




SPECIFICATION SHEET NO.	R1109- 0805B471K500BD	
ORIGINAL MFG/PART NO.	Aillen Capacitors/0805B471K500BD	
NEXTGEN PART CODE	0805B471K500BD	Indicate This Code For RFQ /Order
DATE	Nov. 9, 2024	
REVISION	A9	Updated With Most Recent Data
DESCRIPTION AND MAIN PARAMETRICS	<p>Multilayer Ceramic Chip Capacitors (MLCC), Case 2012 Metric, 0805 Series, Dimension L2.00*W1.25*H0.85mm, Thickness: 1.0mm Max.</p> <p>Dielectric X7R, Capacitance 470pF, Tolerance ±10%, Rated Voltage 50V</p> <p>Operating Temp. Range -55°C ~+125°C</p> <p>Package in Tape/Reel, 4,000pcs/Reel</p> <p>REACH/RoHS/RoHS III Compliant</p>	
CUSTOMER		
CUSTOMER PART NUMBER		
CROSS REF. PART NUMBER		
MEMO		

VENDOR APPROVE		
Issued/Checked/Approved		
		
Date: Nov. 9, 2024		

CUSTOMER APPROVE
DATE:

DESCRIPTION

MLCC consists of a conducting material and electrodes. To manufacture a chip-type SMT and achieve miniaturization, high density and high efficiency, ceramic condensers are used. MLCC is made by NP0 (COG), X7R, X6S, X5R dielectric material and which provides product with high electrical precision, stability and reliability.



Image shown is a representation only.

Exact specifications should be obtained from the product dimension.

MAIN FEATURE

- A Wide Selection Of Size Is Available (0201 to 1812)
- High Capacitance In Given Case Size
- Temperature Characteristics: NP0 (COG), X7R, X6S and X5R
- Capacitor With Lead-free Termination (Pure Tin)
- REACH/RoHS/RoHS III Compliant



APPLICATION

- General Digital Circuit
- Power Supply by pass capacitors
- Consumer Electronics
- Telecommunication

ELECTRICAL CHARACTERISTICS

- See Page 4~Page 8 For Different Part Code.
- All Products Parameters are Subject To NextGen Components' Final Confirmation.

HOW TO ORDER

- Please Follow Up Part Code Guide And Indicate NextGen Part Code 0805B471K500BD For RFQ and Order.

RFQ

[Request For Quotation](#)

PART CODE GUIDE

CODE	NAME	KEY SPECIFICATION OPTION
0805	Size	0201 (0603 Metric): L0.60*W0.30mm; 0402 (1005 Metric): L1.00*W0.50mm 0603 (1608 Metric): L1.60*W0.80mm; 0805 (2012 Metric): L2.00*W1.25mm 1206 (3216 Metric): L3.20*W1.60mm; 1210 (3225 Metric): L3.20*W2.50mm 1808 (4520 Metric): L4.50*W2.03mm; 1812 (4532 Metric): L4.50*W3.20mm
B	Temperature Coefficient	N: NPO (COG); B: X7R; W: X5R; S: X6S
471	Capacitance	Two significant digits followed by number of Zero, The 3rd digit signifies the multiplying factor, and letter R is decimal point. OR5: 0.5pF; 471: 470pF; 102: 1000 pF; 104: 0.1μF; 330: 33pF
K	Tolerance	A=±0.05pF; B=±0.1pF; C=±0.25pF; D=±0.5pF; F=±1%; G=±2%; J=±5%; K=±10% M=±20%; Z=-20%~+80%
500	Rated Voltage	Two significant digits followed by No. of zeros. "R" is in place of decimal point. 4R0=4 VDC; 6R3=6.3 VDC; 100=10 VDC; 160=16 VDC; 250=25 VDC; 500=50 VDC 101 =100 VDC
B	Thickness	B: 0.85 ±0.15mm, See Page 9 ~ Page 11 for Different part code
D	Package	K: 0.5 Kpcs/Reel; A: 1Kpcs/Reel; B: 2Kpcs/Reel; C: 3Kpcs/Reel; D: 4Kpcs/Reel; E: 15Kpcs/Reel; I: 10Kpcs/Reel; J: 2.5Kpcs/Reel
()	Internal Control	Blank: N/A; XX: Letter A~Z, a~z or digits (0~9) for Special/Custom Parameters

ELECTRICAL CHARACTERISTICS - Ta = 25°C, FOR DIFFERENT PART CODE

NEXTGEN PART CODE	TEMP. COEFFICIENT	CAPACITANCE	TOLERANCE	VOLTAGE	THICKNESS (MAX.)	OPERATING TEMP. RANGE	CAPACITANCE CHARACTERISTIC
	-	-	-	V	mm	°C	-
0805W106K6R3CC	X5R	10 μF	±10%	6.3	1.45	-55 ~+85	±15%
0805W226M6R3CC	X5R	22 μF	±20%	6.3	1.45	-55 ~+85	±15%
0805W476M6R3CC	X5R	47 μF	±20%	6.3	1.45	-55 ~+85	±15%
0805B105K100CC	X7R	1.0 μF	±10%	10	1.45	-55 ~+125	±15%
0805W226M100CC	X5R	22 μF	±20%	10	1.45	-55 ~+85	±15%
0805B475K100CC	X7R	4.7 μF	±10%	10	1.45	-55 ~+125	±15%
0805B105K160CC	X7R	1.0 μF	±10%	16	1.45	-55 ~+125	±15%
0805B225K160CC	X7R	2.2 μF	±10%	16	1.45	-55 ~+125	±15%
0805B475K160CC	X7R	4.7 μF	±10%	16	1.45	-55 ~+125	±15%
0805B105J250CC	X7R	1.0 μF	±5%	25	1.45	-55 ~+125	±15%
0805B105K250CC	X7R	1.0 μF	±10%	25	1.45	-55 ~+125	±15%
0805B225K250CC	X7R	2.2 μF	±10%	25	1.45	-55 ~+125	±15%
0805B333K250BD	X7R	0.033 μF	±10%	25	1.00	-55 ~+125	±15%
0805B334K250CC	X7R	0.33 μF	±10%	25	1.45	-55 ~+125	±15%
0805B475K250CC	X7R	4.7 μF	±10%	25	1.45	-55 ~+125	±15%
0805B684K250CC	X7R	0.68 μF	±10%	25	1.45	-55 ~+125	±15%
0805W106K250CC	X5R	10 μF	±10%	25	1.45	-55 ~+85	±15%
0805W225K250CC	X5R	2.2 μF	±10%	25	1.45	-55 ~+85	±15%
0805W475K250CC	X5R	4.7 μF	±10%	25	1.45	-55 ~+85	±15%
0805B101K500BD	X7R	100 pF	±10%	50	1.00	-55 ~+125	±15%

ELECTRICAL CHARACTERISTICS - Ta = 25°C, FOR DIFFERENT PART CODE

NEXTGEN PART CODE	TEMP. COEFFICIENT	CAPACITANCE	TOLERANCE	VOLTAGE	THICKNESS (MAX.)	OPERATING TEMP. RANGE	CAPACITANCE CHARACTERISTIC
	-	-	-	V	mm	°C	-
0805B102K500BD	X7R	1000 pF	±10%	50	1.00	-55 ~+125	±15%
0805B103K500BD	X7R	0.01 µF	±10%	50	1.00	-55 ~+125	±15%
0805B104J500BD	X7R	0.1 µF	±5%	50	1.00	-55 ~+125	±15%
0805B104K500BD	X7R	0.1 µF	±10%	50	1.00	-55 ~+125	±15%
0805B105K500CC	X7R	1.0 µF	±10%	50	1.45	-55 ~+125	±15%
0805B221K500BD	X7R	220 pF	±10%	50	1.00	-55 ~+125	±15%
0805B224K500CC	X7R	0.22 µF	±10%	50	1.45	-55 ~+125	±15%
0805B225K500CC	X7R	2.2 µF	±10%	50	1.45	-55 ~+125	±15%
0805B331K500BD	X7R	330 pF	±10%	50	1.00	-55 ~+125	±15%
0805B332K500BD	X7R	3300 pF	±10%	50	1.00	-55 ~+125	±15%
0805B333K500BD	X7R	0.033 µF	±10%	50	1.00	-55 ~+125	±15%
0805B334K500CC	X7R	0.33 µF	±10%	50	1.45	-55 ~+125	±15%
0805B471K500BD	X7R	470 pF	±10%	50	1.00	-55 ~+125	±15%
0805B472K500BD	X7R	4700 pF	±10%	50	1.00	-55 ~+125	±15%
0805B474K500CC	X7R	0.47 µF	±10%	50	1.45	-55 ~+125	±15%
0805B682K500BD	X7R	6800 pF	±10%	50	1.00	-55 ~+125	±15%
0805B684K500CC	X7R	0.68 µF	±10%	50	1.45	-55 ~+125	±15%
0805N101J500AD	NPO (COG)	100 pF	±5%	50	0.70	-55 ~+125	±30ppm
0805N102J500BD	NPO (COG)	1000 pF	±5%	50	1.00	-55 ~+125	±30ppm
0805N103J500AD	NPO (COG)	0.01 µF	±5%	50	0.70	-55 ~+125	±30ppm

ELECTRICAL CHARACTERISTICS - Ta = 25°C, FOR DIFFERENT PART CODE

NEXTGEN PART CODE	TEMP. COEFFICIENT	CAPACITANCE	TOLERANCE	VOLTAGE	THICKNESS (MAX.)	OPERATING TEMP. RANGE	CAPACITANCE CHARACTERISTIC
	-	-	-	V	mm	°C	-
0805N121J500AD	NPO (COG)	120 pF	±5%	50	0.70	-55 ~+125	±30ppm
0805N150J500AD	NPO (COG)	15 pF	±5%	50	0.70	-55 ~+125	±30ppm
0805N180J500AD	NPO (COG)	18 pF	±5%	50	0.70	-55 ~+125	±30ppm
0805N1R5C500AD	NPO (COG)	1.5 pF	±0.25pF	50	0.70	-55 ~+125	±30ppm
0805N220J500AD	NPO (COG)	22 pF	±5%	50	0.70	-55 ~+125	±30ppm
0805N221J500AD	NPO (COG)	220 pF	±5%	50	0.70	-55 ~+125	±30ppm
0805N2R7C500AD	NPO (COG)	2.7 pF	±0.25pF	50	0.70	-55 ~+125	±30ppm
0805N330J500AD	NPO (COG)	33 pF	±5%	50	0.70	-55 ~+125	±30ppm
0805N331J500AD	NPO (COG)	330 pF	±5%	50	0.70	-55 ~+125	±30ppm
0805N391J500AD	NPO (COG)	390 pF	±5%	50	0.70	-55 ~+125	±30ppm
0805N3R3C500AD	NPO (COG)	3.3 pF	±0.25pF	50	0.70	-55 ~+125	±30ppm
0805N470J500AD	NPO (COG)	47 pF	±5%	50	0.70	-55 ~+125	±30ppm
0805N471J500BD	NPO (COG)	470 pF	±5%	50	1.00	-55 ~+125	±30ppm
0805N4R7B500AD	NPO (COG)	4.7 pF	±0.1pF	50	0.70	-55 ~+125	±30ppm
0805N560J500AD	NPO (COG)	56 pF	±5%	50	0.70	-55 ~+125	±30ppm
0805N5R0C500AD	NPO (COG)	5 pF	±0.25pF	50	0.70	-55 ~+125	±30ppm
0805N681J500BD	NPO (COG)	680 pF	±5%	50	1.00	-55 ~+125	±30ppm
0805N6R8C500AD	NPO (COG)	6.8 pF	±0.25pF	50	0.70	-55 ~+125	±30ppm
0805W106K500CC	X5R	10 µF	±10%	50	1.45	-55 ~+85	±15%
0805W475K500CC	X5R	4.7 µF	±10%	50	1.45	-55 ~+85	±15%

ELECTRICAL CHARACTERISTICS - Ta = 25°C, FOR DIFFERENT PART CODE

NEXTGEN PART CODE	TEMP. COEFFICIENT	CAPACITANCE	TOLERANCE	VOLTAGE	THICKNESS (MAX.)	OPERATING TEMP. RANGE	CAPACITANCE CHARACTERISTIC
	-	-	-	V	mm	°C	-
0805B101K101BD	X7R	100 pF	±10%	100	1.00	-55 ~+125	±15%
0805B102K101BD	X7R	1000 pF	±10%	100	1.00	-55 ~+125	±15%
0805B104K101CC	X7R	0.1 µF	±10%	100	1.45	-55 ~+125	±15%
0805B152K101BD	X7R	1500 pF	±10%	100	1.00	-55 ~+125	±15%
0805B153K101BD	X7R	0.015 µF	±10%	100	1.00	-55 ~+125	±15%
0805B221K101BD	X7R	220 pF	±10%	100	1.00	-55 ~+125	±15%
0805B222K101BD	X7R	2200 pF	±10%	100	1.00	-55 ~+125	±15%
0805B223K101BD	X7R	0.022 µF	±10%	100	1.00	-55 ~+125	±15%
0805B224K101CC	X7R	0.22 µF	±10%	100	1.45	-55 ~+125	±15%
0805B272K101BD	X7R	2700 pF	±10%	100	1.00	-55 ~+125	±15%
0805B471K101BD	X7R	470 pF	±10%	100	1.00	-55 ~+125	±15%
0805B472K101BD	X7R	4700 pF	±10%	100	1.00	-55 ~+125	±15%
0805B473K101CC	X7R	0.047 µF	±10%	100	1.45	-55 ~+125	±15%
0805N100J101AD	NPO (COG)	10 pF	±5%	100	0.70	-55 ~+125	±30ppm
0805N101J101AD	NPO (COG)	100 pF	±5%	100	0.70	-55 ~+125	±30ppm
0805N221J101AD	NPO (COG)	220 pF	±5%	100	0.70	-55 ~+125	±30ppm
0805N222K101XD	NPO (COG)	2200 pF	±10%	100	1.00	-55 ~+125	±30ppm
0805N2R2C101AD	NPO (COG)	2.2 pF	±0.25pF	100	0.70	-55 ~+125	±30ppm
0805N331J101AD	NPO (COG)	330 pF	±5%	100	0.70	-55 ~+125	±30ppm
0805N332J101CC	NPO (COG)	3300 pF	±5%	100	1.45	-55 ~+125	±30ppm

