

# TOPMAY PART NO. SYSTEM

1. TMC (Product)

Topmay Capacitor

2. F (Series)

C-Ceramic Capacitor

E-Electrolytic Capacitor

F-Film Capacitor

T-Tantalum Capacitor

S-Super Capacitor

M-Mica Capacitor

V-Variable Capacitor

3. 18 (Sub-series)

4. 105

0.5pF=0R5

10pF=100

100pF=101

1nF=102

10nF=103

100nF=104

1uF=105

5. K (Tolerance)

C=±0.25pF

D=±0.5pF

F=±1%

G=±2%

J=±5%

K=±10%

M=±20%

Z=+80%, -20%

6. 275V (Voltage)

7. P22.5 (Pitch)

8. B (Packing)

A=Ammo Packing

B=Bulk

T=Tape&Reel

9. 0402 (size)

0201,0402,0603,0805,1206,1210,1808,1812,2220

A=A Case, B=B Case, C=C Case, D=D Case, E=E Case

10. COG (Material)

COG, NPO, SL, X7R, X7S, X5R, Y5P, Y5V, Y5U

TMC

F

18

105

K

275V

P22.5

B

0402

COG

1

2

3

4

5

6

7

8

9

10

# CATALOGUE

## Aluminum Electrolytic Capacitor

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|                                                                        |         |
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|                                                                   |         |
|-------------------------------------------------------------------|---------|
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|                                                         |         |
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|                                       |         |
|---------------------------------------|---------|
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|---------------------------------------|---------|

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|                                         |         |
|-----------------------------------------|---------|
| TMCS01 Cylindrical Super Capacitor..... | 101-103 |
| TMCS02 Coin Super Capacitor.....        | 104-106 |

# CERAMIC CAPACITOR >>

## 2 Ceramic Capacitors

### TMCC01 Ceramic Disc Capacitor

#### Specification

- Capacitance: Under 1KHz and 25°C±2°C, Vrms=1.0V conditions, not exceed capacitance tolerance.
- Dissipation factor(D.F.): MAX 2.5%
- Insulation resistance: At working voltage for 1 minute, I.R. ≥4000MΩ.
- Test voltage: At 2.5 times of working voltage.

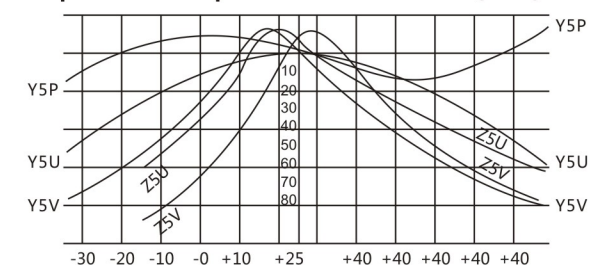
#### Capacitor range and diameter

| Capacitance Range |              |              |          |              |              | Dmax<br>(mm) | F     |
|-------------------|--------------|--------------|----------|--------------|--------------|--------------|-------|
| DC50V             |              |              | DC500V   |              |              |              |       |
| 2B4(Y5P)          | 2E4(Y5U,Z5U) | 2F4(Y5V,Z5V) | 2B4(Y5P) | 2E4(Y5U,Z5U) | 2F4(Y5V,Z5V) |              |       |
| 221-152           | 222-472      | 472-103      | 101-102  | 202-222      | 202-222      | 4-5.0        | A,B   |
| 182-272           | 502-103      | 103-203      | 122      | 272          | 272-472      | 6.0          |       |
| 302-392           | -            | 203-223      | 152-182  | 392-472      | -            | 7.0          |       |
| 472-682           | -            | -            | 152-182  | -            | 103          | 8.0          | A,B,E |
| 103               | 203-223      | -            | -        | -            | -            | 9.0          |       |
| -                 | -            | -            | 272-332  | 103          | -            | 10.0         |       |
| -                 | -            | -            | 472      | -            | 223          | 12.0         | E     |
| -                 | -            | -            | 103      | 223          | -            | 14.0         |       |



| Temp range | Letter symbol | Max.cap.change | Letter symbol |
|------------|---------------|----------------|---------------|
| +10~+85°C  | Z5            | ±4.7%          | E             |
|            |               | ±15%           | P             |
| +30~+85°C  | Y5            | ±10%           | R             |
|            |               | +22%~-56%      | U             |
| +55~+85°C  | X5            | +22%~-82%      | V             |

#### Capacitance Temperature Characteristics(HI-K)II



| DC(V) |     |
|-------|-----|
| C     | 12  |
| D     | 16  |
| E     | 25  |
| F     | 50  |
| H     | 100 |
| K     | 250 |
| L     | 500 |

Diameter is expressed in 2 digit and if diameter has a decimal, raise it to a unit.  
(ex)

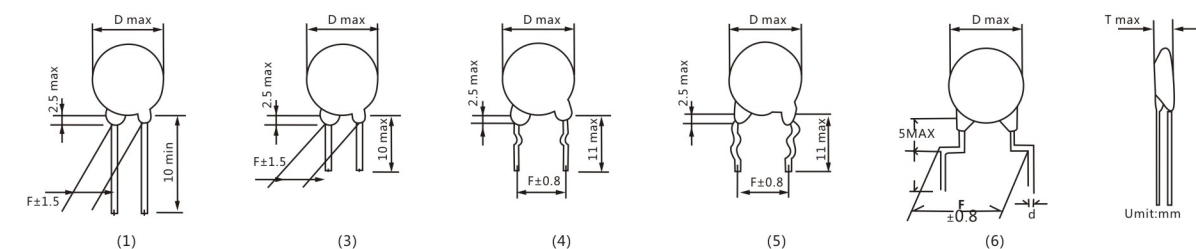
| Dia | Code |
|-----|------|
| 6.0 | 6    |
| 7.4 | 8    |

| CODE | SHAPE               |
|------|---------------------|
| 1    | Long straight type  |
| 3    | Short straight type |
| 4    | Single inner kinked |
| 5    | Double kinked       |
| 6    | Frog foot type      |

| CODE | SPACE |
|------|-------|
| A    | 2.5   |
| B    | 5.0   |
| E    | 7.6   |

| CAP     | CODE |
|---------|------|
| 560PF   | 561  |
| 1000PF  | 102  |
| 10000PF | 103  |

| TOL  | CODE |
|------|------|
| ±10% | K    |
| ±20% | M    |
| +50% | S    |
| -20% |      |
| +80% | Z    |
| -20% |      |



## TMCC02 High Voltage Ceramic Disc Capacitor

### Specification

- Capacitance: Under 1KHz (CLASS II) and 1KHz (CLASS I) and  $25^{\circ}\text{C}\pm 2^{\circ}\text{C}$ ,  $V_{\text{rms}}=1.0\text{V}$  conditions, not exceed capacitance tolerance.
- Dissipation factor(D.F.): SI.YL  $Q>1000$   
Y5P Y5U Y5V D.F. $<2.5\%$   
Bn D.F. $<0.5\%$   
2R D.F. $<0.1\%$
- Insulation resistance: At DC500V voltage for 1 minute, CLASS I  
I.R. $\geq 10000\text{M}\Omega$  .CLASS II I.R. $\geq 4000\text{M}\Omega$
- Test voltage:  $U_R < 6\text{KV}$ ,  $U_t = 1.5U_R + 500\text{V}$   $U_R \geq 6\text{KV}$ ,  $U_t = 1.5 \times U_R$



