

Reference Specification

Safety Standard Certified Lead Type Disc Ceramic Capacitors for Consumer Electronics & Industrial Equipment /Type KX

Product specifications in this catalog are as of Feb. 2024, and are subject to change or obsolescence without notice.

Please consult the approval sheet before ordering. Please read rating and Cautions first.

<Reference>Please kindly use our website.

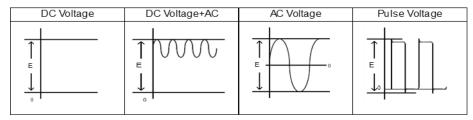
↑ CAUTION

1. OPERATING VOLTAGE

- 1. Do not apply a voltage to a safety standard certified product that exceeds the rated voltage as called out in the specifications. Applied voltage between the terminals of a safety standard certified product shall be less than or equal to the rated voltage (+10 %). When a safety standard certified product is used as a DC voltage product, the AC rated voltage value becomes the DC rated voltage value. (Example:AC250 V (r.m.s.) rated product can be used as DC250 V (+10 %) rated product.) If both AC rated voltage and DC rated voltage are specified, apply the voltage lower than the respective rated voltage.
 - 1-1. When a safety standard certified product is used in a circuit connected to a commercial power supply, ensure that the applied commercial power supply voltage including fluctuation should be less than 10 % above its rated voltage.
 - 1-2. When using a safety standard certified product as a DC rated product in circuits other than those connected to a commercial power supply.

When AC voltage is superimposed on DC voltage, the zero-to-peak voltage shall not exceed the rated DC voltage. When AC voltage or pulse voltage is applied, the peak-to-peak voltage shall not exceed the rated DC voltage.

Typical Voltage Applied to the DC Capacitor



(E: Maximum possible applied voltage.)

2. Abnormal voltages (surge voltage, static electricity, pulse voltage, etc.) shall not exceed the rated DC voltage.

2. OPERATING TEMPERATURE AND SELF-GENERATED HEAT

Keep the surface temperature of a capacitor below the upper limit of its rated operating temperature range. Be sure to take into account the heat generated by the capacitor itself.

When the capacitor is used in a high-frequency current, pulse current or the like, it may have the self-generated heat due to dielectric-loss. Applied voltage should be the load such as self-generated heat is within 20 °C on the condition of atmosphere temperature 25 °C. When measuring, use a thermocouple of small thermal capacity-K of Φ 0.1 mm and be in the condition where capacitor is not affected by radiant heat of other components and wind of surroundings. Excessive heat may lead to deterioration of the capacitor's characteristics and reliability. (Never attempt to perform measurement with the cooling fan running. Otherwise, accurate measurement cannot be ensured.)

3. TEST CONDITION FOR WITHSTANDING VOLTAGE

1. TEST EQUIPMENT

Test equipment for AC withstanding voltage should be used with the performance of the wave similar to 50/60 Hz sine wave.

If the distorted sine wave or over load exceeding the specified voltage value is applied, the defective may be caused.

2. VOLTAGE APPLIED METHOD

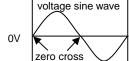
When the withstanding voltage is applied, capacitor's lead or terminal should be firmly connected to the out-put of the withstanding voltage test equipment, and then the voltage should be raised from near zero to the test voltage.

If the test voltage without the raise from near zero voltage would be applied directly to capacitor, test voltage should be applied with the *zero cross. At the end of the test time, the test voltage should be reduced to near zero, and then capacitor's lead or terminal should be taken off the out-put of the withstanding voltage test equipment.

If the test voltage without the raise from near zero voltage would be applied directly to capacitor, the surge voltage may arise, and therefore, the defective may be caused.

*ZERO CROSS is the point where voltage sine wave pass 0 V.

See the right figure -



4. FAIL-SAFE

When capacitor would be broken, failure may result in a short circuit. Be sure to provide an appropriate fail-safe function like a fuse on your product if failure would follow an electric shock, fire or fume.

5. VIBRATION AND IMPACT

Do not expose a capacitor or its leads to excessive shock or vibration during use.

6. SOLDERING

When soldering this product to a PCB/PWB, do not exceed the solder heat resistance specification of the capacitor. Subjecting this product to excessive heating could melt the internal junction solder and may result in thermal shocks that can crack the ceramic element.

Please verify that the soldering process does not affect the quality of capacitors.

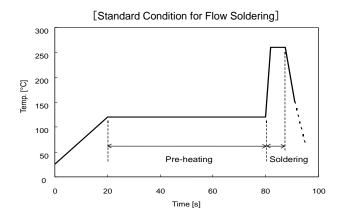
6-1. Flow Soldering

Soldering temperature : 260 °C max.

Soldering time : 7.5 s max.

Preheating temperature : 120 °C max.

Preheating time : 60 s max.



6-2. Reflow Soldering

Do not apply reflow soldering.

6-3. Soldering Iron

Temperature of iron-tip : 400 °C max. Soldering iron wattage : 50 W max. Soldering time : 3.5 s max.

7. BONDING, RESIN MOLDING AND COATING

Before bonding, molding or coating this product, verify that these processes do not affect the quality of capacitor by testing the performance of the bonded, molded or coated product in the intended equipment.

In case of the amount of applications, dryness / hardening conditions of adhesives and molding resins containing organic solvents (ethyl acetate, methyl ethyl ketone, toluene, etc.) are unsuitable, the outer coating resin of a capacitor is damaged by the organic solvents and it may result, worst case, in a short circuit.

The variation in thickness of adhesive, molding resin or coating may cause a outer coating resin cracking and/or ceramic element cracking of a capacitor in a temperature cycling.

8. TREATMENT AFTER BONDING, RESIN MOLDING AND COATING

When the outer coating is hot (over 100 $^{\circ}$ C) after soldering, it becomes soft and fragile. So please be careful not to give it mechanical stress.

