



PRODUCT SPECIFICATION

**PRODUCT: CERAMIC DISC CAPACITOR
SAFETY RECOGNIZED**

TYPE: AH SERIES

CUSTOMER: _____

DOC. NO.: POE-D10-00-E-13

APPROVED BY CUSTOMER

VENDOR :

- WALSIN TECHNOLOGY CORPORATION**
566-1, KAO SHI ROAD, YANG-MEI
TAO-YUAN, TAIWAN
- PAN OVERSEAS (GUANGZHOU) ELECTRONIC CO.,LTD.**
NO.277,HONG MING ROAD,EASTERN SECTION,
GUANG ZHOU ECONOMIC AND TECHNOLOGY
DEVELOPMENT ZONE,CHINA
- DONGGUAN WALSIN TECHNOLOGY ELECTRONICS CO., LTD.**
NO.638, MEI JING WEST ROAD,XINIUPO,ADMINISTRATIVE
ZONE,DALANGTOWN,DONGGUAN CITY, GUANGDONG PROVINCE

MANUFACTURE SITE :

- PAN OVERSEAS (GUANGZHOU) ELECTRONIC CO.,LTD.**
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Record of change

Date	Version	Description	page
2008.6.3	1	1.D22-00-E-01(before) → POE-D10-00-E-01(1 st edition)	
2008.8.22	2	1 Complete lead code 2. Add last SAP code “ H” for halogen and Pb free , epoxy resin..	21 3
2008.12.12	3	1. Complete the 13 th to 17 th codes of SAP P/N. 2. Page layout adjustment.	4-5
2009.7.8	4	1 Change PSA & POE logo to Walsin & POE logo. 2.Complete Marking statement. 3.Revised standard NO. of SEV, SEMKO, FIMKO, NEMKO, DEMKO and KEMA. Revised recognized NO. of FIMKO, NEMKO, DEMKO and KEMA.	10 12
2009.9.14	5	1. H0: 18.0+2.0/-1.5 revised to 18.0+2.0/-0 2. “Protrusion length”: “+0.5to-1.0” revised to “2.0max (Or the end of lead wire may be inside the tape.)” 3. Add “250V~” under the “UL” mark according to the product’s marking.	9 9 10
2009.12.24	6	1. Marking 2. Correct X1 of recognized No by KTL. 3. Revised the Figure of impulse voltage test(Item 7.3.14) according to the standard IEC 60384-14 ed.3 4. Add “1AH” code for Y1:400V marking type.	10 11 14 4
2011.1.11	7	1. Review SAP P/N about diameter code: YU*AH561K100*→YU*AH561K080* 2. Delete “AT” taping type. 3. Add test item “Temperature Cycle ” . 4. Add item 10 “Drawing of internal structure and material list”	6 4,5,8,9 14 19
2011.5.12	8	1. Review the safety standards approval and recognized no. 2. Delete “old P/N” 3. Add the special marking for P/N:YP*AH102K100	10 5~6 9
2012.1.30	9	1. Review the approval rated voltage of UL and the marking.	8~9
2012/4/6	10	In order to improve the traceability of the product, change the date code on capacitor body, new date code can trace back to production “Lot No.”	8
2013/5/13	11	1. Review the Lead diameter ϕ from 0.60 +0.1/-0.05mm to 0.55+/-0.05mm 2. Add“3.1Nominal parts&3.2 special for surge parts” for “3. Part numbering/T.C/Capacitance/ Tolerance/Diameter” 3. In order the customer to know the round time of manufacture, change the date code on capacitor body, new date code can know the month of manufacture. 4. Delete “No marked with “ _” stand for Pb free”. 5. Delete “When the TCC is Y5V(YV), there is a “F” between the “AH” and capacitance code.” 6. Review the Solderability time from 2 ±0.5s to 5±0.5s	5,6,7 6 8 8 8 11
2013/10/16	12	1. Review the “Manufactured Date” to “Products ID” on the marking page 2. Delete “The marking can be printed on either one side or two side of coating body.” and add “for SAP part number 10-11 digits ≤ ‘07’ products” to two sides and “for SAP part number 11-12 digits ≥ ‘08’ products” to one side.	8 8

