

# MULTILAYER CERAMIC CHIP CAPACITORS

## - GMC SERIES -

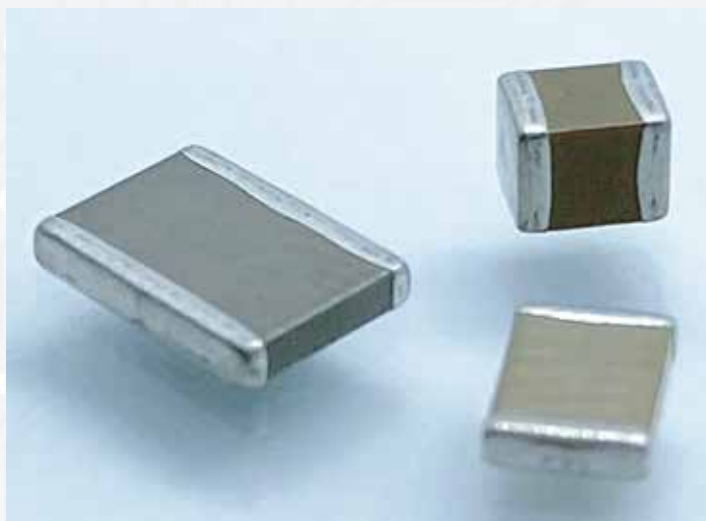
### APPLICATIONS

- Can be used on surface mount assembly equipment
- Our fully integrated manufacturing and total quality control systems ensure unprecedented high standards of quality and reliability.

### FEATURES

- Large capacitance values in small sizes
- Excellent high frequency characteristics

### CHIP CAPACITOR SELECTION



#### DIELECTRIC TYPE

**COG (NPO)** - Capacitance change with temperature is 0-30ppm/°C which is less than -0.3%/°C from -55°C to +125°C. Typical capacitance change with life is less than -0.1 % for NPOs, one-fifth that shown by most other dielectrics. NPO formulations show no aging characteristics.

Ultra stable class I dielectric: linear temperature coefficient, low loss, negligible change of electrical properties with time, voltage and frequency.

| OPERATING TEMPERATURE RANGE | TEMPERATURE COEFFICIENT | DISSIPATION FACTOR      | INSULATION RESISTANCE  | DIELECTRIC WITHSTANDING VOLTAGE | AGING RATE         | TEST PARAMETERS  |
|-----------------------------|-------------------------|-------------------------|--|---------------------------------|--------------------|--|
| -55°C to +125 C             | 0±30ppm°C               | 0.1% Max, 0.02% Typical | •>100GΩ or 1000ΩF<br>•125°C VDCW: 10GΩF or 100ΩF whichever is less | 3 X VDCW                        | 0% per decade hour | • C<1000pF f=1MHz<br>V=1.0Vrms ±0.2Vrms T=25°C<br>• C>1000pF f=1KHz<br>V=1.0Vrms ±0.2Vrms T=25°C |

#### Stable class II dielectric

| OPERATING TEMPERATURE RANGE   | TEMPERATURE COEFFICIENT          | DISSIPATION FACTOR     | INSULATION RESISTANCE   | DIELECTRIC WITHSTANDING VOLTAGE | AGING RATE          | TEST PARAMETERS  |
|---|----------------------------------|------------------------|---|---------------------------------|---------------------|--|
| X7R: -55C to+125C<br>X5R: -55C to+85C<br>X6S: -55C to+105C<br>X7S: -55C to+125C | ± 15%<br>± 15%<br>± 22%<br>± 22% | 2.5% Max, 1.8% Typical | •25°C, VdCW: >100GΩF or 1000ΩF, whichever is less<br>•125°C, VdCW: >100GΩF or1000ΩF whichever is less | 2.5 X VDCW                      | <2% per decade hour | • 1KHz 1.0Vrms +/-0.2Vrms 25c<br>Values > or = to 10µF 0.5+/-0.1 VDCW @120Hz |

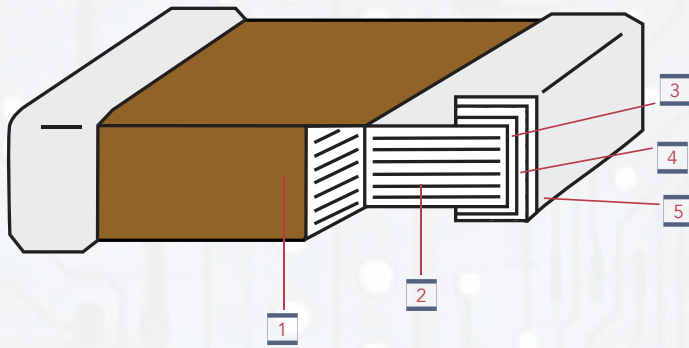
**Z5U** - Despite their capacitance instability, Z5U formulations are very popular because of their small size, temperature range low ESL, low ESR and excellent frequency response. These features are particularly important for decoupling application where only a minimum capacitance value is required.

**Y5V** - Y5V formulations are for general purpose use in a limited temperature range. They have a wide temperature characteristic of +22% - 82% capacitance change over the operating temperature range of -30°C to +85°C. Y5Vs high dielectric constant allows the manufacture of very high capacitance values (up to 100µF) in small physical sizes.

High capacitance per unit volume: general purpose product

| OPERATING TEMPERATURE RANGE | TEMPERATURE COEFFICIENT | TEMPERATURE VOLTAGE COEFFICIENT (Δc MAX @ VdCW) | DISSIPATION FACTOR     | INSULATION RESISTANCE                        | DIELECTRIC WITHSTANDING VOLTAGE | AGING RATE           | TEST PARAMETERS  |
|-----------------------------|-------------------------|---|------------------------|--|---------------------------------|----------------------|--|
| -30°C to +85°C              | +22%<br>-82%            | N/A   | 3.0% Max, 2.0% Typical | •10GΩ or 100ΩF whichever is less, 25°C, VdCW | 2.5 X VdCW                      | 3.0% per decade hour | • 1 KHz, 1 Vrms 25°C values > or = to 10uF 1.0Vrms 120Hz |

## CONSTRUCTION



| NO. | NAME                     | CLASS I DIELECTRIC | CLASS II DIELECTRIC |
|-----|--------------------------|--------------------|---------------------|
| 1   | Ceramic Material         | CaZrO <sub>3</sub> | BaTiO <sub>3</sub>  |
| 2   | Inner Electrode          | Ni                 | Ni                  |
| 3   | Inner layer              | Cu                 | Cu                  |
| 4   | Termination Middle layer | Ni                 | Ni                  |
| 5   | Termination Outer layer  | Sn                 | Sn                  |

## CAPACITANCE VALUE & TOLERANCE

Determined by circuit requirements. Note that chip prices decrease with lower capacitance value and looser tolerance.

## CAPACITOR SIZE

Select the smallest unit permitted by the circuit constraints that provides the required capacitance and voltage rating. All Cal-Chip capacitors conform to EIA specifications.

## VOLTAGE

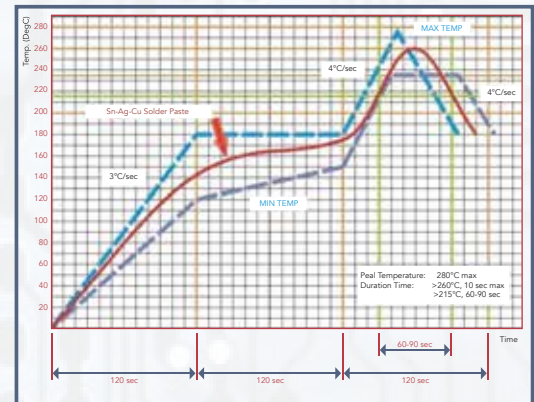
Determined by circuit requirements.

## CAPACITOR TERMINATION

Nickel barrier is standard and recommended for units exposed to repeated solder cycles, to minimize leaching of the termination.

## REFLOW SOLDERING CONDITIONS

The lead-free termination MLCCs are not only to be used on SMT against lead-free solder paste, but also suitable against lead-containing solder paste. If the optimized solder joint is requested, increasing soldering time, temperature and concentration of N<sub>2</sub> within oven are recommended.



## PART NUMBER GUIDE

| GMC          | 21   | CG  | 102   | J   | 50   | NT                     | D   |
|--------------|--|---|---|---|--|------------------------|---|
| PRODUCT TYPE | DIMENSIONS   | DIELECTRIC  | CAPACITANCE   | TOLERANCE   | VOLTAGE DC   | TERMINATION            | PACKAGING CODE  |
|              | 01: 1005 32: 1210<br>02: 0201 40: 1808<br>04: 0402 43: 1812<br>10: 0603 45: 1825<br>21: 0805 55: 2220<br>31: 1206 57: 2225 | CG: COG/NPO<br>X7R<br>X5R<br>X7S<br>X6S<br>Y5V<br>Z5U | 0R5: 0.5pF<br>5R0: 5.0pF<br>R75: 0.75pF<br>100: 10pF<br>101: 100pF<br>102: 1000pF<br>103: .01uF<br>104: .1uF<br>105: 1.0uF<br>106: 10uF<br>107: 100uF | A: +/- .05pF<br>B: +/- .1pF<br>C: +/- .25pF<br>D: +/- .5pF<br>F: +/- 1%<br>G: +/- 2%<br>J: +/- 5%<br>K: +/- 10%<br>M: +/- 20%<br>Z: -20%/+80% | 4R0: 4.0V<br>6R3: 6.3V<br>10: 10V<br>16: 16V<br>25: 25V<br>35: 35V<br>50: 50V<br>63: 63V<br>100: 100V<br>200: 200V | NT: Sn/Ni<br>PT: Pd/Ag | Blank: 7" reel<br>D: See page 19 & 20<br>G: See page 19 & 20<br>Q: See page 19 & 20 |