Failure to follow the above cautions may result, worst case, in a short circuit and cause fuming or partial dispersion when the product is used.

9. OPERATING AND STORAGE ENVIRONMENT

The insulating coating of capacitors does not form a perfect seal; therefore, do not use or store capacitors in a corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. And avoid exposure to moisture. Before cleaning, bonding, or molding this product, verify that these processes do not affect product quality by testing the performance of a cleaned, bonded or molded product in the intended equipment. Store the capacitors where the temperature and relative humidity do not exceed -10 to 40 °C and 15 to 85 %.

Use capacitors within 6 months after delivered. Check the solderability after 6 months or more.

10. LIMITATION OF APPLICATIONS

The products listed in the specification(hereinafter the product(s) is called as the "Product(s)") are designed and manufactured for applications specified in the specification. (hereinafter called as the "Specific Application")

We shall not warrant anything in connection with the Products including fitness, performance, adequateness, safety, or quality, in the case of applications listed in from (1) to (11) written at the end of this precautions, which may generally require high performance, function, quality, management of production or safety.

Therefore, the Product shall be applied in compliance with the specific application.

WE DISCLAIM ANY LOSS AND DAMAGES ARISING FROM OR IN CONNECTION WITH THE PRODUCTS INCLUDING BUT NOT LIMITED TO THE CASE SUCH LOSS AND DAMAGES CAUSED BY THE UNEXPECTED ACCIDENT, IN EVENT THAT (i) THE PRODUCT IS APPLIED FOR THE PURPOSE WHICH IS NOT SPECIFIED AS THE SPECIFIC APPLICATION FOR THE PRODUCT, AND/OR (ii) THE PRODUCT IS APPLIED FOR ANY FOLLOWING APPLICATION PURPOSES FROM (1) TO (11) (EXCEPT THAT SUCH APPLICATION PURPOSE IS UNAMBIGUOUSLY SPECIFIED AS SPECIFIC APPLICATION FOR THE PRODUCT IN OUR CATALOG SPECIFICATION FORMS, DATASHEETS, OR OTHER DOCUMENTS OFFICIALLY ISSUED BY US*)

- 1. Aircraft equipment
- 2. Aerospace equipment
- 3. Undersea equipment
- 4. Power plant control equipment
- 5. Medical equipment
- 6. Transportation equipment
- 7. Traffic control equipment
- 8. Disaster prevention/security equipment
- 9. Industrial data-processing equipment
- 10. Combustion/explosion control equipment
- 11. Equipment with complexity and/or required reliability equivalent to the applications listed in the above.

For exploring information of the Products which will be compatible with the particular purpose other than those specified in the specification, please contact our sales offices, distribution agents, or trading companies with which you make a deal, or via our web contact form.

Contact form: https://www.murata.com/contactform

*We may design and manufacture particular Products for applications listed in (1) to (11). Provided that, in such case we shall unambiguously specify such Specific Application in the specification without any exception.

Therefore, any other documents and/or performances, whether exist or non-exist, shall not be deemed as the evidence to imply that we accept the applications listed in (1) to (11).

NOTICE

1. CLEANING (ULTRASONIC CLEANING)

To perform ultrasonic cleaning, observe the following conditions.

Rinse bath capacity: Output of 20 watts per liter or less.

Rinsing time: 5 min maximum.

Do not vibrate the PCB/PWB directly.

Excessive ultrasonic cleaning may lead to fatigue destruction of the terminals.

2. CAPACITANCE CHANGE OF CAPACITORS

· Class 1 capacitors

Capacitance might change a little depending on a surrounding temperature or an applied voltage. Please contact us if you use for the strict time constant circuit.

Class 2 capacitors

Class 2 capacitors like temperature characteristic B, E and F have an aging characteristic, whereby the capacitor continually decreases its capacitance slightly if the capacitor leaves for a long time. Moreover, capacitance might change greatly depending on a surrounding temperature or an applied voltage. So, it is not likely to be able to use for the time constant circuit.

Please contact us if you need a detail information.

3. PERFORMANCE CHECK BY EQUIPMENT

Before using a capacitor, check that there is no problem in the equipment's performance and the specifications.

Generally speaking, Class 2 ceramic capacitors have voltage dependence characteristics and temperature dependence characteristics in capacitance. So, the capacitance value may change depending on the operating condition in a equipment. Therefore, be sure to confirm the apparatus performance of receiving influence in a capacitance value change of a capacitor, such as leakage current and noise suppression characteristic.

Moreover, check the surge-proof ability of a capacitor in the equipment, if needed, because the surge voltage may exceed specific value by the inductance of the circuit.

M NOTE

- 1. Please make sure that your product has been evaluated in view of your specifications with our product being mounted to your product.
- 2. You are requested not to use our product deviating from this specification.

1.Application

This product specification is applied to Safety Standard Certified Lead Type Disc Ceramic Capacitors Type KX.

The safety standard certification is obtained as Class X1, Y1.

1. Specific applications:

- •Consumer Equipment: Products that can be used in consumer equipment such as home appliances, audio/visual equipment, communication equipment, information equipment, office equipment, and household robotics, and whose functions are not directly related to the protection of human life and property.
- •Industrial Equipment: Products that can be used in industrial equipment such as base stations, manufacturing equipment, industrial robotics equipment, and measurement equipment, and whose functions do not directly relate to the protection of human life and property.
- ·Medial Equipment [GHTF A/B/C] except for Implant Equipment: Products suitable for use in medical devices designated under the GHTF international classifications as Class A or Class B (the functions of which are not directly involved in protection of human life or property) or in medical devices other than implants designated under the GHTF international classifications as Class C (the malfunctioning of which is considered to pose a comparatively high risk to the human body).
- ·Automotive infotainment/comfort equipment: Products that can be used for automotive equipment such as car navigation systems and car audio systems that do not directly relate to human life and whose structure, equipment, and performance are not specifically required by law to meet technical standards for safety assurance or environmental protection.
- 2.Unsuitable Application: Applications listed in "Limitation of applications" in this product specification.