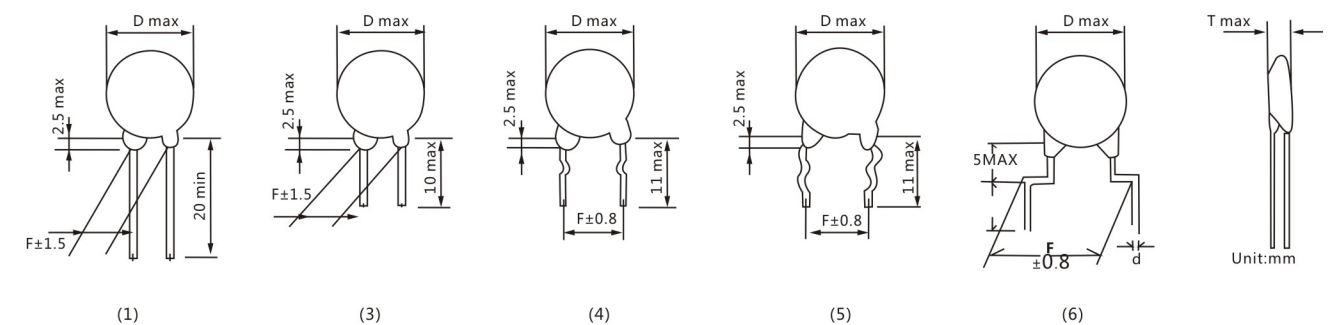
### Capacitor range and diameter

| U <sub>s</sub><br>(DC) | TEMP.CO.F./ (PE). |               |                       |                       |                       |           |                       | Damx | Tmax |
|------------------------|-------------------|---------------|-----------------------|-----------------------|-----------------------|-----------|-----------------------|------|------|
|                        | CLASS I           |               | CLASSII               |                       |                       |           |                       |      |      |
|                        | SL                | YL<br>(N3300) | COMMON D.F.           |                       |                       | LOW D.F.  |                       |      |      |
|                        |                   |               | 2B <sub>s</sub> (Y5P) | 2E <sub>s</sub> (Z5U) | 2F <sub>s</sub> (Z5V) | Bn        | 2R <sub>s</sub> (Y5R) |      |      |
| 1KV                    | 10-100            | 100-200       | 100-470               | 1000                  | 1500                  | -         | -                     | 6    | 4.0  |
|                        | 120-220           | 240-470       | 560-1000              | 2200                  | 3300                  | 100-470   | 100-560               | 8    |      |
|                        | 240-470           | 500-750       | 1500-2200             | 5600                  | 10000                 | 560-820   | 680-1000              | 10   |      |
|                        | 560               | -             | 2700-3300             | 10000                 | -                     | 1000-1800 | 1200-1500             | 12   |      |
|                        | -                 | 820-1000      | 4700-6800             | -                     | 22000                 | 2200-2700 | 1800                  | 14   |      |
|                        | -                 | -             | 10000                 | 22000                 | -                     | 3300-4700 | -                     | 16   |      |
| 2KV                    | 10-68             | 56-120        | 100-560               | 1000-1500             | 1500-2200             | 100-330   | 100-330               | 8    | 5.0  |
|                        | 82-150            | 150-220       | 1000-1500             | 2200                  | 3300-4700             | 360-680   | 470-560               | 10   |      |
|                        | 180-270           | 270-390       | 2200-2700             | 3300                  | 5600-8200             | 820-1000  | 680-1000              | 12   |      |
|                        | 330-390           | 470-560       | 3300-3900             | 4700-6800             | 10000                 | 1200-1800 | 1200-1500             | 14   |      |
|                        | 470-560           | 680-1000      | 4700                  | 10000                 | -                     | 2200-3300 | 1800                  | 16   |      |
|                        | -                 | -             | -                     | -                     | 22000                 | 3900-4700 | -                     | 18   |      |

### Capacitor range and diameter

| U <sub>r</sub><br>(DC) | TEMP.CO.F./.(PE). |               |                       |                       |                       |           |                       | Damx | Tmax |
|------------------------|-------------------|---------------|-----------------------|-----------------------|-----------------------|-----------|-----------------------|------|------|
|                        | CLASS I           |               | CLASSII               |                       |                       |           |                       |      |      |
|                        | SL                | YL<br>(N3300) | COMMON D.F.           |                       |                       | LOW D.F.  |                       |      |      |
|                        |                   |               | 2B <sub>s</sub> (Y5P) | 2E <sub>s</sub> (Z5U) | 2F <sub>s</sub> (Z5V) | Bn        | 2R <sub>s</sub> (Y5R) |      |      |
| 3KV                    | -                 | -             | 100-470               | 100-390               | 680-1000              | -         | -                     | 8    | 6.0  |
|                        | -                 | -             | 270-470               | 470-560               | 2200-3300             | 100-270   | 330-470               | 10   |      |
|                        | -                 | -             | 560-820               | 680-1000              | 4700-5600             | 330-680   | 560-680               | 12   |      |
|                        | -                 | -             | 1000-1500             | 1500-2200             | 8200                  | 820-1500  | 820-1000              | 14   |      |
|                        | -                 | -             | 1800-2200             | 3300-3900             | 10000                 | 1800-2200 | 1500                  | 16   |      |
|                        | -                 | -             | 2700-3300             | 4700                  | -                     | -         | -                     | 18   |      |
| 6.3KV                  | -                 | -             | 100-470               | 220-680               | 1000                  | -         | -                     | 10   | 7.0  |
|                        | -                 | -             | 680-820               | 1000                  | 1500                  | -         | -                     | 12   |      |
|                        | -                 | -             | 1000                  | 1500                  | 1800                  | -         | -                     | 14   |      |
|                        | -                 | -             | 1500                  | 1800                  | 2200                  | -         | -                     | 16   |      |
|                        | -                 | -             | 1800                  | 2200                  | 3300                  | -         | -                     | 18   |      |
| 10KV                   | -                 | -             | 150-220               | 330                   | 470                   | -         | -                     | 10   | 7.5  |
|                        | -                 | -             | 330                   | 470-680               | 1000                  | -         | -                     | 14   |      |
|                        | -                 | -             | -                     | 1000                  | -                     | -         | -                     | 16   |      |
|                        | -                 | -             | 1000                  | -                     | 2200                  | -         | -                     | 18   |      |
| 15KV                   | -                 | -             | 100-150               | 330                   | 470                   | -         | -                     | 10   | 8.0  |
|                        | -                 | -             | 220-330               | 470                   | 680                   | -         | -                     | 12   |      |
|                        | -                 | -             | 470                   | 680                   | -                     | -         | -                     | 14   |      |
|                        | -                 | -             | 680                   | -                     | 1000                  | -         | -                     | 18   |      |

| DC(V) |      | Dia                                           | Code | CODE | SHAPE               | CODE | SPACE | CAP     | CODE | TOL        | CODE |
|-------|------|-----------------------------------------------|------|------|---------------------|------|-------|---------|------|------------|------|
| L     | 500  | 6.0                                           | 6    | 1    | Long straight type  | B    | 5.0   | 560PF   | 561  | $\pm 10\%$ | K    |
| N     | 1000 | 7.4                                           | 8    | 3    | Short straight type | C    | 6.35  | 1000PF  | 102  | $\pm 20\%$ | M    |
| R     | 2000 | YL=N330<br>2B=Y5P<br>2E=Y5U Z5U<br>2F=Y5V Z5V |      | 4    | Single inner kinked | D    | 9.5   | 10000PF | 103  | +50%       | S    |
| S     | 3000 |                                               |      | 5    | Double kinked       | E    | 7.6   |         |      | -20%       |      |
| U     | 10KV |                                               |      | 6    | Frog foot type      | F    | 12.5  |         |      | +80%       | Z    |
| V     | 15KV |                                               |      |      |                     |      |       |         |      | -20%       |      |