| DIELECTRIC     |     | NPO/COG     |    |    |    |    |             |    |    |     |     |            |    |    |    |     |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |
|----------------|-----|-------------|----|----|----|----|-------------|----|----|-----|-----|------------|----|----|----|-----|-----------|----|----|-----|-----|-------------|----|----|----|-----|-------------|----|----|-----|-----|
| DIMENSION (MM) |     | GMC01       |    |    |    |    | GMC02       |    |    |     |     | GMC04      |    |    |    |     | GMC10     |    |    |     |     | GMC21       |    |    |    |     | GMC31       |    |    |     |     |
| L              |     | 0.4 ± 0.02  |    |    |    |    | 0.6 ± 0.03  |    |    |     |     | 1.0 ± 0.05 |    |    |    |     | 1.6 ± 0.2 |    |    |     |     | 2.0 ± 0.3   |    |    |    |     | 3.2 ± 0.3   |    |    |     |     |
| W              |     | 0.2 ± 0.02  |    |    |    |    | 0.3 ± 0.03  |    |    |     |     | 0.5 ± 0.05 |    |    |    |     | 0.8 ± 0.2 |    |    |     |     | 1.25 ± 0.2  |    |    |    |     | 1.6 ± 0.2   |    |    |     |     |
| BW             |     | 0.07 ~ 0.14 |    |    |    |    | 0.15 ± 0.05 |    |    |     |     | 0.1 ~ 0.35 |    |    |    |     | 0.1 ~ 0.4 |    |    |     |     | 0.25 ~ 0.75 |    |    |    |     | 0.25 ~ 0.75 |    |    |     |     |
| RATED VOLTAGE  |     | 6.3         | 10 | 16 | 25 | 50 | 16          | 25 | 50 | 100 | 6.3 | 10         | 16 | 25 | 50 | 100 | 200       | 25 | 50 | 100 | 200 | 10          | 16 | 25 | 50 | 100 | 200         | 25 | 50 | 100 | 200 |
| CAP. RANGE     |     |             |    |    |    |    |             |    |    |     |     |            |    |    |    |     |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |
| 0.1pF          | R10 |             |    |    |    |    | C           | C  | C  | C   | H   | H          | H  | H  | H  |     |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |
| 0.2            | R20 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  |     |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |
| 0.3            | R30 | A           | A  | A  | A  | A  | C           | C  | C  | C   | H   | H          | H  | H  | H  |     |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |
| 0.4            | R40 | A           | A  | A  | A  | A  | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | L         | L  | L  |     | J   | J           | J  | J  | J  | J   |             |    |    |     |     |
| 0.47           | R47 |             |    |    |    |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | L         | L  | L  |     | J   | J           | J  | J  | J  | J   | L           | L  |    |     |     |
| 0.5            | 0R5 | A           | A  | A  | A  | A  | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | L         | L  | L  | L   | J   | J           | J  | J  | J  | J   | L           | L  | L  | L   |     |
| 0.56           | R56 |             |    |    |    |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | L         | L  | L  |     | J   | J           | J  | J  | J  | J   | L           | L  |    |     |     |
| 0.6            | 0R6 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | L         | L  | L  |     | J   | J           | J  | J  | J  | J   | L           | L  | L  | L   |     |
| 0.68           | R68 |             |    |    |    |    |             |    |    |     | H   | H          | H  | H  | H  | H   | L         | L  | L  |     | J   | J           | J  | J  | J  | J   | L           | L  |    |     |     |
| 0.7            | 0R7 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | L         | L  | L  |     | J   | J           | J  | J  | J  | J   | L           | L  | L  | L   |     |
| 0.75           | R75 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | L         | L  | L  |     | J   | J           | J  | J  | J  | J   | L           | L  | L  |     |     |
| 0.8            | 0R8 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | L         | L  | L  |     | J   | J           | J  | J  | J  | J   | L           | L  | L  | L   |     |
| 0.82           | R82 |             |    |    |    |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | L         | L  | L  |     | J   | J           | J  | J  | J  | J   |             |    |    |     |     |
| 0.9            | 0R9 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | L         | L  | L  |     | J   | J           | J  | J  | J  | J   | L           | L  | L  | L   |     |
| 1              | 1R0 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | H         | L  | L  | L   | L   | J           | J  | J  | J  | J   | J           | L  | L  | L   | L   |
| 1.1            | 1R1 | A           | A  | A  | A  | A  | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   |           |    |    |     | J   | J           | J  | J  | J  | J   | L           | L  | L  | L   |     |
| 1.2            | 1R2 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | H         | L  | L  | L   | L   | J           | J  | J  | J  | J   | J           | L  | L  | L   | L   |
| 1.3            | 1R3 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   |           |    |    |     | J   | J           | J  | J  | J  | J   | L           | L  | L  | L   |     |
| 1.4            | 1R4 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   |           |    |    |     | J   | J           | J  | J  | J  | J   |             |    |    |     |     |
| 1.5            | 1R5 | A           | A  | A  | A  | A  | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | L         | L  | L  | L   | J   | J           | J  | J  | J  | J   | L           | L  | L  | L   |     |
| 1.6            | 1R6 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | L         | L  | L  | L   | J   | J           | J  | J  | J  | J   | L           | L  | L  | L   |     |
| 1.7            | 1R7 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |
| 1.8            | 1R8 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | L         | L  | L  | L   | J   | J           | J  | J  | J  | J   | L           | L  | L  | L   |     |
| 1.9            | 1R9 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |
| 2              | 2R0 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | L         | L  | L  | L   | J   | J           | J  | J  | J  | J   | L           | L  | L  | L   |     |
| 2.1            | 2R1 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |
| 2.2            | 2R2 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | H         | L  | L  | L   | L   | J           | J  | J  | J  | J   | J           | L  | L  | L   | L   |
| 2.3            | 2R3 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |
| 2.4            | 2R4 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | L         | L  | L  | L   | J   | J           | J  | J  | J  | J   | L           | L  | L  | L   |     |
| 2.5            | 2R5 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |
| 2.6            | 2R6 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |
| 2.7            | 2R7 | A           | A  | A  | A  | A  | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | L         | L  | L  | L   | J   | J           | J  | J  | J  | J   | L           | L  | L  | L   |     |
| 2.8            | 2R8 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |
| 2.9            | 2R9 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |
| 3              | 3R0 | A           | A  | A  | A  | A  | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | L         | L  | L  | L   | J   | J           | J  | J  | J  | J   | L           | L  | L  | L   |     |
| 3.1            | 3R1 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |
| 3.2            | 3R2 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |
| 3.3            | 3R3 | A           | A  | A  | A  | A  | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | H         | L  | L  | L   | L   | J           | J  | J  | J  | J   | J           | L  | L  | L   | L   |
| 3.4            | 3R4 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |
| 3.5            | 3R5 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |
| 3.6            | 3R6 | A           | A  | A  | A  | A  | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | L         | L  | L  | L   | J   | J           | J  | J  | J  | J   | L           | L  | L  | L   |     |
| 3.7            | 3R7 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |
| 3.8            | 3R8 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |
| 3.9            | 3R9 | A           | A  | A  | A  | A  | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | L         | L  | L  | L   | J   | J           | J  | J  | J  | J   | L           | L  | L  | L   |     |
| 4              | 4R0 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | L         | L  | L  | L   | J   | J           | J  | J  | J  | J   | L           | L  | L  | L   |     |
| 4.1            | 4R1 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |
| 4.2            | 4R2 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |
| 4.3            | 4R3 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   | L         | L  | L  | L   | J   | J           | J  | J  | J  | J   | L           | L  | L  | L   |     |
| 4.4            | 4R4 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |
| 4.5            | 4R5 | A           | A  | A  | A  |    | C           | C  | C  | C   | H   | H          | H  | H  | H  | H   |           |    |    |     |     |             |    |    |    |     |             |    |    |     |     |

| MAX HEIGHT |      |      |     |      |
|------------|------|------|-----|------|
| A          | C    | H    | J   | L    |
| 0.22       | 0.33 | 0.55 | 0.7 | 0.90 |





**NPO/COG**

|                |     | NPO/COG     |    |     |    |             |    |    |     |            |    |    |    |     |     |           |    |     |     |             |    |    |     |             |    |    |     |     |   |   |   |   |  |  |  |  |
|----------------|-----|-------------|----|-----|----|-------------|----|----|-----|------------|----|----|----|-----|-----|-----------|----|-----|-----|-------------|----|----|-----|-------------|----|----|-----|-----|---|---|---|---|--|--|--|--|
| DIMENSION (MM) |     | GMC01       |    |     |    | GMC02       |    |    |     | GMC04      |    |    |    |     |     | GMC10     |    |     |     | GMC21       |    |    |     | GMC31       |    |    |     |     |   |   |   |   |  |  |  |  |
| L(L1)          |     | 0.4 ± 0.02  |    |     |    | 0.6 ± 0.03  |    |    |     | 1.0 ± 0.05 |    |    |    |     |     | 1.6 ± 0.2 |    |     |     | 2.0 ± 0.3   |    |    |     | 3.2 ± 0.3   |    |    |     |     |   |   |   |   |  |  |  |  |
| W              |     | 0.2 ± 0.02  |    |     |    | 0.3 ± 0.03  |    |    |     | 0.5 ± 0.05 |    |    |    |     |     | 0.8 ± 0.2 |    |     |     | 1.25 ± 0.2  |    |    |     | 1.6 ± 0.2   |    |    |     |     |   |   |   |   |  |  |  |  |
| BW             |     | 0.07 ~ 0.14 |    |     |    | 0.15 ± 0.05 |    |    |     | 0.1 ~ 0.35 |    |    |    |     |     | 0.1 ~ 0.4 |    |     |     | 0.25 ~ 0.75 |    |    |     | 0.25 ~ 0.75 |    |    |     |     |   |   |   |   |  |  |  |  |
| RATED VOLTAGE  |     | 6.3         | 25 | 16V | 25 | 50          | 25 | 50 | 6.3 | 10         | 16 | 25 | 50 | 100 | 200 | 25        | 50 | 100 | 200 | 16          | 25 | 50 | 100 | 200         | 25 | 50 | 100 | 200 |   |   |   |   |  |  |  |  |
| CAP. RANGE     |     |             |    |     |    |             |    |    |     |            |    |    |    |     |     |           |    |     |     |             |    |    |     |             |    |    |     |     |   |   |   |   |  |  |  |  |
| 500pF          | 501 |             |    |     |    |             |    |    |     |            |    |    |    |     |     |           |    |     |     |             |    |    |     |             |    |    |     |     | M | M | M | M |  |  |  |  |
| 510            | 511 |             |    |     |    |             | C  |    | H   | H          | H  | H  | H  | H   |     | L         | L  | L   | L   | M           | M  | M  | M   |             |    |    |     |     | L | L | L | L |  |  |  |  |
| 560            | 561 |             |    |     |    |             | C  |    | H   | H          | H  | H  | H  | H   |     | L         | L  | L   | L   | M           | M  | M  | M   | M           |    |    |     |     | L | L | L | L |  |  |  |  |
| 620            | 621 |             |    |     |    |             | C  |    | H   | H          | H  | H  | H  | H   |     | L         | L  | L   | L   | M           | M  | M  | M   |             |    |    |     |     | L | L | L | L |  |  |  |  |
| 680            | 681 |             |    |     |    |             | C  |    | H   | H          | H  | H  | H  | H   |     | L         | L  | L   | L   | M           | M  | M  | M   | M           |    |    |     |     | L | L | L | L |  |  |  |  |
| 750            | 751 |             |    |     |    |             | C  |    | H   | H          | H  | H  | H  | H   |     | L         | L  | L   | L   | M           | M  | M  | M   | M           |    |    |     |     | L | L | L | L |  |  |  |  |
| 820            | 821 |             |    |     |    |             | C  |    | H   | H          | H  | H  | H  | H   |     | L         | L  | L   | L   | M           | M  | M  | M   | M           |    |    |     |     | L | L | L | L |  |  |  |  |
| 910            | 911 |             |    |     |    |             | C  |    | H   | H          | H  | H  | H  | H   |     | L         | L  | L   | L   | M           | M  | M  | M   | M           |    |    |     |     | L | L | L | L |  |  |  |  |
| 1000           | 102 |             |    |     |    |             | C  |    | H   | H          | H  | H  | H  | H   |     | L         | L  | L   | L   | M           | M  | M  | M   | M           |    |    |     |     | L | L | L | L |  |  |  |  |
| 1100           | 112 |             |    |     |    |             |    |    | H   | H          | H  | H  | H  |     | L   | L         | L  | L   | M   | M           | M  | M  | M   |             |    |    |     |     |   |   |   |   |  |  |  |  |
| 1200           | 122 |             |    |     |    |             |    |    | H   | H          | H  | H  | H  |     | M   | M         | M  | M   | M   | M           | M  | M  | M   |             |    |    | L   | L   | L | L |   |   |  |  |  |  |
| 1300           | 132 |             |    |     |    |             |    |    | H   | H          | H  | H  | H  |     | M   | M         | M  | M   | M   | M           | M  | M  | M   |             |    |    |     |     |   |   |   |   |  |  |  |  |
| 1500           | 152 |             |    |     |    |             |    |    | H   | H          | H  | H  | H  |     | M   | M         | M  | M   | M   | M           | M  | M  | M   |             |    |    | L   | L   | L | L |   |   |  |  |  |  |
| 1600           | 162 |             |    |     |    |             |    |    | H   | H          | H  | H  |    | M   | M   | M         | M  |     |     |             |    |    |     |             |    |    |     |     |   |   |   |   |  |  |  |  |
| 1800           | 182 |             |    |     |    |             |    |    | H   | H          | H  | H  |    | M   | M   | M         | M  | M   | M   | M           | M  | M  |     |             |    | L  | L   | L   | L |   |   |   |  |  |  |  |
| 2000           | 202 |             |    |     |    |             |    |    | H   | H          | H  | H  |    | M   | M   | M         | M  | M   | M   | M           | M  | M  |     |             |    |    |     |     |   |   |   |   |  |  |  |  |
| 2200           | 222 |             |    |     |    |             |    |    | H   | H          | H  | H  |    | M   | M   | M         | M  | M   | R   | R           | R  | R  | R   |             |    | L  | L   | L   | L |   |   |   |  |  |  |  |
| 2400           | 242 |             |    |     |    |             |    |    |     |            |    |    |    | M   | M   | M         | M  |     | R   | R           | R  | R  | R   |             |    | L  | L   | L   | L |   |   |   |  |  |  |  |
| 2700           | 272 |             |    |     |    |             |    |    | H   | H          | H  | H  |    | M   | M   | M         | M  |     | R   | R           | R  | R  | R   |             |    | L  | L   | L   | L |   |   |   |  |  |  |  |
| 3000           | 302 |             |    |     |    |             |    |    |     |            |    |    |    | M   | M   | M         | M  |     | R   | R           | R  | R  | R   | M           | M  | M  | M   | M   | M |   |   |   |  |  |  |  |
| 3300           | 332 |             |    |     |    |             |    |    | H   | H          | H  | H  |    | M   | M   | M         | M  |     | R   | R           | R  | R  | R   | M           | M  | M  | M   | M   | M |   |   |   |  |  |  |  |
| 3600           | 362 |             |    |     |    |             |    |    |     |            |    |    |    |     |     |           |    |     | R   | R           | R  | R  | R   |             |    |    |     |     |   |   |   |   |  |  |  |  |
| 3900           | 392 |             |    |     |    |             |    |    |     |            |    |    |    | M   | M   | M         | M  |     | R   | R           | R  | R  | R   | M           | M  | M  | M   | M   | M |   |   |   |  |  |  |  |
| 4300           | 432 |             |    |     |    |             |    |    |     |            |    |    |    |     |     |           |    |     | R   | R           | R  | R  | R   |             |    |    |     |     |   |   |   |   |  |  |  |  |
| 4700           | 472 |             |    |     |    |             |    |    | I   | I          | I  | I  | I  |     | M   | M         | M  | M   |     | R           | R  | R  | R   | R           | M  | M  | M   | M   | M | M |   |   |  |  |  |  |
| 5600           | 562 |             |    |     |    |             |    |    | I   | I          | I  | I  | I  |     | M   | M         | M  | M   |     | R           | R  | R  | R   | R           | M  | M  | M   | M   | M | M |   |   |  |  |  |  |
| 6200           | 622 |             |    |     |    |             |    |    |     |            |    |    |    | M   | M   | M         | M  |     | R   | R           | R  | R  | R   |             |    |    |     |     |   |   |   |   |  |  |  |  |
| 6800           | 682 |             |    |     |    |             |    |    | I   | I          | I  | I  | I  |     | M   | M         | M  | M   |     | R           | R  | R  | R   | R           | O  | O  | O   | O   | O | O |   |   |  |  |  |  |
| 7500           | 752 |             |    |     |    |             |    |    |     |            |    |    |    | M   | M   | M         | M  |     | R   | R           | R  | R  | R   | O           | O  | O  | O   | O   | O |   |   |   |  |  |  |  |
| 8200           | 822 |             |    |     |    |             |    |    |     |            |    |    |    | M   | M   | M         | M  |     | R   | R           | R  | R  | R   |             |    | R  | R   | R   | R |   |   |   |  |  |  |  |
| 9100           | 912 |             |    |     |    |             |    |    |     |            |    |    |    | M   | M   | M         | M  |     | R   | R           | R  | R  | R   |             |    |    |     |     |   |   |   |   |  |  |  |  |
| 0.01uF         | 103 |             |    |     |    |             |    |    | I   | I          | I  | I  |    | L   | L   | L         | L  |     | R   | R           | R  | R  | R   |             |    | R  | R   | R   | R |   |   |   |  |  |  |  |
| 0.012          | 123 |             |    |     |    |             |    |    |     |            |    |    |    | M   | M   | M         | M  |     | R   | R           | R  | R  | R   |             |    | U  | U   | U   | U |   |   |   |  |  |  |  |
| 0.015          | 153 |             |    |     |    |             |    |    |     |            |    |    |    | M   | M   | M         | M  |     | R   | R           | R  | R  | R   |             |    | U  | U   | U   | U |   |   |   |  |  |  |  |
| 0.018          | 183 |             |    |     |    |             |    |    |     |            |    |    |    |     |     |           |    |     | R   | R           | R  | R  | R   |             |    | U  | U   | U   | U |   |   |   |  |  |  |  |
| 0.02           | 203 |             |    |     |    |             |    |    |     |            |    |    |    |     |     |           |    |     | R   | R           | R  | R  | R   |             |    |    |     |     |   |   |   |   |  |  |  |  |
| 0.022          | 223 |             |    |     |    |             |    |    |     |            |    |    |    |     |     |           |    |     | R   | R           | R  | R  | R   |             |    | U  | U   | U   | U |   |   |   |  |  |  |  |
| 0.027          | 273 |             |    |     |    |             |    |    |     |            |    |    |    |     |     |           |    |     | R   | R           | R  | R  | R   |             |    | U  | U   | U   | U |   |   |   |  |  |  |  |
| 0.03           | 303 |             |    |     |    |             |    |    |     |            |    |    |    |     |     |           |    |     | R   | R           | R  | R  | R   |             |    |    |     |     |   |   |   |   |  |  |  |  |
| 0.033          | 333 |             |    |     |    |             |    |    |     |            |    |    |    |     |     |           |    |     | R   | R           | R  | R  | R   |             |    | U  | U   | U   | U |   |   |   |  |  |  |  |
| 0.039          | 393 |             |    |     |    |             |    |    |     |            |    |    |    |     |     |           |    |     |     |             |    |    |     |             |    | U  | U   | U   | U |   |   |   |  |  |  |  |
| 0.047          | 473 |             |    |     |    |             |    |    |     |            |    |    |    |     |     |           |    |     | R   | R           | R  | R  | R   |             |    | U  | U   | U   | U |   |   |   |  |  |  |  |
| 0.056          | 563 |             |    |     |    |             |    |    |     |            |    |    |    |     |     |           |    |     |     |             |    |    |     |             |    | U  | U   | U   | U |   |   |   |  |  |  |  |
| 0.068          | 683 |             |    |     |    |             |    |    |     |            |    |    |    |     |     |           |    |     |     |             |    |    |     |             |    | U  | U   | U   | U |   |   |   |  |  |  |  |
| 0.082          | 823 |             |    |     |    |             |    |    |     |            |    |    |    |     |     |           |    |     |     |             |    |    |     |             |    | U  | U   | U   | U |   |   |   |  |  |  |  |
| 0.1            | 104 |             |    |     |    |             |    |    |     |            |    |    |    |     |     |           |    |     |     |             |    |    |     |             |    | T  | T   | U   | U |   |   |   |  |  |  |  |
| 0.12           | 124 |             |    |     |    |             |    |    |     |            |    |    |    |     |     |           |    |     |     |             |    |    |     |             |    |    |     |     |   |   |   |   |  |  |  |  |

