

## **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 MAKER : PAN OVERSEAS (GUANGZHOU) ELECTRONIC CO.,LTD. NO.277, HONG MING ROAD, EASTERN SECTION, GUANG ZHOU ECONOMIC AND TECHNOLOGY POE DEVELOPMENT ZONE, CHINA

7010g

**50V, 100V, 500V, 1KV, 2KV TEMPERATURE COMPENSATING CERAMIC DISC CAPACITOR POE-D01-00-E-16** Ver: 16 Page: 2 of 19

## **Record of change**

Date	Version		Des	cription		page			
2008.6.3	1		$ore) \rightarrow POE-D01-00$	-E-01 (1 <sup>st</sup> edition)					
2008.8.22	2	1.Revised diameter as							
		Before	Now	Before	Now				
		CH5000R5X040*	not available	SL500181X060*	SL500181X050*	8-9			
		CH1010R5X040*	not available	SL500241X070*	SL500241X060*				
		CH501360X050*	CH501360X060*	SL500361X080*	SL500361X070*				
		CH501620X080*	CH501620X060*	SL500391X080*	SL500391X070*				
		CH501680X080*	CH501680X060*	SL101181X060*	SL101181X050*				
		CH501750X080*	CH501750X060*	SL101241X070*	SL101241X060*				
		CH501820X080*	CH501820X070*	SL101361X080*	SL101361X070*				
		CH501101X080*	CH501101X070*	SL101391X080*	SL101391X070*				
		CH102080X060*	CH102080X050*	SL102680X060*	SL102680X050*	6-7			
		CH102100X060*	CH102100X050*	SL102121X100*	SL102121X060*	5			
		CH102120X060*	CH102120X050*	SL102151X100*	SL102151X070*				
		CH102620X080*	CH102620X070*	SL102181X100*	SL102181X070*				
		CH102820X100*	CH102820X080*	SL102201X100*	SL102201X080*				
		1	4 节节	SL102221X100*	SL102221X080*				
		2. Complete lead code		Ph free enovy resin					
2008.12.12	3	114	Add last SAP code "H" for halogen and Pb free , epoxy resin Complete the 13 <sup>th</sup> to 17 <sup>th</sup> codes of SAP P/N.						
2000.12.12	5	2. Page layout adjust	. Page layout adjustment.						
		-							
2009.8.19	4		Change PSA & POE logo to Walsin & POE logo. 2. Operating temperature range change from $-25^{\circ}$ C $\sim +85^{\circ}$ C to $-25^{\circ}$ C $\sim +125^{\circ}$ C,						
					$25 \text{ C} \sim +125 \text{ C},$ ge from +85°C to +125°C	13 15			
			erature didn't change).		ge $110111 + 65 \cup 10 + 125 \cup$	10			
2010.8.24	5				500V 62pF&68pF&75pF.	8			
201010121	C C		Code of diameter dim			9			
2012/5/10	6	1). Review the size D	φ of the item CH/500	V/121&151 from "100	)" to be "080";	8			
		2). Review the size D	$\varphi$ for the item CH/100		be "070", CH/1000V/101	8			
		from "100" to be							
2012/12/5	7		mp of Allowable Volta			18-19			
2013/5/6	8		diameter φ from 0.60 ≤6.0mm shall be omitt			7,10 9			
					$45\pm5^{\circ}$ C , Solderability time	13			
		from 2 ±0.5s to 5				-			
2013/10/18	9	Review the packing				11			
2015/8/31	10	Modify the contents	of the use of epoxy re	sin for 1KV products		8-9			
			ents of the temperature			5,			
			tion about "Old Part No		1108 120) C. DAL CH	6,7			
		3. Delete 300 Pf~ 50V&100V.	391 pF (Code of d	ameter dimension i	s 110&120) for P/N CH	8 8			
2015/9/23	11		00 pF (Code of diame	ter dimension is 070)	and 120 pF &150 pF (Code	5			
		of diameter dime	nsion is 080) for P/N	CH 500V.		8			
					070) for P/N CH 1KV.	8			
		6. Delete 4pF~22p diameter dimensi	F (Code of diameter ion is 070) for P/N CH	dimension is 060) 2KV.	and 24pF~47pF (Code of				
						6-7 17-18			
2016/3/2	12	2. Review 8.6. Amb	6						
		3. Review 9. Drawi	ng of internal structure	e and material list		19			



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Date	Version		Description					
		1. Revised diameter	as below :		9			
		Before	Now					
		SL202181J100*	SL202181J080*					
		SL202201J100*	SL202201J080*					
2016/5/3	13	SL202221J100*	SL202221J080*					
		SL202241J100*	SL202241J080*					
		SL202271J100*	SL202271J080*					
		SL202301J120*	SL202301J110*					
		SL202331J120*	SL202331J110*					
2016/11/3	14	1. Delete "CH" serie	s.		5,8,12~13			
2016/12/21	15	1. Revised the product diameter for SL 50V~500V						
2017/9/27	16	2. Delete 8pF~15pF	Delete 8pF~12pF (Code of diameter dimension is 040) for P/N SL 50V&100V.Delete 8pF~15pF (Code of diameter dimension is 050) for P/N SL 500V.					

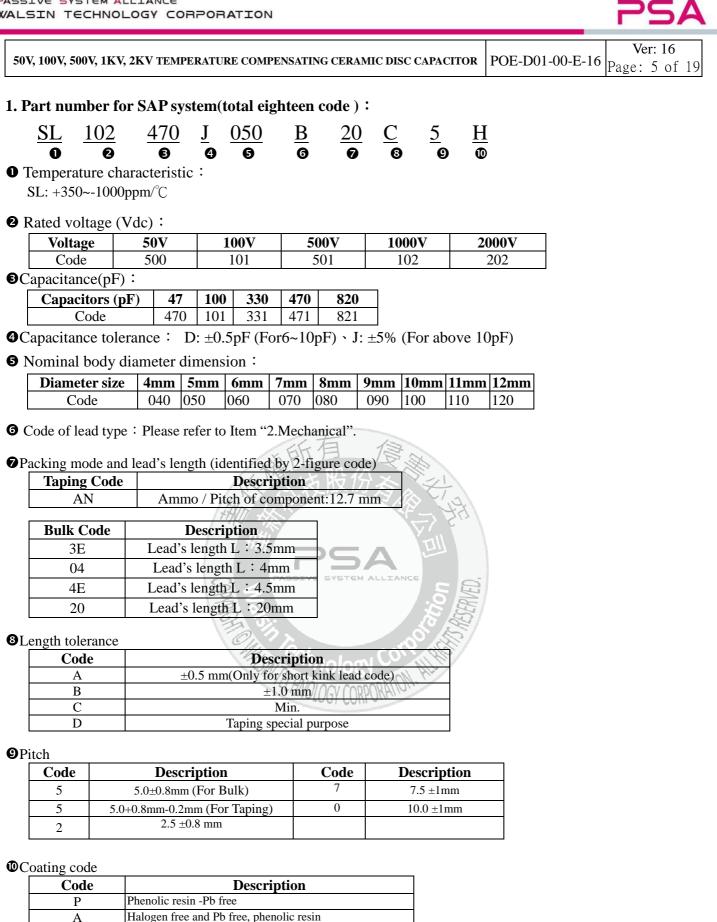


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## 2. Mechanical:

## Available lead code: (unit: mm)

Available lead Lead type	SAP P/N (13-17) digits	Pitch (F)	Lead length (L)	Available rated voltage	Packing	Lead configuration				
	B20C2	$2.5 \pm 0.8$	20 MIN.	50V&100V		D max. T max.				
	B20C5	$5.0 \pm 0.8$	20 MIN.							
-	B20C6	$6.4 \pm 1.0$	20 MIN.		Bulk					
Lead style : B	B20C0	$10 \pm 1.0$	20 MIN.	50V&100V, 500V,	Dum					
Straight long	B20C0	$7.5 \pm 1.0$	20 MIN.	1KV,2KV						
lead -	BAND5	5.0 <sup>+0.8</sup> <sub>-0.2</sub>	Taping Spec. (Ref.							
	BAND2	2.5 ± 0.8	to page.10)	50V&100V	Tap. Ammo	ø d <b>₊  </b> ₊   <mark>└</mark>				
	L05B2	$2.5 \pm 0.8$	$5.0 \pm 1.0$	500 001000		D max. T max.				
	L05B5	$5.0 \pm 0.8$	$5.0 \pm 1.0$							
	L05B0	$10 \pm 1.0$	$5.0 \pm 1.0$							
Lead style : L	L05B6	$6.4 \pm 1.0$	$5.0 \pm 1.0$			( )				
Straight short	L05B7	$7.5 \pm 1.0$	$5.0 \pm 1.0$	50V&100V, 500V,	Bulk					
lead	L4EB5	$5.0 \pm 0.8$	$4.5 \pm 1.0$	1KV, 2KV						
-	L4EB7 L4EB0	$7.5 \pm 1.0$ $10 \pm 1.0$	$4.5 \pm 1.0$ $4.5 \pm 1.0$							
	LILDO		后有	13		∐ ød+∐+ <u>↓</u> ∐				
	H3EA5	$5.0\pm0.8$	3.5 ± 0.5	R &						
	H04A5	$5.0 \pm 0.8$	$4.0 \pm 0.5$	i (Ax Ve	1					
-	H4EB5	$5.0 \pm 0.8$	$4.5 \pm 1.0$	50V&100V, 500V,	Bulk					
	H05B5	$5.0 \pm 0.8$	$5.0 \pm 1.0$	1KV	HH I	D max. T max.				
-	H20C5	5.0 ± 0.8	20 MIN.		C. V					
Lead style : H	HAND5	$5.0^{+0.8}$ -0.2	Taping SPEC. (Ref. to page.10)		Tap. Ammo					
T 1 1 . 1 1	H05B7 H05B0	$7.5 \pm 1.0$	5.0 ±1.0 5.0 ±1.0							
Inside kink	H03B0 H20C0	$10 \pm 1.0$ $10 \pm 1.0$	$5.0 \pm 1.0$ = $20$ MIN.	TEM ALLIANCE		x				
lead	H04A7	$7.5 \pm 1.0$	$4.0 \pm 0.5$			°°, ¯, ≧ <sub>F</sub> _ ≦ ↓ − ∏ ∏				
	H04A0	$10 \pm 1.0$	$4.0 \pm 0.5$	50V&100V, 500V,	Bulk					
	H3EA7	$7.5 \pm 1.0$	$3.5 \pm 0.5$	1KV,2KV	ES I					
	H3EA0	$10 \pm 1.0$	$3.5 \pm 0.5$	coll o	S'					
	H4EB7	$7.5 \pm 1.0$	/4.5 ± 1.0	OgV VIII	S					
	H4EB0	$10 \pm 1.0$	4.5/±1.0	Connonti MUTAGOGGO						
	X3EA5	5.0±0.8	- TULUGY	CORPURAIN						
	X3EA7	7.5±1.0	$3.5 \pm 0.5$			D max. T max.				
	X3EA0	10±1.0								
Lead style : X	X04A5	5.0±0.8								
Outside kink	X04A7	7.5±1.0	$4.0 \pm 0.5$	50V&100V, 500V,	Bulk					
lead	X04A0	10±1.0		1KV, 2KV						
	X05B5	5.0±0.8				X THE				
ŀ			50.10							
F	X05B7	7.5±1.0	$5.0 \pm 1.0$							
	X05B0	10±1.0								
	D04A5	$5.0{\pm}1.0$				D max. T max				
Ē	D04A7	7.5±1.0	$4.0 \pm 0.5$							
Lead style : D	D04A0	10±1.0	1							
Vertical kink	D3EA5	5.0±0.8		50V&100V, 500V,	Bulk	$\mathbf{V}$				
short lead			25.05	1KV, 2KV						
	D3EA7	7.5±1.0	$3.5 \pm 0.5$							
	D3EA0	10±1.0	1							
	202110	5.0 <sup>+0.8</sup> -0.2	Taping SPEC.	4		ød++ bød				

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Lead type	SAP P/N (13-17) digits	Lead length (L)	Available rated voltage	Packing	Lead configu	iration
	M05B5				D max.	T max.
	M05B7	$5.0 \pm 1.0$	5.0 ± 1.0		0	
	M05B0					
Lead style : M	M04B5		50V&100V, 500V,			
Double outside	M04B7		1KV, 2KV	Bulk		Y X
kink lead	M04B0	4.0 ± 1.0				

i k Lead diameter φ= 0.55 +/-0.05mm

\* Phenolic resin coating for 50V/500V/1KV product; Epoxy resin coating for 1KV or 2KV product.

