Safety Standard Certified Resin Molding SMD Type Ceramic Capacitors for General Purpose SYL Series(X1:440V~/Y2:300V~)	POE-D39-00-E-08	Ver: 08	Page:1 / 13

HF

PRODUCT SPECIFICATION

PRODUCT: Safety Standard Certified Resin Molding SMD Type Ceramic Capacitors for General Purpose

TYPE: SYL SERIES（X1:440V~/Y2:300V~）
471K~472M

CUSTOMER:

N.W.: 0.20~0.23g/pc

DOC. NO.: POE-D39-00-E-08

APPROVED BY CUSTOMER

VENDOR：

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PSA

Record of change

Date	Version	Description	page
2022/6/27	00	First edition.	All
2022/7/14	01	Update 7.Packing Description	11
2022/9/6	02	Remove 5.1 Safety standards approval and recognized no.	7
2023/9/4	03	Updae 2. Mechanical Dimension& Packing & Storage conditions	5、11、12
2024/4/16	04	Update 3.Part numbering&5.1 Safety standards approval and recognized no.	5、7
2024/8/6	05	2. Mechanical dimension &3.Part numbering 5.1 Safety standards & 5.3 Product Structure 6.2 Performance 10.2 Reflow Soldering 10.3 Wave Soldering	5 7 8~10 13
2024/10/8	06	6.2 Performance	8~10
2025/4/9	07	Update 8.2 Reflow Soldering 8.3 Wave Soldering Add 5.3 Content of toxic and harmful substances control requirements 11 Capacitor temperature characteristic	12 12 7 13
2025/11/24	08	Cancel YUSYL332MP00, add YVSYL332MP00	

Table of Contents

1. Part number for SAP system:

(Ex.) **YP** **S YL** **102** **K** **P** **00**
(1) **(2)** **(3)** **(4)** **(5)** **(6)**

(1) Temperature characteristic (identified code)

CODE	Temperature characteristic	Cap. Change
YP	B (Y5P)	±10%
YU	E (Y5U)	-56% to +22%
YV	F(Y5V)	-82% to +22%

(2) SMD Type： SYL (X1:440Vac/Y2:300Vac)

(3) Capacitance (identified by 3-figure code):ex. 221=220pF , 102=1000pF

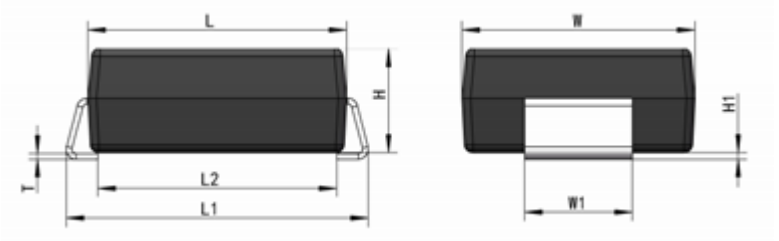
(4) Capacitance tolerance (identified by code): J:±5%,K:±10%,M:±20%

(5) Special Specification Code :

Code	Description
P	Pb Solder Product

(6) Internal code: 00--Normal, other code--Special control

2. Mechanical Dimension : Encapsulation：Epoxy resin, flammability UL94 V-0



Dimension(mm)			
L	6.0±0.5	W	5.6±0.5
L1	7.0±0.5	L2	5.5±0.5
H	2.2±0.1	W1	2.5±0.1
H1	0.15±0.05	T	0.13±0.02

3.Part numbering/T.C/Capacitance/ Tolerance：

SAP P/N	T.C.	Capacitance	Tolerance
YPSYL471KP00	Y5P	470 pF	±10%
YPSYL681KP00		680 pF	
YPSYL102KP00		1000 pF	
YUSYL152MP00	Y5U	1500 pF	±20%
YUSYL222MP00		2200 pF	
YVSYL332MP00	Y5V	3300 pF	±20%
YVSYL472MP00		4700 pF	

