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Messrs. : 一般共用

Date : 2025/11/11

APPROVAL SHEET

Product Name : Anti-Arcing High Voltage Multilayer Ceramic Chip Capacitors

Part No. : FJ Series

Description : Size 1206~2225, C0G/X7R, 1000V~5000V

PREPARED BY	APPROVED BY

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SPECIFICATION

FOR

Product Name : Anti-Arcing High Voltage Multilayer Ceramic Chip Capacitors

Part No. : FJ Series

Description : Size 1206~2225, C0G/X7R, 1000V~5000V

SPEC. No. : FJ-000-001-11

DATE : 2025/11/11

DRAWN BY	CHECEKED BY	APPROVED BY
Jane Hsiao	Yvens Chou	Hank chiang



1. INTRODUCTION

PDC FJ Series green type capacitors are manufactured by using environmental friendly material without lead or cadmium. These capacitors feature series connection of multi-layer capacitor units in a MLCC to realize high voltage performance. This special design can distribute voltage gradients throughout the entire capacitor, so as to prevent short circuit failure. It is a safety design for LCD back-lighting inverter application.

2. FEATURES

- Special interior design offers high voltage rating in a given case size.
- High reliability and stability.
- Anti-Arcing.
- RoHS compliant.

3. APPLICATIONS

- DC to DC converter.
- High voltage coupling/DC blocking.
- Back-lighting inverters.
- LAN/WLAN interface.
- Modem.
- Power supplies.

4. HOW TO ORDER

FJ	31	X	102	K	202	E	C	G
PDC Family	Size	Dielectric	Capacitance	Tolerance	Rated Voltage	Packaging	Thickness	Control Code
Table 1	Table 2	Table 3	Table 4	Table 5	Table 6	Table 7	Table 8	Table 9

Table 1 PDC Family	
Code	Description
FJ	Anti-Arcing high voltage application with $\geq 1\text{KVdc}$

Table 6 Rated Voltage					
Code	Description	Code	Description	Code	Description
102	1000VDC	202	2000VDC	302	3000VDC
152	1500VDC	25	2500VDC	402	4000VDC

Table 2 Size					
Code	Description	Code	Description	Code	Description
31	1206 (3216)	43	1812 (4532)	55	2220 (5750)
32	1210 (3225)	46	1825 (4563)	56	2225 (5763)
42	1808 (4520)	52	2211 (5728)		

Table 7 Packaging Type			
Code	Description	Code	Description
B	Bulk	T	Tray package
E	Tape and 7" Reel, Embossed Tape	P	Tape and 7" Reel, Paper Tape
K	Tape and 10" Reel, Embossed Tape	D	Tape and 10" Reel, Paper Tape
L	Tape and 13" Reel, Embossed Tape	G	Tape and 13" Reel, Paper Tape

Table 3 Dielectric Material Characteristics			
Code	Description	Code	Description
N	C0G	X	X7R

Table 8 Thickness Description					
Code	Description	Code	Description	Code	Description
A	0.60 \pm 0.10 mm	I	1.25 \pm 0.20 mm	Q	0.50 +0.02/-0.05 mm
B	0.8+0.15/-0.10 mm	J	1.15 \pm 0.15 mm	R	3.10 \pm 0.30 mm
C	1.25 \pm 0.10 mm	K	0.50 \pm 0.20 mm	S	0.80 \pm 0.07 mm
D	1.40 \pm 0.15 mm	L	0.30 \pm 0.03 mm	T	0.85 \pm 0.10 mm
E	1.60 \pm 0.20 mm	M	0.95 \pm 0.10 mm	U	0.50 \pm 0.10 mm
F	2.00 \pm 0.20 mm	N	0.50 \pm 0.05 mm	V	0.20 \pm 0.02 mm
G	2.50 \pm 0.30 mm	O	3.50 \pm 0.20 mm	X	0.80 \pm 0.10 mm
H	2.80 \pm 0.30 mm	P	1.60+0.3/-0.10 mm	Z	0.25 \pm 0.03 mm

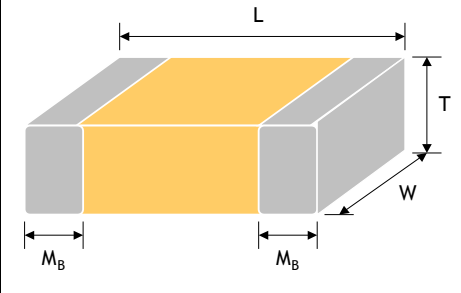
Table 4 Capacitance Rule Code			
Code	Description	Code	Description
R47	0.47pF	102	102=10x10 ² =1000pF
0R5	0.5pF	104	104=10x10 ⁴ =100nF
100	100=10x10 ⁰ =10pF	106	106=10x10 ⁶ =10 μ F

