PRODUCT SPECIFICATION

PRODUCT: CERAMIC DISC CAPACITOR

TYPE: 3KV TEMPERATURE COMPENSATING CERAMIC CAPACITOR

CUSTOMER: _____

DOC. NO.: POE-D02-00-E-15

Ver.: 15

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,
HUANGPU DISTRICT ,GUANG ZHOU,CHINA

MAKER：PAN OVERSEAS (GUANGZHOU) ELECTRONIC CO.,LTD.
NO.277,HONG MING ROAD,EASTERN SECTION,
HUANGPU DISTRICT ,GUANG ZHOU,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
2019/7/26	10	1. Review the Hole-down tape width (W0) from 11.5mm min. to 8.0mm min.	8
2021/9/9	11	1. Delete Walsin & POE logo.	1
2022/1/8	12	1. Add "Soldering Recommendation"	15
2022/4/21	13	1. Add 8.8 List of substances that affect the insulation strength of coating	14
2023/6/15	14	1. The last code "B" is changed from "Epoxy Resin , Pb free" to "Halogen free and Pb free , epoxy resin ".	4,7
2025/7/6	15	1. Review the Packing quantity 2. Review the Drawing of Internal Structure and material list	12 16

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)， K= ±10%

(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 short kink lead code “D / X / H”)	Short lead
B	±1.0 mm	Short lead
C	Min.	Long lead
D	Taping special purpose	Taping

(9)Lead Pitch：

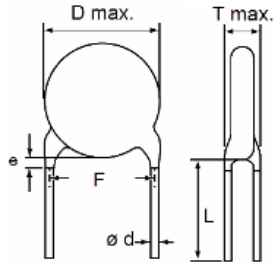
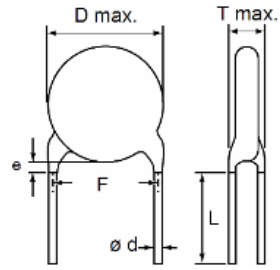
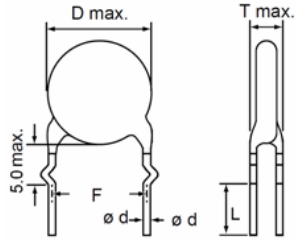
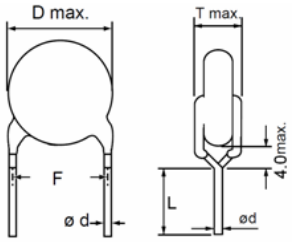
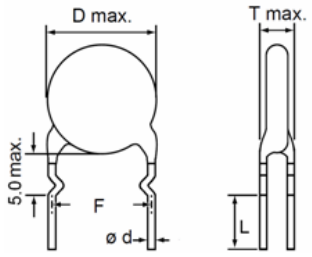
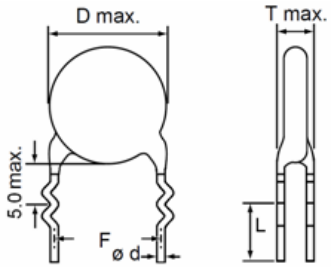
Code	Description
7	7.5±1 mm
0	10±1 mm

(10)Epoxy Resin Code：

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

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

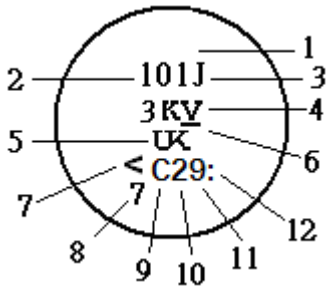
* e (Coating **extension** on leads): 3.0mmMax for straight lead lead style, not exceed the kink for kink lead.

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
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：

