# muRata

Reference Specification

Type SA Safety Standard Certified Lead Type Disc Ceramic Capacitors for General Purpose

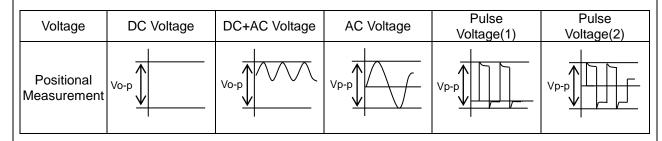
Product specifications in this catalog are as of Oct. 2018, and are subject to change or obsolescence without notice.

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

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### 1. OPERATING VOLTAGE

When DC-rated capacitors are to be used in AC or ripple current circuits, be sure to maintain the Vp-p value of the applied voltage or the Vo-p which contains DC bias within the rated voltage range. When the voltage is started to apply to the circuit or it is stopped applying, the irregular voltage may be generated for a transit period because of resonance or switching. Be sure to use a capacitor within rated voltage containing these irregular 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 selfgenerated 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  $\phi$ 0.1mm 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.

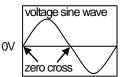
\*ZERO CROSS is the point where voltage sine wave pass 0V. - See the right figure -

## 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.

When soldering capacitor with a soldering iron, it should be performed in following conditions.

Temperature of iron-tip : 400 °C max.

Soldering iron wattage : 50W max.

Soldering time : 3.5s max.

#### 7. BONDING, RESIN MOLDING AND COATING

In case of 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**

Please contact us before using our products for the applications listed below which require especially high reliability for the prevention of defects which might directly cause damage to the third party's life, body or property.

- 1. Aircraft equipment
- 2. Aerospace equipment
- 3. Undersea equipment
- 4. Power plant control equipment
- 5. Medical equipment
- 6. Transportation equipment (vehicles, trains, ships, etc.)
- 7. Traffic signal equipment
- 8. Disaster prevention / crime prevention equipment
- 9. Data-processing equipment exerting influence on public
- 10. Application of similar complexity and/or reliability requirements to the applications listed in the above.

#### 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 lead wires.

#### 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 and 3 capacitors

Class 2 and 3 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.

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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 specification is applied to Safety Standard Certified Lead Type Disc Ceramic Capacitors Type SA used for General Electric equipment.

Type SA is Safety Standard Certified disc ceramic capacitor of Class X1,Y2.

Do not use these products in any automotive power train or safety equipment including battery chargers for electric vehicles and plug-in hybrids.

	Standard number	*Certified number	AC Rated volt V(r.m.s.)
UL	UL60384-14	E37921	
ENEC (VDE)	EN60384-14	40042990	X1:300 Y2:300
CQC	IEC60384-14	CQC15001137840	
the	ve Certified number may b renewal of certification.	e changed on account of the revision of st	andards and
. Rating 2-1. Operating	temperature range	-40 ~ +125°C	
2-2. Rated Volt	age	X1:AC300V(r.m.s.) Y2:AC300V(r.m.s.)	
2-3. Part numb	er configuration		
ex.) <u>DE2</u> Product code	B3 SA Temperature Type C characteristic name	apacitance Capacitance Lead Pac	<u>X02F</u> king Individual code specification
• Produ DE:	ct code 2 denotes class X1,Y2.		
•Tempe	rature characteristic		
	Code 1X	Temperature characteristic SL	
	B3	B	
	E3	E	
	Please confirm detailed sp	ecification on [ Specification and test mether	nods ].
• Type r This	name s denotes safety certified t	vpe name Type SA.	

Capacitance

The first two digits denote significant figures ; the last digit denotes the multiplier of 10 in pF. ex.) In case of 471.

$$47 \times 10^1 = 470 \text{pF}$$

• Capacitance tolerance Please refer to [ Part number list ].

Lead code

Code	Lead style
A*	Vertical crimp long type
J*	Vertical crimp short type
N*	Vertical crimp taping type
* Please refe	r to [Part number list].

Packing style code

ig olylo oodo						
Code	Packing type					
В	Bulk type					
A	Ammo pack taping type					

#### • Individual specification

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

end of part number	
Code	Specification
	<ul> <li>Rated voltage : X1:AC300V(r.m.s.) Y2:AC300V(r.m.s.)</li> </ul>
X02F	<ul> <li>Halogen Free         <ul> <li>Br ≤ 900ppm, Cl ≤ 900ppm</li> <li>Br + Cl ≤ 1500ppm</li> <li>CP wire</li> <li>Dialactria strength between load wireau AC2600\/(rm a)</li> </ul> </li> </ul>
	<ul> <li>Dielectric strength between lead wires: AC2600V(r.m.s.)</li> </ul>

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

#### 3. Marking

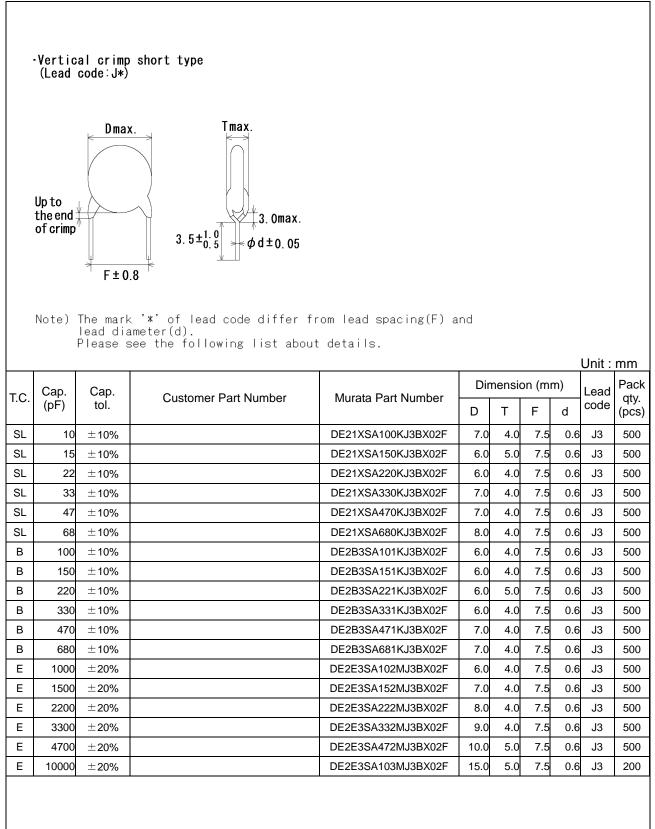
Type name	: SA
Nominal capacitance	: Actual value(under 100pF)
	3 digit system(100pF and over)
Capacitance tolerance	: Code
Class code and Rated voltage mark	: <b>X1 300~</b>
	Y2 300~
Manufacturing year	: Letter code(The last digit of A.D. year.)
Manufacturing month	: Çode
	$\left(\begin{array}{c} \text{Feb./Mar.} \rightarrow 2 \\ \end{array} \right) \text{Aug./Sep.} \rightarrow 8$
	Apr./May. $\rightarrow$ 4Oct./Nov. $\rightarrow$ 0Jun./Jul. $\rightarrow$ 6Dec./Jan. $\rightarrow$ D
	$\bigcup$ Jun./Jul. $\rightarrow 6$ Dec./Jan. $\rightarrow D$
Company name code	: CM15 (Made in Thailand)