1. Part number for SAP system:

(Ex.) YU 0AH 472 M 13 0 L 20 C 0 H
 (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11)

(1)Temperature characteristic (identified code)

CODE	CH(NP0)	SL	YP (Y5P)	YV(Y5V)	YU (Y5U)
Cap. Change	0±60PPM/°C	-1000~+350PPM/°C (+20°C~+85°C)	±10%	-80% ~ +30%	-55% to +20%

(2)TYPE (identified by 3-figure code) : 0AH = AH Type(X1:400V~/Y1:250V~),

1AH=AH Type(X1:400V~/Y1:400V~)

(3)Capacitance (identified by 3-figure code):EX.221=220pF

(4)Capacitance tolerance (identified by code): C:±0.25pF,D:±0.5pF,J:±5%,K:±10%,M:±20%

(5)Nominal body diameter dimension (identified by 2-figure code): 06--Dmax7.0mm, 07--Dmax8.0mm...

(6)Internal code: 0--Normal, other code--Special control

(7)Lead Style : Refer to “2. Mechanical”.

(8)Packing mode and lead length (identified by 2-figure code)

Taping Code	Description
AM	Ammo box and product pitch : 25.4 mm

Bulk Code	Description
3E	Lead length : 3.5mm
04	Lead length : 4.0mm
4E	Lead length : 4.5mm
20	Lead length : 20mm

(9)Length tolerance

Code	Description
A	±0.5 mm (only for kink lead type)
B	±1.0 mm
C	Min.
D	Taping special purpose

(10)Pitch

Code	Description
0	10±1 mm
A	10±0.5 mm

(11)Epoxy Resin Code

Code	Description
B	Pb free, Epoxy Resin
H	Halogen and Pb free, epoxy resin.

2. Mechanical:

Encapsulation : Epoxy resin, flammability UL94 V-0

Available lead code (unit: mm):

Lead type	SAP P/N (13-17)digits	Pitch (F)	Lead Length (L)	Packing	Lead Configuration
Lead style : L Type L Straight long lead	L20C0	10 ± 1.0	20 min.	Bulk	
Lead style : B Type B Straight long lead	BAMD0	10 ± 1.0	Refer to "4. Taping format"	Tap. Ammo	
Lead style : L Type L Straight short lead	L03B0	10 ± 1.0	3.0 ± 1.0	Bulk	
	L4EB0	10 ± 1.0	4.5 ± 1.0		
	L05B0	10 ± 1.0	5.0 ± 1.0		
Lead style : D Type D Vertical kink lead	D3EA0	10 ± 1.0	3.5 ± 0.5	Bulk	
	D04A0	10 ± 1.0	4.0 ± 0.5		
	DAMD0	10 ± 1.0	Refer to "4. Taping format"	Tap. Ammo	
Lead style : X Type X Outside kink lead	X3EA0	10 ± 1.0	3.5 ± 0.5	Bulk	
	X04A0	10 ± 1.0	4.0 ± 0.5		
	X05B0	10 ± 1.0	5.0 ± 1.0		
	XAMD0	10 ± 1.0	Refer to "4. Taping format"	Tap. Ammo	

 * Lead diameter Φd : 0.55 ± 0.05 mm

 *e (Coating **extension** on leads): 3.0mmMax for straight lead lead style, not exceed the kink for kink lead.

