

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 $+125^{\circ}\text{C}$.
- 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.

APPLICATION

Y capacitor for automotive battery chargers or air conditioners

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			
	45	SL	+350 to -1,000ppm/°C	2GA	X1:440V AC Y2:300V AC	100	10pF	J ±5%	A	For use in automobiles	G Long lead	K	Safety standard approved	A	Halogen-free
	65					221	220pF	K ±10%			N Short lead				
	70	B ±10%	472			4,700pF	M ±20%	V Taping							
	75	ZU (Z5U) +22, -56%													
	80														
	85														
	95														
	11														

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

OPERATING TEMPERATURE RANGE

Temperature characteristics	Operating temperature ($^{\circ}\text{C}$)	Storage temperature ($^{\circ}\text{C}$)*
SL	-55 to 125	-55 to 125
B	-55 to 125	-55 to 125
ZU(Z5U)	-55 to 125	-55 to 125

The maximum operating temperature of $+125^{\circ}\text{C}$ 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

Dimensions 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.

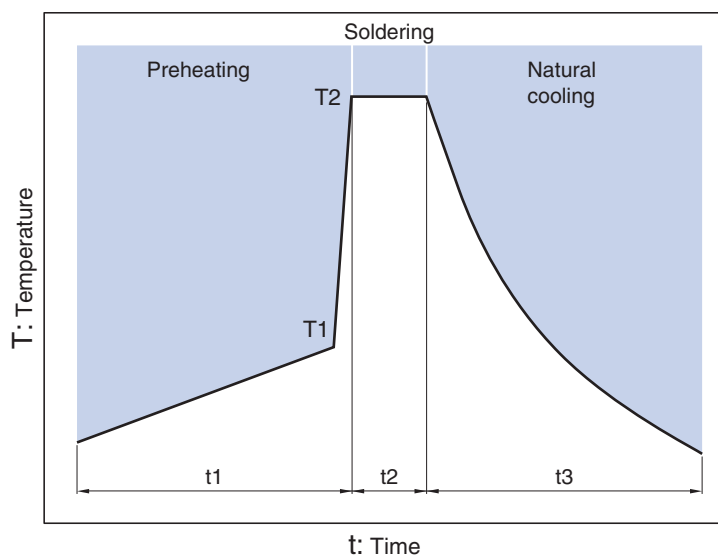
Overview of CS series

CERTIFIED STATUS OF VARIOUS COUNTRIES

Safety standard	IEC standard No.	Standard No.	Temperature characteristics	Sub-class	Rated voltage	Approval report No.* Xiamen
BSI	BS EN60384-14 IEC 60384-14	BS EN60065 (8.8, 14.2) BS EN60384-14				KM37103
VDE						40017930
SEV						19.0043
SEMKO						1910408
NEMKO		EN 60384-14		X1,Y2	X1:440V AC Y2:300V AC	P19223652
DEMKO			SL,B,Z5U			D-04986
FIMKO						FI 140177
IMQ	IEC 60384-14					V3692
SAA						CS6268
CSA		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.

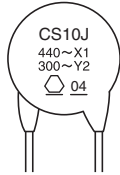
RECOMMENDED FLOW PROFILE



Preheating		Peak		Natural cooling
Temp.	Time	Temp.	Time	Time
T1	t1	T2	t2	t3
110°C min.	30 to 60s.	260°C	Within 10s.	Over 60s.