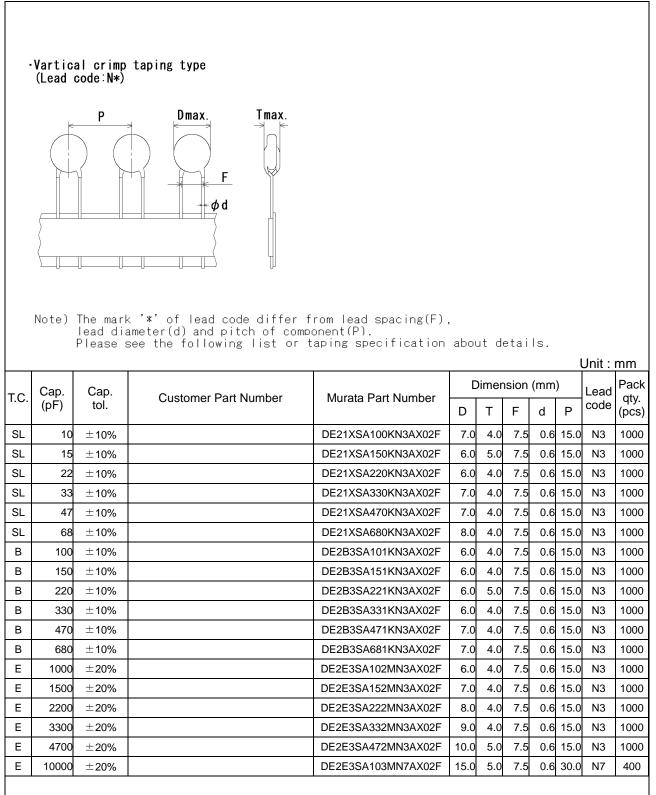




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	4. Part number list •Vertical crimp long type (Lead code:A*)									
		0 The mark lead dia	x. Tmax. 3.0max. 25.0min. $\phi d$ $\pm 0.05$ x. '*' of lead code differ fr ameter(d). see the following list about		nd				Unit :	mm
T.C.	Cap. (pF)	Cap. tol.	Customer Part Number	Murata Part Number	Dir D	nensio T	on (m F		Lead code	Pack qty. (pcs)
SL	10	±10%		DE21XSA100KA3BX02F	7.0	4.0	7.5	0.6	A3	250
SL	15	±10%		DE21XSA150KA3BX02F	6.0	5.0	7.5			500
SL	22	±10%		DE21XSA220KA3BX02F	6.0	4.0	7.5		A3	500
SL	33	±10%		DE21XSA330KA3BX02F	7.0	4.0	7.5	0.6	A3	250
SL	47									250
02	47	$\pm 10\%$		DE21XSA470KA3BX02F	7.0	4.0	7.5	0.6	A3	230
SL	68	±10% ±10%		DE21XSA470KA3BX02F DE21XSA680KA3BX02F	7.0 8.0	4.0 4.0	7.5 7.5			250
								0.6	A3	
SL	68	$\pm$ 10%		DE21XSA680KA3BX02F	8.0	4.0	7.5	0.6 0.6	A3 A3	250
SL B	68 100	±10% ±10%		DE21XSA680KA3BX02F DE2B3SA101KA3BX02F	8.0 6.0	4.0 4.0	7.5 7.5 7.5	0.6 0.6 0.6	A3 A3 A3	250 500
SL B B	68 100 150	±10% ±10% ±10%		DE21XSA680KA3BX02F DE2B3SA101KA3BX02F DE2B3SA151KA3BX02F	8.0 6.0 6.0	4.0 4.0 4.0	7.5 7.5 7.5 7.5	0.6 0.6 0.6 0.6	A3 A3 A3 A3	250 500 500
SL B B B	68 100 150 220	±10% ±10% ±10% ±10%		DE21XSA680KA3BX02F DE2B3SA101KA3BX02F DE2B3SA151KA3BX02F DE2B3SA221KA3BX02F	8.0 6.0 6.0 6.0	4.0 4.0 4.0 5.0	7.5 7.5 7.5 7.5	0.6 0.6 0.6 0.6	A3 A3 A3 A3 A3	250 500 500 500
SL B B B	68 100 150 220 330	±10% ±10% ±10% ±10% ±10%		DE21XSA680KA3BX02F DE2B3SA101KA3BX02F DE2B3SA151KA3BX02F DE2B3SA221KA3BX02F DE2B3SA331KA3BX02F	8.0 6.0 6.0 6.0 6.0	4.0 4.0 4.0 5.0 4.0	7.5 7.5 7.5 7.5 7.5	0.6 0.6 0.6 0.6 0.6	A3 A3 A3 A3 A3 A3 A3	250 500 500 500 500
SL B B B B B	68 100 150 220 330 470	±10% ±10% ±10% ±10% ±10%		DE21XSA680KA3BX02F DE2B3SA101KA3BX02F DE2B3SA151KA3BX02F DE2B3SA221KA3BX02F DE2B3SA331KA3BX02F DE2B3SA471KA3BX02F	8.0 6.0 6.0 6.0 6.0 7.0	4.0 4.0 4.0 5.0 4.0 4.0	7.5 7.5 7.5 7.5 7.5 7.5	0.6 0.6 0.6 0.6 0.6 0.6	A3         A3         A3         A3         A3         A3         A3         A3	250 500 500 500 500 250
SL B B B B B B	68 100 150 220 330 470 680	$\pm 10\%$ $\pm 10\%$ $\pm 10\%$ $\pm 10\%$ $\pm 10\%$ $\pm 10\%$ $\pm 10\%$		DE21XSA680KA3BX02F DE2B3SA101KA3BX02F DE2B3SA151KA3BX02F DE2B3SA221KA3BX02F DE2B3SA331KA3BX02F DE2B3SA471KA3BX02F DE2B3SA681KA3BX02F	8.0 6.0 6.0 6.0 7.0 7.0	4.0 4.0 4.0 5.0 4.0 4.0 4.0	7.5 7.5 7.5 7.5 7.5 7.5 7.5	0.6 0.6 0.6 0.6 0.6 0.6 0.6	A3	250 500 500 500 500 250 250
SL B B B B B B E	68 100 150 220 330 470 680 1000	$\pm 10\%$ $\pm 10\%$ $\pm 10\%$ $\pm 10\%$ $\pm 10\%$ $\pm 10\%$ $\pm 10\%$ $\pm 20\%$		DE21XSA680KA3BX02F DE2B3SA101KA3BX02F DE2B3SA151KA3BX02F DE2B3SA221KA3BX02F DE2B3SA331KA3BX02F DE2B3SA471KA3BX02F DE2B3SA681KA3BX02F DE2E3SA102MA3BX02F	8.0 6.0 6.0 6.0 7.0 7.0 6.0	4.0 4.0 5.0 4.0 4.0 4.0 4.0 4.0	7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5	0.6 0.6 0.6 0.6 0.6 0.6 0.6	A3	250 500 500 500 250 250 250 500
SL B B B B B B E E	68 100 220 330 470 680 1000 1500	$\pm 10\%$ $\pm 10\%$ $\pm 10\%$ $\pm 10\%$ $\pm 10\%$ $\pm 10\%$ $\pm 20\%$ $\pm 20\%$		DE21XSA680KA3BX02F DE2B3SA101KA3BX02F DE2B3SA151KA3BX02F DE2B3SA221KA3BX02F DE2B3SA331KA3BX02F DE2B3SA471KA3BX02F DE2B3SA681KA3BX02F DE2E3SA102MA3BX02F DE2E3SA152MA3BX02F	8.0 6.0 6.0 6.0 7.0 7.0 7.0 7.0 7.0	4.0 4.0 5.0 4.0 4.0 4.0 4.0 4.0 4.0	7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5	0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6	A3	250 500 500 500 250 250 500 250
SL B B B B B E E E	68 100 220 330 470 680 1000 1500 2200	$\pm 10\%$ $\pm 10\%$ $\pm 10\%$ $\pm 10\%$ $\pm 10\%$ $\pm 10\%$ $\pm 20\%$ $\pm 20\%$		DE21XSA680KA3BX02F DE2B3SA101KA3BX02F DE2B3SA151KA3BX02F DE2B3SA221KA3BX02F DE2B3SA331KA3BX02F DE2B3SA471KA3BX02F DE2B3SA681KA3BX02F DE2E3SA102MA3BX02F DE2E3SA152MA3BX02F DE2E3SA222MA3BX02F	8.0 6.0 6.0 7.0 7.0 7.0 6.0 7.0 8.0	4.0 4.0 5.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0	7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5	0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6	A3          A3	250 500 500 500 250 250 500 250 250 250