| MAX HEIGHT |      |      |      |      |      |      |      |      |      |
|------------|------|------|------|------|------|------|------|------|------|
| C          | H    | I    | L    | M    | O    | Q    | R    | T    | U    |
| 0.33       | 0.55 | 0.65 | 0.90 | 0.95 | 1.10 | 1.40 | 1.45 | 1.80 | 1.90 |



| DIELECTRIC     |     | NPO/COG     |    |    |             |     |    |             |     |    |             |     |    |             |     |    |             |     |    |     |     |
|----------------|-----|-------------|----|----|-------------|-----|----|-------------|-----|----|-------------|-----|----|-------------|-----|----|-------------|-----|----|-----|-----|
| DIMENSION (MM) |     | GMC32       |    |    | GMC40       |     |    | GMC43       |     |    | GMC45       |     |    | GMC55       |     |    | GMC57       |     |    |     |     |
| L              |     | 3.2 ± 0.3   |    |    | 4.57 ± 0.25 |     |    | 4.5 ± 0.35  |     |    | 4.5 ± 0.35  |     |    | 5.7 ± 0.4   |     |    | 5.7 ± 0.4   |     |    |     |     |
| W              |     | 2.5 ± 0.3   |    |    | 2.03 ± 0.25 |     |    | 3.2 ± 0.3   |     |    | 6.3 ± 0.4   |     |    | 5.0 ± 0.4   |     |    | 6.3 ± 0.4   |     |    |     |     |
| BW             |     | 0.25 ~ 0.75 |    |    | 0.25 ~ 0.75 |     |    | 0.25 ~ 0.75 |     |    | 0.40 ~ 1.10 |     |    | 0.50 ~ 1.20 |     |    | 0.50 ~ 1.20 |     |    |     |     |
| RATED VOLTAGE  |     | 16          | 25 | 50 | 100         | 200 | 50 | 100         | 200 | 50 | 100         | 200 | 50 | 100         | 200 | 50 | 100         | 200 | 50 | 100 | 200 |
| CAP. RANGE     |     |             |    |    |             |     |    |             |     |    |             |     |    |             |     |    |             |     |    |     |     |
| 10pF           | 100 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 11             | 110 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 12             | 120 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 13             | 130 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 15             | 150 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 16             | 160 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 18             | 180 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 20             | 200 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 22             | 220 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 24             | 240 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 27             | 270 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 30             | 300 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 33             | 330 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 36             | 360 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 39             | 390 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 43             | 430 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 47             | 470 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 51             | 510 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 56             | 560 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 62             | 620 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 68             | 680 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 75             | 750 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 82             | 820 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 91             | 910 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 100            | 101 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 120            | 121 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 130            | 131 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 150            | 151 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 160            | 161 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 180            | 181 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 200            | 201 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 220            | 221 | R           | R  | R  | R           | R   | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 240            | 241 | R           | R  | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 270            | 271 | R           | R  | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 300            | 301 | R           | R  | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 330            | 331 | R           | R  | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 360            | 361 | R           | R  | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 390            | 391 | R           | R  | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 430            | 431 | R           | R  | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |
| 470            | 471 | R           | R  | R  | R           | R   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V           | V   | V  | V   | V   |

| MAX HEIGHT |      |
|------------|------|
| R          | V    |
| 1.45       | 2.20 |

**NPO/COG**

| DIELECTRIC     |     | NPO/COG     |    |    |     |     |             |     |     |             |     |     |             |     |     |             |     |     |             |     |     |    |     |     |  |
|----------------|-----|-------------|----|----|-----|-----|-------------|-----|-----|-------------|-----|-----|-------------|-----|-----|-------------|-----|-----|-------------|-----|-----|----|-----|-----|--|
| DIMENSION (MM) |     | GMC32       |    |    |     |     | GMC40       |     |     | GMC43       |     |     | GMC45       |     |     | GMC55       |     |     | GMC57       |     |     |    |     |     |  |
| L(L1)          |     | 3.2 ± 0.3   |    |    |     |     | 4.57 ± 0.25 |     |     | 4.5 ± 0.35  |     |     | 4.5 ± 0.35  |     |     | 5.7 ± 0.4   |     |     | 5.7 ± 0.4   |     |     |    |     |     |  |
| W              |     | 2.5 ± 0.3   |    |    |     |     | 2.03 ± 0.25 |     |     | 3.2 ± 0.3   |     |     | 6.3 ± 0.4   |     |     | 5.0 ± 0.4   |     |     | 6.3 ± 0.4   |     |     |    |     |     |  |
| BW             |     | 0.25 ~ 0.75 |    |    |     |     | 0.25 ~ 0.75 |     |     | 0.25 ~ 0.75 |     |     | 0.40 ~ 1.10 |     |     | 0.50 ~ 1.20 |     |     | 0.50 ~ 1.20 |     |     |    |     |     |  |
| RATED VOLTAGE  |     | 16          | 25 | 50 | 100 | 200 | 50          | 100 | 200 | 50          | 100 | 200 | 50          | 100 | 200 | 50          | 100 | 200 | 50          | 100 | 200 | 50 | 100 | 200 |  |
| CAP. RANGE     |     |             |    |    |     |     |             |     |     |             |     |     |             |     |     |             |     |     |             |     |     |    |     |     |  |
| 510pF          | 511 | R           | R  | R  | R   | R   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 560            | 561 | R           | R  | R  | R   | R   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 620            | 621 |             |    |    |     |     | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 680            | 681 | R           | R  | R  | R   | R   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 750            | 751 | R           | R  | R  | R   | R   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 820            | 821 | R           | R  | R  | R   | R   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 910            | 911 | R           | R  | R  | R   | R   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 1000           | 102 | R           | R  | R  | R   | R   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 1100           | 112 |             |    |    |     |     | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 1200           | 122 | R           | R  | R  | R   | R   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 1500           | 152 | R           | R  | R  | R   | R   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 1800           | 182 | R           | R  | R  | R   | R   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 2000           | 202 |             |    |    |     |     | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 2200           | 222 | R           | R  | R  | R   | R   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 2400           | 242 | R           | R  | R  | R   | R   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 2700           | 272 | R           | R  | R  | R   | R   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 3000           | 302 |             |    |    |     |     | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 3300           | 332 | R           | R  | R  | R   | R   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 3900           | 392 | R           | R  | R  | R   | R   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 4700           | 472 | R           | R  | R  | R   | R   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 5600           | 562 | R           | R  | R  | R   | R   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 6800           | 682 | R           | R  | R  | R   | R   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 7500           | 752 | R           | R  | R  | R   | R   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 8200           | 822 | R           | R  | R  | R   | R   | V           | V   |     | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| .01uF          | 103 | R           | R  | R  | R   | R   | V           | V   |     | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   | V   | V  | V   |     |  |
| 0.012          | 123 | P           | P  | P  | P   | P   | V           | V   |     | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   |     | V  | V   |     |  |
| 0.015          | 153 | P           | P  | P  | P   | P   | V           |     |     | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   |     | V  | V   |     |  |
| 0.018          | 183 | V           | V  | V  | V   | V   | V           |     |     | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   |     | V  | V   |     |  |
| 0.022          | 223 | V           | V  | V  | V   | V   |             |     |     | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   |     | V  | V   |     |  |
| 0.027          | 273 | V           | V  | V  | V   | V   |             |     |     | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   |     | V  | V   |     |  |
| 0.033          | 333 | V           | V  | V  | V   | V   |             |     |     | V           | V   | V   | V           | V   | V   | V           | V   | V   | V           | V   |     | V  | V   |     |  |
| 0.039          | 393 | V           | V  | V  | V   | V   |             |     |     | Y           | Y   | Y   | V           | V   |     | V           | V   |     | V           | V   |     | V  | V   |     |  |
| 0.047          | 473 | V           | V  | V  | V   | V   |             |     |     | Y           | Y   | Y   | V           | V   |     | V           | V   |     | V           | V   |     | V  | V   |     |  |
| 0.056          | 563 | V           | V  | V  | V   |     |             |     |     | Y           | Y   | Y   | V           | V   |     | V           | V   |     | V           | V   |     | V  | Y   |     |  |
| 0.068          | 683 | V           | V  | V  | V   |     |             |     |     | Y           | Y   | Y   | V           | V   |     | V           | V   |     | V           | V   |     | V  | Y   |     |  |
| 0.082          | 823 | V           | V  | V  | V   |     |             |     |     | Y           | Y   | Y   | V           |     |     | Y           | Y   |     | V           | V   |     | V  | Y   |     |  |
| 0.1            | 104 | V           | V  | V  | V   |     |             |     |     | Y           | Y   | Y   | V           |     |     | Y           | Y   |     | V           | V   |     | V  | Y   |     |  |
| 0.12           | 124 | A5          | A5 | A5 |     |     |             |     |     | Y           | Y   |     | V           |     |     | V           | V   |     | Y           | Y   |     |    |     |     |  |
| 0.15           | 154 | W           | W  | W  |     |     |             |     |     | Y           | Y   |     | V           |     |     | V           | V   |     |             |     |     |    |     |     |  |
| 0.18           | 184 |             |    |    |     |     |             |     |     | Y           |     |     | V           |     |     | V           | V   |     |             |     |     |    |     |     |  |
| 0.22           | 224 | W           | W  |    |     |     |             |     |     | A2          |     |     | V           |     |     | V           | V   |     |             |     |     |    |     |     |  |
| 0.27           | 274 |             |    |    |     |     |             |     |     |             |     |     | V           |     |     | V           | V   |     |             |     |     |    |     |     |  |
| 0.33           | 334 |             |    |    |     |     |             |     |     |             |     |     | V           | V   |     | V           | V   |     |             |     |     |    |     |     |  |
| 0.47           | 474 |             |    |    |     |     |             |     |     |             |     |     | V           |     |     | V           |     |     |             |     |     |    |     |     |  |
| 1              | 105 |             |    |    |     |     |             |     |     |             |     |     |             |     |     |             |     |     |             |     |     |    |     |     |  |
| 2.2            | 225 |             |    |    |     |     |             |     |     |             |     |     |             |     |     |             |     |     |             |     |     |    |     |     |  |
| 4.7            | 475 |             |    |    |     |     |             |     |     |             |     |     |             |     |     |             |     |     |             |     |     |    |     |     |  |

