

# Disc Type Capacitors with Lead

High Voltage Ceramic Capacitors  
Automotive Grade

Safety Standard Approved  
CS series

Issue date: March 2013

- 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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## BASIC INSULATION TYPE CLASS 2 HIGH DIELECTRIC

### FEATURES

- AEC-Q200 compliant.
- 1,000 cycles guaranteed under heat shock testing at  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ .
- It can be used as a Y capacitor for battery chargers used in automobiles (EV, PHEV).
- Compliant with IEC and the safety standards of various countries.
- Rated at a withstand voltage of AC.2600V.
- Compatible with halogen-free external resin coating.

**OPERATING TEMPERATURE RANGE:  $-40$  to  $+125^{\circ}\text{C}$**

### TEMPERATURE CHARACTERISTICS AND TOLERANCE

| Temperature characteristics                      | Test temperature range         | Capacitance tolerance |
|--|--------------------------------|-----------------------|
| SL (+350 to $-1000\text{ppm}/^{\circ}\text{C}$ ) | $+20$ to $+85^{\circ}\text{C}$ | J ( $\pm 5\%$ )       |
| B ( $\pm 10\%$ )                                 | $-25$ to $+85^{\circ}\text{C}$ | K ( $\pm 10\%$ )      |
| Z5U (+22, $-56\%$ )                              | $+10$ to $+85^{\circ}\text{C}$ | M ( $\pm 20\%$ )      |

### PRODUCT IDENTIFICATION

CS 80 ZU 2GA 222 M A N K A  
(1) (2) (3) (4) (5) (6) (7) (8) (9) (10)

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

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## CAPACITANCE AND DIMENSIONS

| Part No.           | Temperature characteristics | Capacitance (pF) | Capacitance tolerance | Dimensions (mm) |        |         |          | Taping dimensions |
|--------------------|-----------------------------|------------------|-----------------------|-----------------|--------|---------|----------|-------------------|
|                    |                             |                  |                       | D max.          | T max. | F       | d        |                   |
| CS45SL2GA100JA□*KA | SL (+350 to -1000ppm/°C)    | 10               | J (±5%)               | 7.0             | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS45SL2GA150JA□KA  |                             | 15               | J (±5%)               | 7.0             | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS45SL2GA220JA□KA  |                             | 22               | J (±5%)               | 7.0             | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS45SL2GA330JA□KA  |                             | 33               | J (±5%)               | 7.0             | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS45SL2GA470JA□KA  |                             | 47               | J (±5%)               | 8.0             | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS45SL2GA680JA□KA  |                             | 68               | J (±5%)               | 9.0             | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS65-B2GA101KA□KA  | B (±10%)                    | 100              | K (±10%)              | 7.0             | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS65-B2GA151KA□KA  |                             | 150              | K (±10%)              | 7.0             | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS65-B2GA221KA□KA  |                             | 220              | K (±10%)              | 7.0             | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS70-B2GA331KA□KA  |                             | 330              | K (±10%)              | 7.5             | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS75-B2GA471KA□KA  |                             | 470              | K (±10%)              | 9.0             | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS85-B2GA681KA□KA  |                             | 680              | K (±10%)              | 9.5             | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS65ZU2GA102MA□KA  | Z5U (+22, -56%)             | 1,000            | M (±20%)              | 7.0             | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS75ZU2GA152MA□KA  |                             | 1,500            | M (±20%)              | 8.0             | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS80ZU2GA222MA□KA  |                             | 2,200            | M (±20%)              | 9.5             | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS95ZU2GA332MA□KA  |                             | 3,300            | M (±20%)              | 12.0            | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |
| CS11ZU2GA472MA□KA  |                             | 4,700            | M (±20%)              | 13.5            | 7.0    | 7.5±1.5 | 0.6±0.05 | V2                |

\* □ : 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: **CS80ZU2GA222MANKA**

└ N: Lead type (Vertical kink, Short)

