

### 1. Part Number Description:

M	NPO	561	J	2J	R18DS6	RR
①	②	③	④	⑤	⑥	⑦

#### ① Type

Symbol	Type
M	Radial

#### ② Temperature Characteristic

Temp. Charact.	Temperature Range	Capacitance Change
NPO	-55 ~ 125°C	0±30 ppm/°C
X5R	-55 ~ 85°C	±15%
X7R	-55 ~ 125°C	±15%
Y5V	-30 ~ 85°C	+22%, -82%
Z5U	+10 ~ 85°C	+22%, -56%

#### ③ Capacitance Value

Symbol	Cap. Value
010	1pF
1R0	1.0pF
100	10pF
101	100pF
102	1000pF
103	10000pF
104	100000pF
以此类推	

#### ④ Capacitance

Tolerance

Symbol	Cap. Tol.
C	±0.25pF
D	±0.5pF
F	±1%
G	±2%
J	±5%
K	±10%
M	±20%
Z	+80%, -20%

#### ⑤ Rated Voltage

Symbol	Rated Voltage
0J	DC 6.3V
1A	DC 10V
1C	DC 16V
1E	DC 25V
1H	DC 50V
1J	DC 63V
2A	DC 100V
2E	DC 250V
2H	DC 500V
2J	DC 630V
2K	DC 2000V
4K	DC 4000V
5K	DC 5000V

#### ⑥ Size

Check point 3

#### ⑦ Packing

Symbol	Packing
RR	Bulk
TA	AMMO
TR	REEL
CA	3.0±1mm
CB	3.5±1mm
CC	4.0±1mm
CD	4.5±1mm
CE	5.0±1mm

### 2. 特点 Feature

\*体积小，容量大，适合自动安装的卷（编）带包装。

Miniature size, large capacitance, tape and reel packaging suitable for auto-placement

\*环氧树脂封装，从而具有优良的防潮性能、机械强度及耐热性。

Epoxy resin coating creates excellent performance in humidity resistance, mechanical strength and heat resistance