DIMENSION (Unit: mm)

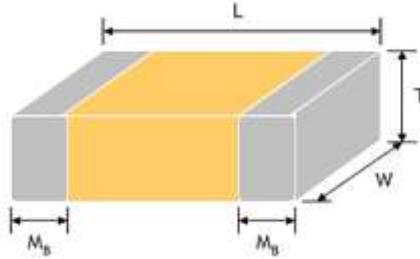


Table 1- A

SIZE CODE	METRIC CODE	L	W	T (SYMBOL)		SOLDERING METHOD	Mb
0201	0603	0.6 ±0.09	0.30 ±0.09	0.3±0.09	L	R	0.15 +0.1/-0.05
0402	1005	1.00 ±0.20	0.50 ±0.20	0.50±0.20	N	R	0.25 +0.05/-0.10
				0.50±0.10	E	R	
				0.50±0.05	H	R	
0603	1608	1.60 ±0.20	0.80 ±0.20	0.50±0.05	H	R/W	0.40 ±0.15
				0.80±0.10	S	R/W	
				0.85±0.15	B	R/W	
				0.80±0.20	X	R/W	
0805	2012	2.00 ±0.20	1.25 ±0.20	0.50±0.05	H	R	0.50 ±0.20
				0.60±0.10	A	R/W	
				0.80±0.20	X	R/W	
				0.85±0.15	B	R/W	
				1.25±0.20	C	R	
1206	3216	3.20 ±0.30	1.60 ±0.30	0.85±0.15	B	R/W	0.60±0.20 0.50±0.25
				0.95±0.10	I	R	
				1.25±0.20	C	R	
				1.15±0.20	J	R	
				1.60±0.20	D	R	
				1.60±0.30	Y	R	
				1.60+0.30/-0.10	P	R	

DIMENSION (Unit: mm)



Table 1- B

SIZE CODE	METRIC CODE	L	W	T (SYMBOL)		SOLDERING METHOD	Mb
1210	3225	3.20 ±0.40	2.50 ±0.30	0.85±0.15	B	R	0.75±0.25
				0.95±0.10	I	R	
				1.25±0.20	C	R	
				1.60±0.20	D	R	
				2.00±0.20	K	R	
				2.50±0.30	M	R	
1808	4520	4.50 ±0.40	2.03 ±0.25	1.25±0.20	C	R	0.75±0.25
				1.40±0.20	F	R	
				1.60±0.20	D	R	
				2.00±0.20	K	R	
1812	4532	4.50 ±0.40	3.20 ±0.40	1.25±0.20	C	R	0.75±0.25
				1.60±0.20	D	R	
				2.00±0.20	K	R	
				2.50±0.30	M	R	
				2.80±0.30	U	R	
1825	4563	4.50 ±0.40	6.30 ±0.40	1.60±0.20	D	R	0.75±0.35
				2.00±0.20	K	R	0.85±0.35
				2.50±0.30	M	R	0.85±0.35
				2.80±0.30	U	R	0.85±0.35

DIMENSION (Unit: mm)



Table 1- C

SIZE CODE	METRIC CODE	L	W	T (SYMBOL)		SOLDERING METHOD	Mb
2211	5728	5.70 ±0.40	2.80 ±0.30	1.60±0.20	D	R	0.75±0.35
				2.00±0.20	K	R	0.85±0.35
				2.50±0.30	M	R	0.85±0.35
				2.80±0.30	U	R	0.85±0.35
2220	5750	5.70 ±0.40	5.00 ±0.40	1.60±0.20	D	R	0.75±0.35
				2.00±0.20	K	R	0.85±0.35
				2.50±0.30	M	R	0.85±0.35
				2.80±0.30	U	R	0.85±0.35
2225	5763	5.70 ±0.40	6.30 ±0.40	1.60±0.20	D	R	0.75±0.35
				2.00±0.20	K	R	0.85±0.35
				2.50±0.30	M	R	0.85±0.35
				2.80±0.30	U	R	0.85±0.35

GENERAL ELECTRICAL CHARACTERISTICS

Table 2

DIELECTRIC	NPO (COG)	X7R	X5R	X6S
Size	0201, 0402, 0603, 0805, 1206, 1210, 1812			
Capacitance Range*	0.1pF to 0.1μF	100pF to 47μF	100pF to 220μF	0.1μF to 100μF
Capacitance Tolerance	Cap. ≤5pF (Note #1): A (±0.05pF), B (±0.1pF), C (±0.25pF) 5pF < Cap < 10pF: C (±0.25pF), D (±0.5pF) Cap ≥ 10pF: F (±1%), G (±2%), J (±5%), K (±10%)	J (±5%), K (±10%), M (±20%)	K (±10%), M (±20%)	K (±10%), M (±20%)
Rated Voltage	10V, 16V, 25V, 50V, 100V	6.3V, 10V, 16V, 25V, 50V, 100V		
Operating Temperature	-55 ~ +125°C		-55 ~ +85°C	-55 ~ +105°C
Capacitance Characteristic	±30ppm	±15%	±15%	±22%
Termination	Ni/Sn (lead-free termination)			

Note:

- #1: NPO, 0.1pF product only provide B tolerance; 0603N0R4 provide B&C tolerance; 0603N0R3 only provide C tolerance.
- * Measured at the condition of 30~70% related humidity.
- NPO: Apply 1.0±0.2Vrms, 1.0MHz±10% for Cap ≤ 1000pF and 1.0±0.2Vrms, 1.0kHz±10% for Cap > 1000pF, 25°C at ambient temperature.
- X7R/X6S/X5R/X6S: Please refer to “Reliability test conditions and requirements” for detail.
- ** Preconditioning for Class II MLCC: Perform a heat treatment at 150±10°C for 1 hour and then leave in ambient condition for 24±2 hours before measurement.

X7R

Table 3

Rated vol.	D.F. \leq	Exception of D.F. \leq	
$\geq 100V$	$\leq 2.5\%$	$\leq 3\%$	1206 $\geq 0.47\mu F$
		$\leq 5\%$	0603 $\geq 0.068\mu F$; 0805 $> 0.1\mu F$; 1206 $\geq 1\mu F$; 1210 $\geq 2.2\mu F$;
		$\leq 10\%$	0805 $> 0.22\mu F$; 1210 $\geq 3.3\mu F$
50V	$\leq 2.5\%$	$\leq 3\%$	0201(50V); 0603 $\geq 0.047\mu F$; 0805 $\geq 0.18\mu F$; 1206 $\geq 0.47\mu F$
		$\leq 5\%$	0201 $\geq 0.01\mu F$; 1210 $\geq 4.7\mu F$
		$\leq 10\%$	0402 $\geq 0.012\mu F$; 0603 $> 0.1\mu F$; 0805/X7R $> 0.47\mu F$; 1206 $\geq 2.2\mu F$; 1210 $\geq 10\mu F$;
35V	$\leq 3.5\%$	$\leq 10\%$	0603 $\geq 1\mu F$; 0805 $\geq 2.2\mu F$; 1206 $\geq 2.2\mu F$; 1210 $\geq 10\mu F$
25V	$\leq 3.5\%$	$\leq 5\%$	0201 $\geq 0.01\mu F$; 0805 $\geq 1\mu F$; 1210/X7R $\geq 10\mu F$
		$\leq 7\%$	0603 $\geq 0.33\mu F$
		$\leq 10\%$	0201 $\geq 0.1\mu F$; 0402/X7R $\geq 0.056\mu F$; 0603 $\geq 0.47\mu F$; 0805 $\geq 2.2\mu F$; 1206 $\geq 4.7\mu F$; 1210 $\geq 22\mu F$
		$\leq 12.5\%$	0402 $\geq 0.47\mu F$
16V	$\leq 3.5\%$	$\leq 5\%$	0201 $\geq 0.01\mu F$; 0402 $\geq 0.033\mu F$; 0603 $\geq 0.15\mu F$; 0805 $\geq 0.68\mu F$; 1206 $\geq 2.2\mu F$; 1210 $\geq 4.7\mu F$
		$\leq 10\%$	0201/X7R $\geq 0.022\mu F$; 0402 $\geq 0.22\mu F$; 0603 $> 0.47\mu F$; 0805 $\geq 2.2\mu F$; 1206 $\geq 4.7\mu F$; 1210 $\geq 22\mu F$;
10V	$\leq 5.0\%$	$\leq 10\%$	0201 $\geq 0.012\mu F$; 0402 $\geq 0.22\mu F$; 0603 $\geq 0.33\mu F$; 0805 $\geq 2.2\mu F$; 1206 $\geq 2.2\mu F$; 1210 $\geq 22\mu F$; 01R5/X5R
		$\leq 15\%$	0201 $\geq 0.1\mu F$; 0402 $\geq 1\mu F$
6.3V	$\leq 10\%$	$\leq 15\%$	0201 $\geq 0.1\mu F$; 0402 $\geq 1\mu F$; 0603 $\geq 10\mu F$; 0805 $\geq 4.7\mu F$; 1206 $\geq 47\mu F$ 1210 $\geq 100\mu F$
		$\leq 20\%$	0402 $\geq 2.2\mu F$
4V	$\leq 15\%$	-	-

X5R

Table 4

Rated vol.	D.F. \leq	Exception of D.F. \leq	
$\geq 100V$	$\leq 2.5\%$	$\leq 3\%$	1206 $\geq 0.47\mu F$
		$\leq 5\%$	0603 $\geq 0.068\mu F$; 0805 $> 0.1\mu F$; 1206 $\geq 1\mu F$; 1210 $\geq 2.2\mu F$;
		$\leq 10\%$	0805 $> 0.22\mu F$; 1210 $\geq 3.3\mu F$
50V	$\leq 2.5\%$	$\leq 3\%$	0201(50V); 0603 $\geq 0.047\mu F$; 0805 $\geq 0.18\mu F$; 1206 $\geq 0.47\mu F$
		$\leq 5\%$	0201 $\geq 0.01\mu F$; 1210 $\geq 4.7\mu F$
		$\leq 10\%$	0402 $\geq 0.012\mu F$; 0603 $> 0.1\mu F$; 0805 $\geq 1\mu F$; 1206 $\geq 2.2\mu F$; 1210 $\geq 10\mu F$;
35V	$\leq 3.5\%$	$\leq 10\%$	0603 $\geq 1\mu F$; 0805 $\geq 2.2\mu F$; 1206 $\geq 2.2\mu F$; 1210 $\geq 10\mu F$
25V	$\leq 3.5\%$	$\leq 5\%$	0201 $\geq 0.01\mu F$; 0805 $\geq 1\mu F$; 1210/X5R $\geq 10\mu F$
		$\leq 7\%$	0603 $\geq 0.33\mu F$
		$\leq 10\%$	0201 $\geq 0.1\mu F$; 0402 $\geq 0.10\mu F$; 0603 $\geq 0.47\mu F$; 0805 $\geq 2.2\mu F$; 1206 $\geq 4.7\mu F$; 1210/X5R $\geq 10\mu F$;
		$\leq 12.5\%$	0402 $\geq 0.47\mu F$
16V	$\leq 3.5\%$	$\leq 5\%$	0201 $\geq 0.01\mu F$; 0402 $\geq 0.033\mu F$; 0603 $\geq 0.15\mu F$; 0805 $\geq 0.68\mu F$; 1206 $\geq 2.2\mu F$; 1210 $\geq 4.7\mu F$
		$\leq 10\%$	0201 $\geq 0.1\mu F$; 0402 $\geq 0.22\mu F$; 01R5/X5R 0603 $> 0.47\mu F$; 0805 $\geq 2.2\mu F$; 1206 $\geq 4.7\mu F$; 1210 $\geq 22\mu F$
10V	$\leq 5.0\%$	$\leq 10\%$	0201 $\geq 0.012\mu F$; 0402 $\geq 0.22\mu F$; 0603 $\geq 0.33\mu F$; 0805 $\geq 2.2\mu F$; 1206 $\geq 2.2\mu F$; 1210 $\geq 22\mu F$
		$\leq 15\%$	0201 $\geq 0.1\mu F$; 0402 $\geq 1\mu F$
6.3V	$\leq 10\%$	$\leq 15\%$	0201 $\geq 0.1\mu F$; 0402 $\geq 1\mu F$; 0603 $\geq 10\mu F$; 0805 $\geq 4.7\mu F$; 1206 $\geq 47\mu F$ 1210 $\geq 100\mu F$
		$\leq 20\%$	0402 $\geq 2.2\mu F$
4V	$\leq 15\%$	-	-

