

# Product Spec Certification

**Customer :** Electronics Source Co., Ltd (PRC)

**Description :** Suppression capacitors - Class X2

**Part No. and the Dimensions in Diagram 1:**

NO	Edition	Sales P/N	Surong's Part No.	Clients' Part No	Rated Voltage	Cap (μF)	Capacitance Tolerance	Dimensions (mm)					
								W ±0.5	T ±0.5	H ±0.5	P ±0.5	L ±1	d ±0.05
1	A2	S33581770	MP2104K3D2GL-25		280VAC	0.1	K	18.0	5.8.	12.0	15.0	25.0	0.8
Remarks													

<u>Draft by</u>	<u>checked by</u>	<u>approved by</u>	<u>date</u>
Cui Jiang	Yongchu.Tan	Jiangun Li	2023-04-26
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## Customers recognize:

<u>Tested by</u>	<u>checked by</u>	<u>approved by</u>	<u>accept date</u>

- Note: 1. The client has read this acknowledgement and confirmed that it fully understands its meaning.  
 2. When this specification comes into effect, the old version will be canceled.  
 3. Pls sign back the first page of datasheet, otherwise the ERP system shouldn't work well.

客 户  
盖 章

## The record of changes

[illegible]

## 1. Features and Using

### 1.1 Features

High voltage proof with good insulation properties. Have strong moisture resistance and well voltage proof.

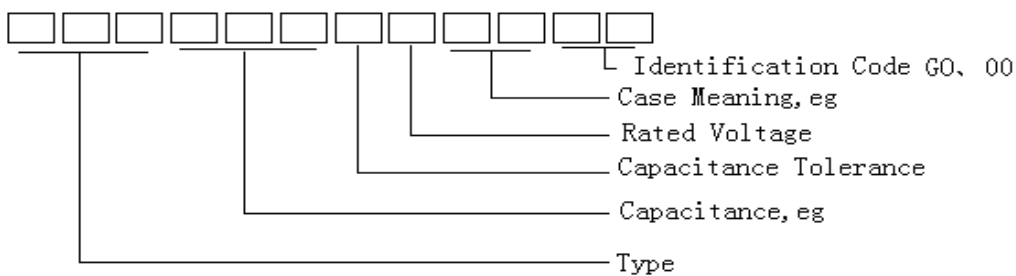
### 1.2 Using:

Used in across-the-line, interference suppression circuit.

## 2. Reference Standard

GB/T2693 (IEC60384-1) 《Fixed Capacitors for use in electronic equipment Part 1:Generic Specification》;  
GB/T6346.14-2015 (IEC60384-14) 《Fixed Capacitors for use in electronic equipment Part 14:Section Specification:  
Fixed capacitors for electromagnetic interference suppression and connection to the supply mains》;

## 3.Part Number System



### 3.1 Digit 1 to 3 Series code

MP2 =MPX/MKP X2

### 3.2 Digit 4 to 6 Rated capacitance value(For example)

Code	102	103	104	105
$\mu F$	0.001	0.01	0.1	1.0

### 3.3 Digit 7 Capacitance Tolerance

Code	K	M
Capacitance Tolerance	$\pm 10\%$	$\pm 20\%$

### 3.4 Digit 8 Rated Voltage

Code	G	3	H
Rated voltage (VAC)	250	280	310

### 3.5 Digit 9 to 10 The size of the case(For example)

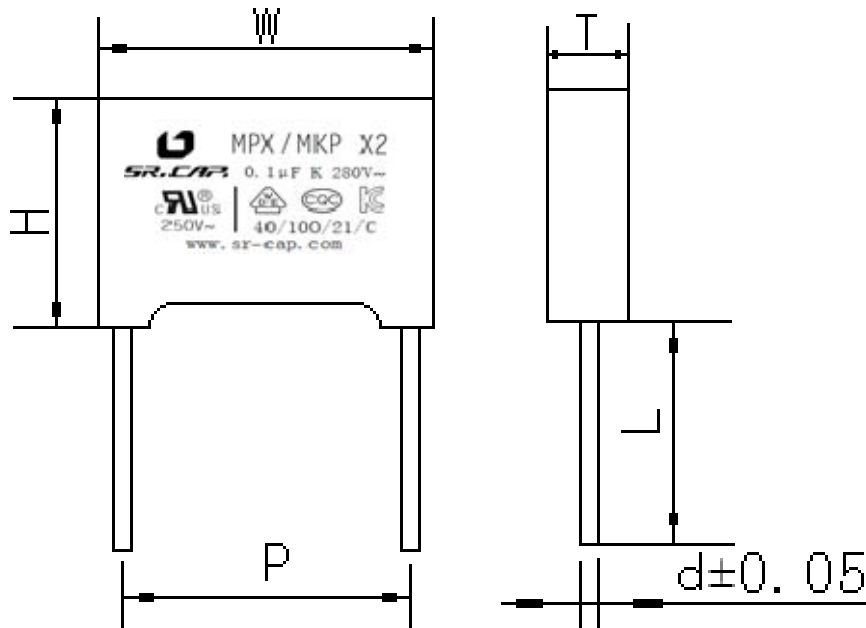
Code	C2	CA	D2	DA	E1
W*T*H	13*5*11	12.6*7.6*16	18*5.8*12	18*10*15.8	26.2*6*15