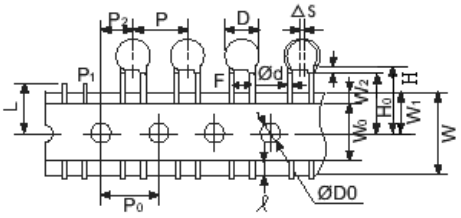


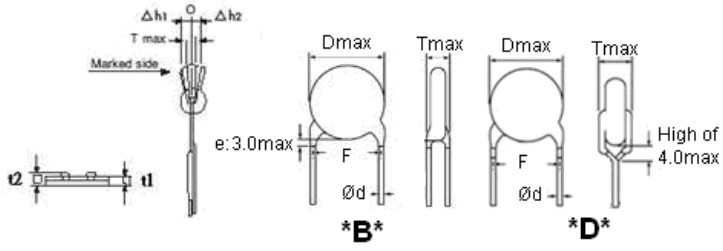
1. Temperature characteristic	2. Nominal capacitance	3. Capacitance tolerance	4. Rated voltage	5. Manufacturer's identification	6. Halogen and Pb free
SL： No marking	Identified by 3-figure code 1. when Cap.≥100pF Ex. 120pF →"121" 2. When Cap<100pF, marked actual Cap. value. Ex. 22pF→"22"	J: ±5% (For above 10pF), K: ±10%	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. (For the last code "H" and "B" of the SAP P/N)
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**:2021, **2**:2022, **3**:2023, **4**:2024, **5**:2025, **6**:2026, 7:2027,…	**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

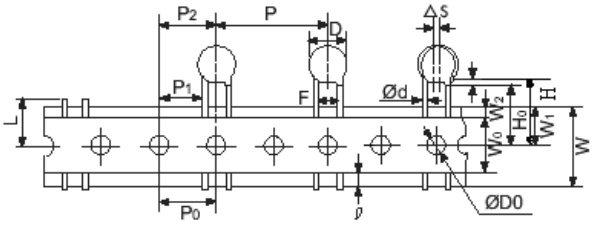
Lead Code: ***BAFD7 & *DAFD7 & *HAFD7 & *XAFD7**

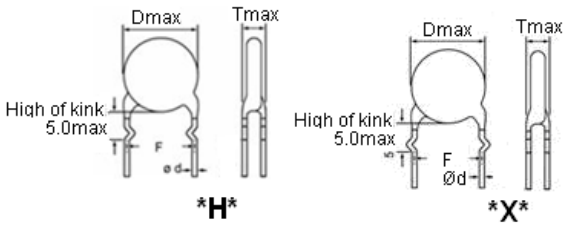




● 25.4mm pitch/lead spacing 10.0mm taping

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±1.0	15.0±1.0	25.4±2.0
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	Δ 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	Δ h1	2.0 max.		
	Δ h2	2.0 max.		
Portion to cut in case of defect	L	11.0 max.		
Hole-down tape width	W0	8.0min		
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:

<table>
<tr><th>ITEM</th><th colspan="2">POST-TEST REQUIREMENTS</th><th>TESTING PROCEDURE</th></tr>
<tr><td>APPEARANCE
STRUCTURE SIZE</td><td colspan="2">NO ABNORMALITIES</td><td></td></tr>
<tr><td>MARKING</td><td colspan="2"></td><td>AS STATED IN SECTION 4</td></tr>
<tr><td rowspan="2">WITHSTAND VOLTAGEN</td><td colspan="2">BETWEEN TERMINALS:
NO ABNORMALITIES</td><td>2 TIMES OF THE RATED VOLTAGE.
TEST VOLTAGE：6KVDC, 1~5 SEC, WITH 50mA MAX. CHARGING CURRENT
Pre-treatment:
Capacitor shall be stored at125±3℃ for 1hour.then placed at※[1]room condition for 24±2hours</td></tr>
<tr><td colspan="2">BETWEEN TERMINAL AND ENCLOSURE :
NO ABNORMALITIES</td><td>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)
Pre-treatment:
Capacitor shall be stored at125±3℃ for 1hour.then placed at※[1]room condition for 24±2hours</td></tr>
<tr><td>INSULATION RESISTANCE</td><td colspan="2">10000 MΩ MIN</td><td>INSULATION RESISTANCE SHALL BE MEASURED AT 60±5 SECONDS AFTER RATED VOLTAGE APPLIED.
RATED VOLTAGE：500VDC
Pre-treatment:
Capacitor shall be stored at125±3℃ for 1hour.then placed at※[1]room condition for 24±2hours</td></tr>
<tr><td>CAPACITANCE</td><td colspan="2">TOLERANCE :
J : ±5%, K : ±10%</td><td rowspan="3">TESTING FREQUENCY: 1MHZ ± 20 % TESTING TEMPERATURE: 25 ± 2℃
TESTING VOLTAGE: 1.0 VRMS
Pre-treatment:
Capacitor shall be stored at125±3℃ for 1hour.then placed at※[1]room condition for 24±2hours</td></tr>
<tr><td rowspan="2">Q FACTOR)</td><td>30PF & ABOVE</td><td>BELOW 30PF</td></tr>
<tr><td>≧1000</td><td>≧400+20×C</td></tr>
<tr><td>TEMPERATURE RANGE</td><td colspan="3">OPERATING TEMPERATURE：
-25℃ ～ +125℃</td></tr>
</table>

