To. _____ No.090702-1

APPROVAL SHEET

ITEM : DISC CERAMIC CAPACITOR
(Alternating Current ; Y-CAP)

Written	Checked	Approved
200 . . .	200 . . .	200 . . .
The term of validity for approved : from approved date year		

2009. 07. 02.

SAMWHA CAPACITOR Co., LTD
(Manufacturer : PT. SAMCON)

Record of Revision	SW-D02-04C
	2/12

P/N	SAMWHA SPEC	P/N	SAMWHA SPEC
	SDE2G222M12BW1 SDE2G472M15BW1		

No	Reason	Contents	Date	Checked	Remark
1	RoHS Free	1)P.6/12 Solder Heat Resistance 2)P.8/12 The regulation of environmental pollution materials	'04.12.01		
2	Insertion	1) P. 6/12 Temperature cycle	'07.02.26		

Approval standard and recognized No.

Mark	Standard	Recognized No.	Type	R.V[Vac]	Temp. Char.
UL	UL 1414	E97754	SC	250	B,E,F
			SD	250	
CSA	C2221 NO1	1577876	SC	250	B,E,F
			SD	250	
VDE	IEC 60384-14, 2'nd edition	40001516	SC	250	B,E,F
		40001503	SD	250/400	B,E
SEMKO	IEC 60384-14, 2'nd edition	021516201-04	SC	250	B,E,F
			SD	250/400	B,E
NEMKO	IEC 384-14, 2'nd edition	P02100817	SC	250	B,E,F
			SD	400	B,E
DEMKO	IEC 60384-14, 2'nd edition	311353-02	SC	250	B,E,F
			SD	400	B,E
FIMKO	IEC 60384-14, 2'nd edition	18099A1	SC	250	B,E,F
			SD	400	B,E
EK	K60384-14	SU3004-2002	SC	250	B,E,F
		SU3004-2001	SD	250/400	B,E

1. SCOPE

This specification relates high dielectric constant disc type fixed A.C (Alternating current) ceramic capacitor, intended for use in equipment for telecommunication and electronic devices.

1-1. Type Designation

SC F 2E 103 Z 14 B W 7

- SC — Style (1-2-1)
- F — Temperature Characteristic (1-2-2)
- 2E — Rating Voltage (1-2-3)
- 103 — Capacitance (1-2-4)
- Z — Cap. Tolerance (1-2-5)
- 14 — Disc Diameter (1-2-6)
- B — Packing Style (1-2-7)
- W — Lead Variation (1-2-7)
- 7 — Lead Spacing & Pitch of Component (1-2-8)

1-2. Specification

1-2-1. Style

High dielectric constant fixed Alternating Current Ceramic Capacitor.

SC : Testing Voltage AC 2500V

SD : Testing Voltage AC 4000V

1-2-2. Temperature characteristics

SAMWHA Symbol	Temp. Range	Change Rate
B (Y5P)	-25℃~+85℃	± 10%
E (Y5U)	-25℃~+85℃	+22% ~ -56%
F (Z4V)	+10℃~+65℃	+22% ~ -82%

1-2-3. Rating Voltage

SC Type - 2E (250Vac)

SD Type - 2G (400Vac)

1-2-4. Capacitance

The nominal capacitance value in pF is expressed by three digit number. The first two digits represent significant figures and the last digit is the number of zero to follow.

(More than 100pF)

EX. 4700pF - 472, 10000pF - 103

1-2-5. Cap. Tolerance.

