PRODUCT SPECIFICATION

PRODUCT: CERAMIC DISC CAPACITOR

TYPE: 50V, 100V, 500V, 1KV, 2KV, TEMPERATURE COMPENSATING CAPACITOR

CUSTOMER: _____

DOC. NO.: POE-D01-00-E-16

Ver.: 16

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

MAKER：PAN OVERSEAS (GUANGZHOU) ELECTRONIC CO.,LTD.

NO.277,HONG MING ROAD,EASTERN SECTION,
GUANG ZHOU ECONOMIC AND TECHNOLOGY
DEVELOPMENT ZONE,CHINA

Record of change

<table>
<tr><th>Date</th><th>Version</th><th>Description</th><th>page</th></tr>
<tr><td>2008.6.3</td><td>1</td><td>1. D08-00-E-14 (before) → POE-D01-00-E-01 (1st edition)</td><td></td></tr>
<tr><td>2008.8.22</td><td>2</td><td>1.Revised diameter as below :
<table>
<tr><th>Before</th><th>Now</th><th>Before</th><th>Now</th></tr>
<tr><td>CH5000R5X040*</td><td>not available</td><td>SL500181X060*</td><td>SL500181X050*</td></tr>
<tr><td>CH1010R5X040*</td><td>not available</td><td>SL500241X070*</td><td>SL500241X060*</td></tr>
<tr><td>CH501360X050*</td><td>CH501360X060*</td><td>SL500361X080*</td><td>SL500361X070*</td></tr>
<tr><td>CH501620X080*</td><td>CH501620X060*</td><td>SL500391X080*</td><td>SL500391X070*</td></tr>
<tr><td>CH501680X080*</td><td>CH501680X060*</td><td>SL101181X060*</td><td>SL101181X050*</td></tr>
<tr><td>CH501750X080*</td><td>CH501750X060*</td><td>SL101241X070*</td><td>SL101241X060*</td></tr>
<tr><td>CH501820X080*</td><td>CH501820X070*</td><td>SL101361X080*</td><td>SL101361X070*</td></tr>
<tr><td>CH501101X080*</td><td>CH501101X070*</td><td>SL101391X080*</td><td>SL101391X070*</td></tr>
<tr><td>CH102080X060*</td><td>CH102080X050*</td><td>SL102680X060*</td><td>SL102680X050*</td></tr>
<tr><td>CH102100X060*</td><td>CH102100X050*</td><td>SL102121X100*</td><td>SL102121X060*</td></tr>
<tr><td>CH102120X060*</td><td>CH102120X050*</td><td>SL102151X100*</td><td>SL102151X070*</td></tr>
<tr><td>CH102620X080*</td><td>CH102620X070*</td><td>SL102181X100*</td><td>SL102181X070*</td></tr>
<tr><td>CH102820X100*</td><td>CH102820X080*</td><td>SL102201X100*</td><td>SL102201X080*</td></tr>
<tr><td></td><td></td><td>SL102221X100*</td><td>SL102221X080*</td></tr>
</table>
2. Complete lead code
3.Add last SAP code “ H” for halogen and Pb free , epoxy resin..</td><td>8-9
6-7
5</td></tr>
<tr><td>2008.12.12</td><td>3</td><td>1. Complete the 13th to 17th codes of SAP P/N.
2. Page layout adjustment.
3. Added Marking when the coating resin is Halogen and PB free Epoxy.</td><td>5-9</td></tr>
<tr><td>2009.8.19</td><td>4</td><td>1 Change PSA & POE logo to Walsin & POE logo.
2.Operating temperature range change from -25℃ ～ +85℃ to -25℃ ～ +125℃,
and the loading temperature of High Temperature Loading change from +85℃ to +125℃
(but the T.C.C temperature didn’t change).</td><td>13
15</td></tr>
<tr><td>2010.8.24</td><td>5</td><td>1. Change the diameter dimension from 060 to 070 for P/N CH 500V 62pF&68pF&75pF.
2. Add 10pF~39pF(Code of diameter dimension is 050) for P/N SL 1KV.</td><td>8
9</td></tr>
<tr><td>2012/5/10</td><td>6</td><td>1). Review the size Dφ of the item CH/500V/121&151 from “100” to be “080”;
2). Review the size Dφ for the item CH/1000V/820 from “080” to be “070”, CH/1000V/101 from “100” to be “070”.</td><td>8
8</td></tr>
<tr><td>2012/12/5</td><td>7</td><td>Add 8.6. Ambient Temp of Allowable Voltage Graph (500Vdc to 2kVdc)</td><td>18-19</td></tr>
<tr><td>2013/5/6</td><td>8</td><td>1. Review the Lead diameter φ from 0.60 +/-0.06mm to 0.55+/-0.05mm
2. Review the “DΦ≤6.0mm shall be omitted.” to “ DΦ≤060 shall be omitted.”
3. Review the Solderability temperature from 255(+5/-0)℃ to 245±5℃，Solderability time from 2 ±0.5s to 5±0.5s.</td><td>7,10
9
13</td></tr>
<tr><td>2013/10/18</td><td>9</td><td>Review the packing specification</td><td>11</td></tr>
<tr><td>2015/8/31</td><td>10</td><td>Modify the contents of the use of epoxy resin for 1KV products</td><td>8-9</td></tr>
<tr><td>2015/9/23</td><td>11</td><td>1. Modify the contents of the temperature characteristic.
2. Delete the definition about“Old Part No.”.
3. Delete 300 Pf~391 pF (Code of diameter dimension is 110&120) for P/N CH 50V&100V.
4. Delete 82 pF &100 pF (Code of diameter dimension is 070) and 120 pF &150 pF (Code of diameter dimension is 080) for P/N CH 500V.
5. Delete 56 pF &68pF~100pF (Code of diameter dimension is 070) for P/N CH 1KV.
6. Delete 4pF~22pF (Code of diameter dimension is 060) and 24pF~47pF (Code of diameter dimension is 070) for P/N CH 2KV.</td><td>5,
6,7
8
8
8
8</td></tr>
<tr><td>2016/3/2</td><td>12</td><td>1. Review the Available lead code of Lead Configuration.
2. Review 8.6. Ambient Temp of Allowable Voltage Graph (500Vdc to 2kVdc)
3. Review 9. Drawing of internal structure and material list</td><td>6-7
17-18
19</td></tr>
</table>

<table>
<tr><th>Date</th><th>Version</th><th>Description</th><th>page</th></tr>
<tr><td>2016/5/3</td><td>13</td><td>1. Revised diameter as below :
<table>
<tr><th>Before</th><th>Now</th></tr>
<tr><td>SL202181J100*</td><td>SL202181J080*</td></tr>
<tr><td>SL202201J100*</td><td>SL202201J080*</td></tr>
<tr><td>SL202221J100*</td><td>SL202221J080*</td></tr>
<tr><td>SL202241J100*</td><td>SL202241J080*</td></tr>
<tr><td>SL202271J100*</td><td>SL202271J080*</td></tr>
<tr><td>SL202301J120*</td><td>SL202301J110*</td></tr>
<tr><td>SL202331J120*</td><td>SL202331J110*</td></tr>
</table></td><td>9</td></tr>
<tr><td>2016/11/3</td><td>14</td><td>1. Delete “CH” series.</td><td>5,8,12~13</td></tr>
<tr><td>2016/12/21</td><td>15</td><td>1. Revised the product diameter for SL 50V~500V</td><td>8</td></tr>
<tr><td>2017/9/27</td><td>16</td><td>1. Delete 8pF~12pF (Code of diameter dimension is 040) for P/N SL 50V&100V.
2. Delete 8pF~15pF (Code of diameter dimension is 050) for P/N SL 500V.
3. Delete 10pF~12pF (Code of diameter dimension is 050) for P/N SL 1KV.</td><td>8</td></tr>
</table>

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1. Part number for SAP system(total eighteen code)：

SL ❶ 102 ❷ 470 ❸ J ❹ 050 ❺ B ❻ 20 ❼ C ❽ 5 ❾ H ❿

❶ Temperature characteristic：
SL: +350~-1000ppm/℃

❷ Rated voltage (Vdc)：

Voltage	50V	100V	500V	1000V	2000V
Code	500	101	501	102	202

❸Capacitance(pF)：

Capacitors (pF)	47	100	330	470	820
Code	470	101	331	471	821

❹Capacitance tolerance： D: ±0.5pF (For6~10pF)、J: ±5% (For above 10pF)

❺ Nominal body diameter dimension：

Diameter size	4mm	5mm	6mm	7mm	8mm	9mm	10mm	11mm	12mm
Code	040	050	060	070	080	090	100	110	120

❻ Code of lead type：Please refer to Item “2.Mechanical”.

❼Packing mode and lead’s length (identified by 2-figure code)

Taping Code	Description
AN	Ammo / Pitch of component:12.7 mm

Bulk Code	Description
3E	Lead’s length L：3.5mm
04	Lead’s length L：4mm
4E	Lead’s length L：4.5mm
20	Lead’s length L：20mm

❽Length tolerance

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

❾Pitch

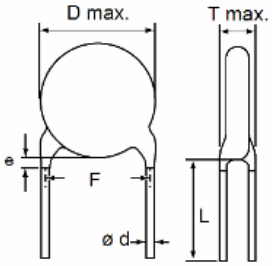
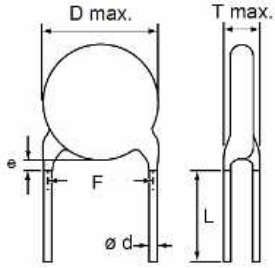
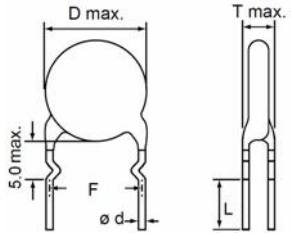
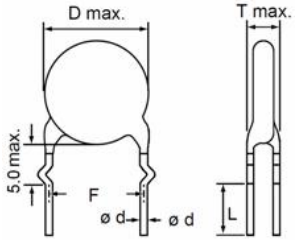
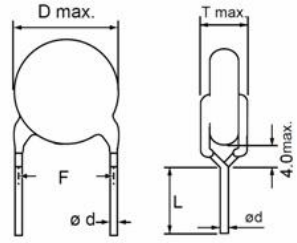
Code	Description	Code	Description
5	5.0±0.8mm (For Bulk)	7	7.5 ±1mm
5	5.0+0.8mm-0.2mm (For Taping)	0	10.0 ±1mm
2	2.5 ±0.8 mm		