## TMCC02 Safety standard type ceramic capacitor

### Specification

- Capacitance: Under 1KHz and 25°C±2°C, Vrms=1.0V conditions, not exceed capacitance tolerance.
- Dissipation factor(D.F.): Max 2.5%
- Insulation resistance: At DC100V voltage for 1 minute, I.R.≥6000MΩ.
- Test voltage: Y1:U<sub>i</sub>=8K VDC or U<sub>i</sub>=4K VAC  
Y2:U<sub>i</sub>=5K VDC or U<sub>i</sub>=1.5K VAC  
X1:U<sub>i</sub>=4K VDC

### Capacitor range and diameter

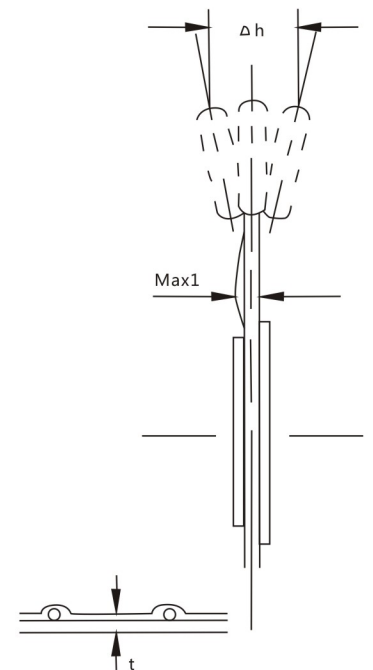
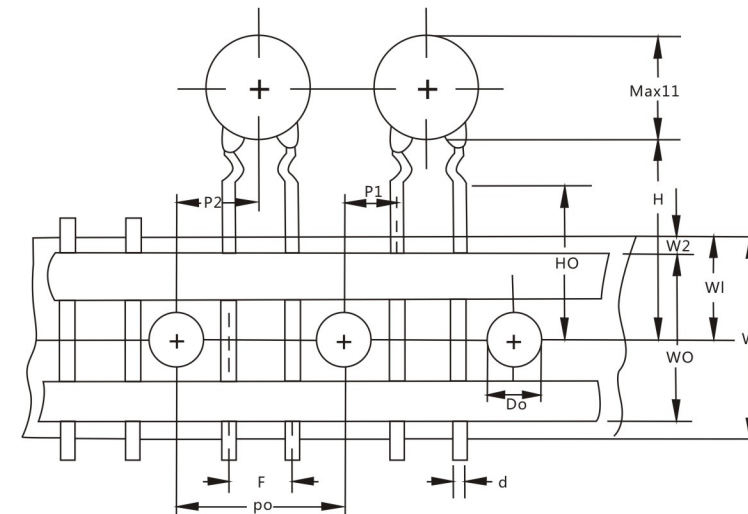
Double insulation or reinforced insulation, CD(250VAC, 400VAC)

| Temp<br>Char               | CAP Value<br>(PF) | CAP<br>TOL | DIMENSIONS(mm) |         |        | d<br>±0.05mm |
|----------------------------|-------------------|------------|----------------|---------|--------|--------------|
|                            |                   |            | D(±1.0)        | F(±0.8) | T(max) |              |
| Y5P<br>(B)<br>±10%         | 100               | K<br>±10%  | 6              | 10      | 6      | 0.6          |
|                            | 150               |            | 6              |         |        |              |
|                            | 220               |            | 6              |         |        |              |
|                            | 270               |            | 6              |         |        |              |
|                            | 330               |            | 7              |         |        |              |
|                            | 390               |            | 7              |         |        |              |
|                            | 470               |            | 7              |         |        |              |
|                            | 560               |            | 8              |         |        |              |
|                            | 680               |            | 9              |         |        |              |
|                            | 820               |            | 10             |         |        |              |
|                            | 1000              |            | 11             |         |        |              |
| Y5U<br>(E)<br>+22%<br>-56% | 470               | M<br>±20%  | 6              | 10      | 6      |              |
|                            | 1000              |            | 8              |         |        |              |
|                            | 1500              |            | 9              |         |        |              |
|                            | 2200              |            | 11             |         |        |              |
|                            | 2700              |            | 12             |         |        |              |
|                            | 3300              |            | 12             |         |        |              |
|                            | 3900              |            | 13             |         |        |              |
|                            | 4700              |            | 15             |         |        |              |
| Y5V<br>(F)<br>+22%<br>-82% | 470               | M<br>±20%  | 6              | 10      | 6      |              |
|                            | 1000              |            | 6              |         |        |              |
|                            | 1500              |            | 7              |         |        |              |
|                            | 2200              |            | 9              |         |        |              |
|                            | 2700              |            | 9              |         |        |              |
|                            | 3300              |            | 10             |         |        |              |
|                            | 3900              |            | 11             |         |        |              |
|                            | 4700              |            | 11             |         |        |              |

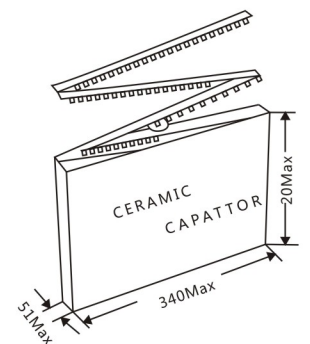
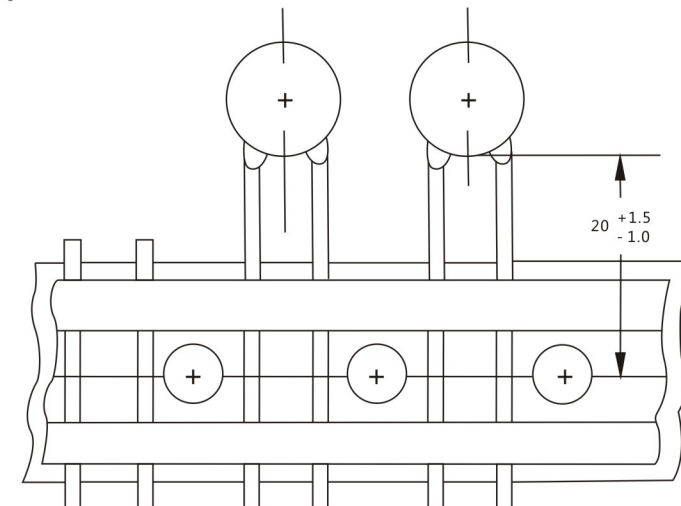


## Taping lead typing capacitors for Automatic insertion

A Type:



B Type:



