

ALTERNATION HISTORY RECORDS 变更记录

Date 日期	Version 版本	Mark 标记	Page 页码	Description 描述	Drafter 制定者	Approver 审批者
2021-07-01	B	/	25	Reissue	Doris	Emily

1. 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.

MT series MLCC is made by NP0,X7R dielectrics and which provides product with high electrical precision, stability and reliability. Besides, MT series MLCC is tighten controlling in quality in line to assure quality performance in automotive applications.

2. FEATURES

- A wide selection of sizes is available (0201 to 0805).
- High capacitance in given case size.
- Capacitor with lead-free termination (pure Tin).
- The MT series meet AEC-Q200 requirement.

3. APPLICATIONS

- For Navigation & Information equipments.
- For entertainment equipments
- For comfortable equipments.
- For Automotive electronic equipment.

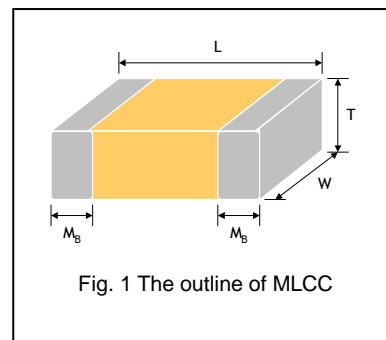
4. HOW TO ORDER

MT	1206	B	102	K	102	K	A
Size	03	Dielectric	Capacitance	Tolerance	Termination	Termination	Packaging
MT=	Inch(mm)	N:NPO	Two significant	B =±0.1pF	100=10 VDC	N : 0.50±0.05mm	A=1kpcs/ reel
Automotive	0201 (0603)	B:X7R	digits followed by	C =±0.25pF	160=16 VDC	A : 0.60±0.10mm	B=2kpcs/ ree
safe concern	0402 (1005)		no. of zeros. And	D =±0.5pF	250=25 VDC	S : 0.80 ±0.07mm	C=3kpcs/ reel
(with	0603 (1608)		R is in place of	F =±1%	500=50 VDC	B :0.80±0.1mm	D=4kpcs/ reel
AEC-Q200	0805 (2012)		decimal point.	G =±2%	101=100 VDC	D : 1.25±0.20mm	l=10kpcs/ reel
qualification)	1206(3216)		eg.:	J =±5%	201=200 VDC	G : 1.60±0.20mm	
	1210(3225)		R47=0.47pF	K =±10%	251=250 VDC	K : 2.00±0.20mm	
			0R5=0.5pF	M =±20%	501=500 VDC	M : 2.50±0.30mm	
			1R0=1.0pF		631=630 VDC	U : 2.80±0.30mm	
			100=10x10 ₀		102=1000 VDC		
			=10pF				

5. EXTERNAL DIMENSIONS

Size Inch (mm)	L (mm)	W (mm)	T (mm)/Symbol	Remark	M _B (mm)
0201 (0603)	0.60±0.03	0.30±0.03	0.30±0.03	L #	0.15±0.05
0402 (1005)	1.00±0.05	0.50±0.05	0.50±0.05	N #	0.25 +0.05/-0.10
0603 (1608)	1.60±0.10	0.80±0.10	0.80±0.07	S	0.40±0.15
	1.60 +0.15/-0.10	0.80 +0.15/-0.10	0.80 +0.15/-0.10	X	
0805 (2012)	2.00±0.15	1.25±0.10	0.60±0.10	A	0.50±0.20
			0.80±0.10	B	
	1.25±0.10	D #			
	2.00±0.20	1.25±0.20	1.25±0.20	I #	
1206 (3216)	3.20±0.15	1.60±0.15	0.80±0.10	B	0.60±0.20
			0.95±0.10	C	
			1.25±0.10	D #	
	3.20±0.20	1.60±0.20	1.60±0.20	G #	
	3.20±0.3/-0.1	1.60±0.3/-0.1	1.60±0.30/-0.10	P #	
1210 (3225)	3.20±0.30	2.50±0.20	0.95±0.10	C #	0.75±0.25
			1.25±0.10	D #	
	3.20±0.40	2.50±0.30	1.60±0.20	G #	
			2.00±0.20	K #	
			2.50±0.30	M #	

Reflow soldering only is recommended.



6. GENERAL ELECTRICAL DATA

Dielectric		X7R
Size	0201, 0402, 0603, 0805, 1206, 1210	0402, 0603, 0805, 1206
Capacitance range*	0.1pF to 0.047uF	100pF to 2.2μF
Capacitance tolerance**	Cap 5pF<Cap<10pF: B (±0.1pF), C (±0.25pF), D (±0.5pF) Cap≥	J (±5%), K (±10%), M (±20%)
Rated voltage (WVDC)	10V, 16V, 25V, 50V, 100V, 200V, 250, 500, 630, 1000	
Operating temperature	-55 to +125°C	
Capacitance characteristic	±30ppm/°C	±15%
Termination	Ni/Sn (lead-free termination)	

#1: NP0, 0.1pF product only provide B tolerance.

* Measured at the condition of 30~70% related humidity.

NP0: 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
Measured at 1.0±0.2Vrms, 1.0kHz±10% for C≤10μF; 0.5±0.2Vrms, 120Hz±20% for C>10μF, 30~70% related humidity, 25°C ambient temperature for X7R.

** Preconditioning for Class II MLCC: Perform a heat treatment at 150±10°C for 1 hour, then leave in a mbient condition for 24±2 hours before measurement.

7. CAPACITANCE RANGE

NP0 Dielectric

DIELECTRIC		NP0																
SIZE		0201					0402					0603						
RATED VOLTAGE		10	16	25	50	100	10	16	25	50	100	10	16	25	50	100	200	250
0.1pF (0R1)		L	L	L	L	L	N	N	N	N	N							
0.2pF (0R2)		L	L	L	L	L	N	N	N	N	N							
0.3pF (0R3)		L	L	L	L	L	N	N	N	N	N							
0.4pF (0R4)		L	L	L	L	L	N	N	N	N	N							
0.5pF (0R5)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
0.6pF (0R6)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
0.7pF (0R7)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
0.8pF (0R8)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
0.9pF (0R9)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
1.0pF (1R0)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
1.2pF (1R2)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
1.5pF (1R5)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
1.8pF (1R8)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
2.0pF (2R0)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
2.2pF (2R2)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
2.7pF (2R7)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
3.0pF (3R0)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
3.3pF (3R3)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
3.9pF (3R9)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
4.0pF (4R0)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
4.7pF (4R7)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
5.0pF (5R0)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
5.6pF (5R6)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
6.0pF (6R0)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
6.8pF (6R8)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
7.0pF (7R0)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
8.0pF (8R0)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
8.2pF (8R2)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
9.0pF (9R0)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
10pF (100)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
12pF (120)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
15pF (150)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
18pF (180)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
22pF (220)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
27pF (270)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
33pF (330)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
39pF (390)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
47pF (470)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
56pF (560)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
68pF (680)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
82pF (820)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
100pF (101)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
120pF (121)		L	L	L	L	L	N	N	N	N	N	S	S	S	S	S	S	S
150pF (151)							N	N	N	N	N	S	S	S	S	S	S	S
180pF (181)							N	N	N	N	N	S	S	S	S	S	S	S
220pF (221)							N	N	N	N	N	S	S	S	S	S	S	S
270pF (271)							N	N	N	N	N	S	S	S	S	S	X	X
330pF (331)							N	N	N	N	N	S	S	S	S	S	X	X
390pF (391)							N	N	N	N	N	S	S	S	S	S	X	X
470pF (471)							N	N	N	N	N	S	S	S	S	S	X	X
560pF (561)							N	N	N	N	N	S	S	S	S	S		
680pF (681)							N	N	N	N	N	S	S	S	S	S		
820pF (821)							N	N	N	N	N	S	S	S	S	S		
1,000pF (102)							N	N	N	N	N	S	S	S	S	S		
1,200pF (122)												X	X	X	X			
1,500pF (152)												X	X	X	X			
1,800pF (182)												X	X	X	X			
2,200pF (222)												X	X	X	X			
2,700pF (272)												X	X	X	X			
3,300pF (332)												X	X	X	X			
3,900pF (392)																		
4,700pF (472)																		
5,600pF (562)																		
6,800pF (682)																		
8,200pF (822)																		
0.01μF (103)																		

* NP0, 0.1pF product only provide B tolerance.

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

2. For more information about products with special capacitance or other data, please contact WTC local representative.

NP0 Dielectric

DIELECTRIC		NP0								
SIZE		0805								
RATED VOLTAGE		10	16	25	50	100	200	250	500	630
Capacitance	0.5pF (0R5)	A	A	A	A	A	A	A	A	A
	0.6pF (0R6)	A	A	A	A	A	A	A	A	A
	0.7pF (0R7)	A	A	A	A	A	A	A	A	A
	0.8pF (0R8)	A	A	A	A	A	A	A	A	A
	0.9pF (0R9)	A	A	A	A	A	A	A	A	A
	1.0pF (1R0)	A	A	A	A	A	A	A	A	A
	1.2pF (1R2)	A	A	A	A	A	A	A	A	A
	1.5pF (1R5)	A	A	A	A	A	A	A	A	A
	1.8pF (1R8)	A	A	A	A	A	A	A	A	A
	2.2pF (2R2)	A	A	A	A	A	A	A	A	A
	2.7pF (2R7)	A	A	A	A	A	A	A	A	A
	3.3pF (3R3)	A	A	A	A	A	A	A	A	A
	3.9pF (3R9)	A	A	A	A	A	A	A	A	A
	4.7pF (4R7)	A	A	A	A	A	A	A	A	A
	5.6pF (5R6)	A	A	A	A	A	A	A	A	A
	6.8pF (6R8)	A	A	A	A	A	A	A	A	A
	8.2pF (8R2)	A	A	A	A	A	A	A	A	A
	10pF (100)	A	A	A	A	A	A	A	A	A
	12pF (120)	A	A	A	A	A	A	A	A	A
	15pF (150)	A	A	A	A	A	A	A	A	A
	18pF (180)	A	A	A	A	A	A	A	A	A
	22pF (220)	A	A	A	A	A	A	A	A	A
	27pF (270)	A	A	A	A	A	A	A	A	A
	33pF (330)	A	A	A	A	A	A	A	A	A
	39pF (390)	A	A	A	A	A	A	A	A	A
	47pF (470)	A	A	A	A	A	A	A	A	A
	56pF (560)	A	A	A	A	A	A	A	A	A
	68pF (680)	A	A	A	A	A	A	A	A	A
	82pF (820)	A	A	A	A	A	A	A	B	B
	100pF (101)	A	A	A	A	A	B	B	B	B
	120pF (121)	A	A	A	A	A	B	B	D	D
	150pF (151)	A	A	A	A	A	D	D	D	D
	180pF (181)	A	A	A	A	A	D	D	D	D
	220pF (221)	A	A	A	A	A	D	D	D	D
	270pF (271)	A	A	A	A	A	D	D	D	D
	330pF (331)	A	A	A	A	A	D	D	D	D
	390pF (391)	B	B	A	A	A	D	D	D	D
	470pF (471)	B	B	B	B	B	D	D	I	I
	560pF (561)	B	B	B	B	B	D	D	I	I
	680pF (681)	B	B	B	B	B	D	D	I	I
820pF (821)	B	B	B	B	B	D	D	I	I	
1,000pF (102)	B	B	B	B	B	D	D	I	I	
1,200pF (122)	B	B	B	B	B	D	D			
1,500pF (152)	B	B	B	B	B	D	D			
1,800pF (182)	B	B	B	B	B	D	D			
2,200pF (222)	B	B	B	B	B	D	D			
2,700pF (272)	D	D	D	D	D					
3,300pF (332)	D	D	D	D	D					
3,900pF (392)	D	D	D	D	D					
4,700pF (472)	D	D	D	D	D					
5,600pF (562)	D	D	D	D	D					
6,800pF (682)	D	D	D	D	D					
8,200pF (822)	D	D	D	D	D					
0.01μF (103)	D	D	D	D	D					

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

2. For more information about products with special capacitance or other data, please contact WTC local representative.

NP0 Dielectric

DIELECTRIC		NP0									
SIZE		1206									
RATED VOLTAGE		10	16	25	50	100	200	250	500	630	1000
Capacitance	1.0pF (1R0)										
	1.2pF (1R2)	B	B	B	B	B	B	B	B	B	
	1.5pF (1R5)	B	B	B	B	B	B	B	B	B	B
	1.8pF (1R8)	B	B	B	B	B	B	B	B	B	B
	2.2pF (2R2)	B	B	B	B	B	B	B	B	B	B
	2.7pF (2R7)	B	B	B	B	B	B	B	B	B	B
	3.3pF (3R3)	B	B	B	B	B	B	B	B	B	B
	3.9pF (3R9)	B	B	B	B	B	B	B	B	B	B
	4.7pF (4R7)	B	B	B	B	B	B	B	B	B	B
	5.6pF (5R6)	B	B	B	B	B	B	B	B	B	B
	6.8pF (6R8)	B	B	B	B	B	B	B	B	B	B
	8.2pF (8R2)	B	B	B	B	B	B	B	B	B	B
	10pF (100)	B	B	B	B	B	B	B	B	B	B
	12pF (120)	B	B	B	B	B	B	B	B	B	B
	15pF (150)	B	B	B	B	B	B	B	B	B	B
	18pF (180)	B	B	B	B	B	B	B	B	B	B
	22pF (220)	B	B	B	B	B	B	B	B	B	D
	27pF (270)	B	B	B	B	B	B	B	B	B	D
	33pF (330)	B	B	B	B	B	B	B	B	B	D
	39pF (390)	B	B	B	B	B	B	B	B	B	D
	47pF (470)	B	B	B	B	B	B	B	B	B	D
	56pF (560)	B	B	B	B	B	B	B	B	B	D
	68pF (680)	B	B	B	B	B	B	B	B	B	D
	82pF (820)	B	B	B	B	B	B	B	B	B	D
	100pF (101)	B	B	B	B	B	B	B	B	B	D
	120pF (121)	B	B	B	B	B	B	B	B	B	D
	150pF (151)	B	B	B	B	B	B	B	B	B	D
	180pF (181)	B	B	B	B	B	B	B	B	B	G
	220pF (221)	B	B	B	B	B	B	B	B	B	G
	270pF (271)	B	B	B	B	B	B	C	C	C	G
	330pF (331)	B	B	B	B	B	B	C	C	C	G
	390pF (391)	B	B	B	B	B	B	C	C	C	G
	470pF (471)	B	B	B	B	B	C	C	C	C	G
	560pF (561)	B	B	B	B	B	C	D	D	D	G
680pF (681)	B	B	B	B	B	C	D	D	D	G	
820pF (821)	B	B	B	B	B	C	G	G	G	G	
1,000pF (102)	B	B	B	B	B	C	G	G	G	G	
1,200pF (122)	B	B	B	B	B	C	G	G	G		
1,500pF (152)	B	B	B	B	B	D	G	G	G		
1,800pF (182)	B	B	B	B	B	D	G	G	G		
2,200pF (222)	B	B	B	B	B	D	G	G	G		
2,700pF (272)	B	B	B	B	B	D	G	G	G		
3,300pF (332)	B	B	B	B	B	D	G	G	G		
3,900pF (392)	B	B	B	B	B	D	G	G	G		
4,700pF (472)	B	B	B	B	B	D	G	G	G		
5,600pF (562)	B	B	B	B	B						
6,800pF (682)	C	C	C	C	C						
8,200pF (822)	D	D	D	D	D						
0.01μF (103)	D	D	D	D	D						

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

2. For more information about products with special capacitance or other data, please contact WTC local representative.

NP0 Dielectric

DIELECTRIC		NP0									
SIZE		1210									
RATED VOLTAGE		10	16	25	50	100	200	250	500	630	1000
Capacitance	10pF (100)	C	C	C	C	C	C	C	C	C	C
	12pF (120)	C	C	C	C	C	C	C	C	C	C
	15pF (150)	C	C	C	C	C	C	C	C	C	C
	18pF (180)	C	C	C	C	C	C	C	C	C	C
	22pF (220)	C	C	C	C	C	C	C	C	C	C
	27pF (270)	C	C	C	C	C	C	C	C	C	C
	33pF (330)	C	C	C	C	C	C	C	C	C	C
	39pF (390)	C	C	C	C	C	C	C	C	C	C
	47pF (470)	C	C	C	C	C	C	C	C	C	C
	56pF (560)	C	C	C	C	C	C	C	C	C	C
	68pF (680)	C	C	C	C	C	C	C	C	C	C
	82pF (820)	C	C	C	C	C	C	C	C	C	C
	100pF (101)	C	C	C	C	C	C	C	C	C	D
	120pF (121)	C	C	C	C	C	C	C	C	C	D
	150pF (151)	C	C	C	C	C	C	C	C	C	D
	180pF (181)	C	C	C	C	C	C	C	C	C	D
	220pF (221)	C	C	C	C	C	C	C	C	C	G
	270pF (271)	C	C	C	C	C	C	C	C	C	G
	330pF (331)	C	C	C	C	C	C	C	C	C	G
	390pF (391)	C	C	C	C	C	C	C	C	C	G
	470pF (471)	C	C	C	C	C	C	C	C	C	G
	560pF (561)	C	C	C	C	C	C	C	C	C	G
	680pF (681)	C	C	C	C	C	C	C	C	C	G
	820pF (821)	C	C	C	C	C	C	C	C	C	G
	1,000pF (102)	C	C	C	C	C	D	D	D	D	G
	1,200pF (122)	C	C	C	C	C	D	D	D	D	
	1,500pF (152)	C	C	C	C	C	D	D	D	D	
	1,800pF (182)	C	C	C	C	C	D	D	D	D	
	2,200pF (222)	C	C	C	C	C	D	D	D	D	
	2,700pF (272)	C	C	C	C	C	D	D	D	D	
	3,300pF (332)	C	C	C	C	C	D	D	D	D	
	3,900pF (392)	C	C	C	C	C	D	D	D	D	
	4,700pF (472)	C	C	C	C	C	G	G			
	5,600pF (562)	C	C	C	C	C	G	G			
	6,800pF (682)	C	C	C	C	C	G	G			
	8,200pF (822)	C	C	C	C	C	G	G			
	0.010μF (103)	C	C	C	C	C	G	G			
	0.012μF (123)	D	D	D	D	D					
	0.015μF (153)	D	D	D	D	D					
	0.018μF (183)	K	K	K	K	K					
0.022μF (223)	K	K	K	K	K						
0.027μF (273)	K	K	K	K	K						
0.033μF (333)	K	K	K	K	K						
0.039μF (393)	K	K	K	K	K						
0.047μF (473)	K	K	K	K	K						

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

2. For more information about products with special capacitance or other data, please contact WTC local representative.

X7R Dielectric

DIELECTRIC		X7R												
SIZE		0201				0402				0603				
RATED VOLTAGE		10	16	25	50	10	16	25	50	10	16	25	50	100
Capacitance	100pF (101)	L	L	L	L	N	N	N	N	S	S	S	S	S
	120pF (121)	L	L	L	L	N	N	N	N	S	S	S	S	S
	150pF (151)	L	L	L	L	N	N	N	N	S	S	S	S	S
	180pF (181)	L	L	L	L	N	N	N	N	S	S	S	S	S
	220pF (221)	L	L	L	L	N	N	N	N	S	S	S	S	S
	270pF (271)	L	L	L	L	N	N	N	N	S	S	S	S	S
	330pF (331)	L	L	L	L	N	N	N	N	S	S	S	S	S
	390pF (391)	L	L	L	L	N	N	N	N	S	S	S	S	S
	470pF (471)	L	L	L	L	N	N	N	N	S	S	S	S	S
	560pF (561)	L	L	L	L	N	N	N	N	S	S	S	S	S
	680pF (681)	L	L	L	L	N	N	N	N	S	S	S	S	S
	820pF (821)	L	L	L	L	N	N	N	N	S	S	S	S	S
	1,000pF (102)	L	L	L	L	N	N	N	N	S	S	S	S	S
	1,200pF (122)	L	L	L		N	N	N	N	S	S	S	S	S
	1,500pF (152)	L	L	L		N	N	N	N	S	S	S	S	S
	1,800pF (182)	L	L	L		N	N	N	N	S	S	S	S	S
	2,200pF (222)	L	L	L		N	N	N	N	S	S	S	S	S
	2,700pF (272)	L	L	L		N	N	N	N	S	S	S	S	S
	3,300pF (332)	L	L	L		N	N	N	N	S	S	S	S	S
	3,900pF (392)	L	L	L		N	N	N	N	S	S	S	S	S
	4,700pF (472)	L	L	L		N	N	N	N	S	S	S	S	S
	5,600pF (562)	L	L	L		N	N	N	N	S	S	S	S	S
	6,800pF (682)	L				N	N	N	N	S	S	S	S	S
	8,200pF (822)	L				N	N	N	N	S	S	S	S	S
	0.010μF (103)	L				N	N	N	N	S	S	S	S	S
	0.012μF (123)					N	N	N		S	S	S	S	X
	0.015μF (153)					N	N	N		S	S	S	S	X
	0.018μF (183)					N	N	N		S	S	S	S	X
	0.022μF (223)					N	N	N		S	S	S	S	X
	0.027μF (273)					N	N	N		S	S	S	S	X
	0.033μF (333)					N	N	N		S	S	S	X	X
	0.039μF (393)					N	N	N		S	S	S	X	X
	0.047μF (473)					N	N	N		S	S	S	X	X
	0.056μF (563)					N	N	N		S	S	S	X	
0.068μF (683)					N	N	N		S	S	S	X		
0.082μF (823)					N	N	N		S	S	S	X		
0.10μF (104)					N	N	N		S	S	S	X		
0.12μF (124)									X	X	X			
0.15μF (154)									X	X	X	X		
0.18μF (184)									X	X	X			
0.22μF (224)									X	X	X	X		
0.33μF (334)									X	X	X	X		