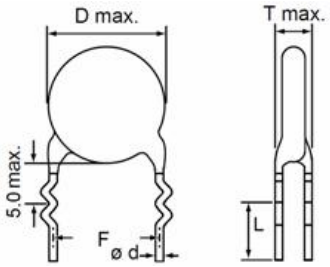
❿Coating code

Code	Description
P	Phenolic resin -Pb free
A	Halogen free and Pb free, phenolic resin
B	Epoxy Resin , Pb free
H	Halogen free and Pb free , epoxy resin

2. Mechanical:

Available lead code: (unit: mm)

Lead type	SAP P/N (13-17) digits	Pitch (F)	Lead length (L)	Available rated voltage	Packing	Lead configuration
Lead style：B Straight long lead	B20C2	2.5 ± 0.8	20 MIN.	50V&100V	Bulk	
	B20C5	5.0 ± 0.8	20 MIN.	50V&100V, 500V, 1KV,2KV		
	B20C6	6.4 ± 1.0	20 MIN.			
	B20C0	10 ± 1.0	20 MIN.			
	B20C7	7.5 ± 1.0	20 MIN.			
	BAND5	5.0 $^{+0.8}_{-0.2}$	Taping Spec. (Ref. to page.10)		Tap. Ammo	
	BAND2	2.5 ± 0.8		50V&100V		
Lead style：L Straight short lead	L05B2	2.5 ± 0.8	5.0 ± 1.0	50V&100V, 500V, 1KV, 2KV	Bulk	
	L05B5	5.0 ± 0.8	5.0 ± 1.0			
	L05B0	10 ± 1.0	5.0 ± 1.0			
	L05B6	6.4 ± 1.0	5.0 ± 1.0			
	L05B7	7.5 ± 1.0	5.0 ± 1.0			
	L4EB5	5.0 ± 0.8	4.5 ± 1.0			
	L4EB7	7.5 ± 1.0	4.5 ± 1.0			
	L4EB0	10 ± 1.0	4.5 ± 1.0			
Lead style：H Inside kink lead	H3EA5	5.0 ± 0.8	3.5 ± 0.5	50V&100V, 500V, 1KV	Bulk	
	H04A5	5.0 ± 0.8	4.0 ± 0.5			
	H4EB5	5.0 ± 0.8	4.5 ± 1.0			
	H05B5	5.0 ± 0.8	5.0 ±1.0			
	H20C5	5.0 ± 0.8	20 MIN.			
	HAND5	5.0 $^{+0.8}_{-0.2}$	Taping SPEC. (Ref. to page.10)		Tap. Ammo	
	H05B7	7.5 ± 1.0	5.0 ±1.0	50V&100V, 500V, 1KV,2KV	Bulk	
	H05B0	10 ± 1.0	5.0 ±1.0			
	H20C0	10 ± 1.0	20 MIN.			
	H04A7	7.5 ± 1.0	4.0 ± 0.5			
	H04A0	10 ± 1.0	4.0 ± 0.5			
	H3EA7	7.5 ± 1.0	3.5 ± 0.5			
	H3EA0	10 ± 1.0	3.5 ± 0.5			
	H4EB7	7.5 ± 1.0	4.5 ± 1.0			
	H4EB0	10 ± 1.0	4.5 ± 1.0			
Lead style：X Outside kink lead	X3EA5	5.0±0.8	3.5 ± 0.5	50V&100V, 500V, 1KV, 2KV	Bulk	
	X3EA7	7.5±1.0				
	X3EA0	10±1.0				
	X04A5	5.0±0.8	4.0 ± 0.5			
	X04A7	7.5±1.0				
	X04A0	10±1.0				
	X05B5	5.0±0.8	5.0 ± 1.0			
	X05B7	7.5±1.0				
	X05B0	10±1.0				
Lead style：D Vertical kink short lead	D04A5	5.0±1.0	4.0 ± 0.5	50V&100V, 500V, 1KV, 2KV	Bulk	
	D04A7	7.5±1.0				
	D04A0	10±1.0				
	D3EA5	5.0±0.8	3.5 ± 0.5			
	D3EA7	7.5±1.0				
	D3EA0	10±1.0				
	DAND5	5.0 $^{+0.8}_{-0.2}$	Taping SPEC. (Ref. to page.10)		Tap. Ammo	

Lead type	SAP P/N (13-17) digits	Lead length (L)	Available rated voltage	Packing	Lead configuration
Lead style：M Double outside kink lead	M05B5	5.0 ± 1.0	50V&100V, 500V, 1KV, 2KV	Bulk	
	M05B7				
	M05B0				
	M04B5	4.0 ± 1.0			
	M04B7				
	M04B0				

※ 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.

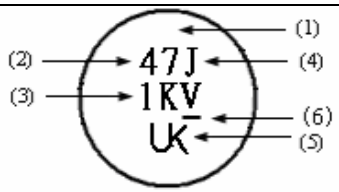
For kink lead style: not exceed the kink.

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

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

T.C	SL																			
Rate voltage	50V/100V							500V					1KV				2KV			
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	150												150				150			
18	180							180					180				180			
20	200							200					200				200			
22	220							220					220				220			
24	240							240					240				240			
27	270							270					270				270			
30	300							300					300				300			
33	330							330					330				330			
36	360							360					360				360			
39	390							390					390				390			
47	470							470					470				470			
51	510							510					510				510			
56	560							560					560				560			
68	680							680					680				680			
75	750							750						750			750			
82	820							820						820			820			
100	101							101						101				101		
120		121							121					121					121	
150		151							151						151				151	
180		181								181					181				181	
200			201							201						201			201	
220			221							221						221			221	
240			241								241								241	
270				271							271								271	
300				301							301									301
330				331							331									331
360				361								361								
390				391								391								
470					471															
500						501														
510						511														
560						561														
680							681													
750							751													
820							821													
PACKING	TAPING or BULK							TAPING or BULK					TAPING or BULK				TAPING or BULK			BULK
COATING	Phenolic resin												Phenolic resin or Epoxy Resin				Epoxy Resin			

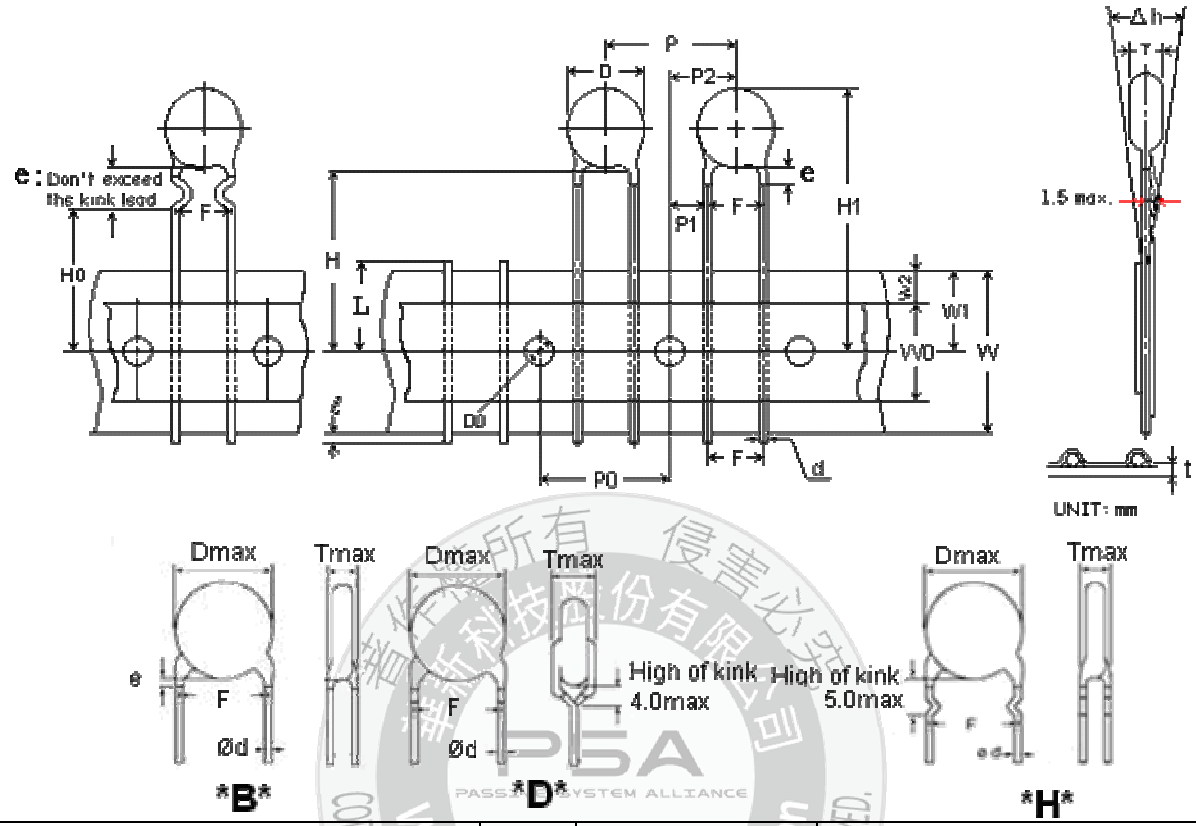
4. Marking:

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

5. Taping specifications:

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

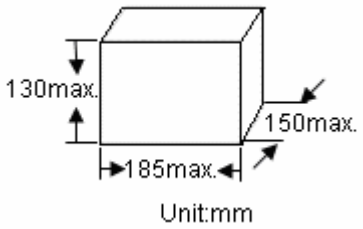
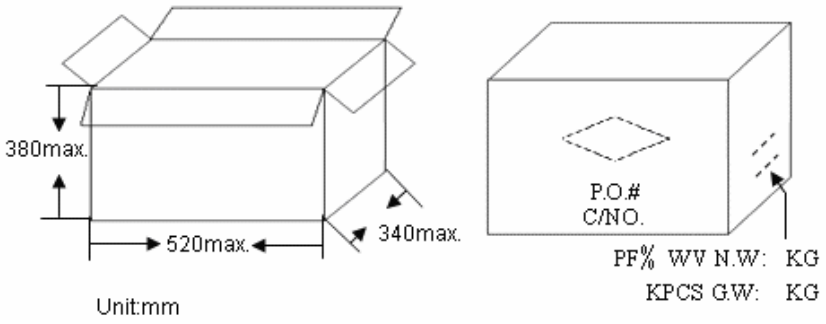
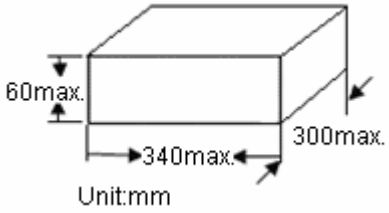
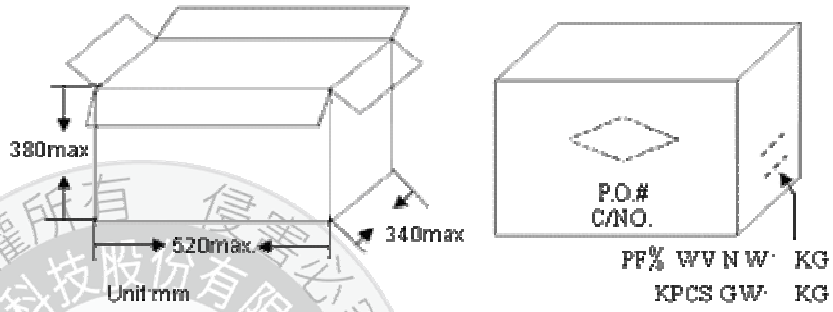
- **12.7mm pitch/lead spacing 5.0mm taping**
  Lead code: *BAND5 & *DAND5 & *HAND5