### 3.6 Digit 11 to 12 : Internal use



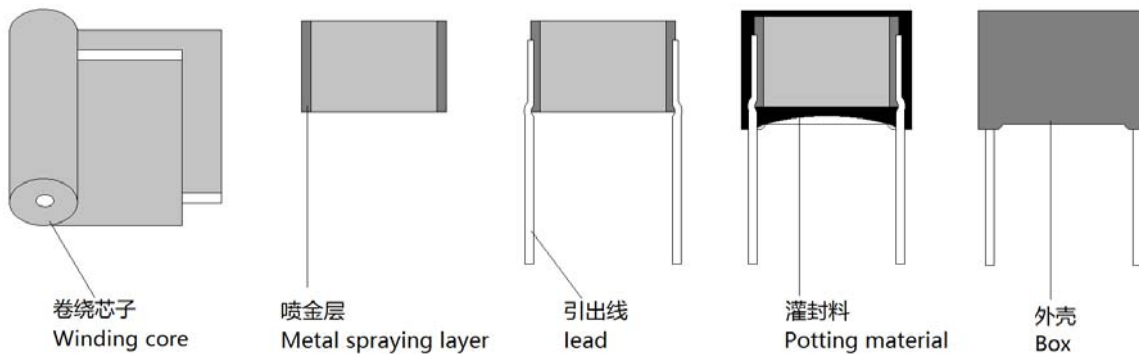
#### 4.0 Capacitor outline drawing, structure drawing and Ingredients list

##### 4.1 Outline Drawing:



##### 4.2 Structure drawing and Ingredients list:

###### 4.2.1 Structure drawing:



###### 4.2.2 Ingredients list:

Product Name	Part	Name of raw material
Interferon Suppression Capacitors, X2 Class	Winding core	Metallized polypropylene film
	Metal spraying layer	zinc wire and tin-zinc alloy
	Lead	Tin-coated copper-clad steel wire (Cp wire)
	Potting material	Flame-retardant epoxy resin<UL94/V-0>
	Plastic shell	PBT Case<UL94/V-0>



5. MPX/MKP X2 Safety Approvals:

Certificate Authority	UL	VDE	CQC	KTL	
Certificate Number	E314875	40008924	CQC06001018191	Capacitance range	Certificate No.
				0.0022-0.1 $\mu$ F	SU03022-6001C
				0.12-0.33 $\mu$ F	SU03022-6002C
				0.39-1.0 $\mu$ F	SU03022-6003C
				1.2-3.0 $\mu$ F	SU03022-7001A
				3.3-4.7 $\mu$ F	SU03022-7002A