#### **※ e** (Coating **extension** on leads):

For straight lead style: 1.5mmMax when the rated voltage is 50Vdc & 100Vdc;

2.0mmMax when the rated voltage is 500Vdc and 1KVdc;

3.0mmMax when the rated voltage is 2KVdc.

For kink lead style: not exceed the kink.

When Dφ≥11mm, only for bulk, but Dφ≤10mm can do Bulk or Taping.



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## 3. Capacitance value vs. rated voltage, product diameter:

T.C										S	L									
Rate voltage			5	0V/100	V					500V				11	٢V			2H	٢V	
Dφ	040	050	060	070	080	090	100	050	060	070	080	100	050	060	070	080	060	070	080	110
D max. (mm)	5.0	6.0	7.0	8.0	9.0	10.0	11.0	6.0	7.0	8.0	9.0	11.0	6.0	7.0	8.0	9.0	7.5	8.5	9.5	12.5
T max. (mm)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.0	4.0	4.0	4.0	4.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
2																				
3 4																				
5																				
6																				
7 8																				
10																				
12																				
15 18	150 180							180					150 180				150 180			
20	200							200					200				200			
22	220							220					220				220			
24	240							240					240				240			
27 30	270 300							270 300					270 300				270 300			
33	330							330					330				330			
36	360							360					360				360			
39	390							390					390				390			
47 51	470 510							470 510					470 510				470 510			
56	560							560					560				560			
68	680							680	1		1-		680				680			
75 82	750 820						-	750 820	(E		72	-		750 820			750 820			
100	820 101						12	820	. П	1 / 0	~~~	120		820			820	101		
120	101	121				1	1. V		121	÷15	X		11	121				101	121	
150		151					X	$\sim$	151	トン	N				151				151	
180 200		181	201			- tw			-	181		2	50		181	201			181 201	
200			201 221			1+14	$-\infty$			201 221			1	1		201 221			201 221	
240			241				444	7			241	TY '							241	
270				271			HH-	-			271	1							271	
300 330				301 331		-					301 331									301 331
360		-	-	361					=		331	361						-		331
390				391		8	1	PASSI	ve sv	STCM.	ALLIA	391	~	0						
470					471	YO!	2						6	N						
500 510						501 511	2							5/						
560		-	-			561	0							2/				-		+
680							681	25				-Ô	7.65							
750						10	751	10			00	$\infty_{\perp}$	222	/						
820 PACKING			TAD	ING or B			821		TAD	ING or B			KS.	FAPING	or BIII	 K	ТАВ	ING or B		BULK
COATING			IAP	UNG OF B	OLK	Phenol	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	12	IAP.	ING OF B	ULK	- N/			or BULI		IAP		Resin	DULK

#### 4. Marking:

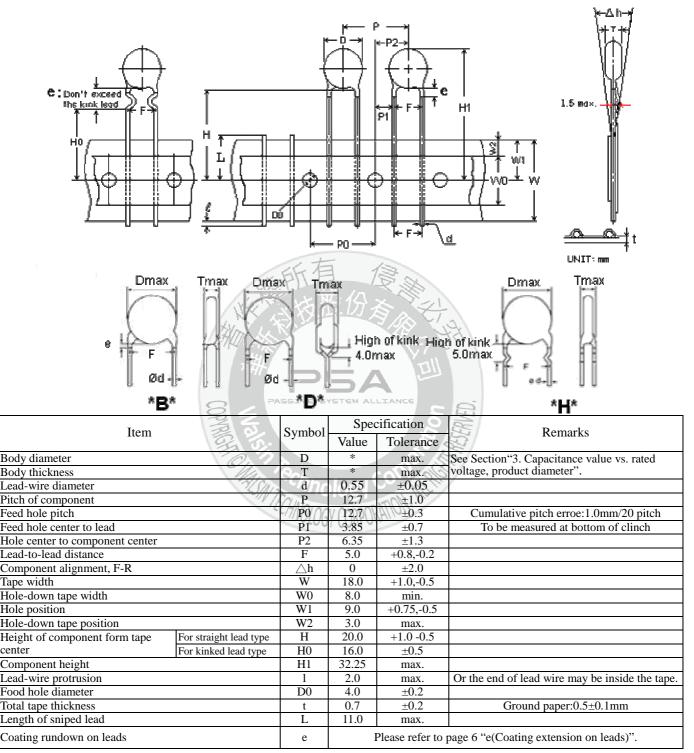
SL - (1) (2) 47 J -Marking (4) (3) -1 K V (6) UK-(S) Remarks SL: No marking. (1). Temp. char. Identified by 3-Figure Code. Ex.  $47pF \rightarrow "47"$ ,  $470pF \rightarrow "471"$ (2). Rated capacitance 50V&100V Marked with code "\_\_" under the rated capacitance. (3). Rated voltage No any marking under the rated capacitance. 500V 1000V&2000V Marked with code:  $1000V \rightarrow "1KV"$ ,  $2000V \rightarrow "2KV"$ (4). Capacitance tolerance C: ±0.25pF (For below 5pF) 、 D: ±0.5pF (For6~10pF) 、 J: ±5% (For above 10pF) Shall be marked as " $\lor$ ", but D $\Phi \leq 060$  shall be omitted. (5). Manufacturer's identification There is a "\_\_"marking under the code "V" when the coating resin is Halogen and (6). Halogen and Pb free Pb free Epoxy.

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## 5. Taping specifications:

\* Lead spacing:  $F=5.0^{+0.8}$ -0.2 (mm)

• 12.7mm pitch/lead spacing 5.0mm taping Lead code: \*BAND5 & \*DAND5 & \*HAND5

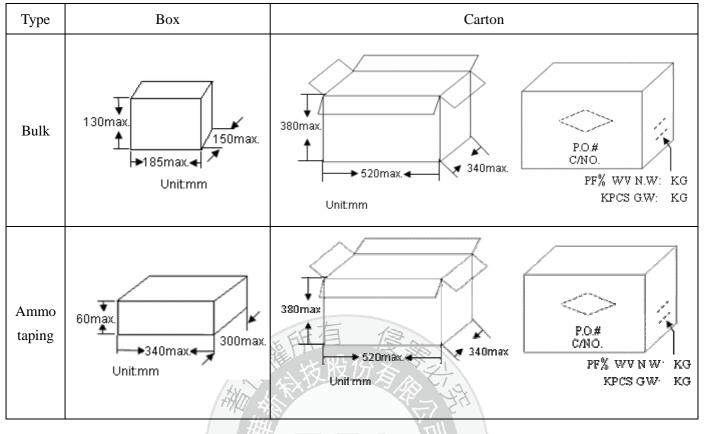


## 6. Packing Baggage :

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#### 6.1 Packing size:



#### 6.2 Packing quantity:

Packing Type	The	e code of 14th to15th in SAP P/N	MPQ	Kpcs/Box)	Remark
Toping		AN Charles			Phenolic resin
Taping		AN	ogy 1111.5		Epoxy resin
Packing Type	Lead length Size code of 10th to 12th/00 in SAP P/N		MPQ (Kpcs/Bag)	Kpcs/Box	Remark
		040~070	1	3	Phenolic resin
	Long lead	080~100	1	2	Phenolic resin
	(L $\geq$ 16mm)	050~100	1	2	Epoxy resin
Bulk		110~120	0.5	1.5	
Duik		040~060	1	6	
	Short lead	070~080	1	4	
	(L<16mm)	090~100	1	3	
		110~120	1	2	

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## 7. Specification and test method:

7.1 SCOPE: THIS SPECIFICATION APPLIES TO TEMPERATURE COMPENSATING CERAMIC DISC CAPACITOR.

#### 7.2 TEST CONDITIONS :

UNLESS OTHERWISE SPECIFIED, ALL TESTS SHALL BE OPERATED AT THE STANDARD TEST CONDITIONS OF TEMPERATURE 5°C TO 35°C AND RELATIVE HUMIDITY 45% TO 85%. WHEN FAILS A TEST, RETEST BE OPERATED AT THE CONDITIONS OF TEMPERATURE  $25^{\circ}C \pm 2^{\circ}C$ , RELATIVE HUMIDITY OF 60% TO 70% AND BAROMETRIC PRESSURE 860 TO 1060 MBAR.

- 7.3 HANDLE PROCEDURE : TO AVOID UNEXPECT TESTING RESULTS FROM OCCURRING, THE TESTED CAPACITOR MUST BE KEPT AT ROOM TEMPERATURE FOR AT LEAST 30 MINUTES AND COMPLETELY DISCHARGED.
- 7.4 TEST ITEMS :

ITEM	POST-TEST REQUIREMENTS	TESTING PROCEDURE					
APPEARANCE STRUCTURE SIZE	NO ABNORMALITIES	AS SECTION 3.					
MARKING	機目	AS STATED IN SECTION 4					
	BETWEEN TERMINALS: NO ABNORMALITIES	<ul> <li>A. BELOW 1KV: 300% RATED VOLTAGE WITH 50mA MAX. CHARGING CURRENT FOR 1~5 SEC.</li> <li>B. 1KV &amp; ABOVE: 200% RATED VOLTAGE WITH 50mA MAX. CHARGING CURRENT FOR 1~5 SEC.</li> </ul>					
WITHSTAND VOLTAGE	BETWEEN TERMINAL AND ENCLOSURE : NO ABNORMALITIES	SMALL METALLIC BALLS WITH 1mm DIAMETERS SHALL BE PUT ON A VESSEL AND THE TEST CAPACITOR SHALL BE SUBMERGED EXCEPT 2mm FROM THE TOP OF ITS COMPONENT BODY. THE TEST VOLTAGE SHALL BE APPLIED BETWEEN THE SHORT-CIRCUITED TERMINALS AND THE METALLIC BALLS. (APPLY 1.3KV DC OF RATED VOLTAGE BETWEEN TERMINALS AND ENCLOSURE FOR 1~5 SEC)					
INSULATION RESISTANCE	10000 MΩ MIN	INSULATION RESISTANCE SHALL BE MEASURED AT 60±5 SECONDS AFTER APPLIED VOLTAGE (RATED) RATED VOLTAGE: 50V=50V, 100V=100V, 500V & ABOVE=500V					
CAPACITANCE	TOLERANCE :         C : $\pm 0.25PF$ D : $\pm 0.50PF$ J : $\pm 5\%$ K : $\pm 10\%$	TESTING FREQUENCY : 1 MHZ ± 20% TESTING VOLTAGE : 1.0 VRMS					
OPERATING TEMPERATURE RANGE							
Q FACTOR	$ \begin{array}{c c} 30 \ PF \\ \& \ ABOVE \\ \hline BELOW \\ 30PF \\ \end{array} Q \geq 400 + 20 \times C  \end{array} $	AS ABOVE STIPULATION OF CAPACITANCE					

