------------|-------------|
| Capacitance<br>Size/Voltage(Vdc) | 104<br>0.1μF   | 224<br>0.22μF | 474<br>0.47μF | 105<br>1μF     | 225<br>2.2μF | 475<br>4.7μF | 106<br>10μF |
| KGM03<br>(0201)                  | 2.5<br>4<br>10 |               |               | B8<br>C8<br>C8 |              |              |             |

Please contact for capacitance value other than standard.

Please refer to [here](#) for the test method and specifications of Standard Specification 2.

The code in the capacity range table means product thickness (T-dimension) and Tan delta. For details about T dimensions, please refer to the Dimension section in the parts number list below. For Tan delta, please refer to the list on the right.

(Example) In case of "C9" for KGM15;

T: 0.8±0.2mm, Tanδ: 15.0% max.

| Tan δ<br>Code | Tan δ      |
|---------------|------------|
| 7             | 10.0% max. |
| 8             | 12.5% max. |
| 9             | 15.0% max. |
| 10            | 20.0% max. |

Parts number list    General    KGM03~21 Series    Temperature Characteristic: S6    Tolerance □: K: ±10%/ M: ±20%

| Thickness<br>code | Part Number     | Capacitance | Tolerance<br>□ | Voltage<br>[V] | Dimension[mm] |          |          | Packaging: # |      |      |     |      |      |      |     |
|-------------------|-----------------|-------------|----------------|----------------|---------------|----------|----------|--------------|------|------|-----|------|------|------|-----|
|                   |                 |             |                |                | L             | W        | T        | Φ180         |      |      |     | Φ330 |      |      |     |
|                   |                 |             |                |                |               |          |          | code         | QTY  | code | QTY | code | QTY  | code | QTY |
| C10               | KGM03CS61A105M# | 1μF         | M              | 10             | 0.6±0.09      | 0.3±0.09 | 0.3±0.09 | H            | 15kp | —    | —   | N    | 50kp | —    | —   |
| C10               | KGM03CS60J105M# | 1μF         | M              | 6.3            | 0.6±0.09      | 0.3±0.09 | 0.3±0.09 | H            | 15kp | —    | —   | N    | 50kp | —    | —   |
| C10               | KGM03CS60G105M# | 1μF         | M              | 4              | 0.6±0.09      | 0.3±0.09 | 0.3±0.09 | H            | 15kp | —    | —   | N    | 50kp | —    | —   |
| D9                | KGM03DS60E475MH | 4.7μF       | M              | 2.5            | 0.6±0.09      | 0.3±0.09 | 0.5±0.05 | H            | 10kp | —    | —   | —    | —    | —    | —   |
| A8                | KGM05AS61E105□# | 1μF         | K/M            | 25             | 1.0±0.05      | 0.5±0.05 | 0.5±0.05 | H            | 10kp | —    | —   | N    | 50kp | —    | —   |
| A8                | KGM05AS61C474M# | 0.47μF      | M              | 16             | 1.0±0.05      | 0.5±0.05 | 0.5±0.05 | H            | 10kp | —    | —   | N    | 50kp | —    | —   |
| A*8               | KGM05AS61C225□# | 2.2μF       | K/M            | 16             | 1.0±0.2       | 0.5±0.2  | 0.55max. | H            | 10kp | —    | —   | N    | 50kp | —    | —   |
| A8                | KGM05AS61A474M# | 0.47μF      | M              | 10             | 1.0±0.05      | 0.5±0.05 | 0.5±0.05 | H            | 10kp | —    | —   | N    | 50kp | —    | —   |
| A8                | KGM05AS61A105□# | 1μF         | K/M            | 10             | 1.0±0.05      | 0.5±0.05 | 0.5±0.05 | H            | 10kp | —    | —   | N    | 50kp | —    | —   |
| C8                | KGM05CS61A475M# | 4.7μF       | M              | 10             | 1.0±0.2       | 0.5±0.2  | 0.5±0.2  | H            | 10kp | —    | —   | N    | 40kp | —    | —   |
| C8                | KGM05CS60J475M# | 4.7μF       | M              | 6.3            | 1.0±0.2       | 0.5±0.2  | 0.5±0.2  | H            | 10kp | —    | —   | N    | 40kp | —    | —   |
| B8                | KGM05BS60J475M# | 4.7μF       | M              | 6.3            | 1.0±0.15      | 0.5±0.15 | 0.5±0.15 | H            | 10kp | —    | —   | N    | 40kp | —    | —   |
| C8                | KGM05CS60J106M# | 10μF        | M              | 6.3            | 1.0±0.2       | 0.5±0.2  | 0.5±0.2  | H            | 10kp | —    | —   | N    | 40kp | —    | —   |
| D8                | KGM05DS60G226M# | 22μF        | M              | 4              | 1.0±0.2       | 0.5±0.2  | 0.8max.  | H            | 10kp | —    | —   | N    | 30kp | —    | —   |
| C8                | KGM15CS61C475□# | 4.7μF       | K/M            | 16             | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp  | —    | —   | M    | 10kp | —    | —   |
| C9                | KGM15CS61C106M# | 10μF        | M              | 16             | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp  | —    | —   | M    | 10kp | —    | —   |
| C9                | KGM15CS61A106□# | 10μF        | K/M            | 10             | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp  | —    | —   | M    | 10kp | —    | —   |
| C8                | KGM15CS61A226M# | 22μF        | M              | 10             | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp  | —    | —   | M    | 10kp | —    | —   |
| C8                | KGM15CS60J226M# | 22μF        | M              | 6.3            | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp  | —    | —   | M    | 10kp | —    | —   |
| C8                | KGM15CS60G226M# | 22μF        | M              | 4              | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp  | —    | —   | M    | 10kp | —    | —   |
| C8                | KGM15CS60G476M# | 47μF        | M              | 4              | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp  | —    | —   | M    | 10kp | —    | —   |
| C8                | KGM15CS60E476M# | 47μF        | M              | 2.5            | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp  | —    | —   | M    | 10kp | —    | —   |
| A8                | KGM21AS61E226M# | 22μF        | M              | 25             | 2.0±0.2       | 1.25±0.2 | 1.25±0.2 | U            | 3kp  | —    | —   | L    | 10kp | —    | —   |
| A8                | KGM21AS61C226M# | 22μF        | M              | 16             | 2.0±0.2       | 1.25±0.2 | 1.25±0.2 | U            | 3kp  | —    | —   | L    | 10kp | —    | —   |
| A8                | KGM21AS61A226M# | 22μF        | M              | 10             | 2.0±0.2       | 1.25±0.2 | 1.25±0.2 | U            | 3kp  | —    | —   | L    | 10kp | —    | —   |
| A8                | KGM21AS60J226M# | 22μF        | M              | 6.3            | 2.0±0.2       | 1.25±0.2 | 1.25±0.2 | U            | 3kp  | —    | —   | L    | 10kp | —    | —   |
| A7                | KGM21AS60G476M# | 47μF        | M              | 4              | 2.0±0.2       | 1.25±0.2 | 1.25±0.2 | U            | 3kp  | —    | —   | L    | 10kp | —    | —   |
| A8                | KGM21AS60G107M# | 100μF       | M              | 4              | 2.0±0.2       | 1.25±0.2 | 1.25±0.2 | U            | 3kp  | —    | —   | L    | 10kp | —    | —   |

Parts number list    General    KGM03 Series    Temperature Characteristics: T6    Tolerance □: K: ±10%/ M: ±20%

| Thickness<br>code | Part Number     | Capacitance | Tolerance<br>□ | Voltage<br>[V] | Dimension[mm] |          |          | Packaging: # |      |      |      |      |      |      |       |
|-------------------|-----------------|-------------|----------------|----------------|---------------|----------|----------|--------------|------|------|------|------|------|------|-------|
|                   |                 |             |                |                | L             | W        | T        | Φ180         |      |      |      | Φ330 |      |      |       |
|                   |                 |             |                |                |               |          |          | code         | QTY  | code | QTY  | code | QTY  | code | QTY   |
| C8                | KGM03CT61A224□# | 0.22μF      | K/M            | 10             | 0.6±0.09      | 0.3±0.09 | 0.3±0.09 | H            | 15kp | —    | —    | N    | 50kp | —    | —     |
| C8                | KGM03CT60G225M# | 2.2μF       | M              | 4              | 0.6±0.09      | 0.3±0.09 | 0.3±0.09 | H            | 15kp | —    | —    | N    | 50kp | —    | —     |
| B8                | KGM03BT60E105M# | 1μF         | M              | 2.5            | 0.6±0.05      | 0.3±0.05 | 0.3±0.05 | H            | 15kp | Q    | 30kp | N    | 50kp | W    | 150kp |
| C8                | KGM03CT60E225M# | 2.2μF       | M              | 2.5            | 0.6±0.09      | 0.3±0.09 | 0.3±0.09 | H            | 15kp | —    | —    | N    | 50kp | —    | —     |



# Multilayer Ceramic Chip Capacitors

## General KGM Series



### R7/K7 Dielectric

● Capacitance chart ■ Standard Spec.1 ■ Standard Spec.2

| R7                |       |       |       |       |       |       |        |        |        |
|-------------------|-------|-------|-------|-------|-------|-------|--------|--------|--------|
| Capacitance       | 101   | 151   | 221   | 331   | 471   | 681   | 102    | 152    | 222    |
| Size/Voltage(Vdc) | 100pF | 150pF | 220pF | 330pF | 470pF | 680pF | 1000pF | 1500pF | 2200pF |
| KGM02 (01005)     | 16    | A8    |       |       |       |       |        |        |        |

| R7                |                             |        |        |     |       |          |          |      |  |
|-------------------|-----------------------------|--------|--------|-----|-------|----------|----------|------|--|
| Capacitance       | 104                         | 224    | 474    | 105 | 225   | 475      | 106      | 226  |  |
| Size/Voltage(Vdc) | 0.1μF                       | 0.22μF | 0.47μF | 1μF | 2.2μF | 4.7μF    | 10μF     | 22μF |  |
| KGM05 (0402)      | 6.3<br>25                   | A8     | A8     | A8  |       |          |          |      |  |
| KGM15 (0603)      | 25                          |        |        | A3  |       |          |          |      |  |
| KGM21 (0805)      | 6.3<br>16<br>25<br>50       |        |        |     |       | A8<br>A7 | A8       |      |  |
| KGM31 (1206)      | 6.3<br>10<br>16<br>25<br>50 |        |        |     |       | A3<br>A3 | A8<br>A5 |      |  |
| KGM32 (1210)      | 25<br>50                    |        |        |     |       |          | A8<br>A3 |      |  |

| K7                |           |        |        |     |          |       |      |      |  |
|-------------------|-----------|--------|--------|-----|----------|-------|------|------|--|
| Capacitance       | 104       | 224    | 474    | 105 | 225      | 475   | 106  | 226  |  |
| Size/Voltage(Vdc) | 0.1μF     | 0.22μF | 0.47μF | 1μF | 2.2μF    | 4.7μF | 10μF | 22μF |  |
| KGM05 (0402)      | 10        |        |        |     | B3       |       |      |      |  |
| KGM15 (0603)      | 10<br>16  |        |        |     |          |       | C8   | C9   |  |
| KGM21 (0805)      | 10        |        |        |     |          |       |      | A8   |  |
| KGM31 (1206)      | 50<br>100 |        |        |     | A3<br>A3 | H3    |      |      |  |

Please contact for capacitance value other than standard.

