SPECIFICATION

MPX/X2-Series

Company and Factory Name: SHANTOU FREE TRADE ZONE SONGTIAN ELECTRONIC TECHNOLOGY CO.,LTD
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Spec. List

STE P/N	Specifications
X2P2102KN1B0130110050ES0	X2-102K-275VAC
X2P2222KN1B0130110050ES0	X2-222K-275VAC
X2P2472KN1B0130110050ES0	X2-472K-275VAC
X2Q2103KN1B0130110050ES0	X2-103K-305VAC
X2Q3103KN1B0130110050ES0	X2-103K-310VAC
X2Q2223KN1B0130110050ES0	X2-223K-305VAC
X2Q3223KN1B0130110050ES0	X2-223K-310VAC
X2P2333KN1B0130110050ES0	X2-333K-275VAC
X2Q2333KN1B0130110050ES0	X2-333K-305VAC
X2Q3333KN1B0130110050ES0	X2-333K-310VAC
X2Q2473KN1B0130110050ES0	X2-473K-305VAC
X2Q3473KN1B0130110050ES0	X2-473K-310VAC
X2P2683KN1B0130120060ES0	X2-683K-275VAC
X2Q3683KN1B0130120060ES0	X2-683K-310VAC
X2P2104KN1B0130120060ES0	X2-104K-275VAC
X2Q2104KN1B0130120060ES0	X2-104K-305VAC
X2Q3104KN1B0130120060ES0	X2-104K-310VAC
X2P2224KN1B0130150080ES0	X2-224K-275VAC
X2P2333KQ1B0180110050ES0	X2-333K-275VAC
X2Q2333KQ1B0180110050ES0	X2-333K-305VAC
X2P2473KQ1B0180110050ES0	X2-473K-275VAC
X2Q2473KQ1B0180110050ES0	X2-473K-305VAC
X2Q3473KQ1B0180110050ES0	X2-473K-310VAC
X2P2683KQ1B0180110050ES0	X2-683K-275VAC

X2Q3683KQ1B0180110050ES0	X2-683K-310VAC
X2P2104KQ1B0180120060ES0	X2-104K-275VAC
X2Q2104KQ1B0180120060ES0	X2-104K-305VAC
X2P2154KQ1B0180120060ES0	X2-154K-275VAC
X2Q3154KQ1B0180120060ES0	X2-154K-310VAC
X2P2224KQ1B0180145085ES0	X2-224K-275VAC
X2Q2224KQ1B0180145085ES0	X2-224K-305VAC
X2Q3224KQ1B0180145085ES0	X2-224K-310VAC
X2Q2474KQ1B0180160100ES0	X2-474K-305VAC
X2P2684KT1B0265170085ES0	X2-684K-275VAC
X2Q2684KT1B0265170085ES0	X2-684K-305VAC
X2Q3684KT1B0265170085ES0	X2-684K-310VAC
X2P2824KT1B0265190100ES0	X2-824K-275VAC
X2Q2824KT1B0265190100ES0	X2-824K-305VAC
X2P2105KT1B0265170085ES0	X2-105K-275VAC
X2Q2105KT1B0265200110ES0	X2-105K-305VAC
X2P2125KT1B0265190100ES0	X2-125K-275VAC
X2Q2125KT1B0265220125ES0	X2-125K-305VAC
X2Q3125KT1B0265220125ES0	X2-125K-310VAC
X2P2155KT1B0265200110ES0	X2-155K-275VAC
X2Q2155KT1B0265220125ES0	X2-155K-305VAC
X2Q2105KV1B0320200110ES0	X2-105K-305VAC
X2Q2125KV1B0320200110ES0	X2-125K-305VAC
X2Q2155KV1B0320220130ES0	X2-155K-305VAC
X2Q3155KV1B0320220130ES0	X2-155K-310VAC
X2P2205KV1B0320220130ES0	X2-205K-275VAC
X2Q2225KV1B0320250140ES0	X2-225K-305VAC