Table 9 Special Control Code	
Code	Description
G	RoHS Compliant
E	Soft Termination

Table 5 Tolerance					
Code	Description	Code	Description	Code	Description
A	± 0.05 pF	H	± 3 %	Q	± 0.03 pF
B	± 0.10 pF	J	± 5 %	Z	-20% ~ +80%
C	± 0.25 pF	K	± 10 %		
D	± 0.50 pF	L	0% ~ +10%		
F	± 1 %	M	± 20 %		
G	± 2 %	N	-5% ~ +10%		
I	-10% ~ 0%	P	± 0.02 pF		



5. EXTERNAL DIMENSIONS

Size Inch (mm)	L (mm)	W (mm)	Code / T (mm)	M _B (mm)	 <p>Fig. 5.1 The outline of MLCC</p>
1206(3216)	3.30±0.30	1.60±0.20	See No.4 Reference Table 8	0.60±0.20	
1210(3225)	3.30±0.40	2.50±0.30		0.75±0.35	
1808(4520)	4.50 +0.50/-0.30	2.00±0.25		0.75±0.35	
1812(4532)	4.50 +0.50/-0.30	3.20±0.40		0.75±0.35	
1825(4563)	4.50 +0.50/-0.30	6.30±0.40		0.75±0.35	
2211(5728)	5.70±0.40	2.80±0.30		0.85±0.35	
2220(5750)	5.70±0.40	5.00±0.40		0.85±0.35	
2225(5763)	5.70±0.40	6.30±0.40		0.85±0.35	

6. GENERAL ELECTRICAL DATA

Dielectric	C0G		X7R	
Size	1206, 1210, 1808, 1812, 1825, 2220, 2225		1206, 1210, 1808, 1812, 1825, 2211, 2220, 2225	
Rated voltage (WVDC)	1000V, 1500V, 2000V, 3000V, 4000V		1000V, 1500V, 2000V, 2500V, 3000V, 4000V	
Capacitance range	1.5pF ~ 10nF		100pF ~ 220nF	
Capacitance tolerance	Reference to Table 5		Reference to Table 5	
Tan δ	Cap. Rang	Q Spec.	≤2.5%	
	Cap.<30pF	Q≥400+20C		
	Cap.≥30pF	Q≥1000		
Capacitance & Tan δ Test condition	Measured at the condition of 30~70% related humidity			
	For 25°C at ambient temperature		Preconditioning for Class II MLCC : Perform a heat treatment at 150±10°C for 1 hour, then leave in ambient condition for 24±2 hours before measurement	
	Cap. Rang	Test Condition	1.0±0.2Vrms, 1.0KHz±10%, at 25°C ambient temperature	
	Cap.≤1000pF	1.0±0.2Vrms, 1.0MHz±10%		
Cap.>1000pF	1.0±0.2Vrms, 1.0KHz±10%			
Insulation resistance at Ur	≥100GΩ or RxC≥500Ω-F, whichever is smaller		≥10GΩ or RxC≥100Ω-F, whichever is smaller	
Operating temperature	-55°C to +125°C			
Capacitance characteristic	±30ppm/°C		±15%	
Termination	Cu or Ag/Ni/Sn (lead-free termination)			



