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

CS series

■ FEATURES

- ○AEC-Q200 compliant.
- ○1,000 cycles guaranteed under heat shock testing at −55°C to +125°C.
- ○For use in Y capacitor for battery chargers of automobile (EV, PHEV).
- ○Compliant with IEC and the safety standards of various countries.
- ○Withstand voltage is 2,600V AC.
- ○Conform to RoHS directive due to lead(Pb) free of lead-wire and internal solder material.
- ○Compatible with halogen-free external resin coating.

■ APPLICATIONS

Y capacitor for AC adapters, chargers, power supplies

■ PART NUMBER CONSTRUCTION

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

Type*
45
65
70
75
80
85
95
11

Temperature characteristics	
SL	+350 to -1,000ppm/℃
-B	±10%
ZU (Z5U)	+22,-56%

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%

Grade classification	
A	For use in automobiles

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.

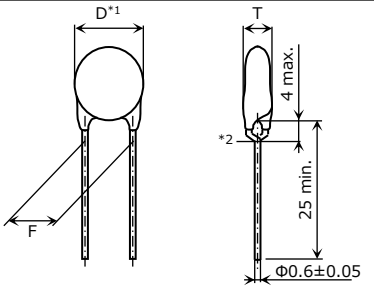
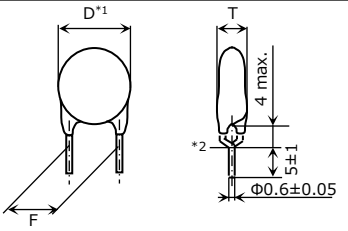
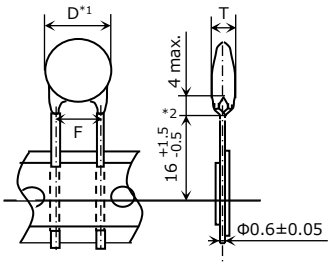
□OPERATING TEMPERATURE RANGE

Temperature characteristics	Operating temperature (℃)	Storage temperature (℃)*
SL	-55 to +125	-55 to +125
B		
ZU (Z5U)		

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 1,500ppm.

Please be sure to request delivery specifications that provide further details on the features and specifications of the products for proper and safe use.
Please note that the contents may change without any prior notice due to reasons such as upgrading.

