**Disc type capacitors with leads**
**High voltage ceramic capacitors, commercial grade, safety standard approved**

RoHS | REACH SVHC-Free | Halogen Free | Lead Free

# CS series

Product Portal | Search | Selection Guide | Tech Note | Application Guides

## FEATURES

- Compliant with IEC and the safety standards of various countries.
- Withstand voltage is 2,600V AC.
- Flame-resistant reinforced outer insulation prevents fires, electrical shock, and other potential hazards.
- Compatible with halogen-free external resin coating.

## APPLICATION

Y capacitor for AC adapter, charger, power supplies

## PART NUMBER CONSTRUCTION

| CS | 80 | ZU | 2GA | 222 | M | Y | □ | K | A |
|---|---|---|---|---|---|---|---|---|---|
| Series name | Type* | Temperature characteristics | Rated voltage | Nominal capacitance | Capacitance tolerance | Internal control code | Lead-wire type | Application classification | Internal code |

| Type* |
|---|
| 45 |
| 65 |
| 70 |
| 75 |
| 80 |
| 85 |
| 95 |
| 11 |
| 14 |

| Temperature characteristics | |
|---|---|
| SL | +350 to –1,000ppm/°C |
| -B | ±10% |
| ZU (Z5U) | +22, –56% |
| -F | +30, –80% |

| Rated voltage | |
|---|---|
| 2GA | X1:440V AC Y2:300V AC |

| Nominal capacitance | |
|---|---|
| 100 | 10pF |
| 221 | 220pF |
| 472 | 4,700pF |

| Capacitance tolerance | |
|---|---|
| J | ±5% |
| K | ±10% |
| M | ±20% |

| Lead-wire type | |
|---|---|
| G | Long lead |
| N | Short lead |
| V | Taping |

| Application classification | |
|---|---|
| K | Safety standard approved |

| Internal code | |
|---|---|
| A | Halogen-free |

* Please refer to P-3 about the product dimensions.

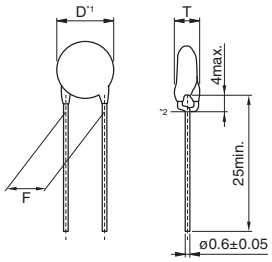
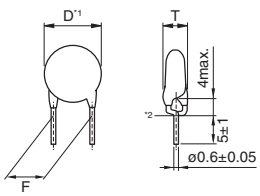
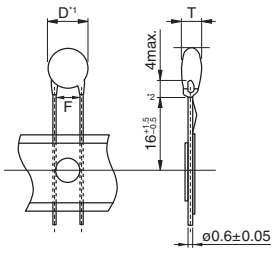
## □OPERATING TEMPERATURE RANGE

| Temperature characteristics | Operating temperature (°C) | Storage temperature (°C)* |
|---|---|---|
| SL | –40 to +125 | –40 to +125 |
| B | –40 to +125 | –40 to +125 |
| ZU (Z5U) | –40 to +125 | –40 to +125 |
| F | –40 to +125 | –40 to +125 |

The maximum operating temperature of +125°C includes capacitor self-generated heat of up to 20°C.
* After capacitor is mounted on board, the storage temperature range is applied.

## □STANDARD LEAD-WIRE SHAPES

Dimemsions in mm

| | Symbol G : Bulk/long leads | Symbol N : Bulk/short leads | Symbol V : Taping |
|---|---|---|---|
| Vertical kink |  |  |  |



TDK's standard product is vertical kink. TDK recommends short leads for bulk products.
*1 Body diameter (D) is reference value if D is smaller than maximum dimension of lead to lead distance (F).
*2 Coating on leads shall not extend beyond the bottom of vertical kink.

○RoHS Directive Compliant Product: See the following for more details. https://product.tdk.com/en/environment/rohs/index.html
○Halogen-free: Indicate that Cl content is less than 900ppm, Br content is less than 900ppm, and that the total Cl and Br content is less than 1500ppm.