Approval standard and certified number

	Standard number		Rated voltage	
UL	UL60384-14	E37921		
CSA	CSA E60384-14	1343810		
VDE	EN60384-14, IEC60384-14	40002831		
BSI	EN62368-1, EN60384-14, IEC60384-14	KM 37901		
SEMKO		SE-S2101013	X1: AC440 V(r.m.s.)	
DEMKO	EN60284 14	D-08838	Y1: AC250 V(r.m.s.)	
FIMKO	EN60384-14, IEC60384-14	FI/41217	11. AC250 V(1.111.5.)	
NEMKO	1200304-14	P21225672		
ESTI		24.0026	1	
IMQ	EN60384-14	V4069	1	
CQC	CQC GB/T6346.14			
ктс	KC60384-14	HU03008-4003, HU03008-4004		

^{*}Above Certified number may be changed on account of the revision of standards and the renewal of certification.

2.Rating

2-1. Operating temperature range

-40 ~ 125°C

2-2.Rated Voltage

X1: AC440 V(r.m.s.) Y1: AC250 V(r.m.s.)

Reference only

2-3. Part number configuration

ex.)

DE1	1X	KX	680	J	J4	В	C05F
Series	Temperature	Certified	Capacitance	Capacitance	Lead	Package	Individual
	Characteristics	Type		Tolerance	Style		Specification

Series

DE1 denotes class X1,Y1.

• Temperature Characteristics

Please confirm detailed specification on [Specification and test methods].

Code	Temperature Characteristics
1X	SL

Certified Type

This denotes safety certified type name Type KX.

Capacitance

The first two digits denote significant figures; the last digit denotes the multiplier of 10 in pF. ex.) In case of 680 .

$$68 \times 10^0 = 68 \text{ pF}$$

Capacitance Tolerance

Please refer to [Part number list].

Lead Style

* Please refer to [Part number list].

Code	Lead Style
A*	Vertical crimp long type
B*	Vertical crimp short type
J*	Vertical crimp short type
N*	Vertical crimp taping type

Package

Code	Package
Α	Ammo pack taping type
В	Bulk type

Individual Specification

In case part number cannot be identified without 'individual specification', it is added at the end of part number.

Code	Individual Specification						
C05F	 →Halogen Free Br≤900ppm, Cl≤900ppm Br+Cl≤1500ppm →CP wire 						

Note) Murata part numbers might be changed depending on lead code or any other changes. Therefore, please specify only the type name(KX) and capacitance of products in the parts list when it is required for applying safety standard of electric equipment.

Reference only

3.Marking

<Right side> <Reverse side>

Certified type : KX Rated voltage mark : X1 440~ : Actual value

Capacitance Y1 250~ : Code Capacitance tolerance CQC Approval mark : \bigcirc

: (Made in Tailand) Company name code KTC Approval mark : Manufacturing year : Letter code

(The last digit of A.D. year.)

Manufacturing month : Code

> Feb./Mar. → 2 Aug./Sep. → 8 Apr./May \rightarrow 4 Oct./Nov. → O Dec./Jan. → D Jun./Jul. \rightarrow 6

UL Approval mark

CSA Approval mark

VDE Approval mark

: BSI BSI Approval mark

SEMKO Approval mark

DEMKO Approval mark

FIMKO Approval mark

NEMKO Approval mark

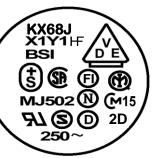
ESTI Approval mark MJ502

IMQ Approval mark

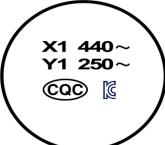
Class code : X1Y1

Halogen free mark : **F**

Rated voltage mark : 250~ (Example) <Right side>

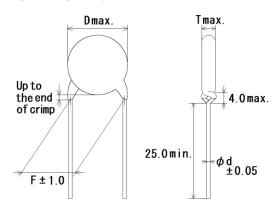


<Reverse side>



4. Part number list

·Vertical crimp long type (Lead Style:A*)



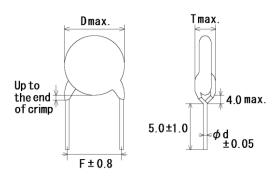
Note) The mark '*' of Lead Style differ from lead spacing (F) and lead diameter (d). Please see the following list about details.

Unit: mm

Customer	Customer Murata T.C. Cap. Cap.		Cap.	Dii	mensi	Lead	Pack			
Part Number	Part Number	1.0.	(pF)	tol.	D	Т	F	d	Style	qty. (pcs)
	DE11XKX100JA4BC05F	SL	10	±5%	9.0	8.0	10.0	0.6	A4	250
	DE11XKX150JA4BC05F	SL	15	±5%	9.0	8.0	10.0	0.6	A4	250
	DE11XKX220JA4BC05F	SL	22	±5%	9.0	8.0	10.0	0.6	A4	250
	DE11XKX330JA4BC05F	SL	33	±5%	9.0	8.0	10.0	0.6	A4	250
	DE11XKX470JA4BC05F	SL	47	±5%	9.0	8.0	10.0	0.6	A4	250
	DE11XKX680JA4BC05F	SL	68	±5%	9.0	8.0	10.0	0.6	A4	250

PNLIST

·Vertical crimp short type
(Lead Style:B*)



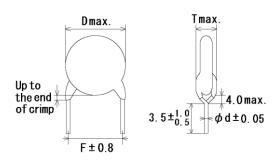
Note) The mark '*' of Lead Style differ from lead spacing (F) and lead diameter (d). Please see the following list about details.