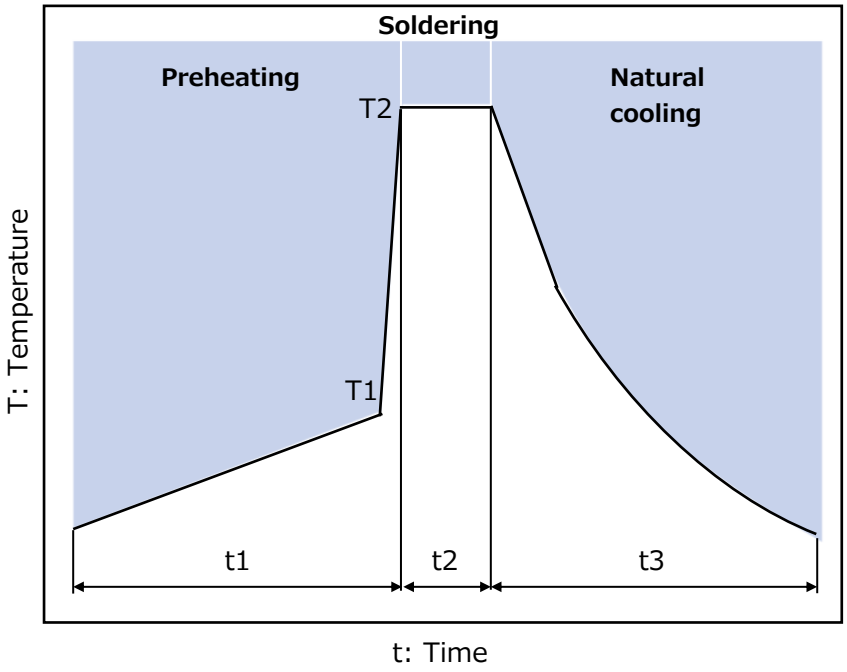
Overview of CS series

■ CERTIFIED STATUS OF VARIOUS COUNTRIES

Safety standard	IEC standard No.	Standard No.	Temperature characteristics	Sub-class	Rated voltage	Approval report Xiamen
BSI	IEC 62368-1 IEC 60384-14	BS EN 62368-1 BS EN 60384-14	SL,B,Z5U	X1,Y2	X1:440V AC Y2:300V AC	KM37103
VDE	IEC 60384-14	EN 60384-14				40017930
SEV						25.0064
SEMKO						SE-S-2200873
NEMKO						P19223652
DEMKO						D-04986-A2
FIMKO						FI/41932
IMQ						V3692
SAA	IEC 60065	AS 60065				CS6268N
CSA	IEC 60384-14	CSA-E60384-14				1785515
UL		UL60384-14				E37861
CQC		IEC 60384-14				CQC10001052862
KTL		K60384-14		X1	440V AC	SU03047-12006
				Y2	300V AC	SU03047-12008

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

■ RECOMMENDED FLOW PROFILE

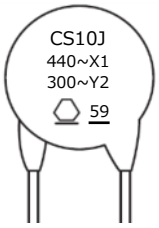


Preheating		Peak		Natural cooling
Temp.	Time	Temp.	Time	Time
T1	t1	T2	t2	t3
100 to 120℃	30 to 60s.	260℃	Within 10s.	Over 60s.

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 ℃.

CS series

■ MARKINGS

Item	Markings	Description	Marking examples
1. Series	CS	CS series	
2. Nominal capacitance	10	10pF	
3. Capacitance tolerance	J	±5%	
4. Rated voltage:Eac	440~X1 300~Y2	X1:440V AC Y2:300V AC	
5. TDK's trademark	⬡	Production base code	
6. Date code	59	2025.09*	
7. Applications	_ (underscore below date code)	For automotive	