Symbol	K	M	Z
Cap. Tol	± 10%	± 20%	+80 ~ -20%

1-2-6. Disk diameter

Code	07	08	09	10	11	12	13	14	15	16	17	18
Dia(Φmm) Max	7.0	8.0	9.0	10.0	11.0	12.5	13.0	14.0	15.0	16.0	17.0	18.0

1-2-7. Packing style & Lead variation

Packing Style		Lead Variation	
F	Taping Type Flat Pack	K	In-Forming Type
		F	Out-Forming Type
B	Bulk	S	Straight Long Type
		N	Straight Short Type
		K	Forming Long Type
		W(L)	Forming Short Type

1-2-8. Lead Spacing & Pitch of Component(see 9/12~11/12)

7 : F=7.5, P=15.0 (Bulk & Taping)

8 : F=7.5, P=30.0 (Taping)　　1 : F=10.0, P=25.4 (Bulk & Taping)

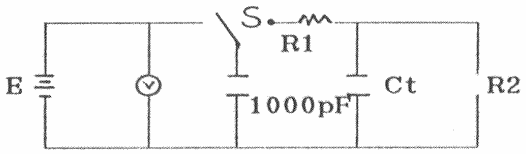
9 : F=7.5, P=25.4 (Taping)　　2 : F=10.0, P=30.0 (Taping)

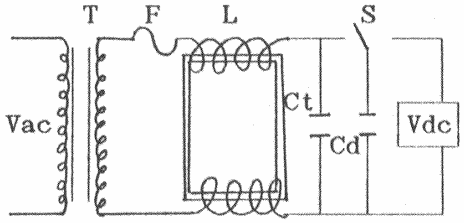
1-3. Requirements and method of test and environmental substance

<table>
<tr><th>ITEM</th><th>STANDARD</th></tr>
<tr><td>Temperature Range</td><td>B, E : -25℃ to +85℃, F : +10℃ to +65℃
Capacitance shall be within the specified tolerance when measured at 1 Vrms, 1±0.1 kHz at 20℃</td></tr>
<tr><td>Dissipation Factor
(D.F)</td><td>B : 2.5% Max at 1 kHz
E : 2.5% Max at 1 kHz
Fz : 5.0% Max at 1 kHz</td></tr>
<tr><td>Insulation Resistance</td><td>More than 10000MΩ
Applied voltage : 500V DC, charging time : 1minute</td></tr>
<tr><td>Withstand Voltage
(Hi-Pot Test)
Between terminals</td><td>SC : 2500V AC for 1~5sec.(Charge & Discharge current 50mAMax)
SD : 4000V AC for 1~5sec.(Charge & Discharge current 50mAMax)
No abnormality is recognized</td></tr>
<tr><td>Temperature Characteristics</td><td>Capacitance is measured under the above-temperature conditions. Capacitance change rate from the 1st step to the 5th is calculated, standardizing capacitance of the 3rd step.
<table>
<tr><th>step / Char.</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr>
<tr><td>B,E</td><td>+20</td><td>-25</td><td>+20</td><td>+85</td><td>+20</td></tr>
<tr><td>F</td><td>+20</td><td>+10</td><td>+20</td><td>+70</td><td>+20</td></tr>
</table>
SPEC :
<table>
<tr><th>Char.</th><th>Change Rate</th></tr>
<tr><td>B</td><td>± 10%</td></tr>
<tr><td>E</td><td>+22 ~ -56%</td></tr>
<tr><td>F</td><td>+22 ~ -82%</td></tr>
</table>
</td></tr>
</table>