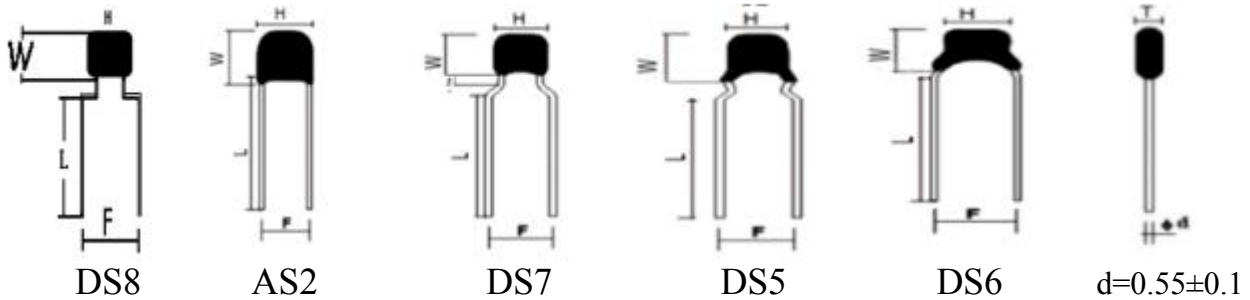
\*工业生产标准尺寸及多种脚型产品。

Standard size, various lead configuration

介质种类 Dielectric Type	I 类介质 Class I	II 类介质 Class II		
介质材料 Dielectric Material	温度补偿型 Temperature Compensating	X7R/X5R(B)	Z5U(E)	Y5V(Y/F)
电气性能 Electrical Properties	电气性能最稳定，几乎不随温度、电压和时间的变化而变化。 The electrical properties is the most stable one and has little change with temperature, voltage and time.	具有较高的介电常数，容量可做到比 I 类电容器高，具有稳定的温度特性。 X7R material has high dielectric constant, and its capacitance is higher than class I. These capacitors are classified as having a semi-stable T.C..	温度特性介于 X7R 和 Y5V 之间，容量稳定性相对较差，对温度、电压等条件较敏感。 Temperature characteristic is between that of X7R and Y5V. The capacitance is unstable and sensible to temperature and voltage.	介电常数最大，但温度特性较差，对温度、电压等条件较敏感。 Y5V material has highest dielectric constant. Its capacitance and dissipation is sensible to temperature and voltage.
应用 Application	适用于低损耗，稳定性要求高的高频电路，如滤波器、振荡器和计时电路等。 Used in applications where low-losses and high-stability are required, such as filters, oscillators, and timing circuits so on.	适用于容量范围广，稳定性要求不高的电路中，如隔直、耦合、旁路及鉴频等电路中。 Used over a wide temperature range, such in these kinds of circuits, DC-blocking, coupling, bypassing, frequency discriminating etc.	适用于要求大容量，使用温度范围接近于室温的旁路、耦合等，及低直流偏压电路中。 Ideally suited for bypassing and coupling application circuits operating with low DC bias in the environment approaching to room temperature.	适用于要求大容量，温度变化不大的电路中 Used over a moderate temperature range in application where high capacitance is required.
容量范围 Available capacitance range	0.5pF~0.1uF	100pF~22uF	1nF~10uF	

### 3.尺寸、工作电压及容量关系表

#### Size Code and Voltage VS Capacitance



尺寸代码 Size Code	外形 Shape	要求				
		脚距 (F)	引线脚长 (L)	本体宽 最大值 (H Max)	本体高 最大值 (W Max)	本体厚 最大值 (T Max)
0402(R12)	AS2	2.54/3.5±0.50	≅25.0	5.0	5.0	3.5
	DS7	5.0±0.58	≅25.0	5.0	5.5	4.0
	DS5	5.08±0.50	≅25.0	5.0	5.5	4.0
	DS6	5.08±0.50	≅25.0	5.0	5.5	4.0
0603(R13)	AS2	2.54/3.5±0.50	≅32.0	5.0	5.0	4.0
	DS7	5.08±0.58	≅32.0	5.0	5.5	4.0
	DS5	5.08±0.50	≅32.0	6.0	6.5	4.0
	DS6	5.08±0.50	≅32.0	6.0	6.5	4.0
0805(R15)	AS2	2.54/3.5±0.50	≅32.0	5.0	5.0	4.0
	DS7	5.08±0.50	≅32.0	5.0	5.5	4.0
	DS5	5.08±0.50	≅32.0	6.0	6.5	4.0
	DS6	5.08±0.50	≅32.0	6.0	6.5	4.0
1206(R18)	AS2	2.54/3.5±0.50	≅32.0	6.0	5.0	4.0
	DS7	5.08±0.50	≅32.0	6.0	6.5	5.0
	DS8	7.5±0.50	≅32.0	6.0	6.5	5.0
1210(R10)	AS2	2.54/3.5±0.50	≅32.0	6.0	6.0	5.0
	DS7	5.08±0.50	≅32.0	6.0	6.5	5.0
1808(R19)	AS2	5.08±0.50	≅32.0	8.0	9.0	5.0
1812(R20)	AS2	5.08±0.50	≅25.0	8.0	9.0	5.0
2220(R22)	AS2	5.08±0.50	≅32.0	8.5	10.5	6.0
2225(R25)	AS2	10.0±0.50	≅25.0	8.5	10.5	6.0
3035(R35)	AS2	10.0±0.50	≅25.0	12	13.8	6.0