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

2. For more information about products with special capacitance or other data, please contact WTC local representative.

X7R Dielectric

DIELECTRIC		X7R																	
SIZE		0805								1206									
RATED VOLTAGE (VDC)		10	16	25	50	100	200	250	500	630	10	16	25	50	100	200	250	500	630
Capacitance	100pF (101)	B	B	B	B	B	B	B	B	B						D	D	D	D
	120pF (121)	B	B	B	B	B	B	B	B	B						D	D	D	D
	150pF (151)	B	B	B	B	B	B	B	B	B	B	B	B	B	B	D	D	D	D
	180pF (181)	B	B	B	B	B	B	B	B	B	B	B	B	B	B	D	D	D	D
	220pF (221)	B	B	B	B	B	B	B	B	B	B	B	B	B	B	D	D	D	D
	270pF (271)	B	B	B	B	B	B	B	B	B	B	B	B	B	B	D	D	D	D
	330pF (331)	B	B	B	B	B	B	B	B	B	B	B	B	B	B	D	D	D	D
	390pF (391)	B	B	B	B	B	B	B	B	B	B	B	B	B	B	D	D	D	D
	470pF (471)	B	B	B	B	B	B	B	B	B	B	B	B	B	B	D	D	D	D
	560pF (561)	B	B	B	B	B	B	B	B	B	B	B	B	B	B	D	D	D	D
	680pF (681)	B	B	B	B	B	B	B	B	B	B	B	B	B	B	D	D	D	D
	820pF (821)	B	B	B	B	B	B	B	B	B	B	B	B	B	B	D	D	D	D
	1,000pF (102)	B	B	B	B	B	B	B	B	B	B	B	B	B	B	D	D	D	D
	1,200pF (122)	B	B	B	B	B	B	B	B	B	B	B	B	B	B	D	D	D	D
	1,500pF (152)	B	B	B	B	B	B	B	B	B	B	B	B	B	B	D	D	D	D
	1,800pF (182)	B	B	B	B	B	B	B	B	B	B	B	B	B	B	D	D	D	D
	2,200pF (222)	B	B	B	B	B	B	B	B	B	B	B	B	B	B	D	D	D	D
	2,700pF (272)	B	B	B	B	B	B	B	B	B	B	B	B	B	B	D	D	D	D
	3,300pF (332)	B	B	B	B	B	B	B	B	B	B	B	B	B	B	D	D	D	D
	3,900pF (392)	B	B	B	B	B	B	B	B	B	B	B	B	B	B	D	D	D	D
	4,700pF (472)	B	B	B	B	B	B	B	D	D	B	B	B	B	B	D	D	D	D
	5,600pF (562)	B	B	B	B	B	B	B	D	D	B	B	B	B	B	D	D	D	D
	6,800pF (682)	B	B	B	B	B	B	B	D	D	B	B	B	B	B	D	D	D	D
	8,200pF (822)	B	B	B	B	B	B	B	D	D	B	B	B	B	B	D	D	D	D
	0.010μF (103)	B	B	B	B	B	D	D	D	D	B	B	B	B	B	D	D	D	D
	0.012μF (123)	B	B	B	B	B	D	D			B	B	B	B	B	D	D		
	0.015μF (153)	B	B	B	B	B	D	D			B	B	B	B	B	D	D		
	0.018μF (183)	B	B	B	B	B	D	D			B	B	B	B	B	D	D		
	0.022μF (223)	B	B	B	B	B	D	D			B	B	B	B	B	D	D		
	0.027μF (273)	B	B	B	B	B					B	B	B	B	B				
	0.033μF (333)	B	B	B	B	B					B	B	B	B	B				
	0.039μF (393)	B	B	B	B	B					B	B	B	B	B				
	0.047μF (473)	B	B	B	B	B					B	B	B	B	B				
	0.056μF (563)	B	B	B	B	B					B	B	B	B	B				
	0.068μF (683)	B	B	B	B	D					B	B	B	B	B				
	0.082μF (823)	B	B	B	B	D					B	B	B	B	D				
	0.10μF (104)	B	B	B	B	D					B	B	B	B	D				
	0.12μF (124)	B	B	B	D						B	B	B	B	D				
	0.15μF (154)	D	D	D	D						C	C	C	C	G				
	0.18μF (184)	D	D	D	D						C	C	C	C	G				
0.22μF (224)	D	D	D	D						C	C	C	C	G					
0.27μF (274)	D	D	D	I						C	C	C	D						
0.33μF (334)	D	D	D	I						C	C	C	D						
0.39μF (394)	D	D	D	I						C	C	J	P						
0.47μF (474)	D	D	D	I						J	J	J	P						
0.56μF (564)	D	D	D							J	J	J	P						
0.68μF (684)	D	D	D	I						J	J	J	P						
0.82μF (824)	D	D	D							J	J	J	P						
1.0μF (105)	D	D	D	I						J	J	J	P						
2.2μF (225)																			
4.7μF (475)																			
10μF (106)																			

1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capacitance or other data, please contact WTC local representative.

X7R Dielectric

DIELECTRIC		X7R							
SIZE		1210							
RATED VOLTAGE (VDC)		10	16	25	50	100	250	500	1000
Capacitance	100pF (101)						D	D	D
	120pF (121)						D	D	D
	150pF (151)						D	D	D
	180pF (181)						D	D	D
	220pF (221)						D	D	D
	270pF (271)						D	D	D
	330pF (331)						D	D	D
	390pF (391)						D	D	D
	470pF (471)						D	D	D
	560pF (561)						D	D	D
	680pF (681)						C	D	D
	820pF (821)						C	D	D
	1,000pF (102)	C	C	C	C	C	C	D	D
	1,200pF (122)	C	C	C	C	C	C	D	D
	1,500pF (152)	C	C	C	C	C	C	D	D
	1,800pF (182)	C	C	C	C	C	C	D	D
	2,200pF (222)	C	C	C	C	C	C	D	D
	2,700pF (272)	C	C	C	C	C	C	D	D
	3,300pF (332)	C	C	C	C	C	C	D	D
	3,900pF (392)	C	C	C	C	C	C	D	G
	4,700pF (472)	C	C	C	C	C	C	D	G
	5,600pF (562)	C	C	C	C	C	C	D	G
	6,800pF (682)	C	C	C	C	C	C	D	G
	8,200pF (822)	C	C	C	C	C	C	D	G
	0.010μF (103)	C	C	C	C	C	C	D	G
	0.012μF (123)	C	C	C	C	C	C	D	
	0.015μF (153)	C	C	C	C	C	C	D	
	0.018μF (183)	C	C	C	C	C	C	D	
	0.022μF (223)	C	C	C	C	C	C	D	
	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	D		
	0.056μF (563)	C	C	C	C	C			
	0.068μF (683)	C	C	C	C	C			
	0.082μF (823)	C	C	C	C	C			
	0.10μF (104)	C	C	C	C	C			
	0.12μF (124)	C	C	C	C				
	0.15μF (154)	C	C	C	C				
	0.18μF (184)	C	C	C	C				
0.22μF (224)	C	C	C	C					
0.27μF (274)	C	C	C	C					
0.33μF (334)	C	C	C	D					
0.39μF (394)	C	C	C	D					
0.47μF (474)	C	C	C	D					
0.56μF (564)	D	D	D	D					
0.68μF (684)	D	D	D	D					
0.82μF (824)	D	D	D	D					
1.0μF (105)	D	D	D	D					
1.5μF (155)		K							
2.2μF (225)		K							
4.7μF (475)									
10μF (106)									

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

2. For more information about products with special capacitance or other data, please contact WTC local representative.

8. PACKAGING STYLE AND QUANTITY

Size	Thickness (mm)/Symbol		Paper tape		Plastic tape	
			7" reel	13" reel	7" reel	13" reel
0201 (0603)	0.30±0.03	L	15k	70k	-	-
0402 (1005)	0.50±0.05	N	10k	50k	-	-
0603 (1608)	0.80±0.07	S	4k	15k	-	-
	0.80+0.15/-0.10	X	4k	15k	-	-
0805 (2012)	0.60±0.10	A	4k	15k	-	-
	0.80±0.10	B	4k	15k	-	-
	1.25±0.10	D	-	-	3k	10k
	1.25±0.20	I	-	-	3k	10k
1206 (3216)	0.80±0.10	B	4k	15k	-	-
	0.95±0.10	C	-	-	3k	10k
	1.15±0.15	J	-	-	3k	10k
	1.25±0.10	D	-	-	3k	10k
	1.60±0.20	G	-	-	2k	10k
	1.60+0.30/-0.10	P	-	-	2k	9k
1210 (3225)	0.95±0.10	C	-	-	3k	10k
	1.25±0.10	D	-	-	3k	10k
	1.60±0.20	G	-	-	2k	-
	2.00±0.20	K	-	-	1k	6k
	2.50±0.30	M	-	-	1k	6k

9. RELIABILITY TEST CONDITIONS AND REQUIREMENTS

No.	AEC-Q200 Test Item	AEC-Q200 Test Condition	Requirements																																																			
1.	Pre-and Post-Stress Electrical Test	---																																																				
2.	High Temperature Exposure (Storage) MIL-STD-202 Method 108	<ul style="list-style-type: none"> * Test temp.: 150±3°C * Unpowered. * Test time: 1000+24/-0 hrs. * Measurement to be made after keeping at room temp. for 24±2 hrs. 	<ul style="list-style-type: none"> * No remarkable damage. * Cap change: NP0: within ±2.5% or ±0.25pF whichever is larger. X7R: within ±10.00%. * Q/D.F. value: NP0: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C. X7R: <table border="1"> <thead> <tr> <th>Rated vol.</th> <th>DF ≤</th> <th colspan="2">Exception of DF</th> </tr> </thead> <tbody> <tr> <td rowspan="3">≥50V</td> <td rowspan="3">≤3%</td> <td>≤6%</td> <td>0201(50V); 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF;</td> </tr> <tr> <td>≤10%</td> <td>1210≥4.7μF;</td> </tr> <tr> <td>≤20%</td> <td>0402≥0.1μF; 0603≥1μF; 0805≥1μF; 1206≥2.2μF;</td> </tr> <tr> <td>35V</td> <td>≤5%</td> <td>≤20%</td> <td>0603≥1μF; 0805≥2.2μF; 1210≥10μF;</td> </tr> <tr> <td rowspan="2">25V</td> <td rowspan="2">≤5%</td> <td>≤10%</td> <td>0201≥0.01μF; 0805≥1μF; 1210≥10μF</td> </tr> <tr> <td>≤15%</td> <td>0603≥0.33μF; 1206≥4.7μF; 0402≥0.10μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥6.8μF; 1210≥22μF;</td> </tr> <tr> <td rowspan="2">16V</td> <td rowspan="2">≤5%</td> <td>≤10%</td> <td>0603≥0.15μF;0805≥0.68μF;1 206≥2.2μF;1210≥4.7μF</td> </tr> <tr> <td>≤15%</td> <td>0201≥0.01μF;0402≥0.033μF; 0603≥0.68μF;0805≥2.2μF 1206≥4.7μF; 1210≥22μF;</td> </tr> <tr> <td rowspan="2">10V</td> <td rowspan="2">≤7.5%</td> <td>≤15%</td> <td>0201≥0.012μF;0402≥0.33μF; 0603≥0.33μF;0805≥2.2μF 1206≥2.2μF; 1210≥22μF</td> </tr> <tr> <td>≤20%</td> <td>0201≥0.1μF ;0402≥1μF;</td> </tr> <tr> <td>6.3V</td> <td>≤15%</td> <td>≤30%</td> <td>0201≥0.1μF;0402≥1μF; 0603≥10μF;0805≥4.7μF; 1206≥47μF;1210≥100μF;</td> </tr> <tr> <td>4V</td> <td>≤20%</td> <td>---</td> <td>---</td> </tr> </tbody> </table> <p>IR.: ≥10GΩ or RxC≥500Ω-F whichever is smaller</p> <p>Class II (X7R)</p> <table border="1"> <thead> <tr> <th>Rated voltage</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>≥100V: X7R</td> <td rowspan="5">1GΩ or R x C ≥ 10 Ω-F whichever is smaller.</td> </tr> <tr> <td>50V: 0603≥1μF;0805≥1μF;1206≥4.7μF; 1210≥4.7μF</td> </tr> <tr> <td>35V: 0805≥2.2μF;1210≥10μF</td> </tr> <tr> <td>25V: 0402≥1μF;0603≥2.2μF;0805≥2.2μF; 1206≥10μF;1210≥10μF</td> </tr> <tr> <td>16V: 0201≥0.1uF;0402≥0.22μF; 0603≥1μF;0805≥2.2μF; 1206≥10μF;1210≥47μF</td> </tr> <tr> <td>10V: 0201≥47nF;0402≥0.47μF; 0603≥0.47μF;0805≥2.2μF; 1206≥4.7μF;1210≥47μF</td> </tr> </tbody> </table>	Rated vol.	DF ≤	Exception of DF		≥50V	≤3%	≤6%	0201(50V); 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF;	≤10%	1210≥4.7μF;	≤20%	0402≥0.1μF; 0603≥1μF; 0805≥1μF; 1206≥2.2μF;	35V	≤5%	≤20%	0603≥1μF; 0805≥2.2μF; 1210≥10μF;	25V	≤5%	≤10%	0201≥0.01μF; 0805≥1μF; 1210≥10μF	≤15%	0603≥0.33μF; 1206≥4.7μF; 0402≥0.10μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥6.8μF; 1210≥22μF;	16V	≤5%	≤10%	0603≥0.15μF;0805≥0.68μF;1 206≥2.2μF;1210≥4.7μF	≤15%	0201≥0.01μF;0402≥0.033μF; 0603≥0.68μF;0805≥2.2μF 1206≥4.7μF; 1210≥22μF;	10V	≤7.5%	≤15%	0201≥0.012μF;0402≥0.33μF; 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%	---	---	Rated voltage	Insulation Resistance	≥100V: X7R	1GΩ or R x C ≥ 10 Ω-F whichever is smaller.	50V: 0603≥1μF;0805≥1μF;1206≥4.7μF; 1210≥4.7μF	35V: 0805≥2.2μF;1210≥10μF	25V: 0402≥1μF;0603≥2.2μF;0805≥2.2μF; 1206≥10μF;1210≥10μF	16V: 0201≥0.1uF;0402≥0.22μF; 0603≥1μF;0805≥2.2μF; 1206≥10μF;1210≥47μF	10V: 0201≥47nF;0402≥0.47μF; 0603≥0.47μF;0805≥2.2μF; 1206≥4.7μF;1210≥47μF
Rated vol.	DF ≤	Exception of DF																																																				
≥50V	≤3%	≤6%	0201(50V); 0603≥0.047μF; 0805≥0.18μF; 1206≥0.47μF;																																																			
		≤10%	1210≥4.7μF;																																																			
		≤20%	0402≥0.1μF; 0603≥1μF; 0805≥1μF; 1206≥2.2μF;																																																			
35V	≤5%	≤20%	0603≥1μF; 0805≥2.2μF; 1210≥10μF;																																																			
25V	≤5%	≤10%	0201≥0.01μF; 0805≥1μF; 1210≥10μF																																																			
		≤15%	0603≥0.33μF; 1206≥4.7μF; 0402≥0.10μF; 0603≥0.47μF; 0805≥2.2μF; 1206≥6.8μF; 1210≥22μF;																																																			
16V	≤5%	≤10%	0603≥0.15μF;0805≥0.68μF;1 206≥2.2μF;1210≥4.7μF																																																			
		≤15%	0201≥0.01μF;0402≥0.033μF; 0603≥0.68μF;0805≥2.2μF 1206≥4.7μF; 1210≥22μF;																																																			
10V	≤7.5%	≤15%	0201≥0.012μF;0402≥0.33μF; 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%	---	---																																																			
Rated voltage	Insulation Resistance																																																					
≥100V: X7R	1GΩ or R x C ≥ 10 Ω-F whichever is smaller.																																																					
50V: 0603≥1μF;0805≥1μF;1206≥4.7μF; 1210≥4.7μF																																																						
35V: 0805≥2.2μF;1210≥10μF																																																						
25V: 0402≥1μF;0603≥2.2μF;0805≥2.2μF; 1206≥10μF;1210≥10μF																																																						
16V: 0201≥0.1uF;0402≥0.22μF; 0603≥1μF;0805≥2.2μF; 1206≥10μF;1210≥47μF																																																						
10V: 0201≥47nF;0402≥0.47μF; 0603≥0.47μF;0805≥2.2μF; 1206≥4.7μF;1210≥47μF																																																						