(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

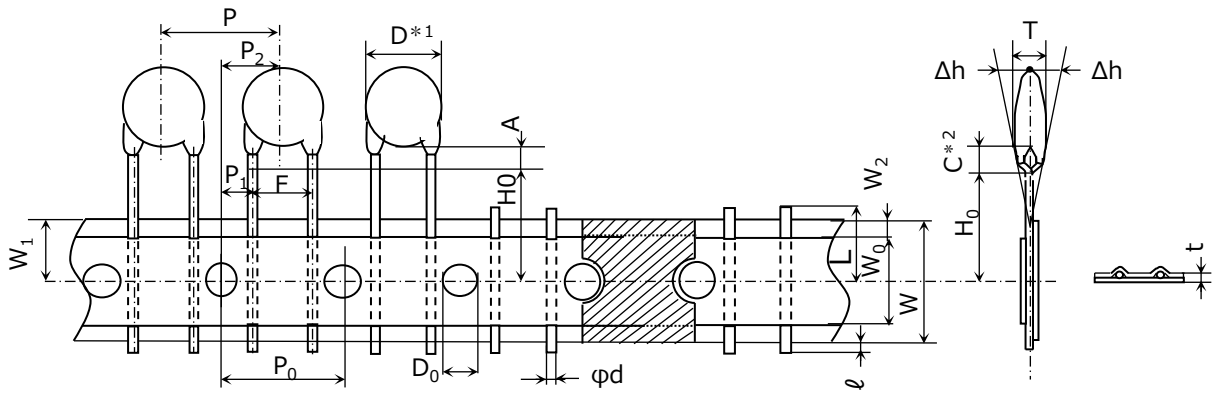
Temperature characteristics	Capacitance	Capacitance tolerance	Dimensions (mm)				Part numbers		
			Dmax.*	Tmax.	F (Applied to bulk)	F (Applied to taping)	Bulk/long leads (Symbol: G)	Bulk/short leads (Symbol: N)	Taping (Symbol: V)
SL	10 pF	±5 %	(7.0)	7.0	7.5±1.5	7.5±0.8	CS45SL2GA100JAGKA	CS45SL2GA100JANKA	CS45SL2GA100JAVKA
SL	15 pF	±5 %	(7.0)	7.0	7.5±1.5	7.5±0.8	CS45SL2GA150JAGKA	CS45SL2GA150JANKA	CS45SL2GA150JAVKA
SL	22 pF	±5 %	(7.0)	7.0	7.5±1.5	7.5±0.8	CS45SL2GA220JAGKA	CS45SL2GA220JANKA	CS45SL2GA220JAVKA
SL	33 pF	±5 %	(7.0)	7.0	7.5±1.5	7.5±0.8	CS45SL2GA330JAGKA	CS45SL2GA330JANKA	CS45SL2GA330JAVKA
SL	47 pF	±5 %	(8.0)	7.0	7.5±1.5	7.5±0.8	CS45SL2GA470JAGKA	CS45SL2GA470JANKA	CS45SL2GA470JAVKA
SL	68 pF	±5 %	9.0**	7.0	7.5±1.5	7.5±0.8	CS45SL2GA680JAGKA	CS45SL2GA680JANKA	CS45SL2GA680JAVKA
B	100 pF	±10 %	(7.0)	7.0	7.5±1.5	7.5±0.8	CS65-B2GA101KAGKA	CS65-B2GA101KANKA	CS65-B2GA101KAVKA
B	150 pF	±10 %	(7.0)	7.0	7.5±1.5	7.5±0.8	CS65-B2GA151KAGKA	CS65-B2GA151KANKA	CS65-B2GA151KAVKA
B	220 pF	±10 %	(7.0)	7.0	7.5±1.5	7.5±0.8	CS65-B2GA221KAGKA	CS65-B2GA221KANKA	CS65-B2GA221KAVKA
B	330 pF	±10 %	(7.5)	7.0	7.5±1.5	7.5±0.8	CS70-B2GA331KAGKA	CS70-B2GA331KANKA	CS70-B2GA331KAVKA
B	470 pF	±10 %	9.0**	7.0	7.5±1.5	7.5±0.8	CS75-B2GA471KAGKA	CS75-B2GA471KANKA	CS75-B2GA471KAVKA
B	680 pF	±20 %	9.5	7.0	7.5±1.5	7.5±0.8	CS85-B2GA681KAGKA	CS85-B2GA681KANKA	CS85-B2GA681KAVKA
Z5U	1,000 pF	±20 %	(7.0)	7.0	7.5±1.5	7.5±0.8	CS65ZU2GA102MAGKA	CS65ZU2GA102MANKA	CS65ZU2GA102MAVKA
Z5U	1,500 pF	±20 %	(8.0)	7.0	7.5±1.5	7.5±0.8	CS75ZU2GA152MAGKA	CS75ZU2GA152MANKA	CS75ZU2GA152MAVKA
Z5U	2,200 pF	±20 %	9.5	7.0	7.5±1.5	7.5±0.8	CS80ZU2GA222MAGKA	CS80ZU2GA222MANKA	CS80ZU2GA222MAVKA
Z5U	3,300 pF	±20 %	12	7.0	7.5±1.5	7.5±0.8	CS95ZU2GA332MAGKA	CS95ZU2GA332MANKA	CS95ZU2GA332MAVKA
Z5U	4,700 pF	±20 %	13.5	7.0	7.5±1.5	7.5±0.8	CS11ZU2GA472MAGKA	CS11ZU2GA472MANKA	CS11ZU2GA472MAVKA

*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.

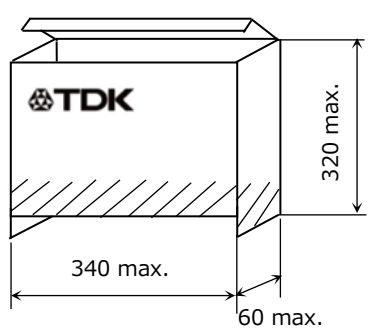
CS series

■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	Φd	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.

■AMMO PACK INNER BOX SIZE



Dimemsions in mm

■PACKAGE QUANTITY

Type	Package quantity Bulk (pcs/bag)	Taping (pcs/box)*
CS	1,000	1,000

*500 pieces applies to CS11ZU2GA472MAVKA.

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 (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.