Item		Symbol	Specification		Remarks
			Value	Tolerance	
Body diameter		D	*	max.	See Section“3. Capacitance value vs. rated voltage, product diameter”.
Body thickness		T	*	max.	
Lead-wire diameter		d	0.55	±0.05	
Pitch of component		P	12.7	±1.0	
Feed hole pitch		P0	12.7	±0.3	Cumulative pitch erroe:1.0mm/20 pitch
Feed hole center to lead		P1	3.85	±0.7	To be measured at bottom of clinch
Hole center to component center		P2	6.35	±1.3	
Lead-to-lead distance		F	5.0	+0.8,-0.2	
Component alignment, F-R		△h	0	±2.0	
Tape width		W	18.0	+1.0,-0.5	
Hole-down tape width		W0	8.0	min.	
Hole position		W1	9.0	+0.75,-0.5	
Hole-down tape position		W2	3.0	max.	
Height of component form tape center	For straight lead type	H	20.0	+1.0 -0.5	
	For kinked lead type	H0	16.0	±0.5	
Component height		H1	32.25	max.	
Lead-wire protrusion		l	2.0	max.	Or the end of lead wire may be inside the tape.
Food hole diameter		D0	4.0	±0.2	
Total tape thickness		t	0.7	±0.2	Ground paper:0.5±0.1mm
Length of sniped lead		L	11.0	max.	
Coating rundown on leads		e	Please refer to page 6 “e(Coating extension on leads)”.		

6. Packing Baggage：

6.1 Packing size:

Type	Box	Carton
Bulk		
Ammo taping		

6.2 Packing quantity:

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

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℃ TO 35℃ AND RELATIVE HUMIDITY 45% TO 85%. WHEN FAILS A TEST, RETEST BE OPERATED AT THE CONDITIONS OF TEMPERATURE 25℃ ± 2℃, 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			AS STATED IN SECTION 4
WITHSTAND VOLTAGE	BETWEEN TERMINALS: NO ABNORMALITIES		A. BELOW 1KV: 300% RATED VOLTAGE WITH 50mA MAX. CHARGING CURRENT FOR 1～5 SEC. B. 1KV & ABOVE: 200% RATED VOLTAGE WITH 50mA MAX. CHARGING CURRENT FOR 1～5 SEC.
	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 : ±0.25PF D : ±0.50PF J : ±5% K : ±10%		TESTING FREQUENCY : 1 MHZ ± 20% TESTING VOLTAGE : 1.0 VRMS
OPERATING TEMPERATURE RANGE	-25℃ ～ +125℃		
Q FACTOR	30 PF & ABOVE	Q ≧1000	AS ABOVE STIPULATION OF CAPACITANCE
	BELOW 30PF	Q ≧ 400+20×C	

<table>
<tr><th>ITEM</th><th>POST-TEST REQUIREMENTS</th><th>TESTING PROCEDURE</th></tr>
<tr><td rowspan="2">TEMPERATURE CHARACTERISTIC</td><td>TEMPERATURE COEFFICIENT :
SL :+350～-1000 ppm/℃
FOR (+20℃~+85℃)</td><td>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/℃ =(C2-C1)×10E6/C1(T2-T1)
<table><tr><td>Step</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>Temp. (℃)</td><td>25±2</td><td>20±3</td><td>25±2</td><td>85±2</td><td>25±2</td></tr></table>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</td></tr>
<tr><td>CAPACITANCE TOLERANCE :
WITHIN ±0.2% OR ±0.05PF,
WHICHEVER IS LARGE</td><td>ACCORDING TO ABOVE STEP 1,3 & 5, CAPACITANCE TOLERANCE SHALL BE CALCULATED ON THE FOLLOWING FORMULA :
△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</td></tr>
<tr><td rowspan="2">TERMINAL STRENGTH</td><td>TENSIBLE STRENGTH :
NO BREAKDOWN</td><td>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.</td></tr>
<tr><td>BENDING STRENGTH :
NO BREAKDOWN</td><td>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)</td></tr>
<tr><td rowspan="3">SOLDERING HEAT RESISTANCE</td><td>APPEARANCE :
NO ABNORMALITIES</td><td rowspan="3">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)℃ FOR 3.0±0.5 SECONDS.
(B) BODY DIA.＞5.0mm: INTO THE MOLTEN SOLDER OF WHICH TEMPERATURE 260(+5/-0)℃ FOR 5~10 SECONDS.
THEN LEAVE AT STANDARD TEST CONDITIONS FOR 1~2 HOURS, THEN MEASURED.
※WHEN SOLDERING CAPACITOR WITH A SOLDERING IRON, IT SHOULD BE PERFORMED IN FOLLOWING CONDITIONS.
TEMPERATURE OF IRON-TIP: 350~400 ℃
SOLDERING IRON WATTAGE : 50W MAX.
SOLDERING TIME : 3.5 SEC. MAX.</td></tr>
<tr><td>CAP.CHANGE :
WITHIN ±2.5% OR ±0.25PF,
WHICHEVER IS LARGE.</td></tr>
<tr><td>WITHSTAND VOLTAGE :
(BETWEEN TERMINALS)
NO ABNORMALITIES</td></tr>
<tr><td>SOLDERABILITY</td><td>LEAD WIRE SHALL BE SOLDERED OVER 75% OF THE CIRCUMFERENTIAL DIRECTION.</td><td>TO COMPLY WITH JIS-C-5102 8.4 SOLDER TEMPERATURE245±5℃ AND DIPPING TIME 5±0.5 SECONDS FLUX : WEIGHT RATIO OF ROSIN 25%</td></tr>
</table>

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

ITEM	POST-TEST REQUIREMENTS	TESTING PROCEDURE
TEMPERATURE CYCLING	APPEARANCE : NO ABNORMALITIES	CAPACITORS SHALL BE SUBJECTED TO: -25±3℃(30±3min) → 25℃(3min) → 125±3℃(30±3min) → 25℃(3min) FOR 5 CYCLE.
	CAP. CHANGE : WITHIN ±5% OR ±0.5PF, WHICHEVER IS LARGE	
	D.F. C ＜30pF : Q≧275+(5/2)C C ≧30pF : Q≧350	
	INSULATION RESISTANCE : 1000 MΩ MIN.	

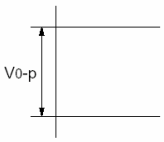
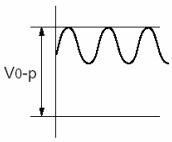
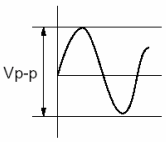
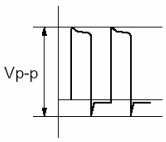
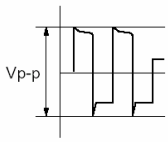
8. Cautions & notices:

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					

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.

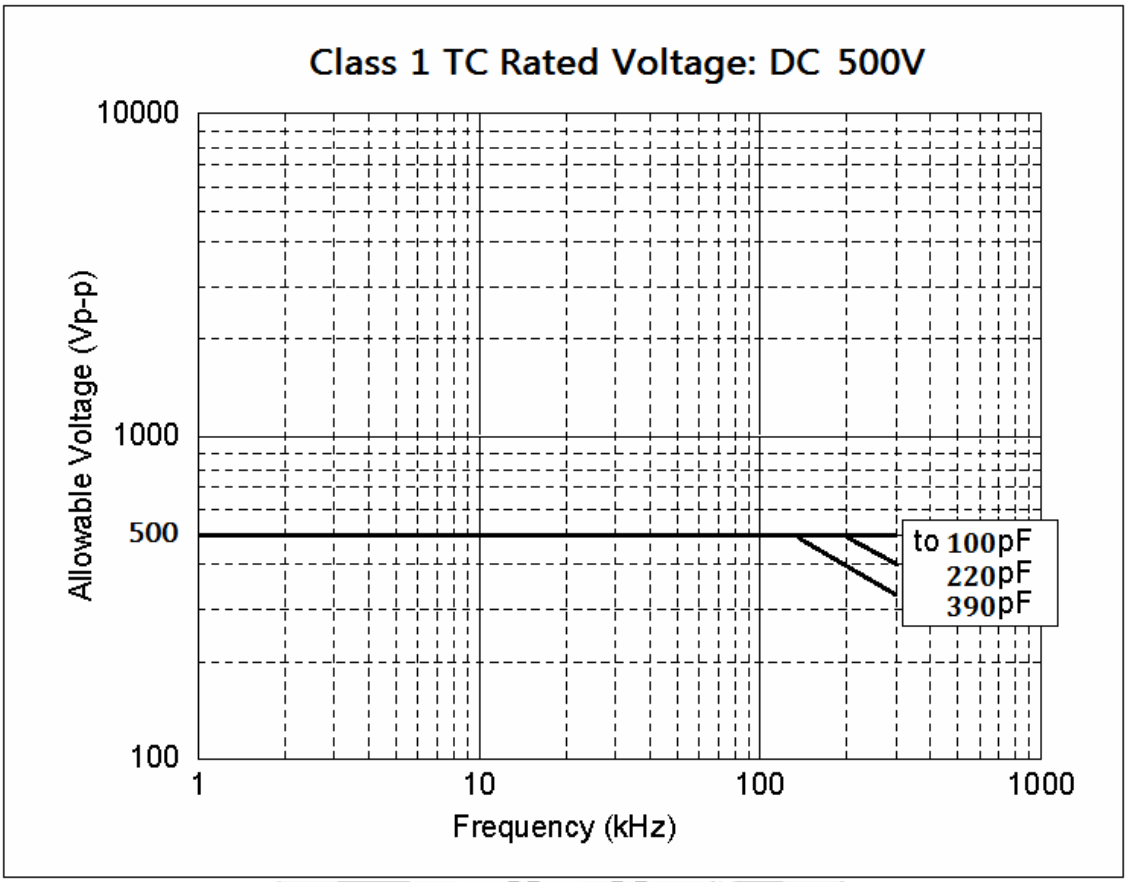
Rinse bath capacity : Output of 20 watts per liter or less.