Contents

1. Applications

Widely used in across-the-line,interference suppression circuit.ect

2. Part Number Code

X2	P2	102	K	N	1	B0	130	110	050	E	S	0

Capacitor Series
X2

Voltage
P2:275VAC
Q2:305VAC
Q3:310VAC

Capacitance
102: 1nF
222: 2.2nF
472: 4.7nF
103: 10nF
223:22nF
333:33nF
473:47nF
683:68nF
104:100nF
154:150nF
224:220nF
474:470nF
684:680nF
824:820nF
105:1.0μF
125:1.2μF
155:1.5μF
205:2.0μF
225:2.2μF

Tolerence
K:±10%

Pitch
N:10.0mm
Q:15.0mm
T:22.5mm
V:27.5mm

Terminal Type
1:Long Straight
2:Inside Kink Lead
5:Straight Lead Taping
6:Inner Crimped Tapping

Lead Length
30~39:3.0~3.9mm
40~49:4.0~4.9mm
50~59:5.0~5.9mm
60~69:6.0~6.9mm
70~79:7.0~7.9mm
80~89:8.0~8.9mm
90~99:9.0~9.9mm

Lead Length
A0~A9:11.0~19.0mm
B0~B9:20.0~29.0mm
C0~C9:30.0~39.0mm

Width
130:13.0mm
180:18.0mm
265:26.5mm
320:32.0mm

Height
110:11.0mm
120:12.0mm
145:14.5mm
160:16.0mm
170:17.0mm
190:19.0mm
200:20.0mm
220:22.0mm
250:25.0mm

Thickness
050:5.0mm
060:6.0mm
080:8.0mm
085:8.5mm
100:10.0mm
110:11.0mm
125:12.5mm
130:13.0mm
140:14.0mm

Client Catagoryt
S:Yellow
E:Grey

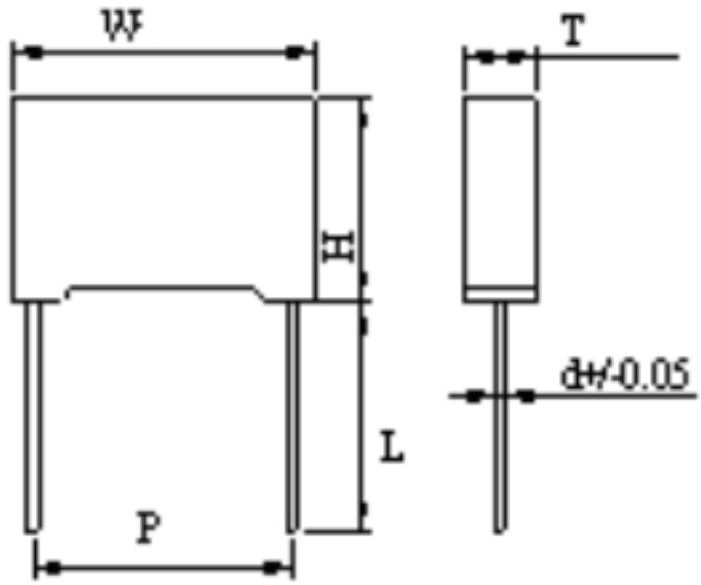
Environmental Standard
E:RoHS
F:RoHS+Halogen-Free

Inner Management
0

3. Electrical Characteristics

Climatic Category	40/110/56
Operating Temperature Range	-40℃～110℃
Rated Voltage	275VAC/305VAC/310VAC
Nominal Capacity	0.001μF～2.2μF
Tolerance	±10% (K)
Dissipation Factor(tanδ)	≤0.1%
Withstand Voltage	Between terminals to case: $2U_R$+1500VAC Minimum of 2000VAC
	Between terminals: $4.3U_R$(DC)/5S
Insulation Resistance (I.R.)	C_R≤0.33μF, IR≥15000MΩ C_R＞0.33μF, IR≥5000S Note: T[s]=I.R.[MΩ]*CN [μF]　20℃、100V、60S