3. Part numbering/T.C/Capacitance/ Tolerance/Diameter :
3.1 Normal parts:

SAP P/N	T.C.	Capacitance(pF)	Tolerance	Dimension (unit:mm)			
				D(max.)	T(max.)	F	Φd
CH*AH***C060*	CH (NP0)	2, 3,4, 5(pF)	±0.25pF	7.0	5.0	10±1	0.55+/-0.05
CH*AH***D060*		6,7,8,9,10(pF)	±0.5pF	7.0			
CH*AH120J060*		12		7.0			
CH*AH***J070*		15,18,20,22,24,27(pF)		8.0			
SL*AH***J060*	SL*	15,18,20,22,24,27,30, 33, 36, 39(pF)	±5%	7.0			
SL*AH***J070*		47,50,51, 56,62(pF)		8.0			
SL*AH***J080*		68,75(pF)		9.0			
SL*AH***J090*		82,100(pF)		10.0			
YP*AH101K060*	Y5P	100 pF	±10%	7.0			
YP*AH151K060*		150 pF		7.0			
YP*AH221K060*		220 pF		7.0			
YP*AH331K060*		330 pF		7.0			
YP*AH471K070*		470 pF		8.0			
YP*AH561K080*		560 pF		9.0			
YP*AH681K080*		680 pF		9.0			
YP*AH102K100*		1000 pF		11.0			
YU*AH102M070*		Y5U		1000 pF	±20%	8.0	
YU*AH152M080*	1500 pF		9.0				
YU*AH222M090*	2200 pF		10.0				
YU*AH332M110*	3300 pF		12.0				
YU*AH392M120*	3900 pF		14.0				
YU*AH472M130*	4700 pF		14.0				
YV*AH102M060*	Y5V	1000pF		7.0			
YV*AH152M070*		1500pF		8.0			
YV*AH222M080*		2200pF		9.0			
YV*AH332M100*		3300pF		11.0			
YV*AH472M110*		4700pF		12.0			
					5.5		

- The minimum thickness of coating (reinforced insulation) is 0.4mm.

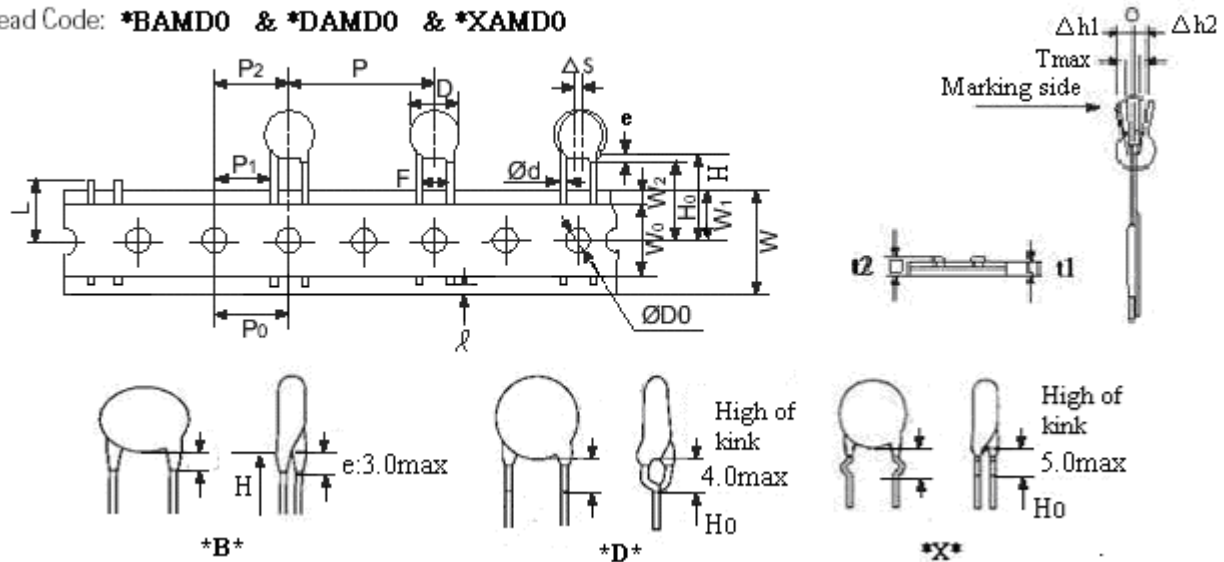
3.2 Special for surge parts:

Part Number	Temp. Char.	Cap.(pF)	Tol.	Dimension (mm)			
				D(max.)	T (max.)	F	Wire Dia. (φd)
YP *AH101K06S*	Y5P	100	±10%	7.0	6.0	10±1	0.55+/-0.05
YP *AH151K06S*		150		7.0			
YP *AH221K06S*		220		7.0			
YP *AH331K07S*		330		8.0			
YP *AH471K08S*		470		9.0			
YP *AH681K09S*		680		10.0			
YP *AH102K11S*		1000		12.0			
YU*AH102M07S*		Y5U		1000			
YU*AH152M08S*	1500		9.0				
YU*AH222M09S*	2200		10.0				
YU*AH332M11S*	3300		12.0				
YU*AH392M12S*	3900		14.0				
YU*AH472M13S*	4700		14.0				

- The special parts only improve surge withstanding, but can't independently be used in protecting application against surges.

4. Taping Format:

- 25.4mm pitch/lead spacing 10.0mm taping

 Lead Code: ***BAMD0** & ***DAMD0** & ***XAMD0**


POE Part Number		*BAMD0 / *DAMD0 / *XAMD0
Item	Symbol	Dimensions(mm)
Pitch of component	P	25.4 ± 2
Pitch of sprocket	P0	12.7 ± 0.3
Lead spacing	F	10.0 ± 1.0
Length from hole center to component center	P2	12.7 ± 1.5
Length from hole center to lead	P1	7.7 ± 1.5
Body diameter	D	See the “3. Part numbering/T.C/Capacitance/ Tolerance/Diameter”
Deviation along tape, life or right	ΔS	0 ± 2.0
Carrier tape width	W	18.0 +1/- 0.5
Position of sprocket hole	W1	9.0 ± 0.5
Lead distance between the kink and center of sprocket hole	H0	18.0 +2.0/-0 (For: *DAMD0 & *XAMD0)
Lead distance between the bottom of body and the center of sprocket hole	H	20.0+1.5/-1.0 (For: *BAMD0)
Length from the terminal of the lead wire to the edge of carrier tape	ℓ	2.0min (Or the end of lead wire may be inside the hole-down tape.)
Diameter of sprocket hole	D0	4.0 ± 0.2
Lead diameter	φd	0.55 ± 0.05
Total tape thickness	t1	0.6 ± 0.3
Total thickness, tape and lead wire	t2	1.5 max.
Deviation across tape	Δh1	2.0 max.
	Δh2	2.0 max
Portion to cut in case of defect	L	11.0 max.
Hole-down tape width	W0	8.0 min
Hole-down tape distortion	W2	1.5 ± 1.5
Coating extension on leads	e	3.0 max for straight lead style; Not exceed the kink leads for kink lead.
Body thickness	T	See the “3. Part numbering/T.C/Capacitance/ Tolerance/Diameter”

5. Marking:

1.Type Designation	AH		
2.Nominal Capacitance	3-digit-system		
3.Capacitance Tolerance	C:±0.25pF,D:±0.5pF,J:±5%,K:±10%,M:±20%		
4.Company Name Code(Trade mark)	UK		
5. Products ID	Abbreviation ex.: Manufacture year: ← 3 C 6 1234 → Last 4 digits of lot no. 3:2013 4:2014 5:2015 : : Manufacture month: 1:January 2:February : : 9:September O:October N:November D:December Epoxy resin code: " _ ": Halogen and Pb free epoxy resin (For the last code "H" and "B" of SAP P/N) Manufacture: C:Pan overseas (Guangzhou) D:Walsin (Dongguan)		
6.Approved Monogram:			
(1) VDE approval mark		IEC 60384-14 Class Code : X1 : 400V~ , Y1 : 250V~ or 400V~	
(2) UL approval mark		(6) DEMKO approval mark	
(3) CSA approval mark		(7) FIMKO approval mark	
(4) SEMKO approval mark		(8) SEV approval mark	
(5) NEMKO approval mark		(9) CQC approval mark	
Normal marking		YP*AH102K***** (Special marking)	
Two sides (for SAP part number 10-11 digits ≤ "07" products)		One side (for SAP part number 10-11 digits ≥ "08" products)	
0AH : 1AH :	0AH: 1AH:	0AH 1AH	
* Marking by the laser. * " <u>C</u> " : Marked with code " _ " stand for Halogen and Pb free epoxy resin.			