Unit: mm

Customer	Customer Murata T.C. Cap. Cap.		Dii	mensi	on (mı	ım) Lead		Pack		
Part Number	Part Number	1.0.	(pF)	tol.	D	Т	F	d	SIVIEL	qty. (pcs)
	DE11XKX100JB4BC05F	SL	10	±5%	9.0	8.0	10.0	0.6	B4	500
	DE11XKX150JB4BC05F	SL	15	±5%	9.0	8.0	10.0	0.6	B4	500
	DE11XKX220JB4BC05F	SL	22	±5%	9.0	8.0	10.0	0.6	B4	500
	DE11XKX330JB4BC05F	SL	33	±5%	9.0	8.0	10.0	0.6	B4	500
	DE11XKX470JB4BC05F	SL	47	±5%	9.0	8.0	10.0	0.6	B4	500
	DE11XKX680JB4BC05F	SL	68	±5%	9.0	8.0	10.0	0.6	B4	500

PNLIST

Vertical crimp short type (Lead Style: J*)

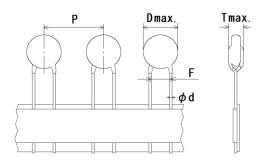


Note) The mark '*' of Lead Style differ from lead spacing (F) and lead diameter (d). Please see the following list about details.

Unit: mm

Customer	Customer Murata T.C. Cap. C		Cap.	Dii	mensi	Lead	Pack			
Part Number	Part Number	1.0.	(pF)	tol.	D	Т	F	d	SIVIEL	qty. (pcs)
	DE11XKX100JJ4BC05F	SL	10	±5%	9.0	8.0	10.0	0.6	J4	500
	DE11XKX150JJ4BC05F	SL	15	±5%	9.0	8.0	10.0	0.6	J4	500
	DE11XKX220JJ4BC05F	SL	22	±5%	9.0	8.0	10.0	0.6	J4	500
	DE11XKX330JJ4BC05F	SL	33	±5%	9.0	8.0	10.0	0.6	J4	500
	DE11XKX470JJ4BC05F	SL	47	±5%	9.0	8.0	10.0	0.6	J4	500
	DE11XKX680JJ4BC05F	SL	68	±5%	9.0	8.0	10.0	0.6	J4	500

·Vartical crimp taping type (Lead Style:N*)



Note) The mark '*' of Lead Style differ from lead spacing (F), lead diameter (d) and pitch of compoment (P). Please see the following list or taping specification about details.

Unit: mm

Customer	Murata		Cap.	Cap.		Dime		Lead	Pack		
Part Number	Part Number	T.C.	(pF)	tol.	D	Т	F	d	Р	Style	qty. (pcs)
	DE11XKX100JN4AC05F	SL	10	±5%	9.0	8.0	10.0	0.6	25.4	N4	500
	DE11XKX150JN4AC05F	SL	15	±5%	9.0	8.0	10.0	0.6	25.4	N4	500
	DE11XKX220JN4AC05F	SL	22	±5%	9.0	8.0	10.0	0.6	25.4	N4	500
	DE11XKX330JN4AC05F	SL	33	±5%	9.0	8.0	10.0	0.6	25.4	N4	500
	DE11XKX470JN4AC05F	SL	47	±5%	9.0	8.0	10.0	0.6	25.4	N4	500
	DE11XKX680JN4AC05F	SL	68	±5%	9.0	8.0	10.0	0.6	25.4	N4	500

5. Sp	ecification										
No.	T	t Item	Specification		Test I	Method (Re	ef. Standar	d:JIS C 51	01(all parts), IEC6038	34(all parts))
1	Appearance and	· ·				The capacitor should be inspected by naked eyes for visible evidence of defect.					
			Please refer to [Part number	list].	Dimensions should be measured with slide calipers.						
2	Marking		To be easily legible.		The c	apacitor sh	ould be ins	spected by	naked eye	S.	
3	Dielectric strength	Between lead wires	No failure.		The capacitor should be inspected by naked eyes. The capacitor should not be damaged when AC4,000 V(r.m.s.) <50/60 Hz> is applied between the lead wires for 60 s.						
	Terminal To No failure. External Resin				First, the terminals of the capacitor should be connected together. Then, a metal foil should be closely wrapped around the body of the capacitor to the distance of about 3 to 6 mm from each terminal. Then, the capacitor should be inserted into a container filled with metal balls of about 1 mm diameter. Finally, AC4,000 V(r.m.s.) <50/60 Hz> is applied for 60 s between the capacitor lead wires and metal balls.						
4	Insulation Resis	tance (I.R.)	10,000 MΩ min.		60±5 The v	s of chargi	ng.		easured w		±50 V within
5	Capacitance		Within specified tolerance.				should be and AC1±		at 20 °C w	vith 1±0.1 k	Hz (Char.
6	Q Dissipation Fact	tor (D.E.)	Char. SL: $Q \ge 400 + 20C^{2} (30 \text{ pF})$ $Q \ge 1,000 (30 \text{ pF})$ Char. B,E: DF ≤ 0.025	under) F min.)	The d	issipation f	actor and 0	Q should be	e measured £0.2 V(r.m.s		with 1±0.1
7	Temperature ch	MI AUTOTIONIO	Char. SL: +350 to -1,000 ppr (Temp. range: 20 to 85 °C) Char. B: Within ±10 % Char. E: Within +20/-55 % (Temp. range: -25 to 85 °C)	Step Temp.(-					Sp specilieu	
8	Active flammabi	ility	The cheese-cloth should not	be on fire.	than to subject discharge after the subject of the	wo complected to 20 carges shou he last discontinuous formula for the last discontinuous formula for the last discontinuous for the last discontinuous formula for the last discontinuous for the last discontinu	te layers of discharges Id be 5 s. Tcharge. F L1 C1 C2 UAC L3 10 %, H±20 % 16 ±2 %,	C3 A Rod con Ct UR test	oth. The card later than t	apacitor ship successive aintained for successive aintained for successive second seco	ve or 2 min ut
*2 "C"	expresses nom	inal capacitance	l value(pF)		<u> </u>						