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POST-TEST REQUIREMENTS	TESTING PROCEDURE
	ACCORDING TO STEP 1 TO 5 IN ORDER, MEASURED
	CAPACITANCE WHEN TEMPERATURE REACH
	BALANCE AND TEMPERATURE COEFFICIENT SHALL
	BE CALCULATED ON THE FOLLOWING FORMULA :

		BALANCE AND TEMPERATURE COEFFICIENT SHALL BE CALCULATED ON THE FOLLOWING FORMULA : PPM/°C =(C2-C1)×10E6/C1(T2-T1)						
	TEMPERATURE COEFFICIENT : SL :+350~-1000 ppm/°C	Step	1	2	3	4	5	
	FOR (+20°C ~+85°C)	Temp. (°C)	25±2	20±3	25±2	85±2	25±2	-
TEMPERATURE CHARACTERISTIC		NOTE : $C1 = C2 = CAPACI$ T1 = TEMPEI T2 = TEMPEI	TANCE RATURE	AS STE E AS STE	P 2 OR 4 EP 3	4		
	CAPACITANCE TOLERANCE : WITHIN ±0.2% OR ±0.05PF, WHICHEVER IS LARGE	ACCORDING TOLERANCE FOLLOWING $\triangle C\% = (G - S)$ NOTE : G = C RESULT OF S S = LEAST C OF STEP 1,3 C1 = CAPACI	E SHALI G FORM 0/C1 GREATE STEP 1,2 APACIT & 5	L BE CA ULA : ST CAP 3 & 5 ANCE A	LCULA ACITAN S TEST	TED ON	THE FESTIN	
TERMINAL STRENGTH	TENSIBLE STRENGTH : NO BREAKDOWN	WIRE DIA.0.5 M/M. LOADING WEIGHT 0.5 KGS, FOR 10±1 SECONDS. WIRE DIA.0.6 M/M. LOADING WEIGHT 1.0 KGS, FOR 10±1 SECONDS.						
	BENDING STRENGTH : NO BREAKDOWN	WIRE DIA.0.5 mm, LOADING WEIGHT 0.25 KGS. WIRE DIA.0.6 mm, LOADING WEIGHT 0.5 KGS. (BENDING BACK AND FORTH 90 DEGREE TWICE)						
	APPEARANCE : School NO ABNORMALITIES	LEAD WIRE OR TERMINALS SHALL BE IMMERSED UP TO 2.0 M/M FORM BODY. (A) BODY DIA. ≦ 5.0mm: INTO THE MOLTEN SOLDER OF WHICH TEMPERATURE: 260(+5/-0)°C FOR 3.0±0.5						DER OF
SOLDERING HEAT	CAP.CHANGE : WITHIN ±2.5% OR ±0.25PF, WHICHEVER IS LARGE.	SECONDS. (B) BODY DIA. > 5.0mm: INTO THE MOLTEN SOLDER OF WHICH TEMPERATURE 260(+5/-0)°C FOR 5~10 SECONDS.						
RESISTANCE	WITHSTAND VOLTAGE : (BETWEEN TERMINALS) NO ABNORMALITIES	THEN LEAVE AT STANDARD TEST CONDITIONS FOR 1~2 HOURS, THEN MEASURED. *WHEN SOLDERING CAPACITOR WITH A SOLDERING						ERING
		IRON, IT SHOULD BE PERFORMED IN FOLLOWING CONDITIONS. TEMPERATURE OF IRON-TIP: 350~400 °C SOLDERING IRON WATTAGE : 50W MAX. SOLDERING TIME : 3.5 SEC. MAX.						U
SOLDERABILITY	LEAD WIRE SHALL BE SOLDERED OVER 75% OF THE CIRCUMFERENTIAL DIRECTION.	TO C TEMPER SECOND	ATURE		AND DI	PPING	TIME 5	±0.5

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ITEM	POST-TEST REQUIREMENTS	TESTING PROCEDURE
HUMIDITY CHARACTERISTIC	APPEARANCE : NO ABNORMALITIES CAP. CHANGE : SL : WITHIN $\pm 5\%$ OR $\pm 0.5$ PF, WHICHEVER IS LARGE Q FACTOR : SL : LESS THAN 10PF ==> Q $\ge 200 + 10 \times C$ MORE THAN 10PF AND LESS THAN 30PF => Q $\ge 275 + 5 \times C / 2$ MORE THAN 30PF => Q $\ge 350$ INSULATION RESISTANCE : 1000M $\Omega$ MIN.	CAPACITORS SHALL BE SUBJECTED TO A RELATIVE HUMIDITY OF 90 ~ 95% AT 40 ± 2°C FOR 500(+24/-0) HOURS, THEN DRIED FOR 1~2 HOURS AND MEASURED.
HUMIDITY LOADING	APPEARANCE : NO ABNORMALITIES CAP.CHANGE : SL : WITHIN $\pm 7.5\%$ OR $\pm 0.75PF$ , WHICHEVER IS LARGE Q FACTOR : SL : LESS THAN 30PF => Q $\geq 100 + 10 \times C/3$ MORE THAN 30PF => Q $\geq 200$ INSULATION RESISTANCE : 500M $\Omega$ MIN.	CAPACITORS SHALL BE SUBJECTED TO A RELATIVE HUMIDITY OF 90 $\sim$ 95% AT 40±2°C FOR 500(+24/-0) HOURS WITH RATED VOLTAGE APPLIED (LESS THAN 50mA), THAN DRIED FOR 1~2 HOURS AND MEASURED.
HIGH TEMPERATURE LOADING	APPEARANCE : NO ABNORMALITIES CAP. CHANGE : SL : WITHIN $\pm 3\%$ OR $\pm 0.3PF$ , WHICHEVER IS LARGE Q FACTOR : SL : LESS THAN 10PF => Q $\ge 200 + 10 \times C$ MORE THAN 10PF & LESS THAN 30PF => Q $\ge 275 + 5 \times C / 2$ MORE THAN 30PF => Q $\ge 350$ INSULATION RESISTANCE : 1000M $\Omega$ MIN.	<ul> <li>CAPACITORS SHALL BE SUBJECTED TO A TEST OF:</li> <li>(A) BELOW 1KV: 200% RATED VOLTAGE WITH 50mA MAX.</li> <li>(B) 1KV &amp; ABOVE: 150% RATED VOLTAGE WITH 50mA MAX.</li> <li>FOR 1000(+48/-0) HOURS AT 125°C ± 2°C (FOR CH &amp; SL) AND THEN DRIED FOR 1~2 HOURS AND MEASURED.</li> </ul>

50V, 100V, 500V, 1KV, 2KV TEMPERATURE COMPENSATING CERAMIC DISC CAPACITOR POE-D01-00-E-

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ITEM	POST-TEST REQUIREMENTS	TESTING PROCEDURE
	APPEARANCE : NO ABNORMALITIES	CAPACITORS SHALL BE SUBJECTED TO: $-25\pm3^{\circ}\mathbb{C} (30\pm3\min) \rightarrow 25^{\circ}\mathbb{C} (3\min) \rightarrow 125\pm3^{\circ}\mathbb{C} (30\pm3\min) \rightarrow 25^{\circ}\mathbb{C} (3\min)$ FOR 5 CYCLE.
	CAP. CHANGE :	
	WITHIN $\pm 5\%$ OR $\pm 0.5$ PF,	
TEMPERATURE	WHICHEVER IS LARGE	
CYCLING	D.F.	
	$C < 30 pF : Q \ge 275 + (5/2)C$	
	$C \ge 30 pF : Q \ge 350$	
	INSULATION RESISTANCE :	
	1000 MΩ MIN.	



50V, 100V, 500V, 1KV, 2KV TEMPERATURE COMPENSATING CERAMIC DISC CAPACITOR POE-D01-00-E-16 Page: 15 of 19

## 8. Cautions & notices:

#### 8.1. Caution (Rating)

#### I. 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 applied to the circuit, starting or stopping may generate irregular voltage for a transit period because of resonance or switching. Be sure to use a capacitor with a rated voltage range that includes these irregular voltages.

Voltage	DC Voltage	DC+AC Voltage	AC Voltage	Pulse Voltage (1)	Pulse Voltage (2)
Positional measurement	Vo-p	V0-p	Vp-p	Vp-p	Vp-p

#### II. 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 similar current, it may self-generate heat due to dielectric loss. The frequency of the applied sine wave voltage should be less than 100kHz. The applied voltage load (\*) should be such that the capacitor's self-generated heat is within 20°C at an atmosphere temperature of 25°C. When measuring, use a thermocouple of small thermal capacity-K of ø0.1mm in conditions where the capacitor is not affected by radiant heat from other components or surrounding ambient fluctuations.

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.)

#### III. Fail-Safe

When capacitor is 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.

8.2. Caution (Storage and operating condition)

#### I. 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 % for 6 months maximum and use within the period after receiving the capacitors.

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.

#### 8.3.Caution (Soldering and Mounting)

#### I. Vibration and impact

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

#### II. 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.

## 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.

#### 8.4. 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 PRDUCT IS USED.

#### 8.5. Notice

8.5.1. Notice (Soldering and Mounting)

Cleaning (ultrasonic cleaning)

To perform ultrasonic cleaning, observe the following conditions.

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

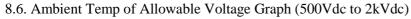
Rinsing time : 5 min. maximum.

Do not vibrate the PCB/PWB directly.

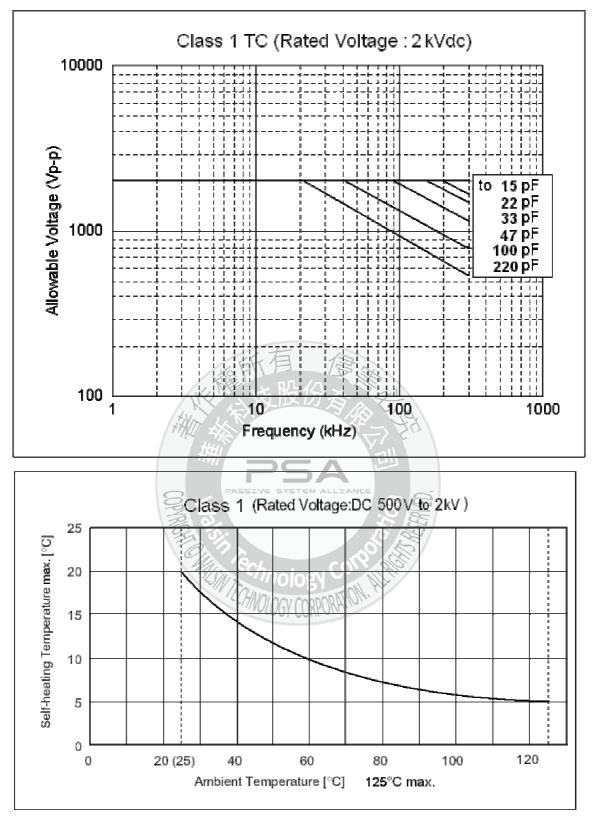
Excessive ultrasonic cleaning may lead to fatigue destruction of the lead wires.