Dimensions in mm

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

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

## MARKINGS

| Item                     | Markings         | Specifications             | Marking examples                        |
|--------------------------|------------------|----------------------------|---|
| 1. Series                | CS               | CS series                  | <p>(Marking position is reference.)</p> |
| 2. Nominal capacitance   | 222              | 2200pF                     |   |
| 3. Capacitance tolerance | M                | ±20%                       |   |
| 4. Rated voltage Eac     | 440~X1<br>300~Y2 | X1: AC.440V<br>Y2: AC.300V |   |
| 5. TDK's logogram        |                  | Production base code       |   |
| 6. Date code             | 29               | 2012.9*                    |   |
| 7. Applications          | —                | For use in automobiles     |   |

(Underscore below date of production)

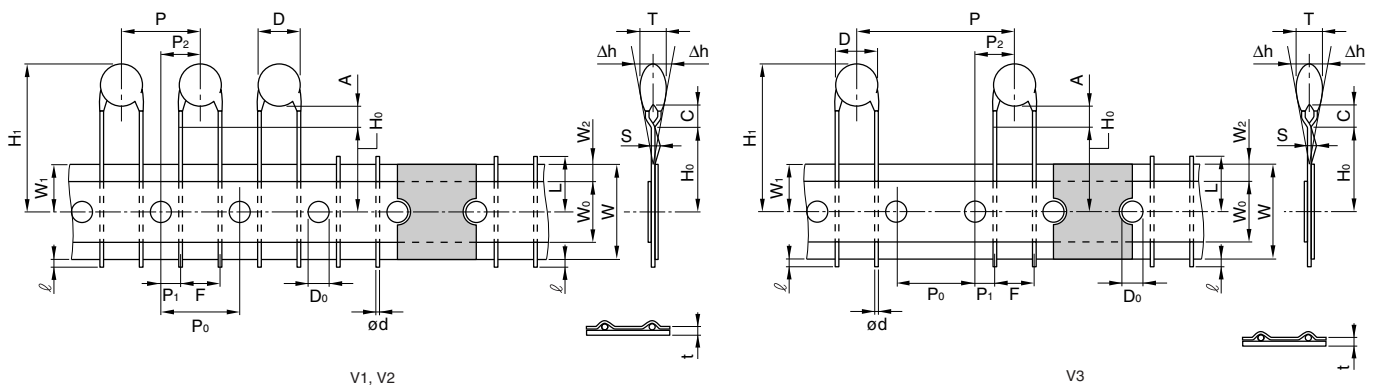
\* Year and month of production: last digit of year + month denoted by 1, 2, 3, 4, 5, 6, 7, 8, 9, O (October), N (November), or D (December).

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

**CERTIFIED STATUS OF VARIOUS COUNTRIES**

| Safety standard | Standard No.      | Temperature characteristics | Insulation sub-class | Rated voltage              | Approval report No. |                |
|-----------------|-------------------|-----------------------------|----------------------|----------------------------|---------------------|----------------|
|                 |                   |                             |                      |                            | Taiwan              | Xiamen         |
| BSI             | BS EN60384-14     | SL, B, Z5U                  | X1, Y2               | X1: AC.440V<br>Y2: AC.300V | KM37103             | KM37103        |
| VDE             | EN 60384-14       |                             |                      |                            | 40017930            | 40017930       |
| SEV             | EN 60384-14       |                             |                      |                            | 12.0263             | 12.0263        |
| SEMKO           | EN 60384-14       |                             |                      |                            | 1125249             | 1125249        |
| NEMKO           | EN 60384-14       |                             |                      |                            | P12215336           | P12215336      |
| DEMKO           | EN 60384-14       |                             |                      |                            | D-01153             | D-01153        |
| FIMKO           | EN 60384-14       |                             |                      |                            | FI 27399            | FI 27399       |
| IMQ             | EN 60384-14       |                             |                      |                            | V3692               | V3692          |
| SAA             | AS3250            |                             |                      |                            | CS6268              | CS6268         |
| UL              | UL 60384-14       |                             |                      |                            | E37861              | E37861         |
| CSA             | CAN/CSA-E60384-14 |                             |                      |                            | 1785515             | 1785515        |
| CQC             | GB/T14472-1998    |                             |                      |                            | CQC12001082619      | CQC10001052862 |

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

**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> | 10.0min.                                      | 10.0min.       | 10.0min.       |  |
| 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> | 4.0max.                                       | 4.0max.        | 4.0max.        | 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        | 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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