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# Panasonic

## High Voltage Ceramic Capacitors (SMD)

### High Voltage Ceramic Capacitors For Surface Mounting 1 to 5 kVDC



#### ■ Features

- Resin molded SMD type for reflow solderings
- High reliability through use of disc capacitor element
- Wide rated voltage ranges from 1 kV to 5 kV, through a disc element which withstand high voltage and outcurve terminals
- Wide rated voltage range 1 to 5 kV

#### ■ Recommended Application

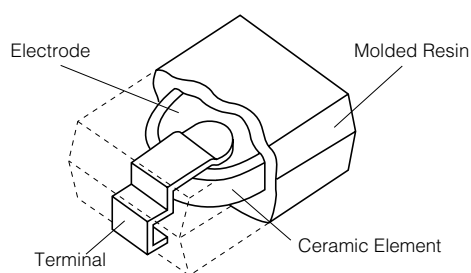
- Ballast circuit of LCD backlighting inverter  
(For 3 to 5 kVDC Char.SL/GP)
- Snubber circuit of switching power supply  
(For 1 to 2 kVDC Char.B/Y5P)

#### ■ Explanation of Part Numbers

| 1            | 2      | 3               | 4          | 5             | 6             | 7                   | 8           | 9              | 10      | 11          | 12          |        |            |
|--------------|--------|-----------------|------------|---------------|---------------|---------------------|-------------|----------------|---------|-------------|-------------|--------|------------|
| E            | C      | C               | T          | 3             | F             | 4                   | 7           | 0              | J       | G           |             |        |            |
| Product Code |        | Packaging Style |            | Rated Voltage |               | Nominal Capacitance |             | Cap. Tolerance |         | Temp. Char. |             | Suffix |            |
| Code         | Class  | Code            | Style      | Code          | Rated Voltage | Ex.                 | Capacitance | Code           | Tol.    | Code        | Temp. Char. | Code   | Style code |
| ECC          | Class1 | T               | Taped type | 3A            | 1 kVDC        | 100                 | 10 pF       | D              | ±0.5 pF | G           | SL/GP       | Nil    | 1          |
| ECK          | Class2 |                 |            | 3D            | 2 kVDC        | 470                 | 47 pF       | J              | ±5 %    | B           | B/Y5P       | M      | 2          |
|              |        |                 |            | 3F            | 3 kVDC        | 101                 | 100 pF      | K              | ±10 %   |             |             | 2      | 3          |
|              |        |                 |            | 3G            | 4 kVDC        | 221                 | 220 pF      | M              | ±20 %   |             |             | Y      | 4          |
|              |        |                 |            | 3H            | 5 kVDC        |                     |             |                |         |             |             |        |            |

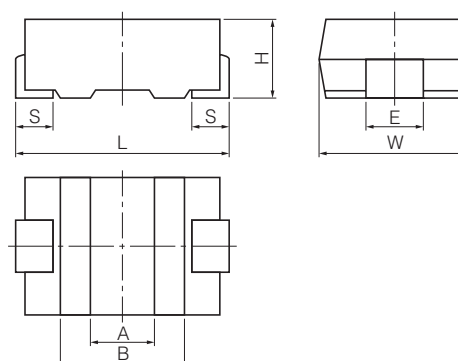
#### ■ Construction

- Inside Terminal

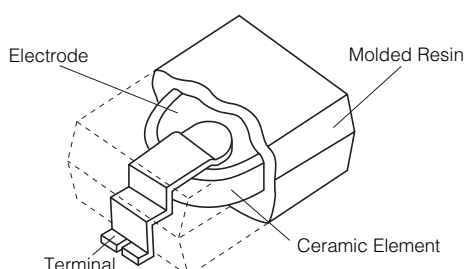


#### ■ Dimensions in mm (not to scale)

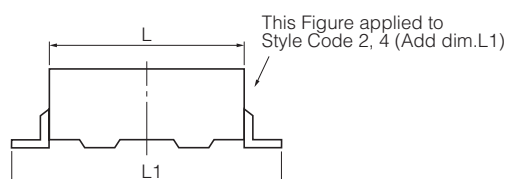
- style 1, 3



- Outside Terminal



- style 2, 4



| Symbol  | L1       | L       | W       | H       | S         | E       | A     | B     |
|---------|----------|---------|---------|---------|-----------|---------|-------|-------|
| Style 1 | —        | 7.1±0.5 | 6.3±0.3 | 2.5±0.3 | 1.45±0.30 | 2.5±0.2 | (2.0) | (3.7) |
| Style 2 | 10.8±0.5 | 6.8±0.5 | 6.3±0.3 | 2.5±0.3 | —         | 2.5±0.2 | (2.0) | (3.7) |
| Style 3 | —        | 5.7±0.5 | 4.5±0.3 | 2.3max. | 0.85±0.30 | 2.5±0.2 | (1.7) | (3.1) |
| Style 4 | 9.4±0.3  | 5.5±0.5 | 4.5±0.3 | 2.3±0.2 | —         | 2.5±0.2 | (1.7) | (3.1) |