4. Marking:

1.Company Name Code(Trade mark)	UK
2.Type/Series Designation	SYL
3.Code of Dielectric	B(Y5P) / E(Y5U) / F(Y5V)
4.Nominal Capacitance	Identified by 3-Figure Code. Ex. 680pF→"681", 1000pF→"102"
5.Capacitance Tolerance	K:±10%,M:±20%
6.Class code/Rated Voltage Mark	X1 : 440V~ ; Y2 : 300V~
7. Products ID (Manufactured Date code, add as needed)	Abbreviation ex.: N0303 N:2021 year 03: March 03:date
Marking sample	
UK SYL E 102M X1 440V~ Y2 300V~ N0303	

Date code comparison table:

code of year				code of month		code of day			
year	code	year	code	month	code	day	code	day	code
		2020	M	1	1	1	1	16	16
		2021	N	2	2	2	2	17	17
2010	A	2022	P	3	3	3	3	18	18
2011	B	2023	R	4	4	4	4	19	19
2012	C	2024	S	5	5	5	5	20	20
2013	D	2025	T	6	6	6	6	21	21
2014	E	2026	U	7	7	7	7	22	22
2015	F	2027	V	8	8	8	8	23	23
2016	H	2028	W	9	9	9	9	24	24
2017	J	2029	X	10	10	10	10	25	25
2018	K			11	11	11	11	26	26
2019	L			12	12	12	12	27	27
						13	13	28	28
						14	14	29	29
						15	15	30	30
								31	31

Note: the year code repeats once every 20 years for a one-week period.

5. Scope:

THIS SPECIFICATION APPLIES TO CERAMIC INSULATED CAPACITORS RESIN MOLDING SMD TYPE USED IN ELECTRONIC EQUIPMENT.

5.1Applicable safety standard

This specification applies to the UL/CUL, VDE/ENEC, CQC and KC approved ceramic capacitors resin molding SMD type for antenna coupling, line-by-pass and across-the-line. X1, Y1 capacitor based on IEC60384-14.

5.2 Safety standards approval and recognized no.

Safety Standard	Standard No.	Subclass	w.v.	Recognized No.
UL / CUL	ANSI/UL 60384-14	X1/Y2	440Vac/300Vac	E146544
ENEC	EN 60384-14:2013/A1:2016	X1/Y2	440Vac/300Vac	ENEC-03632-M1
CQC	GB/T6346.14	X1/Y2	440Vac/300Vac	CQC21001311379

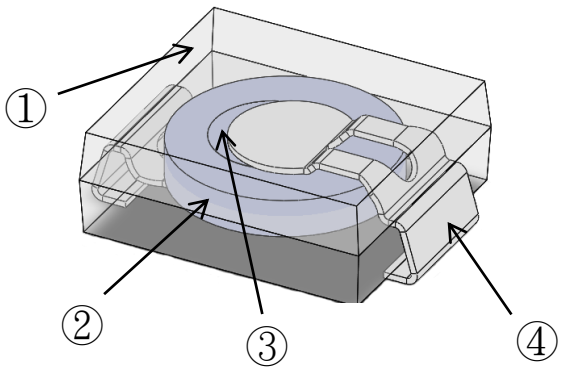
5.3 Content of toxic and harmful substances control requirements

RoHS2.0 2011/65/EU、Halogen、REACH No1907/2006

5.4 Exemption Clause

2010/571/EU 7(a)：Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead)

5.5 Product Structure:



No.	Part name	Material
①	Coating	Epoxy molding compound (Conforming to UL94V-0 standard)
②	Chip	Ceramic chip
③	Solder	Sn-Pb-Ag Solder
④	Lead pin	Copper alloy
		Tin coating