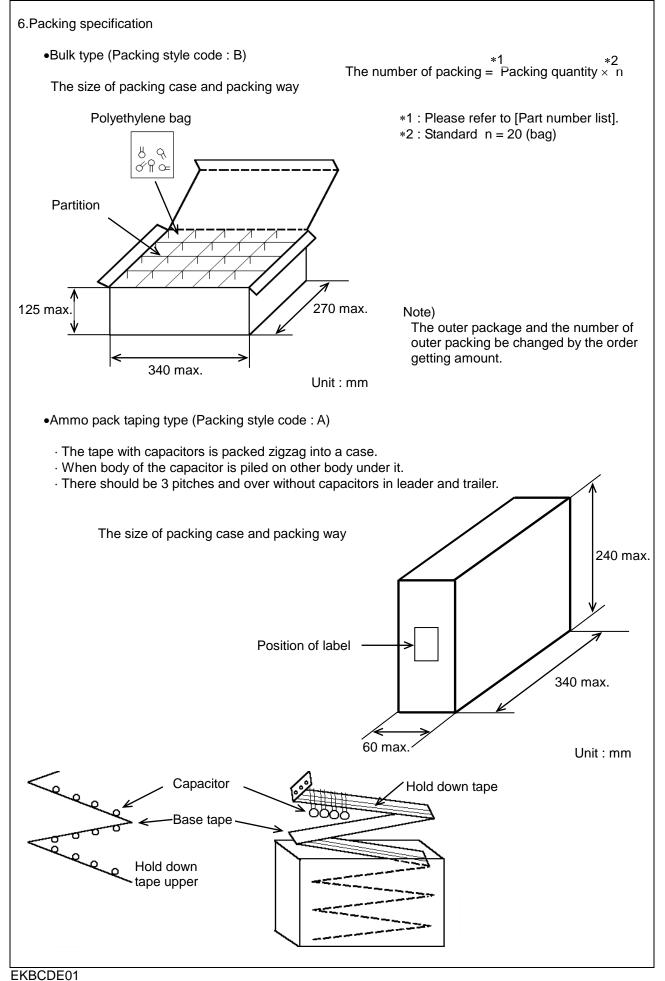


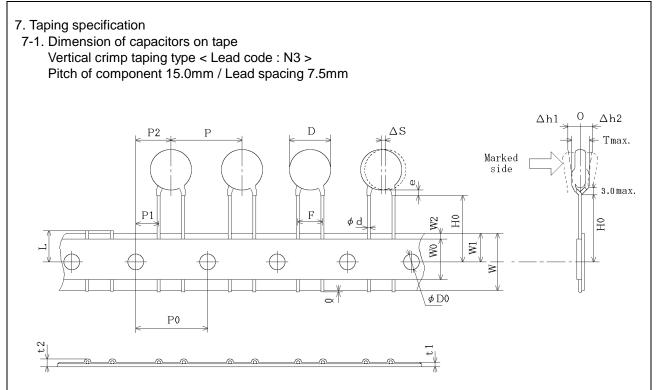
Appearance and c Marking Dielectric strength		No marked de form and dime	p [Part number li		AC2600V(r.m.	should be lence of d nould be r should be should no	efect. neasured inspected of be dama	with slide	calipers d eyes.
Marking Dielectric	Between lead wires Body	form and dime Please refer to To be easily le No failure.	ensions. [Part number li		for visible evic Dimensions sl The capacitor The capacitor AC2600V(r.m.	lence of d nould be r should be should no	efect. neasured inspected of be dama	with slide	calipers d eyes.
Dielectric	wires Body	To be easily le No failure.		st].	The capacitor The capacitor AC2600V(r.m.	should be should no	e inspected ot be dama	l by naked	d eyes.
Dielectric	wires Body	No failure.	gible.		The capacitor AC2600V(r.m.	should no	ot be dama		
	wires Body				AC2600V(r.m.			iged when	l i
Sacingui	Body	No failure.				The capacitor should not be damaged when AC2600V(r.m.s.) <50/60Hz> is applied between			
		No failure.			the lead when	AC2600V(r.m.s.) <50/60Hz> is applied between the lead wires for 60 s.			
	insulation			No failure.			e capacito	r should b	e
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					be closely wra the body of the			, A	I About
					to the distance	•	foil r	<u></u>	+ About + 3 to 4 n
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					from each terr Then, the cap				
					container filled				
					diameter. Fina				
					applied for 60		n the capa	citor lead	wires
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Insulation Resista	100 (I.R.)	10000MΩ min							eu
									tor
					through a resi	stor of 1M	Ω.		
Capacitance		Within specifie	ed tolerance.	Π	•				°C with
Dissinction Factor		0.50/							
ussipation Factor	(U.F.)	∠.5% max.							) may
Temperature chara	acteristic							ould be m	ade at
					eacn step spe	cified in T	adie.		
		(Temp. range : -25 to +85°C )							
					<u> </u>				
			Step		1 2	3	4	5	
			Temp.(°C)	20	)±2 -25±2	20±2	85±2	20±2	
		fire.			Least one but in cheese-cloth. 20 discharges discharges shi maintained for single for trr single for trr singl	more than The capa . The inte ould be 5 $2 \min \text{ after}$ $2 \min \text{ after}$ $2 \min \text{ after}$ $2 \min \text{ after}$ $2 \lim (1 - 1)^{2}$ 1 - 1 - 1 $2 \lim (1 - 1)^{2}$ $2 \lim ($	two comp citor shoul rval betwe s. The UA er the last of $\frac{12}{2}$ $\frac{12}{2}$ $\frac{12}{2$	lete layers d be subje en succes c should b discharge tischarge c t tischarge	s of ected to ssive be  u u u u
expresses nomina	l capacitance valu	le(pF)						time	
	Capacitance Dissipation Factor Temperature chara	Capacitance Dissipation Factor (D.F.) Temperature characteristic Active flammability	Capacitance       Within specifie         Dissipation Factor (D.F.)       2.5% max.         Temperature characteristic       Char. SL : +35         (Temp. range       Char. B : Wit         Char. B : Wit       The cheese-classic         Active flammability       The cheese-classic         Active flammability       In the cheese-classic         expresses nominal capacitance value(pF)       Expresses nominal capacitance value(pF)	Capacitance       Within specified tolerance.         Dissipation Factor (D.F.)       2.5% max.         Temperature characteristic       Char. SL : +350 to -1000 pm/* (Temp. range : +20 to +85°C ) Char. B : Within ±10 % Char. E : Within ±10 % Char. E : Within ±20/-55% (Temp. range : -25 to +85°C )         Active flammability       The cheese-cloth should not b fire.         Active flammability       The cheese-cloth should not b fire.         expresses nominal capacitance value(pF)	Capacitance       Within specified tolerance.         Dissipation Factor (D.F.)       2.5% max.         Temperature characteristic       Char. SL : +350 to -1000 pm/°C (Temp. range : +20 to +85°C )         Char. B : Within ±10 %       Char. E : Within ±20'-55% (Temp. range : -25 to +85°C )         Image: -25 to +85°C )       Image: -25 to +85°C )         Active flammability       The cheese-cloth should not be on fire.         Active flammability       The cheese-cloth should not be on fire.         expresses nominal capacitance value(pF)       Expresses nominal capacitance value(pF)	Capacitance       Within specified tolerance.       The voltage st         Dissipation Factor (D.F.)       2.5% max.       The dissipation at 20°C with 1         Temperature characteristic       Char. 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B : Within ±20/55% (Temp. range : -25 to +85°C.)Active flammabilityThe cheese-cloth should not be or fire.The cheese-cloth should not be or maintained for 2 min after maintained for 2 min after discharges should be 5 maintained for 2 min after fire.C1.2: 1µF±10%, CC L1 to L4 : 1.5mH±20% R C : 100±2%, CL UAc : UR ±5% U U CX : Capacitor und F : Fuse, Rated 1 Ut : Voltage applic	CapacitanceWithin specified tolerance.Within 60±5 s of The voltage should be applied to t through a resistor of 1M0.Dissipation Factor (D.F.)2.5% max.The capacitance should be measu 1±0.1kHz and AC1±0.2V(r.m.s.) m at 20°C with 1±0.1kHz and AC1±0.2V(r.m.s.) m at 20°C with 1±0.1kHz and AC1±0.2V(r.m.s.) m at 20°C with 1±0.1kHz and AC1±0.2V(r.m.s.) m through a resistor of 1M0.Temperature characteristicChar. SL : +350 to -1000 pm/°C (Temp. range : +20 to +85°C)The capacitance measurement sh each step specified in Table.Active flammabilityStep1234Temp.(°C)20±2-25±220±285±2Active flammabilityThe cheese-cloth should not be on fire.The capacitance beind be individual each step specified to 5 s. The UA maintained for 2min after the last on but more than two comp cheese-cloth. The capacitor should be 5 s. The UA maintained for 2min after the last of tichchart step should be 5 s. The UA maintained for 2min after the last of tichchart step should be 5 s. The UA maintained for 2min after the last of tichchart step should be 5 s. The UA maintained for 2min after the last of tichchart step should be 5 s. The UA maintained for 2min after the last of tichchart step should be 5 s. The UA maintained for 2min after the last of tichchart step should be 5 s. The UA maintained for 2min after the last of tichchart step should be 5 s. The UA maintained for 2min after the last of tichchart step step should be 5 s. The UA maintained for 2min after the last of tichchart step step step step step step step ste	CapacitanceWithin specified tolerance.Within 60±5 s of charging. The voltage should be applied to the capaci- through a resistor of 1Mo.Dissipation Factor (D.F.)2.5% max.The capacitance should be measured at 20°C with 1±0.1kHz and AC1±0.2V(rm.s.) max. The dissipation factor should be measured at 20°C with 1±0.1kHz and AC1±0.2V(rm.s.) max.Temperature characteristicChar. SL : +350 to -1000 pm/°C (Temp. range : +20 to +85°C) Char. E : Within ±10 % Char. E : Within ±10 % Char. E : Within ±20/55% (Temp.range : -25 to +85°C)The capacitance measurement should be measured at 20°C with 1±0.1kHz and AC1±0.2V(rm.s.) max.Active flammabilityThe cheese-cloth should not be or fire.The capacitance should be individually wrapp least one but more than two complete layer cheese-cloth should not be or minead to should be 5 s. The LAC should the maintained for 2min after the last discharge scheme should be 5 s. The LAC should the maintained for 2min after the last discharge R : 100±22%, C1 : 3µF±5% 10K UA c : UR ±5% UR: Rated working vc C c : Capacitor under test F : Fuse, Rated 10A Ut : Voltage applied to Ct