### 4. 通用型引线 MLCC 可靠性及测试方法

#### Reliability and Test Method for General Leaded MLCC

项目 Item	技术要求 Technical Specification		测试方法和备注 Test Method and Remarks		
容量(C) Capacitance	I 类 Class I	应符合指定的误差级别 within the specified tolerance.	标称容量 Capacitance	测试频率 Measuring Frequency	测试电压 Measuring Voltage
			≤1000pF	1MHZ±10%	1.0±0.2V
			> 1000 pF	1KHZ±10%	
	II 类 Class II	应符合指定的误差级别 within the specified tolerance.	对于 II 类电容器, 测试前应先预处理 The capacitance should be pretreated before measured(only for class II ).		
			测试频率 Measuring Frequency	测试电压 Measuring Voltage	
			< 10uF 1KHZ ± 10% ≥10uF 120Hz ±10%	B: 1.0±0.2V	E/Y(F) < 1uF/0.5 ± 0.2V ≥ 1uF/1.0 ± 0.2V
损耗角正切(DF) Dissipation Factor	I 类 Class I	C <sub>R</sub> ≥ 50pF DF ≤ 0.15% C <sub>R</sub> < 50pF DF ≤ 1.5[(150/C <sub>R</sub> ) + 7] × 10 <sup>-4</sup>	标称容量 Capacitance	测试频率 Measuring Frequency	测试电压 Measuring Voltage
			≤1000pF	1MHZ±10%	1.0±0.2V
			> 1000 pF	1KHZ±10%	
	II 类 Class II	B	< 1uF, DF ≤ 3.5% ≥ 1uF, DF ≤ 5.5% ≥ 10uF, DF ≤ 7.5%	≤10uF 测试频率: 1KHZ ± 10%; 测试电压: 1.0 ± 0.2V ≥10uF 测试频率: 120Hz ± 10%; 测试电压: 1.0 ± 0.2V Measuring Frequency Measuring voltage	
	E/ Y (F)	≤ 7.5%(C, R ≤ 0.1uF) ≤ 10.0%(≥ 1 uF) C, R ≥ 0.1uF ≤ 15%(C, R ≥ 1uF)	测试频率: 1KHZ ± 10% Measuring Frequency 测试电压: 0.5 ± 0.2V Measuring Voltage		
绝缘电阻 (Ir) Insulation Resistance	I 类 Class I	见附件 1 See the attachment 1	测试电压: 额定电压 Measuring Voltage: Rated Voltage 测试时间: 60 ± 5 秒 Duration: 60 ± 5s		
	II 类 Class II	见附件 1 See the attachment 1			

Attachment 1:

介质类别 Dielectric Type	I 类 Class I		II 类 Class II	
	容量 Capacitance	$\leq 10\text{nF}$	$> 10\text{nF}$	$\leq 25\text{nF}$
绝缘电阻 Insulation Resistance	$\geq 10\text{G}\Omega$	$\geq 100\Omega\text{F/C}$	$\geq 4\text{G}\Omega$	$\geq 100\Omega\text{F/C}$

1) "C"代表此产品的容量 "C" stands for product capacitance

2) 举例 For example:

1) MX7R104M1HR15DS7TA (Ceramic Cap,0805,X7R,50V,0.1uF,±20%)

$$\text{IR} \geq 100\Omega\text{F/C} = 100\Omega\text{F}/(0.1 \times 10^{-6}\text{F}) = 10^9\Omega = 1\text{G}\Omega$$