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## High Voltage Ceramic Capacitors (SMD)

### Specifications

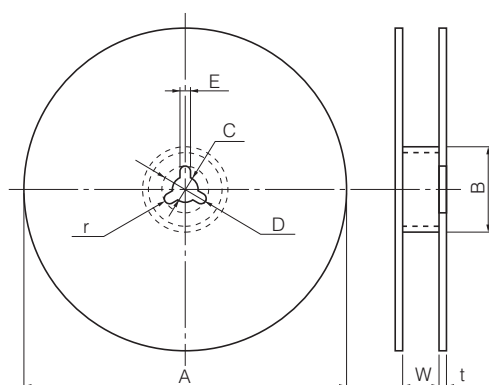
| Characteristics                 | Char. SL/GP                                                                                     |                                           |                                           | Char. B/Y5P                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------|
| Operating Temperature Range     | -25 to 105 °C                                                                                   |                                           |                                           |                                                                                     |
| Rated Voltage                   | 2 to 3 kVDC                                                                                     | 4 to 5 kVDC                               | 5 kVDC                                    | 1 to 2 kVDC                                                                         |
| Dielectric Withstanding Voltage | 200 % of Rated Voltage for 1 to 5 seconds                                                       | 150 % of Rated Voltage for 1 to 5 seconds | 120 % of Rated Voltage for 1 to 5 seconds | 200 % of Rated Voltage for 1 to 5 seconds                                           |
| Capacitance                     | Within the specified tolerance, when measured at 1 MHz±20 %, 1 to 5 Vrms. and 20 °C             |                                           |                                           | Within the specified tolerance, when measured at 1 kHz±20 %, 1 to 5 Vrms. and 20 °C |
| Q or Dissipation Factor (tan δ) | 30 pF or under Q ≥ 400+20 C (C:Cap.pF) over 30 pF Q ≥ 1000 at 1 MHz±20 %,1 to 5 Vrms. and 20 °C |                                           |                                           | tan δ ≤ 0.025 at 1 kHz±20 %,1 to 5 Vrms. and 20 °C                                  |
| Insulation Resistance           | 10000 M Ω min. at 500 VDC and 1 minute electrification                                          |                                           |                                           |                                                                                     |
| Temperature Characteristics     | Temperature Coefficient:<br>+350 to -1000 ppm/ °C<br>(Temperature Range : 20 to 85 °C)          |                                           |                                           | Max. Cap. Change:±10 %<br>(Temperature Range : -25 to 85 °C)                        |

### Packaging Methods (Taping)

#### Minimum Quantity/Packing Unit

| Type                  | Packaging Style         | Part Number  |             | Minimum Packing Quantity | Packing Quantity in Carton | Carton Dimensions in mm LxWxH |
|-----------------------|-------------------------|--------------|-------------|--------------------------|----------------------------|-------------------------------|
| 1 to 5 kVDC (style 1) | Embossed Carrier Taping | EC□T3□□□□□□  | 5 to 470 pF | 2000 pcs./reel           | 6000 pcs.                  | 350×350×62                    |
| 5 kVDC (style 2)      | Embossed Carrier Taping | ECCT3H□□□□□M | 5 to 27 pF  | 2000 pcs./reel           | 4000 pcs.                  | 350×350×62                    |
| 4 kVDC (style 3)      | Embossed Carrier Taping | ECCT3G□□□JG2 | 10 to 27 pF | 3000 pcs./reel           | 9000 pcs.                  | 350×350×62                    |
| 5 kVDC (style 4)      | Embossed Carrier Taping | ECCT3H□□□□□Y | 5 to 15 pF  | 3000 pcs./reel           | 6000 pcs.                  | 350×350×62                    |