Please refer to [here](#) for the test method and specifications of Standard Specification 1.

Please refer to [here](#) for the test method and specifications of Standard Specification 2.

The code in the capacity range table means product thickness (T-dimension) and Tan delta. For details about T dimensions, please refer to the Dimension section in the parts number list below. For Tan delta, please refer to the list on the right.

(Example) In case of "A8" for KGM02;  
T: 0.8±0.2mm, Tanδ: 12.5% max.

| Tan δ Code | Tan δ      |
|------------|------------|
| 3          | 5.0% max.  |
| 5          | 7.5% max.  |
| 7          | 10.0% max. |
| 8          | 12.5% max. |
| 9          | 15.0% max. |

### Parts number list General KGM02~32 Series Temperature Characteristics: R7 Tolerance □: K: ±10%/ M: ±20%

| Thickness code | Part Number     | Capacitance | Tolerance □ | Voltage [V] | Dimension[mm] |          |          | Packaging: # |       |      |      |      |      |      |     |
|----------------|-----------------|-------------|-------------|-------------|---------------|----------|----------|--------------|-------|------|------|------|------|------|-----|
|                |                 |             |             |             |               |          |          | Φ180         |       |      |      | Φ330 |      |      |     |
|                |                 |             |             |             | L             | W        | T        | code         | QTY   | code | QTY  | code | QTY  | code | QTY |
| A8             | KGM02AR71C101□# | 100pF       | K/M         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp  | P    | 40kp | N    | 80kp | —    | —   |
| A8             | KGM02AR71C151□# | 150pF       | K/M         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp  | P    | 40kp | N    | 80kp | —    | —   |
| A8             | KGM02AR71C221□# | 220pF       | K/M         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp  | P    | 40kp | N    | 80kp | —    | —   |
| A8             | KGM02AR71C331□# | 330pF       | K/M         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp  | P    | 40kp | N    | 80kp | —    | —   |
| A8             | KGM02AR71C471□# | 470pF       | K/M         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp  | P    | 40kp | N    | 80kp | —    | —   |
| A8             | KGM02AR71C681□# | 680pF       | K/M         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp  | P    | 40kp | N    | 80kp | —    | —   |
| A8             | KGM02AR71C102□# | 1000pF      | K/M         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp  | P    | 40kp | N    | 80kp | —    | —   |
| A8             | KGM02AR71C152□# | 1500pF      | K/M         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp  | P    | 40kp | N    | 80kp | —    | —   |
| A8             | KGM02AR71C222□# | 2200pF      | K/M         | 16          | 0.4±0.02      | 0.2±0.02 | 0.2±0.02 | H            | 20kp  | P    | 40kp | N    | 80kp | —    | —   |
| A8             | KGM05AR71E104□# | 0.1μF       | K/M         | 25          | 1.0±0.05      | 0.5±0.05 | 0.5±0.05 | H            | 10kp  | —    | —    | N    | 50kp | —    | —   |
| A8             | KGM05AR70J474□# | 0.47μF      | K/M         | 6.3         | 1.0±0.05      | 0.5±0.05 | 0.5±0.05 | H            | 10kp  | —    | —    | N    | 50kp | —    | —   |
| A8             | KGM05AR70J105□# | 1μF         | K/M         | 6.3         | 1.0±0.05      | 0.5±0.05 | 0.5±0.05 | H            | 10kp  | —    | —    | N    | 50kp | —    | —   |
| A3             | KGM15AR71E105□# | 1μF         | K/M         | 25          | 1.6±0.1       | 0.8±0.1  | 0.8±0.1  | T            | 4kp   | —    | —    | M    | 10kp | —    | —   |
| A3             | KGM21AR71H105□# | 1μF         | K/M         | 50          | 2.0±0.2       | 1.25±0.2 | 1.25±0.2 | U            | 3kp   | —    | —    | L    | 10kp | —    | —   |
| A7             | KGM21AR71E475□# | 4.7μF       | K/M         | 25          | 2.0±0.2       | 1.25±0.2 | 1.25±0.2 | U            | 3kp   | —    | —    | L    | 10kp | —    | —   |
| A8             | KGM21AR71C475□# | 4.7μF       | K/M         | 16          | 2.0±0.2       | 1.25±0.2 | 1.25±0.2 | U            | 3kp   | —    | —    | L    | 10kp | —    | —   |
| A8             | KGM21AR71C106□# | 10μF        | K/M         | 16          | 2.0±0.2       | 1.25±0.2 | 1.25±0.2 | U            | 3kp   | —    | —    | L    | 10kp | —    | —   |
| A8             | KGM21AR70J106□# | 10μF        | K/M         | 6.3         | 2.0±0.2       | 1.25±0.2 | 1.25±0.2 | U            | 3kp   | —    | —    | L    | 10kp | —    | —   |
| A3             | KGM31AR71H475□# | 4.7μF       | K/M         | 50          | 3.2±0.2       | 1.6±0.2  | 1.6±0.2  | U            | 2.5kp | —    | —    | L    | 5kp  | —    | —   |
| A3             | KGM31AR71E475□# | 4.7μF       | K/M         | 25          | 3.2±0.2       | 1.6±0.2  | 1.6±0.2  | U            | 2.5kp | —    | —    | L    | 5kp  | —    | —   |
| A3             | KGM31AR71E106□# | 10μF        | K/M         | 25          | 3.2±0.2       | 1.6±0.2  | 1.6±0.2  | U            | 2.5kp | —    | —    | L    | 5kp  | —    | —   |
| A8             | KGM31AR71C106□# | 10μF        | K/M         | 16          | 3.2±0.2       | 1.6±0.2  | 1.6±0.2  | U            | 2.5kp | —    | —    | L    | 5kp  | —    | —   |
| A5             | KGM31AR71A226□# | 22μF        | K/M         | 10          | 3.2±0.2       | 1.6±0.2  | 1.6±0.2  | U            | 2.5kp | —    | —    | L    | 5kp  | —    | —   |
| A8             | KGM31AR70J226□# | 22μF        | K/M         | 6.3         | 3.2±0.2       | 1.6±0.2  | 1.6±0.2  | U            | 2.5kp | —    | —    | L    | 5kp  | —    | —   |
| A3             | KGM32AR71H106□# | 10μF        | K/M         | 50          | 3.2±0.3       | 2.5±0.2  | 2.5±0.2  | U            | 1kp   | —    | —    | L    | 4kp  | —    | —   |
| A8             | KGM32AR71E106□# | 10μF        | K/M         | 25          | 3.2±0.3       | 2.5±0.2  | 2.5±0.2  | U            | 1kp   | —    | —    | L    | 4kp  | —    | —   |

### Parts number list General KGM05~31 Series Temperature Characteristics: K7 Tolerance □: K: ±10%/ M: ±20%

| Thickness code | Part Number     | Capacitance | Tolerance □ | Voltage [V] | Dimension[mm] |          |          | Packaging: # |       |      |     |      |      |      |     |
|----------------|-----------------|-------------|-------------|-------------|---------------|----------|----------|--------------|-------|------|-----|------|------|------|-----|
|                |                 |             |             |             |               |          |          | Φ180         |       |      |     | Φ330 |      |      |     |
|                |                 |             |             |             | L             | W        | T        | code         | QTY   | code | QTY | code | QTY  | code | QTY |
| B3             | KGM05BK71A225□# | 2.2μF       | K/M         | 10          | 1.0±0.15      | 0.5±0.15 | 0.5±0.15 | H            | 10kp  | —    | —   | N    | 40kp | —    | —   |
| C8             | KGM15CK71C475□# | 4.7μF       | K/M         | 16          | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp   | —    | —   | M    | 10kp | —    | —   |
| C9             | KGM15CK71A106M# | 10μF        | M           | 10          | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp   | —    | —   | M    | 10kp | —    | —   |
| A8             | KGM21AK71A226M# | 22μF        | M           | 10          | 2.0±0.2       | 1.25±0.2 | 1.25±0.2 | U            | 3kp   | —    | —   | L    | 10kp | —    | —   |
| A3             | KGM31AK72A225□# | 2.2μF       | K/M         | 100         | 3.2±0.2       | 1.6±0.2  | 1.6±0.2  | U            | 2.5kp | —    | —   | L    | 5kp  | —    | —   |
| A3             | KGM31AK71H225□# | 2.2μF       | K/M         | 50          | 3.2±0.2       | 1.6±0.2  | 1.6±0.2  | U            | 2.5kp | —    | —   | L    | 5kp  | —    | —   |
| H3             | KGM31HK72A475□U | 4.7μF       | K/M         | 100         | 3.2±0.3       | 1.6±0.3  | 1.6±0.3  | U            | 2kp   | —    | —   | —    | —    | —    | —   |

# Multilayer Ceramic Chip Capacitors

## General KGM Series

### S7/T7 Dielectric



● Capacitance chart ■ Standard Spec.1 ■ Standard Spec.2 ▨ Optional Spec.

| S7                |       |        |        |          |                |       |
|-------------------|-------|--------|--------|----------|----------------|-------|
| Capacitance       | 104   | 224    | 474    | 105      | 225            | 475   |
| Size/Voltage(Vdc) | 0.1μF | 0.22μF | 0.47μF | 1μF      | 2.2μF          | 4.7μF |
| KGM03 (0201)      | 6.3   | ▨ A7   |        |          |                |       |
| KGM05 (0402)      | 4     |        |        | A8<br>A8 | B3<br>B3<br>B3 |       |
| KGM21 (0805)      | 100   |        |        | A3       |                |       |
| KGM31 (1206)      | 100   |        |        |          | A3             | H3    |

| T7                |       |        |        |     |       |       |      |
|-------------------|-------|--------|--------|-----|-------|-------|------|
| Capacitance       | 104   | 224    | 474    | 105 | 225   | 475   | 106  |
| Size/Voltage(Vdc) | 0.1μF | 0.22μF | 0.47μF | 1μF | 2.2μF | 4.7μF | 10μF |
| KGM03 (0201)      | 6.3   |        |        | C8  |       |       |      |
| KGM05 (0402)      | 10    |        |        |     |       | C8    |      |
| KGM15 (0603)      | 6.3   |        |        |     |       | C8    | C9   |
|                   | 10    |        |        |     |       | C8    | C9   |
|                   | 16    |        |        |     |       | C8    |      |
| KGM21 (0805)      | 6.3   |        |        |     |       |       | A8   |
|                   | 10    |        |        |     |       |       | A8   |

Please contact for capacitance value other than standard.

Please refer to [here](#) for the test method and specifications of Standard Specification 1.