No.	AEC-Q200 Test Item	AEC-Q200 Test Condition	Requirements																																																															
3.	Temperature : Cycling JESD22 Method JA-104	<p>* Conduct 1000 cycles according to the temperatures and time.</p> <table border="1" data-bbox="416 286 794 430"> <thead> <tr> <th>Step</th> <th>Temp. (°C)</th> <th>Time (min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55°C +0/-3</td> <td>5±1</td> </tr> <tr> <td>2</td> <td>+125°C +3/-0</td> <td>5±1</td> </tr> </tbody> </table> <p>Before initial measurement (X7R only): Perform 150+0/-10°C for 1 hr and then set for 24±2 hrs at room temp. *Measurement to be made after keeping at room temp. for 24±2 hrs.</p>	Step	Temp. (°C)	Time (min.)	1	-55°C +0/-3	5±1	2	+125°C +3/-0	5±1	<p>* No remarkable damage. * Cap change: NPO: within ±2.5% or ±0.25pF whichever is larger. X7R: within ±10.00%. * Q/D.F. value: NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C. X7R:</p> <table border="1" data-bbox="826 416 1519 1258"> <thead> <tr> <th>Rated vol.</th> <th>DF≤</th> <th colspan="2">Exception of DF</th> </tr> </thead> <tbody> <tr> <td rowspan="3">≥ 50V</td> <td rowspan="3">≤ 3%</td> <td>≤ 6%</td> <td>0201(50V);0603≥ 0.047μF; 0805≥ 0.18μF; 1206≥ 0.47μF</td> </tr> <tr> <td>≤ 10%</td> <td>1210≥ 4.7μF</td> </tr> <tr> <td>≤ 20%</td> <td>0402≥ 0.1μF;0603≥ 1μF; 0805≥ 1μF;1206≥ 2.2μF; 1210≥ 10μF;</td> </tr> <tr> <td>35V</td> <td>≤ 5%</td> <td>≤ 20%</td> <td>0603≥ 1μF;0805≥2.2μF; 1210≥ 10μF</td> </tr> <tr> <td rowspan="3">25V</td> <td rowspan="3">≤ 5%</td> <td>≤ 10%</td> <td>0201≥ 0.01μF;0805≥ 1μF; 1210≥ 10μF</td> </tr> <tr> <td>≤ 14%</td> <td>0603≥ 0.33μF;1206≥ 4.7μF</td> </tr> <tr> <td>≤ 15%</td> <td>0402≥ 0.10μF;0603≥ 0.47μF;0 805≥ 2.2μF;1206≥ 6.8μF; 1210≥ 22μF;</td> </tr> <tr> <td rowspan="2">16V</td> <td rowspan="2">≤ 5%</td> <td>≤ 10%</td> <td>0603≥ 0.15μF;0805≥ 0.68μF;1 206≥ 2.2μF;1210≥ 4.7μF</td> </tr> <tr> <td>≤ 15%</td> <td>0201≥ 0.01μF;0402≥ 0.033μF; 0603≥ 0.68μF;0805≥ 2.2μF 1206≥ 4.7μF; 1210≥ 22μF;</td> </tr> <tr> <td rowspan="2">10V</td> <td rowspan="2">≤ 7.5%</td> <td>≤ 15%</td> <td>0201≥ 0.012μF;0402≥ 0.33μF; 0603≥ 0.33μF;0805≥ 2.2μF 1206≥ 2.2μF; 1210≥ 22μF</td> </tr> <tr> <td>≤ 20%</td> <td>0201≥ 0.1μF ;0402≥ 1μF;</td> </tr> <tr> <td>6.3V</td> <td>≤ 15%</td> <td>≤ 30%</td> <td>0201≥ 0.1μF;0402≥ 1μF;0603 ≥ 10μF; 0805≥ 4.7μF;1206≥ 47μF;121 0≥ 100μF;</td> </tr> <tr> <td>4V</td> <td>≤ 20%</td> <td>---</td> <td>----</td> </tr> </tbody> </table> <p>IR.: ≥10GΩ or RxC≥500Ω-F whichever is smaller</p> <p>Class II (X7R)</p> <table border="1" data-bbox="826 1339 1519 1899"> <thead> <tr> <th>Rated voltage</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>≥100V: X7R</td> <td rowspan="7">1GΩ or R x C ≥ 10 Ω-F whichever is smaller.</td> </tr> <tr> <td>50V:0603≥1μF;0805≥1μF; 1206≥4.7μF;1210≥4.7μF</td> </tr> <tr> <td>35V:0805≥2.2μF;1210≥ 10μF</td> </tr> <tr> <td>25V:0402≥1μF;0603≥2.2μF; 0805≥2.2μF;1206≥10μF;1210≥10μF</td> </tr> <tr> <td>16V: 0201 ≥ 0.1uF;0402≥0.22μF; 0603≥1μF;0805≥2.2μF; 1206≥10μF;1210≥47μF</td> </tr> <tr> <td>10V:0201≥47nF;0402≥0.47μF; 0603≥0.47μF;0805≥2.2μF; 1206≥4.7μF;1210≥47μF</td> </tr> <tr> <td>6.3V ; 4V ;</td> </tr> </tbody> </table>	Rated vol.	DF≤	Exception of DF		≥ 50V	≤ 3%	≤ 6%	0201(50V);0603≥ 0.047μF; 0805≥ 0.18μF; 1206≥ 0.47μF	≤ 10%	1210≥ 4.7μF	≤ 20%	0402≥ 0.1μF;0603≥ 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;0 805≥ 2.2μF;1206≥ 6.8μF; 1210≥ 22μF;	16V	≤ 5%	≤ 10%	0603≥ 0.15μF;0805≥ 0.68μF;1 206≥ 2.2μF;1210≥ 4.7μF	≤ 15%	0201≥ 0.01μF;0402≥ 0.033μF; 0603≥ 0.68μF;0805≥ 2.2μF 1206≥ 4.7μF; 1210≥ 22μF;	10V	≤ 7.5%	≤ 15%	0201≥ 0.012μF;0402≥ 0.33μF; 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;121 0≥ 100μF;	4V	≤ 20%	---	----	Rated voltage	Insulation Resistance	≥100V: X7R	1GΩ or R x C ≥ 10 Ω-F whichever is smaller.	50V:0603≥1μF;0805≥1μF; 1206≥4.7μF;1210≥4.7μF	35V:0805≥2.2μF;1210≥ 10μF	25V:0402≥1μF;0603≥2.2μF; 0805≥2.2μF;1206≥10μF;1210≥10μF	16V: 0201 ≥ 0.1uF;0402≥0.22μF; 0603≥1μF;0805≥2.2μF; 1206≥10μF;1210≥47μF	10V:0201≥47nF;0402≥0.47μF; 0603≥0.47μF;0805≥2.2μF; 1206≥4.7μF;1210≥47μF	6.3V ; 4V ;
Step	Temp. (°C)	Time (min.)																																																																
1	-55°C +0/-3	5±1																																																																
2	+125°C +3/-0	5±1																																																																
Rated vol.	DF≤	Exception of DF																																																																
≥ 50V	≤ 3%	≤ 6%	0201(50V);0603≥ 0.047μF; 0805≥ 0.18μF; 1206≥ 0.47μF																																																															
		≤ 10%	1210≥ 4.7μF																																																															
		≤ 20%	0402≥ 0.1μF;0603≥ 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;0 805≥ 2.2μF;1206≥ 6.8μF; 1210≥ 22μF;																																																															
16V	≤ 5%	≤ 10%	0603≥ 0.15μF;0805≥ 0.68μF;1 206≥ 2.2μF;1210≥ 4.7μF																																																															
		≤ 15%	0201≥ 0.01μF;0402≥ 0.033μF; 0603≥ 0.68μF;0805≥ 2.2μF 1206≥ 4.7μF; 1210≥ 22μF;																																																															
10V	≤ 7.5%	≤ 15%	0201≥ 0.012μF;0402≥ 0.33μF; 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;121 0≥ 100μF;																																																															
4V	≤ 20%	---	----																																																															
Rated voltage	Insulation Resistance																																																																	
≥100V: X7R	1GΩ or R x C ≥ 10 Ω-F whichever is smaller.																																																																	
50V:0603≥1μF;0805≥1μF; 1206≥4.7μF;1210≥4.7μF																																																																		
35V:0805≥2.2μF;1210≥ 10μF																																																																		
25V:0402≥1μF;0603≥2.2μF; 0805≥2.2μF;1206≥10μF;1210≥10μF																																																																		
16V: 0201 ≥ 0.1uF;0402≥0.22μF; 0603≥1μF;0805≥2.2μF; 1206≥10μF;1210≥47μF																																																																		
10V:0201≥47nF;0402≥0.47μF; 0603≥0.47μF;0805≥2.2μF; 1206≥4.7μF;1210≥47μF																																																																		
6.3V ; 4V ;																																																																		

No.	AEC-Q200 Test Item	AEC-Q200 Test Condition	Requirements																																																						
4.	Destructive Physical Analysis EIA-469	Per EIA-469	No defects or abnormalities																																																						
5.	Moisture Resistance MIL-STD-202 Method 106	Test temp.: 25~65°C Humidity: 80~100% RH Test time: 10 cycles, t=24hrs/cycle. Measurement to be made after keeping at room temp. for 24±2 hrs.	<p>* No remarkable damage.</p> <p>* Cap change: NPO: within ±3.0% or ±0.30pF whichever is larger. X7R: within ±12.5%.</p> <p>* Q/D.F. value: NPO: More than 30pF $Q \geq 350$; $10pF \leq C \leq 30pF$, $Q \geq 275 + 2.5C$ Less than 10pF $Q \geq 200 + 10$.</p> <p>X7R:</p> <table border="1" data-bbox="794 456 1465 1429"> <thead> <tr> <th>Rated vol.</th> <th>DF ≤</th> <th colspan="2">Exception of DF</th> </tr> </thead> <tbody> <tr> <td rowspan="3">≥ 50V</td> <td rowspan="3">≤ 3%</td> <td>≤ 6%</td> <td>0201(50V);0603 ≥ 0.047μF; 0805 ≥ 0.18μF; 1206 ≥ 0.47μF</td> </tr> <tr> <td>≤ 10%</td> <td>1210 ≥ 4.7μF</td> </tr> <tr> <td>≤ 20%</td> <td>0402 ≥ 0.1μF;0603 ≥ 1μF; 0805 ≥ 1μF;1206 ≥ 2.2μF; 1210 ≥ 10μF; TT series</td> </tr> <tr> <td>35V</td> <td>≤ 5%</td> <td>≤ 20%</td> <td>0603 ≥ 1μF;0805 ≥ 2.2μF;1210 ≥ 10μF</td> </tr> <tr> <td rowspan="3">25V</td> <td rowspan="3">≤ 5%</td> <td>≤ 10%</td> <td>0201 ≥ 0.01μF;0805 ≥ 1μF; 1210 ≥ 10μF</td> </tr> <tr> <td>≤ 14%</td> <td>0603 ≥ 0.33μF;1206 ≥ 4.7μF</td> </tr> <tr> <td>≤ 15%</td> <td>0402 ≥ 0.10μF;0603 ≥ 0.47μF;0805 ≥ 2.2μF;1206 ≥ 6.8μF; 1210 ≥ 22μF; TT series</td> </tr> <tr> <td rowspan="2">16V</td> <td rowspan="2">≤ 5%</td> <td>≤ 10%</td> <td>0603 ≥ 0.15μF;0805 ≥ 0.68μF;1206 ≥ 2.2μF;1210 ≥ 4.7μF</td> </tr> <tr> <td>≤ 15%</td> <td>0201 ≥ 0.01μF;0402 ≥ 0.033μF; 0603 ≥ 0.68μF;0805 ≥ 2.2μF 1206 ≥ 4.7μF; 1210 ≥ 22μF; TT series</td> </tr> <tr> <td>10V</td> <td>≤ 7.5%</td> <td>≤ 15%</td> <td>0201 ≥ 0.012μF;0402 ≥ 0.33μF; 0603 ≥ 0.33μF;0805 ≥ 2.2μF 1206 ≥ 2.2μF; 1210 ≥ 22μF</td> </tr> <tr> <td rowspan="2">6.3V</td> <td rowspan="2">≤ 15%</td> <td>≤ 20%</td> <td>0201 ≥ 0.1μF ;0402 ≥ 1μF; TT series</td> </tr> <tr> <td>≤ 30%</td> <td>0201 ≥ 0.1μF;0402 ≥ 1μF;0603 ≥ 10μF; 0805 ≥ 4.7μF;1206 ≥ 47μF;1210 ≥ 100μF;</td> </tr> <tr> <td>4V</td> <td>≤ 20%</td> <td>---</td> <td>----</td> </tr> </tbody> </table> <p>IR.: ≥10GΩ or $RxC \geq 500\Omega \cdot F$ whichever is smaller</p> <p>Class II (X7R)</p> <table border="1" data-bbox="794 1503 1501 1951"> <thead> <tr> <th>Rated voltage</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>≥100V: X7R</td> <td rowspan="7">1GΩ or $R \times C \geq 10 \Omega \cdot F$ whichever is smaller.</td> </tr> <tr> <td>50V:0603 ≥ 1μF;0805 ≥ 1μF; 1206 ≥ 4.7μF;1210 ≥ 4.7μF</td> </tr> <tr> <td>35V:0805 ≥ 2.2μF;1210 ≥ 10μF</td> </tr> <tr> <td>25V:0402 ≥ 1μF;0603 ≥ 2.2μF;0805 ≥ 2.2μF; 1206 ≥ 10μF;1210 ≥ 10μF</td> </tr> <tr> <td>16V: 0201 ≥ 0.1μF;0402 ≥ 0.22μF; 0603 ≥ 1μF;0805 ≥ 2.2μF; 1206 ≥ 10μF;1210 ≥ 47μF</td> </tr> <tr> <td>10V:0201 ≥ 47nF;0402 ≥ 0.47μF; 0603 ≥ 0.47μF;0805 ≥ 2.2μF; 1206 ≥ 4.7μF;1210 ≥ 47μF</td> </tr> <tr> <td>6.3V ; 4V ;</td> </tr> </tbody> </table>	Rated vol.	DF ≤	Exception of DF		≥ 50V	≤ 3%	≤ 6%	0201(50V);0603 ≥ 0.047μF; 0805 ≥ 0.18μF; 1206 ≥ 0.47μF	≤ 10%	1210 ≥ 4.7μF	≤ 20%	0402 ≥ 0.1μF;0603 ≥ 1μF; 0805 ≥ 1μF;1206 ≥ 2.2μF; 1210 ≥ 10μF; TT series	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; TT series	16V	≤ 5%	≤ 10%	0603 ≥ 0.15μF;0805 ≥ 0.68μF;1206 ≥ 2.2μF;1210 ≥ 4.7μF	≤ 15%	0201 ≥ 0.01μF;0402 ≥ 0.033μF; 0603 ≥ 0.68μF;0805 ≥ 2.2μF 1206 ≥ 4.7μF; 1210 ≥ 22μF; TT series	10V	≤ 7.5%	≤ 15%	0201 ≥ 0.012μF;0402 ≥ 0.33μF; 0603 ≥ 0.33μF;0805 ≥ 2.2μF 1206 ≥ 2.2μF; 1210 ≥ 22μF	6.3V	≤ 15%	≤ 20%	0201 ≥ 0.1μF ;0402 ≥ 1μF; TT series	≤ 30%	0201 ≥ 0.1μF;0402 ≥ 1μF;0603 ≥ 10μF; 0805 ≥ 4.7μF;1206 ≥ 47μF;1210 ≥ 100μF;	4V	≤ 20%	---	----	Rated voltage	Insulation Resistance	≥100V: X7R	1GΩ or $R \times C \geq 10 \Omega \cdot F$ whichever is smaller.	50V:0603 ≥ 1μF;0805 ≥ 1μF; 1206 ≥ 4.7μF;1210 ≥ 4.7μF	35V:0805 ≥ 2.2μF;1210 ≥ 10μF	25V:0402 ≥ 1μF;0603 ≥ 2.2μF;0805 ≥ 2.2μF; 1206 ≥ 10μF;1210 ≥ 10μF	16V: 0201 ≥ 0.1μF;0402 ≥ 0.22μF; 0603 ≥ 1μF;0805 ≥ 2.2μF; 1206 ≥ 10μF;1210 ≥ 47μF	10V:0201 ≥ 47nF;0402 ≥ 0.47μF; 0603 ≥ 0.47μF;0805 ≥ 2.2μF; 1206 ≥ 4.7μF;1210 ≥ 47μF	6.3V ; 4V ;
Rated vol.	DF ≤	Exception of DF																																																							
≥ 50V	≤ 3%	≤ 6%	0201(50V);0603 ≥ 0.047μF; 0805 ≥ 0.18μF; 1206 ≥ 0.47μF																																																						
		≤ 10%	1210 ≥ 4.7μF																																																						
		≤ 20%	0402 ≥ 0.1μF;0603 ≥ 1μF; 0805 ≥ 1μF;1206 ≥ 2.2μF; 1210 ≥ 10μF; TT series																																																						
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; TT series																																																						
16V	≤ 5%	≤ 10%	0603 ≥ 0.15μF;0805 ≥ 0.68μF;1206 ≥ 2.2μF;1210 ≥ 4.7μF																																																						
		≤ 15%	0201 ≥ 0.01μF;0402 ≥ 0.033μF; 0603 ≥ 0.68μF;0805 ≥ 2.2μF 1206 ≥ 4.7μF; 1210 ≥ 22μF; TT series																																																						
10V	≤ 7.5%	≤ 15%	0201 ≥ 0.012μF;0402 ≥ 0.33μF; 0603 ≥ 0.33μF;0805 ≥ 2.2μF 1206 ≥ 2.2μF; 1210 ≥ 22μF																																																						
6.3V	≤ 15%	≤ 20%	0201 ≥ 0.1μF ;0402 ≥ 1μF; TT series																																																						
		≤ 30%	0201 ≥ 0.1μF;0402 ≥ 1μF;0603 ≥ 10μF; 0805 ≥ 4.7μF;1206 ≥ 47μF;1210 ≥ 100μF;																																																						
4V	≤ 20%	---	----																																																						
Rated voltage	Insulation Resistance																																																								
≥100V: X7R	1GΩ or $R \times C \geq 10 \Omega \cdot F$ whichever is smaller.																																																								
50V:0603 ≥ 1μF;0805 ≥ 1μF; 1206 ≥ 4.7μF;1210 ≥ 4.7μF																																																									
35V:0805 ≥ 2.2μF;1210 ≥ 10μF																																																									
25V:0402 ≥ 1μF;0603 ≥ 2.2μF;0805 ≥ 2.2μF; 1206 ≥ 10μF;1210 ≥ 10μF																																																									
16V: 0201 ≥ 0.1μF;0402 ≥ 0.22μF; 0603 ≥ 1μF;0805 ≥ 2.2μF; 1206 ≥ 10μF;1210 ≥ 47μF																																																									
10V:0201 ≥ 47nF;0402 ≥ 0.47μF; 0603 ≥ 0.47μF;0805 ≥ 2.2μF; 1206 ≥ 4.7μF;1210 ≥ 47μF																																																									
6.3V ; 4V ;																																																									