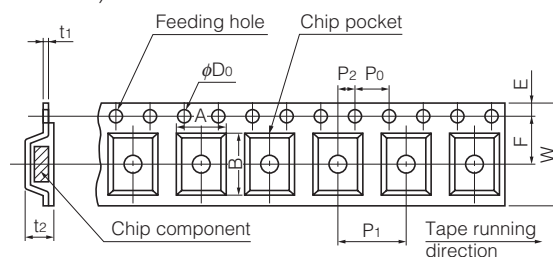
#### Reel



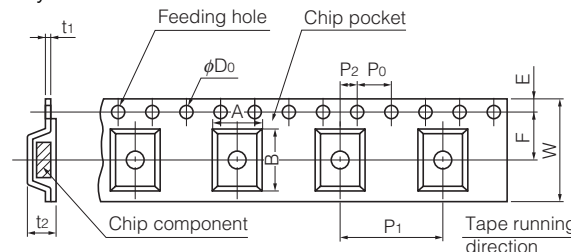
#### Embossed Carrier Taping

style 1, 3, 4

(W=12 mm)



style 2



Unit:(mm)

| Symbol     | A     | B       | C        | D        | E       | W        | t       | r    |
|------------|-------|---------|----------|----------|---------|----------|---------|------|
| Dim. (mm)  |       |         |          |          |         |          |         |      |
| style 1, 3 | 330±5 | 60 min. | 13.0±0.5 | 21.0±1.0 | 2.0±0.5 | 13.5±1.5 | 2.0±0.5 | R1.0 |
| style 2    |       |         |          |          |         | 25.5±1.5 |         |      |
| style 4    |       |         |          |          |         | 17.5±1.5 |         |      |

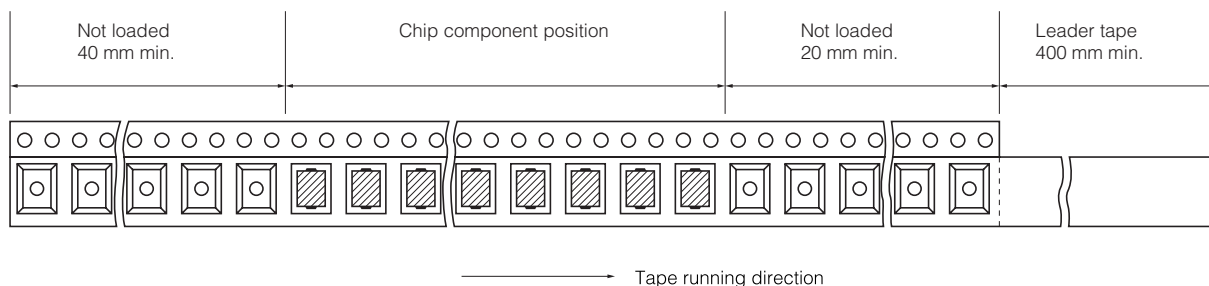
Unit:(mm)

| Symbol    | A         | B        | W        | F        | E         | P1       | P2      | P0      | φD0           | t1      | t2        |
|-----------|-----------|----------|----------|----------|-----------|----------|---------|---------|---------------|---------|-----------|
| Dim. (mm) |           |          |          |          |           |          |         |         |               |         |           |
| style1    | 6.5±0.2   | 7.5±0.2  | 12.0±0.3 | 5.5±0.1  | 1.75±0.10 | 8.0±0.1  | 2.0±0.1 | 4.0±0.1 | 1.5±0.1<br>-0 | 0.3±0.1 | 3.2±0.3   |
| style2    | 6.65±0.20 | 11.2±0.2 | 24.0±0.3 | 11.5±0.1 | 1.75±0.10 | 12.0±0.1 | 2.0±0.1 | 4.0±0.1 | 1.5±0.1<br>-0 | 0.3±0.1 | 3.2±0.3   |
| style3    | 4.8±0.2   | 6.0±0.2  | 12.0±0.3 | 5.5±0.1  | 1.75±0.10 | 8.0±0.1  | 2.0±0.1 | 4.0±0.1 | 1.5±0.1<br>-0 | 0.3±0.1 | 2.8±0.3   |
| style4    | 4.7±0.2   | 10.0±0.5 | 16.0±0.3 | 7.5±0.1  | 1.75±0.10 | 8.0±0.1  | 2.0±0.1 | 4.0±0.1 | 1.5±0.1<br>-0 | 0.3±0.1 | 2.85±0.30 |

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## High Voltage Ceramic Capacitors (SMD)