Please refer to [here](#) for the test method and specifications of Standard Specification 2.

The code in the capacity range table means product thickness (T-dimension) and Tan delta. For details about T dimensions, please refer to the Dimension section in the parts number list below. For Tan delta, please refer to the list on the right.

(Example) In case of "C9" for KGM15;

T: 0.8±0.2mm, Tanδ: 15.0% max.

| Tan δ Code | Tan δ      |
|------------|------------|
| 3          | 5.0% max.  |
| 5          | 7.5% max.  |
| 7          | 10.0% max. |
| 8          | 12.5% max. |
| 9          | 15.0% max. |

#### Parts number list General KGM03~31 Series Temperature Characteristics: S7 Tolerance □: K: ±10%/ M: ±20%

| Thickness code | Part Number     | Capacitance | Tolerance □ | Voltage [V] | Dimension[mm] |          |          | Packaging: # |       |      |      |      |      |      |       |
|----------------|-----------------|-------------|-------------|-------------|---------------|----------|----------|--------------|-------|------|------|------|------|------|-------|
|                |                 |             |             |             |               |          |          | Φ180         |       |      |      | Φ330 |      |      |       |
|                |                 |             |             |             |               |          |          | code         | QTY   | code | QTY  | code | QTY  | code | QTY   |
| A7             | KGM03AS70J104□# | 0.1μF       | K/M         | 6.3         | 0.6±0.03      | 0.3±0.03 | 0.3±0.03 | H            | 15kp  | Q    | 30kp | N    | 50kp | W(W) | 150kp |
| B3             | KGM05BS71A225□# | 2.2μF       | K/M         | 10          | 1.0±0.15      | 0.5±0.15 | 0.5±0.15 | H            | 10kp  | —    | —    | N    | 40kp | —    | —     |
| A8             | KGM05AS70J105□# | 1μF         | K/M         | 6.3         | 1.0±0.05      | 0.5±0.05 | 0.5±0.05 | H            | 10kp  | —    | —    | N    | 50kp | —    | —     |
| B3             | KGM05BS70J225□# | 2.2μF       | K/M         | 6.3         | 1.0±0.15      | 0.5±0.15 | 0.5±0.15 | H            | 10kp  | —    | —    | N    | 40kp | —    | —     |
| A8             | KGM05AS70G105□# | 1μF         | K/M         | 4           | 1.0±0.05      | 0.5±0.05 | 0.5±0.05 | H            | 10kp  | —    | —    | N    | 50kp | —    | —     |
| B3             | KGM05BS70G225M# | 2.2μF       | M           | 4           | 1.0±0.15      | 0.5±0.15 | 0.5±0.15 | H            | 10kp  | —    | —    | N    | 40kp | —    | —     |
| A3             | KGM21AS72A105□# | 1μF         | K/M         | 100         | 2.0±0.2       | 1.25±0.2 | 1.25±0.2 | U            | 3kp   | —    | —    | L    | 10kp | —    | —     |
| A3             | KGM31AS72A225□# | 2.2μF       | K/M         | 100         | 3.2±0.2       | 1.6±0.2  | 1.6±0.2  | U            | 2.5kp | —    | —    | L    | 5kp  | —    | —     |
| H3             | KGM31HS72A475□U | 4.7μF       | K/M         | 100         | 3.2±0.3       | 1.6±0.3  | 1.6±0.3  | U            | 2kp   | —    | —    | —    | —    | —    | —     |

#### Parts number list General KGM03~21 Series Temperature Characteristics: T7 Tolerance □: K: ±10%/ M: ±20%

| Thickness code | Part Number     | Capacitance | Tolerance □ | Voltage [V] | Dimension[mm] |          |          | Packaging: # |      |      |     |      |      |      |     |
|----------------|-----------------|-------------|-------------|-------------|---------------|----------|----------|--------------|------|------|-----|------|------|------|-----|
|                |                 |             |             |             |               |          |          | Φ180         |      |      |     | Φ330 |      |      |     |
|                |                 |             |             |             |               |          |          | code         | QTY  | code | QTY | code | QTY  | code | QTY |
| C8             | KGM03CT70J105M# | 1μF         | M           | 6.3         | 0.6±0.09      | 0.3±0.09 | 0.3±0.09 | H            | 15kp | —    | —   | N    | 50kp | —    | —   |
| C8             | KGM05CT71A475□# | 4.7μF       | K/M         | 10          | 1.0±0.2       | 0.5±0.2  | 0.5±0.2  | H            | 10kp | —    | —   | N    | 40kp | —    | —   |
| C8             | KGM15CT71C475□# | 4.7μF       | K/M         | 16          | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp  | —    | —   | M    | 10kp | —    | —   |
| C8             | KGM15CT71A475□# | 4.7μF       | K/M         | 10          | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp  | —    | —   | M    | 10kp | —    | —   |
| C9             | KGM15CT71A106M# | 10μF        | M           | 10          | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp  | —    | —   | M    | 10kp | —    | —   |
| C8             | KGM15CT70J475□# | 4.7μF       | K/M         | 6.3         | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp  | —    | —   | M    | 10kp | —    | —   |
| C9             | KGM15CT70J106M# | 10μF        | M           | 6.3         | 1.6±0.2       | 0.8±0.2  | 0.8±0.2  | T            | 4kp  | —    | —   | M    | 10kp | —    | —   |
| A8             | KGM21AT71A226M# | 22μF        | M           | 10          | 2.0±0.2       | 1.25±0.2 | 1.25±0.2 | U            | 3kp  | —    | —   | L    | 10kp | —    | —   |
| A8             | KGM21AT70J226M# | 22μF        | M           | 6.3         | 2.0±0.2       | 1.25±0.2 | 1.25±0.2 | U            | 3kp  | —    | —   | L    | 10kp | —    | —   |

Specifications and Test Conditions for Temperature Compensation Type (C) Characteristics  
KGM/KGT/KGU Series (Standard Spec.1)

| Test Items                |                                            | Specifications                                                    | Test Conditions (Complies with JIS C5101/ IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |  |             |             |         |              |             |              |          |              |           |
|---------------------------|--------------------------------------------|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|-------------|-------------|---------|--------------|-------------|--------------|----------|--------------|-----------|
| Capacitance               |                                            | Within tolerance                                                  | <table><tr><th>Capacitance</th><th>Frequency</th><th>Voltage</th></tr><tr><td>C≤1000pF</td><td>1MHz±10%</td><td rowspan="2">0.5 to 5Vrms</td></tr><tr><td>C&gt;1000pF</td><td>1kHz±10%</td></tr></table>                                                                                                                                                                                                                                                                                 |  |  | Capacitance | Frequency   | Voltage | C≤1000pF     | 1MHz±10%    | 0.5 to 5Vrms | C>1000pF | 1kHz±10%     |           |
| Capacitance               | Frequency                                  | Voltage                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |
| C≤1000pF                  | 1MHz±10%                                   | 0.5 to 5Vrms                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |
| C>1000pF                  | 1kHz±10%                                   |                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |
| Q                         |                                            | C≥30pF : Q≥1000<br>C<30pF : Q≥400+20C                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |
| Insulation Resistance     |                                            | Over 10000MΩ or 500MΩ・μF, whichever is less                       | Measure after applying rated voltage for 1 minute in normal temperature and humidity.<br>The charge and discharge current of the capacitor must not exceed 50mA.                                                                                                                                                                                                                                                                                                                         |  |  |             |             |         |              |             |              |          |              |           |
| Dielectric Strength       |                                            | Resist without problem                                            | Apply*3 times of the rated voltage for 1 to 5 seconds.<br>*KGU02ACA1ER20-120 : twice<br>The charge and discharge current of the capacitor must not exceed 50mA.                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |
| Appearance                |                                            | No problem observed                                               | Microscope                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |  |             |             |         |              |             |              |          |              |           |
| Termination Strength      |                                            | No problem observed                                               | Apply a sideward force of 5N to a PCB-mounted sample.<br>note: 1N for 01005 size.                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |             |             |         |              |             |              |          |              |           |
| Bending Strength          |                                            | No significant damage with 1mm bending.                           | Glass epoxy PCB (90mm fulcrum spacing), 10 seconds duration time.                                                                                                                                                                                                                                                                                                                                                                                                                        |  |  |             |             |         |              |             |              |          |              |           |
| Vibration                 | Appearance                                 | No problem observed                                               | Vibration frequency: 10 to 55 (Hz)<br>Amplitude: 1.5mm<br>Sweeping condition: 10→55→10Hz/ 1 minute in X, Y and Z directions: 2 hours each, 6 hours in total.                                                                                                                                                                                                                                                                                                                             |  |  |             |             |         |              |             |              |          |              |           |
|                           | Capacitance                                | Within Tolerance                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |
|                           | Q                                          | C≥30pF : Q≥1000<br>C<30pF : Q≥400+20C                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |
| Resistance to Solder Heat | Appearance                                 | No problem observed                                               | Soak the sample in 260±5°C solder for 10±0.5 seconds, and measure after resting in normal temperature and humidity for 24±2 hours.<br>(Pre-heating conditions before soak) <table><tr><th>Order</th><th>Temperature</th><th>Time</th></tr><tr><td>1</td><td>80 to 100°C</td><td>2 minutes</td></tr><tr><td>2</td><td>150 to 200°C</td><td>2 minutes</td></tr></table> The charge and discharge current of the capacitor must not exceed 50mA for IR and dielectric strength measurement. |  |  | Order       | Temperature | Time    | 1            | 80 to 100°C | 2 minutes    | 2        | 150 to 200°C | 2 minutes |
|                           | Order                                      | Temperature                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  | Time        |             |         |              |             |              |          |              |           |
|                           | 1                                          | 80 to 100°C                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  | 2 minutes   |             |         |              |             |              |          |              |           |
|                           | 2                                          | 150 to 200°C                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  | 2 minutes   |             |         |              |             |              |          |              |           |
|                           | Capacitance Variation                      | Within±2.5% or±0.25pF, whichever is larger                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |
| Q                         | C≥30pF : Q≥1000<br>C<30pF : Q≥400+20C      |                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |
| Insulation Resistance     | Over 10000MΩ or 500MΩ・μF whichever is less |                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |
| Dielectric strength       | Resist without problem                     |                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |
| Solderability             |                                            | Solder coverage : 95% min.                                        | Soaking condition <table><tr><th>Solder Type</th><th>Temperature</th><th>Time</th></tr><tr><td>Sn-3Ag-0.5Cu</td><td>245±5°C</td><td>3±0.5 sec.</td></tr></table>                                                                                                                                                                                                                                                                                                                         |  |  | Solder Type | Temperature | Time    | Sn-3Ag-0.5Cu | 245±5°C     | 3±0.5 sec.   |          |              |           |
| Solder Type               | Temperature                                | Time                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |
| Sn-3Ag-0.5Cu              | 245±5°C                                    | 3±0.5 sec.                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |
| Temperature Cycle         | Appearance                                 | No problem observed                                               | (Cycle)<br>Lowest operation temperature (30 min.)→<br>Room temperature (3 min.)→<br>Highest operation temperature (30 min.)→<br>Room temperature (3 min.)<br>After 5 cycles, measure after 24±2 hours.<br>The charge and discharge current of the capacitor must not exceed 50mA for IR and dielectric strength measurement.                                                                                                                                                             |  |  |             |             |         |              |             |              |          |              |           |
|                           | Capacitance Variation                      | Within±2.5% or ±0.25pF, whichever is larger                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |
|                           | Q                                          | C≥30pF : Q≥1000<br>C<30pF : Q≥400+20C                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |
|                           | Insulation Resistance                      | Over 10000MΩ or 500MΩ・μF, whichever is less                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |
|                           | Dielectric Strength                        | Resist without problem                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |
| Load Humidity             | Appearance                                 | No problem observed                                               | Apply the rated voltage for 500+12/ -0 hours in the condition of 40±2°C and 90 to 95%RH, and measure after resting in normal temperature and humidity for 24±2 hours.<br>The charge and discharge current of the capacitor must not exceed 50mA for IR measurement.                                                                                                                                                                                                                      |  |  |             |             |         |              |             |              |          |              |           |
|                           | Capacitance Variation                      | Within±7.5% or ±0.75pF, whichever is larger                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |
|                           | Q                                          | C≥30pF : Q≥200<br>C<30pF : Q≥100+10C/ 3                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |
|                           | Insulation Resistance                      | Over 500MΩ or 25MΩ・μF, whichever is less                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |
| Load Life                 | Appearance                                 | No problem observed.                                              | Apply *twice the rated voltage in 125±3°C for 1000+12/ -0 hours, and measure after resting in normal temperature and humidity for 24±2 hours.<br>The charge and discharge current of the capacitor must not exceed 50mA for IR measurement.<br>*Products listed below shall apply each indicated voltage.                                                                                                                                                                                |  |  |             |             |         |              |             |              |          |              |           |
|                           | Capacitance Variation                      | Within ±3% or ±0.3pF, whichever is larger                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |
|                           | Q                                          | C≥30pF : Q≥350<br>10pF<C<30pF : Q≥275+5C/ 2<br>C<10pF : Q≥200+10C |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |
|                           | Insulation Resistance                      | Over 1000MΩ or 50MΩ・μF, whichever is less                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |  |             |             |         |              |             |              |          |              |           |