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terminations Capacitor should not be broken. In the radial direction of capacitor up to 10 N and keep it for 10 1 s.					•
Robustness of terminations Lead wire should not cut off.	No.	Tes	t Item	Specification	Test Method (Ref. Standard:JIS C 5101(all parts), IEC60384(all parts))
body in such a manner that the axis of the termination is vertice mass applying a force of \$N\$ is then suspended from the end intermination. The body of the capacitor is then inclined, within a period of 2 3 s, through an angle of approximately 90 °in the vertical plan then retrurred to its initial position over the parameter of the capacitor should be stored at the operation constituées one bend. One bend immediately followed by a second bend in the opposition of the capacitor should be firmly soldered to the supporting lead without which is 10 to 50 Hz in the vibration char 10 ± 10 ± 10 ± 10 ± 10 ± 10 ± 10 ± 10		Robustness of		Lead wire should not cut off.	Fix the body of capacitor, a tensile weight gradually to each lead wire in the radial direction of capacitor up to 10 N and keep it for
Pesistance Capacitance Capacitance Char. St.:			Bending		The body of the capacitor is then inclined, within a period of 2 to 3 s, through an angle of approximately 90 ° in the vertical plane and then returned to its initial position over the same period of time; this operation constitutes one bend. One bend immediately followed by a second bend in the opposite
Q Char. S.L. Q ≥ 400+20C² (30 pF under) Q ≥ 1,000 (30 pF min.)	10	Vibration	Appearance	No marked defect.	The capacitor should be firmly soldered to the supporting lead wire and
Classified Q≥400+20C² (30 pF under) Q≥400+20C² (30 pF min.)		resistance	Capacitance	Within the specified tolerance.	vibration which is 10 to 55 Hz in the vibration frequency range, 1.5 mm
Factor (D.F.)				Char. SL : Q ≥ 400+20C ^{*2} (30 pF under) Q ≥ 1,000 (30 pF min.)	in total amplitude, and about 1 min in the rate of vibration change from 10 Hz to 55 Hz and back to 10 Hz is applied for a total of 6 h; 2 h each in 3 mutually perpendicular directions.
uniformly coated on the axial direction over 3/4 of the circumferential direction. Soldering effect (Non-preheat) Appearance (Non-preheat) Appearanc			Factor (D.F.)	•	
effect (Non-preheat) I.R. 1,000 MΩ min. Dielectric strength Appearance (On-preheat) I.R. 1,000 MΩ min. Appearance (On-preheat) I.R. 1,000 MΩ min. Per item 3 Appearance (On-preheat) I.R. 1,000 MΩ min. Appearance Capacitance change I.R. 1,000 MΩ min. Dielectric strength Appearance Capacitance change I.R. 1,000 MΩ min. Dielectric strength Appearance Capacitance change I.R. 1,000 MΩ min. Dielectric strength Per item 3 Immersion time : 3.5±0.5 s (In case of 260±5 °C : 10±1 s) The depth of immersion is up to about 1.5 to 2.0 mm from the lead wires. Pre-treatment : Capacitor should be stored at 85±2 °C for 1 h, then placed at '1 room condition for 24±2 h befor initial measurements. Pre-treatment : Capacitor should be stored at 120+0/-5 °C for 60+0/-5 as in figure, the lead wires should be immersed solder of 260-up to 1.5 to 2.0 mm from the root of terminal for 7.5+0/-1 s. Pre-treatment : Capacitor should be stored at 85±2 °C for 1 h, then placed at '1 room condition for 24±2 h befor initial measurements. Pre-treatment : Capacitor should be stored at 85±2 °C for 1 h, then placed at '1 room condition for 24±2 h befor initial measurements. Pre-treatment : Capacitor should be stored at 85±2 °C for 1 h, then placed at '1 room condition for 24±2 h befor initial measurements. Pre-treatment : Capacitor should be stored at 85±2 °C for 1 h, then placed at '1 room condition for 24±2 h befor initial measurements. Pre-treatment : Capacitor should be stored at 85±2 °C for 1 h, then placed at '1 room condition for 24±2 h befor initial measurements. Pre-treatment : Capacitor should be stored at 85±2 °C for 1 h, then placed at '1 room condition for 24±2 h befor initial measurements.	11	Solderability of	leads	uniformly coated on the axial direction over 3/4 of the circumferential	ethanol (25% rosin in weight propotion). Immerse in solder solution for 2±0.5 s. In both cases the depth of dipping is up to about 1.5 to 2.0 mm from the root of lead wires.
The depth of immersion is up to about 1.5 to 2.0 mm from the lead wires. The mail insulating I.R. 1,000 MΩ min. Dielectric strength Pre-treatment: Capacitor should be stored at 85±2 °C for 1 h, then placed at '1 room condition for 24±2 h befor initial measurements. Post-treatment: Capacitor should be stored for 1 to 2 h at '1 room condition. Appearance No marked defect. Capacitance (On-preheat) Appearance Within ±10 % change I.R. Dielectric Thermal insulating I.S. Thermal insulating I.S. Dielectric Strength Pre-treatment: Capacitor should be stored at 120+0/-5 °C for 60+0/-5 as in figure, the lead wires should be immersed solder of 260-up to 1.5 to 2.0 mm from the root of terminal for 7.5+0/-1 s. Pre-treatment: Capacitor should be stored at 85±2 °C for 1 h, then placed at '1 room condition for 24±2 h befor initial measurements. Pre-treatment: Capacitor should be stored at 85±2 °C for 1 h, then placed at '1 room condition for 24±2 h befor initial measurements. Pre-treatment: Capacitor should be stored at 85±2 °C for 1 h, then placed at '1 room condition for 24±2 h befor initial measurements. Pre-treatment: Capacitor should be stored for 1 to 2 h at '1 room condition for 24±2 h befor initial measurements. Pre-treatment: Capacitor should be stored for 1 to 2 h at '1 room condition for 24±2 h befor initial measurements.	12	Soldering	Appearance	No marked defect.	Solder temperature : 350±10 °C or 260±5 °C