			Reference only	
No.	Item		Specification	Test method
9	Robustness of terminations	Tensile	Lead wire should not cut off. Capacitor should not be broken.	Fix the body of capacitor, apply a tensile weight gradually to each lead wire in the radial direction of
				capacitor up to 10N and keep it for 10±1 s.
		Bending		With the termination in its normal position, the
				capacitor is held by its body in such a manner that
				the axis of the termination is vertical; a mass
				applying a force of 5N is then suspended from the end of the termination.
				The body of the capacitor is then inclined,
				within a period of 2 to 3 s, through an angle of
				about 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
10	Vibration	Appearance	No marked defect.	in the opposite direction. The capacitor should be firmly soldered to the
10	resistance	Capacitance	Within the specified tolerance.	supporting lead wire and vibration which is 10 to
		D.F.	2.5% max.	55Hz in the vibration frequency range,1.5mm in
				total amplitude, and about 1min in the rate of
				vibration change from 10Hz to 55Hz and back to
				10Hz is applied for a total of 6 h; 2 h each in
11	Solderability of lead	<u>ا</u>	Lead wire should be soldered with	3 mutually perpendicular directions.
11		3	uniformly coated on the axial	The lead wire of a capacitor should be dipped into a ethanol solution of 25wt% rosin and then into
			direction over 3/4 of the	molten solder for $2\pm0.5$ s. In both cases the depth
			circumferential direction.	of dipping is up to about 1.5 to 2.0mm from the
				root of lead wires.
				Temp. of solder :
	<b>.</b>			245±5°C Lead Free Solder (Sn-3Ag-0.5Cu)
12	Soldering effect (Non-preheat)	Appearance	No marked defect.	Solder temperature: 350±10°C or 260±5°C
	(Non-preneat)	Capacitance change	Within ±10%	Immersion time : $3.5\pm0.5$ s
		I.R.	1000MΩ min.	(In case of $260\pm5^{\circ}C$ : $10\pm1$ s) The depth of immersion is up to about
		Dielectric	Per item 3	1.5 to 2.0mm from the root of lead wires.
		strength		
				Thermal Capacitor
				□
				└────────────────────────────────────
				Pre-treatment : Capacitor should be stored at
				$125\pm2^{\circ}C$ for 1 h, and apply the
				AC2000V(r.m.s.) 60s then placed at *1room condition for 24±2 h
				before initial measurements.
				(Do not apply to Char. SL)
				Post-treatment : Capacitor should be stored for 1
40	O al da si da di	A		to 2 h at *1room condition.
13	Soldering effect (On-preheat)	Appearance	No marked defect.	First the capacitor should be stored at $120+0/-5^{\circ}C$ for $60+0/-5$ s.
	(On-preneat)	Capacitance	Within ±10%	Then, as in figure, the lead wires should be
		change I.R.	1000MΩ min.	immersed solder of 260+0/-5°C up to 1.5 to 2.0mm
		Dielectric	Per item 3	from the root of terminal for 7.5+0/-1 s.
		strength		Thermal Capacitor
				Thermal Capacitor
				<u>□ === +</u> to 2.0mm
				solder
				Pre-treatment : Capacitor should be stored at 125±2°C for 1 h, and apply the
				AC2000V(r.m.s.) 60s then placed
				at *1room condition for 24±2 h
				before initial measurements.
				(Do not apply to Char. SL)
				Post-treatment : Capacitor should be stored for 1 2 h at *1room condition.
*2 "C'	expresses nominal o	capacitance valu	e(pF)	
U	stprosoco nominal (	apuonanoe valu	-(p. )	
	A0.3C			

			Reference only	
No.	Item	ו	Specification	Test method
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 cycle.
			Cycle Time	<u>A</u>
				Capacitor Flame
			1 to 4 30 s max.	
			5 60 s max.	
				Gas Burner
15	Passive flammabilit	tv	The burning time should not be	The capacitor under test should be held in the flame
		- ,	exceeded the time 30 s. The tissue paper should not	in the position which best promotes burning. Time of exposure to flame is for 30 s.
			ignite.	Length of flame : 12±1mm
				Gas burner : Length 35mm min.
				Inside Dia. 0.5±0.1mm Outside Dia. 0.9mm max.
				Gas : Butane gas Purity 95% min.
				About 8mm
				+
				Gas burner
				45°
				About 10mm thick board
16	Humidity	Appearance	No marked defect.	Set the capacitor for $500\pm12$ h at $40\pm2^{\circ}$ C in 90 to
	(Under steady state)	Capacitance change	Char. SL : Within ±5% Char. B : Within ±10%	95% relative humidity.
	51010)	change	Char. B : Within ±10% Char. E : Within ±15%	Pre-treatment : Capacitor should be stored at
		D.F.	Char. SL : 2.5% max.	125±2°C for 1 h, and apply the
			Char. B, E : 5.0% max.	AC2000V(r.m.s.) 60s then placed
		I.R.	3000MΩ min.	at *1room condition for 24±2 h
		Dielectric	Per item 3	before initial measurements.
		strength		(Do not apply to Char. SL) Post-treatment :Capacitor should be stored for 1
				to 2 h at *1 room condition.
17	Humidity loading	Appearance	No marked defect.	Apply AC300V(r.m.s.) for 500±12 h at 40±2°C in
		Capacitance	Char. SL : Within ±5%	90 to 95% relative humidity.
		change	Char. B : Within ±10%	Prostreatment - Canacitar should be stared at
		D.F.	Char. E : Within ±15% Char. SL : 2.5% max.	Pre-treatment : Capacitor should be stored at 125±2°C for 1 h, and apply the
		D.F.	Char. SL : $2.5\%$ max. Char. B, E : $5.0\%$ max.	AC2000V(r.m.s.) 60s then placed
		I.R.	3000MΩ min.	at *1room condition for 24±2 h
		Dielectric	Per item 3	before initial measurements.
		strength		(Do not apply to Char. SL) Post-treatment :Capacitor should be stored for 1
				to 2 h at *1room condition.
* <sup>1</sup> "ro	n condition" Tempe	rature: 15 to 35°	L C, Relative humidity: 45 to 75%, Atm	
10		Jature: 10 10 00		
ESS	403C			