| MAX HEIGHT |      |     |     |     |     |      |
|------------|------|-----|-----|-----|-----|------|
| R          | P    | V   | W   | Y   | A2  | A5   |
| 1.45       | 1.35 | 2.2 | 2.3 | 2.8 | 3.5 | 2.60 |









| DIELECTRIC     |     | X7R         |    |    |    |    |    |     |     |             |     |     |    |             |    |    |     |     |    |    |    |             |     |    |    |    |     |     |    |             |    |     |     |    |    |    |     |             |  |  |  |
|----------------|-----|-------------|----|----|----|----|----|-----|-----|-------------|-----|-----|----|-------------|----|----|-----|-----|----|----|----|-------------|-----|----|----|----|-----|-----|----|-------------|----|-----|-----|----|----|----|-----|-------------|--|--|--|
| DIMENSION (MM) |     | GMC32       |    |    |    |    |    |     |     | GMC40       |     |     |    | GMC43       |    |    |     |     |    |    |    | GMC45       |     |    |    |    |     |     |    | GMC55       |    |     |     |    |    |    |     | GMC57       |  |  |  |
| L              |     | 3.2 ± 0.3   |    |    |    |    |    |     |     | 4.57 ± 0.25 |     |     |    | 4.5 ± 0.35  |    |    |     |     |    |    |    | 4.5 ± 0.35  |     |    |    |    |     |     |    | 5.7 ± 0.4   |    |     |     |    |    |    |     | 5.7 ± 0.4   |  |  |  |
| W              |     | 2.5 ± 0.3   |    |    |    |    |    |     |     | 2.03 ± 0.25 |     |     |    | 3.2 ± 0.3   |    |    |     |     |    |    |    | 6.3 ± 0.4   |     |    |    |    |     |     |    | 5.0 ± 0.4   |    |     |     |    |    |    |     | 6.3 ± 0.4   |  |  |  |
| BW             |     | 0.25 ~ 0.75 |    |    |    |    |    |     |     | 0.25 ~ 0.75 |     |     |    | 0.25 ~ 0.75 |    |    |     |     |    |    |    | 0.40 ~ 1.10 |     |    |    |    |     |     |    | 0.50 ~ 1.20 |    |     |     |    |    |    |     | 0.50 ~ 1.20 |  |  |  |
| RATED VOLTAGE  |     | 6.3         | 10 | 16 | 25 | 35 | 50 | 100 | 200 | 50          | 100 | 200 | 10 | 16          | 25 | 50 | 100 | 200 | 16 | 25 | 50 | 100         | 200 | 16 | 25 | 50 | 100 | 200 | 16 | 25          | 50 | 100 | 200 | 16 | 25 | 50 | 100 | 200         |  |  |  |
| CAP. RANGE     |     |             |    |    |    |    |    |     |     |             |     |     |    |             |    |    |     |     |    |    |    |             |     |    |    |    |     |     |    |             |    |     |     |    |    |    |     |             |  |  |  |
| 1000pF         | 102 | O           | O  | O  | O  | O  | O  | O   | O   | R           | R   | R   | R  | R           | R  | R  | R   | R   | R  | R  | R  | R           | R   | R  | R  | R  | R   | V   | V  | V           | V  | V   | V   | V  | V  | V  | V   |             |  |  |  |
| 1200           | 122 | O           | O  | O  | O  | O  | O  | O   | O   | R           | R   | R   | R  | R           | R  | R  | R   | R   | R  | R  | R  | R           | R   | R  | R  | R  | R   | V   | V  | V           | V  | V   | V   | V  | V  | V  | V   |             |  |  |  |
| 1500           | 152 | O           | O  | O  | O  | O  | O  | O   | O   | R           | R   | R   | R  | R           | R  | R  | R   | R   | R  | R  | R  | R           | R   | R  | R  | R  | R   | V   | V  | V           | V  | V   | V   | V  | V  | V  | V   |             |  |  |  |
| 1800           | 182 | O           | O  | O  | O  | O  | O  | O   | O   | R           | R   | R   | R  | R           | R  | R  | R   | R   | R  | R  | R  | R           | R   | R  | R  | R  | R   | V   | V  | V           | V  | V   | V   | V  | V  | V  | V   |             |  |  |  |
| 2200           | 222 | O           | O  | O  | O  | O  | O  | O   | O   | R           | R   | R   | R  | R           | R  | R  | R   | R   | R  | R  | R  | R           | R   | R  | R  | R  | R   | V   | V  | V           | V  | V   | V   | V  | V  | V  | V   |             |  |  |  |
| 2400           | 242 | O           | O  | O  | O  | O  | O  | O   | O   | R           | R   | R   | R  | R           | R  | R  | R   | R   | R  | R  | R  | R           | R   | R  | R  | R  | R   | V   | V  | V           | V  | V   | V   | V  | V  | V  | V   |             |  |  |  |
| 2700           | 272 | O           | O  | O  | O  | O  | O  | O   | O   | R           | R   | R   | R  | R           | R  | R  | R   | R   | R  | R  | R  | R           | R   | R  | R  | R  | R   | V   | V  | V           | V  | V   | V   | V  | V  | V  | V   |             |  |  |  |
| 3000           | 302 | O           | O  | O  | O  | O  | O  | O   | O   | R           | R   | R   | R  | R           | R  | R  | R   | R   | R  | R  | R  | R           | R   | R  | R  | R  | R   | V   | V  | V           | V  | V   | V   | V  | V  | V  | V   |             |  |  |  |
| 3300           | 332 | O           | O  | O  | O  | O  | O  | O   | O   | R           | R   | R   | R  | R           | R  | R  | R   | R   | R  | R  | R  | R           | R   | R  | R  | R  | R   | V   | V  | V           | V  | V   | V   | V  | V  | V  | V   |             |  |  |  |
| 3600           | 362 | O           | O  | O  | O  | O  | O  | O   | O   | R           | R   | R   | R  | R           | R  | R  | R   | R   | R  | R  | R  | R           | R   | R  | R  | R  | R   | V   | V  | V           | V  | V   | V   | V  | V  | V  | V   |             |  |  |  |
| 3900           | 392 | O           | O  | O  | O  | O  | O  | O   | O   | R           | R   | R   | R  | R           | R  | R  | R   | R   | R  | R  | R  | R           | R   | R  | R  | R  | R   | V   | V  | V           | V  | V   | V   | V  | V  | V  | V   |             |  |  |  |
| 4300           | 432 | O           | O  | O  | O  | O  | O  | O   | O   | R           | R   | R   | R  | R           | R  | R  | R   | R   | R  | R  | R  | R           | R   | R  | R  | R  | R   | V   | V  | V           | V  | V   | V   | V  | V  | V  | V   |             |  |  |  |