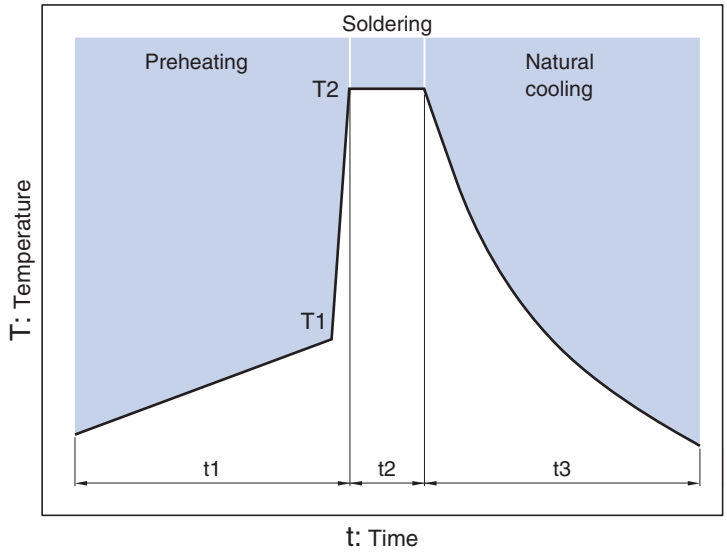
# Overview of CS series

## CERTIFIED STATUS OF VARIOUS COUNTRIES

| Safety standard | IEC standard No. | Standard No. | Temperature characteristics | Sub-class | Rated voltage | Approval report No.* | |
|---|---|---|---|---|---|---|---|
| | | | | | | Taiwan | Xiamen |
| BSI | BS EN 60384-14<br>IEC 60384-14 | BS EN 60065<br>(8.8, 14.2)<br>BS EN 60384-14 | SL,B,Z5U,F | X1,Y2 | X1:440V AC<br>Y2:300V AC | KM37103 | |
| VDE | IEC 60384-14 | EN 60384-14 | | | | 40017930 | |
| SEV | | | | | | 19.0043 | |
| SEMKO | | | | | | 1910408 | |
| NEMKO | | | | | | P19223652 | |
| DEMKO | | | | | | D-04986 | |
| FIMKO | | | | | | FI 140177 | |
| IMQ | | | | | | V3692 | |
| SAA | | AS3250 | | | | CS6268 | |
| CSA | | CSA-E60384-14 | | | | 1785515 | |
| UL | | UL60384-14 | | | | E37861 | |
| CQC | | GB/T14472-1998 | | | | CQC12001082619 | CQC10001052862 |
| KTL | | K60384-14 | | X1 | 440V AC | SZ03001-12006 | SU03047-12006 |
| | | | | Y2 | 300V AC | SZ03001-12008 | SU03047-12008 |

* Certificate numbers shall be changed owing to the revisions of the related standards and renewal of certificate.

## RECOMMENDED FLOW PROFILE



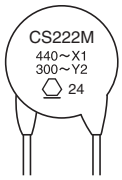

| Preheating | | Peak | | Natural cooling |
|---|---|---|---|---|
| Temp. | Time | Temp. | Time | Time |
| T1 | t1 | T2 | t2 | t3 |
| 100 to 120°C | 30 to 60s. | 260°C | Within 10s. | Over 60s. |

Before soldering, be sure to preheat components.
The preheating temperature should be set so that the temperature difference between the solder temperature and product temperature does not exceed 150°C.

# CS series

## MARKINGS

| Item | Markings | Description | Marking examples |
|---|---|---|---|
| 1.Series | CS | CS series | |
| 2.Nominal capacitance | 222 | 2,200pF | |
| 3.Capacitance tolerance | M | ±20% | |
| 4.Rated voltage Eac | 440～X1<br>300～Y2 | X1: 440V AC<br>Y2: 300V AC | |
| 5.TDK's trademark | ⏣ | Production base code | |
| 6.Date code | 24 | 2022.04* | |



(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.