No.	AEC-Q200 Test Item	AEC-Q200 Test Condition	Requirements																																																																
6.	Biased Humidity MIL-STD-202 Method 103	Test temp.: $85 \pm 3^\circ \text{C}$ Humidity: 85%RH Test time: 1000+24/-0 hrs. To apply voltage: rated voltage and 1.3~1.5Vdc. (add 100k ohm resistor) Before initial measurement (Class II only) : To apply test voltage for 1hr at test temp. and then set for 24 ± 2 hrs at room temp. Measurement to be made after keeping at room temp. for 24 ± 2 hrs.	<p>* No remarkable damage.</p> <p>* Cap change: NPO: within $\pm 3.0\%$ or $\pm 0.30\text{pF}$ whichever is larger. X7R: within $\pm 12.5\%$.</p> <p>* Q/D.F. value: NPO: $C \geq 30\text{pF}$ $Q \geq 200$; $C \leq 30\text{pF}$, $Q \geq 100 + 10/3C$. X7R:</p> <table border="1" data-bbox="837 360 1506 1272"> <thead> <tr> <th>Rated vol.</th> <th>DF\leq</th> <th colspan="2">Exception of DF</th> </tr> </thead> <tbody> <tr> <td rowspan="3">$\geq 50\text{V}$</td> <td rowspan="3">$\leq 3\%$</td> <td>$\leq 6\%$</td> <td>0201(50V);0603$\geq 0.047\mu\text{F}$; 0805$\geq 0.18\mu\text{F}$; 1206$\geq 0.47\mu\text{F}$</td> </tr> <tr> <td>$\leq 10\%$</td> <td>1210$\geq 4.7\mu\text{F}$</td> </tr> <tr> <td>$\leq 20\%$</td> <td>0402$\geq 0.1\mu\text{F}$;0603$\geq 1\mu\text{F}$; 0805$\geq 1\mu\text{F}$;1206$\geq 2.2\mu\text{F}$; 1210$\geq 10\mu\text{F}$;</td> </tr> <tr> <td>35V</td> <td>$\leq 5\%$</td> <td>$\leq 20\%$</td> <td>0603$\geq 1\mu\text{F}$;0805$\geq 2.2\mu\text{F}$;1210$\geq 10\mu\text{F}$</td> </tr> <tr> <td rowspan="3">25V</td> <td rowspan="3">$\leq 5\%$</td> <td>$\leq 10\%$</td> <td>0201$\geq 0.01\mu\text{F}$;0805$\geq 1\mu\text{F}$; 1210$\geq 10\mu\text{F}$</td> </tr> <tr> <td>$\leq 14\%$</td> <td>0603$\geq 0.33\mu\text{F}$;1206$\geq 4.7\mu\text{F}$</td> </tr> <tr> <td>$\leq 15\%$</td> <td>0402$\geq 0.10\mu\text{F}$;0603$\geq 0.47\mu\text{F}$;0 805$\geq 2.2\mu\text{F}$;1206$\geq 6.8\mu\text{F}$; 1210$\geq 22\mu\text{F}$</td> </tr> <tr> <td rowspan="2">16V</td> <td rowspan="2">$\leq 5\%$</td> <td>$\leq 10\%$</td> <td>0603$\geq 0.15\mu\text{F}$;0805$\geq 0.68\mu\text{F}$; 1206$\geq 2.2\mu\text{F}$;1210$\geq 4.7\mu\text{F}$</td> </tr> <tr> <td>$\leq 15\%$</td> <td>0201$\geq 0.01\mu\text{F}$;0402$\geq 0.033\mu\text{F}$; 0603$\geq 0.68\mu\text{F}$;0805$\geq 2.2\mu\text{F}$ 1206$\geq 4.7\mu\text{F}$; 1210$\geq 22\mu\text{F}$;</td> </tr> <tr> <td rowspan="2">10V</td> <td rowspan="2">$\leq 7.5\%$</td> <td>$\leq 15\%$</td> <td>0201$\geq 0.012\mu\text{F}$;0402$\geq 0.33\mu\text{F}$; 0603$\geq 0.33\mu\text{F}$;0805$\geq 2.2\mu\text{F}$ 1206$\geq 2.2\mu\text{F}$; 1210$\geq 22\mu\text{F}$</td> </tr> <tr> <td>$\leq 20\%$</td> <td>0201$\geq 0.1\mu\text{F}$;0402$\geq 1\mu\text{F}$;</td> </tr> <tr> <td>6.3V</td> <td>$\leq 15\%$</td> <td>$\leq 30\%$</td> <td>0201$\geq 0.1\mu\text{F}$;0402$\geq 1\mu\text{F}$; 0603$\geq 10\mu\text{F}$; 0805$\geq 4.7\mu\text{F}$;1206$\geq 47\mu\text{F}$; 1210$\geq 100\mu\text{F}$;</td> </tr> <tr> <td>4V</td> <td>$\leq 20\%$</td> <td>---</td> <td>----</td> </tr> </tbody> </table> <p>IR.: $\geq 10\text{G}\Omega$ or $R \times C \geq 50\Omega \cdot \text{F}$ whichever is smaller</p> <p>Class II (X7R)for rated voltage test</p> <table border="1" data-bbox="837 1350 1525 1771"> <thead> <tr> <th>Rated voltage</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>$\geq 100\text{V}$: X7R</td> <td rowspan="7">500MΩ or $R \times C \geq 5 \Omega \cdot \text{F}$ whichever is smaller.</td> </tr> <tr> <td>50V:0603$\geq 1\mu\text{F}$;0805$\geq 1\mu\text{F}$;1206$\geq 4.7\mu\text{F}$; 1210$\geq 4.7\mu\text{F}$</td> </tr> <tr> <td>35V:0805$\geq 2.2\mu\text{F}$;1210$\geq 10\mu\text{F}$</td> </tr> <tr> <td>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$\geq 10\mu\text{F}$</td> </tr> <tr> <td>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$\geq 47\mu\text{F}$</td> </tr> <tr> <td>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$\geq 47\mu\text{F}$</td> </tr> <tr> <td>6.3V ; 4V ;</td> </tr> </tbody> </table> <p>Class II (X7R)for 1.3V~1.5V</p> <table border="1" data-bbox="837 1848 1525 2235"> <thead> <tr> <th>Rated voltage</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>$\geq 100\text{V}$: X7R</td> <td rowspan="7">1GΩ or $R \times C \geq 10 \Omega \cdot \text{F}$ whichever is smaller.</td> </tr> <tr> <td>50V:0603$\geq 1\mu\text{F}$;0805$\geq 1\mu\text{F}$;1206$\geq 4.7\mu\text{F}$; 1210$\geq 4.7\mu\text{F}$</td> </tr> <tr> <td>35V:0805$\geq 2.2\mu\text{F}$;1210$\geq 10\mu\text{F}$</td> </tr> <tr> <td>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$\geq 10\mu\text{F}$</td> </tr> <tr> <td>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$\geq 47\mu\text{F}$</td> </tr> <tr> <td>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$\geq 47\mu\text{F}$</td> </tr> <tr> <td>6.3V ; 4V ;</td> </tr> </tbody> </table>	Rated vol.	DF \leq	Exception of DF		$\geq 50\text{V}$	$\leq 3\%$	$\leq 6\%$	0201(50V);0603 $\geq 0.047\mu\text{F}$; 0805 $\geq 0.18\mu\text{F}$; 1206 $\geq 0.47\mu\text{F}$	$\leq 10\%$	1210 $\geq 4.7\mu\text{F}$	$\leq 20\%$	0402 $\geq 0.1\mu\text{F}$;0603 $\geq 1\mu\text{F}$; 0805 $\geq 1\mu\text{F}$;1206 $\geq 2.2\mu\text{F}$; 1210 $\geq 10\mu\text{F}$;	35V	$\leq 5\%$	$\leq 20\%$	0603 $\geq 1\mu\text{F}$;0805 $\geq 2.2\mu\text{F}$;1210 $\geq 10\mu\text{F}$	25V	$\leq 5\%$	$\leq 10\%$	0201 $\geq 0.01\mu\text{F}$;0805 $\geq 1\mu\text{F}$; 1210 $\geq 10\mu\text{F}$	$\leq 14\%$	0603 $\geq 0.33\mu\text{F}$;1206 $\geq 4.7\mu\text{F}$	$\leq 15\%$	0402 $\geq 0.10\mu\text{F}$;0603 $\geq 0.47\mu\text{F}$;0 805 $\geq 2.2\mu\text{F}$;1206 $\geq 6.8\mu\text{F}$; 1210 $\geq 22\mu\text{F}$	16V	$\leq 5\%$	$\leq 10\%$	0603 $\geq 0.15\mu\text{F}$;0805 $\geq 0.68\mu\text{F}$; 1206 $\geq 2.2\mu\text{F}$;1210 $\geq 4.7\mu\text{F}$	$\leq 15\%$	0201 $\geq 0.01\mu\text{F}$;0402 $\geq 0.033\mu\text{F}$; 0603 $\geq 0.68\mu\text{F}$;0805 $\geq 2.2\mu\text{F}$ 1206 $\geq 4.7\mu\text{F}$; 1210 $\geq 22\mu\text{F}$;	10V	$\leq 7.5\%$	$\leq 15\%$	0201 $\geq 0.012\mu\text{F}$;0402 $\geq 0.33\mu\text{F}$; 0603 $\geq 0.33\mu\text{F}$;0805 $\geq 2.2\mu\text{F}$ 1206 $\geq 2.2\mu\text{F}$; 1210 $\geq 22\mu\text{F}$	$\leq 20\%$	0201 $\geq 0.1\mu\text{F}$;0402 $\geq 1\mu\text{F}$;	6.3V	$\leq 15\%$	$\leq 30\%$	0201 $\geq 0.1\mu\text{F}$;0402 $\geq 1\mu\text{F}$; 0603 $\geq 10\mu\text{F}$; 0805 $\geq 4.7\mu\text{F}$;1206 $\geq 47\mu\text{F}$; 1210 $\geq 100\mu\text{F}$;	4V	$\leq 20\%$	---	----	Rated voltage	Insulation Resistance	$\geq 100\text{V}$: X7R	500M Ω or $R \times C \geq 5 \Omega \cdot \text{F}$ whichever is smaller.	50V: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 $\geq 2.2\mu\text{F}$;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 ;	Rated voltage	Insulation Resistance	$\geq 100\text{V}$: X7R	1G Ω or $R \times C \geq 10 \Omega \cdot \text{F}$ whichever is smaller.	50V: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 $\geq 2.2\mu\text{F}$;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 ;
Rated vol.	DF \leq	Exception of DF																																																																	
$\geq 50\text{V}$	$\leq 3\%$	$\leq 6\%$	0201(50V);0603 $\geq 0.047\mu\text{F}$; 0805 $\geq 0.18\mu\text{F}$; 1206 $\geq 0.47\mu\text{F}$																																																																
		$\leq 10\%$	1210 $\geq 4.7\mu\text{F}$																																																																
		$\leq 20\%$	0402 $\geq 0.1\mu\text{F}$;0603 $\geq 1\mu\text{F}$; 0805 $\geq 1\mu\text{F}$;1206 $\geq 2.2\mu\text{F}$; 1210 $\geq 10\mu\text{F}$;																																																																
35V	$\leq 5\%$	$\leq 20\%$	0603 $\geq 1\mu\text{F}$;0805 $\geq 2.2\mu\text{F}$;1210 $\geq 10\mu\text{F}$																																																																
25V	$\leq 5\%$	$\leq 10\%$	0201 $\geq 0.01\mu\text{F}$;0805 $\geq 1\mu\text{F}$; 1210 $\geq 10\mu\text{F}$																																																																
		$\leq 14\%$	0603 $\geq 0.33\mu\text{F}$;1206 $\geq 4.7\mu\text{F}$																																																																
		$\leq 15\%$	0402 $\geq 0.10\mu\text{F}$;0603 $\geq 0.47\mu\text{F}$;0 805 $\geq 2.2\mu\text{F}$;1206 $\geq 6.8\mu\text{F}$; 1210 $\geq 22\mu\text{F}$																																																																
16V	$\leq 5\%$	$\leq 10\%$	0603 $\geq 0.15\mu\text{F}$;0805 $\geq 0.68\mu\text{F}$; 1206 $\geq 2.2\mu\text{F}$;1210 $\geq 4.7\mu\text{F}$																																																																
		$\leq 15\%$	0201 $\geq 0.01\mu\text{F}$;0402 $\geq 0.033\mu\text{F}$; 0603 $\geq 0.68\mu\text{F}$;0805 $\geq 2.2\mu\text{F}$ 1206 $\geq 4.7\mu\text{F}$; 1210 $\geq 22\mu\text{F}$;																																																																
10V	$\leq 7.5\%$	$\leq 15\%$	0201 $\geq 0.012\mu\text{F}$;0402 $\geq 0.33\mu\text{F}$; 0603 $\geq 0.33\mu\text{F}$;0805 $\geq 2.2\mu\text{F}$ 1206 $\geq 2.2\mu\text{F}$; 1210 $\geq 22\mu\text{F}$																																																																
		$\leq 20\%$	0201 $\geq 0.1\mu\text{F}$;0402 $\geq 1\mu\text{F}$;																																																																
6.3V	$\leq 15\%$	$\leq 30\%$	0201 $\geq 0.1\mu\text{F}$;0402 $\geq 1\mu\text{F}$; 0603 $\geq 10\mu\text{F}$; 0805 $\geq 4.7\mu\text{F}$;1206 $\geq 47\mu\text{F}$; 1210 $\geq 100\mu\text{F}$;																																																																
4V	$\leq 20\%$	---	----																																																																
Rated voltage	Insulation Resistance																																																																		
$\geq 100\text{V}$: X7R	500M Ω or $R \times C \geq 5 \Omega \cdot \text{F}$ whichever is smaller.																																																																		
50V: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 $\geq 2.2\mu\text{F}$;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 ;																																																																			
Rated voltage	Insulation Resistance																																																																		
$\geq 100\text{V}$: X7R	1G Ω or $R \times C \geq 10 \Omega \cdot \text{F}$ whichever is smaller.																																																																		
50V: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 $\geq 2.2\mu\text{F}$;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 ;																																																																			

No.	AEC-Q200 Test Item	AEC-Q200 Test Condition	Requirements																																																										
10.	Moisture Resistance MIL-STD-202 Method 106	* Temperature: 25±5°C * Time: 3+0.5/-0 min. *Solvent: Iso - propyl alcohol.	<p>*No remarkable damage. *Cap.: within the specified tolerance. *Q/D.F. value: NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C X7R:</p> <table border="1" data-bbox="743 347 1474 1359"> <thead> <tr> <th>Rated vol.</th> <th>DF≤</th> <th colspan="2">Exception of DF</th> </tr> </thead> <tbody> <tr> <td rowspan="3">≥ 50V</td> <td rowspan="3">≤ 2.5%</td> <td>≤ 3%</td> <td>0201(50V);0603 ≥ 0.047μF; 0805 ≥ 0.18μF; 1206 ≥ 0.47μF</td> </tr> <tr> <td>≤ 5%</td> <td>1210 ≥ 4.7μF</td> </tr> <tr> <td>≤ 10%</td> <td>0402 ≥ 0.1μF;0603 ≥ 1μF; 0805 ≥ 1μF;1206 ≥ 2.2μF; 1210 ≥ 10μF;</td> </tr> <tr> <td>35V</td> <td>≤ 3.5%</td> <td>≤ 10%</td> <td>0603 ≥ 1μF;0805 ≥ 2.2μF; 1210 ≥ 10μF</td> </tr> <tr> <td rowspan="3">25V</td> <td rowspan="3">≤ 3.5%</td> <td>≤ 5%</td> <td>0201 ≥ 0.01μF;0805 ≥ 1μF; 1210 ≥ 10μF</td> </tr> <tr> <td>≤ 7%</td> <td>0603 ≥ 0.33μF;1206 ≥ 4.7μF</td> </tr> <tr> <td>≤ 10%</td> <td>0402 ≥ 0.10μF;0603 ≥ 0.47μF; 0805 ≥ 2.2μF;1206 ≥ 6.8μF; 1210 ≥ 22μF;</td> </tr> <tr> <td rowspan="2">16V</td> <td rowspan="2">≤ 3.5%</td> <td>≤ 5%</td> <td>0603 ≥ 0.15μF;0805 ≥ 0.68μF; 1206 ≥ 2.2μF;1210 ≥ 4.7μF</td> </tr> <tr> <td>≤ 10%</td> <td>0201 ≥ 0.01μF;0402 ≥ 0.033μF; 0603 ≥ 0.68μF;0805 ≥ 2.2μF 1206 ≥ 4.7μF; 1210 ≥ 22μF;</td> </tr> <tr> <td rowspan="2">10V</td> <td rowspan="2">≤ 5%</td> <td>≤ 10%</td> <td>0201 ≥ 0.012μF;0402 ≥ 0.33μF; 0603 ≥ 0.33μF;0805 ≥ 2.2μF 1206 ≥ 2.2μF; 1210 ≥ 22μF</td> </tr> <tr> <td>≤ 15%</td> <td>0201 ≥ 0.1μF ;0402 ≥ 1μF;</td> </tr> <tr> <td rowspan="3">6.3V</td> <td rowspan="3">≤ 10%</td> <td></td> <td>0201 ≥ 0.1μF;0402 ≥ 1μF; 0603 ≥ 10μF;0805 ≥ 4.7μF; 1206 ≥ 47μF;1210 ≥ 100μF;</td> </tr> <tr> <td>≤ 15%</td> <td></td> </tr> <tr> <td>≤ 20%</td> <td>0402 ≥ 2.2μF;</td> </tr> <tr> <td>4V</td> <td>≤ 15%</td> <td>---</td> <td>----</td> </tr> </tbody> </table> <p>IR.: ≥10GΩ or RxC ≥500Ω-F whichever is smaller</p> <p>Class II (X7R)</p> <table border="1" data-bbox="743 1438 1417 1863"> <thead> <tr> <th>Rated voltage</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>≥100V: X7R</td> <td rowspan="7">10GΩ or R x C ≥ 10 Ω-F whichever is smaller.</td> </tr> <tr> <td>50V:0603 ≥ 1μF;0805 ≥ 1μF;1206 ≥ 4.7μF; 1210 ≥ 4.7μF</td> </tr> <tr> <td>35V:0805 ≥ 2.2μF;1210 ≥ 10μF</td> </tr> <tr> <td>25V:0402 ≥ 1μF;0603 ≥ 2.2μF;0805 ≥ 2.2μF; 1206 ≥ 10μF;1210 ≥ 10μF</td> </tr> <tr> <td>16V: 0201 ≥ 0.1μF;0402 ≥ 0.22μF;0603 ≥ 1μF; 0805 ≥ 2.2μF;1206 ≥ 10μF;1210 ≥ 47μF</td> </tr> <tr> <td>10V:0201 ≥ 47nF;0402 ≥ 0.47μF;0603 ≥ 0.47μF; 0805 ≥ 2.2μF;1206 ≥ 4.7μF;1210 ≥ 47μF</td> </tr> <tr> <td>6.3V ; 4V ;</td> </tr> </tbody> </table>	Rated vol.	DF≤	Exception of DF		≥ 50V	≤ 2.5%	≤ 3%	0201(50V);0603 ≥ 0.047μF; 0805 ≥ 0.18μF; 1206 ≥ 0.47μF	≤ 5%	1210 ≥ 4.7μF	≤ 10%	0402 ≥ 0.1μF;0603 ≥ 1μF; 0805 ≥ 1μF;1206 ≥ 2.2μF; 1210 ≥ 10μF;	35V	≤ 3.5%	≤ 10%	0603 ≥ 1μF;0805 ≥ 2.2μF; 1210 ≥ 10μF	25V	≤ 3.5%	≤ 5%	0201 ≥ 0.01μF;0805 ≥ 1μF; 1210 ≥ 10μF	≤ 7%	0603 ≥ 0.33μF;1206 ≥ 4.7μF	≤ 10%	0402 ≥ 0.10μF;0603 ≥ 0.47μF; 0805 ≥ 2.2μF;1206 ≥ 6.8μF; 1210 ≥ 22μF;	16V	≤ 3.5%	≤ 5%	0603 ≥ 0.15μF;0805 ≥ 0.68μF; 1206 ≥ 2.2μF;1210 ≥ 4.7μF	≤ 10%	0201 ≥ 0.01μF;0402 ≥ 0.033μF; 0603 ≥ 0.68μF;0805 ≥ 2.2μF 1206 ≥ 4.7μF; 1210 ≥ 22μF;	10V	≤ 5%	≤ 10%	0201 ≥ 0.012μF;0402 ≥ 0.33μF; 0603 ≥ 0.33μF;0805 ≥ 2.2μF 1206 ≥ 2.2μF; 1210 ≥ 22μF	≤ 15%	0201 ≥ 0.1μF ;0402 ≥ 1μF;	6.3V	≤ 10%		0201 ≥ 0.1μF;0402 ≥ 1μF; 0603 ≥ 10μF;0805 ≥ 4.7μF; 1206 ≥ 47μF;1210 ≥ 100μF;	≤ 15%		≤ 20%	0402 ≥ 2.2μF;	4V	≤ 15%	---	----	Rated voltage	Insulation Resistance	≥100V: X7R	10GΩ or R x C ≥ 10 Ω-F whichever is smaller.	50V:0603 ≥ 1μF;0805 ≥ 1μF;1206 ≥ 4.7μF; 1210 ≥ 4.7μF	35V:0805 ≥ 2.2μF;1210 ≥ 10μF	25V:0402 ≥ 1μF;0603 ≥ 2.2μF;0805 ≥ 2.2μF; 1206 ≥ 10μF;1210 ≥ 10μF	16V: 0201 ≥ 0.1μF;0402 ≥ 0.22μF;0603 ≥ 1μF; 0805 ≥ 2.2μF;1206 ≥ 10μF;1210 ≥ 47μF	10V:0201 ≥ 47nF;0402 ≥ 0.47μF;0603 ≥ 0.47μF; 0805 ≥ 2.2μF;1206 ≥ 4.7μF;1210 ≥ 47μF	6.3V ; 4V ;
Rated vol.	DF≤	Exception of DF																																																											
≥ 50V	≤ 2.5%	≤ 3%	0201(50V);0603 ≥ 0.047μF; 0805 ≥ 0.18μF; 1206 ≥ 0.47μF																																																										
		≤ 5%	1210 ≥ 4.7μF																																																										
		≤ 10%	0402 ≥ 0.1μF;0603 ≥ 1μF; 0805 ≥ 1μF;1206 ≥ 2.2μF; 1210 ≥ 10μF;																																																										
35V	≤ 3.5%	≤ 10%	0603 ≥ 1μF;0805 ≥ 2.2μF; 1210 ≥ 10μF																																																										
25V	≤ 3.5%	≤ 5%	0201 ≥ 0.01μF;0805 ≥ 1μF; 1210 ≥ 10μF																																																										
		≤ 7%	0603 ≥ 0.33μF;1206 ≥ 4.7μF																																																										
		≤ 10%	0402 ≥ 0.10μF;0603 ≥ 0.47μF; 0805 ≥ 2.2μF;1206 ≥ 6.8μF; 1210 ≥ 22μF;																																																										
16V	≤ 3.5%	≤ 5%	0603 ≥ 0.15μF;0805 ≥ 0.68μF; 1206 ≥ 2.2μF;1210 ≥ 4.7μF																																																										
		≤ 10%	0201 ≥ 0.01μF;0402 ≥ 0.033μF; 0603 ≥ 0.68μF;0805 ≥ 2.2μF 1206 ≥ 4.7μF; 1210 ≥ 22μF;																																																										
10V	≤ 5%	≤ 10%	0201 ≥ 0.012μF;0402 ≥ 0.33μF; 0603 ≥ 0.33μF;0805 ≥ 2.2μF 1206 ≥ 2.2μF; 1210 ≥ 22μF																																																										
		≤ 15%	0201 ≥ 0.1μF ;0402 ≥ 1μF;																																																										
6.3V	≤ 10%		0201 ≥ 0.1μF;0402 ≥ 1μF; 0603 ≥ 10μF;0805 ≥ 4.7μF; 1206 ≥ 47μF;1210 ≥ 100μF;																																																										
		≤ 15%																																																											
		≤ 20%	0402 ≥ 2.2μF;																																																										
4V	≤ 15%	---	----																																																										
Rated voltage	Insulation Resistance																																																												
≥100V: X7R	10GΩ or R x C ≥ 10 Ω-F whichever is smaller.																																																												
50V:0603 ≥ 1μF;0805 ≥ 1μF;1206 ≥ 4.7μF; 1210 ≥ 4.7μF																																																													
35V:0805 ≥ 2.2μF;1210 ≥ 10μF																																																													
25V:0402 ≥ 1μF;0603 ≥ 2.2μF;0805 ≥ 2.2μF; 1206 ≥ 10μF;1210 ≥ 10μF																																																													
16V: 0201 ≥ 0.1μF;0402 ≥ 0.22μF;0603 ≥ 1μF; 0805 ≥ 2.2μF;1206 ≥ 10μF;1210 ≥ 47μF																																																													
10V:0201 ≥ 47nF;0402 ≥ 0.47μF;0603 ≥ 0.47μF; 0805 ≥ 2.2μF;1206 ≥ 4.7μF;1210 ≥ 47μF																																																													
6.3V ; 4V ;																																																													