6. Specification and test method:

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

6.2 Performance:

No	Items		Specification	Testing method
1	Appearance and dimensions		No marked defect on appearance form and dimensions. Please refer to [Part number list].	The capacitor should be inspected by naked eyes for visible evidence of defect. Dimensions should be measured with slide calipers.
2	Marking		To be easily legible.	The capacitor should be inspected by naked eyes.
3	Voltage proof	Between lead wires	No permanent break-down or flashover during the test period	test voltage:2600VAC frequency:50/60Hz duration:60 seconds leakage current: 5mA max
		Body Insulation	No permanent break-down or flashover during the test period	
4	Capacitance	Within specified tolerance	Within specified tolerance K: ±10% M: ±20%	Temperature:25±3℃ Humidity: 55±30%RH Voltage: 1.0±0.2V Frequency : 1±0.2KHZ
5	Dissipation Factor(D.F.)		Y5P: ≤2.5% Y5U:≤2.5% Y5V: ≤2.5%	Temperature: 25±3℃ Humidity: 55±30%RH Voltage: 1.0±0.2V Frequency : 1±0.2KHZ
6	Temperature Characteristic		Char. / Capacitance Change B(Y5P) / Within ± 10% E(Y5U) / Within +22/-56% F(Y5V) / Within +22/-82%	The capacitance measurement shall be made at each step specified in Table Step: 1 / 2 / 3 / 4 / 5 Temp.(℃): +20±2 / -25±2 / +20±2 / +85±2 / +20±2 $\triangle = (C_X - C_0) / C_0$ CX capacitor for step2,4 C0 capacitor for step 3
7	Insulation resistance	Between lead wires	10000MΩ MIN	Measuring voltage: 500±50VDC duration: 60±5 seconds The voltage should be applied to the capacitor through a resistor of 1MΩ.
		Body Insulation	10000MΩ MIN	
8	Solderability		Good tin coating (tin rate above 90%), within 3s of convergence.	Immerse the capacitor in the solution of ethanol (JIS K 8101) and rosin (JIS K 5902) (25% rosin in weight proportion). (Reference) Immerse in solder solution for 2±0.5s. Temp. of solder: 245±10°C

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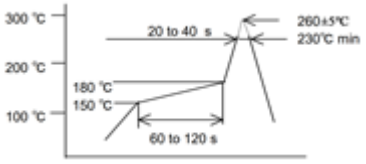
No	Items		Specification	Testing method
9	Resistance to Soldering Heat	Appearance	No marked defect.	Reflow(peak) solder temperature：260±5℃ Solder zone：230℃ min. 20-40s.  Pre-treatment The capacitor should be stored at 125 ± 3℃ for 1 hour and subjected to AC2600V (r.m.s.) for 60 seconds. Then, it should be left at room temperature for 24 ± 2 hours before initial measurement. Post-treatment : Capacitor should be stored for 24±2h at *room condition.
		I.R.	refer item 7	
		voltage proof	refer item 3	
		Capacitance Change	B(Y5P)：Within ±10% E(Y5U),F(Y5V)：Within ±20%	
		D.F	Y5P: ≤2.5% Y5U:≤2.5% Y5V: ≤2.5%	
10	Vibration	Appearance	No marked defect. Y5P: ±10% Y5U: ±15% Y5V: ±15% DF ≦2.5%	Frequency rangs: 10→55→10Hz Swing:0.75mm, The total duration shall be 6 hours. Duration of exposure at X,Y,Z：2hours
11	Temperature cycle	Appearance	No marked defect.	Pre-treatment : The capacitor should be stored at 125 ± 3℃ for 1 hour and subjected to AC2600V (r.m.s.) for 60 seconds. Then, it should be left at room temperature for 24 ± 2 hours before initial measurement Upper category temperature : +125±3℃ Lower category temperature : -40±3℃ Number of cycles :5 Duration of exposure at the temperature limits：30minutes Capacitor shall be placed at 25±3℃for 24±2h before initial measurements.
		voltage proof	refer item 3	
		Capacitance	Y5P: ±10% Y5U: ±20% Y5V: ±20%	
		D.F	Y5P: ≤2.5% Y5U:≤2.5% Y5V: ≤2.5%	
		I.R.	3000MΩ MIN	
12	Impulse voltage		No permanent breakdown or flashover during the test period	Peak impulse voltage: 5.0KV Impulses distance : ＞10 seconds Impulses times:24
			If any three successive impulses are shown by the oscilloscope monitor to have had a waveform indicating that no self-healing breakdowns or flashovers have taken place in the capacitor, then no further impulses shall be applied and the capacitor shall be counted as conforming.	
			If all 24 impulses have been applied to the capacitor and 3 or more of them are of a waveform indicating that no self-healing breakdowns or flashovers have occurred, then the capacitor shall be counted as conforming.	
			If less than 3 impulses are of the required waveform, then the capacitor shall be counted as a nonconforming item.	