50V, 100V, 500V, 1KV, 2KV TEMPERATURE COMPENSATING CERAMIC DISC CAPACITOR POE-D01-00-E-16 Ver: 16 Page: 17 of 19

Class 1 TC Rated Voltage: DC 500V 10000 Allowable Voltage (Vp-p) 1000 ++ 500 to 100pF 220pF 390pF 100 1 10 100 1000 Frequency (kHz) Class 1 TC (Rated Voltage : 1kVdc) 10000 Allowable Voltage (Vp-p) 1000 to 62.pF 100 pF 220 pF ļ ł I I I Н 100 1000 1 10 100 Frequency (kHz)



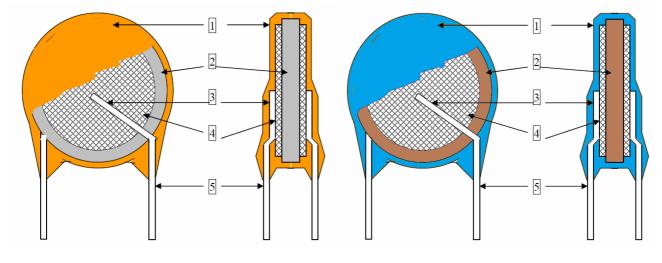
50V, 100V, 500V, 1KV, 2KV TEMPERATURE COMPENSATING CERAMIC DISC CAPACITOR POE-D01-00-E-16 Ver: 16 Page: 18 of 19



The ambient temperature and the surface temperature of capacitor must be  $125^{\circ}$ C or lower. (Including self-heating.)

**50V, 100V, 500V, 1KV, 2KV TEMPERATURE COMPENSATING CERAMIC DISC CAPACITOR** POE-D01-00-E-16 Ver: 16 Page: 19 of 19

## 9. Drawing of internal structure and material list:



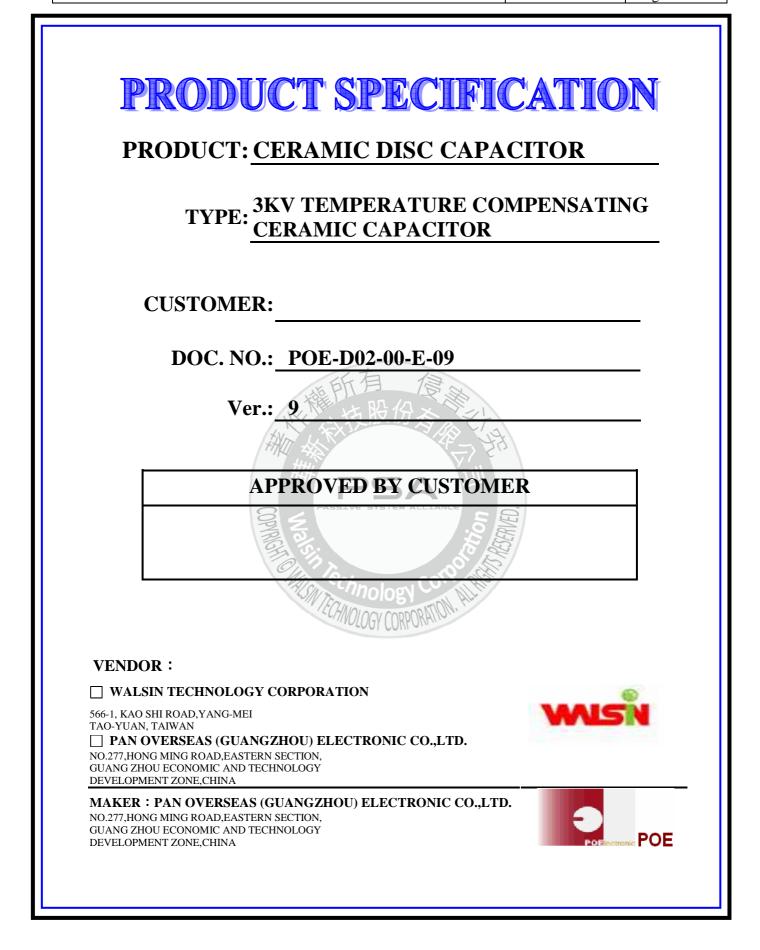
(phenolic resin)

(epoxy resin)

		6F	有自	
NO.	部位	材質	構成部份	供應商
NO.	Part name	Material	LAZ 17 Component	Vendor
1	Inculation Coating	Phenolic resin	Phenolic resin, Filler, Pigment	Namics
1	Insulation Coating	Epoxy resin	Epoxy resin, SiO2, TiO2	Kai Hua
			<b>'SA</b>	Hua Xing
2	Dielectric Element	Ceramic	BaTiO3	Wang Feng
		高可		Fenghua
3	Solder	Tin-silver	Sn97.5-Ag2.5	Huajun
5	Solder	TIII-SUVEI CO	70/02V	Haili
4	Electrodes Ag		OGY COP Silver, Glass frit	Daejoo
4			Con Com Silver, Glass Int	Xinguang
5	Leads wire	Tinned copper	Substrate metal:Fe&Cu	Hengtai
3	Leaus wile	clad steel wire	Surface plating:Sn 100%	Wuhu Taililai

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Version

1

2

Date

2008.6.3

2008.8.22

2016/11/3

9

2.

## **3KV TEMPERATURE COMPENSATING CERAMIC CAPACITOR**

1. Complete lead code

2008.12.12 3		1. Complete the $13^{\text{th}}$ to $17^{\text{th}}$ codes of SAP P/N.	
		2. Page layout adjustment.	
		3. Added Marking when the coating resin is Halogen and Pb free	
		Epoxy.	
2009/8/19	4.	1. Change PSA & POE logo to Walsin & POE logo.	
		2. capacity list $\rightarrow$ product range	6
2010/9/9	5	1. Review "but Dφ≤6.0 mm shall be omitted." to "but when the code of body diameter dimension ≤060 shall be omitted."	7
		2. Add date code on marking (item 7~12).	7
2013/5/6	6	1. Review the Lead diameter $\varphi$ from 0.60 +/-0.06mm to 0.55+/-0.05mm 2. Review the Solderability temperature from 235±5°C to 245±5°C,	5,6,8 10
		solderability time from $2\pm0.5$ s to $5\pm0.5$ s.	
2013/10/18	7	Review the packing specification	11
2016/3/2	8	<ol> <li>Review the Available lead code of Lead Configuration.</li> <li>Delete the definition about "Old Part No."</li> <li>Delete 6pF~22pF (Code of diameter dimension is 060), 24pF (Code of</li> </ol>	
2010/3/2	0	<ul> <li>diameter dimension is 070), 27pF~30pF (Code of diameter dimension is 080) and 33pF (Code of diameter dimension is 090)for P/N CH 3KV.</li> <li>4. Review 9. Drawing of internal structure and material list</li> </ul>	15
2016/11/2	0	1. Delete "CH" series.	4,6,7,10~13,15

Delete 5pF~8pF (Code of diameter dimension is 060) for P/N SL 3KV.

## **Record** of change

1. F03-00-F-09 (before)  $\rightarrow$  POE-F02-00-F-01 (1<sup>st</sup> edition)

2. Add last SAP code "H" for halogen and Pb free, epoxy resin..

3. Remove F(PITCH)=5.0+/-0.8 mm for 3 KV (all lead type)

1. Complete the  $13^{\text{th}}$  to  $17^{\text{th}}$  codes of SAP P/N.

Description

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page

5-16

2,10

15

6

**3KV TEMPERATURE COMPENSATING CERAMIC CAPACITOR** 

No.	Item	Page
1	Part number for SAP system	4/15
2	Mechanical	5/15
3	Capacitance value vs. Rate voltage, product diameter	6/15
4	Marking	7/16
5	Taping Format	8/16
6	Specification and test method	9/16~11/15
7	Packing specification	12/15
8	Notices	13/15~14/15
9	Drawing of internal structure and material list	15/15
	展開有 復慶之	
	# PSA	
	PASETVE EVETEN ALLTANCE	



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1. Part number for SAP system :

<u>SL</u>	302	100	J	060	В	20	С	7	<u>H</u>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

(1)Temperature Characteristic : SL:+350~-1000ppm/°C

(2)Rate Voltage(identified by 3-figure code) : 302=3KVDC

(3)Rate Capacitance (identified by code) : ex. 100=10pF, 101=100pF

(4)Tolerance of Capacitance :  $J = \pm 5\%$  (For above 10pF)

(5)Nominal body diameter dimension (Ref.to page.6 D\u00fc Code spec.).

(6)Lead Style : Refer to "2. Mechanical".

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

Taping Code	Description	
AF	Box and Pitch : 15.0 mm	
AM	Box and Pitch : 25.4 mm	
	上所月	1
Bulk Code	Description	企業
3E	Lead length : 3.5mm	
04	Lead length : 4.0mm	

**a** 1

(8)Length tolerance :

4E 20

Code	Description	
А	±0.5 mm	5
	(only for kink lead type)	
В	±1.0 mm	ev Co.
С	MIN. ECHNOLOGIUS	STATION HE
D	Taping special purpose	DRPOKAINO

Lead length: 4.5mm

Lead length : 20.0mm

(9)Lead Pitch :

Code	Description
7	7.5±1 mm
0	10±1 mm

(10)Epoxy Resin Code:

Code	Description
В	Pb free, Epoxy Resin
Н	Halogen and Pb free, epoxy resin.

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## 2. Mechanical:

Available lead code (Epoxy Resin Coating)- (unit: mm)

Lead type	SAP P/N (13-17)digits	Pitch (F)	Lead Length (L)	Packing	Lead Configuration		
	B20C7	$7.5 \pm 1.0$	20 MIN.		D max. T max.		
	B20C0	$10 \pm 1.0$	20 MIN.	Bulk			
Lead style : B Straight long lead	BAFD7	7.5 ± 1.0	Refer to "5. Taping				
Touc	BAMD0	$10 \pm 1.0$	format"	Tap. Ammo			
	L03B7	$7.5 \pm 1.0$	3.0 ± 1.0		D max. T max.		
	L4EB7	$7.5 \pm 1.0$	$4.5 \pm 1.0$				
	L05B7	$7.5 \pm 1.0$	$5.0 \pm 1.0$				
Lead style : L	L10B7	7.5 ± 1.0	$10.0 \pm 1.0$		( )		
Straight short	L03B0	$10 \pm 1.0$	3.0 ± 1.0	Bulk			
lead	L4EB0	$10 \pm 1.0$	$4.5 \pm 1.0$				
	L05B0	$10 \pm 1.0$	5.0 ± 1.0		↑ (*** F →*)		
	L10B0	$10 \pm 1.0$	10.0 ± 1.0		0 d+ + ↓		
	X3EA7	$7.5 \pm 1.0$	3.5 ± 0.5		D max. T max.		
	X04A7	$7.5 \pm 1.0$	$4.0 \pm 0.5$	the second second			
x 1 . 1 . xz	X05B7	$7.5 \pm 1.0$	5.0 ± 1.0				
Lead style : X	X3EA0	$10 \pm 1.0$	3.5 ± 0.5	Bulk			
Outside kink	X04A0	$10 \pm 1.0$	$4.0 \pm 0.5$	P4			
lead	X05B0	$10 \pm 1.0$ $10 \pm 1.0$	$1.0 \pm 0.5$ $5.0 \pm 1.0$	-> 213	X L L L L L L L L L L L L L L L L L L L		
	XAFD7	$10 \pm 1.0$ $7.5 \pm 1.0$	Refer to "5. Taping		°°∓¶⊢ <sub>F</sub> → ° → H		
	XAMD0		format"	Tap. Ammo	ød+ +ød [L]		
	D3EA7	$10 \pm 1.0$					
		7.5 ± 1.0	SSIVE 3.5 1 0.5 LLIANCE				
	D04A7	$7.5 \pm 1.0$	$4.0 \pm 0.5$	Bulk			
Lead style : D	D3EA0	$10 \pm 1.0$	$3.5 \pm 0.5$		( ) U U		
Vertical kink	D04A0	$10 \pm 1.0$	$4.0 \pm 0.5$		$\lambda$ $\langle$ $ $ $ $ $ $ $ $ $ $		
short lead	DAFD7	$7.5 \pm 1.0$	Par colle	122			
Short leau	DAMD0	10 ± 1.0	Refer to "5. Taping format"	Tap. Ammo			
Lead style : H	H3EA0	10.0±1.0	3.5±0.5 mm	Bulk	D max.		
Inside kink	HAFD0						
lead	HAMD0	Refer to "5. Taping format"		Tap. Ammo			
Lead style : M	M04B7	7.5 ± 1.0	4.0 ± 1.0	D. "	D max.		
Double outside kink lead	M04B0	$10 \pm 1.0$	4.0 ± 1.0	Bulk			