Voltage to be applied in the Load Life (Applied voltage is the multiple of the rated voltage)

| Applied Voltage | Rated Voltage | Products          |
|-----------------|---------------|-------------------|
| $\times 1.2$    | 25V           | KGU02ACA1ER20-120 |

Specifications and Test Conditions for High Dielectric Type (R5, R7, S7)  
KGM/KGT Series (Standard Spec.1)

| Test Items                |                       | Specifications                                                                                                                      | Test Conditions (Complies with JIS C5101/ IEC60384)                                                                                                                                                                                                                                                                                                                              |               |             |         |              |             |               |   |              |               |          |             |               |
|---------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|---------|--------------|-------------|---------------|---|--------------|---------------|----------|-------------|---------------|
| Capacitance               |                       | Within tolerance                                                                                                                    | Measure after heat treatment                                                                                                                                                                                                                                                                                                                                                     |               |             |         |              |             |               |   |              |               |          |             |               |
| Tanδ                      |                       | Refer to capacitance chart                                                                                                          | <table><tr><th>Capacitance</th><th>Frequency</th><th>Voltage</th></tr><tr><td>C ≤ 10μF</td><td>1kHz ± 10%</td><td>1.0 ± 0.2Vrms</td></tr><tr><td></td><td>*1kHz ± 10%</td><td>0.5 ± 0.1Vrms</td></tr><tr><td>C &gt; 10μF</td><td>120Hz ± 10%</td><td>0.5 ± 0.1Vrms</td></tr></table>                                                                                             | Capacitance   | Frequency   | Voltage | C ≤ 10μF     | 1kHz ± 10%  | 1.0 ± 0.2Vrms |   | *1kHz ± 10%  | 0.5 ± 0.1Vrms | C > 10μF | 120Hz ± 10% | 0.5 ± 0.1Vrms |
|                           | Capacitance           |                                                                                                                                     | Frequency                                                                                                                                                                                                                                                                                                                                                                        | Voltage       |             |         |              |             |               |   |              |               |          |             |               |
|                           | C ≤ 10μF              |                                                                                                                                     | 1kHz ± 10%                                                                                                                                                                                                                                                                                                                                                                       | 1.0 ± 0.2Vrms |             |         |              |             |               |   |              |               |          |             |               |
|                           | *1kHz ± 10%           | 0.5 ± 0.1Vrms                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
| C > 10μF                  | 120Hz ± 10%           | 0.5 ± 0.1Vrms                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
|                           |                       |                                                                                                                                     | *KGM02AR50J104□#<br>The charge and discharge current of the capacitor must not exceed 50mA.                                                                                                                                                                                                                                                                                      |               |             |         |              |             |               |   |              |               |          |             |               |
| Insulation Resistance     |                       | Over 10000MΩ or 500MΩ · μF, whichever is less                                                                                       | Measure after applying rated voltage for 1 minute in normal temperature and humidity.<br>The charge and discharge current of the capacitor must not exceed 50mA.                                                                                                                                                                                                                 |               |             |         |              |             |               |   |              |               |          |             |               |
| Dielectric Strength       |                       | Resist without problem                                                                                                              | Apply *2.5 times of the rated voltage for 1 to 5 seconds.<br>*KGM31AR52A225, KGM31AS72A225 : twice<br>The charge and discharge current of the capacitor must not exceed 50mA.                                                                                                                                                                                                    |               |             |         |              |             |               |   |              |               |          |             |               |
| Appearance                |                       | No problem observed                                                                                                                 | Microscope                                                                                                                                                                                                                                                                                                                                                                       |               |             |         |              |             |               |   |              |               |          |             |               |
| Termination Strength      |                       | No problem observed                                                                                                                 | Apply a sideward force of 5N to a PCB-mounted sample.<br>note : 2N for 0201 size, and 1N for 01005 size.<br>Exclude KGT series with thickness of less than 0.66mm.                                                                                                                                                                                                               |               |             |         |              |             |               |   |              |               |          |             |               |
| Bending Strength          |                       | No significant damage with 1mm bending                                                                                              | Glass epoxy PCB (90mm fulcrum spacing), 10 seconds duration time.<br>Exclude KGT series with thickness of less than 0.66mm.                                                                                                                                                                                                                                                      |               |             |         |              |             |               |   |              |               |          |             |               |
| Vibration                 | Appearance            | No problem observed                                                                                                                 | Take the initial value after heat treatment.<br>Vibration frequency: 10 to 55 (Hz)<br>Amplitude: 1.5mm<br>Sweeping condition: 10→55→10Hz/ 1 minute in X, Y and Z directions: 2 hours each, 6 hours in total, then measure the sample after heat treatment.                                                                                                                       |               |             |         |              |             |               |   |              |               |          |             |               |
|                           | Capacitance           | Within tolerance                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
|                           | Tanδ                  | Within tolerance                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
| Resistance to Solder Heat | Appearance            | No problem observed                                                                                                                 | Take the initial value after heat treatment.<br>Soak the sample in 260±5°C solder for 10±0.5 seconds, and measure after heat treatment.<br>(Pre-heating conditions before soak)                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
|                           | Capacitance Variation | Within±7.5%                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
|                           | Tanδ                  | Within tolerance                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
|                           | Insulation Resistance | Over 10000MΩ or 500MΩ · μF, whichever is less                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
|                           | Dielectric Strength   | Resist without problem                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
|                           |                       |                                                                                                                                     | <table><tr><th>Order</th><th>Temperature</th><th>Time</th></tr><tr><td>1</td><td>80 to 100°C</td><td>2 minutes</td></tr><tr><td>2</td><td>150 to 200°C</td><td>2 minutes</td></tr></table>                                                                                                                                                                                       | Order         | Temperature | Time    | 1            | 80 to 100°C | 2 minutes     | 2 | 150 to 200°C | 2 minutes     |          |             |               |
| Order                     | Temperature           | Time                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
| 1                         | 80 to 100°C           | 2 minutes                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
| 2                         | 150 to 200°C          | 2 minutes                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
| Solderability             |                       | Solder coverage : 95% min.                                                                                                          | Soaking condition <table><tr><th>Solder Type</th><th>Temperature</th><th>Time</th></tr><tr><td>Sn-3Ag-0.5Cu</td><td>245±5°C</td><td>3±0.5 sec.</td></tr></table>                                                                                                                                                                                                                 | Solder Type   | Temperature | Time    | Sn-3Ag-0.5Cu | 245±5°C     | 3±0.5 sec.    |   |              |               |          |             |               |
| Solder Type               | Temperature           | Time                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
| Sn-3Ag-0.5Cu              | 245±5°C               | 3±0.5 sec.                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
| Temperature Cycle         | Appearance            | No problem observed                                                                                                                 | Take the initial value after heat treatment.<br>(Cycle)<br>Lowest operation temperature (30 min.)→<br>Room temperature (3 min.)→<br>Highest operation temperature (30 min.)→<br>Room temperature (3 min.)<br>After 5 cycles, measure after heat treatment.<br>The charge and discharge current of the capacitor must not exceed 50mA for IR and dielectric strength measurement. |               |             |         |              |             |               |   |              |               |          |             |               |
|                           | Capacitance Variation | Within±7.5%                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
|                           | Tanδ                  | Within tolerance                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
|                           | Insulation Resistance | Over 10000MΩ or 500MΩ · μF, whichever is less                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
|                           | Dielectric Strength   | Resist without problem                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
| Load Humidity             | Appearance            | No problem observed                                                                                                                 | Take the initial value after heat treatment.<br>Apply rated voltage for 500+12/- 0 hours in 40°C±2°C and 90 to 95%RH, and measure after heat treatment.<br>The charge and discharge current of the capacitor must not exceed 50mA for IR measurement.                                                                                                                            |               |             |         |              |             |               |   |              |               |          |             |               |
|                           | Capacitance Variation | Within±12.5%                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
|                           | Tanδ                  | 200% max. of initial value                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
|                           | Insulation Resistance | Over 500MΩ or 25MΩ · μF, whichever is less                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
| Load Life                 | Appearance            | No problem observed                                                                                                                 | Take the initial value after heat treatment.<br>Apply *1.5 times the rated voltage at the highest operation temperature for 1000+12/- 0 hours, and measure after heat treatment.<br>The charge and discharge current of the capacitor must not exceed 50mA for IR measurement.<br>*Products listed below shall apply each indicated voltage.                                     |               |             |         |              |             |               |   |              |               |          |             |               |
|                           | Capacitance Variation | Within±12.5%                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
|                           | Tanδ                  | 200% max. of initial value                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
|                           | Insulation Resistance | Over 1000MΩ or 50MΩ · μF, whichever is less                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |
| Heat treatment            |                       | Expose sample in the temperature of 150+0/- 10°C for 1 hour and leave the sample in normal temperature and humidity for 24±2 hours. |                                                                                                                                                                                                                                                                                                                                                                                  |               |             |         |              |             |               |   |              |               |          |             |               |

Voltage to be applied in the Load Life (Applied voltage is the multiple of the rated voltage)

| Applied Voltage | Rated Voltage | Products                         |
|-----------------|---------------|----------------------------------|
| × 1.0           | 100V          | KGM31AR52A225, KGM31AS72A225     |
|                 | 10V           | KGM02AR51A104                    |
|                 | 6.3V          | KGM21AR50J107                    |
|                 | 4V            | KGM21AR50G107                    |
| × 1.3           | 6.3V          | KGM02AR50J153-104, KGT03YR50J104 |

Please contact us for the optional specifications of the capacitance chart.

