

# Mid-high Voltage Ceramic Capacitors

Disk type with lead

Safety standard approved

CS series

Issue date:      October 2011

- All specifications are subject to change without notice.
  - Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.
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# Mid-high Voltage Ceramic Capacitors(Disk with Lead) Safety Standard Approved CS Series

Conformity to RoHS Directive

**BASIC INSULATION TYPE/Operating temperature range: -25 to +105°C(UL standard: -25 to +85°C)**  
**CLASS 2 HIGH DIELECTRIC**

## FEATURES

- Flame-resistant reinforced outer insulation prevents fires, electrical shock, and other potential hazards.
- Compliant with the safety standards of 11 countries.
- It has a withstand voltage of AC.2600V
- This product is compatible with halogen-free external resin coating (we recommend halogen-free products as standard).

## CAPACITANCE TEMPERATURE CHARACTERISTICS AND TOLERANCE

| Temperature characteristics | Test temperature range | Capacitance tolerance |
|-----------------------------|------------------------|-----------------------|
| B(±10%)                     | -25 to +85°C           | K(±10%)               |
| E(+20, -55%)                | -25 to +85°C           | M(±20%)               |
| F(+30, -80%)                | -25 to +85°C           | M(±20%)               |

## PRODUCT IDENTIFICATION

| CS  | 11  | -E  | 2GA | 222 | M   | Y   | N   | S   | A    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |

- (1) Type
- (2) Shape
- (3) Capacitance temperature characteristics
- (4) Rated voltage
- (5) Nominal capacitance
- (6) Capacitance tolerance
- (7) Class
- (8) Lead type
- (9) Safety standard
- (10) Halogen-free compatible product

## CAPACITANCE AND DIMENSIONS

| Part No.             |                   | Capacitance temperature characteristics | Capacitance (pF) | Capacitance tolerance | Dimensions(mm) |        |         |          | Taping dimensions |
|----------------------|-------------------|-----------------------------------------|------------------|-----------------------|----------------|--------|---------|----------|-------------------|
| Halogen-free product | Current product   |                                         |                  |                       | D max.         | T max. | F       | d        |                   |
| CS70-B2GA101KY□*SA   | CS70-B2GA101KY□*S | B(±10%)                                 | 100              | K(±10%)               | 7.0            | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS70-B2GA151KY□SA    | CS70-B2GA151KY□S  |                                         | 150              | K(±10%)               | 7.0            | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS70-B2GA221KY□SA    | CS70-B2GA221KY□S  |                                         | 220              | K(±10%)               | 7.0            | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS85-B2GA331KY□SA    | CS85-B2GA331KY□S  |                                         | 330              | K(±10%)               | 8.5            | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS85-B2GA471KY□SA    | CS85-B2GA471KY□S  |                                         | 470              | K(±10%)               | 8.5            | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS95-B2GA681KY□SA    | CS95-B2GA681KY□S  |                                         | 680              | K(±10%)               | 9.5            | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS10-B2GA102KY□SA    | CS10-B2GA102KY□S  |                                         | 1,000            | K(±10%)               | 10.0           | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS80-E2GA102MY□SA    | CS80-E2GA102MY□S  |                                         | 1,000            | M(±20%)               | 8.0            | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS90-E2GA152MY□SA    | CS90-E2GA152MY□S  |                                         | 1,500            | M(±20%)               | 9.0            | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS11-E2GA222MY□SA    | CS11-E2GA222MY□S  |                                         | 2,200            | M(±20%)               | 10.5           | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS13-E2GA332MY□SA    | CS13-E2GA332MY□S  | E(+20, -55%)                            | 3,300            | M(±20%)               | 12.5           | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS14-E2GA392MY□SA    | CS14-E2GA392MY□S  |                                         | 3,900            | M(±20%)               | 13.5           | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS15-E2GA472MY□SA    | CS15-E2GA472MY□S  |                                         | 4,700            | M(±20%)               | 14.5           | 7.0    | 7.5±1.5 | 0.6±0.05 | V3                |
| CS12-F2GA472MY□SA    | CS12-F2GA472MY□S  | F(+30, -80%)                            | 4,700            | M(±20%)               | 12.0           | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS17-F2GA103MY□SA    | CS17-F2GA103MY□S  |                                         | 10,000           | M(±20%)               | 16.5           | 7.0    | 10±2    | 0.6±0.05 | —                 |

\* □ : Lead shape symbol

## LIST OF STANDARD LEAD SHAPES

The lead type is indicated by the letter which is the 15th character of the product name.