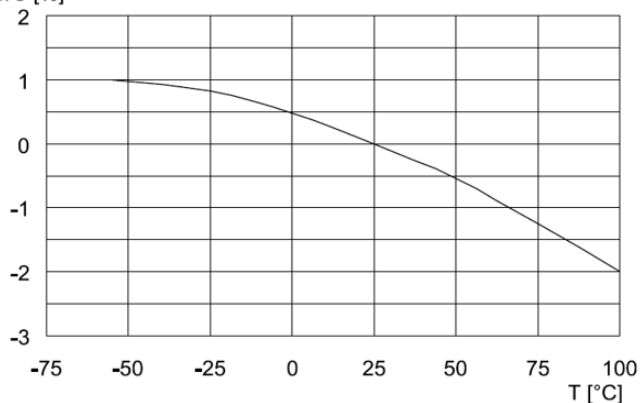
6. Technical Requirements

No.	Item	Performance		
6.1	Climatic category/ flame-retardant grade	40/100/21/C		
6.2	Operating Temperature Range	-40℃~+100℃		
6.3	Rated voltage UR	250VAC、280VAC、310VAC		
6.4	Maximum continuous DC voltage	630VDC		
6.5	Capacitance Range	0.0010 $\mu$ F~10.0 $\mu$ F		
6.6	Capacitance Tolerance	J( $\pm$ 5%) K( $\pm$ 10%) 1KHz, 1V		
6.7	Dissipation Factor	$C_R < 0.01 \mu F$	$\tan \delta \leq 0.002$ (1KHz, 20℃)	$\tan \delta \leq 0.002$ (10KHz, 20℃)
		$0.01 \mu F \leq C_R \leq 0.47 \mu F$	$\tan \delta \leq 0.001$ (1KHz, 20℃)	$\tan \delta \leq 0.002$ (10KHz, 20℃)
		$0.47 \mu F < C_R \leq 1.0 \mu F$	$\tan \delta \leq 0.0020$ (1KHz, 20℃)	$\tan \delta \leq 0.0040$ (10KHz, 20℃)
		$C_R > 1.0 \mu F$	$\tan \delta \leq 0.0030$ (1KHz, 20℃)	/
6.8	Voltage Proof	Between Terminals is 4.3U <sub>R</sub> VDC 2S Between Terminals and Case is 1500VAC+2URVAC (1min)		
6.9	Insulation Resistance	$C_R \leq 0.33 \mu F$ , $\geq 30000 M\Omega$ $C_R > 0.33 \mu F$ , $\geq 10000/C_R M\Omega$ (20℃, 100V, 1min)		
6.10	Soldering	Tin area should be more than 90%. (Solder groove method Ta, Method 1: Solder Temperature: 235 $\pm$ 5℃; Immersion Time: 2.0 $\pm$ 0.5S)		
6.11	Mark	The content of marking should has trademark, product model rated voltage, rated capacitance and tolerance.		
6.12	Appearance	① No rag, bubble, pinhole etc. ② Leads are with no serious damaged. ③ The marking must be correct and clear to identify		



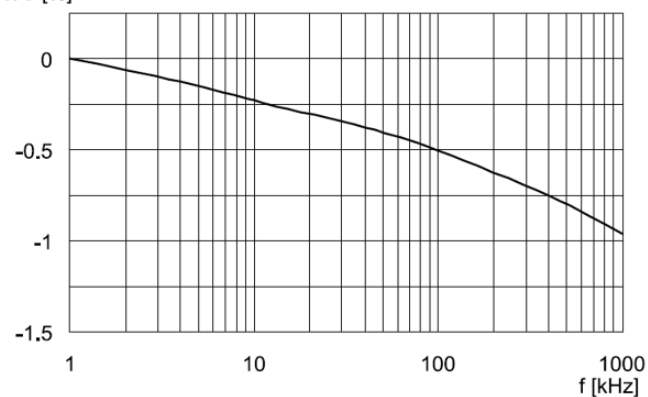
## 7. Typical Graphs

$\Delta C/C$  [%]



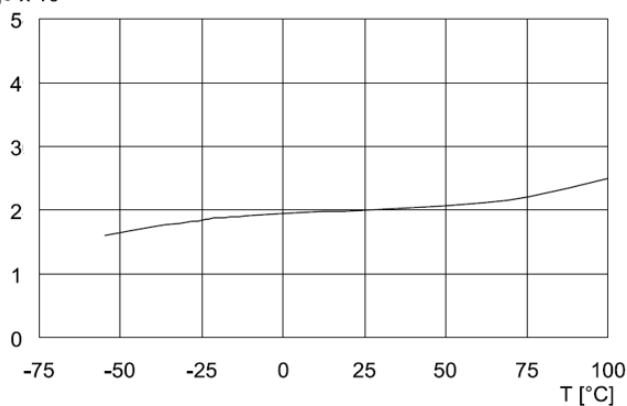
容量温度特性曲线(1KHz)  
Capacitance change vs. temperature at 1kHz

$\Delta C/C$  [%]



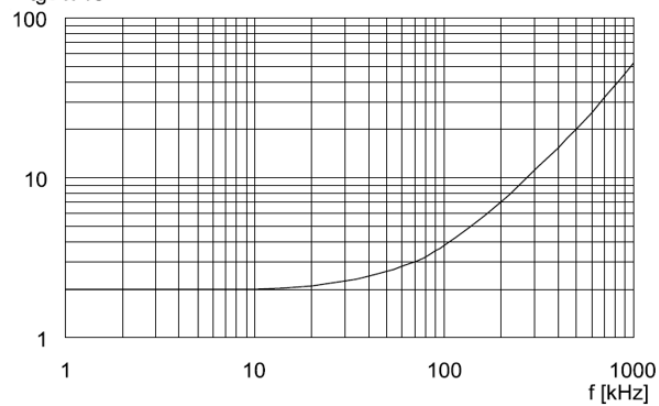
容量频率特性曲线(室温)  
Capacitance change vs. frequency (Room temperature)