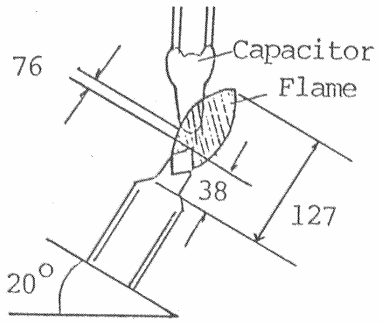
<table>
<tr><th>ITEM</th><th>STANDARD</th></tr>
<tr><td>Humidity Resistance Test</td><td>Capacitor shall be subjected to 40±2℃ relative humidity of 90 to 95% for 500 ±12 hours.
After placing in room condition for 12 to 24 hours after this test shall satisfy table Ⅰ
Table Ⅰ.
<table>
<tr><td>Appearance</td><td>no remarkable damage</td></tr>
<tr><td>Capacitance change</td><td>B : ±10% Max
E : ±20% Max
F: ±30% Max</td></tr>
<tr><td>D.F. (tanδ)</td><td>B : ±5% Max
E : ±5% Max
F: ±7.5% Max</td></tr>
<tr><td>Insulation Resistance</td><td>5000MΩ Min</td></tr>
</table></td></tr>
<tr><td>Humidity Resistance Load Test</td><td>Temperature : 40±2℃
Humidity : 90 ~ 95%
Applied Voltage : Rating Voltage
Testing time : 500±12 hr
Rated value is the same table Ⅰ</td></tr>
<tr><td>Solder Heat Resistance</td><td>Solder temp. : 260-0, +5℃
Immersion time : 5 sec
No remarkable abnormality is recognized.
Rated value is the same table Ⅰ.</td></tr>
<tr><td>High temperature load test</td><td>Capacitors are to placed in a circulating air oven for 1000+24,-0 hours the air oven is to be maintained at a temperature of 85±3℃ throughout the test, each capacitor is to be subjected to a 800Vrms alternating potential having a frequency of 50-60Hz, except that once each hour the potential is to be increased to 1600Vrms for 1/10 sec. After this test, capacitors shall satisfy Table Ⅰ.</td></tr>
<tr><td>Temperature cycle</td><td>Temperature cycle should be measured in the following test.
Cycle time : 5 cycle
Pre-treatment : Capacitor should be stored at 85±3℃for 1hr., placing at room condition for 24±2hrs.
Post treatment : Capacitor should be stored for 24±2hrs at room condition after this test shall satisfy table Ⅰ.
<table>
<tr><td>Step</td><td>1</td><td>2</td><td>3</td><td>4</td></tr>
<tr><td>Temp(℃)</td><td>-25+0/-3℃</td><td>Room Temp</td><td>85+3/-0℃</td><td>Room Temp</td></tr>
<tr><td>Time(min)</td><td>30±5</td><td>2 to 5</td><td>30±5</td><td>2 to 5</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>ITEM</th><th>STANDARD</th></tr>
<tr><td>Discharge test I
(Impulse test)</td><td>
Capacitor shall withstand fifty times of discharges from a dump capacitor with an interval of 5 seconds between successive discharges. After this test, capacitor shall satisfy table II

Table II .
<table>
<tr><td>Insulation Resistance</td><td>1000MΩ Min</td></tr>
<tr><td>Withstand Voltage between terminals and envelope</td><td>No failure</td></tr>
</table>


S : Switch
V : DC Voltmeter
Ct : Test sample
E : 10kV DC
R_1 : 1kΩ
R_2 : 100MΩ (UL,CSA)
4MΩ (VDE)
</td></tr>
<tr><td>Discharge test II
(Impulse test)</td><td>
Capacitor shall withstand, without causing a hazard, four discharges from a dump capacitor charged to a voltage value that when discharged places a potential of Vdc across the capacitor under test, with an interval of 5 seconds between successive discharges.


Vac : 120V, 60Hz
t : Option isolation transformer of pulse blocking
f : Plug fuse 30A power supply
L : 3mH, 0.03 ohm choke coil
Ct : Test specimen
Cd : Dump Capacitor
<table>
<tr><th>Ct(Capacitance)</th><th>Cd(Capacitance)</th><th>Tanδ</th></tr>
<tr><td>0 to 0.005μF</td><td>0.005 μF</td><td>0.5% MAX</td></tr>
<tr><td>0.0051 to 0.05μF</td><td>0.05 μF</td><td>0.5% MAX</td></tr>
</table>
Vdc : Variable DC power supply
Vdc = 5000(Cd + Ct) / Cd (VDC)
</td></tr>
</table>

ITEM	STANDARD
Flaming test	The flame shall be applied for 15 Seconds, and than removed for 15 seconds until 5 such applications have been made. The material to fourth cycle and more than 1 minute in last cycle.  Flame nozzle : ø9.5mm, Dimensions in mm
The regulation of environmental pollution materials.	*Never use materials mentioned below in Y-CAP products regulated this document. *Pb, Hg, Cr^{+6}, PBB, PBDE : 100ppm, Cd : 5ppm *Pb of solder : 1000ppm