### Specifications and Test Conditions for High Dielectric Type (R5, S6, T6, R7, S7, T7, K7) KGM/KGT Series (Standard Spec.2)

| Test Items                |                        | Specifications                         | Test Conditions (Complies with JIS C5101/ IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |             |         |              |             |             |   |              |             |          |            |             |
|---------------------------|------------------------|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|---------|--------------|-------------|-------------|---|--------------|-------------|----------|------------|-------------|
| Capacitance               |                        | Within tolerance                       | Measure after heat treatment                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |             |         |              |             |             |   |              |             |          |            |             |
| Tanδ                      |                        | Refer to capacitance chart             | <table><tr><th>Capacitance</th><th>Frequency</th><th>Voltage</th></tr><tr><td>C ≤ 10μF</td><td>1kHz± 10%</td><td>1.0±0.2Vrms</td></tr><tr><td></td><td>*1kHz± 10%</td><td>0.5±0.1Vrms</td></tr><tr><td>C &gt; 10μF</td><td>120Hz± 10%</td><td>0.5±0.1Vrms</td></tr></table>                                                                                                                                                                                                                        | Capacitance | Frequency   | Voltage | C ≤ 10μF     | 1kHz± 10%   | 1.0±0.2Vrms |   | *1kHz± 10%   | 0.5±0.1Vrms | C > 10μF | 120Hz± 10% | 0.5±0.1Vrms |
|                           | Capacitance            |                                        | Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Voltage     |             |         |              |             |             |   |              |             |          |            |             |
|                           | C ≤ 10μF               |                                        | 1kHz± 10%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1.0±0.2Vrms |             |         |              |             |             |   |              |             |          |            |             |
|                           |                        |                                        | *1kHz± 10%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.5±0.1Vrms |             |         |              |             |             |   |              |             |          |            |             |
| C > 10μF                  | 120Hz± 10%             | 0.5±0.1Vrms                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             |             |         |              |             |             |   |              |             |          |            |             |
|                           |                        |                                        | *KGM02AR50J474, KGM03CR50J225, KGM03BR50J225, KGM03DR50J475, KGM03CR50G475,KGM03DR50GTT106, KGM05CR50J106, KGM05CS60J106, KGM03DS60E475, KGM03BT60E105, KGM05AR70J474, KGT03YR50J105, KGT05ZR50J106, KGT03YT60G105, KGT05YR50J475<br>The charge and discharge current of the capacitor must not exceed 50mA.                                                                                                                                                                                       |             |             |         |              |             |             |   |              |             |          |            |             |
| Insulation Resistance     |                        | Over 50MΩ · μF                         | Measure after applying rated voltage for 1 minute in normal temperature and humidity.<br>The charge and discharge current of the capacitor must not exceed 50mA.                                                                                                                                                                                                                                                                                                                                   |             |             |         |              |             |             |   |              |             |          |            |             |
| Dielectric Strength       |                        | Resist without problem                 | Apply *2.5 times of the rated voltage for 1 to 5 seconds.<br>*KGM21AS72A105, KGM31HS72A475<br>KGM21AK72A105, KGM31HK72A475 : twice<br>The charge and discharge current of the capacitor must not exceed 50mA.                                                                                                                                                                                                                                                                                      |             |             |         |              |             |             |   |              |             |          |            |             |
| Appearance                |                        | No problem observed                    | Microscope                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |             |         |              |             |             |   |              |             |          |            |             |
| Termination Strength      |                        | No problem observed                    | Apply a sideward force of 5N to a PCB-mounted sample.<br>note : 2N for 0201 size, and 1N for 01005 size.<br>Exclude KGT series with thickness of less than 0.66mm.                                                                                                                                                                                                                                                                                                                                 |             |             |         |              |             |             |   |              |             |          |            |             |
| Bending Strength          |                        | No significant damage with 1mm bending | Glass epoxy PCB (90mm fulcrum spacing), 10 seconds duration time.<br>Exclude KGT series with thickness of less than 0.66mm.                                                                                                                                                                                                                                                                                                                                                                        |             |             |         |              |             |             |   |              |             |          |            |             |
| Vibration                 | Appearance             | No problem observed                    | Take the initial value after heat treatment.<br>Vibration frequency: 10 to 55 (Hz)<br>Amplitude: 1.5mm<br>Sweeping condition: 10→55→10Hz/ 1 minute in X, Y and Z directions: 2 hours each, 6 hours in total, then measure the sample after heat treatment.                                                                                                                                                                                                                                         |             |             |         |              |             |             |   |              |             |          |            |             |
|                           | Capacitance            | Within tolerance                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             |             |         |              |             |             |   |              |             |          |            |             |
|                           | Tanδ                   | Within tolerance                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             |             |         |              |             |             |   |              |             |          |            |             |
| Resistance to Solder Heat | Appearance             | No problem observed                    | Take the initial value after heat treatment.<br>Soak the sample in 260±5°C solder for 10±0.5 seconds and measure after heat treatment.<br>(Pre-heating conditions before soak)<br><table><tr><th>Order</th><th>Temperature</th><th>Time</th></tr><tr><td>1</td><td>80 to 100°C</td><td>2 minutes</td></tr><tr><td>2</td><td>150 to 200°C</td><td>2 minutes</td></tr></table><br>The charge and discharge current of the capacitor must not exceed 50mA for IR and dielectric strength measurement. | Order       | Temperature | Time    | 1            | 80 to 100°C | 2 minutes   | 2 | 150 to 200°C | 2 minutes   |          |            |             |
|                           | Order                  | Temperature                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Time        |             |         |              |             |             |   |              |             |          |            |             |
|                           | 1                      | 80 to 100°C                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2 minutes   |             |         |              |             |             |   |              |             |          |            |             |
|                           | 2                      | 150 to 200°C                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2 minutes   |             |         |              |             |             |   |              |             |          |            |             |
|                           | Capacitance Variation  | Within±7.5%                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             |             |         |              |             |             |   |              |             |          |            |             |
| Tanδ                      | Within tolerance       |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             |             |         |              |             |             |   |              |             |          |            |             |
| Insulation Resistance     | Over 50MΩ · μF         |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             |             |         |              |             |             |   |              |             |          |            |             |
| Dielectric Strength       | Resist without problem |                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             |             |         |              |             |             |   |              |             |          |            |             |
| Solderability             |                        | Solder coverage : 95% min.             | Soaking condition<br><table><tr><th>Solder Type</th><th>Temperature</th><th>Time</th></tr><tr><td>Sn-3Ag-0.5Cu</td><td>245±5°C</td><td>3±0.5 sec.</td></tr></table>                                                                                                                                                                                                                                                                                                                                | Solder Type | Temperature | Time    | Sn-3Ag-0.5Cu | 245±5°C     | 3±0.5 sec.  |   |              |             |          |            |             |
| Solder Type               | Temperature            | Time                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             |             |         |              |             |             |   |              |             |          |            |             |
| Sn-3Ag-0.5Cu              | 245±5°C                | 3±0.5 sec.                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             |             |         |              |             |             |   |              |             |          |            |             |

### Specifications and Test Conditions for High Dielectric Type (R5, S6, T6, R7, S7, T7, K7) KGM/KGT Series (Standard Spec.2)

| Test Items        |                       | Specifications             | Test Conditions (Complies with JIS C5101/ IEC60384)                                                                                                                                                                                                                                                                                                                              |
|-------------------|-----------------------|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature Cycle | Appearance            | No problem observed        | Take the initial value after heat treatment.<br>(Cycle)<br>Lowest operation temperature (30 min.)→<br>Room temperature (3 min.)→<br>Highest operation temperature (30 min.)→<br>Room temperature (3 min.)<br>After 5 cycles, measure after heat treatment.<br>The charge and discharge current of the capacitor must not exceed 50mA for IR and dielectric strength measurement. |
|                   | Capacitance Variation | Within±7.5%                |                                                                                                                                                                                                                                                                                                                                                                                  |
|                   | Tanδ                  | Within tolerance           |                                                                                                                                                                                                                                                                                                                                                                                  |
|                   | Insulation Resistance | Over 50MΩ · μF             |                                                                                                                                                                                                                                                                                                                                                                                  |
|                   | Dielectric Strength   | Resist without problem     |                                                                                                                                                                                                                                                                                                                                                                                  |
| Load Humidity     | Appearance            | No problem observed        | Take the initial value after heat treatment.<br>Apply rated voltage for 500+12/-0 hours in 40±2°C and 90 to 95%RH, and measure after heat treatment.<br>The charge and discharge current of the capacitor must not exceed 50mA for IR measurement.                                                                                                                               |
|                   | Capacitance Variation | Within±12.5%               |                                                                                                                                                                                                                                                                                                                                                                                  |
|                   | Tanδ                  | 200% max. of initial value |                                                                                                                                                                                                                                                                                                                                                                                  |
|                   | Insulation Resistance | Over 10MΩ · μF             |                                                                                                                                                                                                                                                                                                                                                                                  |
| Load Life         | Appearance            | No problem observed        | Take the initial value after heat treatment.<br>Apply *One time the rated voltage at the highest operation temperature for 1000+12/-0 hours, and measure after heat treatment.<br>The charge and discharge current of the capacitor must not exceed 50mA for IR measurement.<br>*Products listed below shall apply each indicated voltage.                                       |
|                   | Capacitance Variation | Within±12.5%               |                                                                                                                                                                                                                                                                                                                                                                                  |
|                   | Tanδ                  | 200% max. of initial value |                                                                                                                                                                                                                                                                                                                                                                                  |
|                   | Insulation Resistance | Over 10MΩ · μF             |                                                                                                                                                                                                                                                                                                                                                                                  |

|                |                                                                                                                                    |
|----------------|------------------------------------------------------------------------------------------------------------------------------------|
| Heat treatment | Expose sample in the temperature of 150+0/-10°C for 1 hour and leave the sample in normal temperature and humidity for 24±2 hours. |
|----------------|------------------------------------------------------------------------------------------------------------------------------------|

Voltage to be applied in the Load Life (Applied voltage is the multiple of the rated voltage)