Example) TDK Product Name: **CS11-E2GA222MYNSA**

└─N: Lead type (Vertical kink, Short)

Dimensions in mm

|               | Long lead | Short lead | Taping   |
|---------------|-----------|------------|----------|
|               | Symbol G  | Symbol N   | Symbol V |
| Vertical kink |           |            |          |

- We recommend using a vertical kink type.
- For bulk products, we recommend a short lead type with the symbol N.

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## HALOGEN-FREE PRODUCT

### MARKINGS

| Item                               | Marking examples      |
|------------------------------------|-----------------------|
| 1. Series                          | CS                    |
| 2. Nominal capacitance             | 222(2200pF)           |
| 3. Capacitance tolerance           | M( $\pm 20\%$ )       |
| 4. Rated voltage Eac               | 250V $\sim$ (AC.250V) |
| 5. Sub-class of safety performance | X1Y2                  |
| 6. TDK's logogram                  |                       |
| 7. Date code                       | 15 (2011.5)*          |

(Marking position is reference.)

\* Year and month of production: last digit of year + month denoted by 1, 2, 3, 4, 5, 6, 7, 8, 9, O (October), N (November), or D (December).

\* The expression has become simplified due to a revision in the standards.

### INTERNATIONALLY CERTIFIED STATUS / IEC60384-14 EN60384-14 Approved

| Safety standard | Standard No. of IEC | Standard No.      | Temperature characteristics | Insulation sub-class | Rated voltage Eac(V) | Approval report No.   |                       |                       |
|-----------------|---------------------|-------------------|-----------------------------|----------------------|----------------------|-----------------------|-----------------------|-----------------------|
|                 |                     |                   |                             |                      |                      | Japan                 | Taiwan                | Xiamen                |
| BSI             | IEC 60065           | BS EN 60065       | B, E, F                     | X1, Y2               | 250                  | KM37103               | KM37103               | KM37103               |
|                 | IEC 60384-14        | BS EN60384-14     |                             |                      |                      |                       |                       |                       |
| VDE             | IEC 60384-14        | EN 60384-14       | B, E, F                     | X1, Y2               | 250                  | 40029781              | 40029781              | 40029781              |
| SEV             | IEC 60384-14        | EN 60384-14       | B, E, F                     | X1, Y2               | 250                  | 10.0120               | 10.0120               | 10.0120               |
| SEMKO           | IEC 60384-14        | EN 60384-14       | B, E, F                     | X1, Y2               | 250                  | 912461                | 912461                | 912461                |
| NEMKO           | IEC 60384-14        | EN 60384-14       | B, E, F                     | X1, Y2               | 250                  | P09211677             | P09211677             | P09211677             |
| DEMKO           | IEC 60384-14        | EN 60384-14       | B, E, F                     | X1, Y2               | 250                  | 315269-01             | 315269-01             | 315269-01             |
| FIMKO           | IEC 60384-14        | EN 60384-14       | B, E, F                     | X1, Y2               | 250                  | FI 25553              | FI 25553              | FI 25553              |
| IMQ             | IEC 60384-14        | EN 60384-14       | B, E, F                     | X1, Y2               | 250                  | V3692                 | V3692                 | V3692                 |
| SAA             | IEC 60065           | AS3250            | B, E, F                     | —                    | 400                  | CS6268                | CS6268                | CS6268                |
| UL              | —                   | UL 1414           | B, E, F                     | (X, Y)               | 250                  | E37861                | E37861                | E37861                |
| CSA             | IEC 60384-14        | CAN/CSA-E60384-14 | B, E, F                     | (X, Y)               | 250                  | 2278972<br>(LR 35801) | 2278972<br>(LR 35801) | 2278972<br>(LR 35801) |
| CQC             | IEC 60384-14        | GB-T 14472-1998   | B, E, F                     | X1, Y2               | 250                  | CQC10001051610        | CQC10001051637        | CQC03001004815        |

\* Certificate numbers shall be changed owing to the revisions of the related standards.