1-4. Marking

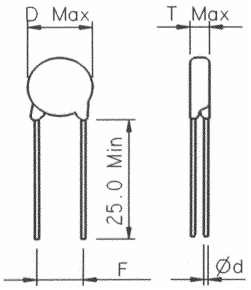
1) Type designation : SC or SD
2) Nominal capacitance : 3 digit system
3) Capacitance tolerance : letter code
4) Manufacture's name : SWC
5) Recognized mark
6) Rating Voltage
7) X,Y Class
8) Month of manufacture
   Even number year/odd number year
   Jan.:A/N, Feb.:B/N, Mar.:C/O,
   Apr.:D/P, May:E/Q, Jun.:F/R
   Jul.:G/S, Aug.:H/T, Sep.:I/U
   Oct.:J/V, Nov.:K/W, Dec.:L/X

	SC TYPE		SD TYPE	
	FRONT	REAR	FRONT	REAR
Below 09ø				
Above 10ø				

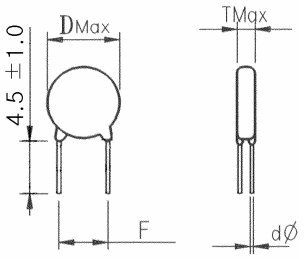
2. Style and dimensions

2-1. Bulk

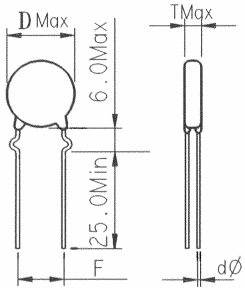
BS Type
(Straight Long Type)



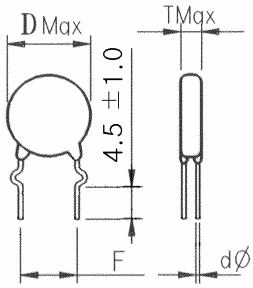
BN Type
(Straight Short Type)



BK Type
(Forming Long Type)



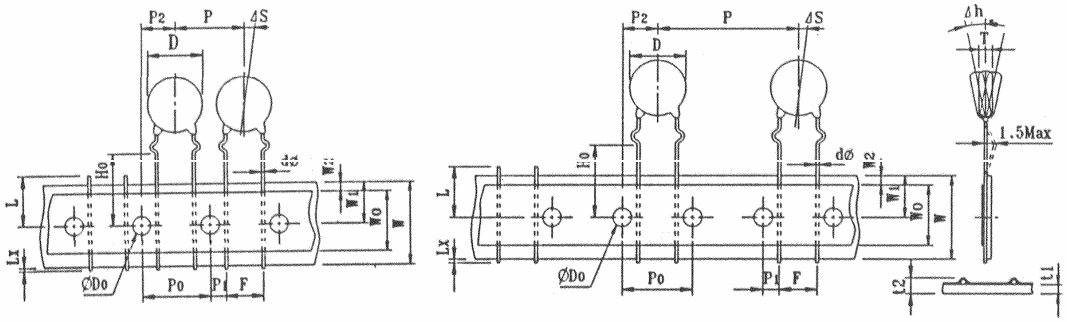
BW/BL Type
(Forming Short-kink)



(Unit : mm)