No.	AEC-Q200 Test Item	AEC-Q200 Test Condition	Requirements																																																										
11.	Mechanical Shock IL-STD-202 Method 213	Peak value: 1500g's. Wave: 1/2 sine. Velocity: 15.4 ft/sec Three shocks in each direction should be applied along 3 mutually perpendicular axes of the test specimen (18 shocks)	<p>*No remarkable damage. *Cap.: within the specified tolerance. *Q/D.F. value: NPO: Cap\geq30pF, Q\geq1000 ; Cap$<$30pF, Q\geq400+20C X7R:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Rated vol.</th> <th>DF\leq</th> <th colspan="2">Exception of DF</th> </tr> </thead> <tbody> <tr> <td rowspan="3">$\geq 50V$</td> <td rowspan="3">$\leq 2.5\%$</td> <td>$\leq 3\%$</td> <td>0201(50V);0603$\geq 0.047\mu F$; 0805$\geq 0.18\mu F$; 1206$\geq 0.47\mu F$</td> </tr> <tr> <td>$\leq 5\%$</td> <td>1210$\geq 4.7\mu F$</td> </tr> <tr> <td>$\leq 10\%$</td> <td>0402$\geq 0.1\mu F$;0603$\geq 1\mu F$; 0805$\geq 1\mu F$;1206$\geq 2.2\mu F$; 1210$\geq 10\mu F$;</td> </tr> <tr> <td>35V</td> <td>$\leq 3.5\%$</td> <td>$\leq 10\%$</td> <td>0603$\geq 1\mu F$;0805$\geq 2.2\mu F$; 1210$\geq 10\mu F$</td> </tr> <tr> <td rowspan="3">25V</td> <td rowspan="3">$\leq 3.5\%$</td> <td>$\leq 5\%$</td> <td>0201$\geq 0.01\mu F$;0805$\geq 1\mu F$; 1210$\geq 10\mu F$</td> </tr> <tr> <td>$\leq 7\%$</td> <td>0603$\geq 0.33\mu F$;1206$\geq 4.7\mu F$</td> </tr> <tr> <td>$\leq 10\%$</td> <td>0402$\geq 0.10\mu F$;0603$\geq 0.47\mu F$; 0805$\geq 2.2\mu F$;1206$\geq 6.8\mu F$; 1210$\geq 22\mu F$;</td> </tr> <tr> <td rowspan="2">16V</td> <td rowspan="2">$\leq 3.5\%$</td> <td>$\leq 5\%$</td> <td>0603$\geq 0.15\mu F$;0805$\geq 0.68\mu F$; 1206$\geq 2.2\mu F$;1210$\geq 4.7\mu F$</td> </tr> <tr> <td>$\leq 10\%$</td> <td>0201$\geq 0.01\mu F$;0402$\geq 0.033\mu F$; 0603$\geq 0.68\mu F$;0805$\geq 2.2\mu F$ 1206$\geq 4.7\mu F$; 1210$\geq 22\mu F$;</td> </tr> <tr> <td rowspan="2">10V</td> <td rowspan="2">$\leq 5\%$</td> <td>$\leq 10\%$</td> <td>0201$\geq 0.012\mu F$;0402$\geq 0.33\mu F$; 0603$\geq 0.33\mu F$;0805$\geq 2.2\mu F$ 1206$\geq 2.2\mu F$; 1210$\geq 22\mu F$</td> </tr> <tr> <td>$\leq 15\%$</td> <td>0201$\geq 0.1\mu F$;0402$\geq 1\mu F$;</td> </tr> <tr> <td rowspan="3">6.3V</td> <td rowspan="3">$\leq 10\%$</td> <td>$\leq 15\%$</td> <td>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$\geq 100\mu F$;</td> </tr> <tr> <td>$\leq 20\%$</td> <td>0402$\geq 2.2\mu F$;</td> </tr> <tr> <td>---</td> <td>----</td> </tr> <tr> <td>4V</td> <td>$\leq 15\%$</td> <td>---</td> <td>----</td> </tr> </tbody> </table> <p>IR.: $\geq 10G\Omega$ or Rx C$\geq 500\Omega$-F whichever is smaller</p> <p>Class II (X7R)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Rated voltage</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>$\geq 100V$: X7R</td> <td rowspan="7" style="text-align: center; vertical-align: middle;">10GΩ or R x C $\geq 100 \Omega$-F whichever is smaller.</td> </tr> <tr> <td>50V:0603$\geq 1\mu F$;0805$\geq 1\mu F$;1206$\geq 4.7\mu F$; 1210$\geq 4.7\mu F$</td> </tr> <tr> <td>35V:0805$\geq 2.2\mu F$;1210$\geq 10\mu F$</td> </tr> <tr> <td>25V:0402$\geq 1\mu F$;0603$\geq 2.2\mu F$;0805$\geq 2.2\mu F$; 1206$\geq 10\mu F$;1210$\geq 10\mu F$</td> </tr> <tr> <td>16V: 0201 $\geq 0.1\mu F$;0402$\geq 0.22\mu F$;0603$\geq 1\mu F$; 0805$\geq 2.2\mu F$;1206$\geq 10\mu F$;1210$\geq 47\mu F$</td> </tr> <tr> <td>10V:0201$\geq 47nF$;0402$\geq 0.47\mu F$;0603$\geq 0.47\mu F$; 0805$\geq 2.2\mu F$;1206$\geq 4.7\mu F$;1210$\geq 47\mu F$</td> </tr> <tr> <td>6.3V ; 4V ;</td> </tr> </tbody> </table>	Rated vol.	DF \leq	Exception of DF		$\geq 50V$	$\leq 2.5\%$	$\leq 3\%$	0201(50V);0603 $\geq 0.047\mu F$; 0805 $\geq 0.18\mu F$; 1206 $\geq 0.47\mu F$	$\leq 5\%$	1210 $\geq 4.7\mu F$	$\leq 10\%$	0402 $\geq 0.1\mu F$;0603 $\geq 1\mu F$; 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 $\geq 2.2\mu F$; 1210 $\geq 10\mu F$	25V	$\leq 3.5\%$	$\leq 5\%$	0201 $\geq 0.01\mu F$;0805 $\geq 1\mu F$; 1210 $\geq 10\mu F$	$\leq 7\%$	0603 $\geq 0.33\mu F$;1206 $\geq 4.7\mu F$	$\leq 10\%$	0402 $\geq 0.10\mu F$;0603 $\geq 0.47\mu F$; 0805 $\geq 2.2\mu F$;1206 $\geq 6.8\mu F$; 1210 $\geq 22\mu F$;	16V	$\leq 3.5\%$	$\leq 5\%$	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 $\geq 0.01\mu F$;0402 $\geq 0.033\mu F$; 0603 $\geq 0.68\mu F$;0805 $\geq 2.2\mu F$ 1206 $\geq 4.7\mu F$; 1210 $\geq 22\mu F$;	10V	$\leq 5\%$	$\leq 10\%$	0201 $\geq 0.012\mu F$;0402 $\geq 0.33\mu F$; 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	$\leq 15\%$	---	----	Rated voltage	Insulation Resistance	$\geq 100V$: X7R	10G Ω or R x C $\geq 100 \Omega$ -F whichever is smaller.	50V:0603 $\geq 1\mu F$;0805 $\geq 1\mu F$;1206 $\geq 4.7\mu F$; 1210 $\geq 4.7\mu F$	35V:0805 $\geq 2.2\mu F$;1210 $\geq 10\mu F$	25V:0402 $\geq 1\mu F$;0603 $\geq 2.2\mu F$;0805 $\geq 2.2\mu F$; 1206 $\geq 10\mu F$;1210 $\geq 10\mu F$	16V: 0201 $\geq 0.1\mu F$;0402 $\geq 0.22\mu F$;0603 $\geq 1\mu F$; 0805 $\geq 2.2\mu F$;1206 $\geq 10\mu F$;1210 $\geq 47\mu F$	10V:0201 $\geq 47nF$;0402 $\geq 0.47\mu F$;0603 $\geq 0.47\mu F$; 0805 $\geq 2.2\mu F$;1206 $\geq 4.7\mu F$;1210 $\geq 47\mu F$	6.3V ; 4V ;
Rated vol.	DF \leq	Exception of DF																																																											
$\geq 50V$	$\leq 2.5\%$	$\leq 3\%$	0201(50V);0603 $\geq 0.047\mu F$; 0805 $\geq 0.18\mu F$; 1206 $\geq 0.47\mu F$																																																										
		$\leq 5\%$	1210 $\geq 4.7\mu F$																																																										
		$\leq 10\%$	0402 $\geq 0.1\mu F$;0603 $\geq 1\mu F$; 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 $\geq 2.2\mu F$; 1210 $\geq 10\mu F$																																																										
25V	$\leq 3.5\%$	$\leq 5\%$	0201 $\geq 0.01\mu F$;0805 $\geq 1\mu F$; 1210 $\geq 10\mu F$																																																										
		$\leq 7\%$	0603 $\geq 0.33\mu F$;1206 $\geq 4.7\mu F$																																																										
		$\leq 10\%$	0402 $\geq 0.10\mu F$;0603 $\geq 0.47\mu F$; 0805 $\geq 2.2\mu F$;1206 $\geq 6.8\mu F$; 1210 $\geq 22\mu F$;																																																										
16V	$\leq 3.5\%$	$\leq 5\%$	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 $\geq 0.01\mu F$;0402 $\geq 0.033\mu F$; 0603 $\geq 0.68\mu F$;0805 $\geq 2.2\mu F$ 1206 $\geq 4.7\mu F$; 1210 $\geq 22\mu F$;																																																										
10V	$\leq 5\%$	$\leq 10\%$	0201 $\geq 0.012\mu F$;0402 $\geq 0.33\mu F$; 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	$\leq 15\%$	---	----																																																										
Rated voltage	Insulation Resistance																																																												
$\geq 100V$: X7R	10G Ω or R x C $\geq 100 \Omega$ -F whichever is smaller.																																																												
50V:0603 $\geq 1\mu F$;0805 $\geq 1\mu F$;1206 $\geq 4.7\mu F$; 1210 $\geq 4.7\mu F$																																																													
35V:0805 $\geq 2.2\mu F$;1210 $\geq 10\mu F$																																																													
25V:0402 $\geq 1\mu F$;0603 $\geq 2.2\mu F$;0805 $\geq 2.2\mu F$; 1206 $\geq 10\mu F$;1210 $\geq 10\mu F$																																																													
16V: 0201 $\geq 0.1\mu F$;0402 $\geq 0.22\mu F$;0603 $\geq 1\mu F$; 0805 $\geq 2.2\mu F$;1206 $\geq 10\mu F$;1210 $\geq 47\mu F$																																																													
10V:0201 $\geq 47nF$;0402 $\geq 0.47\mu F$;0603 $\geq 0.47\mu F$; 0805 $\geq 2.2\mu F$;1206 $\geq 4.7\mu F$;1210 $\geq 47\mu F$																																																													
6.3V ; 4V ;																																																													

No.	AEC-Q200 Test Item	AEC-Q200 Test Condition	Requirements																																																								
12.	Vibration MIL-STD-202 Method 204	Vibration frequency:10~2000Hz/min. (5g's for 20 min) Total amplitude: 1.5mm 12 cycles each of 3 orientations (36 times)	<p>*No remarkable damage. *Cap.: within the specified tolerance. *Q/D.F. value: NPO: Cap\geq30pF, Q\geq1000 ; Cap$<$30pF, Q\geq400+20C X7R:</p> <table border="1" data-bbox="767 367 1501 1272"> <thead> <tr> <th>Rated vol.</th> <th>DF\leq</th> <th colspan="2">Exception of DF</th> </tr> </thead> <tbody> <tr> <td rowspan="3">\geq 50V</td> <td rowspan="3">\leq 2.5%</td> <td>\leq 3%</td> <td>0201(50V);0603\geq 0.047μF; 0805\geq 0.18μF; 1206\geq 0.47μF</td> </tr> <tr> <td>\leq 5%</td> <td>1210\geq 4.7μF</td> </tr> <tr> <td>\leq 10%</td> <td>0402\geq 0.1μF;0603\geq 1μF; 0805\geq 1μF;1206\geq 2.2μF; 1210\geq 10</td> </tr> <tr> <td>35V</td> <td>\leq 3.5%</td> <td>\leq 10%</td> <td>0603\geq 1μF;0805\geq 2.2μF;1210\geq 10μF</td> </tr> <tr> <td rowspan="3">25V</td> <td rowspan="3">\leq 3.5%</td> <td>\leq 5%</td> <td>0201\geq 0.01μF;0805\geq 1μF; 1210\geq 10μF</td> </tr> <tr> <td>\leq 7%</td> <td>0603\geq 0.33μF;1206\geq 4.7μF</td> </tr> <tr> <td>\leq 10%</td> <td>0402\geq 0.10μF;0603\geq 0.47μF; 0805\geq 2.2μF;1206\geq 6.8μF; 1210\geq 22μF;</td> </tr> <tr> <td rowspan="2">16V</td> <td rowspan="2">\leq 3.5%</td> <td>\leq 5%</td> <td>0603\geq 0.15μF;0805\geq 0.68μF; 1206\geq 2.2μF;1210\geq 4.7μF</td> </tr> <tr> <td>\leq 10%</td> <td>0201\geq 0.01μF;0402\geq 0.033μF; 0603\geq 0.68μF;0805\geq 2.2μF 1206\geq 4.7μF; 1210\geq 22μF;</td> </tr> <tr> <td rowspan="2">10V</td> <td rowspan="2">\leq 5%</td> <td>\leq 10%</td> <td>0201\geq 0.012μF;0402\geq 0.33μF; 0603\geq 0.33μF;0805\geq 2.2μF 1206\geq 2.2μF; 1210\geq 22μF</td> </tr> <tr> <td>\leq 15%</td> <td>0201\geq 0.1μF ;0402\geq 1μF;</td> </tr> <tr> <td rowspan="2">6.3V</td> <td rowspan="2">\leq 10%</td> <td>\leq 15%</td> <td>0201\geq 0.1μF;0402\geq 1μF; 0603\geq 10μF;0805\geq 4.7μF; 1206\geq 47μF;1210\geq 100μF;</td> </tr> <tr> <td>\leq 20%</td> <td>0402\geq 2.2μF;</td> </tr> <tr> <td>4V</td> <td>\leq 15%</td> <td>---</td> <td>----</td> </tr> </tbody> </table> <p>IR.: \geq10GΩ or Rx$C \geq$500Ω-F whichever is smaller</p> <p>Class II (X7R)</p> <table border="1" data-bbox="767 1346 1501 1720"> <thead> <tr> <th>Rated voltage</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>\geq100V: X7R</td> <td rowspan="7">10GΩ or Rx C \geq 100 Ω-F Whichever is smaller.</td> </tr> <tr> <td>50V:0603\geq1μF;0805\geq1μF;1206\geq4.7μF;1210\geq4.7μF</td> </tr> <tr> <td>35V:0805\geq2.2μF;1210\geq 10μF</td> </tr> <tr> <td>25V:0402\geq1μF;0603\geq2.2μF;0805\geq2.2μF; 1206\geq10μF;1210\geq10μF</td> </tr> <tr> <td>16V: 0201 \geq 0.1μF;0402\geq0.22μF;0603\geq1μF; 0805\geq2.2μF;1206\geq10μF;1210\geq47μF</td> </tr> <tr> <td>10V:0201\geq47nF;0402\geq0.47μF;0603\geq0.47μF; 0805\geq2.2μF;1206\geq4.7μF;1210\geq47μF</td> </tr> <tr> <td>6.3V ; 4V ;</td> </tr> </tbody> </table>	Rated vol.	DF \leq	Exception of DF		\geq 50V	\leq 2.5%	\leq 3%	0201(50V);0603 \geq 0.047 μ F; 0805 \geq 0.18 μ F; 1206 \geq 0.47 μ F	\leq 5%	1210 \geq 4.7 μ F	\leq 10%	0402 \geq 0.1 μ F;0603 \geq 1 μ F; 0805 \geq 1 μ F;1206 \geq 2.2 μ F; 1210 \geq 10	35V	\leq 3.5%	\leq 10%	0603 \geq 1 μ F;0805 \geq 2.2 μ F;1210 \geq 10 μ F	25V	\leq 3.5%	\leq 5%	0201 \geq 0.01 μ F;0805 \geq 1 μ F; 1210 \geq 10 μ F	\leq 7%	0603 \geq 0.33 μ F;1206 \geq 4.7 μ F	\leq 10%	0402 \geq 0.10 μ F;0603 \geq 0.47 μ F; 0805 \geq 2.2 μ F;1206 \geq 6.8 μ F; 1210 \geq 22 μ F;	16V	\leq 3.5%	\leq 5%	0603 \geq 0.15 μ F;0805 \geq 0.68 μ F; 1206 \geq 2.2 μ F;1210 \geq 4.7 μ F	\leq 10%	0201 \geq 0.01 μ F;0402 \geq 0.033 μ F; 0603 \geq 0.68 μ F;0805 \geq 2.2 μ F 1206 \geq 4.7 μ F; 1210 \geq 22 μ F;	10V	\leq 5%	\leq 10%	0201 \geq 0.012 μ F;0402 \geq 0.33 μ F; 0603 \geq 0.33 μ F;0805 \geq 2.2 μ F 1206 \geq 2.2 μ F; 1210 \geq 22 μ F	\leq 15%	0201 \geq 0.1 μ F ;0402 \geq 1 μ F;	6.3V	\leq 10%	\leq 15%	0201 \geq 0.1 μ F;0402 \geq 1 μ F; 0603 \geq 10 μ F;0805 \geq 4.7 μ F; 1206 \geq 47 μ F;1210 \geq 100 μ F;	\leq 20%	0402 \geq 2.2 μ F;	4V	\leq 15%	---	----	Rated voltage	Insulation Resistance	\geq 100V: X7R	10G Ω or Rx C \geq 100 Ω -F Whichever is smaller.	50V:0603 \geq 1 μ F;0805 \geq 1 μ F;1206 \geq 4.7 μ F;1210 \geq 4.7 μ F	35V:0805 \geq 2.2 μ F;1210 \geq 10 μ F	25V:0402 \geq 1 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 ;
Rated vol.	DF \leq	Exception of DF																																																									
\geq 50V	\leq 2.5%	\leq 3%	0201(50V);0603 \geq 0.047 μ F; 0805 \geq 0.18 μ F; 1206 \geq 0.47 μ F																																																								
		\leq 5%	1210 \geq 4.7 μ F																																																								
		\leq 10%	0402 \geq 0.1 μ F;0603 \geq 1 μ F; 0805 \geq 1 μ F;1206 \geq 2.2 μ F; 1210 \geq 10																																																								
35V	\leq 3.5%	\leq 10%	0603 \geq 1 μ F;0805 \geq 2.2 μ F;1210 \geq 10 μ F																																																								
25V	\leq 3.5%	\leq 5%	0201 \geq 0.01 μ F;0805 \geq 1 μ F; 1210 \geq 10 μ F																																																								
		\leq 7%	0603 \geq 0.33 μ F;1206 \geq 4.7 μ F																																																								
		\leq 10%	0402 \geq 0.10 μ F;0603 \geq 0.47 μ F; 0805 \geq 2.2 μ F;1206 \geq 6.8 μ F; 1210 \geq 22 μ F;																																																								
16V	\leq 3.5%	\leq 5%	0603 \geq 0.15 μ F;0805 \geq 0.68 μ F; 1206 \geq 2.2 μ F;1210 \geq 4.7 μ F																																																								
		\leq 10%	0201 \geq 0.01 μ F;0402 \geq 0.033 μ F; 0603 \geq 0.68 μ F;0805 \geq 2.2 μ F 1206 \geq 4.7 μ F; 1210 \geq 22 μ F;																																																								
10V	\leq 5%	\leq 10%	0201 \geq 0.012 μ F;0402 \geq 0.33 μ F; 0603 \geq 0.33 μ F;0805 \geq 2.2 μ F 1206 \geq 2.2 μ F; 1210 \geq 22 μ F																																																								
		\leq 15%	0201 \geq 0.1 μ F ;0402 \geq 1 μ F;																																																								
6.3V	\leq 10%	\leq 15%	0201 \geq 0.1 μ F;0402 \geq 1 μ F; 0603 \geq 10 μ F;0805 \geq 4.7 μ F; 1206 \geq 47 μ F;1210 \geq 100 μ F;																																																								
		\leq 20%	0402 \geq 2.2 μ F;																																																								
4V	\leq 15%	---	----																																																								
Rated voltage	Insulation Resistance																																																										
\geq 100V: X7R	10G Ω or Rx C \geq 100 Ω -F Whichever is smaller.																																																										
50V:0603 \geq 1 μ F;0805 \geq 1 μ F;1206 \geq 4.7 μ F;1210 \geq 4.7 μ F																																																											
35V:0805 \geq 2.2 μ F;1210 \geq 10 μ F																																																											
25V:0402 \geq 1 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 ;																																																											