7. CAPACITANCE RANGE

7-1. C0G

Dimension		1206				1210			
Cap.(pF)	Code	1000V	1500V	2000V	3000V	1000V	1500V	2000V	3000V
1.5	1R5	X	X	X					
1.8	1R8	X	X	X					
2.2	2R2	X	X	X					
2.7	2R7	X	X	X					
3.3	3R3	X	X	X					
3.9	3R9	X	X	X					
4.7	4R7	X	X	X					
5.0	5R0	X	X	X					
5.6	5R6	X	X	X					
6.8	6R8	X	X	X					
8.2	8R2	X	X	X					
10	100	X	X	X	E	M	M	M	F
12	120	X	X	X	E	M	M	M	F
15	150	X	X	X	E	M	M	M	F
18	180	X	X	X	E	M	M	M	F
22	220	X	X	X	E	M	M	M	F
27	270	X	X	X	E	M	M	M	F
33	330	X	M/X	M/X	E	M	M	M	F
39	390	X	M/X	M/X	E	M	M	M	F
47	470	X	M/X	M/X	E	M	M	M	F
56	560	X	C/X	C/X	E	M	C/M	C/M	F
68	680	X	C/X	C/X	E	M	C/M	C/M	F
82	820	X	C/X	C/X	E	M	C/M	C/M	F
100	101	X	C/X	C/X	E	C	C/M	C/M	F
120	121	X/C	E/X	E/X	E	C	C/M	C/M	F
150	151	C	E/M	E/M		C	E/C/M	E	F
180	181	E/C	E/M	E/M		C	E	E	F
220	221	E/C	E/C	E/C		E	E	E	F
270	271	E/C	P/C	P/C		E	F	F	G
330	331	E/C	P/E	P/E		E	F	F	
390	391	E/C	P/E	P/E		E	G/M	G/M	
470	471	E/C	E	E		E	C	C	
560	561	E				E	G/C	G/C	
680	681	E				E	G/E	G/E	
820	821	E				E	G/E	G/E	
1000	102	E				E	G/F	G/F	
1200	122	E				E	F	F	
1500	152	E				F	G	G	
1800	182	E				F/G	G	G	
2200	222	E				G			
2700	272	E				G			
3300	332	E				F/G			
3900	392	E				G			
4700	472	E				G			
5600	562					F/G			
8200	822					F/G			
10000	103					G			
12000	123					G			
15000	153					G			
18000	183					G			
23000	223					G			



7. CAPACITANCE RANGE(Con.)

7-1. C0G

Dimension		1808						1812					1825			
Cap.(pF)	Code	1000V	1500V	2000V	3000V	4000V	6000V	1000V	1500V	2000V	3000V	4000V	1000V	1500V	2000V	3000V
1.5	1R5															
1.8	1R8															
2.2	2R2	C	C	C	C	C										
2.7	2R7	C	C	C	C	C										
3.3	3R3	C	C	C	C	C	C									
3.9	3R9	C	C	C	C	C	C									
4.7	4R7	C	C	C	C	C	C									
5.0	5R0	C	C	C	C	C	C									
5.6	5R6	C	C	C	C	C	C									
6.8	6R8	C	C	C	C	C	C									
8.2	8R2	C	C	C	C	C	C									
10	100	C	C	C	C	C	C	C	C	C	C	C	F	F	F	F
12	120	C	C	C	C	C	C	C	C	C	C	C	F	F	F	F
15	150	C	C	C	C	C	C	C	C	C	C	C	F	F	F	F
18	180	C	C	C	C	C	C	C	C	C	C	C	F	F	F	F
22	220	C	C	C	C	E	C	C	C	C	C	C	F	F	F	F
27	270	C	C	C	C	E	C	C	C	C	C	C	F	F	F	F
33	330	C	C	C	C	E	C	C	C	C	C	C	F	F	F	F
39	390	C	C	C	C	F	E	C	C	C	C	C	F	F	F	F
47	470	C	C	C	C		E	C	C	C	C	E	F	F	F	F
56	560	C	C	C	C		E	C	C	C	C	E	F	F	F	F
68	680	C	C	C	C		F	C	C	C	C	F	F	F	F	F
82	820	C	C	C	C		F	C	C	C	C	F	F	F	F	F
100	101	C	C	C	C		F	C	C	C	C	F	F	F	F	F
120	121	C	C	C	C			C	C	C	C	G	F	F	F	F
150	151	C	C	C	C			C	C	C	C		F	F	F	F
180	181	C	C	C	C			C	C	C	C		F	F	F	F
220	221	C	C	C	E			C	C	C	C		F	F	F	F
270	271	C	C	C	E			C	C	C	C		F	F	F	F
330	331	C	C	C	F			C	C	C	C		F	F	F	F
390	391	C	C	C	F			C	C	C	C		F	F	F	F
470	471	C	C	C	F			C	C	C	E		F	F	F	F
560	561	C	C	C				C	C	C	E		F	F	F	F
680	681	C	C	C				C	C	C	F		F	F	F	F
820	821	C	C	C				C	C	C	G		F	F	F	F
1000	102	C	E	E				C	C	C	G		F	F	F	F
1200	122	E	E	E				C	E	E	H/R		F	F	F	
1500	152	E	F	F				C	E	E	R		F	F	F	
1800	182	F	F	F				E	F	F			F	F	F	
2200	222	F	F	F				F	F	F			F	F	F	
2700	272	F						F	G	G			F	F	F	
3300	332	F						F	G	G			F	F	F	
3900	392							G					F	F	F	
4700	472							F/G					F	F	F	
5600	562							G					F			
6800	682							G					F			
8200	822							G					G			
10000	103							G					G			
12000	123							G								