Per item 3 Pre-treatment : Capacitor should be stored at 85±2 °C for 1 h, then placed at "1 room condition for 24±2 h befor initial measurements.					The depth of immersion is up to about 1.5 to 2.0 mm from the root of
Pre-treatment : Capacitor should be stored at 85±2 °C for 1 h, then placed at "1 room condition for 24±2 h befor initial measurements. Pre-treatment : Capacitor should be stored at 85±2 °C for 1 h, then placed at "1 room condition for 24±2 h befor initial measurements. Post-treatment : Capacitor should be stored at 120+0/-5 °C for 60+0/-5 as in figure, the lead wires should be immersed solder of 260-up to 1.5 to 2.0 mm from the root of terminal for 7.5+0/-1 s. Pre-treatment : Capacitor should be stored at 85±2 °C for 1 h, then placed at "1 room condition for 24±2 h befor initial measurements. Pre-treatment : Capacitor should be stored at 85±2 °C for 1 h, then placed at "1 room condition for 24±2 h befor initial measurements. Pre-treatment : Capacitor should be stored at 85±2 °C for 1 h, then placed at "1 room condition for 24±2 h befor initial measurements. Pre-treatment : Capacitor should be stored at 85±2 °C for 1 h, then placed at "1 room condition for 24±2 h befor initial measurements. Pre-treatment : Capacitor should be stored at 85±2 °C for 1 h, then placed at "1 room condition for 24±2 h befor initial measurements. Pre-treatment : Capacitor should be stored at 85±2 °C for 1 h, then placed at "1 room condition for 24±2 h befor initial measurements. Pre-treatment : Capacitor should be stored at 85±2 °C for 1 h, then placed at "1 room condition for 24±2 h befor initial measurements.			I.R.	1,000 MΩ min.	
then placed at "1 room condition for 24±2 h befor initial measurements. Post-treatment: Capacitor should be stored for 1 to 2 h at "1 roo condition. Appearance No marked defect. (On-preheat) Appearance Within ±10 % I.R. 1,000 MΩ min. Dielectric strength Per item 3 Thermal insulating 1.5 to 2.0 mm from the root of terminal for 7.5+0/-1 s. Pre-treatment: Capacitor should be stored at 85±2 °C for 1 h, then placed at "1 room condition for 24±2 h befor initial measurements. Post-treatment: Capacitor should be stored for 1 to 2 h at "1 room condition for 24±2 h befor initial measurements. Post-treatment: Capacitor should be stored for 1 to 2 h at "1 room condition for 24±2 h at "1 room condition for 24±2 h befor initial measurements.				Per item 3	1.5 to 2.0mm
Post-treatment : Capacitor should be stored for 1 to 2 h at **frocondition. Appearance					Pre-treatment: Capacitor should be stored at 85±2 °C for 1 h, then placed at ¹ room condition for 24±2 h before initial measurements.
effect (On-preheat) Capacitance change I.R. 1,000 MΩ min. Dielectric strength Per item 3 Pre-treatment: Capacitor should be immersed solder of 260- Pre-treatment: Capacitor should be stored at 85±2 °C for 1 h, then placed at *1 room condition for 24±2 h befor initial measurements. Post-treatment: Capacitor should be stored for 1 to 2 h at *1 room condition for 1 to 2 h at *1 room condition for 2 h at *1 room co					Post-treatment : Capacitor should be stored for 1 to 2 h at *1room condition.
(On-preheat) Change Up to 1.5 to 2.0 mm from the root of terminal for 7.5+0/-1 s.	13	-	Appearance	No marked defect.	First the capacitor should be stored at 120+0/-5 °C for 60+0/-5 s. Then,
Dielectric strength Per item 3 Thermal insulating 1.5 Wolten solder Pre-treatment: Capacitor should be stored at 85±2 °C for 1 h, then placed at *1 room condition for 24±2 h befor initial measurements. Post-treatment: Capacitor should be stored for 1 to 2 h at *1 room condition for 2 h at *1 room co			change		as in figure, the lead wires should be immersed solder of 260+0/-5 °C up to 1.5 to 2.0 mm from the root of terminal for 7.5+0/-1 s.
Pre-treatment: Capacitor should be stored at 85±2 °C for 1 h, then placed at *1 room condition for 24±2 h befor initial measurements. Post-treatment: Capacitor should be stored for 1 to 2 h at *1 room condition for 2 h			I.R.		- Companies
then placed at *1 room condition for 24±2 h befor initial measurements. Post-treatment : Capacitor should be stored for 1 to 2 h at *1 ro				Per item 3	1.5 to 2.0mm
"1 "room condition" Temperature : 15 to 35 °C, Relative humidity : 45 to 75 %, Atmospheric pressure : 86 to 106 kPa	*1 "				then placed at *1 room condition for 24±2 h before initial measurements. Post-treatment: Capacitor should be stored for 1 to 2 h at *1 room condition.