### ● Leader Part and Taped End



### ■ Ratings and Characteristics

#### ● Rated Voltage 1 to 5 kVDC

| Rated Voltage | Part Number  | Capacitance (pF) | Cap. Tolerance (%) | Temp. Char | Style   |
|---------------|--------------|------------------|--------------------|------------|---------|
| 5 kVDC        | ECCT3H050DGM | 5                | ±0.5 pF            | SL/GP      | Style 2 |
|               | ECCT3H100JGM | 10               | ±5                 | SL/GP      |         |
|               | ECCT3H120JGM | 12               | ±5                 | SL/GP      |         |
|               | ECCT3H150JGM | 15               | ±5                 | SL/GP      |         |
|               | ECCT3H180JGM | 18               | ±5                 | SL/GP      |         |
|               | ECCT3H220JGM | 22               | ±5                 | SL/GP      |         |
|               | ECCT3H270JGM | 27               | ±5                 | SL/GP      | Style 4 |
|               | ECCT3H050DGY | 5                | ±0.5 pF            | SL/GP      |         |
|               | ECCT3H080DGY | 8                | ±0.5 pF            | SL/GP      |         |
|               | ECCT3H100JGY | 10               | ±5                 | SL/GP      |         |
|               | ECCT3H120JGY | 12               | ±5                 | SL/GP      |         |
|               | ECCT3H150JGY | 15               | ±5                 | SL/GP      |         |
| 4 kVDC        | ECCT3G100DG2 | 10               | ±0.5 pF            | SL/GP      | Style 3 |
|               | ECCT3G120JG2 | 12               | ±5                 | SL/GP      |         |
|               | ECCT3G150JG2 | 15               | ±5                 | SL/GP      |         |
|               | ECCT3G180JG2 | 18               | ±5                 | SL/GP      |         |
|               | ECCT3G220JG2 | 22               | ±5                 | SL/GP      |         |
|               | ECCT3G270JG2 | 27               | ±5                 | SL/GP      |         |
|               | ECCT3G330JG  | 33               | ±5                 | SL/GP      | Style 1 |
|               | ECCT3G390JG  | 39               | ±5                 | SL/GP      |         |
| 3 kVDC        | ECCT3G470JG  | 47               | ±5                 | SL/GP      | Style 3 |
|               | ECCT3F100DG2 | 10               | ±0.5 pF            | SL/GP      |         |
|               | ECCT3F120JG2 | 12               | ±5                 | SL/GP      |         |
|               | ECCT3F150JG2 | 15               | ±5                 | SL/GP      |         |
|               | ECCT3F180JG2 | 18               | ±5                 | SL/GP      |         |
|               | ECCT3F220JG2 | 22               | ±5                 | SL/GP      |         |
|               | ECCT3F270JG2 | 27               | ±5                 | SL/GP      |         |
|               | ECCT3F330JG2 | 33               | ±5                 | SL/GP      |         |
|               | ECCT3F390JG  | 39               | ±5                 | SL/GP      |         |
|               | ECCT3F470JG  | 47               | ±5                 | SL/GP      |         |
| 2 kVDC        | ECCT3F560JG  | 56               | ±5                 | SL/GP      | Style 1 |
|               | ECCT3D680JG  | 68               | ±5                 | SL/GP      |         |
|               | ECKT3D101KB  | 100              | ±10                | B/Y5P      |         |
|               | ECKT3D121KB  | 120              | ±10                | B/Y5P      |         |
|               | ECKT3D151KB  | 150              | ±10                | B/Y5P      |         |
|               | ECKT3D181KB  | 180              | ±10                | B/Y5P      |         |
|               | ECKT3D221KB  | 220              | ±10                | B/Y5P      |         |
|               | ECKT3D271KB  | 270              | ±10                | B/Y5P      |         |
| 1 kVDC        | ECKT3D331KB  | 330              | ±10                | B/Y5P      |         |
|               | ECKT3A391KB  | 390              | ±10                | B/Y5P      |         |
|               | ECKT3A471KB  | 470              | ±10                | B/Y5P      |         |

Notes \* This part number indicates taped type.

\* Capacitance 9 pF or under is available by special order.

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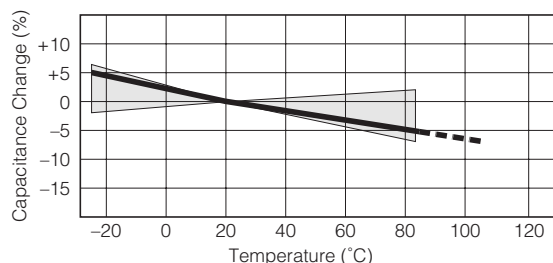
## High Voltage Ceramic Capacitors (SMD)