Type	Temp Char.	Capacitance (pF)	Dimensions			
			Dmax	Tmax	F±1.0	d(ϕ)±0.05
SC	B	100, 220, 270, 330, 470, 560	8.0	6.0	7.5, 10.0	0.60
		150, 390, 680	9.0	6.0	7.5, 10.0	0.60
		820, 1000	10.0	6.0	7.5, 10.0	0.60
	E	1000	7.0	6.0	7.5, 10.0	0.60
		1500	9.0	6.0	7.5, 10.0	0.60
		1800,2200	10.0	6.0	7.5, 10.0	0.60
		3300	12.5	6.0	7.5, 10.0	0.60
		3900	13.0	6.0	7.5, 10.0	0.60
		4700	14.0	6.0	7.5, 10.0	0.60
	F	4700	10.0	6.0	7.5, 10.0	0.60
		6800	11.0	6.0	7.5, 10.0	0.60
		10000	14.0	6.0	7.5, 10.0	0.60
SD	B	100, 150, 330, 390, 470	8.0	7.0	10.0	0.60
		220, 560	9.0	7.0	10.0	0.60
		680	10.0	7.0	10.0	0.60
	E	1000	8.0	7.0	10.0	0.60
		1500	9.0	7.0	10.0	0.60
		2200	12.5	7.0	10.0	0.60
		3300	14.0	7.0	10.0	0.60
		3900,4700	15.0	7.0	10.0	0.60

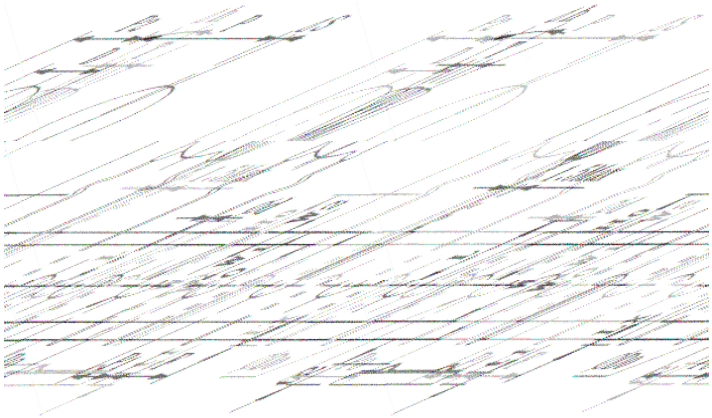
2-2. FF7, FF8



[Unit : mm]

Item	Symbol	Taping specification		Note
		FF7	FF8	
Body Diameter	D	6.3≤D≤14.0	15.0≤D≤20.0	
Body Thickness	T	6.0 Max		
Lead Diameter	dΦ	0.60 ± 0.05		
Pitch of sprocket Hole	Po	15.0 ± 0.3		
Pitch of component	P	15.0 ± 1.0		
Lead length from hole center to lead	P1	3.75 ± 1.0		
Lead length from hole center to Component center	P2	7.5 ± 1.5		
Lead spacing	F	7.5 ± 1.0		
Deviation along tape	△S	0 ± 1.0		
Deviation across tape	△h	0 ± 2.0		
Carrier tape width	W	18.0 + 1.0 −0.5		
Hold down tape width	Wo	5.0 Min		
Position of sprocket hole	W1	9.0 ± 0.5		
Hold down tape position	W2	3.0 Max		
Lead wire clinch height	Ho	16.0 ± 0.5		
Height of component hole	H	20.0 + 1.5 − 1.0		
Diameter of sprocket hole	ΦDo	4.0 ± 0.2		
Length of snipped lead	L	11 Max		
Total tape thickness	t_1	0.7 ± 0.2		
Total thickness, Tape and lead Wire	t_2	1.7 Max		
Lead wire protrusion	Lx	1.0 Max		

2-3. FF9, FF1, FF2



[Unit : mm]