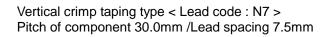
No.         Item         Sepecification         Test method           18         Life         Appearance         Within ±20%         Each individual capacitor should be subjected           18         Life         Appearance         Within ±20%         Each individual capacitor should be subjected           18         Jelectric strength         3000M2 min.         The capacitors are placed in a circulating air or for a period of 1000 h.           19         Temperature and immersion cycle         Appearance Change         No marked defect.         The capacitors are placed in a circulating air or for a period of 1000 h.           19         Temperature and immersion cycle         Appearance Change         No marked defect.         The capacitor should be stored for data period of 1000 h.           19         Temperature and immersion cycle         Appearance Change         No marked defect.         The capacitor should be stored for change           19         Temperature and immersion cycle         Appearance Change         No marked defect.         The capacitor should be stored for change           19         Temperature and immersion cycle         Appearance Change         No marked defect.         The capacitor should be stored for change           10         The capacitor should be stored for change         Char. SL : Within ±12% Char. SL : 55% max.         The capacitor should be stored for change		Item				
Capacitance       Within ±20%       Each individual capacitor should be subjected a 5KV impuses for three times. Then the capacitar should be subjected a 5KV impuses for three times. Then the capacitar should be subjected a 5KV impuses for three times. Then the capacitar should be subjected a 5KV impuses for three times. Then the capacitar should be subjected a 5KV impuses for three times. Then the capacitar should be subjected a 5KV impuses for three times. Then the capacitar should be subjected a 5KV impuses for three times. Then the capacitar should be subjected a 5KV impuses for three times. Then the capacitar should be subjected a 5KV impuses for three times. Then the capacitar should be subjected a 5KV impuses for three times. The ari in the oven is maintained at a temperat of 125+22-0°C, and relative humidity of 50% impuses for the test. The capacitor should be stored for the capacitar should be stored for the test. The capacitor should be stored for 24±2 h at "froom condition for 24±2 h at "froom condition. (Do napply to Char. SL) Within ±10% Char. B. E: 5.0% max.         19       Temperature and immersion cycle       Appearance       No marked defect.       The capacitor should be stored for 5 temperature (*C) Time test. The capacitor should be stored for 5 temperature cycles.         19       Temperature and immersion cycle       Appearance       No marked defect.       The capacitor should be stored for 5 temperature (*C) Time test.         19       Temperature (*C) Time immersion cycle       D.F.       Char. SL : Within ±5% Char. SL : Within ±0% Char. SL : 2.5% max.       The capacitor should be stored for 5 temperature (*C) Time immersion cycle         19       Temperature (*C) Time immersion cycle       Step Temperature (*	8 Life	Δ.			Test method	
1R.     3000MC min.       Dielectric strength     Per item 3       Dielectric strength     Per item 3       Per item 3     Per item 3       The capacitors are placed in a dirculating air or for a period of 1000 h.       The capacitors are placed in a dirculating air or for a period of 1000 h.       The capacitors are placed in a dirculating air or for a period of 1000 h.       The capacitors are placed in a dirculating only of main frequency, except that none each hour voltage is increased to AC1000V(rm.s.) for 0.1       Pre-treatment : Capacitors should be stored at 125:2*C for 1 h, and apply th AC2000V(rm.s.) for the placet change       19     Temperature and immersion cycle       Appearance Change     No marked defect.       Char, B. : Within ±10% Char, B. : Within ±10% Char, B. : 2.5% max.       I.R.     3000MΩ min.       Dielectric strength     Per item 3       I.R.     3000MΩ min.       Dielectric strength     Per item 3       Vice time: 5 crycles					nadar - k - 112	aulais et de
I.R.       3000M() min.         Dielectric strength       Per item 3         Image: Strength       Per item 3 <td></td> <td></td> <td>Within ±20%</td> <td></td> <td></td> <td></td>			Within ±20%			
Delectric strength     Per item 3       Delectric strength     Per item 3       The capacitors are placed in a circulating air or for a period of 1000 h. The capacitors are placed in a circulating air or for a period of 1000 h. The air in the oven is maintained at a temperat of 1254:20-0°C, and relative humidity of 50% m Throughout the test, the capacitors are subject to a ACS10V(rm.s.) 450:0042-saltenating volte of mains frequency, except that once each hou voltage is increased to AC100V(rm.s.), 50:01002, saltenating of the subject of to 1 h, and apply th AC2000V(rm.s.) 50: then plan at "100m condition for 24:2 h before initial measurements. (Do not apply to Char. SL) Dest-treatment : Capacitor should be stored at 24:20 ht "1000 condition 24:20 ht "1000 co						n the capacito
Image: strength     strength       strength     strength       Image: strength     strength <tr< td=""><td></td><td></td><td></td><td>are applied to life te</td><td>est.</td><td></td></tr<>				are applied to life te	est.	
9     Temperature and immersion cycle     Appearance Capacitance Char. BL: Within ±0% Char. B: Within ±0% Char. B: Within ±0% Char. B: ±0.5% max.     The capacitor samplace (1/2 = 0.0) and the state of the capacitors are placed in a circulating air or for a period of 1000 h. The air in the oven is maintained at a temperat of 125-2/2 °C, and relative humidity of 50% m Throughout the test, the capacitors should be stored at 125±2/2 °C or 1 h, and apply th AC2000V(rm.s.) 505 then pla at "froom condition or 24±2 h before initial measurements. (Do not apply to Char. SL)       19     Temperature and immersion cycle     Appearance Capacitance Capacitance Char. SL: Within ±10% Char. B: Within ±10% Char. B: Within ±10% Char. SL: 2:5% max.     The capacitor should be stored for 24±2 h at "froom condition.       10     Temperature and immersion cycle     Appearance Capacitance Char. SL: 2:5% max.     The capacitor should be stored for 24±2 h at "100m condition.       11     R.     3000MΩ min.     The capacitor should be stored for 2 = 0:43     Time immersion cycle>       11     +65+5/-0     15 min water 2     0:43     15 min water 2       11     +65+5/-0     15 min water 2     Cycle time: 5 cycle       Step Temperature(*C)     Time immersion cycle>     Step Temperature(*C)     Time immersion cycle>       Virtue diagram     Per item 3     Cycle time: 5 cycle       Step Temperature(*C)     Time immersion cycle>     Step Temperature(*C)       11     +65+5/-0     15 min water 2       12     0:33     15 min water 2			Per item 3	100_(%)	Front time (T1	1040 167T
Image: Strength     Appearance     No marked defect.     The capacitors expl that once each hou voltage is increased to AC1000V(rm.s.) 450/60Hz-s atternating voltage is increased to AC1000V(rm.s.) 40/60/43       18     Temperature and immersion cycle     Appearance     No marked defect.     The capacitors should be subjected to 5 temperature cycles, then consecutively to 2 immersion cycle       19     Temperature and immersion cycle     D.F.     Char. SL : Within ±10% Char. SL : Within ±10% Char. SL : Within ±10% Char. SL : Sey max.       10     D.F.     Char. SL : 25% max.     The capacitor should be subjected to 5 temperature cycles.       10     D.F.     Char. SL : 25% max.     The capacitor should be subjected to 5 temperature cycles.       11     R.R.     3000MQ min.     The capacitor should be stored at the cycle immersion cycle cycle cycles.       11     Room temp. 13 min.     Step Temperature(*C) Time tycle time: 5 cycle cycles.       11     +65+5/-0     15 min mast capacitor should be stored at the cycle time: 5 cycle cycle cycle time: 5 cycle cycle cycle time: 5 cycle cycle.       11     +65+5/-0     15		strength			· · ·	, ,
9     Imperature and immersion cycle     Appearance     No marked defect.       19     Temperature and immersion cycle     Appearance     No marked defect.       10     Char. SL     Within ±5% Char. SL     Char. SL       11     Appearance     No marked defect.     The capacitor should be stored at a temperature cycles.       12     Temperature and immersion cycle     D.F.     Char. SL     Within ±5% Char. SL       11.R.     3000MΩ min.     D.F.     Char. SL     Som max.       11.R.     3000MΩ min.     D.F.     Char. SL     Som max.       12     Rom temp.     3 min.     Cycle time: 5 cycles.       12     Q dt at a more any by the char. SL     Som max.       12     Q dt at a max.     Time       13     Temperature cycles     Char. SL       14.R.     3000MΩ min.     D.F.       12     Q dt at a more any by the char. SL     Som max.       13     Temperature (°C)     Time       14     Hoor temp.     3 min.       12     Q dt at any by the char.     Time       13     Temperature (°C)     Time       14     Hoor temp.     3 min.       15     Yer temperature (°C)     Time       14     Hoor temp.     3 min.       14						nao (12) – oo ja o
Image: Char. B. L. 2.5% max. Char				0		
Image: Second State Stat					L L	
19       Temperature and immersion cycle       Appearance       No marked defect.       The agacitor should be stored at 125±2°C for 1 h, and apply the Ac2000V(rm.s). 50 shotp. aba at "froom condition for 24±2 h at froom condition for 24±2 h				T2	1	
Image: stand				The capacitors are	placed in a circu	lating air ove