6. Scope:

THIS SPECIFICATION APPLIES TO CERAMIC INSULATED CAPACITORS DISK TYPE USED IN ELECTRONIC EQUIPMENT.

6.1 Applicable safety standard

This specification applies to the VDE, SEV, SEMKO, FIMKO, NEMKO, DEMKO, KTL, UL, CSA approved ceramic capacitors disc type for antenna coupling, line-by-pass and across-the-line. X1, Y1 capacitor based on IEC384-14. "UL, CSA recognized capacitor for across-the-line, line-by-pass" and antenna-isolation.

6.2 Safety standards approval and recognized no.

Safety Standard	Standard No.	Subclass	w.v.	Recognized No.
UL	ANSI/UL 60384-14:2009	X1	400VAC	E146544
		Y1	250VAC/400VAC	
CSA	CAN/CSA E60384-14:2009	X1	400VAC	2347971
		Y1	250VAC/400VAC	
VDE (ENEC)	IEC60384-14	X1	400VAC	40001804
		Y1	250VAC/400VAC	
SEV	IEC60384-14	X1	400VAC	14.0615
		Y1	250VAC/400VAC	
SEMKO	IEC60384-14	X1	400VAC	1110795
		Y1	250VAC/400VAC	
FIMKO	IEC60384-14	X1	400VAC	NCS/FI 28778
		Y1	250VAC/400VAC	
NEMKO	IEC60384-14	X1	400VAC	No.P11214078
		Y1	250VAC/400VAC	
DEMKO	IEC60384-14	X1	400VAC	D-03206
		Y1	250VAC/400VAC	
CQC	GB/T 14472-1998	X1:400VAC /Y1:400VAC		CQC03001003673
		X1:400VAC /Y1:250VAC		CQC11001055510
KTL	K60384-14	X1	400VAC	SU03065-14004
		Y1	250VAC	SU03065-14005
		Y1	400VAC	SU03065-14006

7. Specification and test method:

7.1 Operating Temperature Range: -40 to +125°C

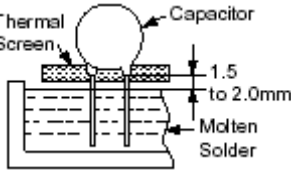
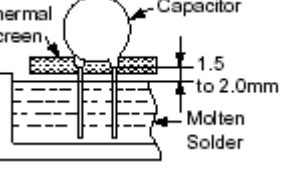
7.2 Test condition:

Test and measurement shall be made at the standard condition. (temperature 15~35°C, relative humidity 45~75% and atmospheric pressure 860~1060hpa). Unless otherwise specified herein.

If doubt occurred on the value of measurement, and measurement was requested by customer capacitors shall be measured at the reference condition. (temperature 20±2°C or 25 ± 2°C, relative humidity 60~70% and atmospheric pressure 860~1060hpa.)