※[1]"room condition" Temperature:15~35, Relative humidity: 45~75%, Atmospheric pressure:86~106kPa

ITEM	POST-TEST REQUIREMENTS	TESTING PROCEDURE
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)
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 Pre-treatment: Capacitor shall be stored at125±3℃ for 1hour.then placed at※[1]room condition for 24±2hours
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%

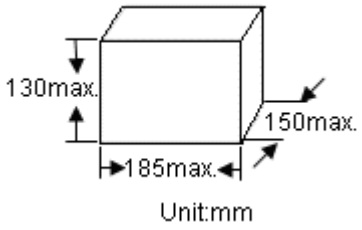
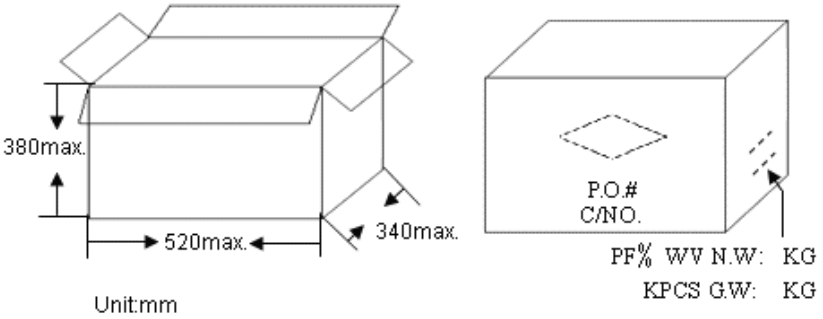
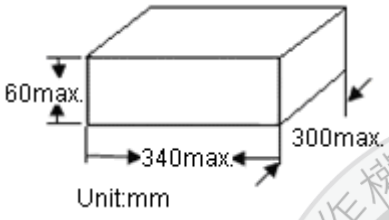
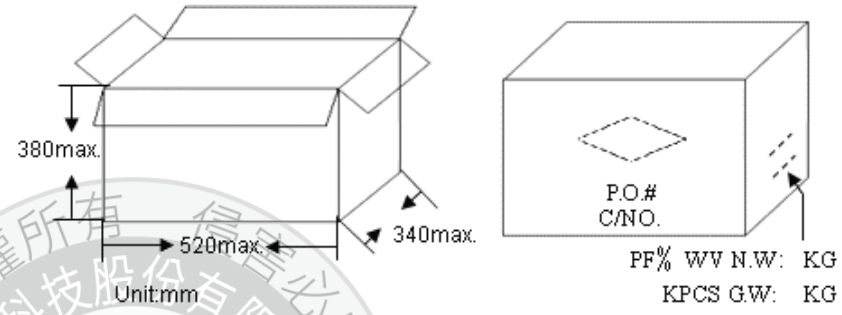
※[1]"room condition" Temperature:15~35, Relative humidity: 45~75%, Atmospheric pressure:86~106kPa

ITEM	POST-TEST REQUIREMENTS	TESTING PROCEDURE
HUMIDITY CHARACTERISTIC (STABLE SITUATION)	APPEARANCE: NO ABNORMALITIES 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.	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. Pre-treatment: Capacitor shall be stored at125±3℃ for 1hour.then placed at※[1]room condition for 24±2hours Post-treatment: Capacitor should be stored for 24±2 hrs. at *[1]room condition
HUMIDITY LOADING	APPEARANCE: NO ABNORAMLITIES 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	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. Pre-treatment: Capacitor shall be stored at125±3℃ for 1hour.then placed at※[1]room condition for 24±2hours Post-treatment: Capacitor should be stored for 24±2 hrs. at *[1]room condition
HIGH TEMPERATURE LOADING	APPEARANCE : NO ABNORMALITIES 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.	150% RATED VOLTAGE WITH 50mA max. FOR 1000(+48/-0) HOURS AT 125±3℃ AND THEN DRIED FOR 1~2 HOURS AND MEASURED. Pre-treatment: Capacitor shall be stored at125±3℃ for 1hour.then placed at※[1]room condition for 24±2hours Post-treatment: Capacitor should be stored for 24±2 hrs. at *[1]room condition