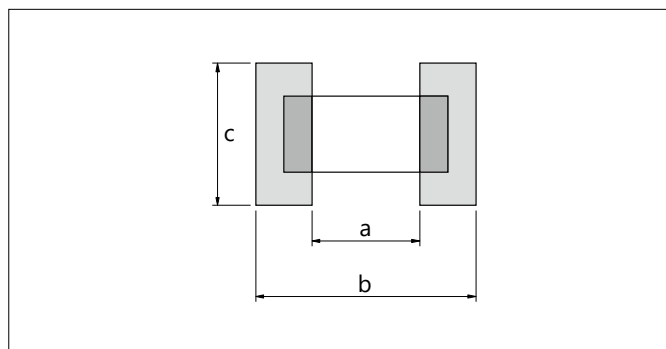
| Applied Voltage | Rated Voltage | Products                                                                                     |
|-----------------|---------------|----------------------------------------------------------------------------------------------|
| ×1.2            | 6.3V          | KGM03BR50J105                                                                                |
| ×1.3            | 10V           | KGM03AR51A223-224                                                                            |
|                 | 6.3V          | KGM03AR50J474                                                                                |
| ×1.5            | 50V           | KGM31AR71H475                                                                                |
|                 | 25V           | KGM15AR71E105, KGM21AR71E475, KGM31AR71E106                                                  |
|                 | 16V           | KGM05AR51C105, KGM15CR51C106                                                                 |
|                 | 10V           | KGM03CR51A105, KGM05AR51A474-225, KGM05CR51A475, KGM21AR51A226, KGM15CS61A106, KGM15CT71A475 |
|                 | 6.3V          | KGM05AR50J225, KGM05CS60J475, KGM21AS60J226, KGM05AR70J474, KGM05AR70J105, KGM05AS70J105     |
|                 |               | KGM15CT70J106, KGM21AT70J226                                                                 |
| ×2.0            | 25V           | KGM31AR71E475                                                                                |



## Test Conditions and Standards

Substrate for Adhesion Strength Test, Vibration Test, Soldering Heat Resistance Test, Temperature Cycle Test, Load Humidity Test, High-Temperature with Loading Test.

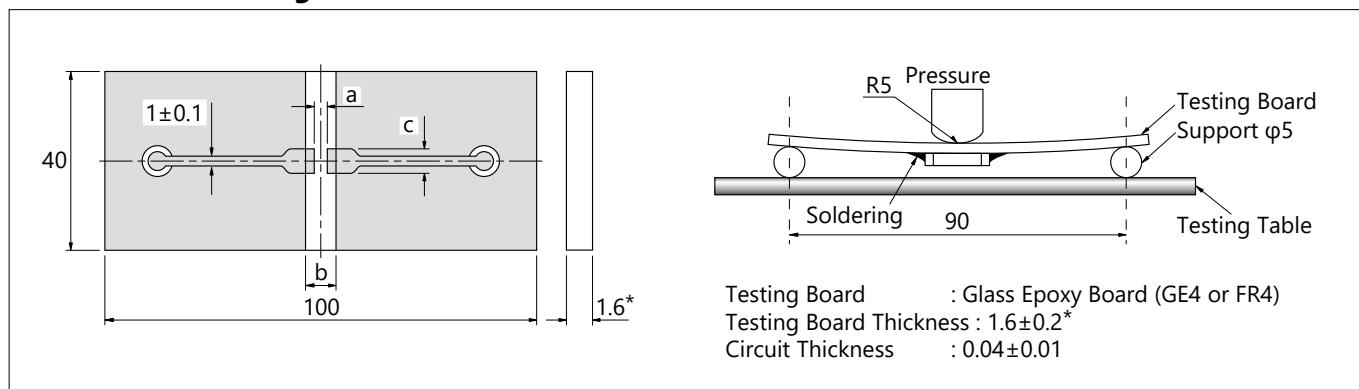
(Unit: mm)



| Size<br>(EIA Code) | a    | b    | c    |
|--------------------|------|------|------|
| 02 (01005)         | 0.15 | 0.5  | 0.2  |
| 03 (0201)          | 0.26 | 0.92 | 0.32 |
| 05 (0402)          | 0.4  | 1.4  | 0.5  |
| 15 (0603)          | 1.0  | 3.0  | 1.2  |
| 21 (0805)          | 1.2  | 4.0  | 1.65 |
| 31 (1206)          | 2.2  | 5.0  | 2.0  |
| 32 (1210)          | 2.2  | 5.0  | 2.9  |

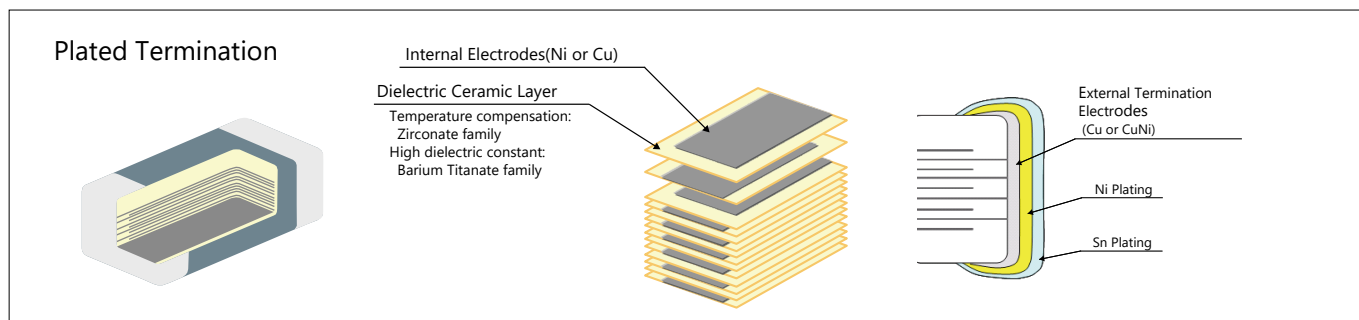
## Substrate for Bending Test

(Unit: mm)



\* 02, 03, 05 size  $0.8 \pm 0.1$ mm

## Structure



### ■ Certification status

<ISO>

Acquired ISO 9001 quality management system certification.

<IATF>

Acquired IATF 16949 quality management system certification.

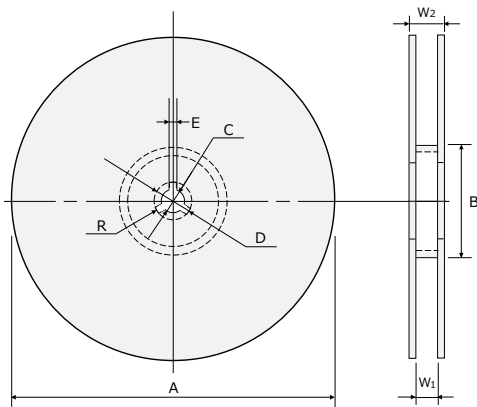
### ■ Production plant

Kagoshima Kokubu plant

# Multilayer Ceramic Chip Capacitors

## Packaging Options Tape and Reel

### Reel



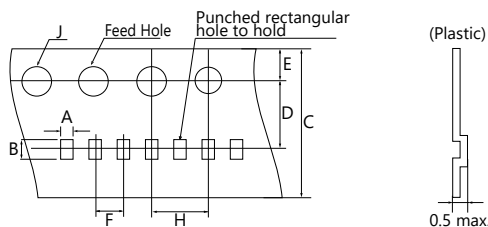
(Unit: mm)

| Code Reel                       | A                                 | B              | C              | D      |
|---------------------------------|-----------------------------------|----------------|----------------|--------|
| 7-inch Reel (CODE: T, H, Q, U)  | 180 <sup>+0</sup> <sub>-2.0</sub> | φ60 min.       | 13±0.5         | 21±0.8 |
| 7-inch Reel (CODE: P)           | 178±2.0                           |                |                |        |
| 13-inch Reel (CODE: L, M, N, W) | 330±2.0                           |                |                |        |
| Code Reel                       | E                                 | W <sub>1</sub> | W <sub>2</sub> | R      |
| 7-inch Reel (CODE: T, H, Q, U)  | 2.0±0.5                           | 10.5±1.5       | 16.5 max.      | 1.0    |
| 7-inch Reel (CODE: P)           |                                   | 4.35±0.3       | 6.95±1.0       |        |
| 13-inch Reel (CODE: L, M, N, W) |                                   | 9.5±1.0        | 16.5 max.      |        |

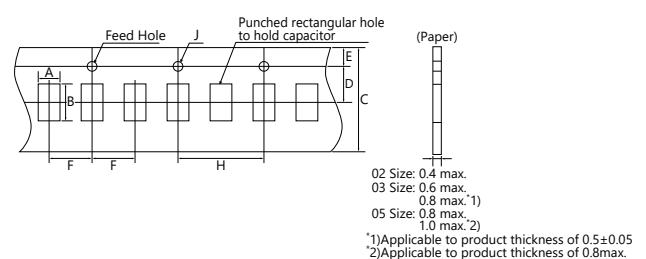
### Carrier Tape

(Unit: mm)

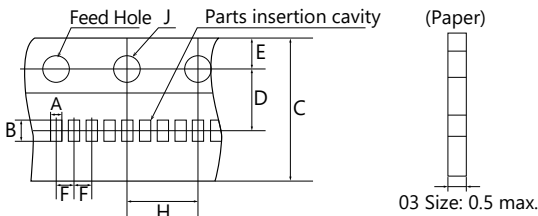
F=1mm (02 Size)



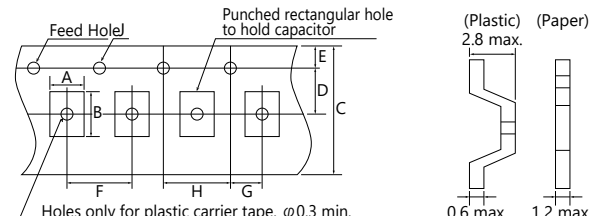
F=2mm (02, 03, 05 Size)



F=1mm (03 Size)



F=4mm (15, 21, 31, 32 Size)