4. Dimensions and Approval

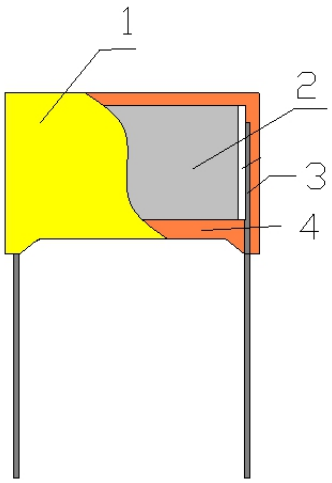


Specifications	L Min (mm)	W±0.5 (mm)	H±0.5 (mm)	T±0.5 (mm)	P±1.0 (mm)	d±0.05 (mm)	Product marking (See item 6 for details)
X2-102K-275VAC	20.0	13.0	11.0	5.0	10.0	0.6	Example 1
X2-222K-275VAC	20.0	13.0	11.0	5.0	10.0	0.6	Example 1
X2-472K-275VAC	20.0	13.0	11.0	5.0	10.0	0.6	Example 1

X2-103K-305VAC	20.0	13.0	11.0	5.0	10.0	0.6	Example 2
X2-103K-310VAC	20.0	13.0	11.0	5.0	10.0	0.6	Example 3
X2-223K-305VAC	20.0	13.0	11.0	5.0	10.0	0.6	Example 2
X2-223K-310VAC	20.0	13.0	11.0	5.0	10.0	0.6	Example 3
X2-333K-275VAC	20.0	13.0	11.0	5.0	10.0	0.6	Example 1
X2-333K-305VAC	20.0	13.0	11.0	5.0	10.0	0.6	Example 2
X2-333K-310VAC	20.0	13.0	11.0	5.0	10.0	0.6	Example 3
X2-473K-305VAC	20.0	13.0	11.0	5.0	10.0	0.6	Example 2
X2-473K-310VAC	20.0	13.0	11.0	5.0	10.0	0.6	Example 3
X2-683K-275VAC	20.0	13.0	12.0	6.0	10.0	0.6	Example 1
X2-683K-310VAC	20.0	13.0	12.0	6.0	10.0	0.6	Example 3
X2-104K-275VAC	20.0	13.0	12.0	6.0	10.0	0.6	Example 1
X2-104K-305VAC	20.0	13.0	12.0	6.0	10.0	0.6	Example 2
X2-104K-310VAC	20.0	13.0	12.0	6.0	10.0	0.6	Example 3
X2-224K-275VAC	20.0	13.0	15.0	8.0	10.0	0.6	Example 1
X2-333K-275VAC	20.0	18.0	11.0	5.0	15.0	0.8	Example 1
X2-333K-305VAC	20.0	18.0	11.0	5.0	15.0	0.8	Example 2
X2-473K-275VAC	20.0	18.0	11.0	5.0	15.0	0.8	Example 1
X2-473K-305VAC	20.0	18.0	11.0	5.0	15.0	0.8	Example 2
X2-473K-310VAC	20.0	18.0	11.0	5.0	15.0	0.8	Example 3
X2-683K-275VAC	20.0	18.0	11.0	5.0	15.0	0.8	Example 1
X2-683K-310VAC	20.0	18.0	11.0	5.0	15.0	0.8	Example 3
X2-104K-275VAC	20.0	18.0	12.0	6.0	15.0	0.8	Example 1
X2-104K-305VAC	20.0	18.0	12.0	6.0	15.0	0.8	Example 2
X2-154K-275VAC	20.0	18.0	12.0	6.0	15.0	0.8	Example 1
X2-154K-310VAC	20.0	18.0	12.0	6.0	15.0	0.8	Example 3
X2-224K-275VAC	20.0	18.0	14.5	8.5	15.0	0.8	Example 1
X2-224K-305VAC	20.0	18.0	14.5	8.5	15.0	0.8	Example 2
X2-224K-310VAC	20.0	18.0	14.5	8.5	15.0	0.8	Example 3