X6S

Table 5

Rated vol.	D.F. \leq	Exception of D.F. \leq	
$\geq 100V$	$\leq 2.5\%$	$\leq 3\%$	1206 $\geq 0.47\mu F$
		$\leq 5\%$	0603 $\geq 0.068\mu F$; 0805 $> 0.1\mu F$; 1206 $\geq 1\mu F$; 1210 $\geq 2.2\mu F$;
		$\leq 10\%$	0805 $> 0.22\mu F$; 1210 $\geq 3.3\mu F$
50V	$\leq 2.5\%$	$\leq 3\%$	0201(50V); 0603 $\geq 0.047\mu F$; 0805 $\geq 0.18\mu F$; 1206 $\geq 0.47\mu F$
		$\leq 5\%$	0201 $\geq 0.01\mu F$; 1210 $\geq 4.7\mu F$
		$\leq 10\%$	0402 $\geq 0.012\mu F$; 0603 $> 0.1\mu F$; 0805 $\geq 1\mu F$; 1206 $\geq 2.2\mu F$; 1210 $\geq 10\mu F$;
35V	$\leq 3.5\%$	$\leq 10\%$	0603 $\geq 1\mu F$; 0805 $\geq 2.2\mu F$; 1206 $\geq 2.2\mu F$; 1210 $\geq 10\mu F$
25V	$\leq 3.5\%$	$\leq 5\%$	0201 $\geq 0.01\mu F$; 0805 $\geq 1\mu F$; 1210/X6S $\geq 10\mu F$
		$\leq 7\%$	0603 $\geq 0.33\mu F$
		$\leq 10\%$	0201 $\geq 0.1\mu F$; 0402 $\geq 0.10\mu F$; 0603 $\geq 0.47\mu F$; 0805 $\geq 2.2\mu F$; 1206 $\geq 4.7\mu F$; 1210 $\geq 22\mu F$;
		$\leq 12.5\%$	0402 $\geq 0.47\mu F$
16V	$\leq 3.5\%$	$\leq 5\%$	0201 $\geq 0.01\mu F$; 0402 $\geq 0.033\mu F$; 0603 $\geq 0.15\mu F$; 0805 $\geq 0.68\mu F$; 1206 $\geq 2.2\mu F$; 1210 $\geq 4.7\mu F$
		$\leq 10\%$	0201 $\geq 0.1\mu F$; 0402 $\geq 0.22\mu F$; 0603 $> 0.47\mu F$; 0805 $\geq 2.2\mu F$; 1206 $\geq 4.7\mu F$; 1210 $\geq 22\mu F$
10V	$\leq 5.0\%$	$\leq 10\%$	0201 $\geq 0.012\mu F$; 0402 $\geq 0.22\mu F$; 0603 $\geq 0.33\mu F$; 0805 $\geq 2.2\mu F$; 1206 $\geq 2.2\mu F$; 1210 $\geq 22\mu F$
		$\leq 15\%$	0201 $\geq 0.1\mu F$; 0402 $\geq 1\mu F$
6.3V	$\leq 10\%$	$\leq 15\%$	0201 $\geq 0.1\mu F$; 0402/X6S $\geq 0.47\mu F$; 0603 $\geq 10\mu F$; 0805 $\geq 4.7\mu F$; 1206 $\geq 47\mu F$; 1210 $\geq 100\mu F$
		$\leq 20\%$	0402 $\geq 2.2\mu F$
4V	$\leq 15\%$	-	-

CAPACITANCE RANGE NPO (COG) DIELECTRIC – SIZE 0201, 0402, 0603

Table 6-A

SIZE	0201			0402					0603				
VDC (V)	16	25	50	10	16	25	50	100	10	16	25	50	100
0.1pF (0R1)	L	L	L	H	H	H	H						
0.2pF (0R2)	L	L	L	H	H	H	H						
0.3pF (0R3)	L	L	L	H	H	H	H						
0.4pF (0R4)	L	L	L	H	H	H	H						
0.5pF (0R5)	L	L	L	H	H	H	H	H	S	S	S	S	S
0.6pF (0R6)	L	L	L	H	H	H	H	H	S	S	S	S	S
0.7pF (0R7)	L	L	L	H	H	H	H	H	S	S	S	S	S
0.8pF (0R8)	L	L	L	H	H	H	H	H	S	S	S	S	S
0.9pF (0R9)	L	L	L	H	H	H	H	H	S	S	S	S	S
1.0pF (1R0)	L	L	L	H	H	H	H	H	S	S	S	S	S
1.2pF (1R2)	L	L	L	H	H	H	H	H	S	S	S	S	S
1.5pF (1R5)	L	L	L	H	H	H	H	H	S	S	S	S/B	S
1.6pF (1R6)						H							
1.8pF (1R8)	L	L	L	H	H	H	H	H	S	S	S	S	S
2.0pF (2R0)	L	L	L	H	H	H	H	H	S	S	S	S	S
2.2pF (2R2)	L	L	L	H	H	H	H	H	S	S	S	S	S
2.7pF (2R7)	L	L	L	H	H	H	H	H	S	S	S	S	S
3.0pF (3R0)	L	L	L	H	H	H	H	H	S	S	S	S	S
3.3pF (3R3)	L	L	L	H	H	H	H	H	S	S	S	S	S
3.9pF (3R9)	L	L	L	H	H	H	H	H	S	S	S	S/B	S
4.0pF (4R0)	L	L	L	H	H	H	H	H	S	S	S	S	S
4.7pF (4R7)	L	L	L	H	H	H	H	H	S	S	S	S/B	S
5.0pF (5R0)	L	L	L	H	H	H	H	H	S	S	S	S	S
5.6pF (5R6)	L	L	L	H	H	H	H	H	S	S	S	S/B	S
6.0pF (6R0)	L	L	L	H	H	H	H	H	S	S	S	S	S
6.8pF (6R8)	L	L	L	H	H	H	H	H	S	S	S	S	S
7.0pF (7R0)	L	L	L	H	H	H	H	H	S	S	S	S/B	S
8.0pF (8R0)	L	L	L	H	H	H	H	H	S	S	S	S	S
8.2pF (8R2)	L	L	L	H	H	H	H	H	S	S	S	S/B	S
9.0pF (9R0)	L	L	L	H	H	H	H	H	S	S	S	S	S

CAPACITANCE RANGE NPO (COG) DIELECTRIC - SIZE 0201, 0402, 0603

Table 6-B

SIZE	0201			0402					0603				
VDC (V)	16	25	50	10	16	25	50	100	10	16	25	50	100
10pF (100)	L	L	L	H	H	H	H	H	S	S	S	S	S
12pF (120)	L	L	L	H	H	H	H	H	S	S	S	S	S
15pF (150)	L	L	L	H	H	H	H	H	S	S	S	S/B	S
18pF (180)	L	L	L	H	H	H	H	H	S	S	S	S/B	S
22pF (220)	L	L	L	H	H	H	H/N	H	S	S	S	S/B	S
27pF (270)	L	L	L	H	H	H	H	H	S	S	S	S	S
30pF (300)						H							
33pF (330)	L	L	L	H	H	H	H	H	S	S	S/B	S/B	S
39pF (390)	L	L	L	H	H	H	H	H	S	S	S	S	S
47pF (470)	L	L	L	H	H	H	H	H	S	S	S	S/B	S
56pF (560)	L	L	L	H	H	H	H	H	S	S	S	S	S
68pF (680)	L	L	L	H	H	H	H	H	S	S	S	S	S
82pF (820)	L	L	L	H	H	H	H	H	S	S	S	S	S
100pF (101)	L	L	L	H	H	H	H/N	H	S	S	S	S/B	S
120pF (121)	L	L	L	H	H	H	H	H	S	S	S	S/B	S
150pF (151)	L	L	L	H	H	H	H	H	S	S	S	S	S
180pF (181)				H	H	H	H	H	S	S	S	S	S
220pF (221)				H	H	H	H	H	S	S	S	S	S
270pF (271)	L			H	H	H	H		S	S	S	S/B	S
330pF (331)	L			H	H	H	H		S	S	S	S/B	S
390pF (391)	L			H	H	H	H		S	S	S	S	S
470pF (471)	L			H	H	H	H		S	S	S	S	S
560pF (561)	L			H	H	H	H		S	S	S	S	S
680pF (681)				H	H	H	H		S	S	S	S	S
820pF (821)				H	H	H	H		S	S	S	S	S
1,000pF (102)				H	H	H	H		S	S	S/B	S	S
1,200pF (122)									X	X	X	X	X
1,500pF (152)									X	X	X	X	X
1,800pF (182)									X	X	X	X	

CAPACITANCE RANGE NP0 (COG) DIELECTRIC - SIZE 0603

Table 6-C

SIZE	0603			
VDC (V)	10	16	25	50
2,200pF (222)	X	X	X	X/B
2,700pF (272)	X	X	X	X/B
3,300pF (332)	X	X	X	X
3,900pF (392)	X	X	X	X
4,700pF (472)	X	X	X	X
5,600pF (562)	X	X	X	X
6,800pF (682)	X	X	X	S/X
8,200pF (822)	X	X	X	X
0.010μF (103)	X	X	X	X

CAPACITANCE RANGE NP0 (COG) DIELECTRIC - SIZE 0805, 1206

Table 6-D

SIZE	0805					1206				
	10	16	25	50	100	10	16	25	50	100
0.5pF (0R5)	A	A	A	A	A					
0.6pF (0R6)	A	A	A	A	A					
0.7pF (0R7)	A	A	A	A	A					
0.8pF (0R8)	A	A	A	A	A					
0.9pF (0R9)	A	A	A	A	A					
1.0pF (1R0)	A	A	A	A	A				B	
1.2pF (1R2)	A	A	A	A	A	B	B	B	B	B
1.5pF (1R5)	A	A	A	A	A	B	B	B	B	B
1.8pF (1R8)	A	A	A	A	A	B	B	B	B	B
2.0pF (2R0)	A	A	A	A	A					
2.2pF (2R2)	A	A	A	A	A	B	B	B	B	B
2.7pF (2R7)	A	A	A	A	A	B	B	B	B	B
3.0pF (3R0)	A	A	A	A	A					
3.3pF (3R3)	A	A	A	A	A	B	B	B	B	B
3.9pF (3R9)	A	A	A	A	A	B	B	B	B	B
4.0pF (4R0)	A	A	A	A	A					

CAPACITANCE RANGE NP0 (COG) DIELECTRIC - SIZE 0805, 1206

Table 6-E

SIZE	0805					1206				
VDC (V)	10	16	25	50	100	10	16	25	50	100
4.7pF (4R7)	A	A	A	A	A	B	B	B	B	B
5.0pF (5R0)	A	A	A	A	A					
5.6pF (5R6)	A	A	A	A	A	B	B	B	B	B
6.0pF (6R0)	A	A	A	A	A					
6.8pF (6R8)	A	A	A	A	A	B	B	B	B	B
7.0pF (7R0)	A	A	A	A	A	B	B	B	B	B
8.0pF (8R0)	A	A	A	A	A					
8.2pF (8R2)	A	A	A	A	A	B	B	B	B	B
9.0pF (9R0)	A	A	A	A	A					
10pF (100)	A	A	A	A	A	B	B	B	B	B
12pF (120)	A	A	A	A	A					
15pF (150)	A	A	A	A	A	B	B	B	B	B
18pF (180)	A	A	A	A	A	B	B	B	B	B
22pF (220)	A	A	A	A	A	B	B	B	B	B
27pF (270)	A	A	A	A	A	B	B	B	B	B
33pF (330)	A	A	A	A	A	B	B	B	B	B
39pF (390)	A	A	A	A	A	B	B	B	B	B
47pF (470)	A	A	A	A	A	B	B	B	B	B
56pF (560)	A	A	A	A	A	B	B	B	B	B
68pF (680)	A	A	A	A	A	B	B	B	B	B
82pF (820)	A	A	A	A	A	B	B	B	B	B
100pF (101)	A	A	A	A	A	B	B	B	B	B
120pF (121)	A	A	A	A	A	B	B	B	B	B
150pF (151)	A	A	A	A	A	B	B	B	B	B
180pF (181)	A	A	A	A	A	B	B	B	B	B
220pF (221)	A	A	A	A	A	B	B	B	B	B
270pF (271)	A	A	A	A	A	B	B	B	B	B
330pF (331)	A	A	A	A	A	B	B	B	B	B
390pF (391)	B	B	B	B	B	B	B	B	B	B
470pF (471)	B	B	B	B	B					

CAPACITANCE RANGE NP0 (COG) DIELECTRIC - SIZE 0805, 1206

Table 6-F

SIZE	0805					1206				
VDC (V)	10	16	25	50	100	10	16	25	50	100
560pF (561)	B	B	B	B	B	B	B	B	B	B
680pF (681)	B	B	B	B	B	B	B	B	B	B
820pF (821)	B	B	B	B	B	B	B	B	B	B
1,000pF (102)	B	B	B	B	B	B	B	B	B	B
1,200pF (122)	B	B	B	B	B	B	B	B	B	B
1,500pF (152)	B	B	B	B	B	B	B	B	B	B
1,800pF (182)	B	B	B	B	B	B	B	B	B	B
2,200pF (222)	B	B	B	B	B	B	B	B	B	B
2,700pF (272)	C	C	C	C	C	B	B	B	B	B
3,300pF (332)	C	C	C	C	C	B	B	B	B	B