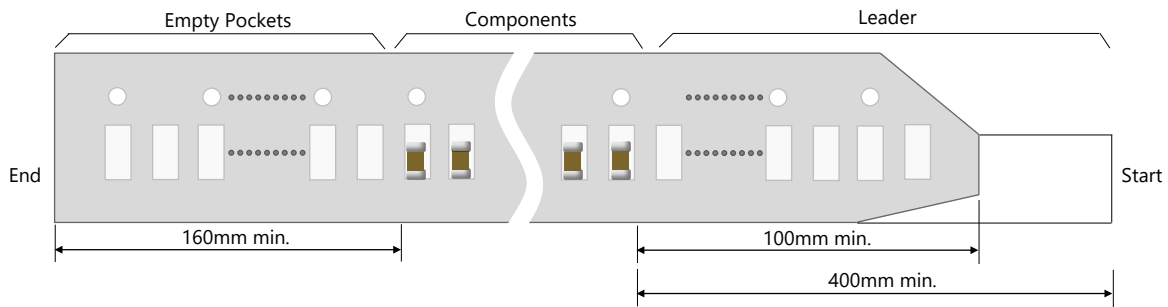
| Size (EIA Code) | A         | B         | C            | D        | E        | F        | G        | H        | J          | Carrier Tape |          |
|-----------------|-----------|-----------|--------------|----------|----------|----------|----------|----------|------------|--------------|----------|
|                 |           |           |              |          |          |          |          |          |            | Width        | Material |
| 02 (01005)*     | 0.24±0.02 | 0.44±0.02 | 4.0±0.08     | 1.8±0.02 | 0.9±0.05 | 1.0±0.02 | —        | 2.0±0.04 | 0.8±0.04   | 4            | Plastic  |
|                 | 0.25±0.03 | 0.45±0.03 | 8.0±0.3      | 3.5±0.05 | 1.75±0.1 | 2.0±0.05 |          | 4.0±0.1  | 1.5±0.1/-0 | 8            | Paper    |
| 03 (0201)*      | 0.37±0.03 | 0.67±0.03 | 8.0±0.3/-0.1 | 3.5±0.05 | 1.75±0.1 | 1.0±0.05 | —        | 4.0±0.05 | 1.5±0.1/-0 | 8            | Paper    |
|                 | 0.39±0.03 | 0.69±0.03 | 8.0±0.3      | 3.5±0.05 | 1.75±0.1 | 2.0±0.05 |          | 4.0±0.1  | 1.5±0.1/-0 |              |          |
|                 | 0.42±0.03 | 0.72±0.03 | 8.0±0.3      | 3.5±0.05 | 1.75±0.1 | 2.0±0.05 |          | 4.0±0.1  | 1.5±0.1/-0 |              |          |
|                 | 0.44±0.05 | 0.74±0.05 | 8.0±0.3      | 3.5±0.05 | 1.75±0.1 | 2.0±0.05 |          | 4.0±0.1  | 1.5±0.1/-0 |              |          |
| 05 (0402)*      | 0.65±0.1  | 1.15±0.1  | 8.0±0.3      | 3.5±0.05 | 1.75±0.1 | 2.0±0.05 | —        | 4.0±0.1  | 1.5±0.1/-0 | 8            | Paper    |
|                 | 0.75±0.1  |           |              |          |          |          |          |          |            |              |          |
|                 | 0.8±0.1   |           |              |          |          |          |          |          |            |              |          |
| 15 (0603)*      | 1.0±0.2   | 1.8±0.2   | 8.0±0.3      | 3.5±0.05 | 1.75±0.1 | 4.0±0.1  | 2.0±0.05 | 4.0±0.1  | 1.5±0.1/-0 | 8            | Paper    |
|                 | 1.1±0.2   | 1.9±0.2   | 8.0±0.3      | 3.5±0.05 | 1.75±0.1 | 4.0±0.1  | 2.0±0.05 | 4.0±0.1  | 1.5±0.1/-0 |              |          |
| 21 (0805)       | 1.5±0.2   | 2.3±0.2   | 8.0±0.3      | 3.5±0.05 | 1.75±0.1 | 4.0±0.1  | 2.0±0.05 | 4.0±0.1  | 1.5±0.1/-0 | 8            | Paper    |
|                 |           |           |              |          |          |          |          |          |            | 8            | Plastic  |
| 31 (1206)       | 2.0±0.2   | 3.6±0.2   | 8.0±0.3      | 3.5±0.05 | 1.75±0.1 | 4.0±0.1  | 2.0±0.05 | 4.0±0.1  | 1.5±0.1/-0 | 8            | Paper    |
|                 |           |           |              |          |          |          |          |          |            | 8            | Plastic  |
| 32 (1210)       | 2.9±0.2   | 3.6±0.2   | 8.0±0.3      | 3.5±0.05 | 1.75±0.1 | 4.0±0.1  | 2.0±0.05 | 4.0±0.1  | 1.5±0.1/-0 | 8            | Paper    |
|                 |           |           |              |          |          |          |          |          |            | 8            | Plastic  |

\* Option

# Multilayer Ceramic Chip Capacitors

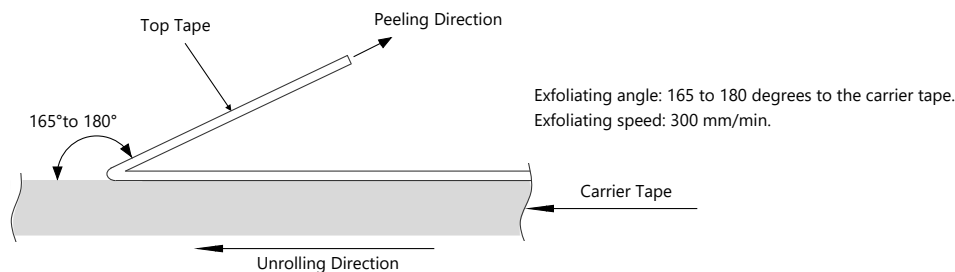
## Packaging Options

### Detail of leader and trailer



### Adhesive tape

- 1) The exfoliative strength when peeling off the top tape from the carrier tape by the method of the following figure shall be \*0.1 to 0.7N. \*02 Size: 0.1 to 0.5N
- 2) When the top tape is peeled off, the adhesive stays on the top tape.
- 3) Chip capacitors will be in a state free without being stuck on the thermal adhesive tape.



### Carrier tape

- 1) Chip will not fall off from carrier tape or carrier tape will not be damaged by bending than within a radius of 25mm.
- 2) The chip are inserted continuously without any empty pocket.
- 3) Chip will not be mis-mounted because of too big clearance between components and cavity. Also the waste of carrier tape will not fill a nozzle hole of mounting machine.

# Multilayer Ceramic Chip Capacitors

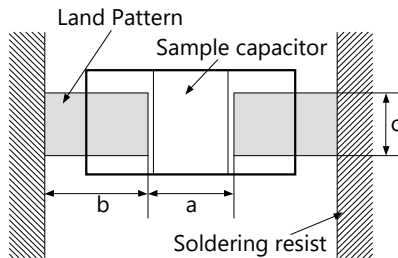
## Surface Mounting Information

### Dimensions for recommended typical land

Since the amount of solder (size of fillet) to be used has direct influence on the capacitor after mounting, the sufficient consideration is necessary.

When the amounts of solder is too much, the stress that a capacitor receives becomes larger. It may become the cause of a crack in the capacitor. When the land design of printed wiring board is considered, it is necessary to set up the form and size of land pattern so that the amount of solder is suitable.

(Two Terminal Capacitors)



### Two Terminal Capacitors

(Unit: mm)

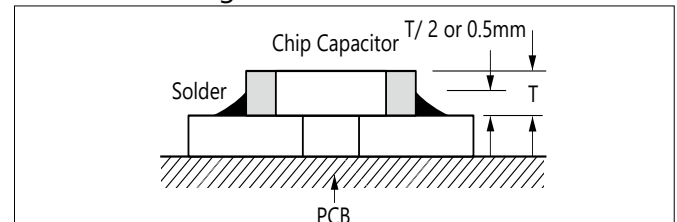
| Size<br>(EIA Code) | Dimension |          | Recommended land dimensions |              |              |
|--------------------|-----------|----------|-----------------------------|--------------|--------------|
|                    | L         | W        | a                           | b            | c            |
| 02 (01005)         | 0.4±0.02  | 0.2±0.02 | 0.13 to 0.2                 | 0.12 to 0.18 | 0.2 to 0.23  |
| 03 (0201)          | 0.6±0.03  | 0.3±0.03 | 0.2 to 0.25                 | 0.25 to 0.35 | 0.3 to 0.4   |
|                    | 0.6±0.05  | 0.3±0.05 |                             |              |              |
|                    | 0.6±0.09  | 0.3±0.09 |                             |              |              |
| 05 (0402)          | 1.0±0.05  | 0.5±0.05 | 0.3 to 0.5                  | 0.35 to 0.45 | 0.4 to 0.6   |
|                    | 1.0±0.15  | 0.5±0.15 |                             |              |              |
|                    | 1.0±0.2   | 0.5±0.2  |                             |              |              |
| 15 (0603)          | 1.6±0.1   | 0.8±0.1  | 0.7 to 1.0                  | 0.8 to 1.0   | 0.6 to 0.9   |
|                    | 1.6±0.2   | 0.8±0.2  | 0.8 to 1.0                  | 0.8 to 1.0   | 0.8 to 1.1   |
| 21 (0805)          | 2.0±0.2   | 1.25±0.2 | 1.0 to 1.3                  | 1.0 to 1.2   | 1.25 to 1.55 |
|                    | 3.2±0.2   | 1.6±0.15 | 2.1 to 2.5                  | 1.1 to 1.3   | 1.4 to 1.9   |
| 31 (1206)          | 3.2±0.2   | 1.6±0.2  | 2.1 to 2.5                  | 1.1 to 1.3   | 1.6 to 2.0   |
|                    | 3.2±0.3   | 1.6±0.3  |                             |              |              |
|                    | 3.2±0.3   | 1.6±0.3  |                             |              |              |
| 32 (1210)          | 3.2±0.3   | 2.5±0.2  | 2.1 to 2.5                  | 1.1 to 1.3   | 1.9 to 2.8   |

\* Recommended land dimensions may differ depending on dimensional tolerance.

### Design of printed circuit and Soldering

The recommended fillet height shall be 1/2 of the thickness of capacitors or 0.5mm. When mounting two or more capacitors in the common land, it is necessary to separate the land with the solder resist strike so that it may become the exclusive land of each capacitor.