## RATED VOLTAGE Eac: X1:440V、Y2:300V

### CAPACITANCE AND DIMENSIONS

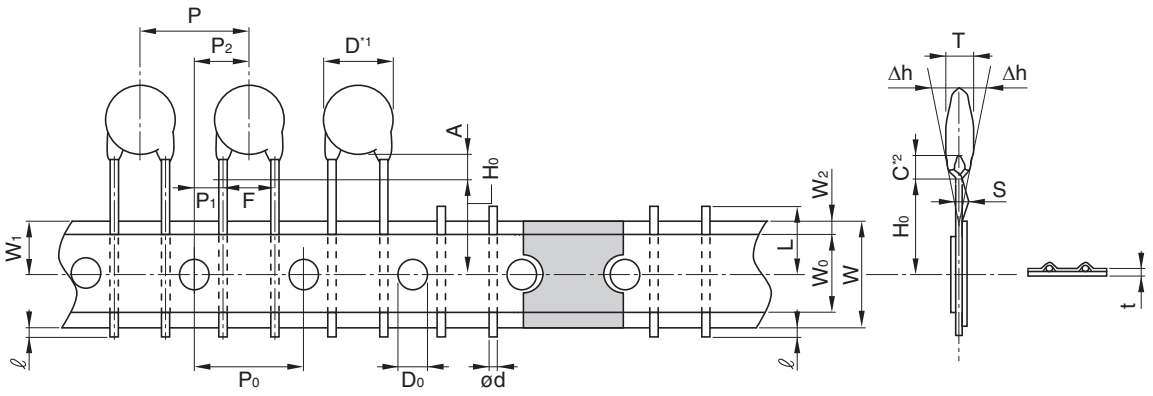
| Temperature characteristics | Capacitance | Capacitance tolerance | Dimensions (mm) | | | | Part numbers | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Dmax. * | Tmax. | F (applied to bulk) | F (applied to taping) | Bulk/long leads (Symbol: G) | Bulk/short leads (Symbol: N) | Taping (Symbol: V) |
| SL | 10 pF | ±5 % | (7.0) | 5.0 | 7.5±1.5 | 7.5±0.8 | CS45SL2GA100JYGKA | CS45SL2GA100JYNKA | CS45SL2GA100JYVKA |
| SL | 15 pF | ±5 % | (7.0) | 5.0 | 7.5±1.5 | 7.5±0.8 | CS45SL2GA150JYGKA | CS45SL2GA150JYNKA | CS45SL2GA150JYVKA |
| SL | 22 pF | ±5 % | (7.0) | 5.0 | 7.5±1.5 | 7.5±0.8 | CS45SL2GA220JYGKA | CS45SL2GA220JYNKA | CS45SL2GA220JYVKA |
| SL | 33 pF | ±5 % | (7.0) | 5.0 | 7.5±1.5 | 7.5±0.8 | CS45SL2GA330JYGKA | CS45SL2GA330JYNKA | CS45SL2GA330JYVKA |
| SL | 47 pF | ±5 % | (7.0) | 5.0 | 7.5±1.5 | 7.5±0.8 | CS45SL2GA470JYGKA | CS45SL2GA470JYNKA | CS45SL2GA470JYVKA |
| SL | 68 pF | ±5 % | (7.5) | 5.0 | 7.5±1.5 | 7.5±0.8 | CS45SL2GA680JYGKA | CS45SL2GA680JYNKA | CS45SL2GA680JYVKA |
| B | 100 pF | ±10 % | (7.0) | 5.0 | 7.5±1.5 | 7.5±0.8 | CS65-B2GA101KYGKA | CS65-B2GA101KYNKA | CS65-B2GA101KYVKA |