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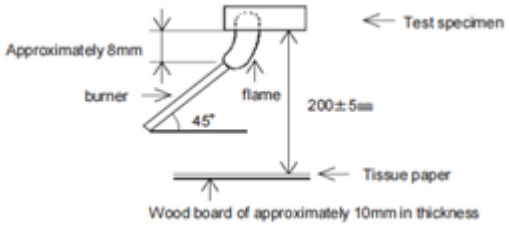
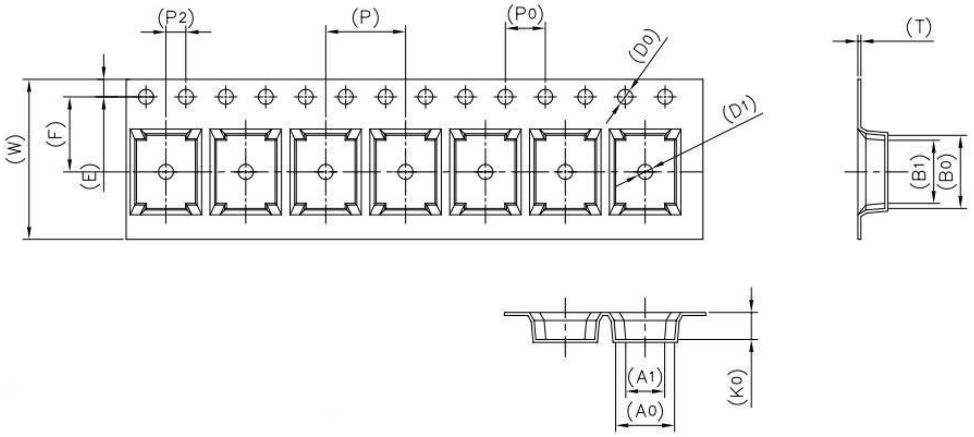
No	Items		Specification	Testing method
13	Endurance	Appearance	No marked defect.	Pre-treatment : The capacitor should be stored at 125 ± 3 ℃ for 1 hour and subjected to AC2600V (r.m.s.) for 60 seconds. Then, it should be left at room temperature for 24 ± 2 hours before initial measurement. Test temperature: 125±3℃ Duration: 1000+24/-0hours Test voltage: 510VAC(1.7 U_R),except that once every hour the voltage shall be increased to 1000v r.m.s.for 0.1s. Each of these voltage shall be applied To each capacitor individually through a resistor of 47Ω±5%. Capacitor shall be placed at 25±3℃for 24±2hours before measurements.
		Capacitance Change	$\triangle=(C_X-C_0)/C_0$ SL:±5% Y5P△: ±10% Y5U△: ±15% Y5V△: ±15%	
		I.R.	≥3000MΩ	
		voltage proof	Per Item 3	
14	Humidity (steady state)	Appearance	No marked defect.	Pre-treatment : The capacitor should be stored at 125 ± 3 ℃ for 1 hour and subjected to AC2600V (r.m.s.) for 60 seconds. Then, it should be left at room temperature for 24 ± 2 hours before initial measurement. test temperature: 40±2℃ humidity: 95±3%RH duration: 500+24/-0hours voltage: 300VAC（U_R）for one half of the samples. capacitor shall be placed at 25±3℃for 24±2hours before measurements
		Capacitance Change	$\triangle=(C_X-C_0)/C_0$ SL:±5% Y5P: ±10% Y5U: ±15% Y5V: ±15%	
		I.R.	≥3000MΩ	
		voltage proof	Per Item 3	
15	Passive flammability		The burning time should not be exceeded the time 10s. The tissue paper should not ignite.	The capacitor under test shall be held in the flame in the position which best promotes burning. Each specimen shall only be exposed once to the flame. Time of exposure to flame : 10 s. Length of flame : 12±1mm Gas burner : Length 35mm min. Inside dia : 0.5±0.1mm Outside dia : 0.9mm max. Gas : Butane gas purity 95% min. 
16	Component solvent Resistanc		No visible damage. Performance according Item 3~7	Solvent to be used:30±5%isopropyl alcohol and 70±5%fluxional compound Solvent temperature: 23±5℃ The capacitor shall be immerged in solvent for 5±0.5seconds
17	Solvent resistance of the marking		The marking shall be legible	Solvent to be used:30±5%isopropyl alcohol and 70±5%fluxional compound Solvent temperature: 23±5℃ The capacitor shall be immerged in solvent for 5±0.5minutes and its markshall be wiped with pledget for 10times.