X2-474K-305VAC	20.0	18.0	16.0	10.0	15.0	0.8	Example 2
X2-684K-275VAC	20.0	26.5	17.0	8.5	22.5	0.8	Example 1
X2-684K-305VAC	20.0	26.5	17.0	8.5	22.5	0.8	Example 2
X2-684K-310VAC	20.0	26.5	17.0	8.5	22.5	0.8	Example 3
X2-824K-275VAC	20.0	26.5	19.0	10.0	22.5	0.8	Example 1
X2-824K-305VAC	20.0	26.5	19.0	10.0	22.5	0.8	Example 2
X2-105K-275VAC	20.0	26.5	17.0	8.5	22.5	0.8	Example 1
X2-105K-305VAC	20.0	26.5	20.0	11.0	22.5	0.8	Example 2
X2-125K-275VAC	20.0	26.5	19.0	10.0	22.5	0.8	Example 1
X2-125K-305VAC	20.0	26.5	22.0	12.5	22.5	0.8	Example 2
X2-125K-310VAC	20.0	26.5	22.0	12.5	22.5	0.8	Example 3
X2-155K-275VAC	20.0	26.5	20.0	11.0	22.5	0.8	Example 1
X2-155K-305VAC	20.0	26.5	22.0	12.5	22.5	0.8	Example 2
X2-105K-305VAC	20.0	32.0	20.0	11.0	27.5	0.8	Example 2
X2-125K-305VAC	20.0	32.0	20.0	11.0	27.5	0.8	Example 2
X2-155K-305VAC	20.0	32.0	22.0	13.0	27.5	0.8	Example 2
X2-155K-310VAC	20.0	32.0	22.0	13.0	27.5	0.8	Example 3
X2-205K-275VAC	20.0	32.0	22.0	13.0	27.5	0.8	Example 1
X2-225K-305VAC	20.0	32.0	25.0	14.0	27.5	0.8	Example 2

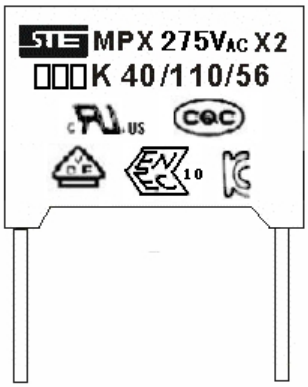
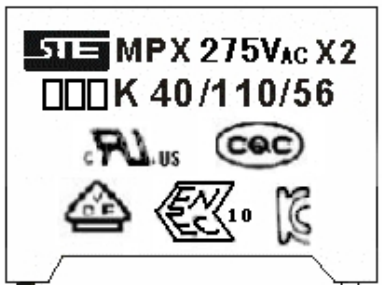
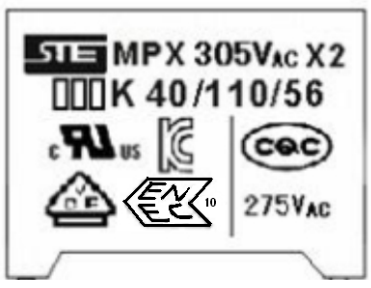
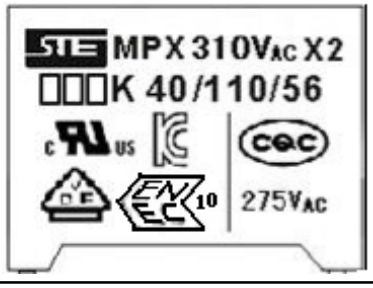
5. Construction



NO.	Name	Material	Percentage
1	Case	Plastic	10%
2	Core	Metallized polypropylene film	60%
3	Metal Pin	CP	10%
4	Sealing Material	Epoxy Resin	20%

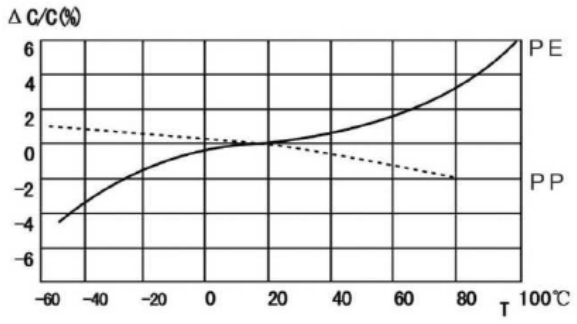
6. Marking

Product marking for the front and top of both sides.