### ■ Typical Characteristics

#### ● Temperature Characteristics

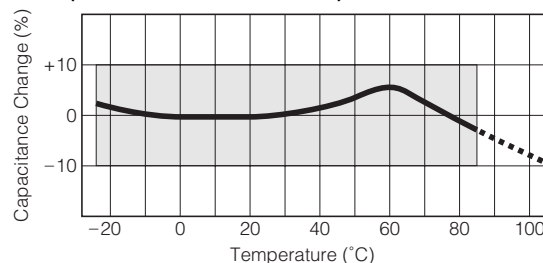
Char. SL/GP

(Temp.Coeff.: +350 to -1000 ppm/°C)



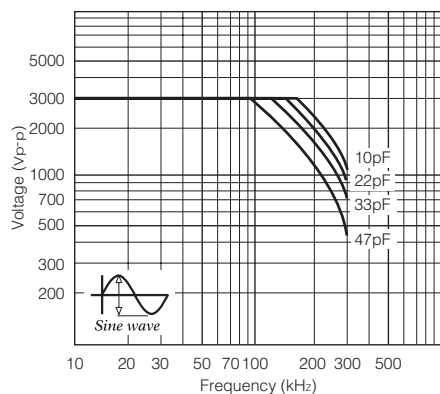
Char. B/Y5P

(Temp.Range: -25 to 85 °C)  
max.Cap.Change: ±10 %

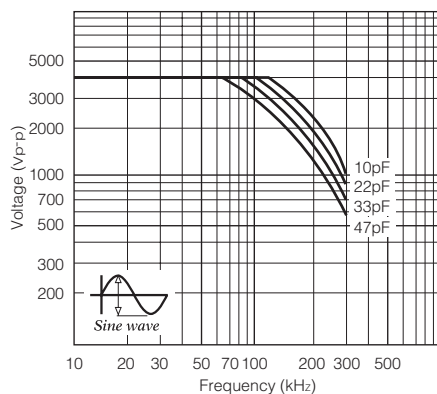


#### ● Characteristics of Voltage-Frequency

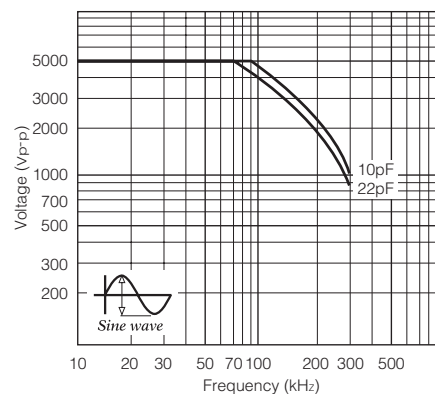
Rated Voltage 3 kVDC



Rated Voltage 4 kVDC



Rated Voltage 5 kVDC



The graphs above show the maximum permissible voltage when using a capacitor with an AC sine wave voltage.

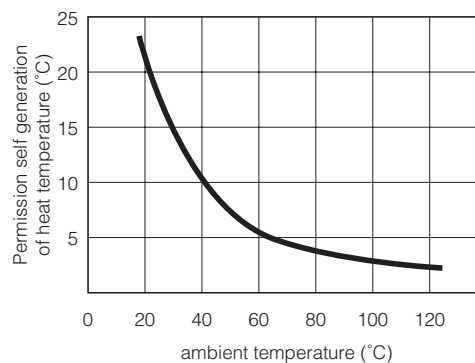
When measuring this voltage in room temperature (25 °C), the capacitor self-heat generation will rise a maximum of 20 °C.

When using a pulse voltage or an AC voltage other than a sine wave, confirm that the capacitor self-heat generation is less than 20 °C in an ambient room temperature of 25 °C.

The self-heat generation temperature is the difference between the surface temperature and the ambient room temperature.

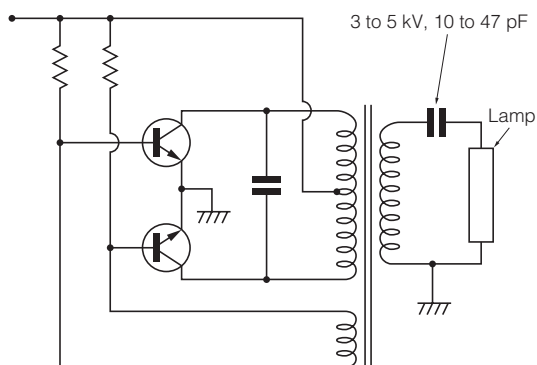
As for the situation when the self-heat generation temperature is more than 25 °C, refer to the figure on the right.

Permission self generation of heat temperature vs. ambient temperature



### ■ Application Examples

#### ● LCD Backlighting Inverter



#### ● Primary circuit and Snubber circuit of Switching Power Supply