## CURRENT PRODUCT

### MARKINGS

| Item                                                    | Marking examples      |
|---------------------------------------------------------|-----------------------|
| 1. Series                                               | CS                    |
| 2. Nominal capacitance                                  | 222(2200pF)           |
| 3. Capacitance tolerance                                | M( $\pm 20\%$ )       |
| 4. Rated voltage Eac                                    | 250V $\sim$ (AC.250V) |
| 5. Withstand voltage Eac                                | X1Y2                  |
| 6. Sub-class of safety performance                      |                       |
| 7. TDK's logogram                                       | 15 (2011.5)*          |
| 8. Date code                                            |                       |
| 9. Regulatory body safety standards compliance markings |                       |

(Marking position of the monogram is reference.)

|                   |     |                      |       |                    |  |                   |  |
|-------------------|-----|----------------------|-------|--------------------|--|-------------------|--|
| BSI<br>(U.K.)     | BSI | SEV<br>(Switzerland) | TJ508 | FIMKO<br>(Finland) |  | NEMKO<br>(Norway) |  |
| SEMKO<br>(Sweden) |     | UL<br>(U.S.A.)       |       | DEMKO<br>(Denmark) |  | IMQ<br>(Italy)    |  |
| VDE<br>(Germany)  |     | CSA<br>(Canada)      |       |                    |  |                   |  |

\* Year and month of production: last digit of year + month denoted by 1, 2, 3, 4, 5, 6, 7, 8, 9, O (October), N (November), or D (December).

### INTERNATIONALLY CERTIFIED STATUS / IEC60384-14 EN60384-14 Approved

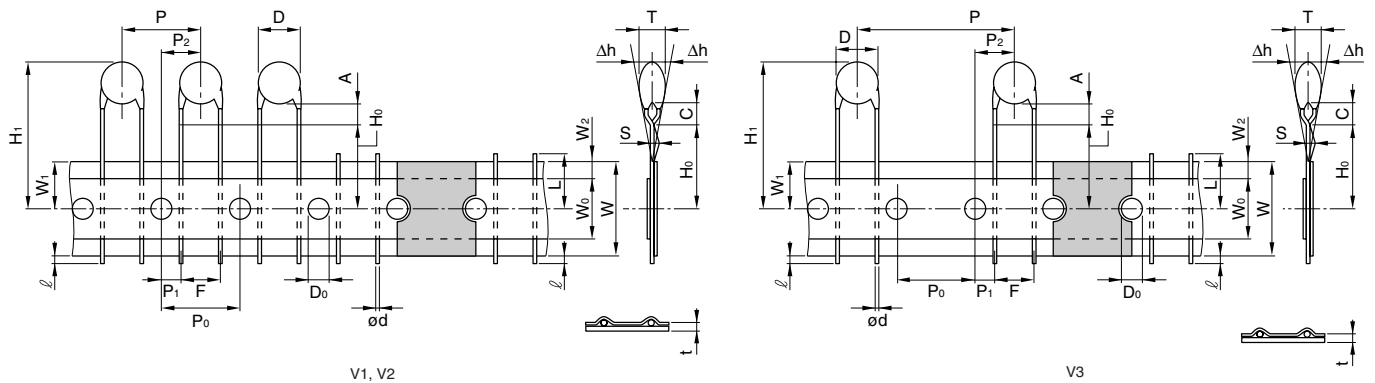
| Safety standard | Standard No. of IEC | Standard No.          | Temperature characteristics | Insulation sub-class | Rated voltage Eac(V) | Approval report No. |           |            |
|-----------------|---------------------|-----------------------|-----------------------------|----------------------|----------------------|---------------------|-----------|------------|
|                 |                     |                       |                             |                      |                      | Japan               | Taiwan    | Xiamen     |
| BSI             | IEC 60065           | BS EN 60065           | B, E, F                     | X1, Y2               | 250                  | 226494              | 226494    | 226494     |
|                 | IEC 60384-14        | BS EN60384-14         |                             |                      |                      |                     |           |            |
| VDE             | IEC 60384-14        | EN 60384-14           | B, E, F                     | X1, Y2               | 250                  | 138559              | 138560    | 122006     |
| SEV             | IEC 60384-14        | EN60384-14            | B, E, F                     | X1, Y2               | 250                  | 09.0962             | 09.0962   | 09.0962    |
| SEMKO           | IEC 60384-14        | EN60384-14            | B, E, F                     | X1, Y2               | 250                  | 915556              | 915556    | 915394     |
| NEMKO           | IEC 60384-14        | EN60384-14            | B, E, F                     | X1, Y2               | 250                  | P09211507           | P09211507 | P08209309  |
| DEMKO           | IEC 60384-14        | EN60384-14            | B, E, F                     | X1, Y2               | 250                  | 315179-01           | 315179-01 | 314664-02  |
| FIMKO           | IEC 60384-14        | EN60384-14            | B, E, F                     | X1, Y2               | 250                  | FI 25453            | FI 25453  | FI 24306A1 |
| IMQ             | IEC 60384-14        | EN60384-14            | B, E, F                     | X1, Y2               | 250                  | V3692               | V3692     | V3692      |
| SAA             | IEC 60065           | AS3250                | B, E, F                     | —                    | 400                  | 6268                | 6268      | 6268       |
| UL              | —                   | UL 1414               | B, E, F                     | (X, Y)               | 250                  | E37861              | E37861    | E37861     |
| CSA             | —                   | CSA C22.2 No.0 & No.1 | B, E, F                     | (X, Y)               | 250                  | LR35801             | LR65972   | LR65972    |