CS series

MARKINGS

Item	Markings	Description	Marking example
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	04	2020.4*	
7.Applications	—	For automobile	
(underscore below date of production)			(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	10pF	±5%	(7.0)	7.0	7.5±1.5	7.5±0.8	CS45SL2GA100JAGKA	CS45SL2GA100JANKA	CS45SL2GA100JAVKA
SL	15pF	±5%	(7.0)	7.0	7.5±1.5	7.5±0.8	CS45SL2GA150JAGKA	CS45SL2GA150JANKA	CS45SL2GA150JAVKA
SL	22pF	±5%	(7.0)	7.0	7.5±1.5	7.5±0.8	CS45SL2GA220JAGKA	CS45SL2GA220JANKA	CS45SL2GA220JAVKA
SL	33pF	±5%	(7.0)	7.0	7.5±1.5	7.5±0.8	CS45SL2GA330JAGKA	CS45SL2GA330JANKA	CS45SL2GA330JAVKA
SL	47pF	±5%	(8.0)	7.0	7.5±1.5	7.5±0.8	CS45SL2GA470JAGKA	CS45SL2GA470JANKA	CS45SL2GA470JAVKA
SL	68pF	±5%	9.0**	7.0	7.5±1.5	7.5±0.8	CS45SL2GA680JAGKA	CS45SL2GA680JANKA	CS45SL2GA680JAVKA
B	100pF	±10%	(7.0)	7.0	7.5±1.5	7.5±0.8	CS65-B2GA101KAGKA	CS65-B2GA101KANKA	CS65-B2GA101KAVKA
B	150pF	±10%	(7.0)	7.0	7.5±1.5	7.5±0.8	CS65-B2GA151KAGKA	CS65-B2GA151KANKA	CS65-B2GA151KAVKA
B	220pF	±10%	(7.0)	7.0	7.5±1.5	7.5±0.8	CS65-B2GA221KAGKA	CS65-B2GA221KANKA	CS65-B2GA221KAVKA
B	330pF	±10%	(7.5)	7.0	7.5±1.5	7.5±0.8	CS70-B2GA331KAGKA	CS70-B2GA331KANKA	CS70-B2GA331KAVKA
B	470pF	±10%	9.0**	7.0	7.5±1.5	7.5±0.8	CS75-B2GA471KAGKA	CS75-B2GA471KANKA	CS75-B2GA471KAVKA
B	680pF	±10%	9.5	7.0	7.5±1.5	7.5±0.8	CS85-B2GA681KAGKA	CS85-B2GA681KANKA	CS85-B2GA681KAVKA
Z5U	1,000pF	±20%	(7.0)	7.0	7.5±1.5	7.5±0.8	CS65ZU2GA102MAGKA	CS65ZU2GA102MANKA	CS65ZU2GA102MAVKA
Z5U	1,500pF	±20%	(8.0)	7.0	7.5±1.5	7.5±0.8	CS75ZU2GA152MAGKA	CS75ZU2GA152MANKA	CS75ZU2GA152MAVKA
Z5U	2,200pF	±20%	9.5	7.0	7.5±1.5	7.5±0.8	CS80ZU2GA222MAGKA	CS80ZU2GA222MANKA	CS80ZU2GA222MAVKA
Z5U	3,300pF	±20%	12.0	7.0	7.5±1.5	7.5±0.8	CS95ZU2GA332MAGKA	CS95ZU2GA332MANKA	CS95ZU2GA332MAVKA
Z5U	4,700pF	±20%	13.5	7.0	7.5±1.5	7.5±0.8	CS11ZU2GA472MAGKA	CS11ZU2GA472MANKA	CS11ZU2GA472MAVKA

* The values in parentheses "()" are reference values.
Click the part number for details.

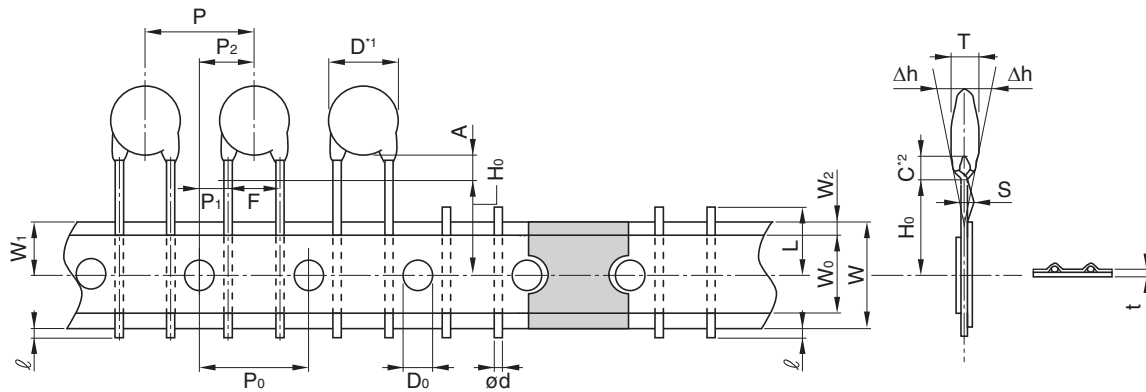
** Reference values are applied to bulk products.

• Please refer to p-4 about the taping dimensions.

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

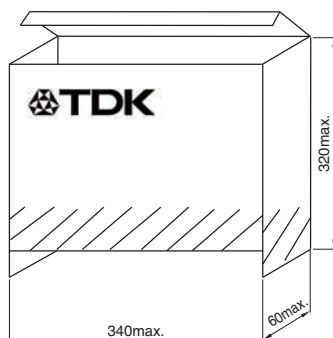
CS series

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