\* Lead diameter  $\Phi$ d: 0.55+/-0.05mm

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



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3. Capacitance value vs. Rate voltage, product diameter :

				SL
M a n u Cap. Valu	ifacturing product ne vs. Rate voltage, product dia	t range meter & type	Photo	58J 3KV K K K K K L L L L L L
T.C.	SL (CLASS	I, Temperature:+20°C~+85°	°C, T.C.C.: +3	50 ~ -1000ppm)
Rate voltage		3KV		
Dq(Code)	060	070		080
D max. (mm)	7.5	8.5		9.5
T max. (mm)	5.0	5.0		5.0
2		5.0		
3				
4				
5				
6				
7				
8	100			
10	100			
12 15	120 150			
15	150			
20	200	化石 15		
20	220	Ph H IS	xe.	
24	240		de !	
27	270	场权历态	× ZL	
30	300	XV		2.
33	330		F = Y	4
36	360		$\nabla / \epsilon$	
39	390			
47		470		
51		510		
56	PAS	SIVE SYSTEM A560 AN	NCE	
<u>62</u> 68	Pe 2	620 680	- 5	44
75	12 a	060		750
82	St. 9:			820
100	O,			101
φd (mm)	HISW TO	Chnolog.55±0.05	Allello	/
PACKING		HOLOG TAPING or B	ULK	
COATING		Epoxy Resi	n	

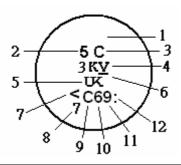


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## 4. Marking :



1. Temperature characteristic	2. Nominal capacitance	3. Capacitance tolerance	4. Rated voltage	5. Manufacturer's identification	6. Halogen and Pb free
SL: No marking	Identified by 3-figure code 1. when Cap.≥100pF Ex. 120pF →"121" 2. When Cap<100pF, marked actual Cap. value. Ex. 22pF→"22"	J: ±5% (For above 10pF)	3000V : Be marked "3kV"	Shall be marked as "└└,", but when the code of body diameter dimension ≤060 shall be omitted.	When the epoxy resin is Halogn and Pb free, there is a "-"marking.
	14	所月存	The state		
Definition of date	code marking:				
7.Supplier of Epoxy	8.No. of test equipment	9.Factory of manufacture	10.Year of manufacture	11.Month of manufacture	12.Week of manufacture by month
<:K-company , : P-company	1~9: No.1~No.9, J: No.10, K: No.11, L: No.12	C: Factory of	1:2011, 2:2012, 3:2013, 4:2014, 5:2015, 6:2016, 7:2017,	<ul><li>1~9:January~ September,</li><li>O: October,</li><li>N: November,</li><li>D: December</li></ul>	week 1: - week 2: ' week 3: : week 4: ' week 5: ;



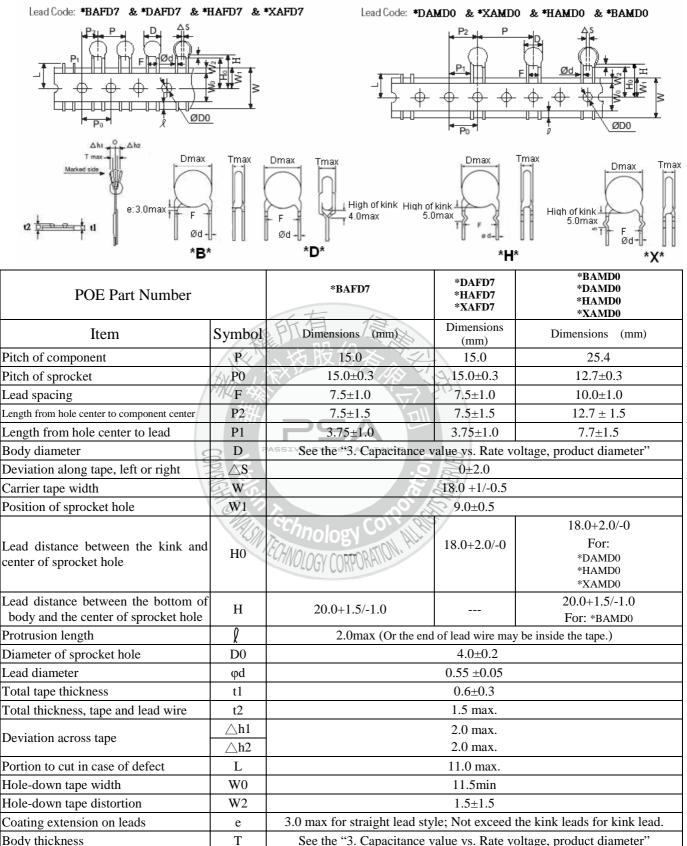
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25.4mm pitch/lead spacing 10.0mm taping

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#### 5. Taping Format:

15mm pitch/lead spacing 7.5mm taping



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#### 6. Specification and test method:

6.1 SCOPE: THIS SPECIFICATION APPLIES TO TEMPERATURE COMPENSATING CONSTANT, 3KV CERAMIC CAPACITOR.

#### 6.2 TEST CONDITIONS:

UNLESS OTHERWISE SPECIFIED, ALL TESTS SHALL BE OPERATED AT THE STANDARD TEST CONDITIONS OF TEMPERATURE 5°C TO 35°C AND RELATIVE HUMIDITY 45% TO 85%. WHEN FAILS A TEST, RETEST BE OPERATED AT THE CONDITIONS OF TEMPERATURE 25°C  $\pm$  2°C, RELATIVE HUMIDITY OF 60% TO 70% AND BAROMETRIC PRESSURE 860 TO 1060 MBAR.

6.3 HANDLE PROCEDURE: TO AVOID UNEXPECT TESTING RESULTS FROM OCCURING, THE TESTED CAPACITOR MUST BE KEPT AT ROOM TEMPERATURE FOR AT LEAST 30 MINUTES AND COMPLETELY DISCHARGED.

ITEM	POST-TEST REQUIREMENTS		TESTING PROCEDURE	
APPEARANCE STRUCTURE SIZE	NO ABNORMALI	ITIES		
MARKING		15	AS STATED IN SECTION 4	
	BETWEEN TERM NO ABNORMAL		2 TIMES OF THE RATED VOLTAGE. TEST VOLTAGE : 6KVDC, 1~5 SEC, WITH 50mA MAX. CHARGING CURRENT	
WITHSTAND VOLTAGEN	BETWEEN TERMINAL AND ENCLOSURE : NO ABNORMALITIES		SMALL METALLIC BALLS WITH 1mm DIAMETERS SHALL BE PUT ON A VESSEL AND THE TEST CAPACITOR SHALL BE SUBMERGED EXCEPT 2mm FROM THE TOP OF ITS COMPONENT BODY. THE TEST VOLTAGE SHALL BE APPLIED BETWEEN THE SHORT-CIRCUITED TERMINALS AND THE METALLIC BALLS. (APPLY 1.3KV DC OF RATED VOLTAGE BETWEEN TERMINALS AND ENCLOSURE FOR 1~5 SEC)	
INSULATION RESISTANCE	10000 MΩ MIN	SIN TECHNOLOGY C	INSULATION RESISTANCE SHALL BE MEASURED AT 60±5 SECONDS AFTER RATED VOLTAGE APPLIED. RATED VOLTAGE : 500VDC	
CAPACITANCE	TOLERANCE : J : ±5%, K : ±10%		TESTING FREQUENCY: 1MHZ $\pm$ 20 % TESTING TEMPERATURE: 25 $\pm$ 2°C TESTING VOLTAGE: 1.0 $\pm$ 0.2 VRMS	
TEMPERATURE RANGE	OPERATING TEM -25°C $\sim$ +125°C			
Q FACTOR)	30PF & ABOVE ≥1000	$\begin{array}{c} \text{BELOW 30PF} \\ \geq 400+20\times \text{C} \end{array}$	AS ABOVE STIPULATION OF CAPACITANCE	
TERMINAL	TENSIBLE STRENGTH: NO BREAKDOWN		WIRE DIA.0.5mm, LOADING WEIGHT 0.5KG FOR 10±1 SECONDS. WIRE DIA.0.6mm, LOADING WEIGHT 1.0KG FOR 10±1 SECONDS	
STRENGTH	BENDING STRENGTH: NO BREAKDOWN		WIRE DIA.0.5mm, LOADING WEIGHT 0.25 KG. WIRE DIA.0.6mm, LOAIDNG WEIGHT 0.5 KG. (BENDING BACK AND FORTH 90 DEGREE TWICE)	

6.4 TEST ITEMS:

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ITEM	POST-TEST REQUIREMENTS	TESTING PROCEDURE
TEMPERATURE	TEMPERTURE COEFFICIENT: SL: +350 ∼ -1000PPM/°C	ACCORDING TO STEP 1 TO 5 IN ORDER, MEASURED CAPACITANCE WHEN TEMPERATURE REACH BALANCE AND TEMPERATURE COEFFICIENT SHALL BE CALCULATED ON THE FOLLOWING FORMULA : PPM/°C =(C2-C1)×10E6/C1(T2-T1) STEP 1,3,5: 25°C STEP 4: 85°C STEP 2: CH:-25°C ; SL:20°C NOTE : C1 = CAPACITANCE AS STEP 3 C2 = CAPACITANCE AS STEP 2 OR 4 T1 = TEMPERATURE AS STEP 3 T2 = TEMPERATURE AS STEP 2 OR 4
CHARACTERISTIC		ACCORDING TO ABOVE STEP 1,3 & 5, CAPACITANCE TOLERANCE SHALL BE CALCULATED ON THE FOLLOWING FORMULA : $\triangle C\% = (G - S)/C1$ NOTE: G = GREATEST CAPACITANCE AS TESTING RESULT OF STEP 1,3 & 5 S = LEAST CAPACITANCE AS TESTING RESULT OF STEP 1,3 & 5 C1 = CAPACITANCE AS STEP 3
SOLDERING HEAT RESISTANCE	NO ABNORMALITIES CAP.CHANGE: SL WITHIN ±2.5% OR ±0.25PF, WHICHEVER IS LARGE.	LEAD WIRE OR TERMINALS SHALL IMMERSE UP TO 2.0 M/M FORM BODY. INTO THE MOLTEN SOLDER OF WHICH TEMPERATURE: 260(+5/-0)°C FOR 5~10 SECONDS. THEN LEAVE AT STANDARD TEST CONDITIONS FOR 24±2 HOURS, THEN MEASURED. WHEN SOLDERING CAPACITOR WITH A SOLDERING IRON, IT SHOULD BE PERFORMED IN
	WITHSTAND VOLTAGE: (BETWEEN TERMINALS)	FOLLOWING CONDITIONS. TEMPERATURE OF IRON-TIP: 350~400 °C SOLDERING IRON WATTAGE : 50W MAX. SOLDERING TIME : 3.5 SEC. MAX.
SOLDERABILITY	LEAD WIRE SHALL BE SOLDERED OVER 75% OF THE CIRCUMFERENTIAL DIRECTION.	TO COMPLY WITH JIS-C-5102 8.4 SOLDER TEMPERATURE 245±5°C AND DIPPING TIME 5±0.5 SECONDS FLUX : WEIGHT RATIO OF POSIN 25%