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## TAPING DIMENSIONS

### VERTICAL KINK LEAD TYPE



| Item                                 | Symbol         | Dimensions(mm)                                |                |                | Remarks                                              |
|--------------------------------------|----------------|-----------------------------------------------|----------------|----------------|------------------------------------------------------|
|                                      |                | V1                                            | V2             | V3             |                                                      |
| Body diameter                        | D              | Depends on the specification of each product. |                |                |                                                      |
| Body thickness                       | T              | Depends on the specification of each product. |                |                |                                                      |
| Lead-wire diameter                   | ød             | 0.6±0.05                                      | 0.6±0.05       | 0.6±0.05       |                                                      |
| Pitch of component                   | P              | 12.7±1.0                                      | 15.0±1.0       | 30.0±1.0       | Including the slant of body                          |
| Feed hole pitch                      | P <sub>0</sub> | 12.7±0.3                                      | 15.0±0.3       | 15.0±0.3       | Excepting the tape splicing part                     |
| Feed hole center to lead             | P <sub>1</sub> | 3.85±0.7                                      | 3.75±0.7       | 3.75±0.7       |                                                      |
| Feed hole center to component center | P <sub>2</sub> | 6.35±1.3                                      | 7.5±1.3        | 7.5±1.3        |                                                      |
| Lead-to lead distance                | F              | 5+0.8, -0.2                                   | 7.5±0.8        | 7.5±0.8        | Measuring point is bottom kink                       |
| Component alignment                  | Δh             | 0±2.0                                         | 0±2.0          | 0±2.0          | Including the slanting body due to bending lead-wire |
| Tape width                           | W              | 18.0+1.0, -0.5                                | 18.0+1.0, -0.5 | 18.0+1.0, -0.5 |                                                      |
| Adhesive tape width                  | W <sub>0</sub> | 11.5min.                                      | 11.5min.       | 11.5min.       |                                                      |
| Hole position                        | W <sub>1</sub> | 9.0±0.5                                       | 9.0±0.5        | 9.0±0.5        |                                                      |
| Adhesive tape position               | W <sub>2</sub> | 3.0max.                                       | 3.0max.        | 3.0max.        | Adhesive tape do not stick out the tape              |
| Bottom of kink from tape center      | H <sub>0</sub> | 16.0+1.5, -0.5                                | 16.0+1.5, -0.5 | 16.0+1.5, -0.5 |                                                      |
| Height of body from tape center      | H <sub>1</sub> | 46.0max.                                      | 46.0max.       | 46.0max.       |                                                      |
| Lead-wire protrusion                 | ℓ              | 1.0max.                                       | 1.0max.        | 1.0max.        |                                                      |
| Feed hole diameter                   | D <sub>0</sub> | 4.0±0.2                                       | 4.0±0.2        | 4.0±0.2        |                                                      |
| Total tape thickness                 | t              | 0.6±0.3                                       | 0.6±0.3        | 0.6±0.3        | Do not including adhesive tape                       |
| Length of snapped lead               | L              | 11.0max.                                      | 11.0max.       | 11.0max.       |                                                      |
| Coating on lead                      | C              | 4.0max.                                       | 4.0max.        | 4.0max.        |                                                      |
| Height of kink                       | A              | 4.0max.                                       | 4.0max.        | 4.0max.        | Measuring point is bottom kink                       |
| Spring action                        | S              | 2.0max.                                       | 2.0max.        | 2.0max.        |                                                      |

• For more information about products with other capacitance or other data, please contact us.

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