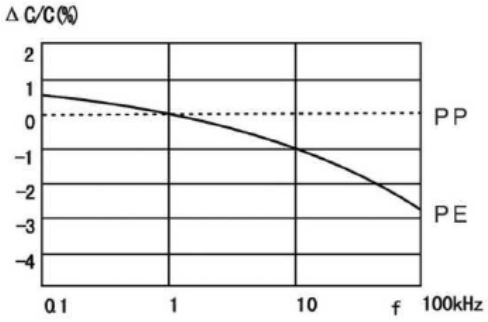
Positive	Item	
	Logogram	
	Type	MPX
	Rated Voltage	275VAC
	Sub-class of safety performance	X2
	Nominal capacitance	□□□
	Capacitance Tolerance	K (±10%)
	Climatic category	40/110/56
	Monogram safety recognized body	:UL :CQC :VDE :EU :KTL
Top	**Item**	
	Security signs(Seal)	
Example 1	**Example 2**	**Example 3**
		

7. Graph

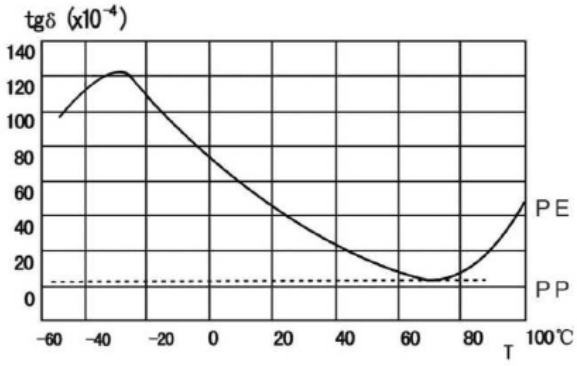
7.1 Rated Value & Characteristic



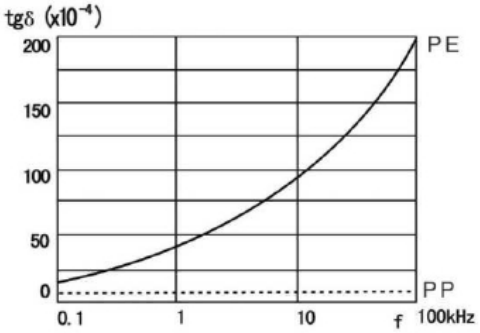
Capacitance vs. Temperature at 1kHz



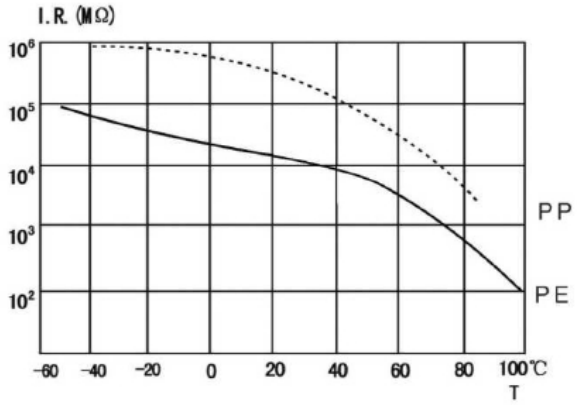
Capacitance vs. frequency (Room temperature)



Dissipation factor vs. temperature at 1kHz



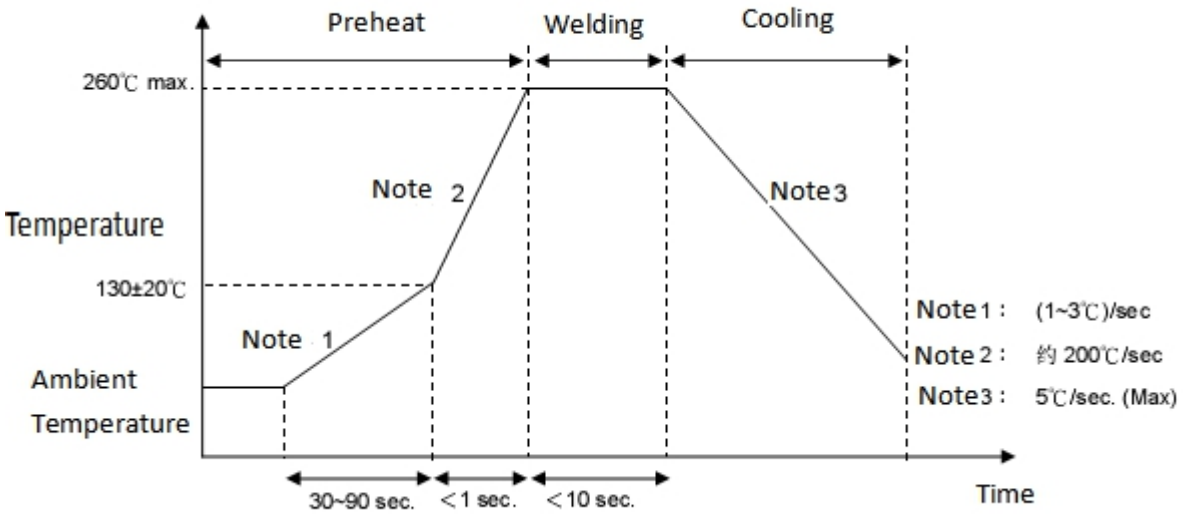
Disspation factor vs. frequency (Room temperature)