| MAX HEIGHT |      |      |
|------------|------|------|
| O          | R    | V    |
| 1.10       | 1.45 | 2.20 |



| DIELECTRIC     |     | X7R         |    |    |    |    |    |             |     |     |    |             |     |    |    |             |    |     |     |             |    |    |     |             |    |    |    |     |     |    |    |    |     |     |   |
|----------------|-----|-------------|----|----|----|----|----|-------------|-----|-----|----|-------------|-----|----|----|-------------|----|-----|-----|-------------|----|----|-----|-------------|----|----|----|-----|-----|----|----|----|-----|-----|---|
| DIMENSION (MM) |     | GMC32       |    |    |    |    |    | GMC40       |     |     |    | GMC43       |     |    |    | GMC45       |    |     |     | GMC55       |    |    |     | GMC57       |    |    |    |     |     |    |    |    |     |     |   |
| L(L1)          |     | 3.2 ± 0.3   |    |    |    |    |    | 4.57 ± 0.25 |     |     |    | 4.5 ± 0.35  |     |    |    | 4.5 ± 0.35  |    |     |     | 5.7 ± 0.4   |    |    |     | 5.7 ± 0.4   |    |    |    |     |     |    |    |    |     |     |   |
| W              |     | 2.5 ± 0.3   |    |    |    |    |    | 2.03 ± 0.25 |     |     |    | 3.2 ± 0.3   |     |    |    | 6.3 ± 0.4   |    |     |     | 5.0 ± 0.4   |    |    |     | 6.3 ± 0.4   |    |    |    |     |     |    |    |    |     |     |   |
| BW             |     | 0.25 ~ 0.75 |    |    |    |    |    | 0.25 ~ 0.75 |     |     |    | 0.25 ~ 0.75 |     |    |    | 0.40 ~ 1.10 |    |     |     | 0.50 ~ 1.20 |    |    |     | 0.50 ~ 1.20 |    |    |    |     |     |    |    |    |     |     |   |
| RATED VOLTAGE  |     | 6.3         | 10 | 16 | 25 | 35 | 50 | 63          | 100 | 200 | 50 | 100         | 200 | 10 | 16 | 25          | 50 | 100 | 200 | 16          | 25 | 50 | 100 | 200         | 16 | 25 | 50 | 100 | 200 | 16 | 25 | 50 | 100 | 200 |   |
| CAP. RANGE     |     |             |    |    |    |    |    |             |     |     |    |             |     |    |    |             |    |     |     |             |    |    |     |             |    |    |    |     |     |    |    |    |     |     |   |
| 4700pF         | 472 | O           | O  | O  | O  | O  | O  | O           | O   | O   | R  | R           | R   | R  | R  | R           | R  | R   | R   | R           | R  | R  | R   | R           | V  | V  | V  | V   | V   | V  | V  | V  | V   | V   | V |
| 5600           | 562 | O           | O  | O  | O  | O  | O  | O           | O   | O   | V  | V           | V   | R  | R  | R           | R  | R   | R   | R           | R  | R  | R   | R           | V  | V  | V  | V   | V   | V  | V  | V  | V   | V   | V |
| 6800           | 682 | O           | O  | O  | O  | O  | O  | O           | O   | O   | V  | V           | V   | R  | R  | R           | R  | R   | R   | R           | R  | R  | R   | R           | V  | V  | V  | V   | V   | V  | V  | V  | V   | V   | V |
| 8200           | 822 | O           | O  | O  | O  | O  | O  | O           | O   | O   | V  | V           | V   | R  | R  | R           | R  | R   | R   | R           | R  | R  | R   | R           | V  | V  | V  | V   | V   | V  | V  | V  | V   | V   | V |
| 0.01uF         | 103 | R           | R  | R  | R  | R  | R  | R           | R   | R   | V  | V           | V   | R  | R  | R           | R  | R   | R   | R           | R  | R  | R   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   | V   |   |
| 0.012          | 123 | O           | O  | O  | O  | O  | O  | O           | O   | O   | V  | V           | V   | R  | R  | R           | R  | R   | R   | R           | R  | R  | R   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   | V   |   |
| 0.015          | 153 | O           | O  | O  | O  | O  | O  | O           | O   | O   | V  | V           | V   | R  | R  | R           | R  | R   | R   | R           | R  | R  | R   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   | V   |   |
| 0.018          | 183 | O           | O  | O  | O  | O  | O  | O           | O   | O   | V  | V           | V   | R  | R  | R           | R  | R   | R   | R           | R  | R  | R   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   | V   |   |
| 0.022          | 223 | O           | O  | O  | O  | O  | O  | O           | O   | O   | V  | V           | V   | R  | R  | R           | R  | R   | R   | R           | R  | R  | R   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   | V   |   |
| 0.027          | 273 | O           | O  | O  | O  | O  | O  | O           | O   | O   | V  | V           | V   | R  | R  | R           | R  | R   | R   | R           | R  | R  | R   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   | V   |   |
| 0.033          | 333 | O           | O  | O  | O  | O  | O  | T           | T   | T   | V  | V           | V   | R  | R  | R           | R  | R   | R   | R           | R  | R  | R   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   | V   |   |
| 0.039          | 393 | O           | O  | O  | O  | O  | O  | O           | O   | O   | V  | V           | V   | R  | R  | R           | R  | R   | R   | R           | R  | R  | R   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   | V   |   |
| 0.04           | 473 | O           | O  | O  | O  | O  | O  | O           | O   | O   | V  | V           | V   | R  | R  | R           | R  | R   | R   | R           | R  | R  | R   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   | V   |   |
| 0.056          | 563 | O           | O  | O  | O  | O  | O  | O           | O   | O   | V  | V           | V   | R  | R  | R           | R  | R   | R   | R           | R  | R  | R   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   | V   |   |
| 0.068          | 683 | O           | O  | O  | O  | O  | O  | O           | O   | O   | V  | V           | V   | R  | R  | R           | R  | R   | R   | R           | R  | R  | R   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   | V   |   |
| 0.082          | 823 | O           | O  | O  | O  | O  | O  | O           | O   | O   | V  | V           | V   | R  | R  | R           | R  | R   | R   | R           | R  | R  | R   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   | V   |   |
| 0.1            | 104 | M           | M  | M  | M  | M  | M  | R           | R   | R   | V  | V           | V   | R  | R  | R           | R  | R   | R   | R           | R  | R  | V   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   |     |   |
| 0.12           | 124 | O           | O  | O  | O  | O  | O  | O           | O   | O   | A1 | A1          | V   | R  | R  | R           | R  | R   | R   | R           | R  | R  | R   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   | V   |   |
| 0.15           | 154 | O           | O  | O  | O  | O  | O  | Y           | Y   | A1  | A1 | V           | R   | R  | R  | R           | R  | R   | R   | R           | R  | R  | V   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   |     |   |
| 0.18           | 184 | O           | O  | O  | O  | O  | O  | Y           | Y   | A1  | A1 | V           | R   | R  | R  | R           | R  | R   | R   | R           | R  | R  | V   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   |     |   |
| 0.22           | 224 | O           | O  | O  | O  | O  | O  | O           | R   | A1  | A1 |             | R   | R  | R  | R           | R  | R   | R   | R           | R  | R  | V   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   |     |   |
| 0.27           | 274 | O           | O  | O  | O  | O  | O  | T           | Y   | A1  | A1 |             | R   | R  | R  | R           | R  | R   | R   | R           | R  | R  | V   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   |     |   |
| 0.33           | 334 | O           | O  | O  | O  | O  | O  | O           | T   | A1  | A1 |             | R   | R  | R  | R           | R  | R   | R   | R           | R  | R  | V   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   |     |   |
| 0.39           | 394 | O           | O  | O  | R  | R  | Z  | Z           | Z   | A1  |    |             | R   | R  | R  | R           | R  | R   | R   | R           | R  | R  | V   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   |     |   |
| 0.47           | 474 | O           | O  | O  | O  | O  | O  | O           | V   | A1  |    |             | R   | R  | R  | R           | R  | R   | R   | R           | R  | R  | V   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   |     |   |
| 0.56           | 564 | R           | R  | R  | R  | R  | R  | Y           | Y   | A1  |    |             | R   | R  | R  | R           | V  |     | V   | V           | V  | V  | V   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   |     |   |
| 0.68           | 684 | O           | O  | O  | O  | O  | O  | T           | Y   | A1  |    |             | R   | R  | R  | V           | V  |     | V   | V           | V  | V  | V   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   |     |   |
| 0.82           | 824 | O           | O  | O  | O  | O  | O  | V           |     |     |    |             | R   | R  | R  | V           | V  |     | V   | V           | V  | V  | V   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   |     |   |
| 1              | 105 | T           | T  | T  | T  | T  | T  | Y           |     |     |    |             | V   | V  | V  | V           | V  | Y   | R   | R           | R  | R  | V   | X           | X  | X  | X  | X   | X   | V  | V  | V  | V   | V   |   |
| 1.5            | 155 | Z           | Z  | Z  | Z  | Z  | Z  | Z           |     |     |    |             | V   | V  | V  | V           | V  |     | V   | V           | V  | V  | Y   | V           | V  | V  | V  | V   | V   | Y  | Y  | Y  | Y   | Y   |   |
| 2.2            | 225 | Z           | Z  | Z  | Z  | Z  | Z  | Z           |     |     |    |             | Y   | Y  | Y  | Y           | Y  |     | V   | V           | V  | V  | Y   | V           | V  | V  | V  | V   | V   | Y  | Y  | Y  | Y   | Y   |   |
| 3.3            | 335 | Z           | Z  | Z  | Z  | Z  | Z  | Z           |     |     |    |             | Y   | Y  | Y  | Y           | Y  |     | V   | V           | V  | V  | V   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   |     |   |
| 4.7            | 475 | A3          | A3 | A3 | A3 | A3 | A3 | Z           | Z   |     |    |             | V   | V  | V  | V           | Y  |     | V   | V           | V  | V  | V   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   |     |   |
| 6.8            | 685 | Z           | Z  | Z  | Z  | Z  |    |             |     |     |    |             | Y   | Y  | Y  | Y           |    |     | V   | V           | V  | V  | V   | V           | V  | V  | V  | V   | V   | V  | V  | V  | V   |     |   |
| 10             | 106 | Z           | Z  | Z  | Z  | Z  | Z  | Y           | Z   |     |    |             | Y   | Y  | Y  | Y           |    |     | Y   | Y           | Y  | Y  |     | Y           | Y  | Y  | Y  |     | Y   | Y  | Y  | Y  | Y   |     |   |
| 15             | 156 | Y           | Y  | Y  |    |    |    |             |     |     |    |             | A1  | A1 | A1 |             |    |     |     |             |    |    |     | A1          | A1 |    |    |     |     |    |    |    |     |     |   |
| 22             | 226 | Y           | Y  | Y  | Y  |    |    |             |     |     |    |             | Y   | Y  | Y  | A4          |    |     |     |             |    |    |     | Y           | Y  | Y  |    |     |     |    |    |    |     |     |   |
| 33             | 336 |             |    |    |    |    |    |             |     |     |    |             | Y   | Y  |    |             |    |     |     |             |    |    |     | V           | V  |    |    |     |     |    |    |    |     |     |   |
| 47             | 476 | Y           | Y  |    |    |    |    |             |     |     |    |             |     |    |    |             |    |     |     |             |    |    |     | X           | X  |    |    |     |     |    |    |    |     |     |   |
| 100            | 107 |             |    |    |    |    |    |             |     |     |    |             |     |    |    |             |    |     |     |             |    |    |     |             |    |    |    |     |     |    |    |    |     |     |   |
| 150            | 157 |             |    |    |    |    |    |             |     |     |    |             |     |    |    |             |    |     |     |             |    |    |     |             |    |    |    |     |     |    |    |    |     |     |   |
| 220            | 227 |             |    |    |    |    |    |             |     |     |    |             |     |    |    |             |    |     |     |             |    |    |     |             |    |    |    |     |     |    |    |    |     |     |   |
| 330            | 337 |             |    |    |    |    |    |             |     |     |    |             |     |    |    |             |    |     |     |             |    |    |     |             |    |    |    |     |     |    |    |    |     |     |   |

| MAX HEIGHT |      |      |      |     |     |     |     |     |     |     |
|------------|------|------|------|-----|-----|-----|-----|-----|-----|-----|
| M          | O    | R    | T    | V   | X   | A3  | Y   | Z   | A1  | A4  |
| 0.95       | 1.10 | 1.45 | 1.80 | 2.2 | 2.5 | 2.7 | 2.8 | 2.9 | 3.1 | 3.4 |



| DIELECTRIC     |     | X7S         |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
|----------------|-----|-------------|-----|----|----|-------|----|------------|----|----|-----|-------|----|-----------|----|----|----|-----|---|-------------|----|----|----|----|----|-------------|---|---|----|----|----|-------------|----|-----|---|-----|----|-------------|----|----|----|-----|----|------------|----|----|-----|----|----|-----|
| DIMENSION (MM) |     | GMC02       |     |    |    |       |    | GMC04      |    |    |     |       |    | GMC10     |    |    |    |     |   | GMC21       |    |    |    |    |    | GMC31       |   |   |    |    |    | GMC32       |    |     |   |     |    | GMC43       |    |    |    |     |    | GMC55      |    |    |     |    |    |     |
| L(L1)          |     | 0.6 ± 0.03  |     |    |    |       |    | 1.0 ± 0.05 |    |    |     |       |    | 1.6 ± 0.2 |    |    |    |     |   | 2.0 ± 0.3   |    |    |    |    |    | 3.2 ± 0.3   |   |   |    |    |    | 3.2 ± 0.3   |    |     |   |     |    | 4.5 ± 0.35  |    |    |    |     |    | 5.7 ± 0.4  |    |    |     |    |    |     |
| W              |     | 0.3 ± 0.03  |     |    |    |       |    | 0.5 ± 0.05 |    |    |     |       |    | 0.8 ± 0.2 |    |    |    |     |   | 1.25 ± 0.2  |    |    |    |    |    | 1.6 ± 0.2   |   |   |    |    |    | 2.5 ± 0.3   |    |     |   |     |    | 3.2 ± 0.3   |    |    |    |     |    | 6.3 ± 0.4  |    |    |     |    |    |     |
| BW             |     | 0.15 ± 0.05 |     |    |    |       |    | 0.1 - 0.35 |    |    |     |       |    | 0.1 - 0.4 |    |    |    |     |   | 0.25 - 0.75 |    |    |    |    |    | 0.25 - 0.75 |   |   |    |    |    | 0.25 - 0.75 |    |     |   |     |    | 0.25 - 0.75 |    |    |    |     |    | 0.50 - 1.2 |    |    |     |    |    |     |
| RATED VOLTAGE  |     | 4           | 6.3 | 10 | 16 | 4/6.3 | 10 | 16         | 25 | 50 | 100 | 4/6.3 | 10 | 16        | 25 | 35 | 50 | 100 | 4 | 6.3         | 10 | 16 | 25 | 35 | 50 | 100         | 4 | 6 | 10 | 16 | 25 | 35          | 50 | 100 | 4 | 6.3 | 10 | 16          | 25 | 50 | 63 | 100 | 16 | 25         | 35 | 50 | 100 | 25 | 50 | 100 |
| CAP. RANGE     |     |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 1000pF         | 102 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 1500           | 152 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 2200           | 222 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 3300           | 332 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 4700           | 472 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 6800           | 682 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| .01uF          | 103 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 0.022          | 223 | C           | C   | C  |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 0.033          | 333 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 0.039          | 393 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 0.047          | 473 | C           | C   | C  |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 0.056          | 563 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 0.068          | 683 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 0.082          | 823 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 0.1            | 104 | C           | C   | C  | C  |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 0.15           | 154 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 0.22           | 224 | D           | D   |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 0.33           | 334 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 0.47           | 474 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 0.56           | 564 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 0.68           | 684 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 0.82           | 824 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 1              | 105 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 1.5            | 155 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 2.2            | 225 | J           | J   |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 3.3            | 335 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 4.7            | 475 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 6.8            | 685 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 10             | 106 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 15             | 156 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 22             | 226 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 33             | 336 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 47             | 476 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |
| 100            | 107 |             |     |    |    |       |    |            |    |    |     |       |    |           |    |    |    |     |   |             |    |    |    |    |    |             |   |   |    |    |    |             |    |     |   |     |    |             |    |    |    |     |    |            |    |    |     |    |    |     |