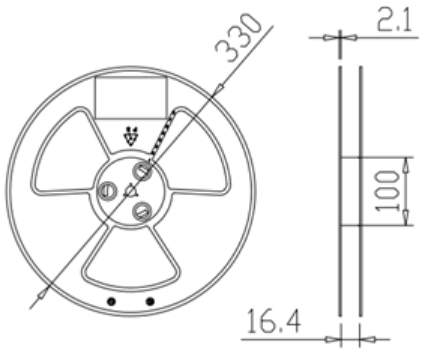
7.Packing Description ：

7.1 Dimension of tap



ITEM	W	A0	B0	K0	E	F	P	P0	P2	D0	D1	T	A1	B1
DIM	16.0	5.90	7.30	2.70	1.75	7.50	8.00	4.00	2.00	1.50	1.50	0.30	3.00	6.30
TOLE	±0.30	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.10	±0.05	±0.10	±0.10

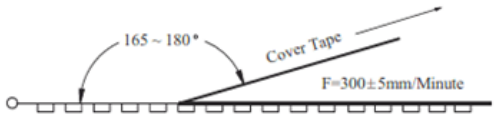
7.2 Reel Drawing



REEL	REEL SIZE
3000pcs	13inch

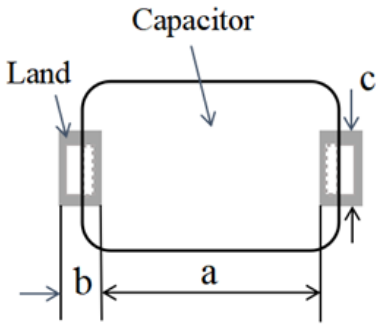
7.3 Peeling Strength

Item	Data	Remark
Cover tape adhesion	10～100g	Carrier tape and cover tape open angle 165～180° F=300± 5mm/minute