No.	AEC-Q200 Test Item	AEC-Q200 Test Condition	Requirements																																																									
13.	Resistance to Soldering Heat MIL-STD-202 Method 210	* Solder temperature: 270±5°C * Dipping time: 10±1 sec * Before initial measurement (X7R only): Perform 150+0/-10°C for 1 hr and then set for 24±2 hrs at room temp. * Measurement to be made after keeping X7R: at room temp. for 24±2 hrs.	*No remarkable damage. *Cap change: NPO: within ±2.5% or 0.25pF whichever is larger X7R: within ±7.5% *Q/D.F. value: NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C X7R: <table border="1" data-bbox="778 421 1520 1323"> <thead> <tr> <th>Rated vol.</th> <th>DF≤</th> <th colspan="2">Exception of DF</th> </tr> </thead> <tbody> <tr> <td rowspan="3">≥ 50V</td> <td rowspan="3">≤ 2.5%</td> <td>≤ 3%</td> <td>0201(50V);0603 ≥ 0.047μF; 0805 ≥ 0.18μF; 1206 ≥ 0.47μF</td> </tr> <tr> <td>≤ 5%</td> <td>1210 ≥ 4.7μF</td> </tr> <tr> <td>≤ 10%</td> <td>0402 ≥ 0.1μF;0603 ≥ 1μF; 0805 ≥ 1μF;1206 ≥ 2.2μF; 1210 ≥ 10μF;</td> </tr> <tr> <td>35V</td> <td>≤ 3.5%</td> <td>≤ 10%</td> <td>0603 ≥ 1μF;0805 ≥ 2.2μF;1210 ≥ 10μF</td> </tr> <tr> <td rowspan="3">25V</td> <td rowspan="3">≤ 3.5%</td> <td>≤ 5%</td> <td>0201 ≥ 0.01μF;0805 ≥ 1μF; 1210 ≥ 10μF</td> </tr> <tr> <td>≤ 7%</td> <td>0603 ≥ 0.33μF;1206 ≥ 4.7μF</td> </tr> <tr> <td>≤ 10%</td> <td>0402 ≥ 0.10μF;0603 ≥ 0.47μF; 0805 ≥ 2.2μF;1206 ≥ 6.8μF; 1210 ≥ 22μF;</td> </tr> <tr> <td rowspan="2">16V</td> <td rowspan="2">≤ 3.5%</td> <td>≤ 5%</td> <td>0603 ≥ 0.15μF;0805 ≥ 0.68μF; 1206 ≥ 2.2μF;1210 ≥ 4.7μF</td> </tr> <tr> <td>≤ 10%</td> <td>0201 ≥ 0.01μF;0402 ≥ 0.033μF; 0603 ≥ 0.68μF;0805 ≥ 2.2μF 1206 ≥ 4.7μF; 1210 ≥ 22μF;</td> </tr> <tr> <td rowspan="2">10V</td> <td rowspan="2">≤ 5%</td> <td>≤ 10%</td> <td>0201 ≥ 0.012μF;0402 ≥ 0.33μF; 0603 ≥ 0.33μF;0805 ≥ 2.2μF 1206 ≥ 2.2μF; 1210 ≥ 22μF</td> </tr> <tr> <td>≤ 15%</td> <td>0201 ≥ 0.1μF ;0402 ≥ 1μF;</td> </tr> <tr> <td rowspan="2">6.3V</td> <td rowspan="2">≤ 10%</td> <td>≤ 15%</td> <td>0201 ≥ 0.1μF;0402 ≥ 1μF; 0603 ≥ 10μF;0805 ≥ 4.7μF; 1206 ≥ 47μF;1210 ≥ 100μF</td> </tr> <tr> <td>≤ 20%</td> <td>0402 ≥ 2.2μF;</td> </tr> <tr> <td>4V</td> <td>≤ 15%</td> <td>---</td> <td>----</td> </tr> </tbody> </table> IR.: ≥10GΩ or RxC ≥500Ω-F whichever is smaller Class II (X7R) <table border="1" data-bbox="778 1397 1520 1771"> <thead> <tr> <th>Rated voltage</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>≥100V: X7R</td> <td rowspan="7">10GΩ or R x C ≥ 10 Ω-F whichever is smaller.</td> </tr> <tr> <td>50V:0603 ≥ 1μF;0805 ≥ 1μF;1206 ≥ 4.7μF;1210 ≥ 4.7μF</td> </tr> <tr> <td>35V:0805 ≥ 2.2μF;1210 ≥ 10μF</td> </tr> <tr> <td>25V:0402 ≥ 1μF;0603 ≥ 2.2μF;0805 ≥ 2.2μF; 1206 ≥ 10μF;1210 ≥ 10μF</td> </tr> <tr> <td>16V: 0201 ≥ 0.1μF;0402 ≥ 0.22μF;0603 ≥ 1μF; 0805 ≥ 2.2μF;1206 ≥ 10μF;1210 ≥ 47μF</td> </tr> <tr> <td>10V:0201 ≥ 47nF;0402 ≥ 0.47μF;0603 ≥ 0.47μF; 0805 ≥ 2.2μF;1206 ≥ 4.7μF;1210 ≥ 47μF</td> </tr> <tr> <td>6.3V ; 4V ;</td> </tr> </tbody> </table>		Rated vol.	DF≤	Exception of DF		≥ 50V	≤ 2.5%	≤ 3%	0201(50V);0603 ≥ 0.047μF; 0805 ≥ 0.18μF; 1206 ≥ 0.47μF	≤ 5%	1210 ≥ 4.7μF	≤ 10%	0402 ≥ 0.1μF;0603 ≥ 1μF; 0805 ≥ 1μF;1206 ≥ 2.2μF; 1210 ≥ 10μF;	35V	≤ 3.5%	≤ 10%	0603 ≥ 1μF;0805 ≥ 2.2μF;1210 ≥ 10μF	25V	≤ 3.5%	≤ 5%	0201 ≥ 0.01μF;0805 ≥ 1μF; 1210 ≥ 10μF	≤ 7%	0603 ≥ 0.33μF;1206 ≥ 4.7μF	≤ 10%	0402 ≥ 0.10μF;0603 ≥ 0.47μF; 0805 ≥ 2.2μF;1206 ≥ 6.8μF; 1210 ≥ 22μF;	16V	≤ 3.5%	≤ 5%	0603 ≥ 0.15μF;0805 ≥ 0.68μF; 1206 ≥ 2.2μF;1210 ≥ 4.7μF	≤ 10%	0201 ≥ 0.01μF;0402 ≥ 0.033μF; 0603 ≥ 0.68μF;0805 ≥ 2.2μF 1206 ≥ 4.7μF; 1210 ≥ 22μF;	10V	≤ 5%	≤ 10%	0201 ≥ 0.012μF;0402 ≥ 0.33μF; 0603 ≥ 0.33μF;0805 ≥ 2.2μF 1206 ≥ 2.2μF; 1210 ≥ 22μF	≤ 15%	0201 ≥ 0.1μF ;0402 ≥ 1μF;	6.3V	≤ 10%	≤ 15%	0201 ≥ 0.1μF;0402 ≥ 1μF; 0603 ≥ 10μF;0805 ≥ 4.7μF; 1206 ≥ 47μF;1210 ≥ 100μF	≤ 20%	0402 ≥ 2.2μF;	4V	≤ 15%	---	----	Rated voltage	Insulation Resistance	≥100V: X7R	10GΩ or R x C ≥ 10 Ω-F whichever is smaller.	50V:0603 ≥ 1μF;0805 ≥ 1μF;1206 ≥ 4.7μF;1210 ≥ 4.7μF	35V:0805 ≥ 2.2μF;1210 ≥ 10μF	25V:0402 ≥ 1μF;0603 ≥ 2.2μF;0805 ≥ 2.2μF; 1206 ≥ 10μF;1210 ≥ 10μF	16V: 0201 ≥ 0.1μF;0402 ≥ 0.22μF;0603 ≥ 1μF; 0805 ≥ 2.2μF;1206 ≥ 10μF;1210 ≥ 47μF	10V:0201 ≥ 47nF;0402 ≥ 0.47μF;0603 ≥ 0.47μF; 0805 ≥ 2.2μF;1206 ≥ 4.7μF;1210 ≥ 47μF	6.3V ; 4V ;
Rated vol.	DF≤	Exception of DF																																																										
≥ 50V	≤ 2.5%	≤ 3%	0201(50V);0603 ≥ 0.047μF; 0805 ≥ 0.18μF; 1206 ≥ 0.47μF																																																									
		≤ 5%	1210 ≥ 4.7μF																																																									
		≤ 10%	0402 ≥ 0.1μF;0603 ≥ 1μF; 0805 ≥ 1μF;1206 ≥ 2.2μF; 1210 ≥ 10μF;																																																									
35V	≤ 3.5%	≤ 10%	0603 ≥ 1μF;0805 ≥ 2.2μF;1210 ≥ 10μF																																																									
25V	≤ 3.5%	≤ 5%	0201 ≥ 0.01μF;0805 ≥ 1μF; 1210 ≥ 10μF																																																									
		≤ 7%	0603 ≥ 0.33μF;1206 ≥ 4.7μF																																																									
		≤ 10%	0402 ≥ 0.10μF;0603 ≥ 0.47μF; 0805 ≥ 2.2μF;1206 ≥ 6.8μF; 1210 ≥ 22μF;																																																									
16V	≤ 3.5%	≤ 5%	0603 ≥ 0.15μF;0805 ≥ 0.68μF; 1206 ≥ 2.2μF;1210 ≥ 4.7μF																																																									
		≤ 10%	0201 ≥ 0.01μF;0402 ≥ 0.033μF; 0603 ≥ 0.68μF;0805 ≥ 2.2μF 1206 ≥ 4.7μF; 1210 ≥ 22μF;																																																									
10V	≤ 5%	≤ 10%	0201 ≥ 0.012μF;0402 ≥ 0.33μF; 0603 ≥ 0.33μF;0805 ≥ 2.2μF 1206 ≥ 2.2μF; 1210 ≥ 22μF																																																									
		≤ 15%	0201 ≥ 0.1μF ;0402 ≥ 1μF;																																																									
6.3V	≤ 10%	≤ 15%	0201 ≥ 0.1μF;0402 ≥ 1μF; 0603 ≥ 10μF;0805 ≥ 4.7μF; 1206 ≥ 47μF;1210 ≥ 100μF																																																									
		≤ 20%	0402 ≥ 2.2μF;																																																									
4V	≤ 15%	---	----																																																									
Rated voltage	Insulation Resistance																																																											
≥100V: X7R	10GΩ or R x C ≥ 10 Ω-F whichever is smaller.																																																											
50V:0603 ≥ 1μF;0805 ≥ 1μF;1206 ≥ 4.7μF;1210 ≥ 4.7μF																																																												
35V:0805 ≥ 2.2μF;1210 ≥ 10μF																																																												
25V:0402 ≥ 1μF;0603 ≥ 2.2μF;0805 ≥ 2.2μF; 1206 ≥ 10μF;1210 ≥ 10μF																																																												
16V: 0201 ≥ 0.1μF;0402 ≥ 0.22μF;0603 ≥ 1μF; 0805 ≥ 2.2μF;1206 ≥ 10μF;1210 ≥ 47μF																																																												
10V:0201 ≥ 47nF;0402 ≥ 0.47μF;0603 ≥ 0.47μF; 0805 ≥ 2.2μF;1206 ≥ 4.7μF;1210 ≥ 47μF																																																												
6.3V ; 4V ;																																																												

No.	AEC-Q200 Test Item	AEC-Q200 Test Condition	Requirements																																																																	
14.	Thermal Shock IL-STD-202 Method 107	<p>*Conduct 300 cycles according to the temperatures and time. Max. transfer time: 20 sec.</p> <table border="1" data-bbox="384 315 748 472"> <thead> <tr> <th>Step</th> <th>Temp. (°C)</th> <th>Time (min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55°C +0/-3</td> <td>15±3</td> </tr> <tr> <td>2</td> <td>+125°C+3/-0</td> <td>15±3</td> </tr> </tbody> </table> <p>*Max. transfer time: 20 sec *Before initial measurement (X7R only): Perform 150+0/-10°C for 1 hr and then set for 24±2 hrs at room temp. *Measurement to be made after keeping at room temp. for 24±2 hrs</p>	Step	Temp. (°C)	Time (min.)	1	-55°C +0/-3	15±3	2	+125°C+3/-0	15±3	<p>*No remarkable damage. *Cap change: NPO: within ±2.5% or 0.25pF whichever is larger X7R: within ±10.0%</p> <p>*Q/D.F. value: NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C X7R:</p> <table border="1" data-bbox="775 394 1522 1294"> <thead> <tr> <th>Rated vol.</th> <th>DF≤</th> <th colspan="2">Exception of DF</th> </tr> </thead> <tbody> <tr> <td rowspan="3">≥ 50V</td> <td rowspan="3">≤ 2.5%</td> <td>≤ 3%</td> <td>0201(50V);0603 ≥ 0.047μF; 0805 ≥ 0.18μF; 1206 ≥ 0.47μF</td> </tr> <tr> <td>≤ 5%</td> <td>1210 ≥ 4.7μF</td> </tr> <tr> <td>≤ 10%</td> <td>0402 ≥ 0.1μF; 0603 ≥ 1μF; 0805 ≥ 1μF; 1206 ≥ 2.2μF; 1210 ≥ 10μF;</td> </tr> <tr> <td>35V</td> <td>≤ 3.5%</td> <td>≤ 10%</td> <td>0603 ≥ 1μF; 0805 ≥ 2.2μF; 1210 ≥ 10μF</td> </tr> <tr> <td rowspan="3">25V</td> <td rowspan="3">≤ 3.5%</td> <td>≤ 5%</td> <td>0201 ≥ 0.01μF; 0805 ≥ 1μF; 1210 ≥ 10μF</td> </tr> <tr> <td>≤ 7%</td> <td>0603 ≥ 0.33μF; 1206 ≥ 4.7μF</td> </tr> <tr> <td>≤ 10%</td> <td>0402 ≥ 0.10μF; 0603 ≥ 0.47μF; 0805 ≥ 2.2μF; 1206 ≥ 6.8μF; 1210 ≥ 22μF;</td> </tr> <tr> <td rowspan="2">16V</td> <td rowspan="2">≤ 3.5%</td> <td>≤ 5%</td> <td>0603 ≥ 0.15μF; 0805 ≥ 0.68μF; 1206 ≥ 2.2μF; 1210 ≥ 4.7μF</td> </tr> <tr> <td>≤ 10%</td> <td>0201 ≥ 0.01μF; 0402 ≥ 0.033μF; 0603 ≥ 0.68μF; 0805 ≥ 2.2μF 1206 ≥ 4.7μF; 1210 ≥ 22μF;</td> </tr> <tr> <td rowspan="2">10V</td> <td rowspan="2">≤ 5%</td> <td>≤ 10%</td> <td>0201 ≥ 0.012μF; 0402 ≥ 0.33μF; 0603 ≥ 0.33μF; 0805 ≥ 2.2μF 1206 ≥ 2.2μF; 1210 ≥ 22μF</td> </tr> <tr> <td>≤ 15%</td> <td>0201 ≥ 0.1μF ; 0402 ≥ 1μF;</td> </tr> <tr> <td rowspan="2">6.3V</td> <td rowspan="2">≤ 10%</td> <td>≤ 15%</td> <td>0201 ≥ 0.1μF; 0402 ≥ 1μF; 0603 ≥ 10μF; 0805 ≥ 4.7μF; 1206 ≥ 47μF; 1210 ≥ 100μF</td> </tr> <tr> <td>≤ 20%</td> <td>0402 ≥ 2.2μF;</td> </tr> <tr> <td>4V</td> <td>≤ 15%</td> <td>---</td> <td>----</td> </tr> </tbody> </table> <p>IR.: ≥10GΩ or RxC ≥500Ω-F whichever is smaller</p> <p>Class II (X7R)</p> <table border="1" data-bbox="775 1368 1506 1742"> <thead> <tr> <th>Rated voltage</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>≥100V: X7R</td> <td rowspan="7">1GΩ or R x C ≥ 10Ω-F whichever is smaller.</td> </tr> <tr> <td>50V: 0603 ≥ 1μF; 0805 ≥ 1μF; 1206 ≥ 4.7μF; 1210 ≥ 4.7μF</td> </tr> <tr> <td>35V: 0805 ≥ 2.2μF; 1210 ≥ 10μF</td> </tr> <tr> <td>25V: 0402 ≥ 1μF; 0603 ≥ 2.2μF; 0805 ≥ 2.2μF; 1206 ≥ 10μF; 1210 ≥ 10μF</td> </tr> <tr> <td>16V: 0201 ≥ 0.1μF; 0402 ≥ 0.22μF; 0603 ≥ 1μF; 0805 ≥ 2.2μF; 1206 ≥ 10μF; 1210 ≥ 47μF</td> </tr> <tr> <td>10V: 0201 ≥ 47nF; 0402 ≥ 0.47μF; 0603 ≥ 0.47μF; 0805 ≥ 2.2μF; 1206 ≥ 4.7μF; 1210 ≥ 47μF</td> </tr> <tr> <td>6.3V ; 4V ; TT series</td> </tr> </tbody> </table>	Rated vol.	DF≤	Exception of DF		≥ 50V	≤ 2.5%	≤ 3%	0201(50V);0603 ≥ 0.047μF; 0805 ≥ 0.18μF; 1206 ≥ 0.47μF	≤ 5%	1210 ≥ 4.7μF	≤ 10%	0402 ≥ 0.1μF; 0603 ≥ 1μF; 0805 ≥ 1μF; 1206 ≥ 2.2μF; 1210 ≥ 10μF;	35V	≤ 3.5%	≤ 10%	0603 ≥ 1μF; 0805 ≥ 2.2μF; 1210 ≥ 10μF	25V	≤ 3.5%	≤ 5%	0201 ≥ 0.01μF; 0805 ≥ 1μF; 1210 ≥ 10μF	≤ 7%	0603 ≥ 0.33μF; 1206 ≥ 4.7μF	≤ 10%	0402 ≥ 0.10μF; 0603 ≥ 0.47μF; 0805 ≥ 2.2μF; 1206 ≥ 6.8μF; 1210 ≥ 22μF;	16V	≤ 3.5%	≤ 5%	0603 ≥ 0.15μF; 0805 ≥ 0.68μF; 1206 ≥ 2.2μF; 1210 ≥ 4.7μF	≤ 10%	0201 ≥ 0.01μF; 0402 ≥ 0.033μF; 0603 ≥ 0.68μF; 0805 ≥ 2.2μF 1206 ≥ 4.7μF; 1210 ≥ 22μF;	10V	≤ 5%	≤ 10%	0201 ≥ 0.012μF; 0402 ≥ 0.33μF; 0603 ≥ 0.33μF; 0805 ≥ 2.2μF 1206 ≥ 2.2μF; 1210 ≥ 22μF	≤ 15%	0201 ≥ 0.1μF ; 0402 ≥ 1μF;	6.3V	≤ 10%	≤ 15%	0201 ≥ 0.1μF; 0402 ≥ 1μF; 0603 ≥ 10μF; 0805 ≥ 4.7μF; 1206 ≥ 47μF; 1210 ≥ 100μF	≤ 20%	0402 ≥ 2.2μF;	4V	≤ 15%	---	----	Rated voltage	Insulation Resistance	≥100V: X7R	1GΩ or R x C ≥ 10Ω-F whichever is smaller.	50V: 0603 ≥ 1μF; 0805 ≥ 1μF; 1206 ≥ 4.7μF; 1210 ≥ 4.7μF	35V: 0805 ≥ 2.2μF; 1210 ≥ 10μF	25V: 0402 ≥ 1μF; 0603 ≥ 2.2μF; 0805 ≥ 2.2μF; 1206 ≥ 10μF; 1210 ≥ 10μF	16V: 0201 ≥ 0.1μF; 0402 ≥ 0.22μF; 0603 ≥ 1μF; 0805 ≥ 2.2μF; 1206 ≥ 10μF; 1210 ≥ 47μF	10V: 0201 ≥ 47nF; 0402 ≥ 0.47μF; 0603 ≥ 0.47μF; 0805 ≥ 2.2μF; 1206 ≥ 4.7μF; 1210 ≥ 47μF	6.3V ; 4V ; TT series
Step	Temp. (°C)	Time (min.)																																																																		
1	-55°C +0/-3	15±3																																																																		
2	+125°C+3/-0	15±3																																																																		
Rated vol.	DF≤	Exception of DF																																																																		
≥ 50V	≤ 2.5%	≤ 3%	0201(50V);0603 ≥ 0.047μF; 0805 ≥ 0.18μF; 1206 ≥ 0.47μF																																																																	
		≤ 5%	1210 ≥ 4.7μF																																																																	
		≤ 10%	0402 ≥ 0.1μF; 0603 ≥ 1μF; 0805 ≥ 1μF; 1206 ≥ 2.2μF; 1210 ≥ 10μF;																																																																	
35V	≤ 3.5%	≤ 10%	0603 ≥ 1μF; 0805 ≥ 2.2μF; 1210 ≥ 10μF																																																																	
25V	≤ 3.5%	≤ 5%	0201 ≥ 0.01μF; 0805 ≥ 1μF; 1210 ≥ 10μF																																																																	
		≤ 7%	0603 ≥ 0.33μF; 1206 ≥ 4.7μF																																																																	
		≤ 10%	0402 ≥ 0.10μF; 0603 ≥ 0.47μF; 0805 ≥ 2.2μF; 1206 ≥ 6.8μF; 1210 ≥ 22μF;																																																																	
16V	≤ 3.5%	≤ 5%	0603 ≥ 0.15μF; 0805 ≥ 0.68μF; 1206 ≥ 2.2μF; 1210 ≥ 4.7μF																																																																	
		≤ 10%	0201 ≥ 0.01μF; 0402 ≥ 0.033μF; 0603 ≥ 0.68μF; 0805 ≥ 2.2μF 1206 ≥ 4.7μF; 1210 ≥ 22μF;																																																																	
10V	≤ 5%	≤ 10%	0201 ≥ 0.012μF; 0402 ≥ 0.33μF; 0603 ≥ 0.33μF; 0805 ≥ 2.2μF 1206 ≥ 2.2μF; 1210 ≥ 22μF																																																																	
		≤ 15%	0201 ≥ 0.1μF ; 0402 ≥ 1μF;																																																																	
6.3V	≤ 10%	≤ 15%	0201 ≥ 0.1μF; 0402 ≥ 1μF; 0603 ≥ 10μF; 0805 ≥ 4.7μF; 1206 ≥ 47μF; 1210 ≥ 100μF																																																																	
		≤ 20%	0402 ≥ 2.2μF;																																																																	
4V	≤ 15%	---	----																																																																	
Rated voltage	Insulation Resistance																																																																			
≥100V: X7R	1GΩ or R x C ≥ 10Ω-F whichever is smaller.																																																																			
50V: 0603 ≥ 1μF; 0805 ≥ 1μF; 1206 ≥ 4.7μF; 1210 ≥ 4.7μF																																																																				
35V: 0805 ≥ 2.2μF; 1210 ≥ 10μF																																																																				
25V: 0402 ≥ 1μF; 0603 ≥ 2.2μF; 0805 ≥ 2.2μF; 1206 ≥ 10μF; 1210 ≥ 10μF																																																																				
16V: 0201 ≥ 0.1μF; 0402 ≥ 0.22μF; 0603 ≥ 1μF; 0805 ≥ 2.2μF; 1206 ≥ 10μF; 1210 ≥ 47μF																																																																				
10V: 0201 ≥ 47nF; 0402 ≥ 0.47μF; 0603 ≥ 0.47μF; 0805 ≥ 2.2μF; 1206 ≥ 4.7μF; 1210 ≥ 47μF																																																																				
6.3V ; 4V ; TT series																																																																				