### Capacitor range and diameter

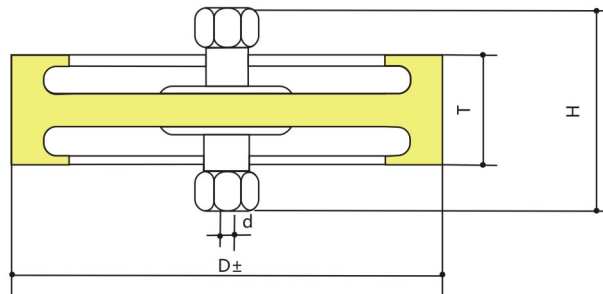
Basic insulation or reinforced insulation, CE(250VAC, 400VAC)

| Temp Char               | CAP Value (PF) | CAP TOL   | DIMENSIONS(mm) |           |        | D±0.05mm |
|-------------------------|----------------|-----------|----------------|-----------|--------|----------|
|                         |                |           | D(±1)          | F(±0.8)   | T(max) |          |
| Y5P (B)<br>±10%         | 100            | K<br>±10% | 6              | 7.5 or 10 | 5      | 0.6      |
|                         | 150            |           | 6              |           |        |          |
|                         | 220            |           | 6              |           |        |          |
|                         | 270            |           | 6              |           |        |          |
|                         | 330            |           | 6              |           |        |          |
|                         | 390            |           | 7              |           |        |          |
|                         | 470            |           | 7              |           |        |          |
|                         | 560            |           | 8              |           |        |          |
|                         | 680            |           | 8              |           |        |          |
|                         | 820            |           | 10             |           |        |          |
| 1000                    | 10             |           |                |           |        |          |
| Y5U (E)<br>±22%<br>-56% | 1000           | M<br>±20% | 7              | 7.5 or 10 | 5      |          |
|                         | 1500           |           | 8              |           |        |          |
|                         | 2200           |           | 10             |           |        |          |
|                         | 2700           |           | 11             |           |        |          |
|                         | 3300           |           | 12             |           |        |          |
|                         | 3900           |           | 12             |           |        |          |
|                         | 4700           |           | 12             |           |        |          |
| Y5V (F)<br>±22%<br>-82% | 1000           | M<br>±20% | 6              | 7.5 or 10 | 5      |          |
|                         | 1500           |           | 7              |           |        |          |
|                         | 2200           |           | 7              |           |        |          |
|                         | 2700           |           | 8              |           |        |          |
|                         | 3300           |           | 8              |           |        |          |
|                         | 3900           |           | 10             |           |        |          |
|                         | 4700           |           | 10             |           |        |          |
|                         | 6800           |           | 12             |           |        |          |
|                         | 10000          |           | 14             |           |        |          |
|                         |                |           |                |           | 10     |          |

## RADIAL TYPE T/BOX

| Symbol    | P    | P0   | P1   | P2   | d              | F    | W          | W0   | W1            | W2  | e   | D0   | t    | L   | H            | H0   |
|-----------|------|------|------|------|----------------|------|------------|------|---------------|-----|-----|------|------|-----|--------------|------|
| Dimension | 12.7 | 12.7 | 3.85 | 6.35 | 0.6            | 5    | 18         | 12.5 | 9             | 3   | 2   | 4    | 0.7  | 11  | 20           | 16   |
| Tolerance | ±1   | ±0.3 | ±0.7 | ±1.3 | ±0.06<br>-0.05 | ±0.8 | ±1<br>-0.5 | Min  | ±0.75<br>-0.5 | Max | Max | ±0.3 | ±0.2 | Max | ±1.5<br>-1.0 | ±0.5 |

## TMCC02 High Power Ceramic Capacitor CCG81

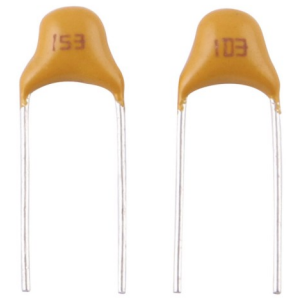


## Feature

- Low Dissipation, High with standing Voltage, Easy for Installation.
- Use for resonance, coupling, by pass, filtering and some other circuits.

| Model           | Capacitance PF |           | Temp.Cof. | Rated Voltage DC/KV | Rated Reactive Power KVA | Max. Current | Test (General Condition) |        | Size(mm) |        |        |     |
|-----------------|----------------|-----------|-----------|---------------------|--------------------------|--------------|--------------------------|--------|----------|--------|--------|-----|
| Size-code       | Nominal Value  | Tolerance |           |                     |                          |              | tgδ≤                     | Ri ≥MΩ | D        | T      | H      | d   |
| CCG81-1 DT50    | 50-200         | K (±10%)  | U         | 10                  | 8                        | 12           | 0.05%                    | 1X105  | 50       | 17     | 30     | M6  |
| CCG81-2 (DT60)  | 100-300        |           |           | 12                  | 15                       | 15           |                          |        | 60       | 17     | 30     |     |
|                 | 500            |           |           | 10                  | 15                       | 15           |                          |        |          | 17     | 28     |     |
|                 | 300            |           |           | 15                  | 30                       | 20           |                          |        |          | 18     | 31     |     |
| CCG81-3 (DT80)  | 500            |           |           | 14                  | 15                       | 20           |                          |        | 80       | 16     | 28     | M8  |
|                 | 1000           |           |           | 8                   | 15                       | 20           |                          |        |          | 18     | 28     |     |
| CCG81-4 (DT110) | 300            |           |           | 30                  | 90                       | 17           |                          |        | 110      | 27     | 52     |     |
|                 | 500            |           |           | 16                  | 45                       | 17           |                          |        |          | 19     | 48     |     |
|                 | 1000           |           |           | 12                  | 40                       | 20           |                          |        |          | 17     | 46     |     |
|                 | 1500           |           |           | 9                   | 22                       | 20           |                          |        |          | 15     | 45     |     |
| CCG81-5 (DT140) | 500            |           |           | 30                  | 90                       | 25           |                          |        | 140      | 25     | 52     |     |
|                 | 1000           |           |           | 20                  | 100                      | 30           |                          |        |          | 25     | 50     |     |
|                 | 1500           |           |           | 15                  | 90                       | 30           |                          |        |          | 20     | 48     |     |
|                 | 2000           |           |           | 8                   | 70                       | 25           |                          |        |          | 20     | 45     |     |
| CCG81-6 (DT150) | 500            |           |           | 30                  | 120                      | 35           |                          |        | 150      | 25     | 52     |     |
|                 | 1500           |           |           | 20                  | 120                      | 35           |                          |        |          | 23     | 48     |     |
|                 | 2200           |           |           | 15                  | 90                       | 30           |                          |        |          | 21     | 46     |     |
| CCG81-7 (DT160) | 2000           |           |           | 20                  | 120                      | 40           |                          |        | 160      | 23     | 48     |     |
| CCG81-8 (DT200) | 1000-2000      |           |           | 30-20               | 300-200                  | 60           |                          |        |          | 333-30 | 68-62  | M10 |
|                 | 3000-5000      |           |           | 13-12               | 100-80                   | 60           |                          |        |          | 330-25 | 647-45 |     |

## TMCC03 Radial Multilayer Ceramic Capacitor



## Feature

- Miniature size, wide capacitance, tape and reel packing available for auto-placement.
- Coating with epoxy resin, creates the excellent humidity resistance and prevents body from damage during soldering and washing.
- Industry standard size and various lead spacing available

| T.C                   | NPO/COG                                                                                       | X7R(B)                                                                                                                                                                  | Y5V(Y/F)                                                                                                                                             | Z5U(E) |
|-----------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Dielectric type       | Stable class I Dielectric                                                                     | Stable classII Dielectric                                                                                                                                               |                                                                                                                                                      |        |
| Electrical properties | With negligible dependence of electrical properties on temperature voltage frequency and time | With predictable change of properties with temperature voltage, frequency and time, this dielectric is ferroelectric and offers higher capacitance ranges than class I. | With high twist dielectric constant and greater variation of properties with temperature and test conditions, very high capacitance per unit volume. |        |
| Application           | Use in circuits requiring stable performance                                                  | Use as blocking, by-passing discriminating element                                                                                                                      | Suited for by-passing and coupling application such as store power and memory circuit.                                                               |        |