$\text{tg} \delta \times 10^{-4}$



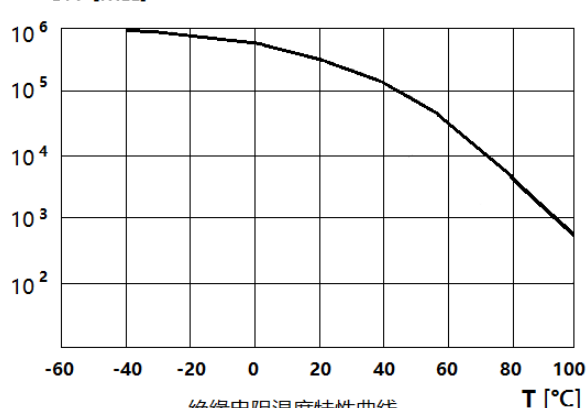
损耗温度特性曲线(1KHz)  
Dissipation factor vs. temperature at 1kHz

$\text{tg} \delta \times 10^{-4}$



损耗频率特性曲线(室温)  
Dissipation factor vs. frequency (Room temperature)


IR [MΩ]



绝缘电阻温度特性曲线  
Insulation resistance vs. temperature



## 8. Testing Methods and Performance

NO.	Item	Performance	Testing Condition or Method
8.1	Initial Measurement	Capacitance Loss pin tangent $CR \leq 1 \mu F$ , Measured at 10KHZ $CR > 1 \mu F$ , Measured at 1KHZ	
	Terminal strength	No significant defects	Tensile Test Ual: Tense: $0.50 < d \leq 0.80\text{mm}$ ; 10N $0.80 < d \leq 1.25\text{mm}$ ; 20N Bending Test Ub: Bend: $0.50 < d \leq 0.80\text{mm}$ ; 5N $0.80 < d \leq 1.25\text{mm}$ ; 10N The terminals shall be bent 2 times in each direction.
	Resistance to solder heat	No significant defects, clear signs	Solder groove method Tb, Method 1A, $260 \pm 5^\circ\text{C}$ , 10 $\pm 1\text{S}$
	Final Measurement	No significant defects $\Delta C/C \leq 5\%$ (relative to the initial value)	
8.2	Initial Measurement	Capacitance Loss pin tangent $CR \leq 1 \mu F$ , Measured at 10KHZ $CR > 1 \mu F$ , Measured at 1KHZ	
	Rapid change of temperature	No significant defects	$T_A = -40^\circ\text{C}$ , $T_B = +100^\circ\text{C}$ 5 cycles Duration: $t = 30\text{min}$
	Vibration	No significant defects	Amplitude 0.75 mm or acceleration 98m/s <sup>2</sup> (whichever is the smaller severity), f: 10Hz to 500Hz. Three directions, 2h for each direction, total 6h.
	Bump	No significant defects	4000 times, Acceleration 390 m/s <sup>2</sup> Pulse duration, 6ms
	Final Measurement	No significant defects $\Delta C/C \leq 5\%$ (relative to the initial value) Loss pin tangent should be meet the requirement of 6.7.	
8.3	Climate Sequence	Initial Measurement Loss pin tangent $CR \leq 1 \mu F$ , Measured at 10KHZ $CR > 1 \mu F$ , Measured at 1KHZ	
		Dry heat	+100 $^\circ\text{C}$ , 16h
		Damp heat, Cyclic	Test Db, Severity b, the first cycle
		Cold	-40 $^\circ\text{C}$ , 2h
		Damp heat, Cyclic other	Test Db, Severity b, the other cycles
		Final Measurement No significant defects, clear signs $\Delta C/C \leq 5\%$ (relative to the initial value) Increase of tg $\delta$ : $CR \leq 1 \mu F \leq 0.008$ $CR > 1 \mu F \leq 0.005$ Voltage resistance: 4.3U <sub>R</sub> VDC there shall be no permanent breakdown or flashover. IR: $\geq 50\%$ of the rated value	