CAPACITANCE RANGE NP0 (COG) DIELECTRIC - SIZE 0805, 1206

Table 6-G

SIZE	0805					1206				
VDC (V)	10	16	25	50	100	10	16	25	50	100
3,900pF (392)	C	C	C	C	C	B	B	B	B	B
4,700pF (472)	C	C	C	C	C	B	B	B	B	B
5,600pF (562)	C	C	C	C	C	B	B	B	B	B
6,800pF (682)	C	C	C	C	C	I	I	I	I	I
8,200pF (822)	C	C	C	C		C	C	C	C	C
0.010μF (103)	C	C	C	C		C	C	C	C	C
0.012μF (123)	B	B	B	B		P	P	P	P	P
0.015μF (153)						P	P	P	P	P
0.018μF (183)	C	C	C	C		P	P	P	P	P
0.022μF (223)	C	C	C	C		P	P	P	P	P
0.027μF (273)						P	P	P	P	
0.033μF (333)						P	P	P	P	
0.039μF (393)						P	P	P	P	
0.047μF (473)						J	J	J	J	
0.056μF (563)						J	J	J	J	
0.068μF (683)						D	D	D	D	

CAPACITANCE RANGE NP0 (COG) DIELECTRIC- SIZE 0805, 1206

Table 6-H

SIZE	0805					1206				
VDC (V)	10	16	25	50	100	10	16	25	50	100
0.082µF (823)						D	D	D	D	
0.1µF (104)						D	D	D	D	

CAPACITANCE RANGE NP0 (COG) DIELECTRIC - SIZE 1210, 1812

Table 6-I

SIZE	1210					1812		
VDC (V)	10	16	25	50	100	16	50	100
10pF (100)	I	I	I	I	I	C	C	C
15pF (150)	I	I	I	I	I	C	C	C
18pF (180)	I	I	I	I	I	C	C	C
22pF (220)	I	I	I	I	I	C	C	C
27pF (270)	I	I	I	I	I	C	C	C
33pF (330)	I	I	I	I	I	C	C	C
39pF (390)	I	I	I	I	I	C	C	C
47pF (470)	I	I	I	I	I	C	C	C
56pF (560)	I	I	I	I	I	C	C	C
68pF (680)	I	I	I	I	I	C	C	C
82pF (820)	I	I	I	I	I	C	C	C
100pF (101)	I	I	I	I	I	C	C	C
120pF (121)	I	I	I	I	I	C	C	C
150pF (151)	I	I	I	I	I	C	C	C
180pF (181)	I	I	I	I	I	C	C	C
220pF (221)	I	I	I	I	I	C	C	C
270pF (271)	I	I	I	I	I	C	C	C
330pF (331)	I	I	I	I	I	C	C	C
390pF (391)	I	I	I	I	I	C	C	C
560pF (561)	I	I	I	I	I	C	C	C
680pF (681)	I	I	I	I	I	C	C	C
820pF (821)	I	I	I	I	I	C	C	C
1,000pF (102)	I	I	I	I	I	C	C	C
1,200pF (122)	I	I	I	I	I	C	C	C

CAPACITANCE RANGE NPO (COG) DIELECTRIC - SIZE 1210, 1812

Table 6-J

SIZE	1210					1812		
VDC (V)	10	16	25	50	100	16	50	100
1,500pF (152)	I	I	I	I	I	C	C	C
1,800pF (182)	I	I	I	I	I	C	C	C
2,200pF (222)	I	I	I	I	I	C	C	C
2,700pF (272)	I	I	I	I	I	C	C	C
3,300pF (332)	I	I	I	I	I	C	C	C
3,900pF (392)	I	I	I	I	I	C	C	C
4,700pF (472)	I	I	I	I	I	C	C	C
5,600pF (562)	I	I	I	I	I	C	C	C
6,800pF (682)	I	I	I	I	I	C	C	C
8,200pF (822)	I	I	I	I	I	C	C	C
0.010μF (103)	I	I	I	I	I	C	C	C
0.012μF (123)	C	C	C	C	C	C	C	C
0.015μF (153)	C	C	C	C	C	C	C	C
0.018μF (183)		K	K	K	K	C	C	C
0.022μF (223)		K	K	K	K	C	C	C
0.027μF (273)		K	K	K	K	C	C	C
0.033μF (333)		K	K	K	K	C	C	C
0.039μF (393)		K	K	K	K	M	M	M
0.047μF (473)		K	K	K	K	M	M	M
0.056μF (563)						M	M	M
0.068μF (683)						M	M	M
0.082μF (823)						M	M	M
0.1μF (104)						M	M	M

Note: The letter in cell is expressed the symbol of product thickness.

CAPACITANCE RANGE X7R DIELECTRIC - SIZE 0201, 0402

Table 7-A

SIZE	0201					0402					
VDC (V)	6.3	10	16	25	50	6.3	10	16	25	50	100
100pF (101)	L	L	L	L	L	H	H	H	H	H	H
120pF (121)	L	L	L	L	L	H	H	H	H	H	H
150pF (151)	L	L	L	L	L	H	H	H	H	H	H
180pF (181)	L	L	L	L	L	H	H	H	H	H	H
220pF (221)	L	L	L	L	L	H	H	H	H	H	H
270pF (271)	L	L	L	L	L	H	H	H	H	H	H
330pF (331)	L	L	L	L	L	H	H	H	H	H	H
390pF (391)	L	L	L	L	L	H	H	H	H	H	H
470pF (471)	L	L	L	L	L	H	H	H	H	H	H
560pF (561)	L	L	L	L	L	H	H	H	H	H	H
680pF (681)	L	L	L	L	L	H	H	H	H	H	H
820pF (821)	L	L	L	L	L	H	H	H	H	H	H
1,000pF (102)	L	L	L	L	L	H	H	H	H	H	H
1,200pF (122)	L	L	L	L	L	H	H	H	H	H	H
1,500pF (152)	L	L	L	L	L	H	H	H	H	H	H
1,800pF (182)	L	L	L	L	L	H	H	H	H	H	H
2,200pF (222)	L	L	L	L	L	H	H	H	H	H	H
2,700pF (272)	L	L	L	L	L	H	H	H	H	H	H
3,300pF (332)	L	L	L	L	L	H	H	H	H	H	H
3,900pF (392)	L	L	L	L	L	H	H	H	H	H	H
4,700pF (472)	L	L	L	L	L	H	H	H	H	H	H
5,600pF (562)	L	L	L	L	L	H	H	H	H	H	
6,800pF (682)	L	L	L	L	L	H	H	H	H	H	
8,200pF (822)	L	L	L	L	L	H	H	H	H	H	
0.010μF (103)	L	L	L	L	L	H	H	H	H	H	
0.012μF (123)						H	H	H	H	H	
0.015μF (153)						H	H	H	H	H	
0.018μF (183)						H	H	H	H	H	
0.022μF (223)						H	H	H	H	H	

CAPACITANCE RANGE X7R DIELECTRIC - SIZE 0402

Table 7-B

SIZE	0402				
VDC (V)	6.3	10	16	25	50
0.027µF (273)	H	H	H	H	H
0.033µF (333)	H	H	H	H	H
0.039µF (393)	H	H	H	H	H
0.047µF (473)	H	H	H	H	H
0.056µF (563)	H	H	H	H	H
0.068µF (683)	H	H	H	H	H
0.082µF (823)	H	H	H	H	H
0.10µF (104)	H	H	H	H	H
0.22µF (224)	H	H	H	H	
0.47µF (474)	H	H			
1.0µF (105)	H	H			

CAPACITANCE RANGE X7R DIELECTRIC - SIZE 0603, 0805

Table 7-C

SIZE	0603						0805					
VDC (V)	6.3	10	16	25	50	100	6.3	10	16	25	50	100
100pF (101)	S	S	S	S/B	S/B	S	B	B	B	B	B	B
120pF (121)	S	S	S	S	S	S	B	B	B	B	B	B
150pF (151)	S	S	S	S	S	S	B	B	B	B	B	B
180pF (181)	S	S	S	S	S	S/B	B	B	B	B	B	B
220pF (221)	S	S	S	S	S/B	S	B	B	B	B	B	B
270pF (271)	S	S	S	S	S	S	B	B	B	B	B	B
330pF (331)	S	S	S	S	S	S	B	B	B	B	B	B
390pF (391)	S	S	S	S	S	S	B	B	B	B	B	B
470pF (471)	S	S	S	S	S/B	S	B	B	B	B	B	B
560pF (561)	S	S	S	S	S	S	B	B	B	B	B	B
680pF (681)	S	S	S	S	S	S	B	B	B	B	B	B
820pF (821)	S	S	S	S	S	S	B	B	B	B	B	B
1,000pF (102)	S	S	S	S/B	S/B	S/B	B	B	B	B	B	B
1,200pF (122)	S	S	S	S	S	S	B	B	B	B	B	B
1,500pF (152)	S	S	S	S/B	S	S	B	B	B	B	B	B

CAPACITANCE RANGE X7R DIELECTRIC - SIZE 0603, 0805

Table 7-D

SIZE	0603						0805						
	VDC (V)	6.3	10	16	25	50	100	6.3	10	16	25	50	100
1,800pF (182)	S	S	S	S	S	S	S	B	B	B	B	B	B
2,200pF (222)	S	S	S	S	S/B	S	S	B	B	B	B	B	B
2,700pF (272)	S	S	S	S	S/B	S	S	B	B	B	B	B	B
3,300pF (332)	S	S	S	S	S	S	S	B	B	B	B	B	B
3,900pF (392)	S	S	S	S	S	S	S	B	B	B	B	B	B
4,700pF (472)	S	S	S	S	S	S	S	B	B	B	B	B	B
5,600pF (562)	S	S	S	S	S	S	S	B	B	B	B	B	B
6,800pF (682)	S	S	S	S/B	S	S	S	B	B	B	B	B	B
8,200pF (822)	S	S	S	S	S	S	S	B	B	B	B	B	B
0.010μF (103)	S	S	S	S/B	S/B	S	S	B	B	B	B	B	B
0.012μF (123)	S	S	S	S	S	X	X	B	B	B	B	B	B
0.015μF (153)	S	S	S	S/B	S/B	X	X	B	B	B	B	B	B
0.018μF (183)	S	S	S	S	S	X	X	B	B	B	B	B	B
0.022μF (223)	S	S	S	S	S/B	X	X	B	B	B	B	B	B
0.027μF (273)	S	S	S	S	S/B	X	X	B	B	B	B	B	C
0.033μF (333)	S	S	S	S	X/B	X	X	B	B	B	B	B	C
0.039μF (393)	S	S	S	S	X	X	X	B	B	B	B	B	C
0.047μF (473)	S	S	S	S	X	X	X	B	B	B	B	B	C
0.056μF (563)	S	S	S	S	X	X	X	B	B	B	B	B	C
0.068μF (683)	S	S	S	S	X/B	X	X	B	B	B	B	B	C
0.082μF (823)	S	S	S	S	X	X	X	B	B	B	B	B	C
0.10μF (104)	S	S	S/B	S/B	X	X	X	B	B	B	B	B	C
0.12μF (124)	S	S	S	X				B	B	B	B	C	C
0.15μF (154)	S	S	S/B	X				C	C	C	C	C	C
0.18μF (184)	S	S	S	X				C	C	C	C	C	C
0.22μF (224)	S	S	S/B	X/B	X			C	C	C	C	C	C
0.27μF (274)	X	X	X	X				C	C	C	C	C	
0.33μF (334)	X	X	X	X				C	C	C	C	C	
0.39μF (394)	X	X	X	X				C	C	C	C	C	

CAPACITANCE RANGE X7R DIELECTRIC - SIZE 0603, 0805

Table 7-E

SIZE	0603					0805						
	VDC (V)	6.3	10	16	25	50	6.3	10	16	25	50	100
0.47µF (474)	X	X	X/B	X/B	X		C	C	C	C	C	C
0.56µF (564)	X	X	X				C	C	C	C		
0.68µF (684)	X	X	X				C	C	C	C		
0.82µF (824)	X	X	X				C	C	C	C		
1.0µF (105)	X	X	X	X	X		C	C	C	C	C	
1.5µF (155)							C	C	C	C		
2.2µF (225)	X	X/B	X				C	C	C	C	C	
4.7µF (475)	X	X	X				C	C	C	C		
10µF (106)							C*	C*	C*			

CAPACITANCE RANGE X7R DIELECTRIC - SIZE 1206, 1210

Table 7-F

SIZE	1206						1210					
	VDC (V)	6.3	10	16	25	50	100	10	16	25	50	100
150pF (151)	B	B	B	B	B	B	B					
180pF (181)	B	B	B	B	B	B	B					
220pF (221)	B	B	B	B	B	B	B					
270pF (271)	B	B	B	B	B	B	B					
330pF (331)	B	B	B	B	B	B	B					
390pF (391)	B	B	B	B	B	B	B					
470pF (471)	B	B	B	B	B	B	B					
560pF (561)	B	B	B	B	B	B	B					
680pF (681)	B	B	B	B	B	B	B					
820pF (821)	B	B	B	B	B	B	B					
1,000pF (102)	B	B	B	B	B	B	B	I	I	I	I	I
1,200pF (122)	B	B	B	B	B	B	B	I	I	I	I	I
1,500pF (152)	B	B	B	B	B	B	B	I	I	I	I	I
1,800pF (182)	B	B	B	B	B	B	B	I	I	I	I	I
2,200pF (222)	B	B	B	B	B	B	B	I	I	I	I	I
2,700pF (272)	B	B	B	B	B	B	B	I	I	I	I	I
3,300pF (332)	B	B	B	B	B	B	B	I	I	I	I	I