※[1]"room condition" Temperature:15~35, Relative humidity: 45~75%, Atmospheric pressure:86~106kPa

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 (The size code≦11)	1
	AM (The size code≧12)	0.5

Packing type	Lead length	Size code of 10th to 12th in SAP P/N	MPQ (Kpcs/Bag)	Kpcs/Box
Bulk	Long lead (L≧16mm)	060~100	1	2
	Short lead (L＜16mm)	060	1	6
		070~080	1	4
		090~100	1	3

8. Notices:

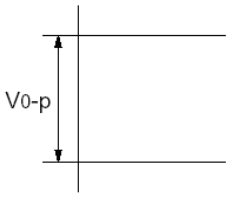
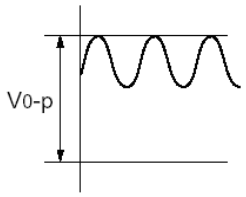
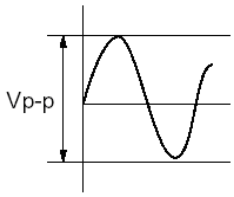
※**Application:** DC or Low frequency High Voltage circuits.

As coupling and decoupling capacitors for such application where higher losses and a reduced capacitance stability are required.

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
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℃ at an atmosphere temperature of 25℃. 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 List of substances that affect the insulation strength of coating：

Epoxy resin solvent

Category	Model		
Ketone	Acetone	Butanone	Cyclohexanone
Esters	Ethyl acetate	Dibutyl phthalate	
Chlorinated hydrocarbons	Dichloromethane		

Epoxy resin thinner

Category		Model	
Reactive diluentactivated thinner	Simple function group	HK-66 (Alkyl glycidyl ether)	
		501 (Butyl glycidyl ether)	
		690 (Phenyl Glycidyl Ether)	
		AGE (C12-14Aliphatic Polyalcohol Glycidyl Ether)	
		692 (Benzyl Glycidyl Ether)	
	Two functional groups	D-678（Neopentyl glycol diglycidyl ether）	
		622 (1,4-Butanediol diglycidyl ether)	
		669 (Ethylene glycol diglycidyl ether)	
		X-632 (Polypropylene glycol diglycidyl ether)	
		X-652 (1,6-Hexadiol diglycidyl ether)	
		D-691Epoxypropane o-methylphenyl ether	
Non-activated thinner		Anhydrous ethanol	Toluene
		Ethyl acetate	Dimethylbenzene
		Dimethyl formamide	Butyl acetate
		Acetone	Styrene
		Polyol	Benzyl alcohol

Note: The above substances should not contact the coating of the product body, otherwise it will affect the insulation strength of the product

8.9 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. Soldering Recommendation：

9.1 Wave Soldering Profile:

- Temperature conditions of the flow is recommended as shown in the chart
- Must implement the pre-heat
- Maximum peak flow temperature is recommended 265℃
- Time " T " implement in the chart recommended within 20 sec. it temperature exceed 200℃
- Take care with the flow solder not to touch the capacitor body directly at mounting