19       Temperature and immersion cycle       Appearance       No marked defect.       The capacitor should be stored for 24±2 h at *1room condition for 24±2 h at *1room condition.         19       Temperature and immersion cycle       Appearance       No marked defect.       The capacitor should be subjected to 5 temperature cycles.         10       Temperature and immersion cycle       Appearance       No marked defect.       The capacitor should be subjected to 5 temperature cycles.         11       Temperature cycles       Char. SL : Within ±10% Char. E : Within ±10% Char. E : S.0% max.       The capacitor should be subjected to 5 temperature cycles.         11       R. 3000M(2 min.       The capacitor should be subjected to 5 temperature cycles.         11       Room temp.       3 min.         12       Room temp.       3 min.         12       Que time: 5 cycles.         11       +65+5/-0       15 min         12       0±3       15 min         13       +125+2°C for 1 h, and apply the Account of the cycles.         14       +65+5/-0       15 min         15       Per item 3       16 min satt water         2       0±3       15 min       Clare to cycle time: cycles.         15       Char. SL : 2.0* for 1 h, and apply the Account or should be stored at to cycle time: cycles.       Cycle time: cycles.						-
Image: Second state of the second s						
Image: Second						
Image: stand sta						
9     Temperature and immersion cycle     Appearance     No marked defect.     The capacitor should be stored for 24±2 h at *1room condition for 24±2 h at *1room condition for 24±2 h at *1room condition.       9     Temperature and immersion cycle     Appearance     Char. SL : Within ±5% Char. B : Within ±10% Char. E : Within ±20%       D.F.     Char. SL : 2.5% max.     The capacitor should be subjected to 5 temperature (°C)       1.R.     3000Mc2 min.       Dielectric     Step Temperature (°C)       Timersion cycle     No marked defect.       char. B, E : 5.0% max.     Step Temperature(°C)       1.R.     3000Mc2 min.       Dielectric     Per item 3       Step Temperature(°C)     Time water       2     0±3     15 min water       3     14*50*/-0     15 min water       2     0±3     15 min water       2     0±3     15 min water       3     00 ron rophy to Char. SL)       4						
9       Temperature and immersion cycle       Appearance       No marked defect.       The capacitor should be subjected to 5 temperature change         9       Temperature and immersion cycle       Appearance       No marked defect.       The capacitor should be subjected to 5 temperature cycles, then consecutively to 2 immersion cycle         0       D.F.       Char. SL : Stimin ±20%       The capacitor cycle char. SL : Stom max.       The capacitor cycle cycles, then consecutively to 2 immersion cycle         1.R.       3000MQ min.       2 Room temp.       3 min         1.R.       3000MQ min.       2 Room temp.       3 min         2       Room temp.       3 min       2 cycle time:5 cycles         Step       Temperature(°C)       Time       Immersion         2       0±3       15 min       water         2       0±3       15 min       water         2       0±3       15 min       water         2       0±3       15 min       Salt         2       0±3       15 min       water         2       0±3       15 min       befor				of mains frequency	, except that once	each hour t
9     Temperature and immersion cycle     Appearance Capacitance change     No marked defect.     The capacitor should be stored for 24±2 h at "room condition for 24±2 h at "room condition.       9     Temperature and immersion cycle     Appearance Capacitance change     No marked defect.     The capacitor should be subjected to 5 temperature cycles, then consecutively to 2 immersion cycle       0     D.F.     Char. SL : 2.5% max. Char. SL : 2.5% max.     Temperature cycle>       1.R.     3000MΩ min.     2     Room temp.     3 min       2     Room temp.     3 min       3     +125+3/-0     30 min.       2     0±3     15 min     Salt       4     Room temp.     3 min       2     0±3     15 min     Salt       4     *room condition for 24±2 h     h     before initial measurements. (C) cot apply to Char. SL)       9     Fer-treatment : Capacitor should be stored at 125±2°C for 1 h, and apply the AC2000V(rm.s.) 60s then pla at "'room condition for 24±2 h						
9       Temperature and immersion cycle       Appearance       No marked defect.       The capacitor should be stored for 24±2 h at "from condition for 24±2 h at "form condition for 24±2 h at th at form form form form form form for 24±2 h						
9     Temperature and immersion cycle     Appearance     No marked defect.     The capacitor should be subjected to 5 tempere cycles, then consecutively to 2 immersion cycle       9     Temperature and immersion cycle     Appearance     Char. SL : Within ±5% Char. B : Within ±10% Char. E : Within ±20%     The capacitor should be subjected to 5 tempere cycles, then consecutively to 2 immersion cycle       D.F.     Char. SL : 2.5% max. Char. B, E : 5.0% max.     The capacitor should be subjected to 5 tempere cycles, then consecutively to 2 immersion cycle       I.R.     3000MΩ min.     2     Room temp.     3 min 3       1     -40+0/-3     30 min 3     125+2°C       Viewersion cycles     Step     Temperature(°C)     Time water       1     +65+5/-0     15 min water       2     0±3     15 min water       2     0±3 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						
9     Temperature and immersion cycle     Appearance     No marked defect.     The capacitor should be stored for 24±2 h at *1room condition.       9     Temperature and immersion cycle     Appearance     Char. SL : Within ±5% Char. B : Within ±10% Char. E : Within ±20%     The capacitor should be subjected to 5 temperat cycles, then consecutively to 2 immersion cycle       D.F.     Char. SL : 2.5% max.     Char. SL : 2.5% max.       I.R.     3000MΩ min.     2       Dielectric strength     Per item 3       Vertext     Per item 3       Cycle time:5 cycles       Step     Temperature(°C)       Time     Immersion cycles       Char. B : 5.0% max.     Char. SL : 2.5% max.       D.F.     Char. SL : 5.0% max.       I.R.     3000MΩ min.       Dielectric strength     Per item 3       Vertext     Per item 3       Cycle time:5 cycles       Step     Temperature(°C)       Time     Immersion water       Cycle time:2 cycles       Pre-treatment : Capacitor should be stored at 125±2°C for 1 h, and apply th AC2000V(r.m.s.) 60s then pla at *1room condition for 24±2 h before initial measurements. (Do not apply to Char. SL)       Post-treatment : Capacitor should be stored of					· · ·	•
9       Temperature and immersion cycle       Appearance       No marked defect.       The capacitor should be stored for 24±2 h at **iroom condition.         9       Temperature and immersion cycle       Appearance       Char. SL : Within ±10% Char. E : Within ±20% Char. E : Within ±20%       The capacitor should be subjected to 5 temperature cycles, then consecutively to 2 immersion cycle         D.F.       Char. SL : 2.5% max.       Char. B. E : 5.0% max.       Temperature cycle>         I.R.       3000MΩ min.       2       Room temp.       3 min         Dielectric strength       Per item 3       Per item 3       3 hin       Cycle time:5 cycles         Step       Temperature(°C)       Time       Immersion cycle       Step       Temperature(°C)       Time         1       +40±0/-3       30 min       2       Room temp.       3 min       Cycle time:5 cycles         2       0±3       15 min       Water       Cycle time:2 cycles       Vector initial measurements. (Do not apply to Char. SL)         2       0±3       15 min       Salt       2       0±3       15 min       Water         2       0±3       15 min       Go temperature transments. (Do not apply to Char. SL)       Post-treatment : Capacitor should be stored at 125±2°C for 1 h, and apply the AC2000V(rm.s.) 60s then plaa at *'noom condition for 24±2 h before initial measurements. (D						
9       Temperature and immersion cycle       Appearance       No marked defect.       The capacitor should be subjected to 5 temperature cycles, then consecutively to 2 immersion cycle         9       Temperature and immersion cycle       Char. SL : Within ±5% Char. B : Within ±10% Char. E : Within ±20%       The capacitor should be subjected to 5 temperature cycles, then consecutively to 2 immersion cycle         0       D.F.       Char. SL : 2.5% max.       Char. B, E : 5.0% max.         1.R.       3000MΩ min.       2       Room temp.         Dielectric strength       Per item 3       3 +125+3/-0       30 min         2       0±3       15 min       Water         2       0±3       15 min       Satt         2       0±3       15 min       Clear at *1room condition for 24±2 h before initial measurements. (Do not apply to Char. SL)         Pre-treatment : Capacitor should be stored at 125±2°C for 1 h, and apply the Char. SL)       Post-treatment : Capacitor should be stored at 125±2°C for 1 h, and apply the Char. SL)						
9     Temperature and immersion cycle     Appearance Char. SL : Within ±5% Char. B : Within ±10% Char. B : Within ±10% Char. B : S. S. Max. D.F.     The capacitor should be subjected to 5 tempera cycles, then consecutively to 2 immersion cycle       D.F.     Char. SL : 2.5% max. Char. B : 5.0% max.     Temperature cycle>       I.R.     3000M02 min.     2 Room temp.     3 min.       Dielectric strength     Per item 3     9 Per item 3     3 the strength       Vector     Vector     Time (Char. B)     1 the strength       Vector     Per item 3     1 the strength     3 the strength       Vector     Per item 3     Step     Temperature(°C)     Time (Char. B)       Vector     Per item 3     Per item 3     Step     Temperature(°C)     Time (Char. B)       Vector     Per item 3     Per item 3     Step     Temperature(°C)     Time (Char. B)       Vector     Per item 3     Per item 3     Step     Temperature(°C)     Time (Char. B)       Vector     Pre-treatment : Capacitor should be stored at 125±2°C for 1 h, and apply the AC2000V(rm.s.) (So then plaa at *1room condition for 24±2 h before initial measurements. (Do not apply to Char. SL)       Post-treatment : Capacitor should be stored of boom condition for 24±2 h     Store of the stored of boom condition for 24±2 h						