8.4	Damp heat steady state	Initial Measurement	Capacitance Loss pin tangent $CR \leq 1\mu F$ , Measured at 10KHZ $CR > 1\mu F$ , Measured at 1KHZ	Temperature: $40^{\circ}C \pm 2^{\circ}C$ Humidity: $93 \pm 3\%RH$ Duration: 21 days
		Final Measurement	No significant defects, clear signs $\Delta C/C \leq 5\%$ (relative to the initial value) Increase of $tg \delta$ : $CR \leq 1\mu F \leq 0.008$ $CR > 1\mu F \leq 0.005$ there shall be no permanent breakdown or flashover when $4.3U_R VDC$ ,5s. IR: $\geq 50\%$ of the rated value	
8.5	Initial Measurement		Capacitance Loss pin tangent $CR \leq 1\mu F$ , Measured at 10KHZ $CR > 1\mu F$ , Measured at 1KHZ	
	8.5.1 Impulse voltage		There are three or more waveforms which indicate that no self-heating breakdown have occurred when it is monitored by the monitor.	① Impulse voltage $2.5KV$ ( $CR \leq 1\mu F$ ) , $2.5/\sqrt{C_R} KV$ ( $CR > 1\mu F$ ) ② Each individual capacitor shall be subjected to 24 impulses of the same polarity (when any three successive impulses are shown by the monitor to have form indicating that no self-heating breakdown have taken place the impulses can be stopped). ③ the time between impulses shall not be less than 10S.
	8.5.2 Endurance	Final Measurement	No significant defects, clear signs $\Delta C/C \leq 10\%$ (relative to the initial value) Increase of $tg \delta$ : $CR \leq 1\mu F \leq 0.008$ $CR > 1\mu F \leq 0.005$ there shall be no permanent or flashover when $4.3U_R VDC$ ,5s. IR: $\geq 50\%$ of the rated value	$+100^{\circ}C$ , 1000h $1.25 \times U_R Va.c$ The voltage shall be subjected to 1000Vrms for 0.1s every one hour during test.
8.6	Charging and discharging	Initial Measurement	Capacitance Loss pin tangent $CR \leq 1\mu F$ , Measured at 10KHZ $CR > 1\mu F$ , Measured at 1KHZ	Times: 10000 Duration of charging: 0.5S Duration of discharging: 0.5S Charging Voltage: $\sqrt{2} U_R (VDC)$ Charging resistance: $220/C_R (\Omega)$ Discharging resistance: $R = \frac{\sqrt{2} U_R}{100 C_R} (\Omega)$ CR :Capacitance ( $\mu F$ )
		Final Measurement	No significant defects, clear signs $\Delta C/C \leq 10\%$ (relative to the initial value) Increase of $tg \delta$ : $CR \leq 1\mu F \leq 0.008$ $CR > 1\mu F \leq 0.005$ IR: $\geq 50\%$ of the rated value	





8.7	Passive flammability	The flaming time of each capacitor shall not go beyond 30s after it is taken apart from the flame. Drop of each capacitors caused by flame shall not fire the tissue below.	IEC695-2-2 Needle flame test The category of flammability:C Expose time:1 time, Capacitor Volume Exposing time $V \text{ (mm}^3\text{)} \leq 250$ , 5s $250 < V \text{ (mm}^3\text{)} \leq 500$ , 10s $500 < V \text{ (mm}^3\text{)} \leq 1750$ , 20s $V \text{ (mm}^3\text{)} > 1750$ , 30s
8.8	Active flammability	The cheese cloth around the capacitor shall not burn with a flame.	The specimens shall be individually wrapped in at least 1, but not more than 2, complete layers of cheesecloth, the cheesecloth shall be untreated pure cotton cloth. Each sample shall be subjected to 20 discharged, the interval between successive discharge shall be 5s. $U_i = 2.5K V_0^{+7} \%$ $UR \pm 5\%$ be applied and be maintained for $120^{+10}_0$ after last discharge. Unless blown the fuses and make the circuit opened.

## 9. Quality Assurance (delivery inspection)

Inspection Item (Each Batch)	Inspection Level (GB/T2828.1, TS02859-1)	
	IL	AQL
Appearance	II	1. 5%
Size		
Capacitance	II	0. 1%
Dissipation Factor		
Rated voltage		
IR		
Solder ability	S-3	2. 5%

## 10. Package、Transmit and Store Requirements

10.1 The inner package and packing container should contain:

- a. Part No.   b. Supplier's Logo   c. Type   d. Capacitance   e. Capacitance Tolerance   f. Rated voltage  
g. The lot no or produce date   h. Quantity   i. OCQ Checker   j. Packager Folder

### 10.2 Package Methods

Put every 100 pieces or whole number times of 100 pieces in the plastic bag with a “QA PASS” certification in. Then put them into the cardboard boxes. Or according to the requirements of customers, such as taping etc.

### 10.3 Transport requirements

The cardboard boxes could be transit by any way under the condition of avoiding the rain and snow and hard machines' damage.

### 10.4 Storage Conditions and Time Limit

Storage Conditions: No more than 35°C, the RH is no more than 65% ,no acid basis.

Time Limit: Please use up within 1 year or the leads will be oxygenate.