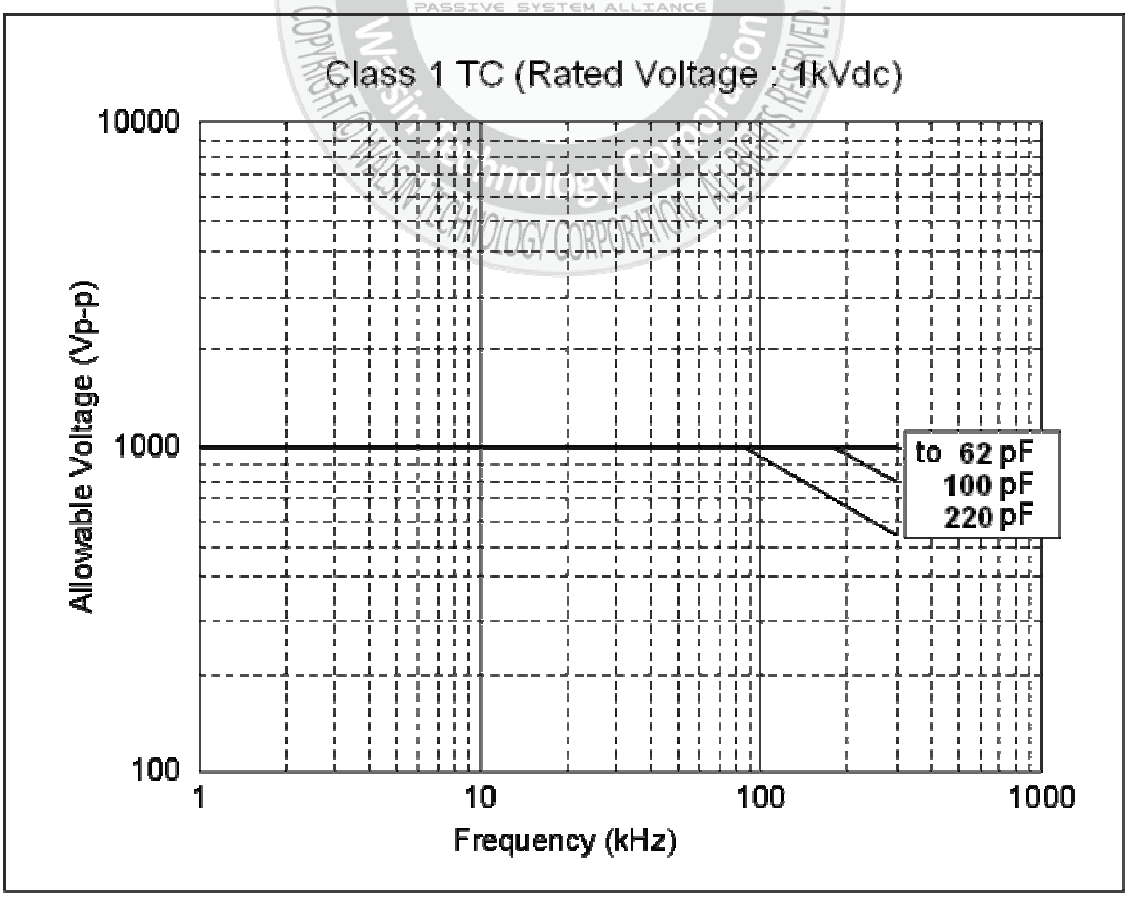
Rinsing time : 5 min. maximum.

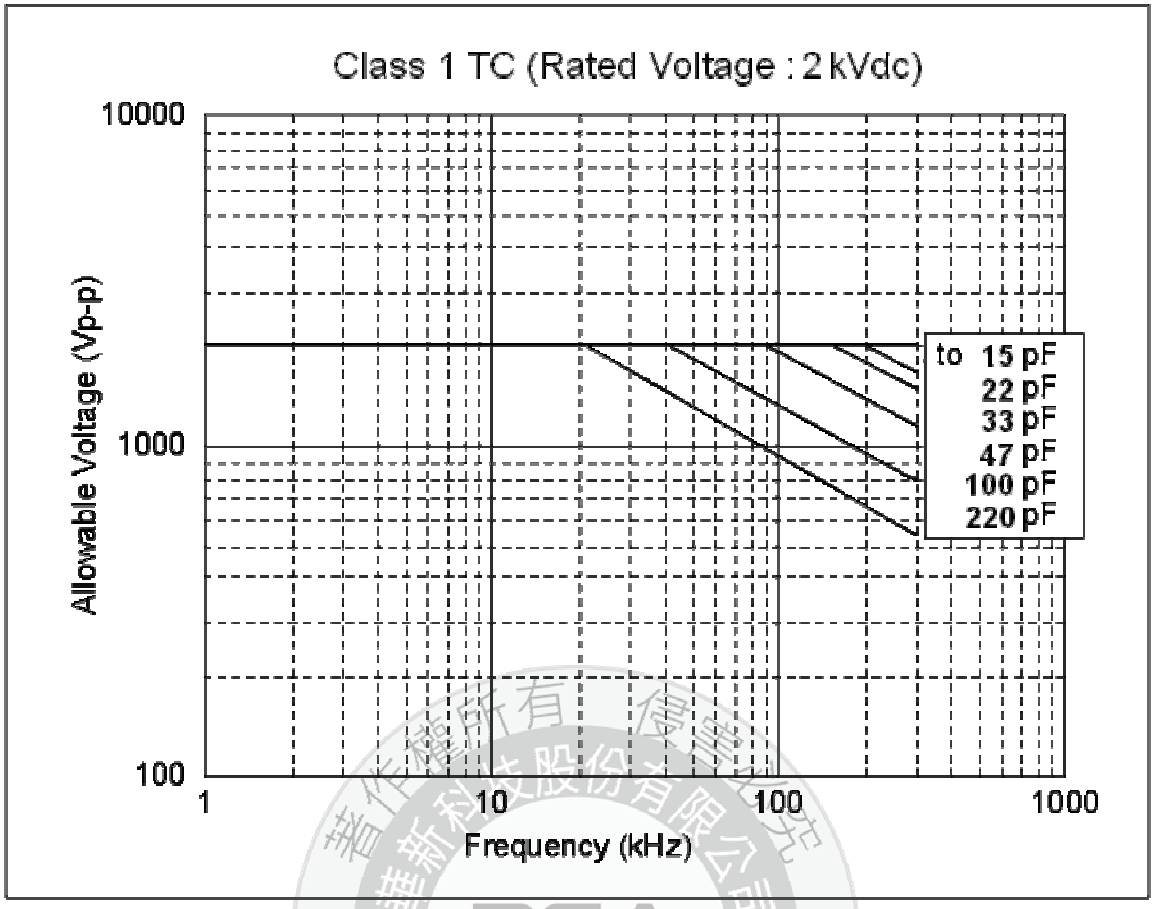
Do not vibrate the PCB/PWB directly.

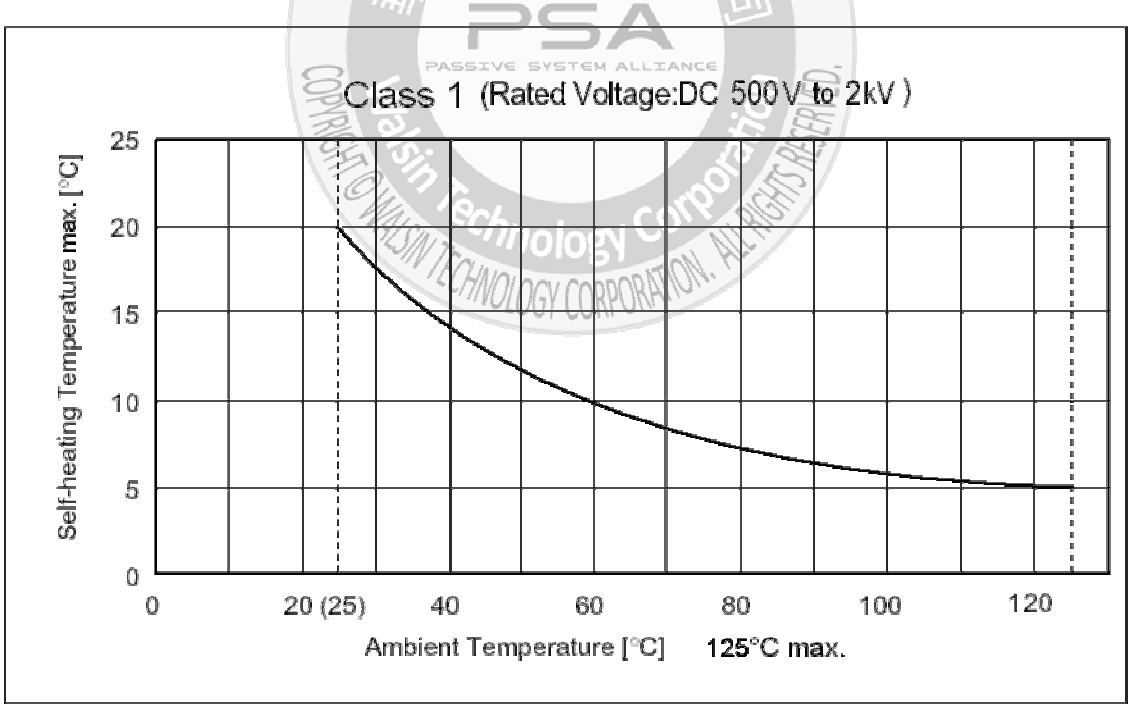
Excessive ultrasonic cleaning may lead to fatigue destruction of the lead wires.

8.6. Ambient Temp of Allowable Voltage Graph (500Vdc to 2kVdc)



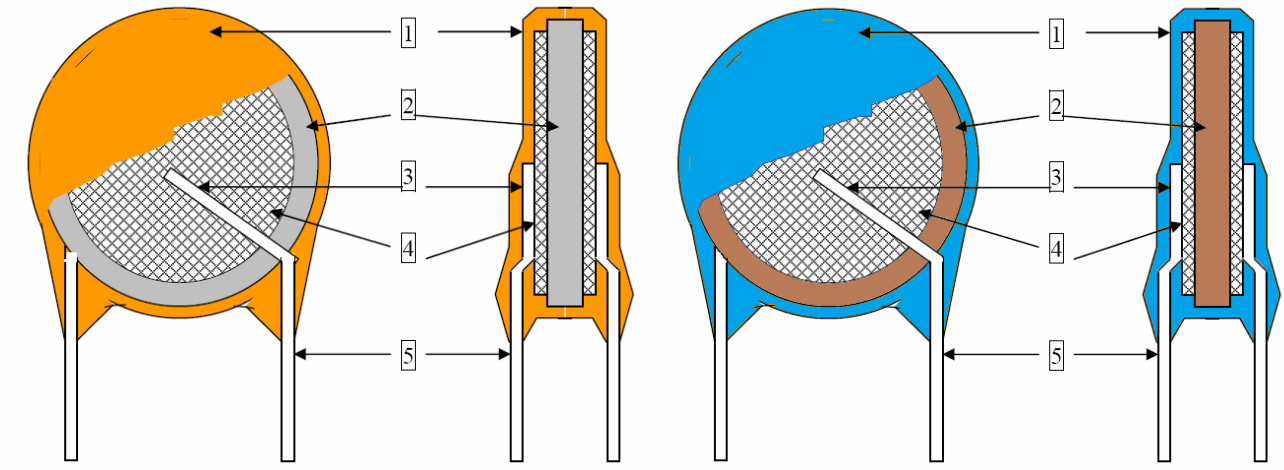






The ambient temperature and the surface temperature of capacitor must be 125℃ or lower. (Including self-heating.)