| MAX HEIGHT |      |      |      |     |      |      |      |      |      |      |      |     |     |     |     |     |     |
|------------|------|------|------|-----|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|
| C          | D    | H    | I    | J   | L    | M    | N    | P    | R    | T    | U    | V   | X   | Y   | Z   | A1  | A4  |
| 0.33       | 0.35 | 0.55 | 0.65 | 0.7 | 0.90 | 0.95 | 1.00 | 1.35 | 1.45 | 1.80 | 1.90 | 2.2 | 2.5 | 2.8 | 2.9 | 3.1 | 3.4 |



| DIELECTRIC     | X6S         |     |    |    |    |            |   |     |    |    |           |    |    |   |     |             |    |    |    |    |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
|----------------|-------------|-----|----|----|----|------------|---|-----|----|----|-----------|----|----|---|-----|-------------|----|----|----|----|-------------|-----|----|----|----|----|----|---|-----|----|----|----|----|----|-----|
|                | GMC02       |     |    |    |    | GMC04      |   |     |    |    | GMC10     |    |    |   |     | GMC21       |    |    |    |    | GMC31       |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| DIMENSION (MM) | 0.6 ± 0.03  |     |    |    |    | 1.0 ± 0.05 |   |     |    |    | 1.6 ± 0.2 |    |    |   |     | 2.0 ± 0.3   |    |    |    |    | 3.2 ± 0.3   |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| L(L1)          | 0.6 ± 0.03  |     |    |    |    | 1.0 ± 0.05 |   |     |    |    | 1.6 ± 0.2 |    |    |   |     | 2.0 ± 0.3   |    |    |    |    | 3.2 ± 0.3   |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| W              | 0.3 ± 0.03  |     |    |    |    | 0.5 ± 0.05 |   |     |    |    | 0.8 ± 0.2 |    |    |   |     | 1.25 ± 0.2  |    |    |    |    | 1.6 ± 0.2   |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| RATED VOLTAGE  | 0.15 ± 0.05 |     |    |    |    | 0.1 ~ 0.35 |   |     |    |    | 0.1 ~ 0.4 |    |    |   |     | 0.25 ~ 0.75 |    |    |    |    | 0.25 ~ 0.75 |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| CAP. RANGE     | 4           | 6.3 | 10 | 16 | 25 | 35         | 4 | 6.3 | 10 | 16 | 25        | 35 | 50 | 4 | 6.3 | 10          | 16 | 25 | 35 | 50 | 4           | 6.3 | 10 | 16 | 25 | 35 | 50 | 4 | 6.3 | 10 | 16 | 25 | 35 | 50 | 100 |
| 200pF          | 222         | C   | C  | C  | C  | C          |   |     |    |    |           |    |    |   |     |             |    |    |    |    |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 4700           | 472         | C   | C  | C  | C  | C          |   |     |    |    |           |    |    |   |     |             |    |    |    |    |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| .01uf          | 103         | C   | C  | C  | C  | C          | H | H   | H  | H  | H         | H  | H  |   |     |             |    |    |    |    |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 0.012          | 123         | C   | C  |    |    |            | H | H   | H  | H  | H         | H  | H  |   |     |             |    |    |    |    |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 0.015          | 153         | C   | C  |    |    |            | H | H   | H  | H  | H         | H  | H  |   |     |             |    |    |    |    |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 0.018          | 183         | C   | C  |    |    |            | H | H   | H  | H  | H         | H  | H  |   |     |             |    |    |    |    |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 0.022          | 223         | C   | C  | C  | C  | C          | H | H   | H  | H  | H         | H  | H  |   |     |             |    |    |    |    |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 0.027          | 273         | C   | C  | C  | C  |            | H | H   | H  | H  | H         |    |    |   |     |             |    |    |    |    |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 0.033          | 333         | C   | C  | C  | C  |            | H | H   | H  | H  | H         | H  |    |   |     |             |    |    |    |    |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 0.039          | 393         | C   | C  |    |    |            |   |     |    |    |           |    |    |   |     |             |    |    |    |    |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 0.047          | 473         | C   | C  | C  | C  | C          | H | H   | H  | H  | H         | H  | H  |   |     |             |    |    |    |    |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 0.056          | 563         | C   | C  |    |    |            | H | H   | H  | H  | H         | J  | J  |   |     |             |    |    |    |    |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 0.068          | 683         | C   | C  | C  | C  |            | H | H   | H  | H  | H         | J  | J  |   |     |             |    |    |    |    |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 0.082          | 823         | C   | C  |    |    |            | H | H   | H  | H  | H         | J  | J  |   |     |             |    |    |    |    |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 0.1            | 104         | C   | C  | C  | C  |            | H | H   | H  | H  | H         | J  | J  |   |     |             |    |    |    |    |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 0.12           | 124         |     |    |    |    |            | H | H   |    |    |           |    |    |   |     |             |    |    |    |    |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 0.15           | 154         |     |    |    |    |            | H | H   | H  | H  | H         |    |    | M | M   | M           | M  | M  | M  | M  |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 0.18           | 184         |     |    |    |    |            | H | H   |    |    |           |    |    | M | M   | M           | M  | M  |    |    |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 0.22           | 224         | C   | C  |    |    |            | H | H   | H  | H  | H         | H  |    | M | M   | M           | M  | M  | M  | M  |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 0.27           | 274         |     |    |    |    |            | H | H   |    |    |           |    |    | M | M   | M           | M  |    |    |    |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 0.33           | 334         |     |    |    |    |            | H | H   | H  | H  |           |    |    | M | M   | M           | M  | M  | M  | M  |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 0.39           | 394         |     |    |    |    |            | H | H   |    |    |           |    |    | M | M   | M           | M  | M  |    |    |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 0.47           | 474         | E   | E  | E  | E  |            | H | H   | H  | H  |           |    |    | M | M   | M           | M  | M  | M  | M  | R           | R   | R  | R  | R  | R  | R  | R | R   | R  | R  |    |    |    |     |
| 0.56           | 564         |     |    |    |    |            | H | H   |    |    |           |    |    | M | M   | M           | M  |    |    |    | R           | R   | R  | R  |    |    |    |   |     |    |    |    |    |    |     |
| 0.68           | 684         |     |    |    |    |            | H | H   | H  | H  |           |    |    | M | M   | M           | M  | M  | M  | M  | R           | R   | R  | R  | R  | R  | R  | R | R   | R  | R  |    |    |    |     |
| 0.82           | 824         |     |    |    |    |            | H | H   |    |    |           |    |    | M | M   | M           | M  |    |    |    | R           | R   | R  | R  |    |    |    |   |     |    |    |    |    |    |     |
| 1              | 105         | E   | E  | E  | E  |            | H | H   | J  | J  | J         | J  |    | M | M   | M           | M  | M  | M  | M  | R           | R   | R  | R  | R  | R  | R  | T | T   | T  | T  | T  | T  |    |     |
| 1.5            | 155         |     |    |    |    |            |   |     |    |    |           |    |    | N | N   | N           | N  |    |    |    | R           | R   | R  | R  | R  | R  | R  | U | U   | U  | U  | U  | U  |    |     |
| 2.2            | 225         |     |    |    |    |            | J | J   | J  | J  | J         |    |    | N | N   | N           | N  |    |    |    | R           | R   | R  | R  | R  | R  | R  | U | U   | U  | U  | U  | U  |    |     |
| 2.7            | 275         |     |    |    |    |            |   |     |    |    |           |    |    |   |     |             |    |    |    |    |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 3.3            | 335         |     |    |    |    |            |   |     |    |    |           |    |    | N | N   | N           | N  |    |    |    | R           | R   | R  | R  | R  | R  | R  | U | U   | U  | U  | U  | U  |    |     |
| 3.9            | 395         |     |    |    |    |            |   |     |    |    |           |    |    |   |     |             |    |    |    |    |             |     |    |    |    |    |    |   |     |    |    |    |    |    |     |
| 4.7            | 475         |     |    |    |    |            | I | I   |    |    |           |    |    | L | L   | L           | N  | N  |    |    | R           | R   | R  | R  | R  | R  | R  | U | U   | U  | U  | U  | U  |    |     |
| 6.8            | 685         |     |    |    |    |            |   |     |    |    |           |    |    | N | N   | N           |    |    |    |    | R           | R   | R  | R  |    |    |    | U | U   | U  | U  | U  |    |    |     |
| 10             | 106         |     |    |    |    |            | J | J   |    |    |           |    |    | N | N   | N           | N  |    |    |    | R           | R   | R  | R  | R  | R  | U  | U | U   | U  | U  | U  |    |    |     |
| 15             | 156         |     |    |    |    |            |   |     |    |    |           |    |    |   |     |             |    |    |    |    | R           | R   | R  | R  |    |    | U  | U | U   | U  |    |    |    |    |     |
| 22             | 226         |     |    |    |    |            | K |     |    |    |           |    |    | N | N   | N           |    |    |    |    | R           | R   | R  | R  |    |    | U  | U | U   | U  | U  |    |    |    |     |
| 33             | 336         |     |    |    |    |            |   |     |    |    |           |    |    |   |     |             |    |    |    |    | R           |     |    |    |    |    | U  | U | U   |    |    |    |    |    |     |
| 47             | 476         |     |    |    |    |            |   |     |    |    |           |    |    | N |     |             |    |    |    |    | R           | R   |    |    |    |    | U  | U | U   |    |    |    |    |    |     |
| 68             | 686         |     |    |    |    |            |   |     |    |    |           |    |    |   |     |             |    |    |    |    |             |     |    |    |    |    | U  |   |     |    |    |    |    |    |     |
| 100            | 107         |     |    |    |    |            |   |     |    |    |           |    |    |   |     |             |    |    |    |    | R           |     |    |    |    |    | U  | U |     |    |    |    |    |    |     |
| 150            | 157         |     |    |    |    |            |   |     |    |    |           |    |    |   |     |             |    |    |    |    |             |     |    |    |    |    | U  |   |     |    |    |    |    |    |     |
| 220            | 227         |     |    |    |    |            |   |     |    |    |           |    |    |   |     |             |    |    |    |    |             |     |    |    |    |    | U  |   |     |    |    |    |    |    |     |

| MAX HEIGHT |      |      |      |     |     |     |      |      |      |      |      |
|------------|------|------|------|-----|-----|-----|------|------|------|------|------|
| C          | E    | H    | I    | J   | K   | L   | M    | N    | R    | T    | U    |
| 0.33       | 0.39 | 0.55 | 0.65 | 0.7 | 0.8 | 0.9 | 0.95 | 1.00 | 1.45 | 1.80 | 1.90 |





| DIELECTRIC     | X6S         |   |     |    |    |    |    |    |             |     |    |    |    |    |    |  |
|----------------|-------------|---|-----|----|----|----|----|----|-------------|-----|----|----|----|----|----|--|
| DIMENSION (MM) | GMC32       |   |     |    |    |    |    |    | GMC43       |     |    |    |    |    |    |  |
| L(L1)          | 3.2 ± 0.30  |   |     |    |    |    |    |    | 4.5 ± 0.35  |     |    |    |    |    |    |  |
| W              | 2.5 ± 0.30  |   |     |    |    |    |    |    | 3.2 ± 0.30  |     |    |    |    |    |    |  |
| BW             | 0.75 ± 0.25 |   |     |    |    |    |    |    | 0.25 ~ 0.75 |     |    |    |    |    |    |  |
| RATED VOLTAGE  | 2.5         | 4 | 6.3 | 10 | 16 | 25 | 35 | 50 | 4           | 6.3 | 10 | 16 | 25 | 35 | 50 |  |
| CAP. RANGE     |             |   |     |    |    |    |    |    |             |     |    |    |    |    |    |  |
| 3.3uF          | 335         |   |     |    |    |    | Z  | Z  | Z           |     |    |    |    |    |    |  |
| 4.7            | 475         |   |     |    |    |    | Z  | Z  | Z           |     |    |    |    |    |    |  |
| 6.8            | 685         |   |     |    |    |    | Z  | Z  | Z           |     |    |    |    |    |    |  |
| 10             | 106         |   |     | Z  | Z  | Z  | Z  | Z  |             |     |    |    |    |    |    |  |
| 22             | 226         |   |     | Y  | Y  | Y  |    |    |             |     |    |    |    |    |    |  |
| 33             | 336         |   |     |    |    |    |    |    |             |     |    |    |    |    |    |  |
| 47             | 476         |   |     | Y  | Y  | Y  |    |    |             |     |    |    |    |    |    |  |
| 68             | 686         |   |     |    |    |    |    |    |             |     |    |    |    |    |    |  |
| 100            | 107         | Z | Z   | Z  | Z  |    |    |    | A1          | A1  |    |    |    |    |    |  |
| 150            | 157         | Z | Z   |    |    |    |    |    |             |     |    |    |    |    |    |  |
| 220            | 227         | Z | Z   | Z  |    |    |    |    |             |     |    |    |    |    |    |  |
| 330            | 337         | Z | Z   |    |    |    |    |    |             |     |    |    |    |    |    |  |