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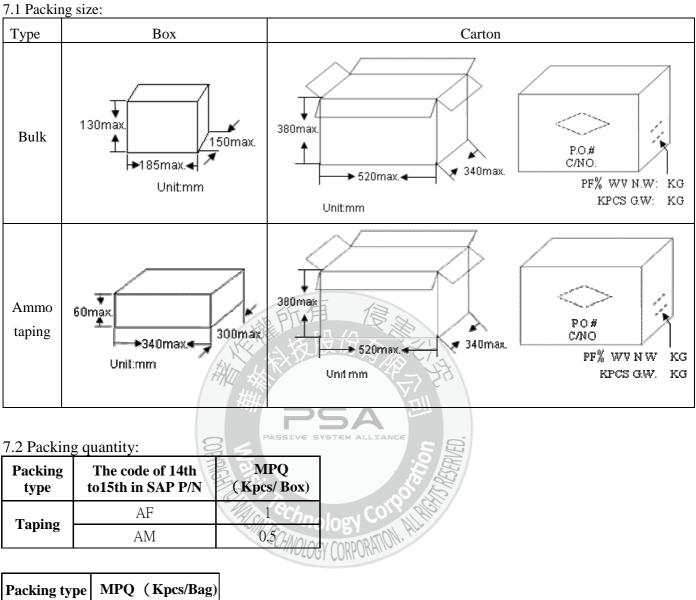
**5A** 

ITEM	POST-TEST REQUIREMENTS	TESTING PROCEDURE
	APPEARANCE: NO ABNORMALITIES CAP.CHANGE: SL WITHIN ±5% OR ±0.5PF, WHICHEVER	
HUMIDITY CHARACTERISTIC (STABLE SITUATION)	IS LARGE. Q FACTOR: SL LESS THAN 10PF => $Q \ge 200 + 10 \times C$ MORE THAN 10PF AND LESS THAN 30PF => $Q \ge 275 + 5 \times C/2$ MORE THAN 30PF => $Q \ge 350$ INSULATION RESISTANCE: 1000M $\Omega$ MIN.	CAPACITORS SHALL BE SUBJECTED TO A RELATIVE HUMIDITY OF 90 $\sim$ 95% AT 40±2°C FOR 500(+24/-0) HOURS. THEN DRIED FOR 1 $\sim$ 2 HOURS AND MEASURED.
HUMIDITY LOADING	APPEARANCE: NO ABNORAMLITIES CAP.CHANGE: SL WITHIN $\pm 7.5\%$ OR $\pm 0.75PF$ , WHICHEVER IS LARGE. Q FACTOR: SL LESS THAN 30PF => Q $\geq 100 + 10 \times C/3$ MORE THAN 30PF => Q $\geq 200$ INSULATION RESISTANCE: 500 M $\Omega$ MIN	CAPACITORS SHALL BE SUBJECTED TO A RELATIVE HUMIDITY OF 90 $\sim$ 95% AT 40 ± 2°C FOR 500(+24/-0) HOURS WITH RATED VOLTAGE APPLIED WITH 50mA MAX. THEN DRIED FOR 1 $\sim$ 2 HOURS AND MEASURED.
	APPEARANCE : NO ABNORMALITIES CAP.CHANGE : WITHIN ±3% OR ±0.3PF, WHICHEVER IS LARGE.	V COTO TANK
HIGH TEMPERATURE LOADING	Q FACTOR : SL : LESS THAN 10PF ==> $Q \ge 200 + 10 \times C$ MORE THAN 10PF AND LESS THAN 30PF ==> $Q \ge 275 + 5 \times C/2$ MORE THAN 30PF ==> $Q \ge 350$	150% RATED VOLTAGE WITH 50mA max. FOR 1000(+48/-0) HOURS AT 125±3℃ AND THEN DRIED FOR 1~2 HOURS AND MEASURED.
	INSULATION RESISTANCE: 1000 MΩ MIN.	

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## 7.Packing Baggage :



Packing type	MPQ (Kpcs/Bag)
Bulk	1

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#### 8. Notices:

#### 8.1 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 applied to the circuit, starting or stopping may generate irregular voltage for a transit period because of resonance or switching. Be sure to use a capacitor with a rated voltage range that includes these irregular voltages.

Voltage	DC Voltage	DC+AC Voltage	AC Voltage	Pulse Voltage (1)	Pulse Voltage (2)
Positional measurement	Vo-p	V0-p	Vp-p	Vp-p	Vp-p

#### 8.2 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 similar current, it may self-generate heat due to dielectric loss. The frequency of the applied sine wave voltage should be less than 100kHz. The applied voltage load (\*) should be such that the capacitor's self-generated heat is within 20°C at an atmosphere temperature of 25°C. When measuring, use a thermocouple of small thermal capacity-K of ø0.1mm in conditions where the capacitor is not affected by radiant heat from other components or surrounding ambient fluctuations.

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.)

#### 8.3 Fail-Safe

When capacitor is 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.

#### 8.4 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 % for 6 months maximum and use within the period after receiving the capacitors.

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.

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#### 8.5 Vibration and impact

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

#### 8.6 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 degrees C. max.

Soldering iron wattage : 50W max.

Soldering time : 3.5 sec. max.

# 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.

#### 8.7 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.

#### 8.8 Rating

Capacitance change of capacitor

I. Class 1 series (Temp. Char. SL)

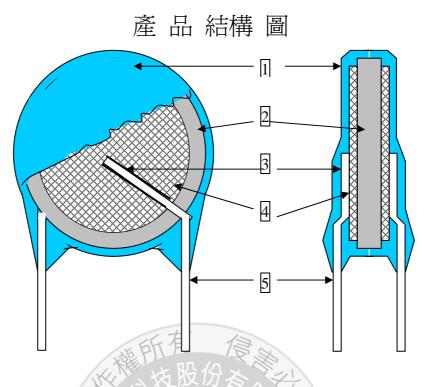
Capacitance might change a little depending on the surrounding temperature or an applied voltage. Please contact us if you intend to use this product in a strict time constant circuit.

5/1005

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# 9.Drawing of internal structure and material list:



#### Remarks :

· · · · · · · · · · · · · · · · · · ·				20		
No.	o. Part name Material		Model/Type	Component		
1			1.EF-150C Ve system alliance 2.EF-150(HF)	Epoxy resin、Pigment (Blue / UL 94 V-0 /)		
1	Insulation Coating	Epoxy polymer	3.PCE-210	The minimum thickness of coating		
		OL 1	2.PCE-300(HF)	(reinforced insulation) is 0.4mm		
2	Dielectric Element	Ceramic	hologsi	BaTiO <sub>3</sub>		
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±0.05 mm	Substrate metal: Fe & Cu Surface plating: Sn 100%(3~7µm)		

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	<b>PRODUCT SPECIFICATION</b>	N
I	PRODUCT: CERAMIC DISC CAPACITOR	
	TYPE: 6KV TEMPERATURE COMPENSATIN CERAMIC CAPACITOR	G
	CUSTOMER:	_
	DOC. NO.: POE-D03-00-E-09	
	Ver.: 9 名节股份有关	_
	APPROVED BY CUSTOMER	]
	Corporation HILLING	
	)R: .SIN TECHNOLOGY CORPORATION	
566-1, KA TAO-YUA <b>PAN</b> NO.277,H <sup>0</sup> GUANG Z	D SHI ROAD, YANG-MEI N, TAIWAN OVERSEAS (GUANGZHOU) ELECTRONIC CO.,LTD. DNG MING ROAD, EASTERN SECTION, HOU ECONOMIC AND TECHNOLOGY MENT ZONE, CHINA	M
NO.277,H GUANG Z	A : PAN OVERSEAS (GUANGZHOU) ELECTRONIC CO.,LTD. DNG MING ROAD,EASTERN SECTION, HOU ECONOMIC AND TECHNOLOGY MENT ZONE,CHINA	POE

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# **Record of change**

Date	Version	Description	page
2008.6.3	1	1. D14-00-E-06 (before) $\rightarrow$ POE-D03-00-E-01(1 <sup>st</sup> edition)	
2008.8.22	2	1. Complete lead code	5-6
		3. Add last SAP code "H" for halogen and Pb free, epoxy resin.	2
2008.12.12	3	1. Complete the $13^{\text{th}}$ to $17^{\text{th}}$ codes of SAP P/N.	
		2. Page layout adjustment.	4-5
		3. Added marking when the coating resin is Halogen and Pb free	
		Epoxy.	
2009/8/19	4	1. Change PSA & POE logo to Walsin & POE logo.	all
		2. Revised WITHSTAND VOLTAGEN and operating temperature	9
		from -25°C ~+85°C to -25°C ~+125°C	
		3. capacity list $\rightarrow$ product range	6
2010/9/9	5	1. Review "but $D\phi \leq 6.0$ mm shall be omitted." to "but when the code of	7
		body diameter dimension $\leq 060$ shall be omitted."	
		2. Delete "1.5000V : Be marked "5kV""	7
		3. Add date code on marking (item 7~12).	7
2013/5/6	6	1. Review the Lead diameter $\varphi$ from 0.60 +/-0.06mm to 0.55+/-0.05mm	5,6,8
		2. Review the Solderability temperature from $235\pm5^{\circ}$ to $245\pm5$ .	10
		$^{\circ}$ C,Solderability time from 2 ±0.5s to 5±0.5s,	
2012/10/19	7		11
2013/10/18	7	Review the packing specification	11
		1. Review the Available lead code of Lead Configuration.	5
		2. Delete the definition about "Old Part No."	5,6
2016/3/2	8	3. Delete 6pF~18pF (Code of diameter dimension is 060), 22pF~27pF (Code of	
2010/2/2	Ũ	diameter dimension is 080), 30pF~39pF (Code of diameter dimension is 090)	
		and 47pF (Code of diameter dimension is 110)for P/N CH 6KV. 4. Review 9. Drawing of internal structure and material list	15
		<ol> <li>Review 9. Drawing of internal structure and material list</li> <li>Delete "CH" series.</li> </ol>	4,6,7,9~11,14,15
2016/11/3	9	<ol> <li>Delete 2pF~8pF (Code of diameter dimension is 060) for P/N SL 6KV.</li> </ol>	4,0,7,9~11,14,15

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No.	Item	Page
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2	Mechanical	5/15
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4	Marking	7/15
5	Taping Format	8/15
6	Specification and test method	9/15~11/15
7	Packing specification	12/15
8	Notices	13/15~14/15
9	Drawing of internal structure and material list	15/15
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	此题的公式	
	LE TO AN AND A LAND AND AND A LAND AND A LAND AND A LAND AND AND A LAND AND AND A LAND AND A LAND AND A LAND AND AND AND AND AND AND AND AND AND	
	PASSIVE SYSTEM ALLIANCE	
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	CHNOLOGY CORPORATION	



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## 1. Part number for SAP system :

<u>SL</u>	<u>602</u>	050	<u> </u>	060	B	20	C	7	<u>H</u>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

(1)Temperature Characteristic : SL:+350~-1000ppm/°C

(2)Rate Voltage(identified by 3-figure code) : 602=6KVDC

(3)Rate Capacitance (identified by code) : ex. 100=10pF, 101=100pF

(4)Tolerance of Capacitance :  $J=\pm 5\%$  (For above 10pF)

(5)Nominal body diameter dimension (Ref. to page.6  $D\phi$  Code spec.).