9. Drawing of internal structure and material list:



(phenolic resin) (epoxy resin)

NO.	部位 Part name	材質 Material	構成部份 Component	供應商 Vendor
1	Insulation Coating	Phenolic resin Epoxy resin	Phenolic resin, Filler, Pigment Epoxy resin, SiO2, TiO2	Namics Kai Hua
2	Dielectric Element	Ceramic	BaTiO3	Hua Xing Wang Feng Fenghua
3	Solder	Tin-silver	Sn97.5-Ag2.5	Huajun Haili
4	Electrodes	Ag	Silver,Glass frit	Daejoo Xinguang
5	Leads wire	Tinned copper clad steel wire	Substrate metal:Fe&Cu Surface plating:Sn 100%	Hengtai Wuhu Taililai

PRODUCT SPECIFICATION

PRODUCT: CERAMIC DISC CAPACITOR

TYPE: 3KV TEMPERATURE COMPENSATING CERAMIC CAPACITOR

CUSTOMER: _____

DOC. NO.: POE-D02-00-E-09

Ver.: 9

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

MAKER：PAN OVERSEAS (GUANGZHOU) ELECTRONIC CO.,LTD.

NO.277,HONG MING ROAD,EASTERN SECTION,
GUANG ZHOU ECONOMIC AND TECHNOLOGY
DEVELOPMENT ZONE,CHINA

Record of change

Date	Version	Description	page
2008.6.3	1	1. F03-00-F-09 (before) → POE-F02-00-F-01 (1st edition)	
2008.8.22	2	1. Complete lead code 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)	5-16 2 ,10 15
2008.12.12	3	1. Complete the 13th to 17th codes of SAP P/N. 2. Page layout adjustment. 3. Added Marking when the coating resin is Halogen and Pb free Epoxy.	4-5
2009/8/19	4.	1. Change PSA & POE logo to Walsin & POE logo. 2. capacity list → 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." 2. Add date code on marking (item 7~12).	7 7
2013/5/6	6	1. Review the Lead diameter φ from 0.60 +/-0.06mm to 0.55+/-0.05mm 2. Review the Solderability temperature from 235±5℃ to 245±5℃ , solderability time from 2±0.5s to 5±0.5s.	5,6,8 10
2013/10/18	7	Review the packing specification	11
2016/3/2	8	1. Review the Available lead code of Lead Configuration. 2. Delete the definition about "Old Part No." 3. Delete 6pF~22pF (Code of diameter dimension is 060) , 24pF (Code of 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. 4. Review 9. Drawing of internal structure and material list	5 5,7 6 15
2016/11/3	9	1. Delete "CH" series. 2. Delete 5pF~8pF (Code of diameter dimension is 060) for P/N SL 3KV.	4,6,7,10~13,15 6

Table of Contents

1. Part number for SAP system：

SL	302	100	J	060	B	20	C	7	H
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

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

(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= ±5%(For above 10pF)

(5)Nominal body diameter dimension (Ref.to page.6 Dφ 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

Bulk Code	Description
3E	Lead length： 3.5mm
04	Lead length： 4.0mm
4E	Lead length： 4.5mm
20	Lead length：20.0mm

(8)Length tolerance：

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

(9)Lead Pitch：

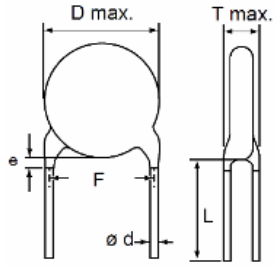
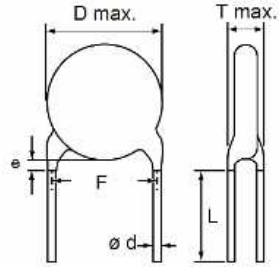
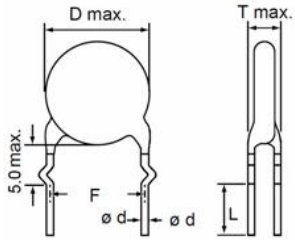
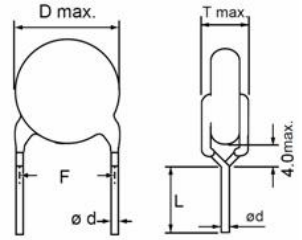
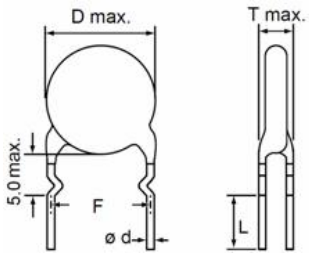
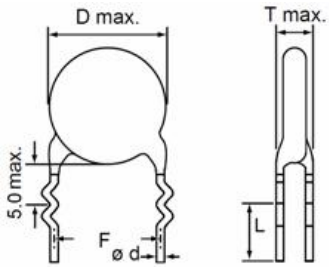
Code	Description
7	7.5±1 mm
0	10±1 mm

(10)Epoxy Resin Code：

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

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
Lead style：B Straight long lead	B20C7	7.5 ± 1.0	20 MIN.	Bulk	
	B20C0	10 ± 1.0	20 MIN.		
	BAFD7	7.5 ± 1.0	Refer to “5. Taping format”	Tap. Ammo	
	BAMD0	10 ± 1.0			
Lead style：L Straight short lead	L03B7	7.5 ± 1.0	3.0 ± 1.0	Bulk	
	L4EB7	7.5 ± 1.0	4.5 ± 1.0		
	L05B7	7.5 ± 1.0	5.0 ± 1.0		
	L10B7	7.5 ± 1.0	10.0 ± 1.0		
	L03B0	10 ± 1.0	3.0 ± 1.0		
	L4EB0	10 ± 1.0	4.5 ± 1.0		
	L05B0	10 ± 1.0	5.0 ± 1.0		
	L10B0	10 ± 1.0	10.0 ± 1.0		
Lead style：X Outside kink lead	X3EA7	7.5 ± 1.0	3.5 ± 0.5	Bulk	
	X04A7	7.5 ± 1.0	4.0 ± 0.5		
	X05B7	7.5 ± 1.0	5.0 ± 1.0		
	X3EA0	10 ± 1.0	3.5 ± 0.5		
	X04A0	10 ± 1.0	4.0 ± 0.5		
	X05B0	10 ± 1.0	5.0 ± 1.0		
	XAFD7	7.5 ± 1.0	Refer to “5. Taping format”	Tap. Ammo	
	XAMD0	10 ± 1.0			
Lead style：D Vertical kink short lead	D3EA7	7.5 ± 1.0	3.5 ± 0.5	Bulk	
	D04A7	7.5 ± 1.0	4.0 ± 0.5		
	D3EA0	10 ± 1.0	3.5 ± 0.5		
	D04A0	10 ± 1.0	4.0 ± 0.5		
	DAFD7	7.5 ± 1.0	Refer to “5. Taping format”	Tap. Ammo	
	DAMD0	10 ± 1.0			
Lead style：H Inside kink lead	H3EA0	10.0±1.0	3.5±0.5 mm	Bulk	
	HAFD0	Refer to “5. Taping format”		Tap. Ammo	
	HAMD0				
Lead style：M Double outside kink lead	M04B7	7.5 ± 1.0	4.0 ± 1.0	Bulk	
	M04B0	10 ± 1.0	4.0 ± 1.0		

* Lead diameter Φd: 0.55+/-0.05mm

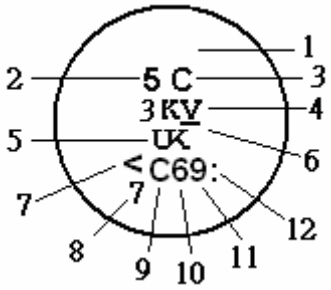
* e (Coating **extension** on leads): 3.0mmMax for straight lead lead style, not exceed the kink for kink lead.

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

Manufacturing product range **Cap. Value vs. Rate voltage, product diameter & type**		SL
	Photo	

T.C.	SL (CLASS Ⅰ, Temperature:+20℃~+85℃, T.C.C.: +350 ~ -1000ppm)		
Rate voltage	**3KV**		
Dφ(Code)	**060**	**070**	**080**
D max. (mm)	7.5	8.5	9.5
T max. (mm)	5.0	5.0	5.0
2			
3			
4			
5			
6			
7			
8			
10	**100**		
12	**120**		
15	**150**		
18	**180**		
20	**200**		
22	**220**		
24	**240**		
27	**270**		
30	**300**		
33	**330**		
36	**360**		
39	**390**		
47		**470**	
51		**510**	
56		**560**	
62		**620**	
68		**680**	
75			**750**
82			**820**
100			**101**
φd (mm)	0.5 5±0.05		
PACKING	**TAPING or BULK**		
COATING	**Epoxy Resin**		

4. Marking：

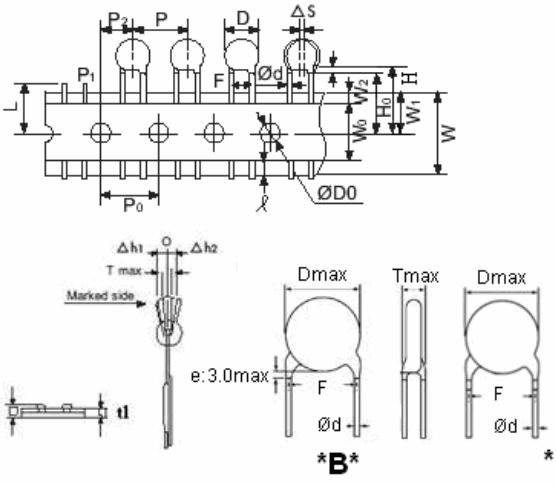


1. Temperature characteristic	2. Nominal capacitance	3. Capacitance tolerance	4. Rated voltage	5. Manufacturer's identification	6. Halogen and Pb free
SL： No marking	Identified by 3-figure code 1. when Cap.≥100pF Ex. 120pF →"121" 2. When Cap<100pF, marked actual Cap. value. Ex. 22pF→"22"	J: ±5% (For above 10pF)	3000V : Be marked "3kV"	Shall be marked as "UK", 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:					
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,…	**1~9**:January~ September, **O**: October, **N**: November, **D**: December	week 1: - week 2: · week 3: **:** week 4: ’ week 5: **;**