| MAX HEIGHT |     |     |
|------------|-----|-----|
| Y          | Z   | A1  |
| 2.8        | 2.9 | 3.1 |







X5R

| DIELECTRIC     |     | X5R         |     |    |    |    |    |    |     |             |     |    |    |    |    |    |    |             |     |    |    |    |    |    |     |            |    |    |    |    |     |  |  |  |  |  |  |
|----------------|-----|-------------|-----|----|----|----|----|----|-----|-------------|-----|----|----|----|----|----|----|-------------|-----|----|----|----|----|----|-----|------------|----|----|----|----|-----|--|--|--|--|--|--|
| DIMENSION (MM) |     | GMC31       |     |    |    |    |    |    |     | GMC32       |     |    |    |    |    |    |    | GMC43       |     |    |    |    |    |    |     | GMC55      |    |    |    |    |     |  |  |  |  |  |  |
| L(L1)          |     | 3.2 ± 0.3   |     |    |    |    |    |    |     | 3.2 ± 0.3   |     |    |    |    |    |    |    | 4.5 ± 0.35  |     |    |    |    |    |    |     | 5.7 ± 0.4  |    |    |    |    |     |  |  |  |  |  |  |
| W              |     | 1.6 ± 0.2   |     |    |    |    |    |    |     | 2.5 ± 0.3   |     |    |    |    |    |    |    | 3.2 ± 0.3   |     |    |    |    |    |    |     | 5.0 ± 0.4  |    |    |    |    |     |  |  |  |  |  |  |
| BW             |     | 0.25 ~ 0.75 |     |    |    |    |    |    |     | 0.25 ~ 0.75 |     |    |    |    |    |    |    | 0.25 ~ 0.75 |     |    |    |    |    |    |     | 0.50 ~ 1.2 |    |    |    |    |     |  |  |  |  |  |  |
| RATED VOLTAGE  |     | 4           | 6.3 | 10 | 16 | 25 | 35 | 50 | 100 | 4           | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100         | 6.3 | 10 | 16 | 25 | 35 | 50 | 100 | 6.3        | 10 | 16 | 25 | 50 | 100 |  |  |  |  |  |  |
| CAP. RANGE     |     |             |     |    |    |    |    |    |     |             |     |    |    |    |    |    |    |             |     |    |    |    |    |    |     |            |    |    |    |    |     |  |  |  |  |  |  |
| .1uF           | 104 | M           | M   | M  | M  | M  | M  | M  | M   | V           | V   | V  | V  | V  | V  | V  | V  | V           |     |    |    |    |    |    |     |            |    |    |    |    |     |  |  |  |  |  |  |
| 0.12           | 124 | M           | M   | M  | M  | M  | M  | M  | M   | O           | O   | O  | O  | O  | O  | O  | O  | O           |     |    |    |    |    |    |     |            |    |    |    |    |     |  |  |  |  |  |  |
| 0.15           | 154 | P           | P   | P  | P  | P  | P  | P  | P   | T           | O   | O  | O  | O  | O  | O  | O  | O           |     |    |    |    |    |    |     |            |    |    |    |    |     |  |  |  |  |  |  |
| 0.18           | 184 | P           | P   | P  | P  | P  | P  | P  | P   | T           | O   | O  | O  | O  | O  | O  | O  | O           |     |    |    |    |    |    |     |            |    |    |    |    |     |  |  |  |  |  |  |
| 0.22           | 224 | Q           | Q   | Q  | Q  | Q  | Q  | Q  | Q   | T           | O   | O  | O  | O  | O  | O  | O  | O           |     |    |    |    |    |    |     |            |    |    |    |    |     |  |  |  |  |  |  |
| 0.27           | 274 | Q           | Q   | Q  | Q  | Q  | Q  | Q  | Q   | T           | O   | O  | O  | O  | O  | O  | O  | O           |     |    |    |    |    |    |     |            |    |    |    |    |     |  |  |  |  |  |  |
| 0.33           | 334 | Q           | Q   | Q  | Q  | Q  | Q  | Q  | Q   | T           | O   | O  | O  | O  | O  | O  | O  | O           |     |    |    |    |    |    |     |            |    |    |    |    |     |  |  |  |  |  |  |
| 0.39           | 394 | U           | U   | U  | U  | U  | U  | U  | U   | O           | O   | O  | O  | O  | O  | R  | R  | Y           | Y   |    |    |    |    |    |     |            |    |    |    |    |     |  |  |  |  |  |  |
| 0.47           | 474 | U           | U   | U  | U  | U  | U  | U  | U   | O           | O   | O  | O  | O  | O  | O  | O  | O           |     |    |    |    |    |    |     |            |    |    |    |    |     |  |  |  |  |  |  |
| 0.56           | 564 | U           | U   | U  | U  | U  | U  | U  | U   | R           | R   | R  | R  | R  | R  | R  | R  | Y           |     |    |    |    |    |    |     |            |    |    |    |    |     |  |  |  |  |  |  |
| 0.68           | 684 | U           | U   | U  | U  | U  | U  | U  | U   | O           | O   | O  | O  | O  | O  | O  | O  | T           |     |    |    |    |    |    |     |            |    |    |    |    |     |  |  |  |  |  |  |
| 0.82           | 824 | U           | U   | U  | U  | U  | U  | U  | U   | O           | O   | O  | O  | O  | O  | O  | O  | V           |     |    |    |    |    |    |     |            |    |    |    |    |     |  |  |  |  |  |  |
| 1              | 105 | T           | T   | T  | T  | T  | T  | T  | T   | T           | T   | T  | T  | T  | T  | T  | T  | Y           |     |    |    |    |    |    |     |            |    |    |    |    |     |  |  |  |  |  |  |
| 1.5            | 155 | U           | U   | U  | U  | U  | U  | U  | U   | Z           | Z   | Z  | Z  | Z  | Z  | Z  | Z  | Z           |     |    |    |    |    |    |     |            |    |    |    |    |     |  |  |  |  |  |  |
| 2.2            | 225 | U           | U   | U  | U  | U  | U  | U  | U   | Z           | Z   | Z  | Z  | Z  | Z  | Z  | Z  | Z           |     |    |    |    |    |    |     |            |    |    |    |    |     |  |  |  |  |  |  |
| 3.3            | 335 | U           | U   | U  | U  | U  | U  | U  | U   | Z           | Z   | Z  | Z  | Z  | Z  | Z  | Z  | Z           | Y   | Y  | Y  | Y  | Y  | Y  | Y   | V          | V  | V  | V  | V  | V   |  |  |  |  |  |  |
| 4.7            | 475 | U           | U   | U  | U  | U  | U  | U  | U   | Z           | Z   | Z  | Z  | Z  | Z  | Z  | Z  | Z           | V   | V  | V  | V  | V  | V  | Y   | V          | V  | V  | V  | V  |     |  |  |  |  |  |  |
| 6.8            | 685 | U           | U   | U  | U  | U  | U  | U  | U   | Z           | Z   | Z  | Z  | Z  | Z  | Z  | Z  | Z           | Y   | Y  | Y  | Y  | Y  | Y  | Y   | V          | V  | V  | V  | V  |     |  |  |  |  |  |  |
| 10             | 106 | U           | U   | U  | U  | U  | U  | U  | U   | Y           | Y   | Y  | Y  | Y  | Y  | Y  | Y  | Y           | Y   | Y  | Y  | Y  | Y  | Y  | Y   | Y          | Y  | Y  | Y  | Y  | Y   |  |  |  |  |  |  |
| 15             | 156 | T           | T   | T  | T  | T  | T  | T  | T   | Y           | Y   | Y  | Y  | Y  | Y  | Y  | Y  | Y           | A1  | A1 | A1 | A1 |    |    |     | A1         | A1 | A1 |    |    |     |  |  |  |  |  |  |
| 22             | 226 | T           | T   | T  | T  | T  | T  | T  | T   | Y           | Y   | Y  | Y  | Y  | Y  | Y  | Y  | Y           | Y   | Y  | Y  | Y  | Y  |    |     | Y          | Y  | Y  | Y  | Y  |     |  |  |  |  |  |  |
| 33             | 336 | T           | T   | T  | T  | T  | T  | T  | T   | V           | V   | V  |    |    |    |    |    |             | Y   | Y  | Y  |    |    |    |     | V          | V  | V  |    |    |     |  |  |  |  |  |  |
| 47             | 476 | T           | T   | T  | T  | T  | T  | T  | T   | Y           | Y   | Y  | Y  | Y  | Y  | Y  | Y  | Y           | A1  | A1 |    |    |    |    |     | X          | X  | X  | X  |    |     |  |  |  |  |  |  |
| 68             | 686 | U           | U   | U  |    |    |    |    |     | V           | V   |    |    |    |    |    |    |             | A1  | A1 |    |    |    |    |     | X          | X  |    |    |    |     |  |  |  |  |  |  |
| 100            | 107 | T           | T   | T  |    |    |    |    |     | Y           | Y   | Y  | Y  |    |    |    |    |             | A1  | A1 |    |    |    |    |     | A1         | A1 |    |    |    |     |  |  |  |  |  |  |
| 220            | 227 | U*          | U*  |    |    |    |    |    |     | Y           | Y   | Y  |    |    |    |    |    |             |     |    |    |    |    |    |     |            |    |    |    |    |     |  |  |  |  |  |  |
| 330            | 337 |             |     |    |    |    |    |    |     | Y           | Y   |    |    |    |    |    |    |             |     |    |    |    |    |    |     |            |    |    |    |    |     |  |  |  |  |  |  |

| MAX HEIGHT |     |      |      |      |      |     |     |     |      |     |     |  |
|------------|-----|------|------|------|------|-----|-----|-----|------|-----|-----|--|
| M          | O   | P    | Q    | R    | T    | U   | V   | X   | Y    | Z   | A1  |  |
| 0.95       | 1.1 | 1.35 | 1.40 | 1.45 | 1.80 | 1.9 | 2.2 | 2.5 | 2.80 | 2.9 | 3.1 |  |

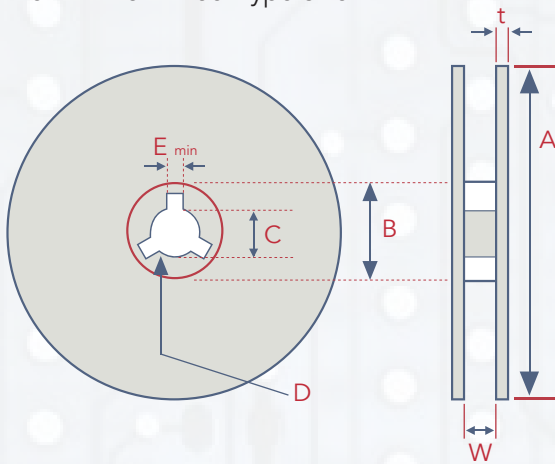
GMC31 - \* L3.2 ± 0.3 | W1.6+/-0.3





# PACKAGING (TAPING)

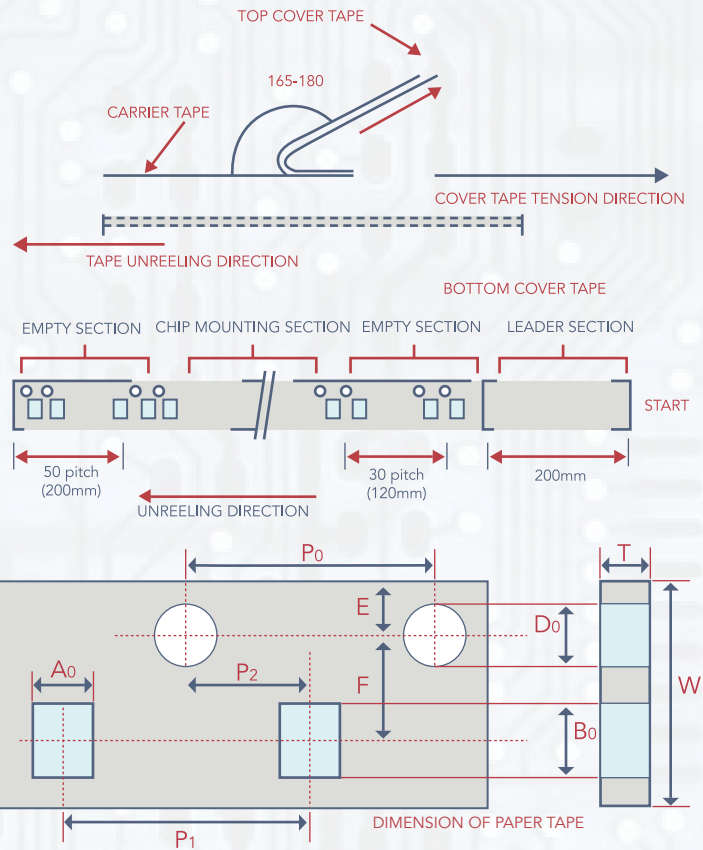
Per EIA-481 - Reel Type Size



UNIT: mm

| SYMBOL   | TAPE WIDTH | A        | B      | C       | D      | E       | W      | t       |
|----------|------------|----------|--------|---------|--------|---------|--------|---------|
| 7" Reel  | 8mm        | Ø178±2.0 | MINØ50 | Ø13±0.5 | 21±0.8 | 2.0±0.5 | 10±0.5 | 0.9±0.2 |
|          | 12mm       | Ø178±2.0 | MINØ50 | Ø13±0.5 | 21±0.8 | 2.0±0.5 | 13±0.5 | 1.2±0.2 |
| 10" Reel | 8mm        | Ø258±2.0 | MINØ70 | Ø13±0.5 | 21±0.8 | 2.0±0.5 | 10±0.5 | 1.8±0.2 |
|          | 12mm       | Ø330±2.0 | MINØ70 | Ø13±0.5 | 21±0.8 | 2.0±0.5 | 13±0.5 | 2.2±0.2 |

## CarrierTape (Standard)



- To peel off the cover tape by the method shown in the right figure apply a peel-off force of 20GF - 60GF (card board); 10GF - 75GF (plastic tape).