 $^{^{1}}$ "room condition" Temperature : 15 to 35 $^{\circ}$ C, Relative humidity : 45 to 75 $^{\circ}$, Atmospheric pressure : 86 to 106 kPa

ESKX03H

^{*2 &}quot;C" expresses nominal capacitance value(pF)

			Reference	only				
	1		T	T=				
No.			Specification	Test Method (Ref. Standard:JIS C 5101(all parts), IEC60384(all parts))				
14	Flame test		The capacitor flame discontinue as follows.	The capacitor should be subjected to applied flame for 15 s. and then removed for 15 s until 5 cycles.				
			Cycle Time 1 to 4 30 s max.	capacitor Flame				
			5 60 s max.	\$\langle \sqrt{\sqrt{s}}\$				
				Gas Burner				
				(in mm)				
15	Passive flammability		The burning time should not be exceeded the time 30 s. The tissue paper should not ignite.	The capacitor under test should be held in the flame in the position which best promotes burning. Time of exposure to flame is for 30 s.				
				Length of flame : 12±1 mm Gas burner : Length 35 mm min. Inside Dia. 0.5±0.1 mm				
				Outside Dia. 0.9 mm max.				
				Gas: Butane gas Purity 95 % min.				
				About 8mm Gas burner Flame 200±5mm				
				———— ← Tissue About 10mm thick board				
16	Humidity	Appearance	No marked defect.	Set the capacitor for 500±12 h at 40±2 °C in 90 to 95 % relative				
	(Under steady state)	Capacitance	Char. SL : Within ±5 %	humidity.				
		change	Char. B: Within ±10 % Char. E: Within ±15 %	Post-treatment : Capacitor should be stored for 1 to 2 h at *1room				
		Q	Char. SL:	condition.				
			Q≧ 275+5/2C ^{*2} min.(30 pF under) Q≧ 350 (30 pF min.)					
		Dissipation Factor (D.F.)	Char. B, E : DF ≦ 0.05					
		I.R.	3,000 MΩ min.	1				
		Dielectric strength	Per item 3					
17	Humidity loading	Appearance	No marked defect.	Apply the rated voltage for 500±12 h at 40±2 °C in 90 to 95 % relative				
		Capacitance change	Char. SL: Within ±5 % Char. B: Within ±10 %	humidity.				
		o larige	Char. E: Within ±15 %	Post-treatment : Capacitor should be stored for 1 to 2 h at *1room				
		Q	Char. SL :	condition.				
			Q \ge 275+5/2C ² min.(30 pF under) Q \ge 350 (30 pF min.)					
		Dissipation Factor (D.F.)	Char. B, E : DF ≦ 0.05					
		I.R.	3,000 MΩ min.					
		Dielectric strength	Per item 3					
*1 "roc	om condition" Te	mperature : 15 t	o 35 °C. Relative humidity : 45 to 75 %	Atmospheric pressure : 86 to 106 kPa				

^{*1} "room condition" Temperature : 15 to 35 °C, Relative humidity : 45 to 75 %, Atmospheric pressure : 86 to 106 kPa ^{*2} "C" expresses nominal capacitance value(pF)

Ю.	Tes	Test Item Specification				Test Method (Ref. Standard:JIS C 5101(all parts), IEC60384(all parts					
18	Life	Appearance	No marked defect.	Impulse voltage							
		Capacitance	Within ±20 %	Each individual capacitor should be subjected to a 8 kV impulses for							
		change			three times or more. Then the capacitors are applied to life test.						
		I.R.	3,000 MΩ min.		100 (%) Front time (T1) = 1.7 µs=1.67T 90 Time to half-value (T2) = 50 µs						
		Dielectric	Per item 3	Time to half-value (T2) = 50 μs The capacitors are placed in a circulating air oven for a period of 1,000 h. The air in the oven is maintained at a temperature of 125+2/-0 °C, and relative humidity of 50 % max Throughout the test, the capacitors are subjected to a AC425 V(r.m.s <50/60 Hz> alternating voltage of mains frequency, except that once each hour the voltage is increased to AC1,000 V(r.m.s.) for 0.1 s.							
		strength									
									, , , , , , , , , , , , , , , , , , , ,		
					Post-treatment : Capacitor should be stored for 1 to 2 h at *1room condition.						
19	Temperature Cycle	Appearance		No marked defect.							
		Capacitance	Char. SL: Within ±5 %		Step Temperature(°C) Tin						
		change	Char. B : Within ±10 %		1	-40+0/-3	30				
			Char. E: Within ±20 %	_	2	Room temp.	3				
		Q	Char. SL:		3	125+3/-0	30				
			Q \ge 275+5/2C ^{*2} min.(30 pF under) Q \ge 350 (30 pF min.)		4	Room temp.	3				
		Dissipation	Char. B, E : DF ≤ 0.05			Cvcle time	e : 5 cycles				
		Factor (D.F.)	Share B, E : Bi = 0.00	Syste time to systee							
		I.R.	3,000 MΩ min.	Pre	Pre-treatment : Capacitor should be stored at 85±2 °C for 1 h,						
		Dielectric	Per item 3	then placed at *1room condition for 24±2 h. Post-treatment : Capacitor should be stored for 4 to 24 h at *1room condition.							
		strength									
				1							

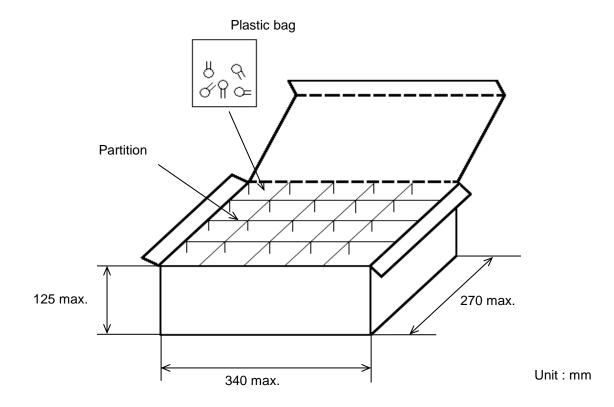
^{1 &}quot;room condition" Temperature: 15 to 35 °C, Relative humidity: 45 to 75 %, Atmospheric pressure: 86 to 106 kPa

^{*2 &}quot;C" expresses nominal capacitance value(pF)

6. Packing specification

Bulk type (Package : B)

The size of packing case and packing way



The number of packing = *1 Packing quantity × *2 n

*1 : Please refer to [Part number list].