No.	AEC-Q200 Test Item	AEC-Q200 Test Condition	Requirements																																																								
15	ESD AEC-Q200-002	Per AEC-Q200-002	<p>* No remarkable damage. * Cap change: within the specified tolerance * Q/D.F. value: NPO: Cap\geq30pF, Q\geq1000 ; Cap$<$30pF, Q\geq400+20C X7R:</p> <table border="1" data-bbox="762 376 1490 1279"> <thead> <tr> <th>Rated vol.</th> <th>DF\leq</th> <th colspan="2">Exception of DF</th> </tr> </thead> <tbody> <tr> <td rowspan="3">\geq 50V</td> <td rowspan="3">\leq 2.5%</td> <td>\leq 3%</td> <td>0201(50V);0603\cong 0.047μF; 0805\cong 0.18μF; 1206\cong 0.47μF</td> </tr> <tr> <td>\leq 5%</td> <td>1210\cong 4.7μF</td> </tr> <tr> <td>\leq 10%</td> <td>0402\cong 0.1μF;0603\cong 1μF; 0805\cong 1μF;1206\cong 2.2μF; 1210\cong 10μF;</td> </tr> <tr> <td>35V</td> <td>\leq 3.5%</td> <td>\leq 10%</td> <td>0603\cong 1μF;0805\geq2.2μF;1210\cong 10μF</td> </tr> <tr> <td rowspan="3">25V</td> <td rowspan="3">\leq 3.5%</td> <td>\leq 5%</td> <td>0201\cong 0.01μF;0805\cong 1μF; 1210\cong 10μF</td> </tr> <tr> <td>\leq 7%</td> <td>0603\cong 0.33μF;1206\cong 4.7μF</td> </tr> <tr> <td>\leq 10%</td> <td>0402\cong 0.10μF;0603\cong 0.47μF;0805\cong 2.2μF;1206\cong 6.8μF; 1210\cong 22μF;</td> </tr> <tr> <td rowspan="2">16V</td> <td rowspan="2">\leq 3.5%</td> <td>\leq 5%</td> <td>0603\cong 0.15μF;0805\cong 0.68μF;1206\cong 2.2μF;1210\cong 4.7μF</td> </tr> <tr> <td>\leq 10%</td> <td>0201\cong 0.01μF;0402\cong 0.033μF;0603\cong 0.68μF;0805\cong 2.2μF 1206\cong 4.7μF; 1210\cong 22μF;</td> </tr> <tr> <td rowspan="2">10V</td> <td rowspan="2">\leq 5%</td> <td>\leq 10%</td> <td>0201\cong 0.012μF;0402\cong 0.33μF; 0603\cong 0.33μF;0805\cong 2.2μF 1206\cong 2.2μF; 1210\cong 22μF</td> </tr> <tr> <td>\leq 15%</td> <td>0201\cong 0.1μF ;0402\cong 1μF;</td> </tr> <tr> <td rowspan="2">6.3V</td> <td rowspan="2">\leq 10%</td> <td>\leq 15%</td> <td>0201\cong 0.1μF;0402\cong 1μF; 0603\cong 10μF;0805\cong 4.7μF; 1206\cong 47μF;1210\cong 100μF;</td> </tr> <tr> <td>\leq 20%</td> <td>0402\cong 2.2μF;</td> </tr> <tr> <td>4V</td> <td>\leq 15%</td> <td>---</td> <td>----</td> </tr> </tbody> </table> <p>IR.: \geq10GΩ or RxC\geq50Ω-F whichever is smaller</p> <p>Class II (X7R)</p> <table border="1" data-bbox="762 1352 1490 1742"> <thead> <tr> <th>Rated voltage</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>\geq100V: X7R</td> <td rowspan="7">1GΩor R x C\geq 100 Ω-F whichever is smaller.</td> </tr> <tr> <td>50V:0603\geq1μF;0805\geq1μF; 1206\geq4.7μF;1210\geq4.7μF</td> </tr> <tr> <td>35V:0805\geq2.2μF;1210\cong 10μF</td> </tr> <tr> <td>25V:0402\geq1μF;0603\geq2.2μF;0805\geq2.2μF; 1206\geq10μF;1210\geq10μF</td> </tr> <tr> <td>16V:0201\cong 0.1μF;0402\geq0.22μF;0603\geq1μF; 0805\geq2.2μF;1206\geq10μF;1210\geq47μF</td> </tr> <tr> <td>10V:0201\geq47nF;0402\geq0.47μF;0603\geq0.47μF; 0805\geq2.2μF;1206\geq4.7μF;1210\geq47μF</td> </tr> <tr> <td>6.3V ; 4V ;</td> </tr> </tbody> </table>	Rated vol.	DF \leq	Exception of DF		\geq 50V	\leq 2.5%	\leq 3%	0201(50V);0603 \cong 0.047 μ F; 0805 \cong 0.18 μ F; 1206 \cong 0.47 μ F	\leq 5%	1210 \cong 4.7 μ F	\leq 10%	0402 \cong 0.1 μ F;0603 \cong 1 μ F; 0805 \cong 1 μ F;1206 \cong 2.2 μ F; 1210 \cong 10 μ F;	35V	\leq 3.5%	\leq 10%	0603 \cong 1 μ F;0805 \geq 2.2 μ F;1210 \cong 10 μ F	25V	\leq 3.5%	\leq 5%	0201 \cong 0.01 μ F;0805 \cong 1 μ F; 1210 \cong 10 μ F	\leq 7%	0603 \cong 0.33 μ F;1206 \cong 4.7 μ F	\leq 10%	0402 \cong 0.10 μ F;0603 \cong 0.47 μ F;0805 \cong 2.2 μ F;1206 \cong 6.8 μ F; 1210 \cong 22 μ F;	16V	\leq 3.5%	\leq 5%	0603 \cong 0.15 μ F;0805 \cong 0.68 μ F;1206 \cong 2.2 μ F;1210 \cong 4.7 μ F	\leq 10%	0201 \cong 0.01 μ F;0402 \cong 0.033 μ F;0603 \cong 0.68 μ F;0805 \cong 2.2 μ F 1206 \cong 4.7 μ F; 1210 \cong 22 μ F;	10V	\leq 5%	\leq 10%	0201 \cong 0.012 μ F;0402 \cong 0.33 μ F; 0603 \cong 0.33 μ F;0805 \cong 2.2 μ F 1206 \cong 2.2 μ F; 1210 \cong 22 μ F	\leq 15%	0201 \cong 0.1 μ F ;0402 \cong 1 μ F;	6.3V	\leq 10%	\leq 15%	0201 \cong 0.1 μ F;0402 \cong 1 μ F; 0603 \cong 10 μ F;0805 \cong 4.7 μ F; 1206 \cong 47 μ F;1210 \cong 100 μ F;	\leq 20%	0402 \cong 2.2 μ F;	4V	\leq 15%	---	----	Rated voltage	Insulation Resistance	\geq 100V: X7R	1G Ω or R x C \geq 100 Ω -F whichever is smaller.	50V:0603 \geq 1 μ F;0805 \geq 1 μ F; 1206 \geq 4.7 μ F;1210 \geq 4.7 μ F	35V:0805 \geq 2.2 μ F;1210 \cong 10 μ F	25V:0402 \geq 1 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 \cong 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 ;
Rated vol.	DF \leq	Exception of DF																																																									
\geq 50V	\leq 2.5%	\leq 3%	0201(50V);0603 \cong 0.047 μ F; 0805 \cong 0.18 μ F; 1206 \cong 0.47 μ F																																																								
		\leq 5%	1210 \cong 4.7 μ F																																																								
		\leq 10%	0402 \cong 0.1 μ F;0603 \cong 1 μ F; 0805 \cong 1 μ F;1206 \cong 2.2 μ F; 1210 \cong 10 μ F;																																																								
35V	\leq 3.5%	\leq 10%	0603 \cong 1 μ F;0805 \geq 2.2 μ F;1210 \cong 10 μ F																																																								
25V	\leq 3.5%	\leq 5%	0201 \cong 0.01 μ F;0805 \cong 1 μ F; 1210 \cong 10 μ F																																																								
		\leq 7%	0603 \cong 0.33 μ F;1206 \cong 4.7 μ F																																																								
		\leq 10%	0402 \cong 0.10 μ F;0603 \cong 0.47 μ F;0805 \cong 2.2 μ F;1206 \cong 6.8 μ F; 1210 \cong 22 μ F;																																																								
16V	\leq 3.5%	\leq 5%	0603 \cong 0.15 μ F;0805 \cong 0.68 μ F;1206 \cong 2.2 μ F;1210 \cong 4.7 μ F																																																								
		\leq 10%	0201 \cong 0.01 μ F;0402 \cong 0.033 μ F;0603 \cong 0.68 μ F;0805 \cong 2.2 μ F 1206 \cong 4.7 μ F; 1210 \cong 22 μ F;																																																								
10V	\leq 5%	\leq 10%	0201 \cong 0.012 μ F;0402 \cong 0.33 μ F; 0603 \cong 0.33 μ F;0805 \cong 2.2 μ F 1206 \cong 2.2 μ F; 1210 \cong 22 μ F																																																								
		\leq 15%	0201 \cong 0.1 μ F ;0402 \cong 1 μ F;																																																								
6.3V	\leq 10%	\leq 15%	0201 \cong 0.1 μ F;0402 \cong 1 μ F; 0603 \cong 10 μ F;0805 \cong 4.7 μ F; 1206 \cong 47 μ F;1210 \cong 100 μ F;																																																								
		\leq 20%	0402 \cong 2.2 μ F;																																																								
4V	\leq 15%	---	----																																																								
Rated voltage	Insulation Resistance																																																										
\geq 100V: X7R	1G Ω or R x C \geq 100 Ω -F whichever is smaller.																																																										
50V:0603 \geq 1 μ F;0805 \geq 1 μ F; 1206 \geq 4.7 μ F;1210 \geq 4.7 μ F																																																											
35V:0805 \geq 2.2 μ F;1210 \cong 10 μ F																																																											
25V:0402 \geq 1 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 \cong 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 ;																																																											
16	Solderability J-STD-002 JESD22-B102E	<p>*Condition A Un-mounted chips 4hrs / 155$^{\circ}$C*dry then completely immersed for 5\pm0.5 sec in solder bath at 245\pm5$^{\circ}$C. *Condition B Un-mounted chips steam 8 hrs then completely immersed for 10\pm1sec in solder bath at 220+5/-0$^{\circ}$C. *Condition C Un-mounted chips steam 8 hrs then completely immersed for 10\pm1 sec. in solder bath at 260+0/-5$^{\circ}$C.</p>	<p>All terminations shall exhibit a continuous solder coating free from defects from a minimum of 95% of the critical surface area of any individual termination.</p>																																																								

No.	AEC-Q200 Test Item	AEC-Q200 Test Condition	Requirements																																																								
17.	Electrical Characterization	<p>*Capacitance</p> <p>*Q/ D.F. (Dissipation Factor) Cap≤1000pF 1.0±0.2Vrms, 1MHz±10% Cap>1000pF 1.0±0.2Vrms, 1KHz±10%</p> <p>*Insulation Resistance To apply rated voltage(500V max.) for max. 120 sec.</p> <p>*Dielectric Strength To apply voltage: ≤ 100 ≥2.5 times VDC 200V~300V ≥2 times VDC 400V~450V ≥1.2 times VDC 500V~999V ≥1.5 times VDC 1000V~3000V ≥1.2 times VDC , duration 1~5 sec, charge and discharge current less than 50mA. *Temperature Coefficient (with no electrical load) Operation temperature: -55~125°C at 25°C</p>	<p>*Cap change: within the specified tolerance *Q/D.F. value: NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C X7R:</p> <table border="1" data-bbox="738 349 1473 1283"> <thead> <tr> <th>Rated vol.</th> <th>DF≤</th> <th colspan="2">Exception of DF</th> </tr> </thead> <tbody> <tr> <td rowspan="3">≥ 50V</td> <td rowspan="3">≤ 2.5%</td> <td>≤ 3%</td> <td>0201(50V);0603≧ 0.047μF; 0805≧ 0.18μF; 1206≧ 0.47μF</td> </tr> <tr> <td>≤ 5%</td> <td>1210≧ 4.7μF</td> </tr> <tr> <td>≤ 10%</td> <td>0402≧ 0.1μF;0603≧ 1μF; 0805≧ 1μF;1206≧ 2.2μF; 1210≧ 10μF; TT series</td> </tr> <tr> <td>35V</td> <td>≤ 3.5 %</td> <td>≤ 10%</td> <td>0603≧ 1μF;0805≧2.2μF;1210≧ 10μF</td> </tr> <tr> <td rowspan="3">25V</td> <td rowspan="3">≤ 3.5%</td> <td>≤ 5%</td> <td>0201≧ 0.01μF;0805≧ 1μF; 1210≧ 10μF</td> </tr> <tr> <td>≤ 7%</td> <td>0603≧ 0.33μF;1206≧ 4.7μF</td> </tr> <tr> <td>≤ 10%</td> <td>0402≧ 0.10μF;0603≧ 0.47μF; 0805≧ 2.2μF;1206≧ 6.8μF; 1210≧ 22μF;</td> </tr> <tr> <td rowspan="2">16V</td> <td rowspan="2">≤ 3.5%</td> <td>≤ 5%</td> <td>0603≧ 0.15μF;0805≧ 0.68μF; 1206≧ 2.2μF;1210≧ 4.7μF</td> </tr> <tr> <td>≤ 10%</td> <td>0201≧ 0.01μF;0402≧ 0.033μF; 0603≧ 0.68μF;0805≧ 2.2μF 1206≧ 4.7μF; 1210≧ 22μF;</td> </tr> <tr> <td rowspan="2">10V</td> <td rowspan="2">≤ 5%</td> <td>≤ 10%</td> <td>0201≧ 0.012μF;0402≧ 0.33μF; 0603≧ 0.33μF;0805≧ 2.2μF 1206≧ 2.2μF; 1210≧ 22μF</td> </tr> <tr> <td>≤ 15%</td> <td>0201≧ 0.1μF ;0402≧ 1μF;</td> </tr> <tr> <td rowspan="2">6.3V</td> <td rowspan="2">≤ 10%</td> <td>≤ 15%</td> <td>0201≧ 0.1μF;0402≧ 1μF; 0603≧ 10μF;0805≧ 4.7μF; 1206≧ 47μF;1210≧ 100μF;</td> </tr> <tr> <td>≤ 20%</td> <td>0402≧ 2.2μF;</td> </tr> <tr> <td>4V</td> <td>≤ 15%</td> <td>---</td> <td>----</td> </tr> </tbody> </table> <p>IR. :≥10GΩ or RxC≥500Ω-F whichever is smaller</p> <p>Class II (X7R)</p> <table border="1" data-bbox="738 1357 1473 1731"> <thead> <tr> <th>Rated voltage</th> <th>Insulation Resistance</th> </tr> </thead> <tbody> <tr> <td>≥100V: X7R</td> <td rowspan="7">10GΩ or RxC ≧ 100Ω-F whichever is smaller.</td> </tr> <tr> <td>50V:0603≧1μF;0805≧1μF;1206≧4.7μF;1210≧4.7μF</td> </tr> <tr> <td>35V:0805≧2.2μF;1210≧ 10μF</td> </tr> <tr> <td>25V:0402≧1μF;0603≧2.2μF;0805≧2.2μF; 1206≧10μF;1210≧10μF</td> </tr> <tr> <td>16V: 0201 ≧ 0.1uF;0402≧0.22μF;0603≧1μF; 0805≧2.2μF;1206≧10μF;1210≧47μF</td> </tr> <tr> <td>10V:0201≧47nF;0402≧0.47μF;0603≧0.47μF; 0805≧2.2μF;1206≧4.7μF;1210≧47μF</td> </tr> <tr> <td>6.3V ; 4V ; TT series</td> </tr> </tbody> </table> <p>*Dielectric strength No evidence of damage or flash over during test.</p> <p>*Temperature Coefficient Capacitance Change: NPO: Within ±30ppm/°C X7R: Within ±15%</p>	Rated vol.	DF≤	Exception of DF		≥ 50V	≤ 2.5%	≤ 3%	0201(50V);0603≧ 0.047μF; 0805≧ 0.18μF; 1206≧ 0.47μF	≤ 5%	1210≧ 4.7μF	≤ 10%	0402≧ 0.1μF;0603≧ 1μF; 0805≧ 1μF;1206≧ 2.2μF; 1210≧ 10μF; TT series	35V	≤ 3.5 %	≤ 10%	0603≧ 1μF;0805≧2.2μF;1210≧ 10μF	25V	≤ 3.5%	≤ 5%	0201≧ 0.01μF;0805≧ 1μF; 1210≧ 10μF	≤ 7%	0603≧ 0.33μF;1206≧ 4.7μF	≤ 10%	0402≧ 0.10μF;0603≧ 0.47μF; 0805≧ 2.2μF;1206≧ 6.8μF; 1210≧ 22μF;	16V	≤ 3.5%	≤ 5%	0603≧ 0.15μF;0805≧ 0.68μF; 1206≧ 2.2μF;1210≧ 4.7μF	≤ 10%	0201≧ 0.01μF;0402≧ 0.033μF; 0603≧ 0.68μF;0805≧ 2.2μF 1206≧ 4.7μF; 1210≧ 22μF;	10V	≤ 5%	≤ 10%	0201≧ 0.012μF;0402≧ 0.33μF; 0603≧ 0.33μF;0805≧ 2.2μF 1206≧ 2.2μF; 1210≧ 22μF	≤ 15%	0201≧ 0.1μF ;0402≧ 1μF;	6.3V	≤ 10%	≤ 15%	0201≧ 0.1μF;0402≧ 1μF; 0603≧ 10μF;0805≧ 4.7μF; 1206≧ 47μF;1210≧ 100μF;	≤ 20%	0402≧ 2.2μF;	4V	≤ 15%	---	----	Rated voltage	Insulation Resistance	≥100V: X7R	10GΩ or RxC ≧ 100Ω-F whichever is smaller.	50V:0603≧1μF;0805≧1μF;1206≧4.7μF;1210≧4.7μF	35V:0805≧2.2μF;1210≧ 10μF	25V:0402≧1μF;0603≧2.2μF;0805≧2.2μF; 1206≧10μF;1210≧10μF	16V: 0201 ≧ 0.1uF;0402≧0.22μF;0603≧1μF; 0805≧2.2μF;1206≧10μF;1210≧47μF	10V:0201≧47nF;0402≧0.47μF;0603≧0.47μF; 0805≧2.2μF;1206≧4.7μF;1210≧47μF	6.3V ; 4V ; TT series
Rated vol.	DF≤	Exception of DF																																																									
≥ 50V	≤ 2.5%	≤ 3%	0201(50V);0603≧ 0.047μF; 0805≧ 0.18μF; 1206≧ 0.47μF																																																								
		≤ 5%	1210≧ 4.7μF																																																								
		≤ 10%	0402≧ 0.1μF;0603≧ 1μF; 0805≧ 1μF;1206≧ 2.2μF; 1210≧ 10μF; TT series																																																								
35V	≤ 3.5 %	≤ 10%	0603≧ 1μF;0805≧2.2μF;1210≧ 10μF																																																								
25V	≤ 3.5%	≤ 5%	0201≧ 0.01μF;0805≧ 1μF; 1210≧ 10μF																																																								
		≤ 7%	0603≧ 0.33μF;1206≧ 4.7μF																																																								
		≤ 10%	0402≧ 0.10μF;0603≧ 0.47μF; 0805≧ 2.2μF;1206≧ 6.8μF; 1210≧ 22μF;																																																								
16V	≤ 3.5%	≤ 5%	0603≧ 0.15μF;0805≧ 0.68μF; 1206≧ 2.2μF;1210≧ 4.7μF																																																								
		≤ 10%	0201≧ 0.01μF;0402≧ 0.033μF; 0603≧ 0.68μF;0805≧ 2.2μF 1206≧ 4.7μF; 1210≧ 22μF;																																																								
10V	≤ 5%	≤ 10%	0201≧ 0.012μF;0402≧ 0.33μF; 0603≧ 0.33μF;0805≧ 2.2μF 1206≧ 2.2μF; 1210≧ 22μF																																																								
		≤ 15%	0201≧ 0.1μF ;0402≧ 1μF;																																																								
6.3V	≤ 10%	≤ 15%	0201≧ 0.1μF;0402≧ 1μF; 0603≧ 10μF;0805≧ 4.7μF; 1206≧ 47μF;1210≧ 100μF;																																																								
		≤ 20%	0402≧ 2.2μF;																																																								
4V	≤ 15%	---	----																																																								
Rated voltage	Insulation Resistance																																																										
≥100V: X7R	10GΩ or RxC ≧ 100Ω-F whichever is smaller.																																																										
50V:0603≧1μF;0805≧1μF;1206≧4.7μF;1210≧4.7μF																																																											
35V:0805≧2.2μF;1210≧ 10μF																																																											
25V:0402≧1μF;0603≧2.2μF;0805≧2.2μF; 1206≧10μF;1210≧10μF																																																											
16V: 0201 ≧ 0.1uF;0402≧0.22μF;0603≧1μF; 0805≧2.2μF;1206≧10μF;1210≧47μF																																																											
10V:0201≧47nF;0402≧0.47μF;0603≧0.47μF; 0805≧2.2μF;1206≧4.7μF;1210≧47μF																																																											
6.3V ; 4V ; TT series																																																											