I.R. vs. temperature

7.2 Soldering Condition

Wave Soldering Graph



Note: Film capacitor is not suitable for reflow soldering welding, because it will cause thermal contraction and affect electrical performance.

Iron Soldering Condition

Item	Condition
Temperature of soldering copper bit	360℃（max.）
Soldering duration	3sec（max.）
Space between soldering position and coating layer	2mm（min.）

8. Safety Certificate

Approval	Organization	Safety Standards	Certificate No.	Capacity Range(μ F)	Rated Voltage
USA Canada	UL/CUL	UL60384-14	E208107	0.001～2.2	250VAC 275VAC 305VAC 310VAC
Germany	VDE	EN60384-14	40034679	0.001～2.2	
EU	ENEC	EN60384-14	40034679	0.001～2.2	
Korea	KTL	K60384	SU03031-12001B	0.1 以下	
			SU03031-12002B	0.1 以上～0.33	
			SU03031-12003C	0.33 以上～1.0	
			SU03031-12004C	1.0 以上～2.2	
China	CQC	GB/T 6346.14-2015	CQC19001213200	0.001～2.2	

9. Reliability Test Methods and Requirements

<table>
<tr><th>NO.</th><th>Item</th><th>Specifications</th><th>Test conditions / Methods</th></tr>
<tr><td>1</td><td>Creep Age Distance and Clearance</td><td><table><tr><th>The range of voltage</th><th>Creep age distance</th><th>Clearance</th></tr><tr><td>250VAC＜ U_R≤500VAC</td><td>＞4.0mm</td><td>＞3.0mm</td></tr><tr><td>130VAC＜ U_R≤250VAC</td><td>＞3.0mm</td><td>＞2.5mm</td></tr></table></td><td>For the measurement between Terminals.</td></tr>
<tr><td>2</td><td>Robustness of Terminals</td><td>Pin No visible damage</td><td>Apply a specified weight to one lead of the sample, bent ±90°, 2 times.<table><tr><th>Terminal diameter (mm)</th><th>Bending Test Apply force(N)</th></tr><tr><td>0.5＜D≤0.8</td><td>5±10%</td></tr></table>Gradually apply the specified force and keep the unit fixed for 10±1sec.<table><tr><th>Terminal diameter (mm)</th><th>Force (N)</th></tr><tr><td>0.5＜d≤0.8</td><td>10±10%</td></tr></table></td></tr>
<tr><td>3</td><td>Solderability</td><td>Lead wire shall be soldered with uniform coating on the axial direction over 95% of the circumferential direction.</td><td>245±3℃, 3±0.3s.
Solder composition:
Sn96.5Ag3.0Cu0.5</td></tr>
<tr><td>4</td><td>Resistance To Soldering Heat</td><td>Pin No visible damage.</td><td>260 ± 5℃;10 ± 0.5S.</td></tr>
<tr><td>5</td><td>Marking Solvent</td><td>Clearly marked, no visible damage.</td><td>Immersion for 5 ± 0.5 min. in a mixture of 70 ± 5% 1,1,2-trichlorotrifluoroethane and 30 ± 5% isopropanol at 23 ± 5 °C Wipe 10 times with absorbent cotton.</td></tr>
</table>