7.3 Performance:

No	Items	Performance	Testing method																								
7.3.1	Appearance And dimension	The appearance and dimension shall be as given in section 3.	Visual check.																								
7.3.2	Marking	The marking shall be easily legible. (As given section 5)	Visual check.																								
7.3.3	Withstand voltage	No failure.	The capacitors shall not be damage when AC4000V (rms.) are applied between the lead wires for 60sec. (Charge/Discharge current ≤ 50mA.)																								
	Body Insulation	No failure.	First. The terminals of the capacitor shall be closely wrapped around the body of the capacitor distance of about 3 to 4mm from each terminal. Then, the capacitor shall be inserted into a container filled with metal balls of about 1mm diameter. Finally, AC4000V (rms.) is applied for 60sec between the capacitor lead wires and metal balls. (Charge/Discharge current ≤ 50mA.)																								
7.3.4	Insulation Resistance	Between terminals 10000MΩ or more.	The insulation resistance shall be measured with DC500±50V within 60±5sec of charging.																								
7.3.5	Capacitance	Within specified tolerance.	Y5P&Y5U&Y5V: The capacitance shall be measured at 20±2°C with 1kHz±20% and 5V(rms.) or less. CH&SL: The capacitance shall be measured at 25°C with 1MHz±20% and 1.0±0.2Vrms																								
7.3.6	Dissipation Factor(tanδ) or Q	Y5P、Y5U : D.F. ≤ 2.5% Y5V : D.F. ≤ 5.0% CH&SL : 30pF&above: ≥ 1000 Below 30PF: ≥ 400+20×C																									
7.3.7	Temperature Characteristic	<table border="1"> <thead> <tr> <th>Char.</th> <th>Capacitance Change</th> </tr> </thead> <tbody> <tr> <td>Y5P</td> <td>Within ± 10%</td> </tr> <tr> <td>Y5U</td> <td>Within $\pm \frac{2}{5} \%$</td> </tr> <tr> <td>Y5V</td> <td>Within -80 ~ +30%</td> </tr> <tr> <td>CH</td> <td>0±60ppm/°C</td> </tr> <tr> <td>SL</td> <td>-1000~+350 ppm/°C (+20°C~+85°C)</td> </tr> </tbody> </table>	Char.	Capacitance Change	Y5P	Within ± 10%	Y5U	Within $\pm \frac{2}{5} \%$	Y5V	Within -80 ~ +30%	CH	0±60ppm/°C	SL	-1000~+350 ppm/°C (+20°C~+85°C)	The capacitance measurement shall be made at each step specified in Table 1. Table 1 <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>+20±2</td> </tr> <tr> <td>2</td> <td>-25±2</td> </tr> <tr> <td>3</td> <td>+20±2</td> </tr> <tr> <td>4</td> <td>+85±2</td> </tr> <tr> <td>5</td> <td>+20±2</td> </tr> </tbody> </table> Pre-treatment: Capacitor shall be stored at 85±2°C for 1hour, then placed at ^{**1} room condition for 24±2hours before measurements.	Step	Temperature (°C)	1	+20±2	2	-25±2	3	+20±2	4	+85±2	5	+20±2
Char.	Capacitance Change																										
Y5P	Within ± 10%																										
Y5U	Within $\pm \frac{2}{5} \%$																										
Y5V	Within -80 ~ +30%																										
CH	0±60ppm/°C																										
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2	-25±2																										
3	+20±2																										
4	+85±2																										
5	+20±2																										
7.3.8	Solderability of Leads	Lead wire should be soldered with uniform coating on the axial direction over 3/4 of the circumferential direction.	The lead wire of capacitor should be dipped into molten solder for 5 ± 0.5 sec. The depth of immersion is up to about 1.5 to 2.0 mm from the root of lead wires. Temp. of solder : Lead Free Solder (Sn-3Ag-0.5Cu) 245±5°C																								

No	Items	Performance	Testing method
7.3.9	Robustness of Terminations	Tensile Lead wire shall not cut off. Capacitor shall not be broken.	With the termination in its normal position, the specimen is held by its body in such a manner that the axis of the termination is vertical; the tensile force of 10N shall be applied to the termination in the direction of its axis and acting in a direction away from the body of the specimen.
		Bending Lead wire shall not cut off. Capacitor shall not be broken.	With the termination in its normal position, the specimen 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 specimen is then inclined, within a period of 2 to 3sec, 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 direction.
7.3.10	Soldering Effect (Non-Preheat)	Appearance No marked defect.	As shown in figure, the lead wires should be immersed in solder of $350 \pm 10^\circ\text{C}$ or $260 \pm 5^\circ\text{C}$ up to 1.5 to 2.0 mm from the root of terminal for 3.5 ± 0.5 sec (10 ± 1 sec. for $260 \pm 5^\circ\text{C}$). 
		I.R. 1000 MΩ min.	
		Dielectric Strength Per item 7.3. 3	
		Capacitance Y5P,Y5U,Y5V : Within $\pm 10\%$ SL,CH: Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$, Whichever is large.	
7.3.11	Soldering Effect (On-Preheat)	Appearance No marked defect.	First the capacitor should be stored at $120 \pm 0/-5^\circ\text{C}$ for $60 \pm 0/-5$ sec. Then , as in figure , the lead wires should be immersed solder of $260 \pm 0/-5^\circ\text{C}$ up to 1.5 to 2.0 mm from the root of terminal for $7.5 \pm 0/-1$ sec. 
		I.R. 1000 MΩ min.	
		Dielectric Strength Per item 7.3.3	
		Capacitance Y5P,Y5U,Y5V : Within $\pm 10\%$ SL,CH: Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$, Whichever is large.	