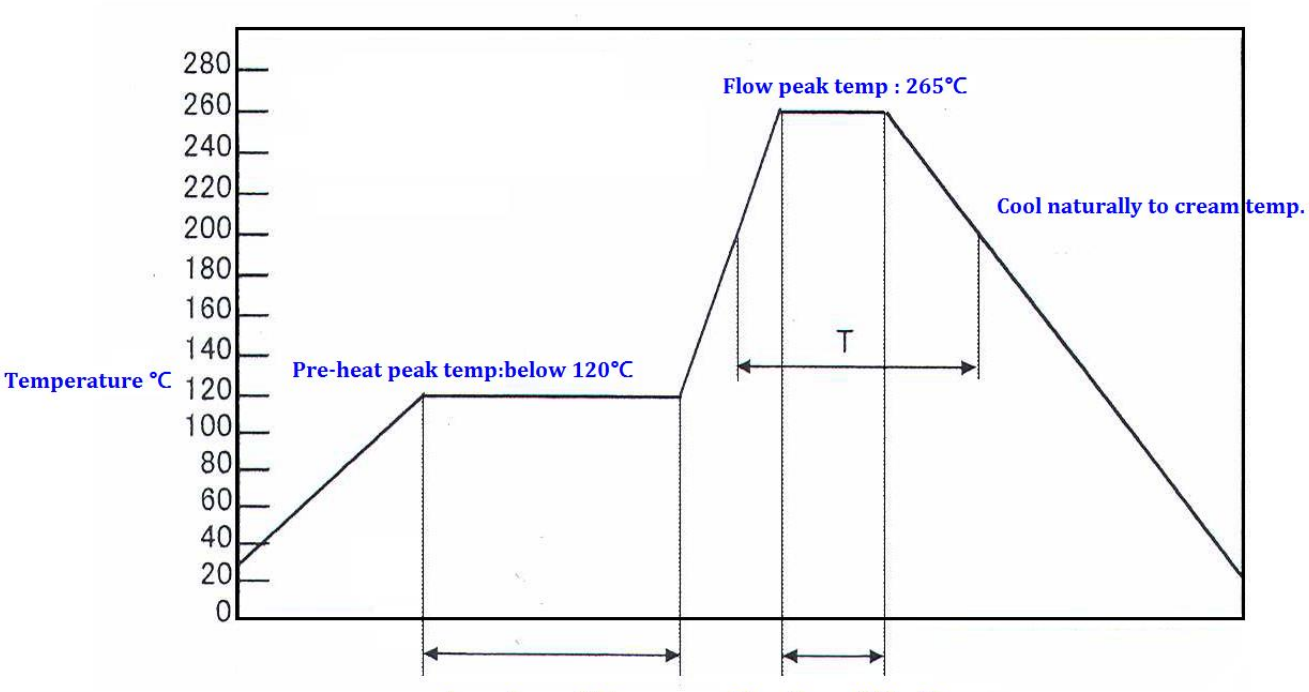


Chart to show flow recommended temp

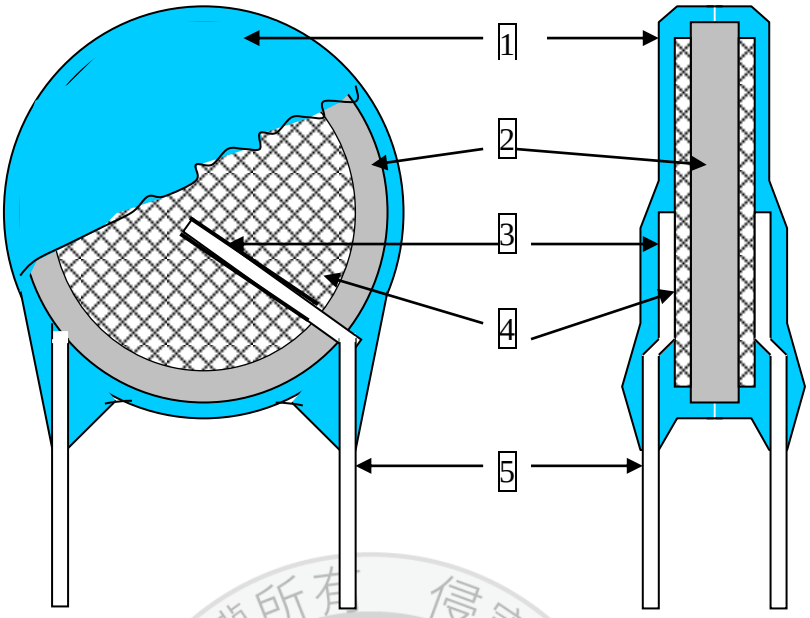
9.2 Recommended Reworking Conditions with Soldering Iron：

- Temperature of iron-tip: 400 degrees C. max.
- Soldering iron wattage: 50W max.
- Soldering time: 3.5 sec. max.
- Distance from coating body: 2 mm (min.)

9.3 Reflow-Soldering：Lead Ceramic Cap. should not be soldered by reflow-soldering.

10.Drawing of internal structure and material list：

產 品 結構 圖



Remarks：

No.	Material	Description
1	Insulation Coating	Epoxy resins
2	Dielectric Element	Ceramic
3	Solder	Tin-Silver alloy
4	Electrodes	Silver [Ag]
5	Leads wire	Solder coated CP wire (Solder : Tin-Silver alloy)