项目 Item	技术要求 Technical Specification	测试方法和备注 Test Method and Remarks	
耐电压 Withstandi- ng Voltage	不应有介质被击穿或损伤 No breakdown or damage.	端之间 B e t w e e n t e r m i n a l s 测试电压 Measuring Voltage: I 类: UR<1000V, 300%额定电压; Class I:UR<1000V, 300% Rated voltage; II 类: UR<500V, 250%额定电压; Class II:UR<500V, 250% Rated voltage; II 类: 500V≤UR<1000V, 150%额定电压; Class II: 500V≤UR<1000V,150% Rated voltage; UR≥1000V, 120%额定电压 UR≥1000V, 120% Rated voltage; 持续时间: 5±1 秒, Duration: 5±1s I 类充/放电电流不应超过 50mA I kind of charge/discharge current should not exceed 50 mA II 类小尺寸芯片(≦0603)充/放电电流不应超过 30mA Class II small size chips charge/discharge current should not exceed 30 mA II 类充/放电电流不应超过 50mA Class II charge/discharge current should not exceed 50 mA	
		端子与外装间 Between terminals and body: 施加电压: 2.5UR Voltage: 2.5 times rated voltage 持续时间: 1~5s Duration: 1~5s 金属制小球法 Small metallic ball method 将电容器本体插入盛满直径为 1mm 的金属小球的容器中, 但保留距端头处 2mm 的本体不插入。试验电压施加在短路回路端子和金属小球之间。 Small metallic balls with 1mm diameters shall be put in a vessel and the test capacitor shall be submerged except 2mm from the top of its component body and the terminals. The test voltage shall be applied between the short-circuited terminals and the metallic balls.	
可焊性 Solder ability	上锡率应大于 95% Lead wire shall be at least 95% covered with a new solder coating.	将电容器引线浸入含有 25%松香的酒精溶液中, 然后浸入温度为: 230±5℃ 的金属焊锡 (63Sn/37Pb) 中 2±0.5 秒, 注意: 电容器本体底面距离锡面约 1.5~2mm, The terminal of capacitor is dipping into a 25% rosin solution of ethanol and then into molten solder(63Sn/37Pb) of 230±5℃ for 2±0.5s. In both cases the depth of dipping is up to about 1.5~2mm from the terminal body.	
耐焊接热 Resistance to Soldering Heat	项目 Item	ΔC/C≤	锡温: 260 ±5℃ Solder temperature: 260 ±5℃ 时间: 10 ±1s Duration: 10 ±1s 浸入条件: 将电容器插入厚度为 1.6mm, 孔径为 1.0mm 的 PC 板。 Immersed conditions: Inserted into the PC board (with t=1.6mm, hole=1.0mm diameter)
	Class I	± 2.5% or ± 0.25pF	对于 I 类介质, 试验后, 应在标准条件下恢复 4~24 小时后才测试。 Recovery: For class I, 4 to 24 hours of recovery under the standard condition after test.
	B	±10%	对于 II 类介质, 在试验前应先进行如下预处理: 150(-10,+0) °C, 1 小时, 接着在标准条件下恢复 48 ±4 小时。 Preconditioning (Class II) : 1 hour of preconditioning at 150(-10,+0) °C, followed by 48 ±4 hours of recovery under the standard condition.
	E / Y(F)	±20%	恢复: 对于 II 类介质试验后, 应在标准条件下恢复 48 ±4 小时后才测试。 Recovery ( Class II) : 48 ±4 hours of recovery under the standard condition after test.
	外观无可见损伤 No significant abnormality in appearance.		
项目 Item	技术要求 Technical Specification	测试方法和备注 Test Method and Remarks	

高温负荷 High Temperature Loading Test	外观无可见损伤 No significant abnormality in appearance.	温度 Temperature			
	容量变化 Capacitance Change: I 类介质 Class I: ≤ ±3% or ±0.3pF 取较大值 Whichever is larger. II 类介质 Class II: B: ≤ ±12.5% E / F(Y): ≤ ±30%	CG (N) /	X7R	Y5V	Z5U
		125(-0,+3)°C		85(-0,+3)°C	
	损耗角正切 Dissipation Factor: I 类介质: 小于原始值的两倍 Class I: Not more than twice of initial value. II 类介质 Class II: B: ≤ 5.0% E / F(Y): ≤ 12.5% ( $C_R \leq 0.1\mu F$ ) ≤ 15.0% ( $1\mu F > C_R > 0.1\mu F$ ) ≤ 17.5% ( $C_R \geq 1\mu F$ )	电压: 1.5 倍额定电压 Applied voltage: 1.5 times rated voltage 充放电流不超过 50mA The charge/ discharge current is less than 50mA. 时间: 1000 (-0, +48) 小时 Duration: 1000 (-0, +48) hours 恢复时间: Recovery Time: I 类介质: 24 ±2 小时, Class I Dielectric : 24 ±2 hours II 类介质: 48 ±4 小时 Class II Dielectric: 48 ±4 hours			
绝缘电阻 Insulation Resistance: ≥ 500MΩ or 25 Ω.F 取较小值 Whichever is smaller.					
耐溶剂性 Solvent Resistance	外观无可见损伤或异常, 标记清晰。 No defects or abnormalities in appearance and legible marking.	溶剂温度: 23±5°C Solvent temperature: 将样品浸在溶剂中 1 分钟, 用脱脂棉在样品有标志部位刷 10 次, 重复 3 次。 put the sample into solvent 1 Min, and then take it out and brush sample's notation area 10 times with pledget, repeat 3 times.			