CAPACITANCE RANGE X7R DIELECTRIC - SIZE 1206, 1210

Table 7-G

SIZE	1206						1210				
VDC (V)	6.3	10	16	25	50	100	10	16	25	50	100
3,900pF (392)	B	B	B	B	B	B	I	I	I	I	I
4,700pF (472)	B	B	B	B	B	B	I	I	I	I	I
5,600pF (562)	B	B	B	B	B	B	I	I	I	I	I
6,800pF (682)	B	B	B	B	B	B	I	I	I	I	I
8,200pF (822)	B	B	B	B	B	B	I	I	I	I	I
0.010μF (103)	B	B	B	B	B	B	I	I	I	I	I
0.012μF (123)	B	B	B	B	B	B	I	I	I	I	I
0.015μF (153)	B	B	B	B	B	B	I	I	I	I	I
0.018μF (183)	B	B	B	B	B	B	I	I	I	I	I
0.022μF (223)	B	B	B	B	B	B	I	I	I	I	I
0.027μF (273)	B	B	B	B	B	B	I	I	I	I	I
0.033μF (333)	B	B	B	B	B	B	I	I	I	I	I
0.039μF (393)	B	B	B	B	B	B	I	I	I	I	I
0.047μF (473)	B	B	B	B	B	B	I	I	I	I	I
0.056μF (563)	B	B	B	B	B	B	I	I	I	I	I
0.068μF (683)	B	B	B	B	B	B	I	I	I	I	I
0.082μF (823)	B	B	B	B	B	C	I	I	I	I	I
0.10μF (104)	B	B	B	B	B	C	I	I	I	I	I
0.12μF (124)	B	B	B	B	B	C	I	I	I	I	I
0.15μF (154)	I	I	I	I	I	D	I	I	I	I	C
0.18μF (184)	I	I	I	I	I	D	I	I	I	I	C
0.22μF (224)	I	I	I	I	I/B	D	I	I	I	I	C
0.27μF (274)	I	I	I	I	C	D	I	I	I	I	D
0.33μF (334)	I	I	I	I	C	D	I	I	I	C	D
0.39μF (394)	I	I	I	J	P	D	I	I	I	C	M
0.47μF (474)	J	J	J	J	P	D	I	I	I	C	M
0.56μF (564)	J	J	J	J	P	P	C	C	C	C	M
0.68μF (684)	J	J	J	J	P	P	C	C	C	C	K
0.82μF (824)	J	J	J	J	P	P	C	C	C	C	K

CAPACITANCE RANGE X7R DIELECTRIC - SIZE 1206, 1210

Table 7-H

SIZE	1206						1210				
VDC (V)	6.3	10	16	25	50	100	10	16	25	50	100
1.0μF (105)	J	J	J	J	P	P	C	C	C	C	K
1.5μF (155)	J	J	J	P				D	D	M	M
2.2μF (225)	J	J	J	P	P	P		D	D	M	M
3.3μF (475)	P	P	P	P				D	D	M	
4.7μF (475)	P	P	P	P	P		K	K	K	M	M
10μF (106)	P	P	P	P			K	K	K	M	
22μF (226)	P*	P*	P*				M	M	M		
47μF (476)							M				
100μF (107)	P*	P*									

CAPACITANCE RANGE X7R DIELECTRIC - SIZE 1812

Table 7-I

SIZE	1812					
VDC (V)	6.3	10	16	25	50	100
1,000pF (102)	C	C	C	C	C	C
1,200pF (122)	C	C	C	C	C	C
1,500pF (152)	C	C	C	C	C	C
1,800pF (182)	C	C	C	C	C	C
2,200pF (222)	C	C	C	C	C	C
2,700pF (272)	C	C	C	C	C	C
3,300pF (332)	C	C	C	C	C	C
3,900pF (392)	C	C	C	C	C	C
4,700pF (472)	C	C	C	C	C	C
5,600pF (562)	C	C	C	C	C	C
6,800pF (682)	C	C	C	C	C	C
8,200pF (822)	C	C	C	C	C	C
0.010μF (103)	C	C	C	C	C	C
0.012μF (123)	C	C	C	C	C	C
0.015μF (153)	C	C	C	C	C	C
0.018μF (183)	C	C	C	C	C	C

CAPACITANCE RANGE X7R DIELECTRIC - SIZE 1812

Table 7-J

SIZE	1812					
VDC (V)	6.3	10	16	25	50	100
0.022μF (223)	C	C	C	C	C	C
0.027μF (273)	C	C	C	C	C	C
0.033μF (333)	C	C	C	C	C	C
0.039μF (393)	C	C	C	C	C	C
0.047μF (473)	C	C	C	C	C	C
0.056μF (563)	C	C	C	C	C	C
0.068μF (683)	C	C	C	C	C	C
0.082μF (823)	C	C	C	C	C	C
0.10μF (104)	C	C	C	C	C	C
0.12μF (124)	C	C	C	C	C	C
0.15μF (154)	C	C	C	C	C	C
0.18μF (184)	C	C	C	C	C	C
0.22μF (224)	C	C	C	C	C	C
0.27μF (274)	C	C	C	C	C	C
0.33μF (334)	C	C	C	C	C	C
0.39μF (394)	C	C	C	C	C	C
0.47μF (474)	C	C	C	C	C	K
0.56μF (564)	C	C	C	C	C	K
0.68μF (684)	C	C	C	C	K	K
0.82μF (824)	C	C	C	C	K	K
1.0μF (105)	C	C	C	C	K	K
1.5μF (155)					K	K
2.2μF (225)					M	M

Note: 1) The letter in cell is expressed the symbol of product thickness. 2) The letter in cell with “ * ” mark is for “M tolerance” (20%) only

CAPACITANCE RANGE X5R DIELECTRIC - SIZE 0201

Table 8-A

SIZE	0201			
VDC (V)	10	16	25	50
100pF (101)		L	L	L
120pF (121)		L	L	L
150pF (151)		L	L	L
180pF (181)		L	L	L
220pF (221)		L	L	L
270pF (271)		L	L	L
330pF (331)		L	L	L
390pF (391)		L	L	L
470pF (471)		L	L	L
560pF (561)		L	L	L
680pF (681)		L	L	L
820pF (821)		L	L	L
1,000pF (102)	L	L	L	L
1,200pF (122)	L	L	L	
1,500pF (152)	L	L	L	
2,200pF (222)	L	L	L	
2,700pF (272)	L	L	L	
3,300pF (332)	L	L	L	
4,700pF (472)	L	L	L	

CAPACITANCE RANGE X5R DIELECTRIC - SIZE 0201, 0402

Table 8-B

SIZE	0201					0402					
	VDC (V)	6.3	10	16	25	50	6.3	10	16	25	50
6,800µF (682)		L	L	L							
0.010µF (103)	L	L	L	L	L						
0.015µF (153)	L	L									H
0.022µF (223)	L	L									H
0.027µF (273)	L	L							H		H
0.033µF (333)	L	L							H		H
0.039µF (393)	L	L							H		H
0.047µF (473)	L	L				H	H	H			H
0.056µF (563)	L	L				H	H	H			H
0.068µF (683)	L	L				H	H	H			H
0.082µF (823)	L	L				H	H	H			H
0.10µF (104)	L	L	L	L		H	H	H	H		H/E
0.15µF (154)						H	H	H	H		
0.22µF (224)	L	L	L*			H	H	H	H		H
0.33µF (334)	L*	L*				H	H				
0.47µF (474)	L					H	H	H	H		H
0.68µF (684)						H	H				
1.0µF (105)	L*	L*	L*			H	H	H	H		H/N
2.2µF (225)	L*	L*				H	H	E/N	E/N		
4.7µF (475)						H/E/N	E/N	E/N*			
10µF (106)						H/E/N	E/N*	E/N*			
22µF (226)						E/N*					

CAPACITANCE RANGE X5R DIELECTRIC - SIZE 0603

Table 8-C

SIZE	0603					
	VDC (V)	6.3	10	16	25	50
0.22µF (224)	X	X	X	X	X	
0.27µF (274)		X	X	X	X	
0.33µF (334)	X	X	X	X	X	
0.39µF (394)		X	X	X	X	
0.47µF (474)	X	X/B	X	X	X	X

CAPACITANCE RANGE X5R DIELECTRIC - SIZE 0603, 0805

Table 8-D

SIZE	0603					0805					
	VDC (V)	6.3	10	16	25	50	6.3	10	16	25	50
0.68μF (684)	X	X	X	X							
0.82μF (824)	X	X	X	X							
1.0μF (105)	X	X	X	X/B	X/B		C	C	C	C	
1.5μF (155)	X						C	C	C	C	
2.2μF (225)	X/B	X	X	X	X		C	C	C	C	C
3.3μF (335)	X	X					C	C	C	C	
4.7μF (475)	X	X	X	X			C	C	C	C	C
10μF (106)	X/B	X	X	X*			C	C	C	C	C
22μF (226)	X*	X*					C	C*	C*	C*	
47μF (476)							C*	C*			
100μF (107)							C*				

CAPACITANCE RANGE X5R DIELECTRIC - SIZE 1206, 1210

Table 8-E

SIZE	1206					1210							
	VDC (V)	6.3	10	16	25	50	4	6.3	10	16	25	35	50
1.5μF (155)		J	J						K	K			
2.2μF (225)		J	J	P	P				K	K			
3.3μF (335)		P	P	P									
4.7μF (475)	P	P	P	P	P				K	K	K		
6.8μF (685)	P	P											
10μF (106)	P	P	P	P/D	P			K	K	K	K	M	M
22μF (226)	P	P	P	P				M	M	M	M	M	
47μF (476)	P	P	P*	P/Y				M	M	M*	M		
100μF (107)	P*							M*	M*				
220μF (227)							M*	M*					

Note: 1) The letter in cell is expressed the symbol of product thickness. 2) The letter in cell with “ * ” mark is for “M tolerance” (20%) only

CAPACITANCE RANGE X6S DIELECTRIC - SIZE 0201, 0402, 0603

Table 9-A

SIZE	0201		0402				0603				
VDC (V)	4	6.3	6.3	10	16	25	4	6.3	10	16	25
0.10µF (104)	L	L									
0.22µF (224)		L									
0.47µF (474)			H								
1.0µF (105)	L*		H	H	H	H					
2.2µF (225)			H	H	H						
4.7µF (475)								X		X	X
10µF (106)								X*	X*	X*	
22µF (226)							X*	X*			

CAPACITANCE RANGE X5R DIELECTRIC - SIZE 0805, 1206, 1210

Table 9-B

SIZE	0805						1206				1210			
VDC (V)	4	6.3	10	16	25	50	6.3	10	16	25	6.3	10	16	25
0.10µF (104)														
0.22µF (224)														
0.47µF (474)														
1.0µF (105)														
2.2µF (225)														
4.7µF (475)					C	C								
10µF (106)	C	C	C	C	C					D				
22µF (226)		C*	C*	C*				P	P*					M
47µF (476)	C*						P				M	M	M	
100µF (107)											M*			

Note: 1) The letter in cell is expressed the symbol of product thickness. 2) The letter in cell with “ * ” mark is for “M tolerance” (20%) only

INSULATION RESISTANCE – Requirement - Class II (X7R, X5R, X6S)

Table 10

RATED VOLTAGE	IR
100V: All X7R	10GΩ or $RxC \geq 100 \Omega\text{-F}$ whichever is smaller
50V: 0402 > 0.01μF; 0603 $\geq 1\mu\text{F}$; 0805 $\geq 1\mu\text{F}$; 1206 $\geq 4.7\mu\text{F}$; 1210 $\geq 4.7\mu\text{F}$	
35V: 0805 $\geq 2.2\mu\text{F}$; 1206 $\geq 2.2\mu\text{F}$; 1210 $\geq 10\mu\text{F}$	
25V: 0402 $\geq 1\mu\text{F}$; 0603 $\geq 2.2\mu\text{F}$; 0805 $\geq 2.2\mu\text{F}$; 1206 $\geq 10\mu\text{F}$; 1210 $\geq 10\mu\text{F}$	
16V: 0201 $\geq 0.1\mu\text{F}$; 0402 $\geq 0.22\mu\text{F}$; 0603 $\geq 1\mu\text{F}$; 0805 $\geq 2.2\mu\text{F}$; 1206 $\geq 10\mu\text{F}$; 1210 $\geq 47\mu\text{F}$	
10V: 0201 $\geq 47\text{nF}$; 0402 $\geq 0.47\mu\text{F}$; 0603 $\geq 0.47\mu\text{F}$; 0805 $\geq 2.2\mu\text{F}$; 1206 $\geq 4.7\mu\text{F}$; 1210 $\geq 47\mu\text{F}$	
6.3V; 4V; Size ≥ 1812	
All X6S items	$RxC \geq 50 \Omega\text{-F}$.
100V: 1210 $\geq 3.3\mu\text{F}$	
50V: 0402 $\geq 0.1\mu\text{F}$; 0603 $\geq 2.2\mu\text{F}$; 0805 $\geq 10\mu\text{F}$; 1206 $\geq 10\mu\text{F}$	
35V: 0603 $\geq 1\mu\text{F}$	
25V: 0201 $\geq 0.1\mu\text{F}$; 0402 $\geq 0.22\mu\text{F}$; 0603 $\geq 10\mu\text{F}$; 0805 $\geq 10\mu\text{F}$; 1206 $\geq 22\mu\text{F}$	
16V: 0201 $\geq 0.22\mu\text{F}$; 0402 $\geq 1\mu\text{F}$; 0603 $\geq 10\mu\text{F}$	
10V: 0201 > 0.1μF; 0402 $\geq 1\mu\text{F}$; 0603 $\geq 10\mu\text{F}$; 0805 $\geq 47\mu\text{F}$	
6.3V: 0201 $\geq 0.1\mu\text{F}$; 0603 $\geq 4.7\mu\text{F}$; 0805 $\geq 47\mu\text{F}$; 1206 $\geq 10\mu\text{F}$	
4V: 0603 $\geq 22\mu\text{F}$; 0805 $\geq 47\mu\text{F}$; 1206 $\geq 100\mu\text{F}$	