No	Items	Performance	Testing method									
7.3.12	Humidity (Under steady State)	Appearance	No marked defect.									
		Capacitance	Y5P : Within $\pm 10\%$ Y5U : Within $\pm 20\%$ Y5V : Within $\pm 30\%$ SL&CH: Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$, Whichever is large.									
		D.F.	Y5P, Y5U : 5.0% max. Y5V : 7.5% max.									
		Q	SL&CH: Less than $30\text{pF} \Rightarrow$ $Q \geq 100 + 10 \times C/3$ More than $30\text{pF} \Rightarrow$ $Q \geq 200$									
7.3.13	Humidity Loading	I.R.	Y5P&Y5U&Y5V : 3000M Ω min. SL&CH: 1000M Ω min.									
		Dielectric Strength	Per Item 7.3.3									
		Appearance	No marked defect.									
7.3.14	Life	Capacitance	Y5P&Y5U&Y5V : Within $\pm 20\%$ SL&CH: Within $\pm 3\%$ or $\pm 0.3\text{pF}$, Whichever is large.									
		I.R.	3000M Ω min. SL&CH: 1000M Ω min.									
		Dielectric Strength	Per Item 7.3.3									
		Appearance	No marked defect.									
7.3.15	Flame Test	The capacitor flame discontinues as follows.	Impulse Voltage Each individual capacitor shall be subjected to 8kV impulses for three times. After the capacitors are applied to life test. Fig. 2 <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Cx (uF)</th> <th>tr (uS)</th> <th>td (uS)</th> </tr> </thead> <tbody> <tr> <td>0.01</td> <td>1.2</td> <td>46</td> </tr> <tr> <td>0.1</td> <td>1.5</td> <td>47</td> </tr> </tbody> </table>	Cx (uF)	tr (uS)	td (uS)	0.01	1.2	46	0.1	1.5	47
		Cx (uF)	tr (uS)	td (uS)								
0.01	1.2	46										
0.1	1.5	47										
The capacitor shall be subjected to applied for 15 sec and then removed for 15 sec until 5 cycles. Fig. 5 												

8.Packing Baggage :
8.1 Packing size:

	Box	Carton
Bulk	<p>(Four bags in a box)</p>	<p>(Eight boxes in a carton)</p>
Ammo taping	<p>Unit:mm</p>	<p>Unit:mm (Ten boxes in a carton)</p>
	<p>Unit:mm</p>	<p>Unit:mm (Ten boxes in a carton)</p>
	<p>Unit:mm</p>	<p>Unit:mm (Ten boxes in a carton)</p>

8.2 Packing quantity:

Packing type	The code of 14th to15th in SAP P/N	MPQ (Kpcs/Box)
Taping	AM (The size code \leq 110)	1
	AM (The size code \geq 120)	0.5

Packing type	Lead length	Size code of 10th to 11th in SAP P/N	MPQ (Kpcs/Bag)	Kpcs/Box
Bulk	Long lead ($L \geq 20$ mm)	06~12	0.5	1.5
		13-15	0.5	1
	Short lead ($L < 20$ mm)	06~14	0.5	2
		15	0.2	1
	All	16	0.2	1

9. Notices:

9.1 Caution (Rating):

(1). Operating Voltage

Be sure to maintain the V_{p-p} value of the applied voltage or the V_{0-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 this irregular voltage.