5. Taping Format:

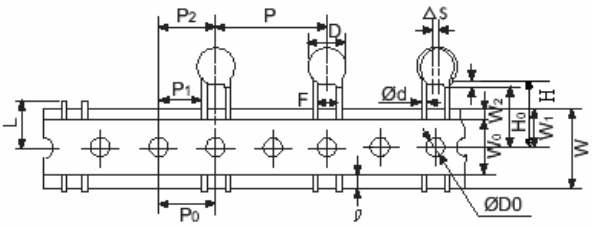
● 15mm pitch/lead spacing 7.5mm taping

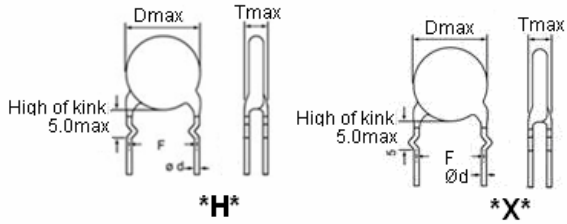
Lead Code: ***BAFD7 & *DAFD7 & *HAFD7 & *XAFD7**



● 25.4mm pitch/lead spacing 10.0mm taping

Lead Code: ***DAMD0 & *XAMD0 & *HAMD0 & *BAMD0**





POE Part Number		***BAFD7**	***DAFD7 *HAFD7 *XAFD7**	***BAMD0 *DAMD0 *HAMD0 *XAMD0**
Item	Symbol	Dimensions (mm)	Dimensions (mm)	Dimensions (mm)
Pitch of component	P	15.0	15.0	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	7.5±1.5	7.5±1.5	12.7 ± 1.5
Length from hole center to lead	P1	3.75±1.0	3.75±1.0	7.7±1.5
Body diameter	D	See the "3. Capacitance value vs. Rate voltage, product diameter"		
Deviation along tape, left or right	△S	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	18.0+2.0/-0 For: *DAMD0 *HAMD0 *XAMD0
Lead distance between the bottom of body and the center of sprocket hole	H	20.0+1.5/-1.0	---	20.0+1.5/-1.0 For: *BAMD0
Protrusion length	ℓ	2.0max (Or the end of lead wire may be inside the 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	△h1	2.0 max.		
	△h2	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 style; Not exceed the kink leads for kink lead.		
Body thickness	T	See the "3. Capacitance value vs. Rate voltage, product diameter"		

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℃ TO 35℃ AND RELATIVE HUMIDITY 45% TO 85%. WHEN FAILS A TEST, RETEST BE OPERATED AT THE CONDITIONS OF TEMPERATURE 25℃ ± 2℃, 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:

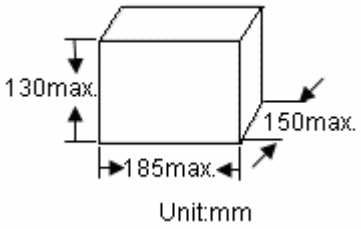
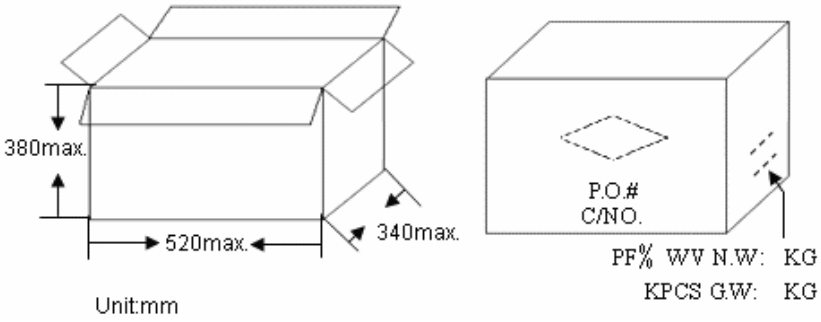
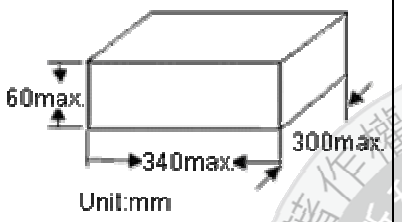
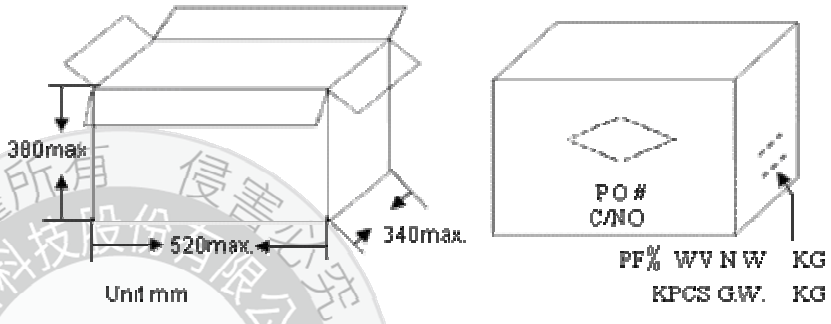
ITEM	POST-TEST REQUIREMENTS		TESTING PROCEDURE
APPEARANCE STRUCTURE SIZE	NO ABNORMALITIES		
MARKING			AS STATED IN SECTION 4
WITHSTAND VOLTAGEN	BETWEEN TERMINALS: NO ABNORMALITIES		2 TIMES OF THE RATED VOLTAGE. TEST VOLTAGE：6KVDC, 1~5 SEC, WITH 50mA MAX. CHARGING CURRENT
	BETWEEN TERMINAL AND ENCLOSURE : 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 ± 20 ％ TESTING TEMPERATURE: 25 ± 2℃ TESTING VOLTAGE: 1.0 ± 0.2 VRMS
TEMPERATURE RANGE	OPERATING TEMPERATURE： -25℃ ～ +125℃		
Q FACTOR)	30PF & ABOVE ≧1000	BELOW 30PF ≧400+20×C	AS ABOVE STIPULATION OF CAPACITANCE
TERMINAL STRENGTH	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
	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)

ITEM	POST-TEST REQUIREMENTS	TESTING PROCEDURE
TEMPERATURE CHARACTERISTIC	TEMPERTURE COEFFICIENT: SL: +350 ～ -1000PPM/℃	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/℃ =(C2-C1)×10E6/C1(T2-T1) STEP 1,3,5: 25℃ STEP 4: 85℃ STEP 2: CH:-25℃ ; SL:20℃ 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
	CAPACITANCE TOLERANCE: SL: WITHIN ±0.2% OR ±0.05PF, WHICHEVER IS LARGE	ACCORDING TO ABOVE STEP 1,3 & 5, CAPACITANCE TOLERANCE SHALL BE CALCULATED ON THE FOLLOWING FORMULA : △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	APPEARANCE: NO ABNORMALITIES	LEAD WIRE OR TERMINALS SHALL IMMERSE UP TO 2.0 M/M FORM BODY. INTO THE MOLTEN SOLDER OF WHICH TEMPERATURE: 260(+5/-0)℃ 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 FOLLOWING CONDITIONS. TEMPERATURE OF IRON-TIP: 350~400 ℃ SOLDERING IRON WATTAGE : 50W MAX. SOLDERING TIME : 3.5 SEC. MAX.
	CAP.CHANGE: SL WITHIN ±2.5% OR ±0.25PF, WHICHEVER IS LARGE.	
	WITHSTAND VOLTAGE: (BETWEEN TERMINALS) NO ABNORMALITIES	
SOLDERABILITY	LEAD WIRE SHALL BE SOLDERED OVER 75% OF THE CIRCUMFERENTIAL DIRECTION.	TO COMPLY WITH JIS-C-5102 8.4 SOLDER TEMPERATURE 245±5℃ AND DIPPING TIME 5±0.5 SECONDS FLUX : WEIGHT RATIO OF POSIN 25%

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

7.Packing Baggage：

7.1 Packing size:

Type	Box	Carton
Bulk		
Ammo taping		

7.2 Packing quantity:

Packing type	The code of 14th to15th in SAP P/N	MPQ（Kpcs/ Box)
Taping	AF	1
	AM	0.5

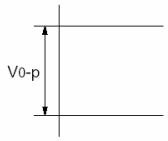
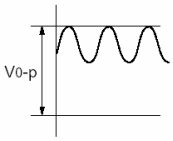
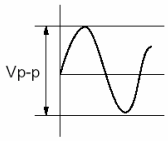
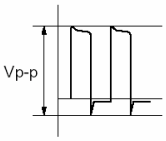
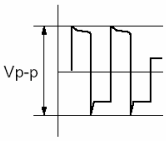
Packing type	MPQ（Kpcs/Bag)
Bulk	1

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					

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.

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

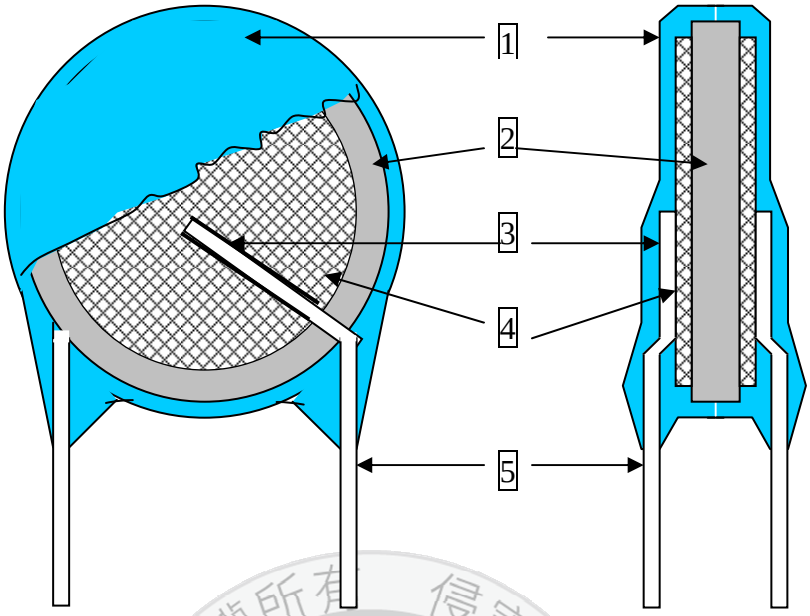
I. Class 1 series (Temp. Char. SL)

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.