## General Specification

|                         | CC4(NPO)                                | CC4(X7R)                              | CT4(Y5 V' Z5U)                                            |
|-------------------------|-----------------------------------------|---------------------------------------|-----------------------------------------------------------|
| Capacitance Range       | OR5 to 104                              | 221 to 225                            | 103 to106                                                 |
| Temperature Coefficient | 0±30PPm/°C<br>0±60PPm/°C (-55 to +125)  | ±15%(-55°C to 125°C)                  | +30%~-80%(-25°C to +85°C)<br>+22%~-56%(+10°C to +85°C)    |
| Insulation Resistance   | C≤10nF R≥10000M<br>C>10nF C.R≥100S      |                                       | C≤25nF R≥4000M<br>C>25nF C.R≥100S                         |
| With Standing Voltage   | 2.5rated voltage                        |                                       |                                                           |
| Dissipation Factor      | 0.15%max<br>(20°C. 1MHZ.1VDC)           | 2.5%max<br>(20°C. 1KHZ.1VDC)          | 5.0%max<br>(20°C. 1KHZ.0.3VDC )                           |
| Rated Voltage           | 25, 50, 63, 100VDC                      |                                       | 25, 50, 63VDC                                             |
| Capacitance Tolerance   | B=±0.1PF<br>D=±0.5PF<br>G=±2%<br>K=±10% | C=±0.25PF<br>F=±1%<br>J=±5%<br>M=±20% | K=±10%<br>M=20%<br>S= +50 %<br>-20 %<br>Z= +80 %<br>-20 % |
| Life Test(1000 hours)   | 200% rated voltage at +125°C 1000h      |                                       | 150% rated voltage at +85°C 1000h                         |

## Quality item&amp;reliability insption

| Ltem                         | Test specifications                                                                                                                                                                                                                                                                                            |                                                                                       | Test Methods                                                                                                                                                                                                                           |         |          |              |       |            |   |      |        |      |                                                                                                                                                                                                       |  |  |  |  |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------|--------------|-------|------------|---|------|--------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
| Solderability                | Termination area shall be at least 75% covered with a new solder coating                                                                                                                                                                                                                                       |                                                                                       | The lead wire of a capacitor shall be dipped into a 25% methanol solution of rosin and then into molten solder of 235°C ±5°C, for 2±0.5 seconds, in both cases the depth of dipping is up to about 2.5 to 3.0mm from the root of lead. |         |          |              |       |            |   |      |        |      |                                                                                                                                                                                                       |  |  |  |  |
| Resistance to soldering heat | <div>There shall be evidence of damage or flash over during the test and sign in focus</div> <table><tr><td>T.C.</td><td>ΔC/C≤</td></tr><tr><td>CG/CH/RH</td><td>0.5%or 0.5pF</td></tr><tr><td>UJ/SL</td><td>1% or 1 pF</td></tr><tr><td>B</td><td>±10%</td></tr><tr><td>Y(F)/E</td><td>±20%</td></tr></table> |                                                                                       | T.C.                                                                                                                                                                                                                                   | ΔC/C≤   | CG/CH/RH | 0.5%or 0.5pF | UJ/SL | 1% or 1 pF | B | ±10% | Y(F)/E | ±20% | The lead wire shall be immersed into the melted solder of 260°C±5°C, up to about 2.5 to 3.0 mm from the main body for 5±0.5 sec and the specited items shall be measured after leaving for 24±2hours. |  |  |  |  |
| T.C.                         | ΔC/C≤                                                                                                                                                                                                                                                                                                          |                                                                                       |                                                                                                                                                                                                                                        |         |          |              |       |            |   |      |        |      |                                                                                                                                                                                                       |  |  |  |  |
| CG/CH/RH                     | 0.5%or 0.5pF                                                                                                                                                                                                                                                                                                   |                                                                                       |                                                                                                                                                                                                                                        |         |          |              |       |            |   |      |        |      |                                                                                                                                                                                                       |  |  |  |  |
| UJ/SL                        | 1% or 1 pF                                                                                                                                                                                                                                                                                                     |                                                                                       |                                                                                                                                                                                                                                        |         |          |              |       |            |   |      |        |      |                                                                                                                                                                                                       |  |  |  |  |
| B                            | ±10%                                                                                                                                                                                                                                                                                                           |                                                                                       |                                                                                                                                                                                                                                        |         |          |              |       |            |   |      |        |      |                                                                                                                                                                                                       |  |  |  |  |
| Y(F)/E                       | ±20%                                                                                                                                                                                                                                                                                                           |                                                                                       |                                                                                                                                                                                                                                        |         |          |              |       |            |   |      |        |      |                                                                                                                                                                                                       |  |  |  |  |
| Life test                    | Appearance                                                                                                                                                                                                                                                                                                     | There shall be no evidence of damage or flash over during the test and sign in focus. | Condition                                                                                                                                                                                                                              | NPO     | X7R      | Y5V          | Z5U   |            |   |      |        |      |                                                                                                                                                                                                       |  |  |  |  |
|                              | ΔC/C≤<br>Capacitance change                                                                                                                                                                                                                                                                                    | NPO≤2% ; X7R≤25%<br>Y5V:≤30%                                                          | Temperature                                                                                                                                                                                                                            | +125°C  |          | +85°C        |       |            |   |      |        |      |                                                                                                                                                                                                       |  |  |  |  |
|                              | D.F.                                                                                                                                                                                                                                                                                                           | NPO≤0.3% ; X7R≤5%<br>Y5V:≤7%                                                          | Time                                                                                                                                                                                                                                   | T=1000h |          |              |       |            |   |      |        |      |                                                                                                                                                                                                       |  |  |  |  |
|                              | I.R.                                                                                                                                                                                                                                                                                                           | R.C>25S                                                                               | Voltage                                                                                                                                                                                                                                | V=1.5VR |          |              |       |            |   |      |        |      |                                                                                                                                                                                                       |  |  |  |  |
|                              |                                                                                                                                                                                                                                                                                                                |                                                                                       | Recovery time                                                                                                                                                                                                                          | 24±1h   |          |              |       |            |   |      |        |      |                                                                                                                                                                                                       |  |  |  |  |