TEMPERATURE COEFFICIENT- Test Condition Measurement voltage for Class II:

Table 11

MEASUREMENT VOLTAGE	SIZE
Cap $\leq 0.01\mu\text{F}$: 0.5V; Cap. > 0.01μF: 0.2V	01005
Cap < 0.1μF: 1.0V; 0.1μF* \leq Cap. < 1.0μF: 0.2V; Cap. $\geq 1.0\mu\text{F}$: 0.1V (*: 0201x104/16V: 0.5V)	0201
Cap < 1μF: 1.0V; Cap. = 1μF: 0.5V; 1μF < Cap. < 10μF: 0.2V; Cap. $\geq 1.0\mu\text{F}$: 0.1V	0402
Cap < 1.0μF: 1.0V; 1.0μF* \leq Cap. $\leq 4.7\mu\text{F}$: 0.5V; Cap. > 4.7μF: 0.2V	0603
Cap < 10μF: 1.0V; Cap. = 10μF: 0.5V; Cap. > 10μF: 0.2V	0805
Cap $\leq 10\mu\text{F}$: 1.0V; 10μF < Cap. $\leq 100\mu\text{F}$: 0.5V; Cap. > 100μF: 0.2V	1206/1210

HUMIDITY (DAMP HEAT) STEADY STATE -Requirement - (X7R, X5R, X6S)

Table 12

Rated vol.	D.F. \leq	Exception of D.F. \leq	
$\geq 100V$	$\leq 3\%$	$\leq 6\%$	1206 $\geq 0.47\mu F$
		$\leq 7.5\%$	0603 $\geq 0.068\mu F$; 0805 $> 0.1\mu F$; 1206 $\geq 1\mu F$; 1210 $\geq 2.2\mu F$;
		$\leq 20\%$	0805 $> 0.22\mu F$; 1210 $\geq 3.3\mu F$
50V	$\leq 3\%$	$\leq 6\%$	0201(50V); 0603 $\geq 0.047\mu F$; 0805 $\geq 0.18\mu F$; 1206 $\geq 0.47\mu F$
		$\leq 10\%$	0201 $\geq 0.01\mu F$; 1210 $\geq 4.7\mu F$
		$\leq 20\%$	0402 $\geq 0.012\mu F$; 0603 $> 0.1\mu F$; 0805 $\geq 1\mu F$ (0805/X7R $> 0.47\mu F$); 1206 $\geq 2.2\mu F$; 1210 $\geq 10\mu F$;
35V	$\leq 5\%$	$\leq 20\%$	0603 $\geq 1\mu F$; 0805 $\geq 2.2\mu F$; 1206 $\geq 2.2\mu F$; 1210 $\geq 10\mu F$
25V	$\leq 5\%$	$\leq 10\%$	0201 $\geq 0.01\mu F$; 0805 $\geq 1\mu F$; 1210/X7R $\geq 10\mu F$
		$\leq 14\%$	0603 $\geq 0.33\mu F$
		$\leq 15\%$	0201 $\geq 0.1\mu F$; 0402 $\geq 0.10\mu F$ & (0402/X7R $\geq 0.056\mu F$); 0603 $\geq 0.47\mu F$; 0805 $\geq 2.2\mu F$; 1206 $\geq 4.7\mu F$; 1210 $\geq 22\mu F$ (1210/X5R $\geq 10\mu F$)
		$\leq 20\%$	0402 $\geq 0.47\mu F$
16V	$\leq 5\%$	$\leq 10\%$	0603 $\geq 0.15\mu F$; 0805 $\geq 0.68\mu F$; 1206 $\geq 2.2\mu F$; 1210 $\geq 4.7\mu F$
		$\leq 15\%$	0201 $\geq 0.01\mu F$ (0201/X7R $\geq 0.022\mu F$); 0402 $\geq 0.033\mu F$; 0603 $> 0.47\mu F$; 0805 $\geq 2.2\mu F$; 1206 $\geq 4.7\mu F$; 1210 $\geq 22\mu F$
10V	$\leq 7.5\%$	$\leq 15\%$	0201 $\geq 0.012\mu F$; 0402 $\geq 0.22\mu F$; 0603 $\geq 0.33\mu F$; 0805 $\geq 2.2\mu F$; 1206 $\geq 2.2\mu F$; 1210 $\geq 22\mu F$
		$\leq 20\%$	0201 $\geq 0.1\mu F$; 0402 $\geq 1\mu F$
6.3V	$\leq 15\%$	$\leq 30\%$	0201 $\geq 0.1\mu F$; 0402 $\geq 1\mu F$ (0402/X6S $\geq 0.47\mu F$); 0603 $\geq 10\mu F$; 0805 $\geq 4.7\mu F$; 1206 $\geq 47\mu F$; 1210 $\geq 100\mu F$
4V	$\leq 20\%$	-	-

HUMIDITY (DAMP HEAT) LOAD -REQUIREMENT - (X7R, X5R, X6S)

Table 13

Rated vol.	D.F. ≤	Exception of D.F. ≤	
≥100V	≤ 3%	≤ 6%	1206 ≥ 0.47μF
		≤ 7.5%	0603 ≥ 0.068μF; 0805 > 0.1μF; 1206 ≥ 1μF; 1210 ≥ 2.2μF;
50V	≤ 3%	≤6%	0201(50V); 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF
		≤10%	1210≥4.7μF
		≤20%	0402≥0.012μF; 0603>0.1μF; 0805≥1μF; 1206≥2.2μF; 1210≥10μF;
35V	≤ 5%	≤20%	0603≥1μF; 0805≥2.2μF; 1210≥10μF
25V	≤ 5%	≤10%	0201≥0.01μF; 0805≥1μF; 1210≥10μF
		≤14%	0603≥0.33μF; 1206≥4.7μF
		≤15%	0402≥0.10μF;0603≥0.47μF;0805≥2.2μF;1206≥6.8μF ; 1210≥22μF
		≤20%	0402≥1μF
16V	≤5%	≤10%	0201≥0.01μF;0402≥0.033μF;0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF
		≤15%	0201≥0.01μF; 0402≥0.22μF; 0603>0.68μF;0805≥2.2μF;1206≥4.7μF; 1210≥22μF
10V	≤ 7.5%	≤15%	0201≥0.012μF;0402≥0.33μF(0402/X7R≥0.22μF) ;0603≥0.33μF;0805≥2.2μF;1206≥2.2μF;1210≥22μF
		≤20%	0201≥0.1μF; 0402≥1μF
6.3V	≤ 15%	≤30%	0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥4.7μF; 1206≥47μF; 1210 ≥100μF
4V	≤20%	-	-

HIGH TEMPERATURE LOAD (ENDURANCE) -REQUIREMENT - (X7R, X5R, X6S)

Table 14

Rated vol.	D.F. ≤	Exception of D.F. ≤	
≥100V	≤ 3%	≤ 6%	1206 ≥ 0.47μF
		≤ 7.5%	0603 ≥ 0.068μF; 0805 > 0.1μF; 1206 > 1 μF;
50V	≤ 3%	≤6%	0201(50V); 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF
		≤10%	1210≥4.7μF
		≤20%	0402≥0.1μF;0603>0.1μF;0805≥1μF; 1206≥2.2μF; 1210≥10μF
35V	≤ 5%	≤20%	0603≥1μF; 0805≥2.2μF; 1210≥10μF
25V	≤ 5%	≤10%	0201≥0.01μF; 0805≥1μF; 1210≥10μF
		≤14%	0603≥0.33μF; 1206≥4.7μF
		≤15%	0402≥0.10μF;0603≥0.47μF;0805≥2.2μF;1206≥6.8μF ; 1210≥22μF
		≤20%	0402≥1μF
16V	≤5%	≤10%	0201≥0.01μF;0402≥0.033μF;0603≥0.15μF; 0805≥0.68μF; 1206≥2.2μF; 1210≥4.7μF
		≤15%	0201≥0.01μF; 0402≥0.22μF; 0603>0.68μF;0805≥2.2μF;1206≥4.7μF; 1210≥22μF
10V	≤ 7.5%	≤15%	0201≥0.012μF;0402≥0.33μF(0402/X7R≥0.22μF) ;0603≥0.33μF;0805≥2.2μF;1206≥2.2μF;1210≥22μF
		≤20%	0201≥0.1μF; 0402≥1μF
6.3V	≤ 15%	≤30%	0201≥0.1μF; 0402≥1μF; 0603≥10μF; 0805≥4.7μF; 1206≥47μF; 1210 ≥100μF
4V	≤20%	-	-

REQUIREMENT - CLASS II (X7R, X5R, X6S)

Table 15

MEASUREMENT VOLTAGE	IR
100V: X7R; 1210 \geq 3.3 μ F	1G Ω or RxC \geq 10 Ω -F whichever is smaller
50V: 0402 $>$ 0.01 μ F; 0603 \geq 1 μ F; 0805 \geq 1 μ F; 1206 \geq 4.7 μ F; 1210 \geq 4.7 μ F	
35V: 0603 \geq 1 μ F; 0805 \geq 2.2 μ F; 1210 \geq 10 μ F	
25V: 0201 \geq 0.1 μ F; 0402 \geq 0.22 μ F; 0603 \geq 2.2 μ F; 0805 \geq 2.2 μ F; 1206 \geq 10 μ F; 1210 \geq 10 μ F	
16V: 0201 \geq 0.1 μ F; 0402 \geq 0.22 μ F; 0603 \geq 1 μ F ;0805 \geq 2.2 μ F; 1206 \geq 10 μ F; 1210 \geq 47 μ F	
10V: 0201 \geq 47nF; 0402 \geq 0.47 μ F; 0603 \geq 0.47 μ F; 0805 \geq 2.2 μ F; 1206 \geq 4.7 μ F; 1210 \geq 47 μ F	
6.3V; 4V; All X6S items; Size \geq 1812	

HIGH TEMPERATURE LOAD (ENDURANCE) – Test Condition-100% of Rated Voltage

Table 16

SIZE	DIELECTRIC	RATED VOLTAGE	CAPACITANCE
0201	X5R/X7R/X6S	\leq 10V	C \geq 0.1 μ F
		\geq 16V	C $>$ 0.1 μ F
0402	X5R	\leq 16V	C $>$ 1.0 μ F
		25V,50V	C \geq 1.0 μ F
	X6S	6.3V,10V	C $>$ 1.0 μ F
		16V,25V	C \geq 1.0 μ F
	X7R	6.3V,10V	C \geq 1.0 μ F
0603	X5R/X7R/X6S	4V	C \geq 22 μ F
		6.3V,10V	C \geq 4.7 μ F
	X5R/X6S	25V	C \geq 1.0 μ F
	X7R	35V	C \geq 1.0 μ F
0805	X5R/X7R/X6S	4V	C \geq 47 μ F
		6.3V	C \geq 22 μ F
		10V, 50V	C \geq 10 μ F
	X6S/X7R	16V, 25V	C \geq 10 μ F
	X5R		C \geq 22 μ F
1206	X5R/X7R/X6S	\leq 6.3V	C \geq 47 μ F
1210	X5R/X7R/X6S	16V	C \geq 47 μ F
	X7R	100V	C \geq 3.3 μ F

HIGH TEMPERATURE LOAD (ENDURANCE) – Test Condition-150% of Rated Voltage

Table 17

DIELECTRIC	RATED VOLTAGE	CAPACITANCE	DIELECTRIC
0201	X5R/X6S	16V, 25V	C= 0.1 μ F
	X7R	16V	C \geq 0.022 μ F
0402	X5R/X7R/X6S	50V	C>0.01 μ F
		10-25V	C \geq 0.22 μ F
0603	Y7R	50V	C>0.1 μ F
		25V	C=1.0 μ F
	X5R	50V	C \geq 1.0 μ F
	X5R/X7R/X6S	10V, 16V	C \geq 1.0 μ F
0805	X5R/X7R/X6S	100V	C \geq 0.47 μ F
		50V	C \geq 1.0 μ F
		35V	C \geq 2.2 μ F
		10-25V	C \geq 4.7 μ F
1206	X7R	100V	C \geq 1.0 μ F
		50V	C=4.7 μ F
	X5R/X6S	100V	C>1.0 μ F
		50V	C=4.7 μ F
1210	X5R/X7R/X6S	50-100V	C \geq 2.2 μ F
1825 2220 2225	X7R	100V-250V	C \geq 1.0 μ F