| B | 150 pF | ±10 % | (7.0) | 5.0 | 7.5±1.5 | 7.5±0.8 | CS65-B2GA151KYGKA | CS65-B2GA151KYNKA | CS65-B2GA151KYVKA |
| B | 220 pF | ±10 % | (7.0) | 5.0 | 7.5±1.5 | 7.5±0.8 | CS65-B2GA221KYGKA | CS65-B2GA221KYNKA | CS65-B2GA221KYVKA |
| B | 330 pF | ±10 % | (7.0) | 5.0 | 7.5±1.5 | 7.5±0.8 | CS70-B2GA331KYGKA | CS70-B2GA331KYNKA | CS70-B2GA331KYVKA |
| B | 470 pF | ±10 % | (7.5) | 5.0 | 7.5±1.5 | 7.5±0.8 | CS75-B2GA471KYGKA | CS75-B2GA471KYNKA | CS75-B2GA471KYVKA |
| B | 680 pF | ±10 % | 8.5** | 5.0 | 7.5±1.5 | 7.5±0.8 | CS85-B2GA681KYGKA | CS85-B2GA681KYNKA | CS85-B2GA681KYVKA |
| Z5U | 1000 pF | ±20 % | (7.0) | 5.0 | 7.5±1.5 | 7.5±0.8 | CS65ZU2GA102MYGKA | CS65ZU2GA102MYNKA | CS65ZU2GA102MYVKA |
| Z5U | 1500 pF | ±20 % | (7.5) | 5.0 | 7.5±1.5 | 7.5±0.8 | CS75ZU2GA152MYGKA | CS75ZU2GA152MYNKA | CS75ZU2GA152MYVKA |
| Z5U | 2200 pF | ±20 % | (8.0) | 5.0 | 7.5±1.5 | 7.5±0.8 | CS80ZU2GA222MYGKA | CS80ZU2GA222MYNKA | CS80ZU2GA222MYVKA |
| Z5U | 3300 pF | ±20 % | 9.5 | 5.0 | 7.5±1.5 | 7.5±0.8 | CS95ZU2GA332MYGKA | CS95ZU2GA332MYNKA | CS95ZU2GA332MYVKA |
| Z5U | 4700 pF | ±20 % | 10.5 | 5.0 | 7.5±1.5 | 7.5±0.8 | CS11ZU2GA472MYGKA | CS11ZU2GA472MYNKA | CS11ZU2GA472MYVKA |
| F | 10000 pF | ±20 % | 14.5 | 5.0 | 7.5±1.5 | 7.5±0.8 | CS14-F2GA103MYGKA | CS14-F2GA103MYNKA | CS14-F2GA103MYVKA |