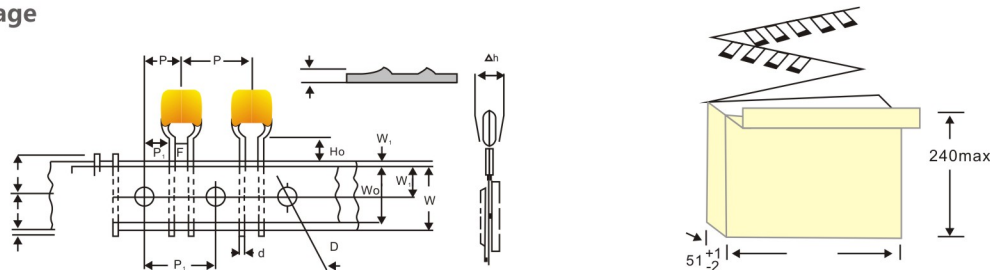
## SIZE CODE,CAPACITANCE AND VOLTAGE

| <br>A  | Size code | shope | Dimensions(mm) |                |      |      |      |     | Voltage            | Capacitance(PF)               |                               |                    |
|-----------------------------------------------------------------------------------------|-----------|-------|----------------|----------------|------|------|------|-----|--------------------|-------------------------------|-------------------------------|--------------------|
|                                                                                         |           |       | F<br>(±0.5)    | Hmin<br>(±0.5) | Lmax | Wmax | Tmax | D   |                    | COG(NPO)                      | X7R                           | Y5V(Z5U)           |
| <br>B  | 0805      | A     | 2.54           | 5.0            | 8.8  | 3.8  | 3.8  | 0.5 | 25V<br>50V<br>100V | OR5~332                       | 221~105                       | 103~105<br>103~684 |
|                                                                                         |           | B     | 2.54           | 10.0           |      |      |      |     |                    |                               |                               |                    |
|                                                                                         |           | C     | 5.08           | 5.0 10.0       |      |      |      |     |                    |                               |                               |                    |
|                                                                                         |           | D     | 5.08           | 5.0            |      |      |      |     |                    |                               |                               |                    |
|                                                                                         |           | E     | 5.08           | 5.0 10.0       |      |      |      |     |                    |                               |                               |                    |
| <br>C  | 1206      | A     | 2.54           | 10.0           | 5.0  | 4.5  | 3.8  | 0.5 | 25V<br>50V<br>100V | OR5~682                       | 102~105                       | 103~125<br>103~105 |
|                                                                                         |           | B     | 3.50           |                |      |      |      |     |                    |                               |                               |                    |
|                                                                                         |           | C     | 5.08           |                |      |      |      |     |                    |                               |                               |                    |
| <br>D  | 1210      | B     | 3.50           | 10.0           | 5.0  | 5.5  | 3.8  | 0.5 | 25V<br>50V<br>100V | 561~103                       | 102~334                       | 104~115            |
|                                                                                         |           | C     | 5.08           |                |      |      |      |     |                    | 561~682<br>561~472            | 102~205<br>102~105            |                    |
| <br>E | 1812      | B     | 4.57           | 10.0           | 8.5  | 6.5  | 3.8  | 0.5 | 25V<br>50V<br>100V | 102~153<br>102~103<br>102~105 | 103~474<br>103~334<br>103~105 | 154~335            |
|                                                                                         |           |       |                |                |      |      |      |     |                    |                               |                               |                    |
|                                                                                         |           |       |                |                |      |      |      |     |                    |                               |                               |                    |
|                                                                                         |           |       |                |                |      |      |      |     |                    |                               |                               |                    |
|                                                                                         |           |       |                |                |      |      |      |     |                    |                               |                               |                    |
| <br>F | 2225      | B     | 5.50           | 10.0           | 10.5 | 9.5  | 4.2  | 0.5 | 25V<br>50V<br>100V | 102~223<br>102~223<br>102~103 | 103~105<br>103~105<br>103~474 | 684~475            |
|                                                                                         |           |       |                |                |      |      |      |     |                    |                               |                               |                    |
|                                                                                         |           |       |                |                |      |      |      |     |                    |                               |                               |                    |
| <br>G | 3035      | B     | 7.50           | 10.0           | 12.5 | 10.5 | 4.2  | 0.5 | 25V<br>50V<br>100V | 102~104<br>102~473<br>102~333 | 103~225<br>103~225<br>103~105 | 105~106<br>105~685 |
|                                                                                         |           |       |                |                |      |      |      |     |                    |                               |                               |                    |
|                                                                                         |           |       |                |                |      |      |      |     |                    |                               |                               |                    |

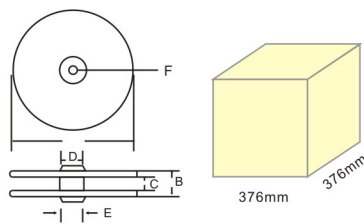
\*Lead spacing determined by customer requirements

## PACKAGING STYLE

### Ammo Package



| Code | P    | P <sub>0</sub> | W           | W <sub>0</sub> | H <sub>2</sub> | W <sub>2</sub> | H <sub>1</sub> | D    | T    | Δh   | H     | S    | P <sub>1</sub> | P <sub>2</sub> | ΔP  |
|------|------|----------------|-------------|----------------|----------------|----------------|----------------|------|------|------|-------|------|----------------|----------------|-----|
| Dim  | 12.7 | 12.7           | 18          | 5              | 9              | 0              | 32.5           | 4    | 0.5  | 0    | 16-18 | 5    | 3.85           | 6.35           | 1.3 |
| Tol  | ±1   | ±0.3           | +1<br>-0.51 | MIN            | ±0.5           | +1             | MAX            | ±0.2 | ±2.0 | ±0.2 | ±0.5  | ±0.5 | ±0.7           | ±0.4           | MAX |



### Reel Package

| A       | B       | C        | D         | E        | F              |
|---------|---------|----------|-----------|----------|----------------|
| 355-365 | 50.8max | 86.36max | 102.01max | 86.36max | 25.40-30.48max |

### Packaging Quantity

| Reel Package | Ammo Packge | Bulk Package |
|--------------|-------------|--------------|
| 2500         | 4000        | 1000         |

Dimension of tape coiling package for radial lead capacitors

## TMCC04 Axial Multilayer Ceramic Capacitor

### Feature

- Wide capacitance
- Industry standard sizes
- Tape and Reel available of auto-placement



### General Specifications

|                               | CC42<br>(NPO)                                                                     | CT42<br>(X7R)                       | CT42<br>(Y5VZ5U)                                         |
|-------------------------------|-----------------------------------------------------------------------------------|-------------------------------------|----------------------------------------------------------|
| Capacitance Range             | OR 5 to 472                                                                       | 331 to 224                          | 103 to 125                                               |
| Temperature Coefficient       | 0±30PPm/°C<br>0±60PPm/°C<br>(-55to+125)                                           | ±15% (-55°C to 125°C)               | +30%~-80% (-25°C to 125°C)<br>+22%~-56% (+10°C to +85°C) |
| Insulation Resistance         | C≤10nF R≥10000MΩ<br>C≤10nF C.R≥100S                                               | C≤25nF R≥4000MΩ<br>C>25nF C.R≥100S  |                                                          |
| With Standing Voltage         | 2.5 X WVDC                                                                        |                                     |                                                          |
| Dissipation Factor            | 0.15%max<br>(20°C,1MHZ,1VDC)                                                      | 25%max<br>(20°C,1KHZ,1VDC)          | 5.0%max<br>(20°C,1KHZ, 0.3VDC)                           |
| Rated Voltage                 | 25, 50, 63, 100VDC                                                                |                                     | 25, 50, 63VDC                                            |
| Capacitance Tolerance         | B=±0.1PF<br>D=±0.5PF<br>G=±2%<br>K=±10%<br>C=±0.25PF<br>F=±1PF<br>J=±5%<br>M=±20% | K=±10PF M=±20%<br>S= +50 %<br>-20 % | M=±20% S= +50 %<br>-20 %<br>Z= +80 %<br>-20 %            |
| Life Test(1000hours)          | 200% rated voltage at +125°C 1000h                                                |                                     | 150% rated voltage at +85°C 1000h                        |
| Solder ability                | SJ/T10211-91 4.11                                                                 | SJ/T10211-91 4.11                   |                                                          |
| Resistance to Soldering Heat  | SJ/T10211-91 4.10                                                                 | SJ/T10211-91 4.10                   |                                                          |
| Mechanical Test               | SJ/T10211-91 4.9                                                                  | SJ/T10211-91 4.9                    |                                                          |
| Temperature Cycling           | SJ/T10211-91 4.12                                                                 | SJ/T10211-91 4.12                   |                                                          |
| Moisture Resistance           | SJ/T10211-91 4.14                                                                 | SJ/T10211-91 4.14                   |                                                          |
| Termination adhesion strength | SJ/T10211-91 4.9                                                                  | SJ/T10211-91 4.9                    |                                                          |
| Environment Testing           | SJ/T10211-91 4.13                                                                 | SJ/T10211-91 4.13                   |                                                          |

## TMCC05 SMD Multilayer Ceramic Capacitor



### Feature

- Stringent dimensional tolerance allow highly reliable, highly speed automatic chip placement on PCBs.
- Terminations are plated with Ni and solder, suited to flow and reflow soldering.
- High insulation resistance and high reliability.
- These capacitors have temperature characteristics ranging form COG to Y5V, applide to general electronic equipment, and instrument panel house electronic appliance.