(6)Lead Style : Refer to "2. Mechanical".

## (7)Packing mode and lead length (identified by 2-figure code) :

	Taping Code	Description	
	AF	Box and Pitch : 15.0 mm	
	AM	Box and Pitch : 25.4 mm	CEL .
		HE PILA	TE Sh
	Bulk Code	Description	份本学科
	3E	Lead length : 3.5mm	2/2 /14
	04	Lead length : 4.0mm	1 - 2 - 5 - 1
	4E	Lead length: 4.5mm	
	20	Lead length : 20.0mm	5A 🖆
(8)L	ength tolerance	PASSIVE SYS	TEM ALLIANCE
	Code	Description	

Code	Description	
А	±0.5 mm	0.5
	(only for kink lead type)	all all a
В	±1.0 mm	Dgy Vor Ille
С	MIN. ECHNOLOGY	CODDODITION .
D	Taping special purpose	OKPURAIL

(9)Lead Pitch :

Code	Description
7	7.5±1 mm
0	10±1 mm

(10) Epoxy Resin Code :

Code	Description
В	Pb free, Epoxy Resin
Н	Halogen and Pb free , epoxy resin.

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# 2. Mechanical:

Available lead code (Epoxy Resin Coating)- (unit: mm)

Available lead code (Epoxy Resin Coating)- (unit: mm)					
Lead type	SAP P/N (13-17)digits	Pitch (F)	Lead Length (L)	Packing	Lead Configuration
	B20C7	$7.5\pm1.0$	20 MIN.	Bulk	D max. T max.
	B20C0	$10 \pm 1.0$	20 MIN.	Buik	
Lead style : B Straight long lead	BAFD7	$7.5\pm1.0$	Refer to "5. Taping	Tap. Ammo	
	BAMD0	$10 \pm 1.0$	format"	тар. Аншно	
	L03B7	$7.5 \pm 1.0$	$3.0 \pm 1.0$		D max. T max.
	L4EB7	$7.5 \pm 1.0$	$4.5 \pm 1.0$		
I and state I I	L05B7	$7.5 \pm 1.0$	$5.0 \pm 1.0$		
Lead style : L	L10B7	$7.5 \pm 1.0$	$10.0\pm1.0$		
	L03B0	$10 \pm 1.0$	$3.0 \pm 1.0$	Bulk	
Straight short	L4EB0	$10 \pm 1.0$	$4.5 \pm 1.0$		
lead	L05B0	$10 \pm 1.0$	5.0 ± 1.0	E	╡╠╾╒╶┿┊╡║║
	L10B0	10 ± 1.0	10.0 ± 1.0		Ø d+ +
	X3EA7	$7.5 \pm 1.0$	$3.5 \pm 0.5$	A VI	D max. T max.
	X04A7	$7.5 \pm 1.0$	$4.0 \pm 0.5$	XF+7	
Lead style : X	X05B7	$7.5 \pm 1.0$	5.0 ± 1.0		
Lead style · A	X3EA0	$10 \pm 1.0$	$3.5 \pm 0.5$	Bulk	
Outside kink	X04A0	$10 \pm 1.0$	$4.0 \pm 0.5$		
lead	X05B0	$10 \pm 1.0$ $10 \pm 1.0$	PASSI 5.0 ± 1.0 M ALLI		
leau	XAFD7	$7.5 \pm 1.0$			XX
	XAMD0 XAMD0	And a second sec	Refer to "5. Taping	Tap. Ammo	ød++ ød L
		$10 \pm 1.0$	format"		
	D3EA7	$7.5 \pm 1.0$	$3.5 \pm 0.5$	5.8	
	D04A7	$7.5 \pm 1.0$	$4.0 \pm 0.5$	Bulk	
Lead style : D	D3EA0	$10 \pm 1.0$	3.5 ± 0.5	Duik	
	D04A0	$10 \pm 1.0$	$4.0 \pm 0.5$	01.12	
Vertical kink	DAFD7	$7.5 \pm 1.0$	WIVLOGY CORPUKA	10.	
short lead	DAMD0	$10 \pm 1.0$	Refer to "5. Taping format"	Tap. Ammo	
Lead style : H Inside kink lead	H3EA0	10.0±1.0	3.5±0.5 mm	Bulk	D max. T max.

\* Lead diameter  $\Phi$ d: 0.55+/-0.05mm

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

When Dφ≥11mm, only for bulk, but Dφ≤10mm can do Bulk or Taping.

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# 3. Capacitance value vs. Rate voltage, product diameter :

3.1 • 6KV:

	cturing produc Rate voltage, product dia		SL BKV BKV SKC201
T.C.	SL (CLAS	S I, Temperature:+20°C ~+85°C, T.C.C.: +350 ~ -1000 $\mu$	opm)
Rate voltage		6KV	
D $\phi$ (Code)	060	080	090
D max. (mm)	7.5	9.5	10.5
T max. (mm)	5.0	5.0	5.0
2			
3			
5			
6			
7			
8			
10	100		
12	120		
15	150		
18	180		
20	200	15 D	
22	220		
27	270	LI CARA	
30	300	300	
<u>33</u> <u>39</u>	330	330	
	390	390	470
47	TTUL TON	470	470
51		510	510
<u>56</u> 62		560	560
62			680
82	PA	SSIVE SYSTEM ALLIANCE	820
100	821		101
φd (mm)	23	0.55±0.05	101
CKING		TAPING or BULK	
COATING	0.2	Epoxy Resin	

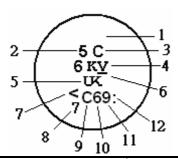


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# 4. Marking :



1. Temperature characteristic	2. Nominal capacitance	3. Capacitance tolerance	4. Rated voltage	5. Manufacturer's identification	6. Halogen and Pb free
SL: No marking	<ol> <li>I.Identified by 3-figure code when Cap.≥100pF Ex. 120pF →"121"</li> <li>When Cap&lt;100pF, marked actual Cap. value Ex. 6pF→"6"</li> </ol>	$\begin{array}{c c} J: \pm 5\% & 6000V: \\ (For above \\ 10pF) & 6kV'' \\ \end{array}$		Shall be marked as "└K", but when the code of body diameter dimension ≤060 shall be omitted.	When the epoxy resin is Halogn and Pb free, there is a "_"marking.
Definition of date	code marking:	所有	1		
7.Supplier of Epoxy	8.No. of test equipment	9.Factory of manufacture	10. Year of manufacture	11.Month of manufacture	12.Week of manufacture by month
<:K-company , : P-company	1~9: No.1~No.9, J: No.10, K: No.11, L: No.12	C: Factory of POEGZ	1:2011, 2:2012, 3:2013, 4:2014, 5:2015, 6:2016, 7:2017,	<ul> <li>1~9:January~ September,</li> <li>O: October,</li> <li>N: November,</li> <li>D: December</li> </ul>	week 1: - week 2: ' week 3: : week 4: ' week 5: ;
	MAISM.	echnology ECHNOLOGY CORPO	COLL HERON		

#### 5. Taping Format:

- 15mm pitch/lead spacing 7.5mm taping
  - [eadlfode: \*BAED? & \*DAED? & \*YAED?
- = 25.4mm pitch/lead spacing 10.0mm taping

Lead Code: *BAFD? & *DAFD? &		Lead Code: *DAN		
read cone. DALD! @ DALD! @	- 201-01	Lead DANG. TOAN		DUBRACE S6 DU
Ahs → Ahz T max Marked side 12 → 11 = 11	Dmax F Ød	Tmax Dmax Tmax F Ød - 4.0a	nofkınk nə∝ Hiqhot 1.	* <b>T</b> ød-[- * <b>X</b> *
POE Part Number	A. A.	BAFD7	*DAFD7 *XAFD7	*BAMD0 *DAMD0 *XAMD0
Item	Symbol	Dimensions (mm)	Dimensions (mm)	Dimensions (mm)
Pitch of component	17/ <b>P</b> 🖏	15.0	2015.0	25.4
Pitch of sprocket	P0	15.0±0.3	15.0±0.3	12.7±0.3
Lead spacing	F	7.5±1.0	7.5±1.0	10.0±1.0
Length from hole center to component center	P2	PASSIVE SY7.5±1.5_LIANCE	7.5±1.5	$12.7 \pm 1.5$
Length from hole center to lead	BPE	3.75±1.0	3.75±1.0	7.7±1.5
Body diameter	%D%	See the "3. Capacitance v	value vs. Rate vo	oltage, product diameter"
Deviation along tape, left or right	∆s		0±2.0	
Carrier tape width	W	Provide the second seco	18.0 +1/-0.5	
Position of sprocket hole	W1	nology	9.0±0.5	
Lead distance between the kink and center of sprocket hole	но	LCHNOLOGY CORPORATION	18.0+2.0/-0	18.0+2.0/-0 For: *DAMD0 *XAMD0
Lead distance between the bottom of body and the center of sprocket hole	Н	20.0+1.5/-1.0		20.0+1.5/-1.0 For: *BAMD0
Protrusion length	l	2.0max (Or the end	l of lead wire may be inside the tape.)	
Diameter of sprocket hole	D0		4.0±0.2	
Lead diameter	φd		$0.55 \pm 0.05$	
Total tape thickness	t1	0.6±0.3		
Total thickness, tape and lead wire	t2	1.5 max.		
Deviation across tape	h1 h2	2.0 max. 2.0 max.		
Portion to cut in case of defect	L	11.0 max.		
Hole-down tape width	W0		11.5min	
Hole-down tape distortion	W2		1.5±1.5	
Coating extension on leads	e	3.0 max for straight lead sty		the kink leads for kink lead
Body thickness	T			oltage, product diameter"
Body mickiess	1	See the 5. Capacitallet V	and vo. Rate vo	shage, product diameter

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#### 6. Specification and test method:

- 6.1 SCOPE: THIS SPECIFICATION APPLIES TO TEMPERATURE COMPENSATING CONSTANT, 3KV CERAMIC CAPACITOR.
- 6.2 TEST CONDITIONS:

UNLESS OTHERWISE SPECIFIED, ALL TESTS SHALL BE OPERATED AT THE STANDARD TEST CONDITIONS OF TEMPERATURE 5°C TO 35°C AND RELATIVE HUMIDITY 45% TO 85%. WHEN FAILS A TEST, RETEST BE OPERATED AT THE CONDITIONS OF TEMPERATURE 25°C  $\pm$  2°C, RELATIVE HUMIDITY OF 60% TO 70% AND BAROMETRIC PRESSURE 860 TO 1060 MBAR.