No.	AEC-Q200 Test Item	AEC-Q200 Test Condition	Requirements																																										
18.	Board Flex AEC-Q200-005	* 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 3mm (2mm for X7R) and then the pressure shall be maintained for 5±1 sec. * Measurement to be made after keeping at room temp. for 24±2 hrs.	* No remarkable damage. * Cap change: NPO: within ±5.0% or ±0.5pF whichever is larger. X7R: within ±12.5%. (This capacitance change means the change of capacitance under specified flexure of substrate from the capacitance measured before the test.)																																										
19	Terminal Strength AEC-Q200-006	* Pressurizing force: 2N (0402), 10N(0603) 18N(0805). * Test time: 60±1 sec.	*No remarkable damage or removal of the terminations. * Capacitance within the specified tolerance * Q/D.F. value: NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C. X7R: <table border="1" data-bbox="772 674 1505 1485"> <thead> <tr> <th data-bbox="772 674 874 734">Rated vol.</th> <th data-bbox="874 674 986 734">D.F. ≅</th> <th colspan="2" data-bbox="986 674 1505 734">Exception of D.F. ≅</th> </tr> </thead> <tbody> <tr> <td data-bbox="772 734 874 913" rowspan="3">≅ 50V</td> <td data-bbox="874 734 986 913" rowspan="3">≅ 2.5%</td> <td data-bbox="986 734 1098 795">≅ 3%</td> <td data-bbox="1098 734 1505 795">0201(50V); 0603 ≅ 0.047μF; 0805 ≅ 0.18μF; 1206 ≅ 0.47μF</td> </tr> <tr> <td data-bbox="986 795 1098 833">≅ 5%</td> <td data-bbox="1098 795 1505 833">1210 ≅ 4.7μF</td> </tr> <tr> <td data-bbox="986 833 1098 913">≅ 10%</td> <td data-bbox="1098 833 1505 913">0402 ≅ 0.1μF; 0603 ≅ 1μF; 0805 ≅ 1μF; 1206 ≅ 2.2μF; 1210 ≅ 10μF;</td> </tr> <tr> <td data-bbox="772 913 874 974">35V</td> <td data-bbox="874 913 986 974">≅ 3.5%</td> <td data-bbox="986 913 1098 974">≅ 10%</td> <td data-bbox="1098 913 1505 974">0603 ≅ 1μF; 0805 ≅ 2.2μF; 1210 ≅ 10μF</td> </tr> <tr> <td data-bbox="772 974 874 1034">25V</td> <td data-bbox="874 974 986 1034">≅ 3.5%</td> <td data-bbox="986 974 1098 1034">≅ 5%</td> <td data-bbox="1098 974 1505 1034">0201 ≅ 0.01μF; 0805 ≅ 1μF; 1210 ≅ 10μF</td> </tr> <tr> <td data-bbox="772 1034 874 1214" rowspan="2">16V</td> <td data-bbox="874 1034 986 1214" rowspan="2">≅ 3.5%</td> <td data-bbox="986 1034 1098 1124">≅ 5%</td> <td data-bbox="1098 1034 1505 1124">0201 ≅ 0.01μF; 0402 ≅ 0.033μF; 0603 ≅ 0.15μF; 0805 ≅ 0.68μF; 1206 ≅ 2.2μF; 1210 ≅ 4.7μF</td> </tr> <tr> <td data-bbox="986 1124 1098 1214">≅ 10%</td> <td data-bbox="1098 1124 1505 1214">0201 ≅ 0.1μF; 0402 ≅ 0.22μF; 0603 ≅ 0.68μF; 0805 ≅ 2.2μF; 1206 ≅ 4.7μF; 1210 ≅ 22μF;</td> </tr> <tr> <td data-bbox="772 1214 874 1337" rowspan="2">10V</td> <td data-bbox="874 1214 986 1337" rowspan="2">≅ 5%</td> <td data-bbox="986 1214 1098 1303">≅ 10%</td> <td data-bbox="1098 1214 1505 1303">0201 ≅ 0.012μF; 0402 ≅ 0.33μF; 0603 ≅ 0.33μF; 0805 ≅ 2.2μF 1206 ≅ 2.2μF; 1210 ≅ 22μF;</td> </tr> <tr> <td data-bbox="986 1303 1098 1337">≅ 15%</td> <td data-bbox="1098 1303 1505 1337">0201 ≅ 0.1μF; 0402 ≅ 1μF</td> </tr> <tr> <td data-bbox="772 1337 874 1460" rowspan="2">6.3V</td> <td data-bbox="874 1337 986 1460" rowspan="2">≅ 10%</td> <td data-bbox="986 1337 1098 1426">≅ 15%</td> <td data-bbox="1098 1337 1505 1426">0201 ≅ 0.1μF; 0402 ≅ 1μF; 0603 ≅ 10μF; 0805 ≅ 4.7μF; 1206 ≅ 47μF ; 1210 ≅ 100μF;</td> </tr> <tr> <td data-bbox="986 1426 1098 1460">≅ 20%</td> <td data-bbox="1098 1426 1505 1460">0402 ≅ 2.2μF</td> </tr> <tr> <td data-bbox="772 1460 874 1485">4V</td> <td data-bbox="874 1460 986 1485">≅ 15%</td> <td data-bbox="986 1460 1098 1485">---</td> <td data-bbox="1098 1460 1505 1485">---</td> </tr> </tbody> </table>	Rated vol.	D.F. ≅	Exception of D.F. ≅		≅ 50V	≅ 2.5%	≅ 3%	0201(50V); 0603 ≅ 0.047μF; 0805 ≅ 0.18μF; 1206 ≅ 0.47μF	≅ 5%	1210 ≅ 4.7μF	≅ 10%	0402 ≅ 0.1μF; 0603 ≅ 1μF; 0805 ≅ 1μF; 1206 ≅ 2.2μF; 1210 ≅ 10μF;	35V	≅ 3.5%	≅ 10%	0603 ≅ 1μF; 0805 ≅ 2.2μF; 1210 ≅ 10μF	25V	≅ 3.5%	≅ 5%	0201 ≅ 0.01μF; 0805 ≅ 1μF; 1210 ≅ 10μF	16V	≅ 3.5%	≅ 5%	0201 ≅ 0.01μF; 0402 ≅ 0.033μF; 0603 ≅ 0.15μF; 0805 ≅ 0.68μF; 1206 ≅ 2.2μF; 1210 ≅ 4.7μF	≅ 10%	0201 ≅ 0.1μF; 0402 ≅ 0.22μF; 0603 ≅ 0.68μF; 0805 ≅ 2.2μF; 1206 ≅ 4.7μF; 1210 ≅ 22μF;	10V	≅ 5%	≅ 10%	0201 ≅ 0.012μF; 0402 ≅ 0.33μF; 0603 ≅ 0.33μF; 0805 ≅ 2.2μF 1206 ≅ 2.2μF; 1210 ≅ 22μF;	≅ 15%	0201 ≅ 0.1μF; 0402 ≅ 1μF	6.3V	≅ 10%	≅ 15%	0201 ≅ 0.1μF; 0402 ≅ 1μF; 0603 ≅ 10μF; 0805 ≅ 4.7μF; 1206 ≅ 47μF ; 1210 ≅ 100μF;	≅ 20%	0402 ≅ 2.2μF	4V	≅ 15%	---	---
Rated vol.	D.F. ≅	Exception of D.F. ≅																																											
≅ 50V	≅ 2.5%	≅ 3%	0201(50V); 0603 ≅ 0.047μF; 0805 ≅ 0.18μF; 1206 ≅ 0.47μF																																										
		≅ 5%	1210 ≅ 4.7μF																																										
		≅ 10%	0402 ≅ 0.1μF; 0603 ≅ 1μF; 0805 ≅ 1μF; 1206 ≅ 2.2μF; 1210 ≅ 10μF;																																										
35V	≅ 3.5%	≅ 10%	0603 ≅ 1μF; 0805 ≅ 2.2μF; 1210 ≅ 10μF																																										
25V	≅ 3.5%	≅ 5%	0201 ≅ 0.01μF; 0805 ≅ 1μF; 1210 ≅ 10μF																																										
16V	≅ 3.5%	≅ 5%	0201 ≅ 0.01μF; 0402 ≅ 0.033μF; 0603 ≅ 0.15μF; 0805 ≅ 0.68μF; 1206 ≅ 2.2μF; 1210 ≅ 4.7μF																																										
		≅ 10%	0201 ≅ 0.1μF; 0402 ≅ 0.22μF; 0603 ≅ 0.68μF; 0805 ≅ 2.2μF; 1206 ≅ 4.7μF; 1210 ≅ 22μF;																																										
10V	≅ 5%	≅ 10%	0201 ≅ 0.012μF; 0402 ≅ 0.33μF; 0603 ≅ 0.33μF; 0805 ≅ 2.2μF 1206 ≅ 2.2μF; 1210 ≅ 22μF;																																										
		≅ 15%	0201 ≅ 0.1μF; 0402 ≅ 1μF																																										
6.3V	≅ 10%	≅ 15%	0201 ≅ 0.1μF; 0402 ≅ 1μF; 0603 ≅ 10μF; 0805 ≅ 4.7μF; 1206 ≅ 47μF ; 1210 ≅ 100μF;																																										
		≅ 20%	0402 ≅ 2.2μF																																										
4V	≅ 15%	---	---																																										
20	Beam Load Test AEC-Q200-003	* Break strength test * Beam speed: 2.5±0.25 mm/se	The chip endure following force * Chip length ≤2.5mm: Thickness >0.5mm (20N), ≤0.5mm (8N) * Chip length ≥3.2mm: Thickness ≥1.25mm (54.5N), <1.25mm (15N)																																										

APPENDIXES

■ Tape & reel dimensions

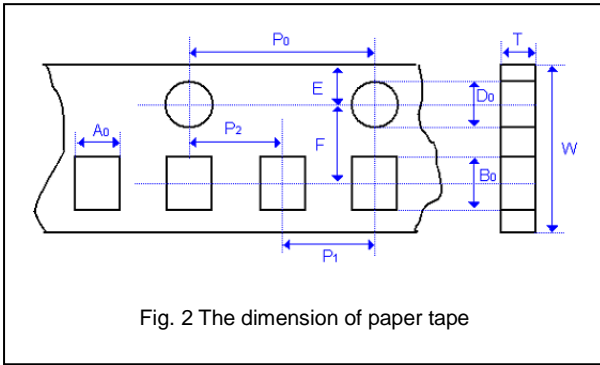


Fig. 2 The dimension of paper tape

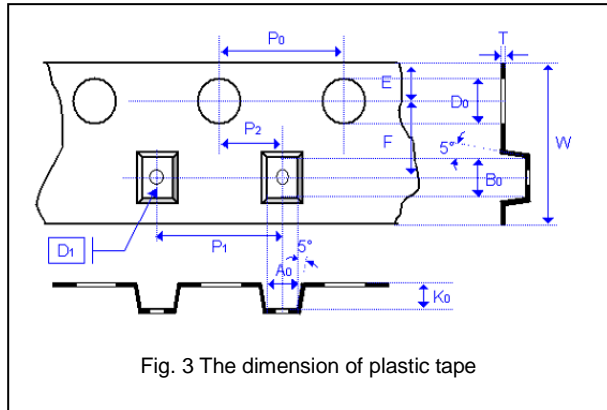


Fig. 3 The dimension of plastic tape

Size	0201	0402	0603	0805			1206			1210		
Thickness	L	N,E	S,H,X	A,H	B,T	D,I	B,T	C,J,D	G,P	T	C,D,G,K	M
A ₀	0.39 +/-0.07	0.70 +/-0.2	1.05 +/-0.30	1.50 +/-0.20	1.50 +/-0.20	< 1.80	1.90 +/-0.50	< 2.00	< 2.30	< 3.05	< 3.05	< 3.20
B ₀	0.69 +/-0.07	1.20 +/-0.2	1.80 +/-0.30	2.30 +/-0.20	2.30 +/-0.20	< 2.70	3.50 +/-0.50	< 3.70	< 4.00	< 3.80	< 3.80	< 3.95
T	≤ 0.50	≤ 0.80	≤ 1.20	≤ 1.15	≤ 1.30	0.23 +/-0.1	≤ 1.30	0.23 +/-0.1	0.23 +/-0.1	0.23 +/-0.1	0.23 +/-0.1	0.23 +/-0.1
K ₀												00
W	8.00 +/-0.10	8.00 +/-0.10	8.00 +/-0.10	8.00 +/-0.10	8.00 +/-0.10	8.00 +/-0.20	8.00 +/-0.10	8.00 +/-0.20	8.00 +/-0.20	8.00 +/-0.20	8.00 +/-0.20	8.00 +/-0.20
P ₀	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10
10xP ₀	40.00 +/-0.10	40.00 +/-0.10	40.00 +/-0.20	40.00 +/-0.20	40.00 +/-0.20	40.00 +/-0.20	40.00 +/-0.20	40.00 +/-0.20	40.00 +/-0.20	40.00 +/-0.20	40.00 +/-0.20	40.00 +/-0.20
P ₁	2.00 +/-0.05	2.00 +/-0.05	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10	4.00 +/-0.10
P ₂	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05	2.00 +/-0.05
D ₀	1.55 +/-0.05	1.55 +/-0.05	1.55 +/-0.05	1.55 +/-0.05	1.55 +/-0.05	1.50 +0.1/-0	1.55 +/-0.05	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
D ₁	-	-	-	-	-	1.00 +/-0.10	-	1.00 +/-0.10	1.00 +/-0.10	1.00 +/-0.10	1.00 +/-0.10	1.00 +/-0.10
E	1.75 +/-0.05	1.75 +/-0.05	1.75 +/-0.05	1.75 +/-0.05	1.75 +/-0.05	1.75 +/-0.10	1.75 +/-0.05	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	3.50 +/-0.05	3.50 +/-0.05	3.50 +/-0.05	3.50 +/-0.05	3.50 +/-0.05	3.50 +/-0.05

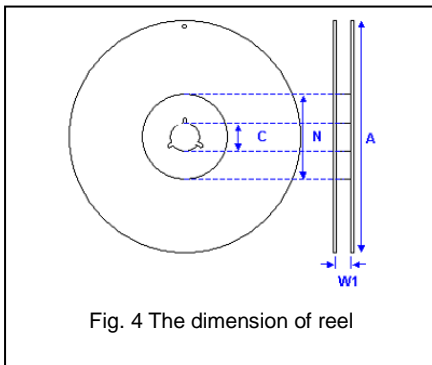


Fig. 4 The dimension of reel

Size	0201, 0402, 0603, 0805, 1206, 1210		
Reel size	7"	10"	13"
C	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
A	178.0±1.00	250.0±1.0	330.0±1.0
N	60.0+1.0/-0	100.0±1.0	100±1.0

■ Constructions

No.	Name	NP0, X7R	
①	Ceramic material	BaTiO	
②	Inner electrode	Ni	
③	Termination	Inner layer	Cu
④		Middle layer	Ni
⑤		Outer layer	Sn (Matt)

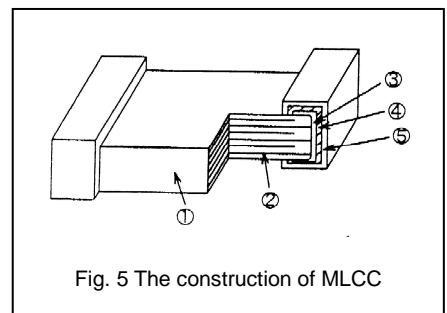


Fig. 5 The construction of MLCC

Storage and handling conditions

- (1) To store products at 5 to 40°C ambient temperature and 20 to 70% related humidity conditions.
- (2) The product is recommended to be used within one year after shipment. Check solderability in case of shelf life extension is needed.

Cautions:

- a. The corrosive gas reacts on the terminal electrodes of capacitors, and results in the poor solderability. Do not store the capacitors in the ambience of corrosive gas (e.g., hydrogen sulfide, sulfur dioxide, chlorine, ammonia gas etc.)
- b. In corrosive atmosphere, solderability might be degraded, and silver migration might occur to cause low reliability.
- c. Due to the dewing by rapid humidity change, or the photochemical change of the terminal electrode by direct sunlight, the solderability 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.

Recommended soldering 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.

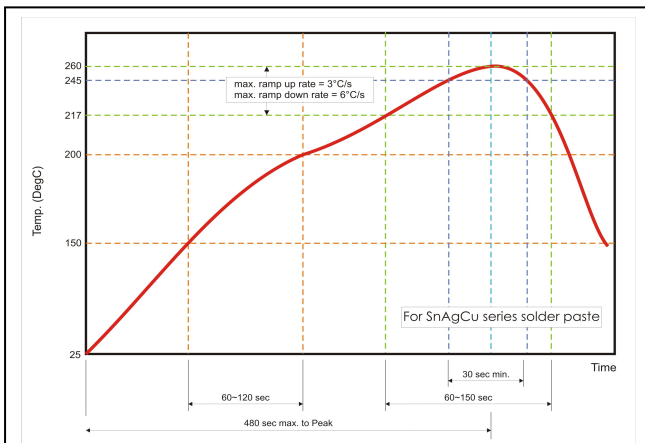


Fig. 5 Recommended reflow soldering profile for SMT process with SnAgCu series solder paste.

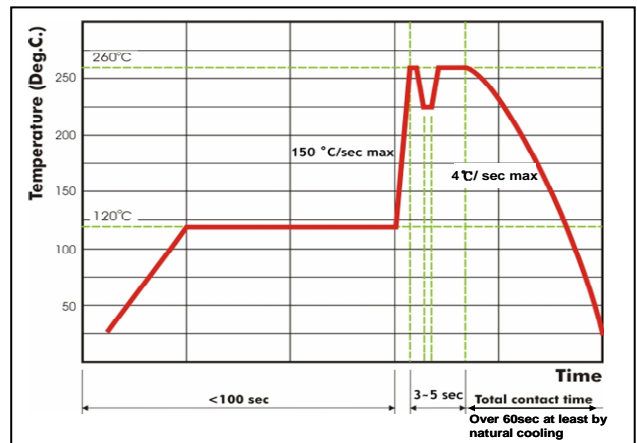


Fig. 6 Recommended wave soldering profile for SMT process with SnAgCu series solder.