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 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	SL	$BaTiO_3$
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±0.05 mm	Substrate metal: Fe & Cu Surface plating: Sn 100%(3~7μm)

PRODUCT SPECIFICATION

PRODUCT: CERAMIC DISC CAPACITOR

TYPE: 6KV TEMPERATURE COMPENSATING CERAMIC CAPACITOR

CUSTOMER: _____

DOC. NO.: POE-D03-00-E-09

Ver.: 9

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

MAKER：PAN OVERSEAS (GUANGZHOU) ELECTRONIC CO.,LTD.

NO.277,HONG MING ROAD,EASTERN SECTION,
GUANG ZHOU ECONOMIC AND TECHNOLOGY
DEVELOPMENT ZONE,CHINA

Record of change

Date	Version	Description	page
2008.6.3	1	1. D14-00-E-06 (before) → POE-D03-00-E-01(1st edition)	
2008.8.22	2	1. Complete lead code 3. Add last SAP code " H" for halogen and Pb free , epoxy resin.	5-6 2
2008.12.12	3	1. Complete the 13th to 17th codes of SAP P/N. 2. Page layout adjustment. 3. Added marking when the coating resin is Halogen and Pb free Epoxy.	4-5
2009/8/19	4	1. Change PSA & POE logo to Walsin & POE logo. 2. Revised WITHSTAND VOLTAGEN and operating temperature from -25℃~+85℃ to -25℃~+125℃ 3. capacity list → product range	all 9 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." 2. Delete "1.5000V : Be marked "5kV"" 3. Add date code on marking (item 7~12).	7 7 7
2013/5/6	6	1. Review the Lead diameter φ from 0.60 +/-0.06mm to 0.55+/-0.05mm 2. Review the Solderability temperature from 235±5℃ to 245±5. ℃,Solderability time from 2 ±0.5s to 5±0.5s,	5,6,8 10
2013/10/18	7	Review the packing specification	11
2016/3/2	8	1. Review the Available lead code of Lead Configuration. 2. Delete the definition about "Old Part No." 3. Delete 6pF~18pF (Code of diameter dimension is 060) , 22pF~27pF (Code of 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	5 5,6 6 15
2016/11/3	9	1. Delete "CH" series. 2. Delete 2pF~8pF (Code of diameter dimension is 060) for P/N SL 6KV.	4,6,7,9~11,14,15 6

Table of Contents

1. Part number for SAP system：

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

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

(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= ±5%(For above 10pF)

(5)Nominal body diameter dimension (Ref. to page.6 Dφ 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

Bulk Code	Description
3E	Lead length： 3.5mm
04	Lead length： 4.0mm
4E	Lead length： 4.5mm
20	Lead length：20.0mm

(8)Length tolerance：

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

(9)Lead Pitch：

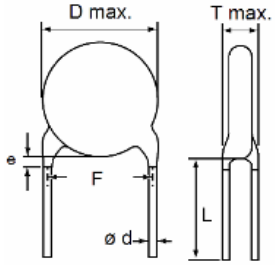
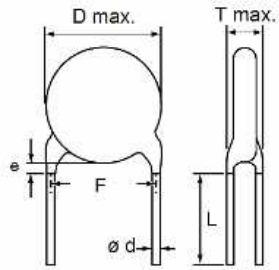
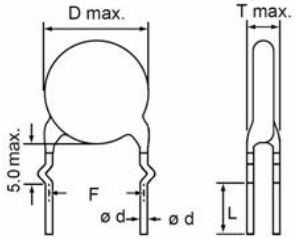
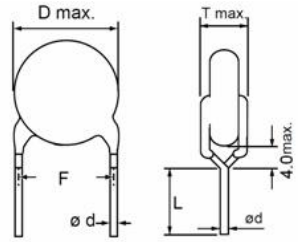
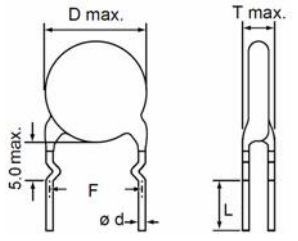
Code	Description
7	7.5±1 mm
0	10±1 mm

(10) Epoxy Resin Code：

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

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
Lead style：B Straight long lead	B20C7	7.5 ± 1.0	20 MIN.	Bulk	
	B20C0	10 ± 1.0	20 MIN.		
	BAFD7	7.5 ± 1.0	Refer to “5. Taping format”	Tap. Ammo	
	BAMD0	10 ± 1.0			
Lead style：L Straight short lead	L03B7	7.5 ± 1.0	3.0 ± 1.0	Bulk	
	L4EB7	7.5 ± 1.0	4.5 ± 1.0		
	L05B7	7.5 ± 1.0	5.0 ± 1.0		
	L10B7	7.5 ± 1.0	10.0 ± 1.0		
	L03B0	10 ± 1.0	3.0 ± 1.0		
	L4EB0	10 ± 1.0	4.5 ± 1.0		
	L05B0	10 ± 1.0	5.0 ± 1.0		
	L10B0	10 ± 1.0	10.0 ± 1.0		
Lead style：X Outside kink lead	X3EA7	7.5 ± 1.0	3.5 ± 0.5	Bulk	
	X04A7	7.5 ± 1.0	4.0 ± 0.5		
	X05B7	7.5 ± 1.0	5.0 ± 1.0		
	X3EA0	10 ± 1.0	3.5 ± 0.5		
	X04A0	10 ± 1.0	4.0 ± 0.5		
	X05B0	10 ± 1.0	5.0 ± 1.0		
	XAFD7	7.5 ± 1.0	Refer to “5. Taping format”	Tap. Ammo	
	XAMD0	10 ± 1.0			
Lead style：D Vertical kink short lead	D3EA7	7.5 ± 1.0	3.5 ± 0.5	Bulk	
	D04A7	7.5 ± 1.0	4.0 ± 0.5		
	D3EA0	10 ± 1.0	3.5 ± 0.5		
	D04A0	10 ± 1.0	4.0 ± 0.5		
	DAFD7	7.5 ± 1.0	Refer to “5. Taping format”	Tap. Ammo	
	DAMD0	10 ± 1.0			
Lead style：H Inside kink lead	H3EA0	10.0±1.0	3.5±0.5 mm	Bulk	

* Lead diameter Φd: 0.55+/-0.05mm

* e (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.

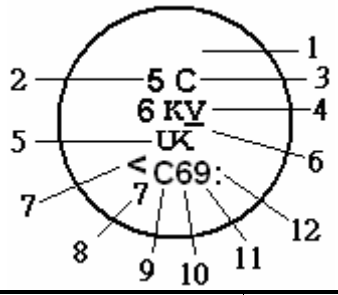
3. Capacitance value vs. Rate voltage, product diameter：

3.1、 6KV:

Manufacturing product range **Cap. Value vs. Rate voltage, product diameter & type**	**Photo** SL 

T.C.	SL (CLASS Ⅰ, Temperature:+20℃~+85℃, T.C.C.: +350 ~ -1000ppm)		
Rate voltage	**6KV**		
Dφ(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**		
22	**220**		
27	**270**		
30	**300**	**300**	
33	**330**	**330**	
39	**390**	**390**	
47		**470**	**470**
51		**510**	**510**
56		**560**	**560**
62			
68			**680**
82			**820**
100			**101**
φd (mm)	0.55±0.05		
PACKING	**TAPING or BULK**		
COATING	**Epoxy Resin**		

4. Marking：

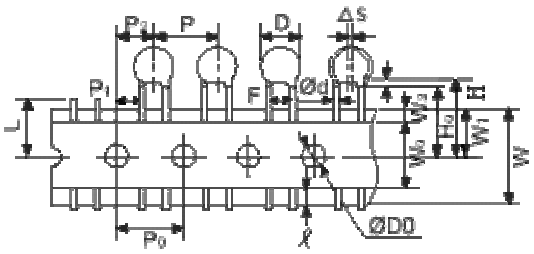


1. Temperature characteristic	2. Nominal capacitance	3. Capacitance tolerance	4. Rated voltage	5. Manufacturer's identification	6. Halogen and Pb free
SL： No marking	1.Identified by 3-figure code when Cap.≥100pF Ex. 120pF →"121" 2. When Cap<100pF, marked actual Cap. value Ex. 6pF→"6"	J: ±5% (For above 10pF)	6000V : Be marked “6kV”	Shall be marked as "UK", 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:					
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,…	**1~9**:January~ September, **O**: October, **N**: November, **D**: December	week 1: - week 2: · week 3: **:** week 4: · week 5: **;**

5. Taping Format:

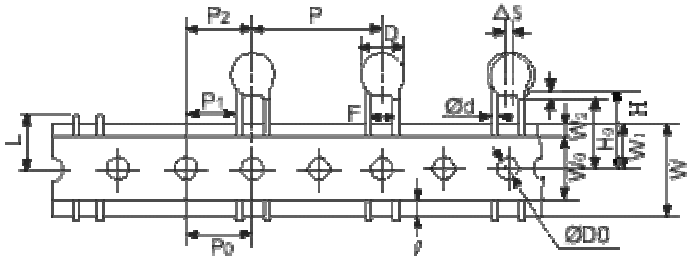
● 15mm pitch/lead spacing 7.5mm taping

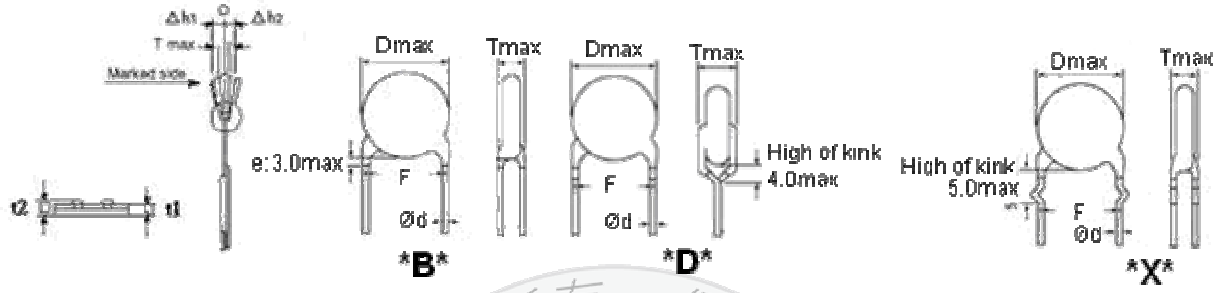
Lead Code: ***BAFD7 & *DAFD7 & *XAFD7**



● 25.4mm pitch/lead spacing 10.0mm taping

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





POE Part Number		***BAFD7**	***DAFD7** ***XAFD7**	***BAMD0** ***DAMD0** ***XAMD0**
Item	Symbol	Dimensions (mm)	Dimensions (mm)	Dimensions (mm)
Pitch of component	P	15.0	15.0	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	7.5±1.5	7.5±1.5	12.7 ± 1.5
Length from hole center to lead	P1	3.75±1.0	3.75±1.0	7.7±1.5
Body diameter	D	See the "3. Capacitance value vs. Rate voltage, product diameter"		
Deviation along tape, left or right	△S	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	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	---	20.0+1.5/-1.0 For: *BAMD0
Protrusion length	ℓ	2.0max (Or the end of lead wire may be inside the 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	△h1	2.0 max.		
	△h2	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 style; Not exceed the kink leads for kink lead.		
Body thickness	T	See the "3. Capacitance value vs. Rate voltage, product diameter"		

6. Specification and test method:

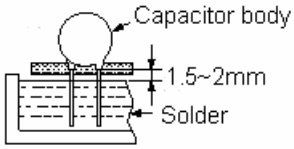
6.1 SCOPE: THIS SPECIFICATION APPLIES TO TEMPERATURE COMPENSATING CONSTANT, 3KV CERAMIC CAPACITOR.