-The cover tape should not touch the top or bottom of the chip.

- If the cover tape has been peeled off it may be difficult to remove the chip due to punch-hole clearance, dirt, and debris. Make sure therefore that no paper waste will adhere to and block the absorption nozzle.

- If the cover tape has been peeled off from the top, stick it back on with a suitable adhesive.

- Follow the illustration for the start and end of the winding operation.

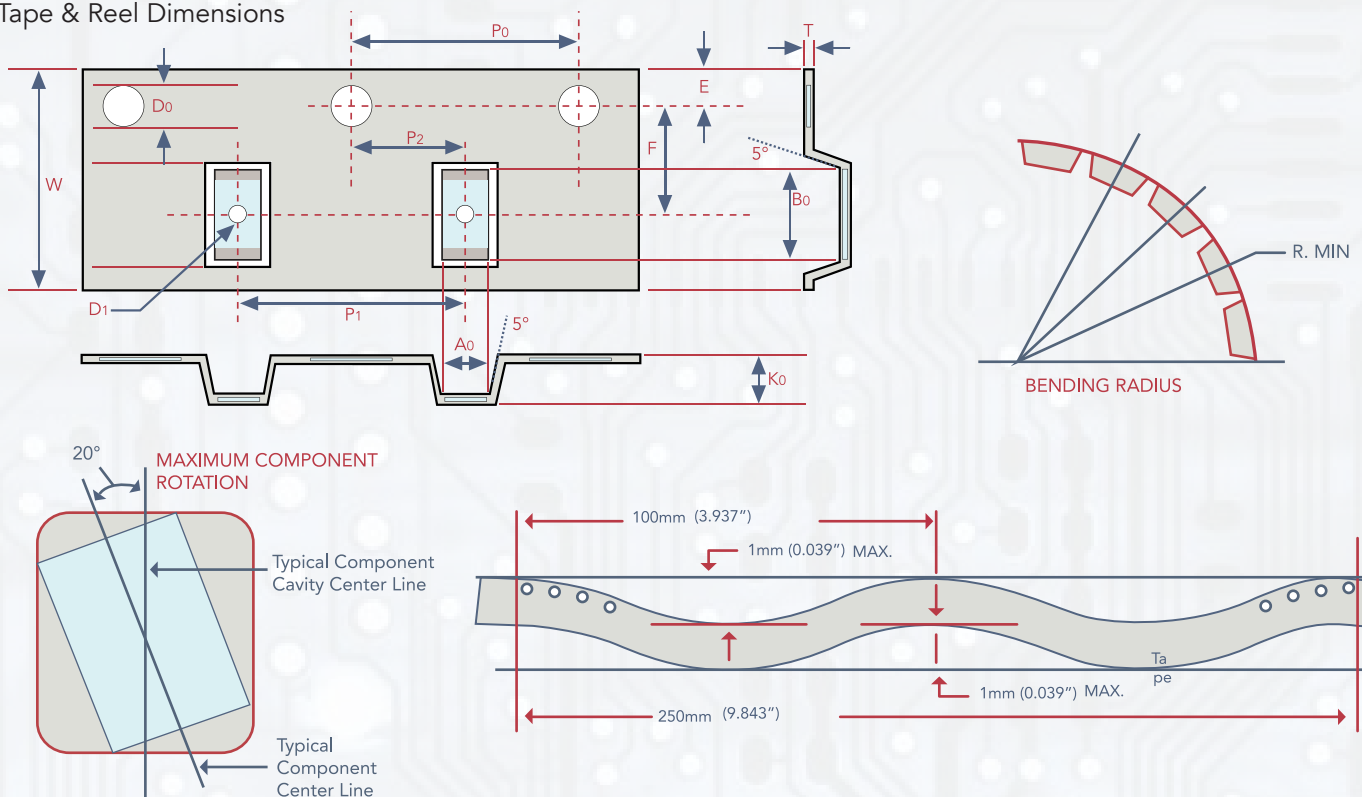
CARDBOARD CARRIER TAPE FOR 01005, 0201, 0402, 0603, 0805, 1206

UNIT=mm

| TYPE  | A <sub>0</sub> | B <sub>0</sub> | T         | K <sub>0</sub> | W        | P <sub>0</sub> | 10XP <sub>0</sub> | P <sub>1</sub> | P <sub>2</sub> | D <sub>0</sub> | D <sub>1</sub> | E         | F        | MOUNTING HOLE      | STD. REEL QTY 7" | OPTIONAL REEL QTY (10/13")       |
|-------|----------------|----------------|-----------|----------------|----------|----------------|-------------------|----------------|----------------|----------------|----------------|-----------|----------|--------------------|------------------|----------------------------------|
| 01005 | 0.25±0.04      | 0.45±0.04      | 0.36±0.05 | *              | 8.0±0.30 | 4.0±0.10       | 40.0±0.10         | 2.0±0.05       | 2.0±0.05       | 1.5±0.1        | *              | 1.75±0.1  | 3.5±0.05 | Angular Punch Hole | 20,000           | 50,000 D                         |
| 0201  | 0.39±0.07      | 0.69±0.07      | <0.50     | *              | 8.0±0.10 | 4.0±0.10       | 40.0±0.10         | 2.0±0.05       | 2.0±0.05       | 1.55±0.05      | *              | 1.75±0.05 | 3.5±0.05 |                    | 10,000<br>15,000 | 50,000 D                         |
| 0402  | 0.7±0.20       | 1.2±0.20       | <0.80     | *              | 8.0±0.10 | 4.0±0.10       | 40.0±0.10         | 2.0±0.05       | 2.0±0.05       | 1.55±0.05      | *              | 1.75±0.05 | 3.5±0.05 |                    | 10,000           | 40,000 D<br>50,000 G             |
| 0603  | 1.1±0.20       | 1.9±0.20       | <1.20     | *              | 8.0±0.10 | 4.0±0.10       | 40.0±0.10         | 2.0±0.05       | 2.0±0.05       | 1.55±0.05      | *              | 1.75±0.05 | 3.5±0.05 |                    | 4,000            | 10,000 D<br>15,000 G             |
| 0805  | 1.65±0.20      | 2.4±0.20       | <01.30    | *              | 8.0±0.10 | 4.0±0.10       | 40.0±0.10         | 2.0±0.05       | 2.0±0.05       | 1.55±0.05      | *              | 1.75±0.05 | 3.5±0.05 |                    | 4,000            | 10,000 D<br>15,000 G<br>20,000 Q |
| 1206  | 2.0±0.20       | 3.6±0.20       | <01.30    | *              | 8.0±0.10 | 4.0±0.10       | 40.0±0.10         | 2.0±0.05       | 2.0±0.05       | 1.55±0.05      | *              | 1.75±0.05 | 3.5±0.05 |                    | 4,000            | 10,000 D<br>15,000 G<br>20,000 Q |

## PACKAGING (TAPING)

### Tape & Reel Dimensions



### • Embossed plastic carrier tape for 0805/1206/1210/1808/1812/1825/2220 AND 2225 type

| TYPE | A <sub>0</sub> | B <sub>0</sub> | T         | K <sub>0</sub> | W         | P <sub>0</sub> | 10XP <sub>0</sub> | P <sub>1</sub> | P <sub>2</sub> | D <sub>0</sub> | D <sub>1</sub> | E         | F        | MOUNTING HOLE         | STD. REEL QTY 7"               | OPTIONAL REEL QTY (10/13") |
|------|----------------|----------------|-----------|----------------|-----------|----------------|-------------------|----------------|----------------|----------------|----------------|-----------|----------|-----------------------|--------------------------------|----------------------------|
| 0805 | <1.80          | <2.70          | 0.23±0.10 | <2.50          | 8.0±0.20  | 4.0±0.10       | 40.0±0.20         | 4.0±0.10       | 2.0±0.05       | 1.5±0.10       | 1.0±0.10       | 1.75±0.10 | 3.5±0.05 | Angular Embossed Hole | 2,000<br>3,000                 | 10,000 D<br>15,000 G       |
| 1206 | <2.30          | <4.00          | 0.23±0.10 | <2.50          | 8.0±0.20  | 4.0±0.10       | 40.0±0.20         | 4.0±0.10       | 2.0±0.05       | 1.5±0.10       | 1.0±0.10       | 1.75±0.10 | 3.5±0.05 |                       | 2,000<br>3,000                 | 8,000 D<br>10,000 G        |
| 1210 | <3.20          | <3.95          | 0.23±0.10 | <3.00          | 8.0±0.20  | 4.0±0.10       | 40.0±0.20         | 4.0±0.10       | 2.0±0.05       | 1.5±0.10       | 1.0±0.10       | 1.75±0.10 | 3.5±0.05 |                       | 500<br>1,000<br>2,000<br>3,000 | 4,000 D<br>8,000 G         |
| 1808 | <2.50          | <5.30          | 0.25±0.10 | <2.50          | 12.0±0.20 | 4.0±0.10       | 40.0±0.20         | 4.0±0.10       | 2.0±0.05       | 1.5±0.10       | 1.0±0.10       | 1.75±0.10 | 5.5±0.10 |                       | 1,000<br>2,000<br>3,000        |                            |
| 1812 | <3.90          | <5.30          | 0.25±0.10 | <3.50          | 12.0±0.20 | 4.0±0.10       | 40.0±0.20         | 8.0±0.10       | 2.0±0.05       | 1.5±0.10       | 1.5±0.10       | 1.75±0.10 | 5.5±0.10 |                       | 500<br>1,000                   | 3,000 D                    |
| 1825 | <6.80          | <5.30          | 0.30±0.10 | <3.10          | 12.0±0.20 | 4.0±0.10       | 40.0±0.20         | 8.0±0.10       | 2.0±0.05       | 1.5±0.10       | 1.5±0.10       | 1.75±0.10 | 5.5±0.10 |                       | 500<br>1,000                   |                            |
| 2220 | <5.80          | <6.50          | 0.30±0.10 | <3.10          | 12.0±0.20 | 4.0±0.10       | 40.0±0.20         | 8.0±0.10       | 2.0±0.05       | 1.5±0.10       | 1.5±0.10       | 1.75±0.10 | 5.5±0.10 |                       | 500<br>700<br>1,000            |                            |
| 2225 | <6.80          | <6.50          | 0.30±0.10 | <3.10          | 12.0±0.20 | 4.0±0.10       | 40.0±0.20         | 8.0±0.10       | 2.0±0.05       | 1.5±0.10       | 1.5±0.10       | 1.75±0.10 | 5.5±0.10 |                       | 500<br>700                     |                            |

**WARRANTY:** All passive components supplied by Calchip Electronics, 59 Steamwhistle Drive, Ivyland, PA. 18974, are under warranty for a period of 2 years from the date of manufacture. Product will meet or exceed all reliability and test specifications expressed by Calchip for the above mentioned time period provided storage conditions (stated below) are met. Product Storage Instructions:

- 1) Product must be kept away from direct sunlight.
- 2) Product must be stored in the following conditions - Temperature; 5 to 35 degrees Celsius / 40 to 95 degrees Fahrenheit Humidity; 45 to 85%
- 3) Product to be kept free of moisture, dirt and debris.

**\*\*WHEN THESE CONDITIONS ARE NOT MET, PRODUCT LIFE COULD BE SHORTENED\*\*\*\*\***

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