- 6.3 HANDLE PROCEDURE: TO AVOID UNEXPECT TESTING RESULTS FROM OCCURING, THE TESTED CAPACITOR MUST BE KEPT AT ROOM TEMPERATURE FOR AT LEAST 30 MINUTES AND COMPLETELY DISCHARGED.
- 6.4 TEST ITEMS:

ITEM	POST-TEST	TESTING PROCEDURE
APPEARANCE	REQUIREMENTS	
STRUCTURE SIZE	NO ABNORMALITIES	AS STATED IN SECTION 3.1 & 3.2
MARKING		AS STATED IN SECTION 4
	BETWEEN TERMINALS: NO ABNORMALITIES	RATED VOLTAGE 6KVDC: 150% OF THE RATED VOLTAGE FOR 1 TO 5 SECONDS.(TEST VOLTAGE : 9000VDC, 1~5 SEC), WITH 50mA MAX. CHARGING CURRENT
WITHSTAND VOLTAGEN	BETWEEN TERMINAL AND ENCLOSURE : NO ABNORMALITIES	SMALL METALLIC BALLS WITH 1mm DIAMETERS SHALL BE PUT ON A VESSEL AND THE TEST CAPACITOR SHALL BE SUBMERGED EXCEPT 2mm FROM THE TOP OF ITS COMPONENT BODY. THE TEST VOLTAGE SHALL BE APPLIED BETWEEN THE SHORT-CIRCUITED TERMINALS AND THE METALLIC BALLS. (APPLY 1.3KV DC OF RATED VOLTAGE BETWEEN TERMINALS AND ENCLOSURE FOR 1~5 SEC)
INSULATION RESISTANCE	10000 MΩ MIN	INSULATION RESISTANCE SHALL BE MEASURED AT 60±5 SECONDS AFTER RATED VOLTAGE APPLIED. RATED VOLTAGE : 500VDC
CAPACITANCE	TOLERANCE : J : ±5% , K : ±10%	TESTING FREQUENCY: 1MHZ $\pm$ 20 % TESTING TEMPERATURE: 25 $\pm$ 2°C TESTING VOLTAGE: 1.0 $\pm$ 0.2 VRMS
OPERATING TEMPERATURE RANGE		ERATURE RANGE : $-25^{\circ}$ C TO $+125^{\circ}$ C TEMPERATURE RISE OF $+20^{\circ}$ C)
Q FACTOR)	$\begin{array}{c c} 30 \text{PF\&Above} & \text{Below 30 PF} \\ \hline \ge 1000 & \ge 400 + 20 \times \end{array}$	AS ABOVE STIPULATION OF CAPACITANCE
TEMPERATURE CHARACTERISTIC	Temperature coefficient: SL: +350 ~ -1000ppm/°C (+20°C ~+85°C) CAPACITANCE TOLERANCE: SL WITHIN ±0.2% OR ±0.05PF, WHICHEVER IS LARGE	ACCORDING TO STEP 1 TO 5 IN ORDER, MEASURED CAPACITANCE WHEN TEMPERATURE REACH BALANCE AND TEMPERATURE COEFFICIENT SHALL BE CALCULATED ON THE FOLLOWING FORMULA : PPM/°C =(C2-C1)×10E6/C1(T2-T1) STEP 1,3,5: 25°C STEP 4: 85°C STEP 2: -25°C , SL(+20°C) NOTE : C1 = CAPACITANCE AS STEP 3 C2 = CAPACITANCE AS STEP 2 OR 4 T1 = TEMPERATURE AS STEP 2 OR 4 ACCORDING TO ABOVE STEP 1,3 & 5, CAPACITANCE TOLERANCE SHALL BE CALCULATED ON THE FOLLOWING FORMULA : $\triangle C \% = (G - S)/C1$ NOTE: G = GREATEST CAPACITANCE AS TESTING RESULT OF STEP 1,3 & 5 S = LEAST CAPACITANCE AS TESTING RESULT OF STEP 1,3 & 5 C1 = CAPACITANCE AS STEP 3

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**PSA** 

ITEM	POST-TEST REQUIREMENTS	TESTING PROCEDURE	
TERMINAL	TENSIBLE STRENGTH: NO BREAKDOWN	WIRE DIA.0.6mm, LOADING WEIGHT 1.0KG FOR 10 SECONDS	
STRENGTH	BENDING STRENGTH: NO BREAKDOWN	WIRE DIA.0.6mm, LOAIDNG WEIGHT 0.5 KG. (BENDING BACK AND FORTH 90 DEGREE TWICE)	
	APPEARANCE: NO ABNORMALITIES	AS SHOWN IN FIGURE, THE LEAD WIRES SHOULD BE IMMERSED IN THE MOLTEN SOLDER UP TO 1.5 TO 2.0mm FROM THE ROOT OF TERMINAL.	
SOLDERING HEAT	CAP.CHANGE: SL WITHIN ±2.5% OR ±0.25PF, WHICHEVER IS LARGE.	(A) BODY DIA. ≤ 6.3mm:INTO THE MOLTEN SOLDER	
RESISTANCE	WITHSTAND VOLTAGE: (BETWEEN TERMINALS) NO ABNORMALITIES	<ul> <li>OF WHICH TEMPERATURE: 270±5℃ FOR 3±0.5 SECONDS.</li> <li>(B) BODY DIA. &gt; 6.3mm:INTO THE MOLTEN SOLDER OF WHICH TEMPERATURE 350±10℃ FOR 3±0.5 SECONDS</li> <li>THEN LEAVE AT STANDARD TEST CONDITIONS FOR 24±2 HOURS, THEN MEASURED.</li> </ul>	
SOLDERABILITY	LEAD WIRE SHALL BE PASSIVE S SOLDERED OVER 75% OF THE CIRCUMFERENTIAL DIRECTION.	TO COMPLY WITH JIS-C-5102 8.4 SOLDER TEMPERATURE 245±5°C AND DIPPING TIME 5±0.5 SECONDS FLUX : WEIGHT RATIO OF POSIN 25%	
	APPEARANCE: NO ABNORMALITIES	DIOGY COTP BY CORPORATION, ALLAST	
HUMIDITY	CAP.CHANGE: SL WITHIN ±5% OR ±0.5PF, WHICHEVER IS LARGE.	CAPACITORS SHALL BE SUBJECTED TO A RELATIVI	
CHARACTERISTI C(STABLE SITUATION)	Q FACTOR: SL LESS THAN 10PF => $Q \ge 200 + 10 \times C$ MORE THAN 10PF AND LESS THAN 30PF => $Q \ge 275 + 5 \times C/2$ MORE THAN 30PF => $Q \ge 350$	HUMIDITY OF 90 $\sim$ 95% AT 40±2°C FOR 500(+24/-0) HOURS. THEN DRIED FOR 1 $\sim$ 2 HOURS AND MEASURED.	
	INSULATION RESISTANCE: 1000MΩ MIN.		

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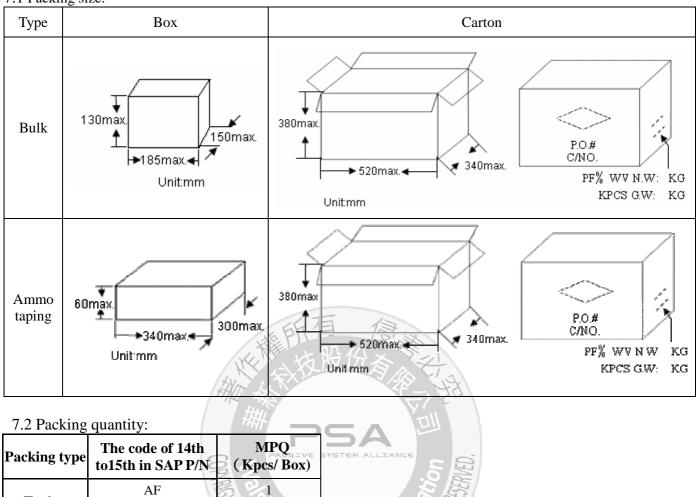
ITEM POST-TEST REQUIREMENTS		TESTING PROCEDURE	
	APPEARANCE: NO ABNORAMLITIES	, CAPACITORS SHALL BE SUBJECTED TO A RELATIVE HUMIDITY OF 90 $\sim$ 95% AT 40 ± 2°C FOR 500(+24/-0) HOURS WITH RATED VOLTAGE APPLIED WITH 50mA MAX. THEN DRIED FOR 1 $\sim$ 2 HOURS AND MEASURED.	
HUMIDITY	CAP.CHANGE: SL WITHIN ±7.5 % OR ±0.75PF, WHICHEVER IS LARGE.		
LOADING	Q FACTOR: SL LESS THAN 30PF => $Q \ge 100 + 10 \times C/3$ MORE THAN 30PF => $Q \ge 200$		
	INSULATION RESISTANCE: 500 MΩ MIN		
	APPEARANCE : NO ABNORMALITIES	「「「「「「「「「」」」	
HIGH	CAP.CHANGE : WITHIN ±3 % OR ±0.3PF, WHICHEVER IS LARGE.	150% RATED VOLTAGE WITH 50mA max.	
TEMPERATURE LOADING	Q FACTOR: SL: LESS THAN 10PF => $Q \ge 200 + 10 \times C$	FOR 1000(+48/-0) HOURS AT 125±2°C AND THEN DRIED FOR 1~2 HOURS AND MEASURED.	
	MORE THAN 10PF AND LESS THAN 30PF =>Q $\geq$ 275 +5 × C/2 MORE THAN 30PF => Q $\geq$ 350	alogy Corport	
	INSULATION RESISTANCE: $1000 \text{ M}\Omega \text{ MIN.}$	DY CORPORATION. HI	

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## 7.Packing Baggage :

7.1 Packing size:



Packing type	MPQ (Kpcs/Bag)
Bulk	1

AM

0.5

TECHNOI

Chnolog

Taping

# 8. Notices:

# 8.1 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 applied to the circuit, starting or stopping may generate irregular voltage for a transit period because of resonance or switching. Be sure to use a capacitor with a rated voltage range that includes these irregular voltages.

Voltage	DC Voltage DC+AC Voltage		AC Voltage	Pulse Voltage (1)	Pulse Voltage (2)
Positional measurement	Vo-p	V0-p	Vp-p	Vp-p	Vp-p

### 8.2 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 similar current, it may self-generate heat due to dielectric loss. The frequency of the applied sine wave voltage should be less than 100kHz. The applied voltage load (\*) should be such that the capacitor's self-generated heat is within 20°C at an atmosphere temperature of 25°C. When measuring, use a thermocouple of small thermal capacity-K of ø0.1mm in conditions where the capacitor is not affected by radiant heat from other components or surrounding ambient fluctuations.

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.)

### 8.3 Fail-Safe

When capacitor is 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.

#### 8.4 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 % for 6 months maximum and use within the period after receiving the capacitors.

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.

#### 8.5 Vibration and impact

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

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#### 8.6 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 degrees C. max.

Soldering iron wattage : 50W max.

Soldering time : 3.5 sec. max.

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.

## 8.7 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.

#### 8.8 Rating

Capacitance change of capacitor

I. Class 1 series (Temp. Char. SL)

Capacitance might change a little depending on the surrounding temperature or an applied voltage.

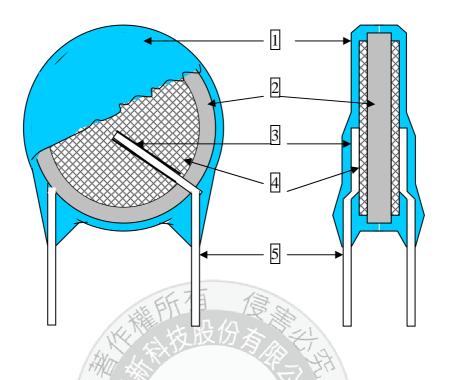
Please contact us if you intend to use this product in a strict time constant circuit.

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# 9.Drawing of internal structure and material list:

產品結構圖



### **Remarks** :

No.	Part name	Material	Model/Type	Component
1	Insulation Coating	Epoxy polymer	1.EF-150C Alliance 2.EF-150(HF) 3.PCE-210 2.PCE-300(HF)	Epoxy resin、Pigment (Blue / UL 94 V-0 /) The minimum thickness of coating (reinforced insulation) is 0.4mm
2	Dielectric Element	Ceramic	hpology Corp	BaTiO <sub>3</sub>
3	Solder	Tin-silver ECA	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±0.05 mm	Substrate metal: Fe & Cu Surface plating: Sn 100%(3~7µm)