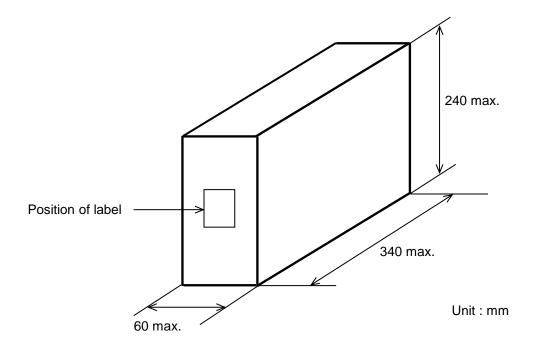
*2 : Standard n = 20 (bag)

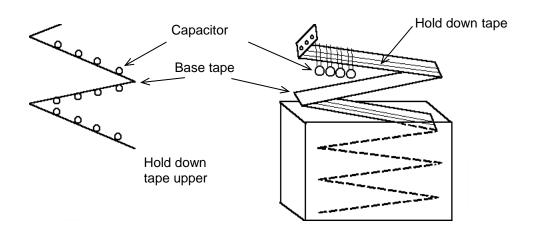
Note)

The outer package and the number of outer packing be changed by the order getting amount.

- •Ammo pack taping type (Package : A)
 - •The tape with capacitors is packed zigzag into a case.
 - •When body of the capacitor is piled on other body under it.
 - •There should be 3 pitches and over without capacitors in leader and trailer.

The size of packing case and packing way



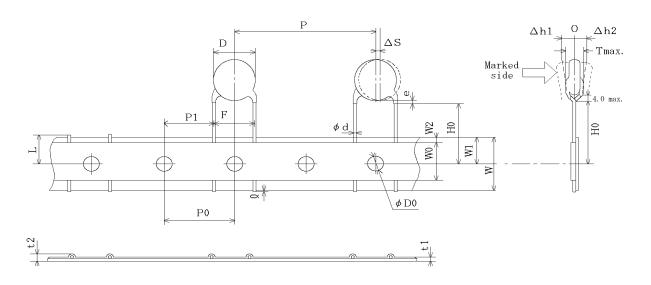


7. Taping specification

7-1. Dimension of capacitors on tape

Vertical crimp taping type < Lead Style : N4 >

Pitch of component 25.4 mm / Lead spacing 10.0 mm

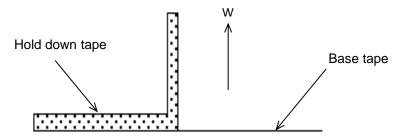


Unit: mm

Item		Dimensions	Remarks		
Pitch of component		25.4+/-2.0			
Pitch of sprocket hole		12.7+/-0.3			
Lead spacing	F	10.0+/-1.0			
Length from hole center to lead	P1	7.7+/-1.5			
Body diameter		Please refer to	[Part number list].		
Deviation along tape, left or right		0+/-2.0	They include deviation by lead bend.		
Carrier tape width		18.0+/-0.5			
Position of sprocket hole		9.0+/-0.5	Deviation of tape width direction		
Lead distance between reference and bottom planes		18.0+2.0/-0			
Protrusion length		+0.5~-1.0			
Diameter of sprocket hole		4.0+/-0.1			
Lead diameter		0.60+/-0.05			
Total tape thickness		0.6+/-0.3	They include hold down tape		
Total thickness of tape and lead wire	t2	1.5 max.	thickness.		
Deviation across tape, front		2.0 max.			
Deviation across tape, rear	Δh2	2.0 IIIax.			
Portion to cut in case of defect		11.0+0/-1.0			
Hold down tape width		11.5 min.			
Hold down tape position		1.5+/-1.5			
Coating extension on lead		Up to the end o	f crimp		
Body thickness	Т	Please refer to [Part number list].			

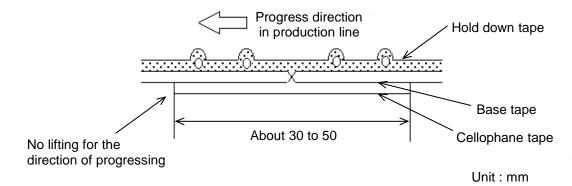
7-2. Splicing way of tape

1) Adhesive force of tape is over 3 N at test condition as below.

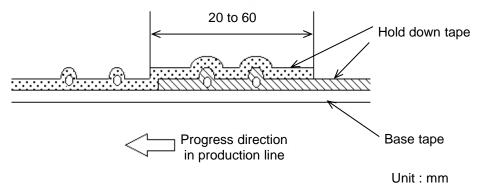


2) Splicing of tape

- a) When base tape is spliced
 - •Base tape should be spliced by cellophane tape. (Total tape thickness should be less than 1.05 mm.)



- b) When hold down tape is spliced
 - •Hold down tape should be spliced with overlapping. (Total tape thickness should be less than 1.05 mm.)



- c) When both tape are spliced
 - •Base tape and hold down tape should be spliced with splicing tape.
- 3) Missing components
 - •There should be no consecutive missing of more than three components.
 - ullet The number of missing components should be not more than 0.5 % of total components that should be present in a Ammo pack.