6.2 TEST CONDITIONS:
UNLESS OTHERWISE SPECIFIED, ALL TESTS SHALL BE OPERATED AT THE STANDARD TEST CONDITIONS OF TEMPERATURE 5℃ TO 35℃ AND RELATIVE HUMIDITY 45% TO 85%. WHEN FAILS A TEST, RETEST BE OPERATED AT THE CONDITIONS OF TEMPERATURE 25℃ ± 2℃, 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:

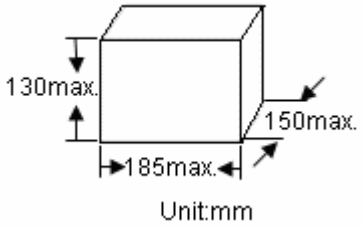
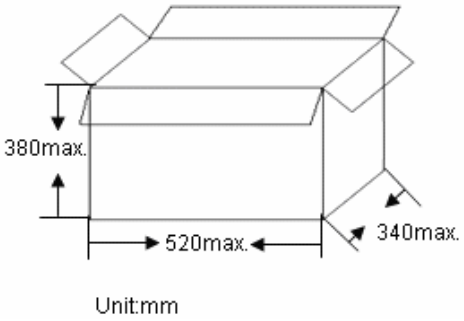
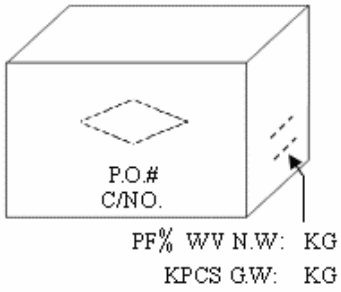
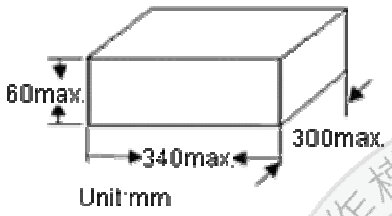
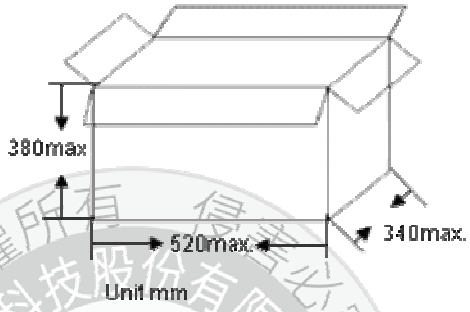
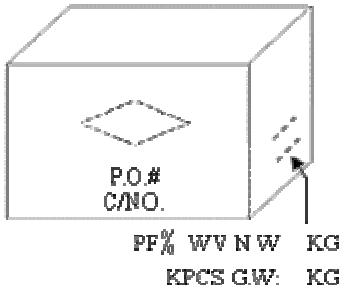
ITEM	POST-TEST REQUIREMENTS	TESTING PROCEDURE
APPEARANCE STRUCTURE SIZE	NO ABNORMALITIES	AS STATED IN SECTION 3.1 & 3.2
MARKING		AS STATED IN SECTION 4
WITHSTAND VOLTAGEN	BETWEEN TERMINALS: NO ABNORMALITIES	RATED VOLTAGE 6KVDC: 150% OF THE RATED VOLTAGE FOR 1 TO 5 SECONDS.(TEST VOLTAGE：9000VDC, 1~5 SEC), WITH 50mA MAX. CHARGING CURRENT
	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 ± 20 % TESTING TEMPERATURE: 25 ± 2℃ TESTING VOLTAGE: 1.0 ± 0.2 VRMS
OPERATING TEMPERATURE RANGE	WIDE OPERATING TEMPERATURE RANGE： -25℃ TO +125℃ (INCLUDING MAXIMUM TEMPERATURE RISE OF +20℃)	
Q FACTOR)	30PF&Above: ≧1000 Below 30PF: ≧400+20×	AS ABOVE STIPULATION OF CAPACITANCE
TEMPERATURE CHARACTERISTIC	Temperature coefficient: SL: +350 ～ -1000ppm/℃ (+20℃~+85℃) 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/℃ =(C2-C1)×10E6/C1(T2-T1) STEP 1,3,5: 25℃ STEP 4: 85℃ STEP 2: -25℃ , SL(+20℃) 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 ACCORDING TO ABOVE STEP 1,3 & 5, CAPACITANCE TOLERANCE SHALL BE CALCULATED ON THE FOLLOWING FORMULA : △ 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

ITEM	POST-TEST REQUIREMENTS	TESTING PROCEDURE
TERMINAL STRENGTH	TENSIBLE STRENGTH: NO BREAKDOWN	WIRE DIA.0.6mm, LOADING WEIGHT 1.0KG FOR 10±1 SECONDS
	BENDING STRENGTH: NO BREAKDOWN	WIRE DIA.0.6mm, LOAIDNG WEIGHT 0.5 KG. (BENDING BACK AND FORTH 90 DEGREE TWICE)
SOLDERING HEAT RESISTANCE	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.  (A) BODY DIA.≦6.3mm:INTO THE MOLTEN SOLDER OF WHICH TEMPERATURE: 270±5℃ FOR 3±0.5 SECONDS. (B) BODY DIA.＞6.3mm:INTO THE MOLTEN SOLDER OF WHICH TEMPERATURE 350±10℃ FOR 3±0.5 SECONDS THEN LEAVE AT STANDARD TEST CONDITIONS FOR 24±2 HOURS, THEN MEASURED.
	CAP.CHANGE: SL WITHIN ±2.5% OR ±0.25PF, WHICHEVER IS LARGE.	
	WITHSTAND VOLTAGE: (BETWEEN TERMINALS) NO ABNORMALITIES	
SOLDERABILITY	LEAD WIRE SHALL BE SOLDERED OVER 75% OF THE CIRCUMFERENTIAL DIRECTION.	TO COMPLY WITH JIS-C-5102 8.4 SOLDER TEMPERATURE 245±5℃ AND DIPPING TIME 5±0.5 SECONDS FLUX : WEIGHT RATIO OF POSIN 25%
HUMIDITY CHARACTERISTIC(STABLE SITUATION)	APPEARANCE: NO ABNORMALITIES	CAPACITORS SHALL BE SUBJECTED TO A RELATIVE HUMIDITY OF 90 ～ 95% AT 40±2℃ FOR 500(+24/-0) HOURS. THEN DRIED FOR 1～2 HOURS AND MEASURED.
	CAP.CHANGE: SL WITHIN ±5% OR ±0.5PF, WHICHEVER IS LARGE.	
	Q FACTOR: SL LESS THAN 10PF => $Q \geqq 200 + 10 \times C$ MORE THAN 10PF AND LESS THAN 30PF => $Q \geqq 275 + 5 \times C/2$ MORE THAN 30PF => $Q \geqq 350$	
	INSULATION RESISTANCE: 1000MΩ MIN.	

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

7.Packing Baggage：

7.1 Packing size:

Type	Box	Carton
Bulk		 
Ammo taping		 

7.2 Packing quantity:

Packing type	The code of 14th to15th in SAP P/N	MPQ（Kpcs/ Box)
Taping	AF	1
	AM	0.5

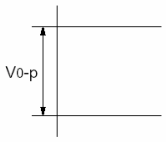
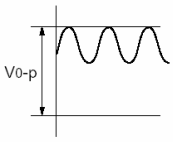
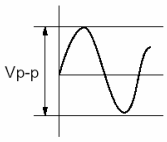
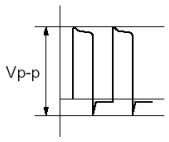
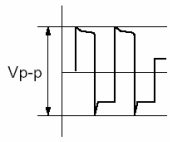
Packing type	MPQ（Kpcs/Bag)
Bulk	1

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					

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.

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

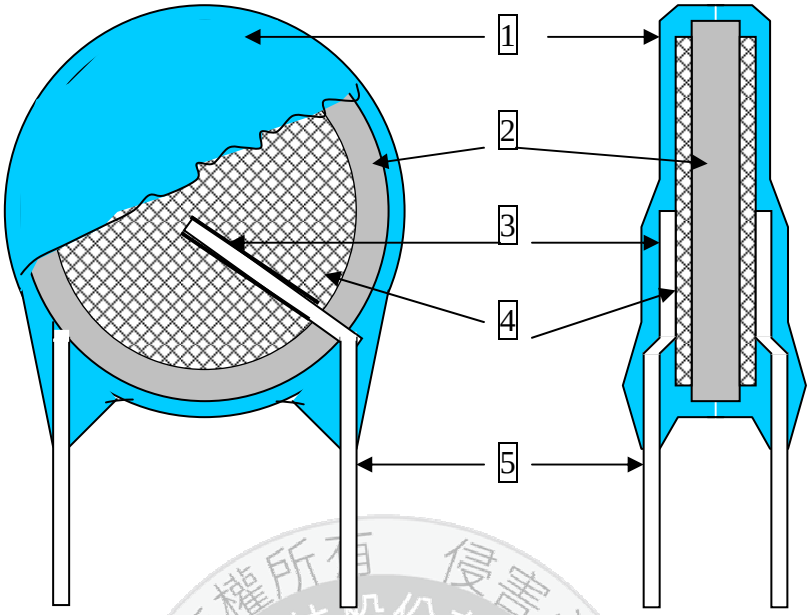
I. Class 1 series (Temp. Char. SL)

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.

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 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	SL	$BaTiO_3$
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±0.05 mm	Substrate metal: Fe & Cu Surface plating: Sn 100%(3~7μm)