9       Temperature and immersion cycle       Appearance       No marked defect.       The capacitor should be subjected to 5 temperaty cycles, then consecutively to 2 immersion cycle chans B: Within ±10% Char. B: Within ±20%         D.F.       Char. SL: 2.5% max.       Char. SL: 2.5% max.         I.R.       3000MΩ min.       2         Dielectric strength       Per item 3         Vertext       Per item 3         Vertext       Step         Temperature(°C)       Time         1       -40+0/-3       30 min         2       Room temp.       3 min         3       +125+3/-0       30 min         4       Room temp.       3 min         Cycle time:5 cycles       Step       Temperature(°C)         Step       Temperature(°C)       Time         Water       2       0±3       15 min         2       0±3       15 min       Water         2       0±3       15 min       Salt         4       Capacitor should be stored to the plan at *1 room condition for 24±2 h before initial measurements. (Do not apply to Char. SL)       Post-treatment : Capacitor should be stored to before initial measurements. (Do not apply to Char. SL)						
immersion cycle       Char. SL : Within ±5% Char. B : Within ±10% Char. E : Within ±20%       cycles, then consecutively to 2 immersion cycle         D.F.       Char. SL : 2.5% max. Char. B, E : 5.0% max.       Temperature cycle>         I.R.       3000MΩ min.       2 Room temp. 3 min 3 +125+3/-0 30 min.         Dielectric strength       Per item 3       3 min 2 Room temp. 3 min 3 +125+3/-0 30 min.         Cycle time:5 cycles       Step       Temperature(°C)       Time 3 min 2 Room temp. 3 min 3 +125+3/-0 15 min water         Cycle time:2 cycles       Step       Temperature(°C)       Time 3 min 3 +125+3/-0 10 min 4 Room temp. 3 min Cycle time:5 cycles         Step       Temperature(°C)       Time       Immersion water         2       0±3       15 min       Salt water         2       0±3       15 min       Salt water         2       0±3       15 min       Salt water         2       0±3       15 min water       Solo then pla at *1rom condition for 24±2 h before initial measurements. (Do not apply to Char. SL)	9 Temperature ar	nd Appearance	No marked defect.			
change       Char. B: Within ±10% Char. E: Within ±20%          D.F.       Char. SL: 2.5% max. Char. B, E: 5.0% max.          I.R.       3000MΩ min.       2         Dielectric strength       Per item 3       30 min         Cycle time:5 cycles       3 +125+3/-0       30 min         Cycle time:5 cycles       Step Temperature(°C)       Time Immersion water         1       +65+5/-0       15 min         2       0±3       15 min         2       0±3       15 min         Step Temperature(°C)       Time Immersion water         2       0±3       15 min         X       Yete time:2 cycles       Pre-treatment : Capacitor should be stored at 125±2°C for 1 h, and apply the AC2000V(r.m.s.) 60s then pla at *1room condition for 24±2 h before initial measurements. (Do not apply to Char. SL)         Post-treatment : Capacitor should be stored of						
Char. E : Within ±20%				,,	,	.,
D.F.       Char. SL : 2.5% max. Char. B, E : 5.0% max.       Step       Temperature(°C)       Time         1.R.       3000MΩ min.       2       Room temp.       3 min         Dielectric strength       Per item 3       3       +125+3/-0       30 min         Cycle time:5 cycles       Cycle time:5 cycles          Immersion cycle>         Step       Temperature(°C)       Time       Immersion water         1       +65+5/-0       15 min       water         2       0±3       15 min       water         3       125±2°C for 1 h, and apply the       AC2000V(r.m.s.) 60s then pla      <		0		<temperature cycle<="" td=""><td><del>?</del>&gt;</td><td></td></temperature>	<del>?</del> >	
I.R.3000M $\Omega$ min.Dielectric strengthPer item 3I.R.3000M $\Omega$ min.Dielectric strengthPer item 3I.R.3000M $\Omega$ min.Dielectric strengthPer item 3I.I.R.Source Per item 3II.R.Source Per item 3II.R.Source Per item 3II.R.Source Per item 3II.R.Source Per item 3II.R.Source Per item 3II.R.Per item 4II.R.Per item 4II.R.Per item 4II.R.Per item 4II.R.Per item 4II.R. <t< td=""><td></td><td>D.F.</td><td></td><td></td><td></td><td>Time</td></t<>		D.F.				Time
I.R.       3000MΩ min.         Dielectric strength       Per item 3         Question of the strength       Per item 3         Pre-treatment : Capacitor should be stored at 125±2°C for 1 h, and apply the AC2000V(r.m.s.) 60s then plate at *1 room condition for 24±2 h before initial measurements. (Do not apply to Char. SL)         Post-treatment : Capacitor should be stored for the stored of the stored of the stored for the stored of the						
Dielectric strength       Per item 3       125+3/-0       30 min 4         1       Room temp.       3 min 4         2       0±3       15 min 8 att 1       Clean water         2       0±3       15 min 8 att 125±2°C for 1 h, and apply the AC2000V(r.m.s.) 60s then plat at *1room condition for 24±2 h before initial measurements. (Do not apply to Char. SL)		I.R.				
strength       4       Room temp.       3 min         Cycle time:5 cycles       Cycle time:5 cycles         Step       Temperature(°C)       Time       Immersion         1       +65+5/-0       15 min       Clean         2       0±3       15 min       Salt         Victor       2       0±3       15 min       Salt         Victor       Cycle time:2 cycles       Cycle time:2 cycles       Pre-treatment : Capacitor should be stored at         125±2°C for 1 h, and apply the AC2000V(r.m.s.) 60s then plat at *1room condition for 24±2 h before initial measurements. (Do not apply to Char. SL)       Post-treatment : Capacitor should be stored for		Dielectric				
Cycle time:5 cycles         Step       Temperature(°C)         Time       Immersion water         1       +65+5/-0       15 min         2       0±3       15 min         Salt       water         Cycle time:2 cycles         Pre-treatment : Capacitor should be stored at 125±2°C for 1 h, and apply the AC2000V(r.m.s.) 60s then plate at *1room condition for 24±2 h before initial measurements. (Do not apply to Char. SL)         Post-treatment : Capacitor should be stored for						
<immersion cycle="">         Step       Temperature(°C)       Time       Immersion water         1       +65+5/-0       15 min       Clean water         2       0±3       15 min       Salt water         Cycle time:2 cycles       Cycle time:2 cycles         Pre-treatment : Capacitor should be stored at 125±2°C for 1 h, and apply the AC2000V(r.m.s.) 60s then plan at *1room condition for 24±2 h before initial measurements. (Do not apply to Char. SL)         Post-treatment : Capacitor should be stored for</immersion>					· ·	
Step       Temperature(°C)       Time       Immersion water         1       +65+5/-0       15 min       Clean water         2       0±3       15 min       Salt water         Cycle time:2 cycles       Cycle time:2 cycles       Pre-treatment : Capacitor should be stored at 125±2°C for 1 h, and apply the AC2000V(r.m.s.) 60s then plat at *1room condition for 24±2 h before initial measurements. (Do not apply to Char. SL)         Post-treatment :       Capacitor should be stored for						ne.5 cycles
Step       Temperature(°C)       Time       water         1       +65+5/-0       15 min       Clean         2       0±3       15 min       Salt         2       0±3       15 min       Salt         Cycle time:2 cycles         Pre-treatment : Capacitor should be stored at 125±2°C for 1 h, and apply the AC2000V(r.m.s.) 60s then plate at *1room condition for 24±2 h before initial measurements. (Do not apply to Char. SL)         Post-treatment : Capacitor should be stored for						Immersion
1       +65+5/-0       15 min       Clean water         2       0±3       15 min       Salt water         Cycle time:2 cycles         Pre-treatment : Capacitor should be stored at 125±2°C for 1 h, and apply the AC2000V(r.m.s.) 60s then plan at *1room condition for 24±2 h before initial measurements. (Do not apply to Char. SL)         Post-treatment : Capacitor should be stored for				Step Temperatur	re(°C) Time	
1       +65+5/-0       15 min       water         2       0±3       15 min       Salt         Water       Cycle time:2 cycles         Pre-treatment : Capacitor should be stored at 125±2°C for 1 h, and apply the AC2000V(r.m.s.) 60s then plan at *1room condition for 24±2 h before initial measurements. (Do not apply to Char. SL)         Post-treatment : Capacitor should be stored for				4 05 5/4	a 45 i	
2       0±3       15 min       Salt water         Cycle time:2 cycles         Pre-treatment : Capacitor should be stored at 125±2°C for 1 h, and apply the AC2000V(r.m.s.) 60s then plan at *1room condition for 24±2 h before initial measurements. (Do not apply to Char. SL)         Post-treatment : Capacitor should be stored for				1 +65+5/-0	0 15 min	
Pre-treatment : Capacitor should be stored at 125±2°C for 1 h, and apply the AC2000V(r.m.s.) 60s then pla at *1room condition for 24±2 h before initial measurements. (Do not apply to Char. SL) Post-treatment : Capacitor should be stored for				2 012	15 min	Salt
Pre-treatment : Capacitor should be stored at 125±2°C for 1 h, and apply the AC2000V(r.m.s.) 60s then pla at *1room condition for 24±2 h before initial measurements. (Do not apply to Char. SL) Post-treatment : Capacitor should be stored for				2 0±3	15 mm	water
Pre-treatment : Capacitor should be stored at 125±2°C for 1 h, and apply the AC2000V(r.m.s.) 60s then pla at *1room condition for 24±2 h before initial measurements. (Do not apply to Char. SL) Post-treatment : Capacitor should be stored for					Cvcle ti	me:2 cvcles
125±2°C for 1 h, and apply the AC2000V(r.m.s.) 60s then pla- at *1room condition for 24±2 h before initial measurements. (Do not apply to Char. SL) Post-treatment : Capacitor should be stored for					-,	
AC2000V(r.m.s.) 60s then pla at *1room condition for 24±2 h before initial measurements. (Do not apply to Char. SL) Post-treatment : Capacitor should be stored fo				Pre-treatment : Ca	pacitor should be	e stored at
at *1room condition for 24±2 h before initial measurements. (Do not apply to Char. SL) Post-treatment : Capacitor should be stored fo				12	25±2°C for 1 h, ar	nd apply the
before initial measurements. (Do not apply to Char. SL) Post-treatment : Capacitor should be stored fo				AC	C2000V(r.m.s.) 6	Os then place
(Do not apply to Char. SL) Post-treatment : Capacitor should be stored fo						
Post-treatment : Capacitor should be stored for						
24+2 h at * <sup>1</sup> room condition.						
"room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa	-		<u></u>			ondition.