Item	Symbol	Taping specification			Note
		FF9	FF1	FF2	
Body Diameter	D	6.0 ~ 20.0			
Body Thickness	T	6.0 Max			
Lead Diameter	dΦ	0.60 ± 0.05			
Pitch of sprocket Hole	Po	12.7 ± 0.3		15.0±0.3	
Pitch of component	P	25.4 ± 1.0		30.0±1.0	
Lead length from hole center to lead	P1	8.95±1.0	7.7±1.0	10.0±1.0	
Lead length from hole center to Component center	P2	12.7±1.5	12.7±1.5	15.0±1.5	
Lead spacing	F	7.5 ± 1.0	10.0 ± 1.0		
Deviation along tape	△S	0 ± 1.0			
Deviation across tape	△h	0 ± 2.0			
Carrier tape width	W	18.0 +1.0 −0.5			
Hold down tape width	Wo	9.0 Min			
Position of sprocket hole	W1	9.0 ± 0.5			
Hold down tape position	W2	3.0 Max			
Lead-wire clinch height	Ho	16.0 ± 0.5			
Height of component hole	H	20.0 +1.5 −1.0			
Diameter of sprocket hole	ΦDo	4.0 ± 0.2			
Length of snipped lead	L	11.0 Max			
Total tape thickness	t_1	0.7 ± 0.2			
Total thickness, Tape and lead Wire	t_2	1.7 Max			
Lead wire protrusion	Lx	1.0 Max			

▣ PACKING SPECIFICATION

1) Bulk

TYPE		PACKING QUANITY [pcs]				
DIVISION	L/W DIVISION [mm]	DIAMETER [Φ]	INNER BOX		OUT BOX	
			VINIL PAPERBAG	IBB 140	OBB 150	OBB300
3 ~ 8kv (Y-CAP)	Long	~ 7	500 +2, -0	5,000	-	20,000
		8 ~ 11		4,000	-	16,000
		12 ~ 14		3,000	6,000	-
		15 ~ 16		2,500	5,000	-
		17 ~ 20	200 +1, -0	2,000	4,000	-
	Short	~ 9	500 +2, -0	10,000	20,000	-
		10 ~ 11	500 +2, -0	7,500	15,000	-
		12 ~ 14	500 +2, -0	5,000	10,000	-
		15 ~ 16	500 +2, -0	4,000	8,000	-
		17 ~ 20	200 +1, -0	2,000	4,000	-

• ETC

SCE222M10, 332M12, F472M10(12) BK7 = 400 +1, -0

2) Taping

DIVISION	F [mm]	TYPE	Pitch	DIAMETER [Φ]	VOLTAGE [V]	BOX H [mm]	PACKING QUANITY [pcs]	
							IBR	OBR
3KV~	7.5	FF7	15.0	14.0↓	SC, SD	52	1,000 +5, -0	5,000
		FF8	30.0	15.0↑			600 +5, -0	3,000
		FF9	25.4	ALL			600 +5, -0	3,000
	10.0	FF1	25.4	ALL			600 +5, -0	3,000
		FF2	30.0				500 +5, -0	2,500

• ETC

SCE2E222M10FF7, SCE2E472M14FF8 = 1,000 +1, -0 (IN), 5,000(OUT)

3) PACKING BOX DIMENSIONS

PACKING STYLE		CATAGORY	W×T×H [mm]
BULK	IBB (Inner Box Bulk)	IBB140	255×230×116
	OBB(Out Box Bulk)	OBB150 (IBB140 ×2)	485×270×136
TAPING	INNER BOX	IBR52	314×52×258
	OUT BOX	OBR52 (IBR52 ×5)	326×300×271

▣ MATERIAL LIST

NO	Material Name	Substance	Remarks
1	Dieletric Powder	BaTiO3,TiO2	
2	Ag Paste	Ag	
3	Solder	Sn,Ag,Cu	
4	Epoxy resin	Epoxy Powder	
5	Lead wire	ⒶCu, Sn ⒷFe, Cu, Sn	Plating thickness : 3㎛ min.(material : tin)

⚠ Note

Please contact our sales representatives or product engineers before using the products in this catalog for the applications listed below, which require especially high reliability for the prevention of defect which might directly damage to a third party's life, body or property, or when one of our products is intented for use in application other than those specified in this cadalog.

1.Aircaft equipment 2.Areospace equipment
3.Undersea equipment 4.Power plant equipment
5.Medical equipment 6.Tranceportation equipment
7.Traffic signal equipment 8.Disaster prevention/crime prevention equipment
9.Data-processing equipment
10.Application of similar complexity and/or reliability requirements to the applications listed in the adove