### Capacitor Selection

The choice of dielectric is largely determined by the temperature stability required.

- NPO(COG)

Ultra stable Class I dielectric, with predictable change of electrical properties on temperature, voltage, frequency and . time Used in circuits requiring stable performance.

- X7R

Stable Class II dielectric, with predictable change of properties with temperature, voltage, frequency and time, Used as blocking, coupling, by-passing and frequency discriminating elements. This dielectric is ferro electric and offers higher capacitance ranges than class I.

- Y5V(Z5U)

General purpose Class II dielectric with highest dielectric constant and greater variation of properties with temperature and test conditions. Very high capacitance per unit volume and suited for application as well as filtering, transient sup-pression blocking, and charge storage application.

### General Specification

|                                 | COG(NPO)                                                                                                                                               | X7R                                                                                        | Y5V(Z5U)                                                               |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| Capacitance Range               | 0.2pF~10nF                                                                                                                                             | 100pF~4.7uF                                                                                | 1000pF~10uF                                                            |
| Capacitance Tolerance           | Preferred $\pm 5\%$ , $\pm 10\%$<br>For values $\leq 10\text{pf}$ , Preferred<br>tolerance is $\pm 5\text{pf}$ , also<br>available $\pm 0.25\text{pf}$ | Preferred $\pm 10\%$ , $\pm 20\%$                                                          | $+80/-20^\circ\text{C}$                                                |
| Operating Temperature Range     | $-55\sim 125^\circ\text{C}$                                                                                                                            | $-55\sim 125^\circ\text{C}$                                                                | $-30\sim 85^\circ\text{C}$                                             |
| Temperature Characteristic      | $0\pm 30\text{ppm}^\circ\text{C}$                                                                                                                      | within $\pm 15\%$                                                                          | within $+22/-82\%$                                                     |
| Rated Voltage                   | 25V,50V,100V,200V                                                                                                                                      | 6.3V,10V,16V,25V,50V,100V                                                                  | 10V,16V,25V,50V                                                        |
| Dissipation Factor and "Q"      | $C_r \geq 30\text{pF}$ , $Q \geq 1000$<br>$C_r \leq 30\text{pF}$ , $Q \geq 400+20$                                                                     | For 6.3V:DF $\leq 5.0\%$<br>For 16V and 10V:DF $\leq 3.5\%$<br>For 25V min:DF $\leq 2.5\%$ | For 10V:12.5% max<br>For 16V:9.0% max<br>For 25Vmin:5.0% max           |
| Insulation Resistance           | more than $10\text{G}\Omega$                                                                                                                           | $10\text{G}\Omega$ min.or $500\Omega\text{F}$ min<br>Whichever is less                     | $10\text{G}\Omega$ min.or $500\Omega\text{F}$ min<br>Whichever is less |
| Dielectric withstanding Voltage | 250% rated voltage                                                                                                                                     | 250% rated voltage                                                                         | 250% rated voltage                                                     |
| Test Voltage                    | 250% rated voltage                                                                                                                                     | $1\pm 0.2\text{Vrms}$                                                                      | $1\pm 0.2\text{Vrms}$                                                  |
| Test Frequency                  | For values $\geq 1000\text{pF}$ :1KHz<br>For values $\leq 1000\text{pF}$ :1MHz                                                                         | 1KHz                                                                                       | 1KHz                                                                   |

### Dimension, Capacitance, Voltage Table

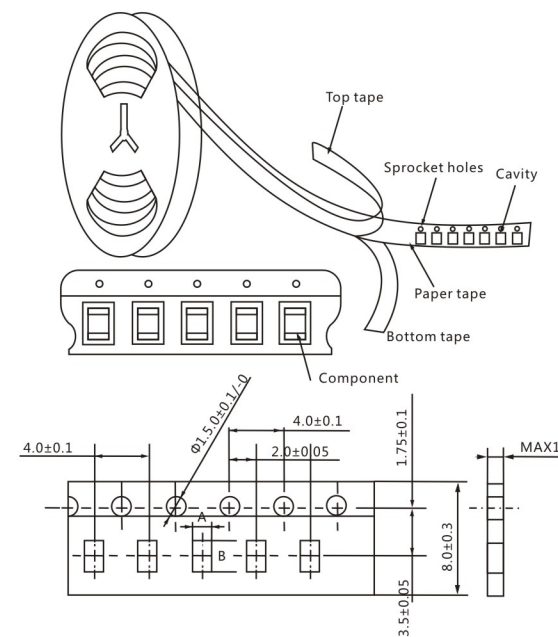
| Size | Dimension(mm)  |                |                |                |      | Voltage | Capacitance |              |              |
|------|----------------|----------------|----------------|----------------|------|---------|-------------|--------------|--------------|
|      | L              | W              | T              | e              | gmin |         | COG(NPO)    | X7R          | Y5V(Z5U)     |
| 0402 | 1.0 $\pm$ 0.05 | 0.5 $\pm$ 0.05 | 0.5 $\pm$ 0.05 | 0.15 $\pm$ 0.3 | 0.4  | 10V     |             | 100pF~0.1uf  | 1.0nF~0.22uf |
|      |                |                |                |                |      | 16V     |             | 100pF~47nf   | 1.0nF~0.1uf  |
|      |                |                |                |                |      | 25V     | 0.2pF~100pf | 100pF~22nf   | 1.0nF~22nf   |
|      |                |                |                |                |      | 50V     |             | 100pF~22nf   | 1.0nF~10nf   |
|      |                |                |                |                |      | 100V    |             |              |              |
|      |                |                |                |                |      | 200V    |             |              |              |
| 0603 | 1.6 $\pm$ 0.1  | 0.8 $\pm$ 0.1  | 0.8 $\pm$ 0.1  | 0.2 $\pm$ 0.5  | 0.5  | 10V     |             | 100pF~0.22uf | 2.2nF~1.0uf  |
|      |                |                |                |                |      | 16V     |             | 100pF~0.1uf  | 2.2nF~0.33uf |
|      |                |                |                |                |      | 25V     | 0.2pF~1.0nf | 100pF~47nf   | 2.2nF~0.22uf |
|      |                |                |                |                |      | 50V     | 0.2pF~1.0nf | 100pF~15nf   | 2.2nF~56nf   |
|      |                |                |                |                |      | 100V    | 0.2pF~300pf | 100pF~47nf   |              |
|      |                |                |                |                |      | 200V    |             |              |              |
| 0805 | 2.0 $\pm$ 0.1  | 1.25 $\pm$ 0.1 | 0.6 $\pm$ 0.1  | 0.2 $\pm$ 0.7  | 0.7  | 10V     |             | 1.0nF~2.2uf  | 10nF~47uf    |
|      |                |                | 0.85 $\pm$ 0.1 |                |      | 16V     |             | 100pF~0.47uf | 10nF~2.2uf   |
|      |                |                | 1.25 $\pm$ 0.1 |                |      | 25V     | 0.5pF~4.7nf | 100pF~0.22uf | 10nF~1.0uf   |
|      |                |                |                |                |      | 50V     | 0.5pF~2.2nf | 100pF~0.1uf  | 10nF~0.33uf  |
|      |                |                |                |                |      | 100V    | 0.5pF~1.0nf | 100pF~22nf   |              |
|      |                |                |                |                |      | 200V    | 0.5pF~470pf |              |              |
| 1206 | 3.2 $\pm$ 0.2  | 1.6 $\pm$ 0.2  | 0.6 $\pm$ 0.1  | 0.2 $\pm$ 0.7  | 0.7  | 10V     |             | 1.0nF~4.7uf  | 10nF~10uf    |
|      |                |                | 0.85 $\pm$ 0.1 |                |      | 16V     |             | 1.0nF~1.0uf  | 10nF~4.7uf   |
|      |                |                | 1.15 $\pm$ 0.1 |                |      | 25V     | 0.5pF~10nf  | 1.0nF~1.0uf  | 10nF~2.2uf   |
|      |                |                | 0.6 $\pm$ 0.2  |                |      | 50V     | 0.5pF~4.7nf | 1.0nF~2.2uf  | 10nF~1.0uf   |
|      |                |                |                |                |      | 100V    | 0.5pF~2.2nf | 1.0nF~0.1uf  |              |
|      |                |                |                |                |      | 200V    | 0.5pF~1.0nf |              |              |