以上所示“标准条件”解释如下:

温度: 5~35°C, 湿度: 45~85%, 气压: 86~106kPa

\* Note on standard condition: "standard condition" referred to herein should be defined as follows:

5 to 35°C of temperature, 45 to 75% of relative humidity, and 86 to 106kPa of atmospheric pressure.

若测试结果有争议时, 仲裁试验用标准大气条件为:

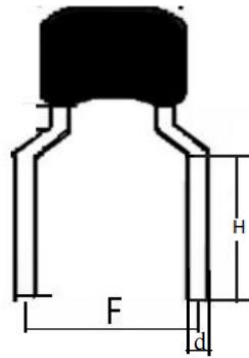
温度: 25±1°C, 相对湿度: 48%~52%, 气压: 86~106kPa

\* When there are questions concerning measurement results:

In order to provide correlation data, the test should be conducted under a condition of 25 degrees plus/minus 1 centigrade of temperature, 48% through 52% of relative humidity and 86 through 106 kPa of atmospheric pressure.

## 5. 包装形式 Packaging Style

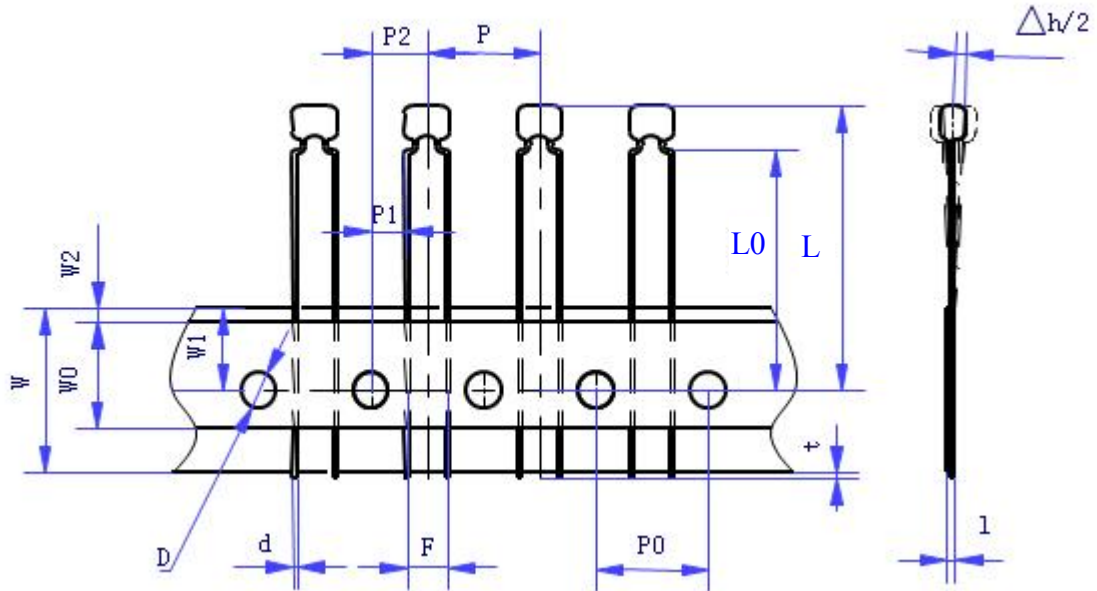
### 5.1 Cutting Type



Code	Size	DS7
CB Cutting-3.5mm	F	$5.08 \pm 0.50$
	H	$3.5 \pm 0.50$
	d	$0.55 \pm 0.10$
Code	Size	DS7
CC Cutting-4.0mm	F	$5.08 \pm 0.50$
	H	$4.0 \pm 0.50$
	d	$0.55 \pm 0.10$



### 5.2 Taping Dimension:



代号 Code	P	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	d	$\Delta h$	W	W <sub>0</sub>	W <sub>1</sub>	W <sub>2</sub>	L	L <sub>0</sub>	D	t