RELIABILITY TEST CONDITIONS AND REQUIREMENTS

ITEM	TEST CONDITION	REQUIREMENTS
Visual and Mechanical	-	* No remarkable defect. * Dimensions to conform to individual spec. sheet.
Capacitance	Class I: (NP0) $\leq 1000\text{pF}$, $1.0 \pm 0.2\text{Vrms}$, $1\text{MHz} \pm 10\%$ $> 1000\text{pF}$, $1.0 \pm 0.2\text{Vrms}$, $1\text{KHz} \pm 10\%$	* Shall not exceed the limits given in the detailed spec.
Q/D.F (Dissipation Factor)	Class II: (X7R, X6S, X5R) $C \leq 10\mu\text{F}$, $1.0 \pm 0.2\text{Vrms}$, $1\text{KHz} \pm 10\%$ ** $C > 10\mu\text{F}$, $0.5 \pm 0.2\text{Vrms}$, $120\text{Hz} \pm 20\%$ ** Test condition: $0.5 \pm 0.2\text{Vrms}$, $1\text{KHz} \pm 10\%$ X7R: 0805=106(6.3V), 0603/475(6.3V) X5R: 0201 ≥ 224 (6.3V,10V,16V)*, 0402 ≥ 475 (6.3V,16V), 0402 ≥ 225 (10V), 0603=106 (6.3V,10V)TT18X ≥ 475 (10V) , TT15X series X6S: 0201/474(4V),0201 ≥ 104 (6.3V,10V)*, 0402 ≥ 225 (6.3V), 0402/475 (10V), 0603/106 (6.3V), * Excluding X5R/0201/105(6.3V); 225(10V), X6S/0201/104(10V) ($1.0 \pm 0.2\text{Vrms}$, $1\text{KHz} \pm 10\%$) * Before initial measurement (Class II only): To apply de-aging at 150°C for 1hr for 24 ± 2 hrs at room temp.	NP0: Cap $\geq 30\text{pF}$, Q ≥ 1000 ; Cap $< 30\text{pF}$, Q $\geq 400+20C$ X7R, See <Table 3> X5R, See <Table 4> X6S: See <Table 5>
Dielectric Strength	* To apply voltage ($\leq 100\text{V}$) 250%. * Duration: 1 to 5 sec. * Charge and discharge current less than 50mA.	* No evidence of damage or flash over during test.
Insulation Resistance	* Preconditioning for Class II MLCC: Perform a heat treatment at $150 \pm 10^\circ\text{C}$ for 1 hour, then leave in ambient condition for 24 ± 2 hours before measurement. To apply rated voltage for max. 120 sec.	Class I: (NP0) $10\text{G}\Omega$ or $RxC \geq 500\Omega\text{-F}$ whichever is smaller. Class II (X7R, X5R, X6S) $10\text{G}\Omega$ or $RxC \geq 500\Omega\text{-F}$ whichever is smaller. See <Table 10>

RELIABILITY TEST CONDITIONS AND REQUIREMENTS

ITEM	TEST CONDITION	REQUIREMENTS
Temperature Coefficient	<p>With no electrical load. @Oprating Temp. Range NP0/X7R: @ -55~125° C; X5R: -55~ 85° C ; X6S: -55~105° C ;</p> <p>* Before initial measurement (Class II only): To apply de-aging at 150° C for 1hr then set for 24±2 hrs at room temp.</p> <ul style="list-style-type: none"> • Measurement voltage for Class II: See <Table 11> 	<p>NP0: Within ±30ppm/° C X7R: Within ±15% X5R: Within ±15% X6S: Within ±22%</p>
Adhesive Strength of Termination	<p>*Pressurizing force: 2N (0201) and 5N (≤0603) and 10N (>0603);</p> <p>* Test time: 10±1 sec.</p>	<p>* No remarkable damage or removal of the terminations.</p>
Vibration Resistance	<p>Vibration frequency: 10~55 Hz/min.</p> <p>* Total amplitude: 1.5mm</p> <p>* Test time: 6 hrs. (Two hrs each in three * mutually perpendicular directions.)</p> <p>* Before initial measurement (Class II only): To apply de-aging at 150° C for 1hr then set for 24±2 hrs at room temp.</p> <p>* Cap./DF(Q) Measurement to be made after de-aging a 150° C for 1hr then set for 24±2 hrs at room temp.</p>	<p>* No remarkable damage or removal of the terminations.</p> <p>* No remarkable damage.</p> <p>* Cap change and Q/D.F.: To meet initial spec.</p>
Bending Test	<p>* The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of about 1 mm per second until the deflection becomes 1 mm and then the pressure shall be maintained for 5±1 sec.</p> <p>*Before initial measurement (Class II only): To apply de-aging at 150° C for 1hr then set for 24±2 hrs at room temp.</p> <p>Measurement to be made after keeping at room temp. for 24±2 hrs.</p>	<p>* No remarkable damage.</p> <p>* Cap change: NP0: within ±5% or 0.5pF whichever is larger X7R, X5R, X6S: within ±12.5%</p> <p>(This capacitance change means the change of capacitance under specified flexure of substrate from the capacitance measured before the test.)</p>

RELIABILITY TEST CONDITIONS AND REQUIREMENTS

ITEM	TEST CONDITION	REQUIREMENTS
Resistance to Soldering Heat	<ul style="list-style-type: none"> * Solder temperature: $260 \pm 5^{\circ} \text{C}$ * Dipping time: $10 \pm 1 \text{ sec}$ * Preheating: $120 \text{ to } 150^{\circ} \text{C}$ for 1 minute before immerse the capacitor in a eutectic solder. * Before initial measurement (Class II only): To apply de-aging at 150°C for 1hr then set for $24 \pm 2 \text{ hrs}$ at room temp. * Cap. / DF(Q) / I.R. Measurement to be made after de-aging at 150°C for 1hr then set for $24 \pm 2 \text{ hrs}$ at room 	<ul style="list-style-type: none"> * No remarkable damage. * Cap change: NP0: within $\pm 2.5\%$ or 0.25pF whichever is larger X7R, X5R, X6S: within $\pm 7.5\%$ * Q/D.F., I.R. and dielectric strength: To meet initial requirements. * 25% max. leaching on each edge.
Temperature Cycle	<ul style="list-style-type: none"> * Conduct the five cycles according to the temperatures and time. Time (min.): $30 \pm 3 @ \text{Min. operating temp. } +0/-3^{\circ} \text{C}$ Time (min.): $2 \sim 3 @ \text{Room temperture}$ Time (min.): $30 \pm 3 @ \text{Max. operating temp. } +3/-0^{\circ} \text{C}$ Time (min.): $2 \sim 3 @ \text{Room temperture}$ * Before initial measurement (Class II only): Perform $150+0/-10^{\circ} \text{C}$ for 1 hr and then set for $24 \pm 2 \text{ hrs}$ at room temp. * Cap. / DF(Q) / I.R. Measurement to be made after de-aging at 150°C for 1hr then set for $24 \pm 2 \text{ hrs}$ at room. 	<ul style="list-style-type: none"> * No remarkable damage. * Cap change: NP0: within $\pm 2.5\%$ or 0.25pF whichever is larger X7R, X5R, X6S: within $\pm 7.5\%$ * Q/D.F., I.R. and dielectric strength: To meet initial requirements.
Solder ability	<ul style="list-style-type: none"> * Solder temperature: $235 \pm 5^{\circ} \text{C}$ * Dipping time: $2 \pm 0.5 \text{ sec}$. 	<ul style="list-style-type: none"> 95% min. coverage of all metalized area

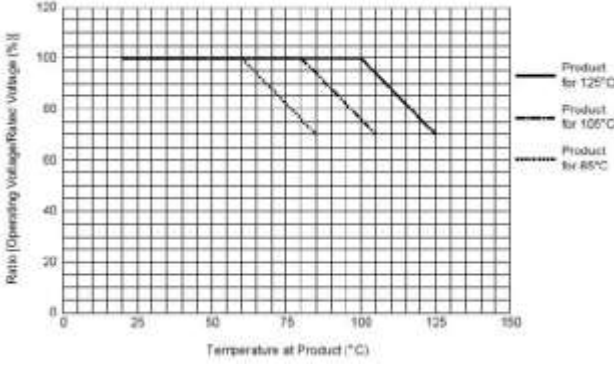
RELIABILITY TEST CONDITIONS AND REQUIREMENTS

ITEM	TEST CONDITION	REQUIREMENTS
Humidity (Damp Heat) Steady State	<ul style="list-style-type: none"> * Test temp.: $40 \pm 2^{\circ}$ C * Humidity: 90~95% RH * Test time: 500+24/-0hrs. • Before initial measurement (Class II only): Perform $150+0/-10^{\circ}$ C for 1 hr and then set for 24 ± 2 hrs at room temp. * Cap. / DF(Q) / I.R. Measurement to be made after de-aging at 150° C for 1hr then set for 24 ± 2 hrs at room temp. 	<ul style="list-style-type: none"> * No remarkable damage. * Cap change: NP0: within $\pm 5\%$ or 0.5pF whichever is larger X7R, X5R, X6S: $\geq 10V^{**}$, within $\pm 12.5\%$; 6.3V within $\pm 25\%$; ** 10V: 0603 $\geq 4.7\mu F$; 0402 $\geq 1\mu F$; 0201 $\geq 0.1\mu F$, within $\pm 25\%$; * Q/D.F. value: NP0: More than 30pF $Q \geq 350$, $10pF \leq C \leq 30pF$, $Q \geq 275+2.5C$ Less than 10pF $Q \geq 200+10C$ X7R, X5R, X6S: See <Table 12> *I.R.: $\geq 10V$, 1GΩ or 50 Ω-F whichever is smaller. Class II (X7R, X5R, X6S) See <Table 15>

RELIABILITY TEST CONDITIONS AND REQUIREMENTS

ITEM	TEST CONDITION	REQUIREMENTS
Humidity (Damp Heat) Load	<ul style="list-style-type: none"> *Test temp.: $40 \pm 2^\circ \text{C}$ * Humidity: 90~95%RH * Test time: 500+24/-0 hrs. * To apply voltage: rated voltage. * Before initial measurement (Class II only): To apply de-aging at 150°C for 1hr then set for 24 ± 2 hrs at room temp. * Cap. / DF(Q) / I.R. Measurement to be made after de-aging at 150°C for 1hr. then set for 24 ± 2 hrs at room temp 	<ul style="list-style-type: none"> * No remarkable damage. Cap change: NP0: $\pm 7.5\%$ or 0.75pF whichever is larger. X7R, X5R, X6S: $\geq 10\text{V}^{**}$, within $\pm 12.5\%$; $\leq 6.3\text{V}$ within $\pm 25\%$; **10V: 0603 $4.7 \geq \mu\text{F}$; 0402 $\geq 1\mu\text{F}$; 0201 $\geq 0.1 \mu\text{F}$, within $\pm 25\%$; value: NP0: $C \geq 30\text{pF}$, $Q \geq 200$; $C < 30\text{pF}$, $Q \geq 100 + 10/3C$ X7R, X5R, X6S: See <Table 13> * I.R.: $\geq 10\text{V}$, $500\text{M}\Omega$ or $25 \Omega\text{-F}$ whichever is smaller. Class II (X7R, X5R, X6S) See Table 15

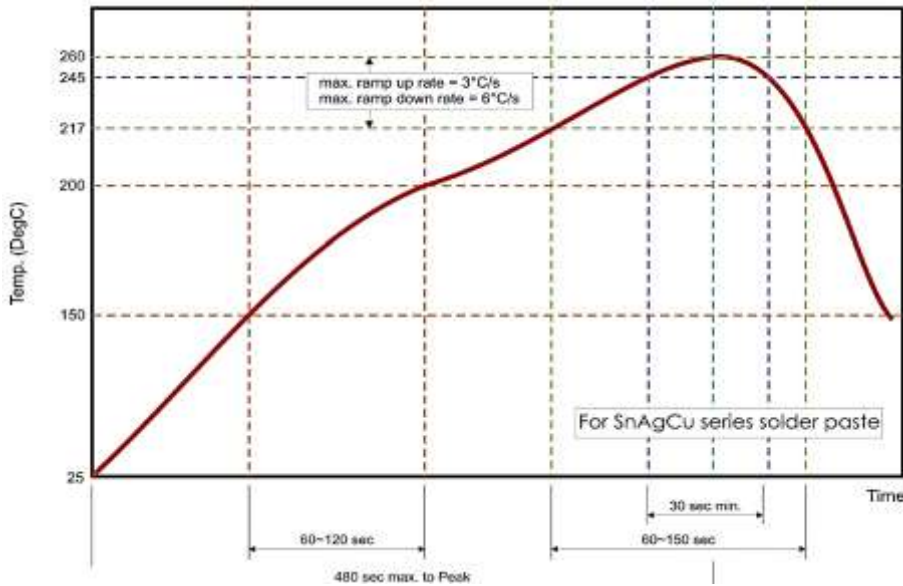
RELIABILITY TEST CONDITIONS AND REQUIREMENTS

ITEM	TEST CONDITION	REQUIREMENTS
<p>High Temperature Load (Endurance)</p>	<p>* Test temp.: NP0, X7R: $125 \pm 3^\circ \text{C}$ X6S: $105 \pm 3^\circ \text{C}$ X5R: $85 \pm 3^\circ \text{C}$</p> <p>* Test time: 1000+24/-0 hrs.</p> <p>* To apply voltage:</p> <p>(1) $\leq 6.3\text{V}$ or $\text{C } 10 \geq \mu\text{F}$: 150% of rated voltage. (2) $10\text{V} \leq \text{Ur} < 500\text{V}$: 200% of rated voltage. (3) 500V: 150% of rated voltage. (4) $\text{Ur} \geq 630\text{V}$: 120% of rated voltage. (5) 100% of rated voltage for below range <i>See Table 16</i></p> <p>(6) 150% of rated voltage for below range. <i>See Table 17</i></p> <p>* Before initial measurement (Class II only): To apply de-aging at 150°C for 1hr then set for 24 ± 2 hrs at room temp.</p> <p>* Cap. / DF(Q) / I.R. Measurement to be made after de-aging at 150°C for 1hr then set for 24 ± 2 hrs at room temp.</p> <p>** De-rating conditions:</p> 	<p>* No remarkable damage. Cap change:</p> <p>NP0: $\pm 3.0\%$ or $\pm 0.3\text{pF}$ whichever is larger</p> <p>X7R, X5R, X6S: $\geq 10\text{V}^{**}$, within $\pm 12.5\%$; $\leq 6.3\text{V}$ within $\pm 25\%$;</p> <p>** 10V: 0603 $\geq 4.7\mu\text{F}$; 0402 $\geq 1\mu\text{F}$; 0201 $\geq 0.1\mu\text{F}$, within $\pm 25\%$;</p> <p>Q/D.F. value:</p> <p>NP0: More than 30pF, $Q \geq 350$ $10\text{pF} \leq \text{C} < 30\text{pF}$, $Q \geq 275 + 2.5\text{C}$ Less than 10pF, $Q \geq 200 + 10\text{C}$ X7R, X5R, X7R, X5R, X6S: <i>See <Table 14></i></p> <p>*I.R.: $\geq 10\text{V}$, 1GΩ or 50Ω-F whichever is smaller. Class II (X7R, X5R, X6S) <i>See <Table 15></i></p>