8. Soldering Recommendation:

8.1 Soldering Land Pattern Size:



Dimension	a(mm)	b(mm)	c(mm)
6.0x5.6	5.5 min.	2.2±0.1	3.6±0.1

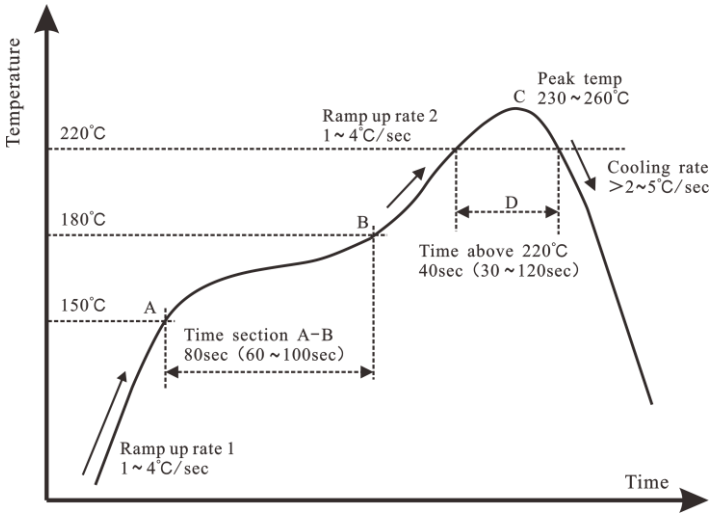
8.2 Reflow Soldering

When soldering capacitor, it should be performed in following conditions.and the continuous welding times shuld not exceed three times.

Soldering temperature : 260±5 ℃

Soldering time : 120s max.

Preheating temperature : 150℃ max.



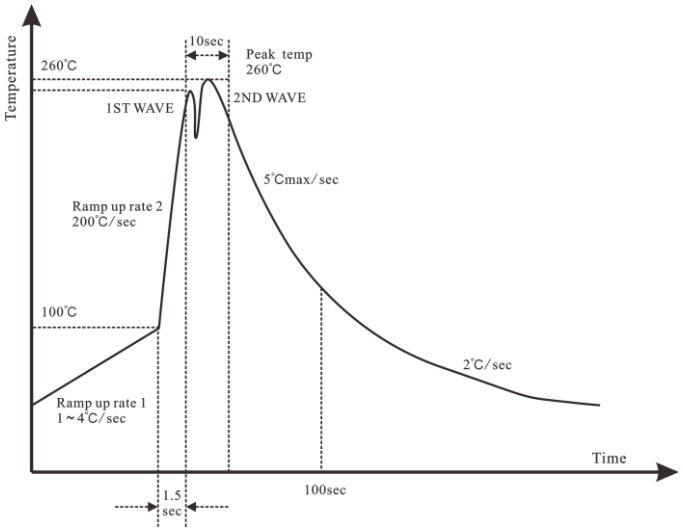
8.3 Wave Soldering

When soldering capacitor, it should be performed in following conditions.and the continuous welding times shuld not exceed three times..

Soldering temperature : 260±5℃.

Soldering time : 10s max.

Preheating temperature : 100℃ max.



8.4 Soldering Iron

When soldering this product to a PCB/PWB, do not exceed the solder heat resisitance 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℃ max.

Soldering iron wattage：50W max.

Soldering time：5s max.

9. Application notes

9.1 Attention is drawn to the fact that repetition of the voltage proof test by the user may damage the capacitor.

9.2 Capacitors mounted on a printed circuit board (PCB) requirements of PCB board welding disc required and capacitor pin paste solder joint agreement, the opposite may cause the capacitor and the PCB board to bad welding and capacitor tube deform the feet or body destruction and damage the capacitor.8.3 Test condition for withstanding voltage

9.3 Avoid any compressive, tensile or flexural stress.

9.4 Please consult us first if you wish to embed the capacitor in plastic resins.

9.5 Do not move the capacitor after it has been soldered to the board.

9.6 Do not pick up the PC board by the soldered capacitor.

10. Storage conditions

10.1 The insulating Epoxy molded 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. So, in order to avoid the absorption of moisture, capacitors are packed in moisture-proof envelope.

10.2 Store the capacitors in the following conditions at all times, and use within 12 months after delivered

Temperature: 10 ～30℃

Humidity: 60%max.

10.3 Solder the enclosed capacitors within 168 hours after opening the moisture-proof package. After opening, store the capacitors in moisture-proof package with a desiccant and HIC card and keep the above condition.

10.4 In case the storage period has been exceeded 12 months or the indicator color of a enclosed HIC card has changed when the package has been opened, perform baking (60℃x168hr)before soldering.

11. Capacitor temperature characteristic