尺寸 Dim.	12.7	12.7	3.85 5.1	6.35	0.5	0	18.5	12	9	1.5	32.25	15~20	4.0	0.7
误差 Tol.	$\pm 0.2$	$\pm 0.2$	0.7	$\pm 1.3$	$\pm 0.1$	$\pm 2$	$\pm 1$	$\pm 1$	$\pm 0.5$	$\pm 1.5$	Max.	$\pm 0.5$	$\pm 0.2$	Max.

注意 Note:

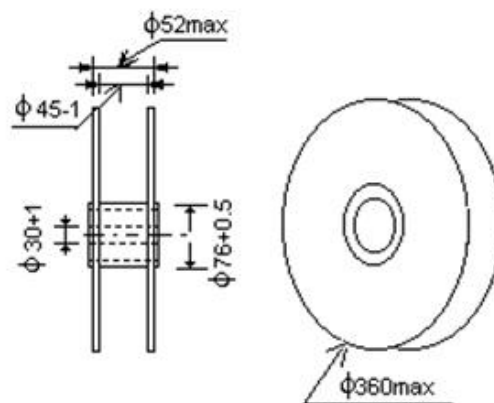
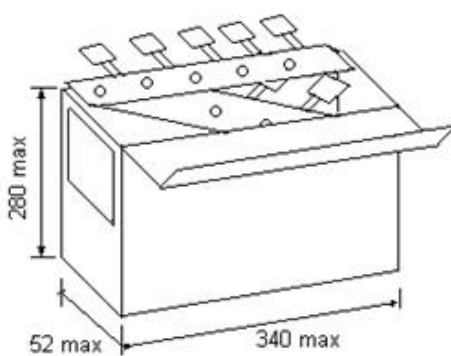
$P_1=3.85\text{mm}$  for  $F=5.08\text{mm}$ ;  $P_1=5.1\text{mm}$  for  $F=2.54\text{mm}$ .

盒带包装

Ammo Packaging

卷带包装

Reel Packaging



### 6. Capacitance Range

Rate Voltage	NPO	X7R	X5R	Y5V	Z5U
6.3V			155~225	475	
10V			334~105	225	
16V		224	105	105	
25V		104~154	224	474	
50V	010~222	221~104		104~224	
100V	010~122	221~223			
250V	101~681				
6.3V			155 ~ 106	475 ~ 226	
10V			334 ~ 475	225 ~ 106	
16V		224 ~ 225	105	105 ~ 475	
25V		104 ~ 155	224	474 ~ 225	
50V	100 ~ 103	221 ~ 334		104 ~ 105	224 ~ 105
100V	100 ~ 472	221 ~ 104			
250V	821 ~ 272	102 ~ 333			
6.3V			106 ~ 226	476	
10V			685 ~ 106	226	
16V		335 ~ 475	106	106	
25V		684 ~ 225	335	475	
50V	392 ~ 333	474 ~ 105		225	
100V	392 ~ 103	333 ~ 474			
250V	332 ~ 822	153 ~ 154			
500V	101 ~ 332	102 ~ 333			