### Ideal Solder Height



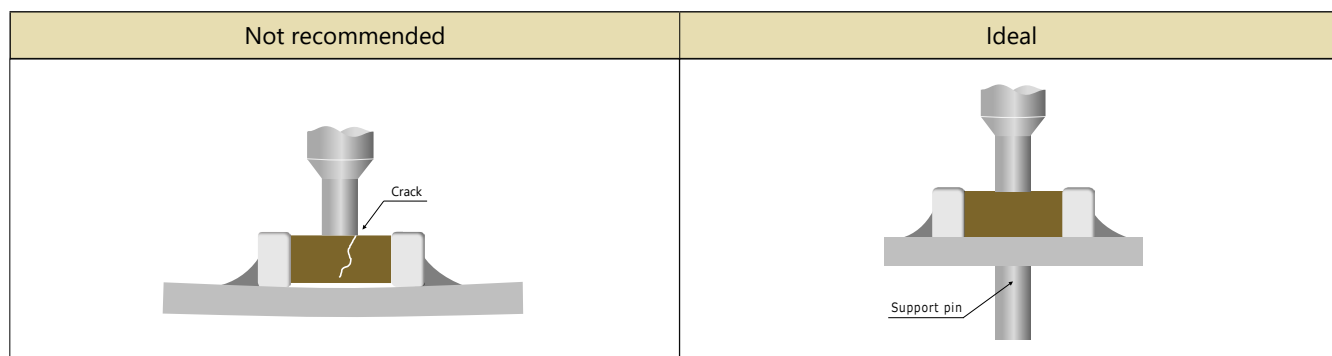
| Item                          | Prohibited | Recommended example : Separation by solder resist |
|-------------------------------|------------|---------------------------------------------------|
| Multiple parts mount          |            |                                                   |
| Mount with leaded parts       |            |                                                   |
| Wire soldering after mounting |            |                                                   |
| Side by side layout           |            |                                                   |

# Multilayer Ceramic Chip Capacitors

## Surface Mounting Information

### Actual Mounting

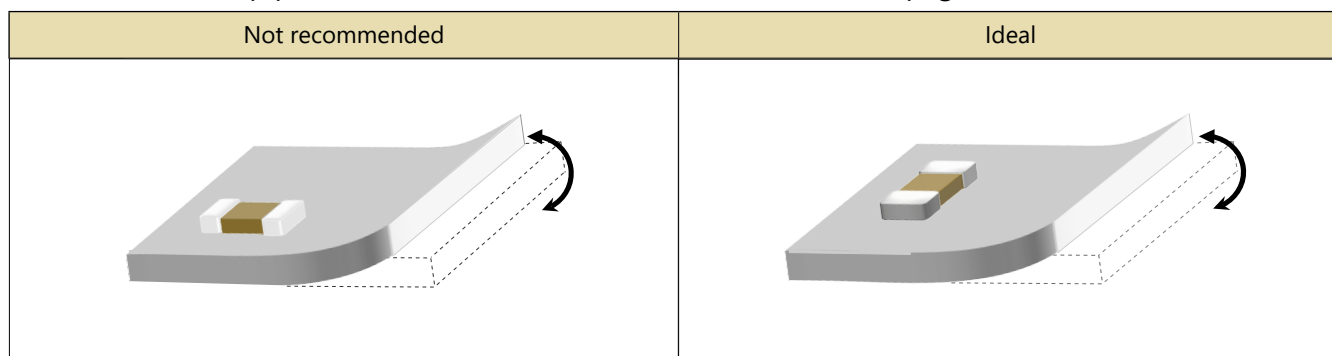
- 1) If the position of the vacuum nozzle is too low, a large force may be applied to the chip capacitor during mounting, resulting in cracking.
- 2) During mounting, set the nozzle pressure to a static load of 1 to 3 N.
- 3) To minimize the shock of the vacuum nozzle, provide a support pin on the back of the PCB to minimize PCB flexure.
- 4) Bottom position of pick up nozzle should be adjusted to the top surface of a substrate which camber is corrected.



### Mounting Design

The chip could crack if the PCB warps during processing after the chip has been soldered.

Recommended chip position on PCB to minimize stress from PCB warpage

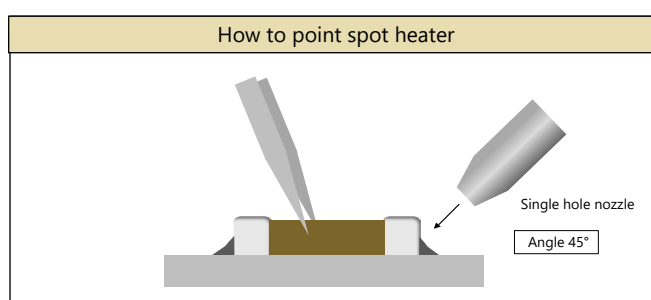


### Soldering Method

- 1) Ceramic is easily damaged by rapid heating or cooling. If some heat shock is unavoidable, preheat enough to limit the temperature difference (Delta T) to within 150 degree Celsius.
- 2) The product size 1.6×0.8mm to 3.2×1.6mm can be used in reflow and wave soldering, and the product size of bigger than 3.2×1.6mm, or smaller than 1.6×0.8mm can be used in reflow.  
Circuit shortage and smoking can be created by using capacitors which are used neglecting the above caution.
- 3) Please see our recommended soldering conditions.
- 4) In case of using Sn-Zn Solder, please contact us in advance.
- 5) The following condition is recommended for spot heater application.

• Recommended spot heater condition

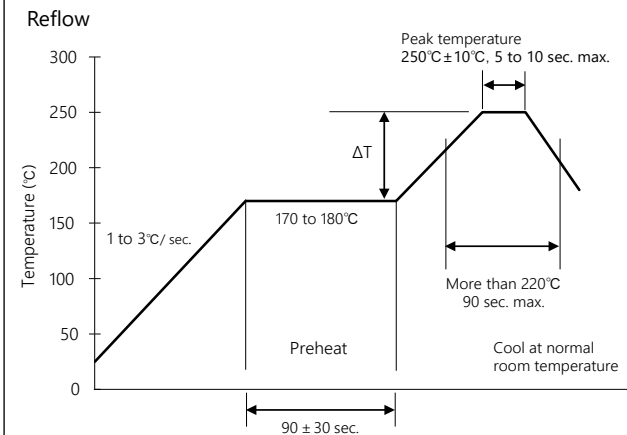
| Item             | Condition                                                         |
|------------------|-------------------------------------------------------------------|
| Distance         | 5mm min.                                                          |
| Angle            | 45°                                                               |
| Projection Temp. | 400°C max.                                                        |
| Flow rate        | Set at the minimum                                                |
| Nozzle diameter  | 2φ to 4φ (Single hole type)                                       |
| Application time | 10 sec. max. (1206 and smaller)<br>30 sec. max. (1210 and larger) |



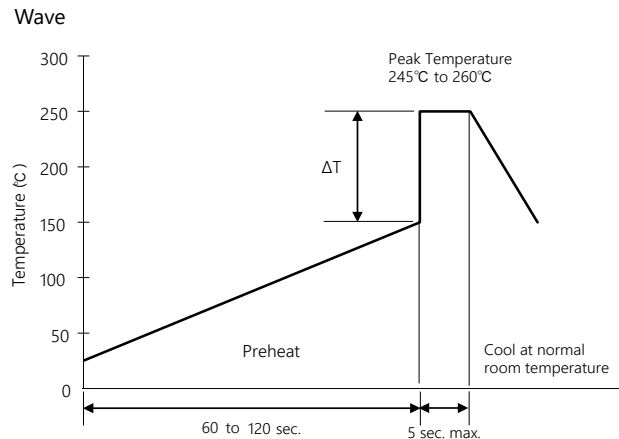
# Multilayer Ceramic Chip Capacitors

## Surface Mounting Information

### ■ Recommended Temperature Profile (Sn-3Ag-0.5Cu)



- ① Minimize soldering time.
- ② Ensure that allowable temperature difference does not exceed 150°C.
- ③ Ensure that allowable temperature difference does not exceed 130°C for 3.2×2.5mm size or larger.
- ④ MLCC can withstand the above reflow conditions up to 3 times.
- ⑤ N<sub>2</sub> atmosphere is recommended for reflow of products of 0.4mm×0.2mm size or smaller.



- ① Ensure that the chip capacitor is preheated adequately.
- ② Ensure that the temperature difference (ΔT) does not exceed 150°C.
- ③ Cool naturally after soldering.
- ④ Wave soldering is not applicable for chips with size of 3.2×2.5mm or larger of 1.0×0.5 mm or smaller and capacitor arrays.

### Resin Mold

- 1) If a large amount of resin is used for molding the chip, cracks may occur due to contraction stress during curing. To avoid such cracks, use a low shrinkage resin.
- 2) The insulation resistance of the chip will degrade due to moisture absorption. Use a low moisture absorption resin.
- 3) Check carefully that the resin does not generate a decomposition gas or reaction gas during the curing process or during normal storage. Such gases may crack the chip capacitor or damage the device itself.



### Circuit Design

1. Once application and assembly environments have been checked, the capacitor may be used in conformance with the rating and performance which are provided in both the catalog and the specifications. Use exceeding that which is specified may result in inferior performance or cause a short, open, smoking, or flaming to occur, etc.
2. Please consult the manufacturer in advance when the capacitor is used in devices such as: devices which deal with human life, i.e. medical devices; devices which are highly public orientated; and devices which demand a high standard of liability.  
Accident or malfunction of devices such as medical devices, space equipment and devices having to do with atomic power could generate grave consequence with respect to human lives or, possibly, a portion of the public. Capacitors used in these devices may require high reliability design different from that of general purpose capacitors.
3. Please use the capacitors in conformance with the operating temperature provided in both the catalog and the specifications.  
Be especially cautious not to exceed the maximum temperature. In the situation the maximum temperature set forth in both the catalog and specifications is exceeded, the capacitor's insulation resistance may deteriorate, power may suddenly surge and short-circuit may occur.  
The capacitor has a loss, and may self-heat due to equivalent series resistance when alternating electric current is passed therethrough. As this effect becomes especially pronounced in high frequency circuits, please exercise caution.  
When using the capacitor in a (self-heating) circuit, please make sure the surface of the capacitor remains under the maximum temperature for usage. Also, please make certain temperature rises remain below 20°C.
4. Please keep voltage under the rated voltage which is applied to the capacitor. Also, please make certain the peak voltage remains below the rated voltage when AC voltage is super-imposed to the DC voltage.  
In the situation where AC or pulse voltage is employed, ensure average peak voltage does not exceed the rated voltage.  
Exceeding the rated voltage provided in both catalog and specifications may lead to defective withstanding voltage or, in worst case situations, may cause the capacitor to smoke or flame.
5. When the capacitor is to be employed in a circuit in which there is continuous application of a high frequency voltage or a steep pulse voltage, even though it is within the rated voltage, please inquire to the manufacturer. In the situation the capacitor is to be employed using a high frequency AC voltage or a extremely fast rising pulse voltage, even though it is within the rated voltage, it is possible capacitor reliability will deteriorate.
6. It is a common phenomenon of high-dielectric products to have a deteriorated amount of static electricity due to the application of DC voltage.  
Due caution is necessary as the degree of deterioration varies depending on the quality of capacitor materials, capacity, as well as the load voltage at the time of operation.
7. Do not use the capacitor in an environment where it might easily exceed the respective provisions concerning shock and vibration specified in the catalog and specifications.  
In addition, it is a common piezo phenomenon of high dielectric products to have some voltage due to vibration or to have noise due to voltage change. Please contact sales in such case.
8. If the electrostatic capacity value of the delivered capacitor is within the specified tolerance, please consider this when designing the respective product in order that the assembled product function appropriately.
9. Please contact us upon using conductive adhesives.

### Storage

Please note the following regarding the storage of delivered products.

1. Set the storage temperature to + 5 to + 40 °C and humidity to 20 ~ 70% RH. Other meteorological conditions are in accordance with classification 1 K2 of JIS C 60721 -3 -1.
2. Store in a place where corrosive gas (H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, Cl<sub>2</sub>, etc.) does not exist in the atmosphere. Also, avoid exposure to salty moisture. In either case, this may cause oxidation corrosion of the terminal electrode, reducing solderability.

If you store the above delivered products according to the conditions listed above, it will satisfy the solderability standard for 6 months from the shipping date.

Safety application guideline and detailed information of electrical properties are also provided in kyocera web site;

URL: <https://ele.kyocera.com/en/product/capacitor/>



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