Voltage	DC Voltage	DC+AC Voltage	AC Voltage	Pulse Voltage (1)	Pulse Voltage (2)
Positional Measurement					

(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 $\phi 0.1\text{mm}$ 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.

(3). Test condition for withstanding Voltage

I. Test Equipment

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

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

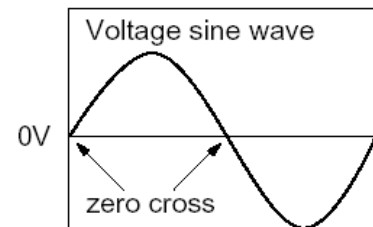
II. Voltage Applied Method

When the withstanding voltage is applied, capacitor's lead or terminal shall be firmly connected to the output of the withstanding voltage test equipment, and then the voltage shall 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 shall be reduced to near zero, and then capacitor's lead or terminal shall be taken off the output 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.

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.

9.2 Caution (Storage and operating condition):

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 degrees centigrade and 15 to 85 %. Use capacitors within 6 months.

"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."

9.3 Caution (Soldering and Mounting):

9.3.1 Vibration and impact:

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

9.3.2 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 degrees C. max.

Soldering iron wattage: 50W max.

Soldering time: 3.5 sec. max.

9.3.3 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.

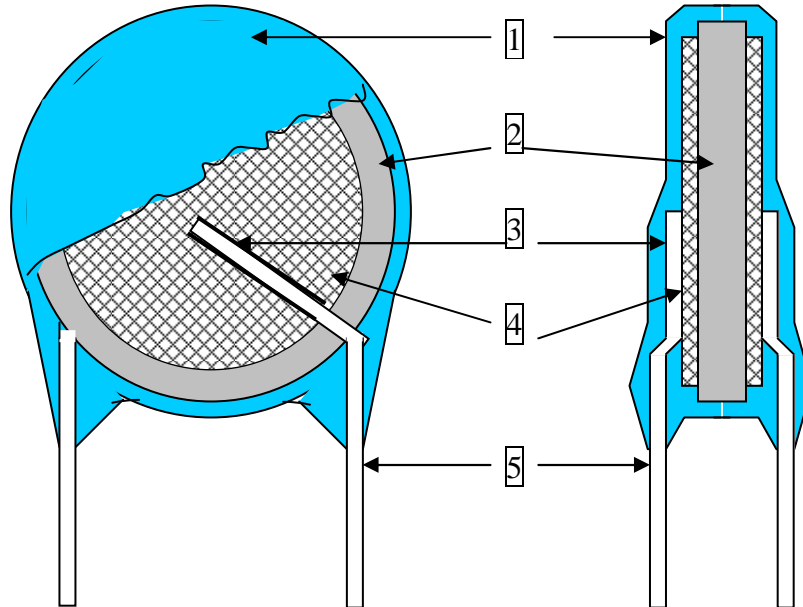
"Failure to follow the above cautions may result, worst case, in a short circuit and cause fuming or partial dispersion when the product is used."

9.4 Caution (Handling):

Vibration and impact

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

"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."

10. Drawing of internal structure and material list :

Remarks :

No.	Part name	Material	Model/Type	Component
1	Insulation Coating	Epoxy polymer	1.EF-150 2.PCE-300	Epoxy resin、Pigment (Blue / UL 94 V-0) The minimum thickness of coating (reinforced insulation) is 0.4mm
2	Dielectric Element	Ceramic	CH/SL/Y5P/Y5U/Y5V	BaTiO ₃
3	Solder	Tin-silver	Sn96.5-Ag3-Cu0.5	Sn96.5-Ag3-Cu0.5
4	Electrodes	Ag	1.SP-160PL 2.SP-260PL	Silver、Glass frit
5	Leads wire	Tinned copper clad steel wire	0.55±0.05mm	Substrate metal: Fe & Cu Surface plating: Sn 100%(3~7μm)