<table>
<tr><th>NO.</th><th>Item</th><th>Specifications</th><th>Test conditions / Methods</th></tr>
<tr><td>6</td><td>Temperature Cycle</td><td>1) Appearance No visible damage.
2) Change rate of capacitance: ≤±5%
3) Dissipation factor:
≤0.008 (C_R≤1.0μF)
≤0.005 (C_R＞1.0μF)
4) According to initial conditions test voltage no breakdown and fly arc.
5) IR≥Initial value50%.</td><td>The capacitor shall be subjected to 5 temperature cycles<table><tr><th>Step</th><th>Temperature (℃)</th><th>Time (min)</th></tr><tr><td>1</td><td>-40+0/-3</td><td>30</td></tr><tr><td>2</td><td>110+3/-0</td><td>30</td></tr></table></td></tr>
<tr><td>7</td><td>Vibration</td><td>Appearance No visible damage</td><td>10~55Hz, 0.75mm,
10Hz→55Hz→10Hz. 1min
Apply for a total of 6 hours, 2 hrs each in 3 mutually perpendicular directions.</td></tr>
<tr><td>8</td><td>Collision or Impact</td><td>1) Appearance No visible damage
2) Change rate of capacitance: ≤±5%
3) Dissipation factor:
≤0.008 (C_R≤1.0μF)
≤0.005 (C_R<1.0μF)
4) According to initial conditions test voltage no breakdown and fly arc.
5) IR≥Initial value50%.</td><td>1000 times or 4000 times,
acceleration 400m/s^2,
pulse duration 6ms.</td></tr>
<tr><td>9</td><td>Damp Heat, Humidity Steady State</td><td>1) Appearance No visible damage.
2) Change rate of capacitance: ≤±5%.
3) Dissipation factor：
≤0.008 (C_R≤1.0μF)
≤0.005 (C_R>1.0μF)
4) According to initial conditions test voltage no breakdown and fly arc.
5) IR≥Initial value50%.</td><td>No voltage applied:
40±2℃, 90~95%RH,56 days.</td></tr>
<tr><td>10</td><td>Pulse Voltage</td><td>Test of capacitor shall be no permanent breakdown and arcing.</td><td>Applied voltage:
C_R≤1.0μF, 2.5KVDC
C_R＞1.0μF, 2.5/$\sqrt{C_R}$
Pulse frequency: 24 times
Time period:
Charging 9S, 2s discharge</td></tr>
<tr><td>11</td><td>Life Test</td><td>1) Appearance No visible damage
2) Change rate of capacitance:
≤ ±10%
3) Dissipation factor：
≤0.008 (C_R≤1.0μF)
≤0.005 (C_R＞1.0μF)
4) According to initial conditions test voltage no breakdown and fly arc.
5) IR ≥ Initial value50%.</td><td>110±3℃,1.25U_R,1000 hours,
the interval not less than the capacitor 25mm,
Voltage shall be increased every 1 hour to
1000VAC, duration is 0.1s, the voltage across a
47Ω ± 5% resistor applied to each capacitor.</td></tr>
</table>

<table>
<tr><th>NO.</th><th>Item</th><th>Specifications</th><th>Test conditions / Methods</th></tr>
<tr><td>12</td><td>Passive Flammability</td><td>The burning time shall not be exceeded the standard. The tissue paper shall not ignite.</td><td>The capacitor under test shall be held in the flame in the position which best promotes burning. Each specimen shall be exposed once in the flame. Specifically as follows: Level B requirements:
<table>
<tr><th rowspan="2">Class</th><th colspan="4">Capacitor volume (mm³) Apply flame time (S)</th><th rowspan="2">Maximum burning time (S)</th></tr>
<tr><th>Volume ＜250</th><th>250＜ Volume ≤500</th><th>500＜ Volume ≤1750</th><th>Volume ＞1750</th></tr>
<tr><td>A</td><td>15</td><td>30</td><td>60</td><td>120</td><td>3</td></tr>
<tr><td>B</td><td>10</td><td>20</td><td>30</td><td>60</td><td>10</td></tr>
<tr><td>C</td><td>5</td><td>10</td><td>20</td><td>30</td><td>30</td></tr>
</table></td></tr>
<tr><td>13</td><td>Active Flammability</td><td>The cheese-cloth shall not be on fire.</td><td>U=U_R,U1=2.5KV
Each sample shall be subjected to an energy storage capacitor 20 times, each interval between two discharge 5S.</td></tr>
<tr><td>14</td><td>Charge and Discharge Test</td><td>1) Capacity change rate: ≤±20%
2) DF loss angle increase: ≤0.8%
3) IR: >3000MΩ</td><td>Applied Voltage: $\sqrt{2}$ U_R .
Charge and discharge for 10,000 cycles
(one charge and one discharge for one cycle).
Its rate is about 1 time / s.</td></tr>
</table>