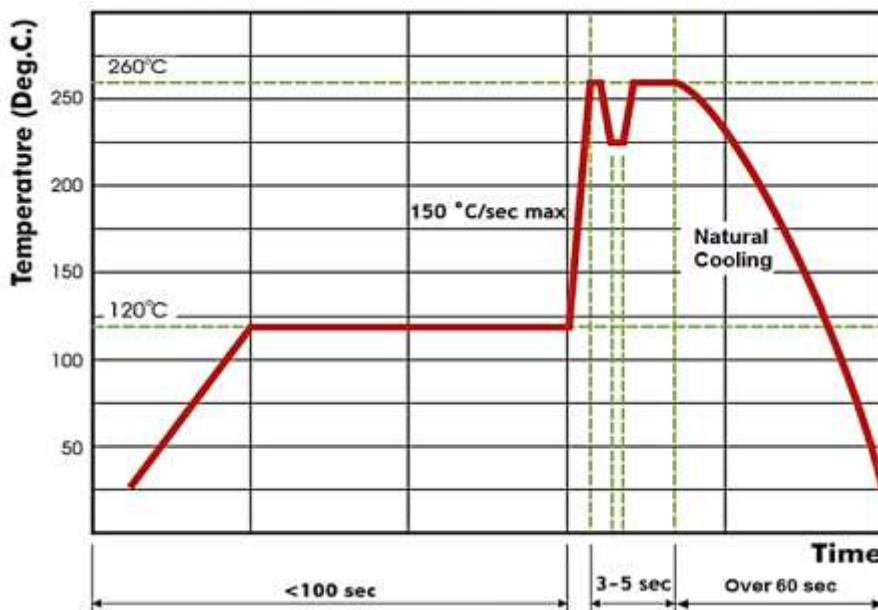
RECOMMENDED PROFILE CONDITIONS

The lead-free termination MLCCs are not only to be used on SMT against lead-free solder paste, but also suitable against lead-containing solder paste.

If the optimized solder joint is requested, increasing soldering time, temperature and concentration of N₂ within oven are recommended.



Reflow Soldering Profile For SMT Process with SnAgCu series Solder Paste



Wave Soldering Profile For SMT Process with SnAgCu series Solder Paste

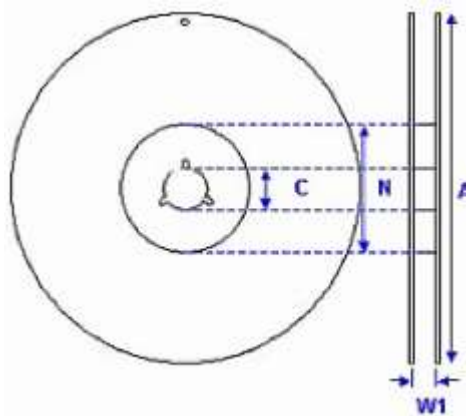
PACKAGING STYLE AND QUANTITY

SIZE	THICKNESS (SYMBOL) (MM)		PAPER TAPE		PLASTIC TAPE	
			7" REEL	13" REEL	7" REEL	13" REEL
0201 (0603)	0.30±0.03	L	15,000	70,000	-	-
	0.30±0.05	L	15,000	-	-	-
	0.30±0.09	L	15,000	-	-	-
0402 (1005)	0.50±0.20	N	10,000	50,000	-	-
	0.50±0.20/-0.10	E	10,000	50,000	-	-
	0.50±0.05	H	10,000	-	-	-
0603 (1608)	0.50±0.10	N	4,000	-	-	-
	0.80±0.07	S	4,000	15,000	-	-
	0.80±0.20	X	4,000	15,000	-	-
0805 (2012)	0.50±0.20	N	4,000	15,000	-	-
	0.60±0.10	A	4,000	15,000	-	-
	0.85±0.15	B	4,000	15,000	-	-
	0.85±0.10	T	4,000	15,000	-	-
	1.25±0.15	C	-	-	3,000	10,000
1206 (3216)	0.85±0.15	B	4,000	15,000	-	-
	0.85±0.10	T	4,000	15,000	-	-
	0.95±0.10	I	-	-	3,000	10,000
	1.15±0.15	J	-	-	3,000	10,000
	1.25±0.15	C	-	-	3,000	10,000
	1.60±0.15	D	-	-	2,000	10,000
	1.60+0.30/-0.10	P	-	-	2,000	9,000
1210 (3225)	0.85±0.10	T	-	-	3,000	10,000
	0.95±0.10	I	-	-	3,000	10,000
	1.25±0.15	C	-	-	3,000	10,000
	1.60±0.15	D	-	-	2,000	
	2.00±0.20	K	-	-	1,000	6,000
	2.50±0.30	M	-	-	1,000	6,000

PACKAGING STYLE AND QUANTITY

SIZE	THICKNESS (SYMBOL) (MM)		PAPER TAPE		PLASTIC TAPE	
			7" REEL	13" REEL	7" REEL	13" REEL
1808 (4520)	1.25±0.15	C	-	-	2,000	10,000
	1.10±0.15	F	-	-	2,000	10,000
	1.60±0.15	D	-	-	2,000	8,000
	2.00±0.20	K	-	-	1,000	6,000
1812 (4532)	1.25±0.15	C	-	-	1,000	5,000
	1.60±0.15	D	-	-	1,000	-
	2.00±0.20	K	-	-	1,000	-
	2.50±0.30	M	-	-	500	3,000
	2.80±0.30	U	-	-	500	-

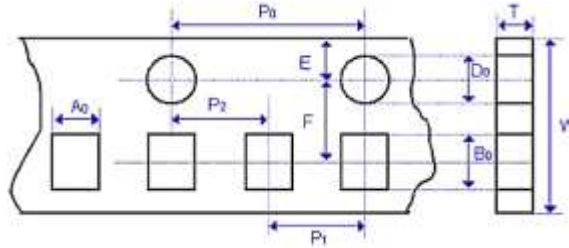
REEL DIMENSION (Unit: mm)



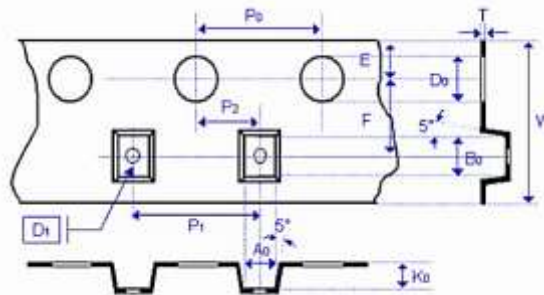
SIZE CODE	0201, 0402, 0603, 0805, 1206, 1210			1812
Reel Size	7"	10"	13"	7"
C	13.0+0.5/-0.2	13.0+0.5/-0.2	13.0+0.5/-0.2	13.0+0.5/-0.2
W 1	8.4+1.5/0	8.4+1.5/-0	8.4+1.5/-0	12.4+2.0/-0
A	178.0±0.10	250.0±1.0	330.0±1.0	178.0±0.10
N	60.0+1.0/-0	100.0±1.0	100±1.0	60.0+1.0/-0

TAPE DIMENSION (Unit: mm)

Paper Tape



Plastic Tape



SIZE	0201	0402	0603	0805		
Thickness	L	H	H, S, B, X	A, H	B, X	C
A0	0.40 +/-0.10	0.70 +/-0.20	1.05 +/-0.30	1.5+/-0.20	1.5 +/-0.20	< 1.80
B0	0.70 +/-0.10	1.20 +/-0.20	1.80 +/-0.30	2.30 +/-0.20	2.30 +/-0.20	< 2.70
T	≤0.55	≤0.80	≤1.20	≤1.15	≤1.20	0.23 +/-0.1
K0	-	-	-	-	-	< 2.50
W	8.00 +/-0.30	8.00 +/-0.30	8.00 +/-0.30	8.00 +/-0.30	8.00 +/-0.30	8.00 +/-0.30
P0	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10
10xP0	40.0 +/-0.10	40.0 +/-0.10	40.0 +/-0.20	40.0 +/-0.20	40.0 +/-0.20	40.0 +/-0.20
P1	2.00 +/-0.05	2.00 +/-0.05	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10
P2	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05
D0	1.50 +0.1/-0	1.50 +0.1/-0	1.50 +0.1/-0	1.50 +0.1/-0	1.50 +0.1/-0	1.50 +0.1/-0
D1	-	-	-	-	-	1.00 +/-0.10
E	1.75 +/-0.10	1.75 +/-0.10	1.75 +/-0.10	1.75 +/-0.10	1.75 +/-0.10	1.75 +/-0.10
F	3.50 +/-0.05	3.50 +/-0.05	3.50 +/-0.05	3.50 +/-0.05	3.50 +/-0.05	3.50 +/-0.05

TAPE DIMENSION (Unit: mm)

SIZE	1206			1210		
Thickness	B	I, C, J	D, P	B	I, C, D, K	M
A0	1.90 +/-0.50	< 2.00	< 2.30	< 3.05	< 3.05	< 3.20
B0	3.50 +/-0.50	< 3.70	< 4.00	< 3.80	< 3.80	< 4.00
T	≤1.20	0.23 +/-0.1	0.23 +/-0.1	0.23 +/-0.1	0.23 +/-0.1	0.23 +/-0.1
K0	-	< 2.50	< 2.50	< 1.50	< 2.50	< 3.20
W	8.00 +/-0.30	8.00 +/-0.30	8.00 +/-0.30	8.00 +/-0.30	8.00 +/-0.30	8.00 +/-0.30
P0	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10
10xP0	40.0 +/-0.20	40.0 +/-0.20	40.0 +/-0.20	40.0 +/-0.20	40.0 +/-0.20	40.0 +/-0.20
P1	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10
P2	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05
D0	1.50 +0.1/-0	1.50 +0.1/-0	1.50 +0.1/-0	1.50 +0.1/-0	1.50 +0.1/-0	1.50 +0.1/-0
D1	-	1.00 +/-0.10	1.00 +/-0.10	1.00 +/-0.10	1.00 +/-0.10	1.00 +/-0.10
E	1.75 +/-0.10	1.75 +/-0.10	1.75 +/-0.10	1.75 +/-0.10	1.75 +/-0.10	1.75 +/-0.10
F	3.50 +/-0.05	3.50 +/-0.05	3.50 +/-0.05	3.50 +/-0.05	3.50 +/-0.05	3.50 +/-0.05

SIZE	1812	
Thickness	C, D, K	M
A0	< 3.90	< 3.90
B0	< 5.30	< 5.30
T	0.25 +/-0.1	0.25 +/-0.1
K0	< 2.50	< 3.50
W	12.00 +/-0.30	12.00 +/-0.30
P0	4.00 +/-0.10	4.00 +/-0.10
10xP0	40.0 +/-0.20	40.0 +/-0.20
P1	8.00 +/-0.10	8.00 +/-0.10
P2	2.00 +/-0.10	2.00 +/-0.10
D0	1.50 +0.1/-0	1.50 +0.1/-0
D1	1.50 +/-0.10	1.50 +/-0.10
E	1.75 +/-0.10	1.75 +/-0.10
F	5.50 +/-0.10	5.50 +/-0.10

STORAGE AND HANDLING CONDITIONS

- To store products at 5 to 40°C ambient temperature and 20 to 70% related humidity conditions.
- The product is recommended to be used within one year after shipment. Check solder ability in case of shelf life extension is needed.
- Don't open the tape until the parts are to be used, use the chips within 3 months after the tape is opened.
- For product of high dielectric constant (Class2&3, characteristics B/W & Y), the Electro static capacity changes with the passage of time due to the inherent characteristics of ceramic dielectric materials. The changed capacity reverts to nominal at the temperature it reaches during the soldering process.

CAUTIONS

- The corrosive gas reacts on the terminal electrodes of capacitors, and results in the poor solder ability. Do not store the capacitors in the ambience of corrosive gas (e.g., hydrogen sulfide, sulfur dioxide, chlorine, ammonia gas etc.)
- In corrosive atmosphere, solder ability might be degraded, and silver migration might occur to cause low reliability.
- Due to the dewing by rapid humidity change, or the photochemical change of the terminal electrode by direct sun light, the solder ability and electrical performance may deteriorate. Do not store capacitors under direct sunlight or dewing condition. To store products on the shelf and avoid exposure to moisture.

ROHS COMPLIANCE

- The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU RoHS Directive (EU) 2015/863 EC (RoHS3). RoHS Test Report for this product can be obtained can be obtained at Download Center.

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2. **REACH COMPLIANCE:** REACH substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, REACH Test Report for this product can be obtained at Download Center.
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