### Capacitance range and operating voltage

| Size | Rated Voltage | Capacitance |           |              |
|------|---------------|-------------|-----------|--------------|
|      |               | NPO         | X7R       | Y5V          |
| 0603 | 100V          | 0.5~820     | 150~10000 | 2200~6800    |
|      | 200V          | 0.5~470     | 150~6800  |              |
| 0805 | 100V          | 0.5~1500    | 150~33000 | 10000~100000 |
|      | 200V          | 0.1~1500    | 150~22000 | 10000~56000  |
|      | 250V          | 0.1~1500    | 150~22000 | 10000~56000  |
|      | 500V          | 0.1~560     | 150~10000 |              |
|      | 1000V         | 0.1~100     |           |              |

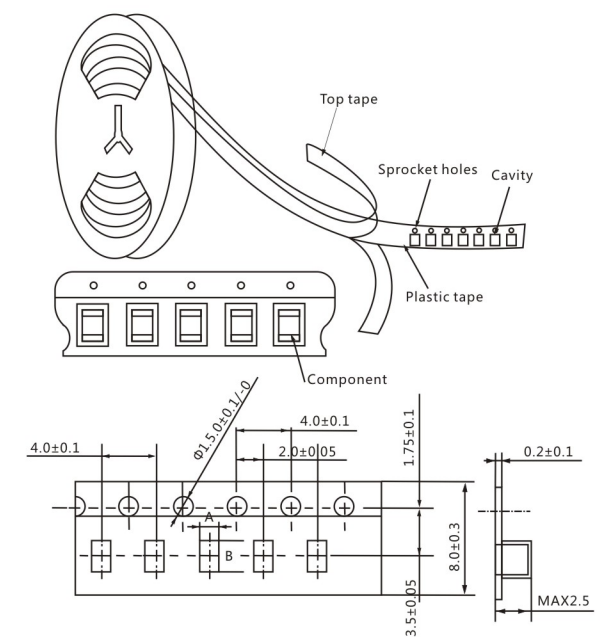
|      |       |          |             |               |
|------|-------|----------|-------------|---------------|
| 1206 | 100V  | 0.5~3300 | 150~1000000 | 150~330000    |
|      | 200V  | 0.1~2700 | 150~47000   | 150~150000    |
|      | 250V  | 0.1~2700 | 150~3300    | 150~150000    |
|      | 500V  | 0.1~1500 | 150~2200    |               |
|      | 1000V | 0.1~1000 | 150~5600    |               |
|      | 2000V | 0.1~270  | 150~1500    |               |
| 1210 | 100V  | 1.0~4700 | 150~2200000 | 10000~820000  |
|      | 200V  | 1.0~3300 | 150~100000  | 10000~390000  |
|      | 250V  | 1.0~3300 | 150~82000   | 10000~390000  |
|      | 500V  | 1.0~2000 | 150~100000  |               |
|      | 1000V | 1.0~820  | 150~10000   |               |
|      | 2000V | 1.0~470  | 150~6800    |               |
| 1808 | 100V  | 2.0~4700 | 150~220000  | 150000~150000 |
|      | 200V  | 2.0~3300 | 150~100000  | 10000~390000  |
|      | 250V  | 2.0~3300 | 150~82000   | 10000~390000  |

## b. Paper tape



| Type          | A         | B        |
|---------------|-----------|----------|
| 0603          | 1.05±0.1  | 1.85±0.1 |
| 0805(T≤1.0mm) | 1.55±0.15 | 2.3±0.15 |
| 1206(T≤1.0mm) | 2.0±0.2   | 3.6±0.2  |

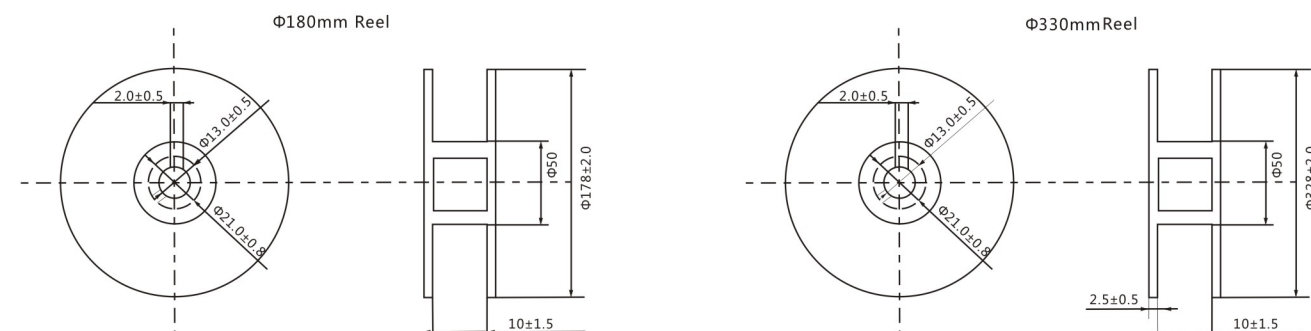
## c. Embossed tape



| Type           | A        | B        |
|----------------|----------|----------|
| 0805(T=1.25mm) | 1.45±0.2 | 2.25±0.2 |
| 1206(T>1mm)    | 1.9±0.2  | 3.5±0.2  |
| 1210(T>1mm)    | 2.8±0.2  | 3.5±0.2  |

## Packaging

### a. Tape & Reel packaging



- (1) Tapes for capacitors are wound clockwise. The sprocket holes are to the right as the tape is pulled toward the user.
- (2) The top tape and base tape are Not, cover attached at the end of the tape for a minimum of 5 pitches.
- (3) Part of the leader and part of the empty tape shall be attached to the end of the tape as follows.
- (4) Number of missing capacitor is less than 0.1% of the total number quoted per reel or 1pcs; whichever is greater, and are not continuous.
- (5) The top tape and bottom tape shall not protrude beyond the edges of the tape and shall not cover sprocket holes.
- (6) Cumulative tolerance of sprocket holes, 10 pitches: ±0.3mm.
- (7) Peeling off force: 0.1 to 0.6N in the direction shown down.