10. Storage Conditions

10.1 Storage Temperature: ≤35℃.

10.2 Relative Humidity: ≤70% RH.

10.3 Keep away from corrosive atmosphere and sunlight.

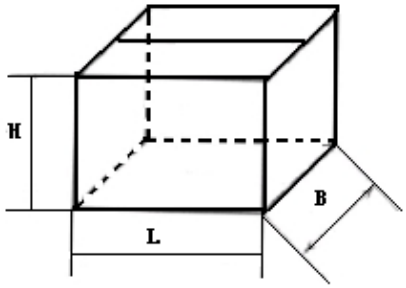
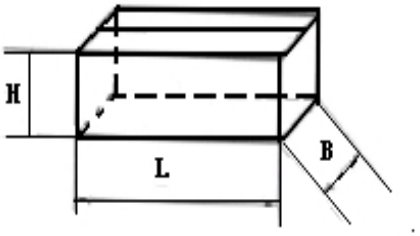
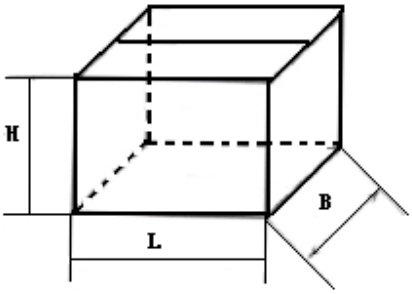
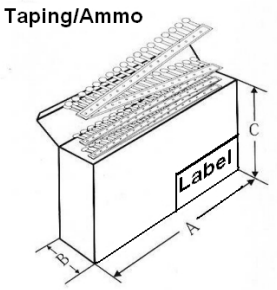
10.4 Period : 1 year.

11. Environmental Compliance:

RoHS Compliance

REACH Compliance

12. Packaging

External Packaging (Bulk)	Internal Packaging (Bulk)
	
External Packaging (Taping)	**Internal Packaging (Taping)**
	

Dimension Description (cm)					
External Packaging (Bulk)			**Internal Packaging (Bulk)**		
L	B	H	L	B	H
41.0	29.0	16.0	18.6	27.3	12.6
External Packaging (Taping)			**Internal Packaging (Taping)**		
L	B	H	B	A	C
54.0	36.0	26.3	4.4	33.5	26.2

SPQ Reference

Type	Specification	Pitch	SPQ
Bulk	All Specification	P=5 Series	1000
	All Specification	P=7.5 Series	500
	All Specification	P=10 T=6	500
	All Specification	P=15, T=6/7.5	500
	All Specification	P=22.5 T=6/7/8.5/10/11/12.5/13	200
	All Specification	P=27.5 T=11/13/14	100
Taping	All Specification	P=5	1000
	B3 10*9*4 B4 10*11*5	P=7.5	1000
	B5 10*12*6 B9 10*16*6 B10 10*15*8	P=7.5	500
	C1 13*11*5	P=10 12.7/15 Taping	500
	C3 13*12*6	P=10 12.7/12.7 Taping	400
	C3 13*12*6	P=10 15 Taping	500
	D2 18*12*6	P=15	300
	D5 18*16*10	P=15	250
	C8 13*15*8	P=10 12.7 Taping	300
	C8 13*15*8	P=10 15 Taping	500

Note: The above is for reference only, the actual packing number of braided tape shall prevail.