* The values in parentheses "( )" are reference values.
** Reference value is applied to bulk product.
Click the part number for details.
● Please refer to p-4 about the taping dimemsions.

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

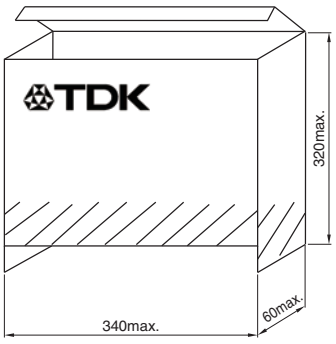
# CS series

## TAPING DIMENSIONS




| Item | Symbols | Dimensions (mm) | Remarks |
|---|---|---|---|
| Body diameter | D | Refer to P-3 | *1 Body diameter (D) is reference value if D is smaller than maximum dimension of lead to lead distance (F). |
| Body thickness | T | Refer to P-3 | |
| Lead-wire diameter | ød | 0.6±0.05 | |
| Pitch of component | P | 15.0±1.0 | Including the slant of body |
| Feed hole pitch | $P_0$ | 15.0±0.3 | Excepting the tape splicing part |
| Feed hole center to lead-wire | $P_1$ | 3.75±0.7 | |
| Feed hole center to component center | $P_2$ | 7.5±1.3 | Including the slanting body due to bending lead-wire |
| Lead-to lead distance | F | 7.5±0.8 | Measuring point is bottom kink |
| Component alignment | Δh | 0±2.0 | Including the slanting body due to bending lead-wire |
| Carrier tape width | W | 18.0+1.0,–0.5 | |
| Adhesive tape width | $W_0$ | 10.0 Min. | |
| Hole position | $W_1$ | 9.0±0.5 | |
| Adhesive tape position | $W_2$ | 4.0 Max. | Adhesive tape do not stick out the tape |
| Bottom of kink from tape center | $H_0$ | 16.0+1.5,–0.5 | |
| Lead-wire protrusion | ℓ | 1.0 Max. | |
| Feed hole diameter | $D_0$ | 4.0±0.2 | |
| Carrier tape thickness (Including adhesive tape) | t | 0.6±0.3 | Including adhesive tape |
| Length of snipped lead-wire | L | 11.0 Max. | |
| Coating on lead-wire | C | 4.0 Max. | *2 Coating on leads shall not extend beyond the bottom of vertical kink. |
| Height of kink | A | 4.0 Max. | Measuring point is bottom kink |
| Spring action | S | 2.0 Max. | |

## AMMO PACK INNER BOX SIZE




Dimensions in mm

## PACKAGE QUANTITY

| Type | Package quantity | |
|---|---|---|
| | Bulk (pieces / bag) | Taping (pieces / box) |
| CS | 1000 | 1000 |

# REMINDERS FOR USING THESE PRODUCTS

Before using these products, be sure to request the delivery specifications.

# SAFETY REMINDERS

Please pay sufficient attention to the warnings for safe designing when using this products.

## ⚠ REMINDERS

- Do not use or store in locations where there are conditions such as gas corrosion (salt, acid, alkali, etc.).
- Before soldering, be sure to preheat components.
  The preheating temperature should be set so that the temperature difference between the solder temperature and product temperature does not exceed 150°C.
- Soldering corrections after mounting should be within the range of the conditions determined in the specifications.
  If overheated, a short circuit, performance deterioration, or lifespan shortening may occur.
- Self heating (temperature increase) occurs when the power is turned ON, so the tolerance should be sufficient for the set thermal design.
- Do not use for a purpose outside of the contents regulated in the delivery specifications.
- The products listed on this catalog are intended for use in general electronic equipment (AV equipment, telecommunications equipment, home appliances, amusement equipment, computer equipment, personal equipment, office equipment, measurement equipment, industrial robots) under a normal operation and use condition.
  The products are not designed or warranted to meet the requirements of the applications listed below, whose performance and/or quality require a more stringent level of safety or reliability, or whose failure, malfunction or trouble could cause serious damage to society, person or property.
  If you intend to use the products in the applications listed below or if you have special requirements exceeding the range or conditions set forth in the each catalog, please contact us.

(1) Aerospace/aviation equipment
(2) Transportation equipment (cars, electric trains, ships, etc.)
(3) Medical equipment
(4) Power-generation control equipment
(5) Atomic energy-related equipment
(6) Seabed equipment
(7) Transportation control equipment
(8) Public information-processing equipment
(9) Military equipment
(10) Electric heating apparatus, burning equipment
(11) Disaster prevention/crime prevention equipment
(12) Safety equipment
(13) Other applications that are not considered general-purpose applications

- Please refer to the guideline of notabilia for fixed ceramic capacitors issued by JEITA(Japan Electronics and Information Technology Association, EIAJ RCR-2335).
  This guideline describes general precautions* for using fixed ceramic capacitors. Please carefully confirm it and use capacitors safely.
  * Items for check, explanation/reason/concrete example and failure examples, etc.

When designing your equipment even for general-purpose applications, you are kindly requested to take into consideration securing protection circuit/device or providing backup circuits in your equipment.