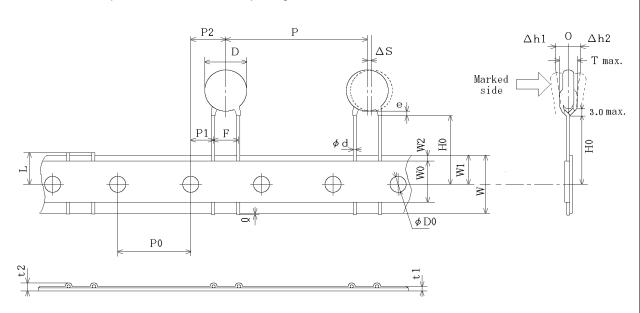




Unit : mm

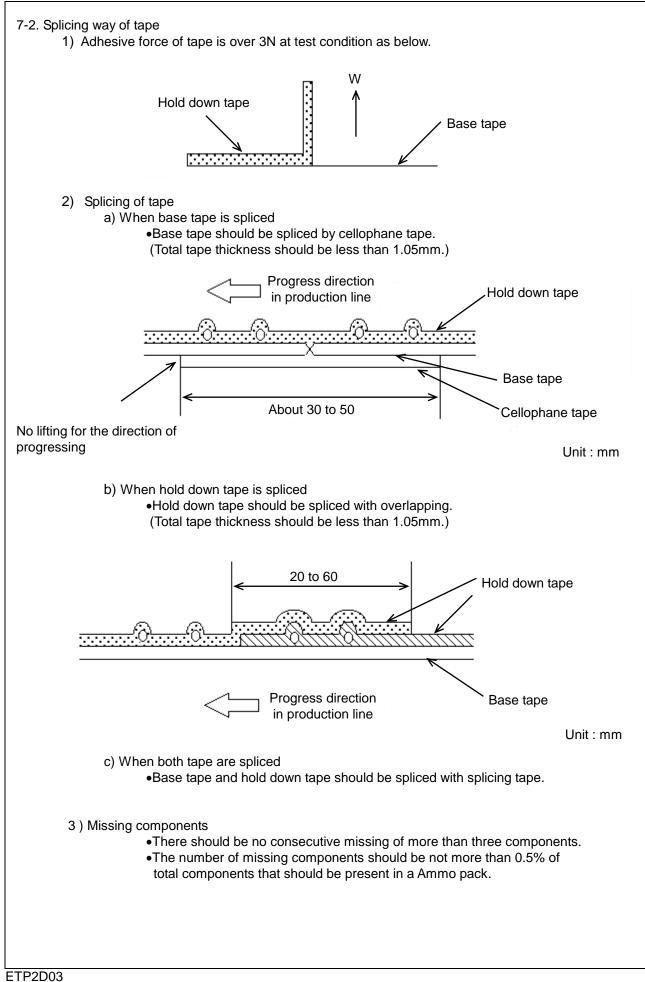
	1	Unit : mm
Code	Dimensions	Remarks
Р	15.0±2.0	
P0	15.0±0.3	
F	7.5±1.0	
P2	7.5±1.5	
P1	3.75±1.0	Deviation of progress direction
D	Please refer to [	Part number list ].
ΔS	0±2.0	They include deviation by lead bend .
W	18.0±0.5	
W1	9.0±0.5	Deviation of tape width direction
ЦЛ	19 0+2.0	
по	18.0±0	
Q	+0.5~-1.0	
φD0	4.0±0.1	
φd	0.60±0.05	
t1	0.6±0.3	<u>-</u>
t2	1.5 max.	They include hold down tape thickness.
∆h1	0.0	
∆h2		
L	11.0± <sup>0</sup> <sub>1.0</sub>	
W0	11.5 min.	
W2	1.5±1.5	
е	Up to the end of	crimp
Т	Please refer to [	Part number list ].
	P         P0         F         P2         P1         D         ΔS         W         W1         H0         Q         φD0         φd         t1         t2         Δh1         Δh2         L         W0         W2         e	P         15.0±2.0           P0         15.0±0.3           F         7.5±1.0           P2         7.5±1.5           P1         3.75±1.0           D         Please refer to [           ΔS         0±2.0           W         18.0±0.5           W1         9.0±0.5           H0         18.0± $_0^{2.0}$ Q         +0.5~-1.0           φD0         4.0±0.1           φd         0.60±0.05           t1         0.6±0.3           t2         1.5 max.           Δh1         2.0 max.           L         11.0± $_{1.0}^{0}$ W0         11.5 min.           W2         1.5±1.5           e         Up to the end of





Unit : mm

Item	Code	Dimensions	Unit : mm Remarks
Pitch of component	P	30.0±2.0	
Pitch of sprocket hole	P0	15.0±0.3	
Lead spacing	F	7.5±1.0	
Length from hole center to component center	P2	7.5±1.5	
Length from hole center to lead	P1	3.75±1.0	Deviation of progress direction
Body diameter	D	Please refer to [	Part number list ].
Deviation along tape, left or right	ΔS	0±2.0	They include deviation by lead bend.
Carrier tape width	W	18.0±0.5	
Position of sprocket hole	W1	9.0±0.5	Deviation of tape width direction
Lead distance between reference and bottom planes	HO	18.0± <sup>2.0</sup> <sub>0</sub>	
Protrusion length	Q	+0.5~-1.0	
Diameter of sprocket hole	φD0	4.0±0.1	
Lead diameter	φd	0.60±0.05	
Total tape thickness	t1	0.6±0.3	
Total thickness, tape and lead wire	t2	1.5 max.	They include hold down tape thickness.
Deviation across tape, front	∆h1	2.0 may	
Deviation across tape, rear	∆h2	2.0 max.	
Portion to cut in case of defect	L	11.0± <sup>0</sup> <sub>1.0</sub>	
Hold down tape width	W0	11.5 min.	
Hold down tape position	W2	1.5±1.5	
Coating extension on lead	е	Up to the end of	crimp
Body thickness	Т	Please refer to [	Part number list ].



#### EU RoHS and Halogen Free

This products of the following crresponds to EU RoHS and Halogen Free

(1) RoHS

EU RoHs 2011/65/EC compliance

maximum concentration values tolerated by weight in homogeneous materials •1000 ppm maximum Lead

- •1000 ppm maximum Mercury
- •100 ppm maximum Cadmium
- •1000 ppm maximum Hexavalent chromium
- •1000 ppm maximum Polybrominated biphenyls (PBB)
- •1000 ppm maximum Polybrominated diphenyl ethers (PBDE)

#### (2) Halogen-Free

The International Electrochemical Commission's (IEC) Definition of Halogen-Free (IEC 61249-2-21) compliance

- •900 ppm maximum chlorine
- •900 ppm maximum bromine
- •1500 ppm maximum total chlorine and bromine