7. CAPACITANCE RANGE(Con.)

7-1. C0G

Dimension		2220					2225				
Cap.(pF)	Code	1000V	1500V	2000V	3000V	4000V	1000V	1500V	2000V	3000V	4000V
10	100	F	F	F	F	F	F	F	F	F	F
12	120	F	F	F	F	F	F	F	F	F	F
15	150	F	F	F	F	F	F	F	F	F	F
18	180	F	F	F	F	F	F	F	F	F	F
22	220	F	F	F	F	F	F	F	F	F	F
27	270	F	F	F	F	F	F	F	F	F	F
33	330	F	F	F	F	F	F	F	F	F	F
39	390	F	F	F	F	F	F	F	F	F	F
47	470	F	F	F	F	F	F	F	F	F	F
56	560	F	F	F	F	F	F	F	F	F	F
68	680	F	F	F	F	F	F	F	F	F	F
82	820	F	F	F	F	F	F	F	F	F	F
100	101	F	F	F	F	F	F	F	F	F	F
120	121	F	F	F	F	F	F	F	F	F	F
150	151	F	F	F	F	F	F	F	F	F	F
180	181	F	F	F	F	F	F	F	F	F	F
220	221	F	F	F	F	F	F	F	F	F	F
270	271	F	F	F	F	G	F	F	F	F	F
330	331	F	F	F	F	G	F	F	F	F	F
390	391	F	F	F	F	F	F	F	F	F	F
470	471	F	F	F	F	F	F	F	F	F	F
560	561	F	F	F	F	F	F	F	F	F	F
680	681	F	F	F	F	F	F	F	F	F	F
820	821	F	F	F	F	F	F	F	F	F	F
1000	102	F	F	F	F	F	F	F	F	F	G
1200	122	F	F	F	F	F	F	F	F	F	
1500	152	F	F	F	F	F	F	F	F	F	
1800	182	F	F	F			F	F	F	F	
2200	222	F	F	F			F	F	F	F	
2700	272	F	F	F			F	F	F	G	
3300	332	F	F	F			F	F	F	G	
3900	392	F	F	F			F	F	F		
4700	472	F	F	F			F	F	F		
5600	562	F					F	F	F		
6800	682	F					F	F	F		
8200	822	G					F	G	G		
10000	103	F/G					G	G	G		
12000	123	G									
15000	153	G									
18000	183	G									
22000	223	G									
27000	273	G									
33000	333	G									



7. CAPACITANCE RANGE(Con.)

7-2. X7R

Dimension		0805	1206				1210			1808					
Cap.(pF)	Code	1000V	1000V	1500V	2000V	2500V	2800V	1000V	1500V	2000V	1000V	1500V	2000V	3000V	4000V
100	101	X	C/X	C/X	C/X	C/X		C	C/E	C/E					
120	121	X	C/X	C/X	C/X	C/X		C	C/E	C/E					
150	151	X	C/X	C/X	C/X	C/X		C	C/E	C/E	C	C	C	C	F
180	181	X	C/X	C/X	C/X	C/X		C	C/E	C/E	C	C	C	C	F
220	221	X	C/X	C/X	C/X	C/X		M/C	M/C	M/C/E	C	C	C	C	F
270	271	X	C/X	C/X	C/X	C/X		M/C	M/C	M/C/E	C	C	C	C	F
330	331	X	C/X	C/X	C/X	C/X		M/C	M/C	M/C/E	C	C	C	F	F
390	391	X	C/X	C/X	C/X	C/X		M/C	M/C	M/C/E	C	C	C	F	F
470	471	X	C/X	C/X	C/X	C/X		M/C	M/C	M/C/E	C	C	C	F	F
560	561	X	C/X	C/X	C/X	C/X		M/C	M/C	M/C/E	C	C	C	F	F
680	681	X	C/X	M/C	M/C	C	C	M/C	M/C	M/C/E	C	C	C	F	F
820	821	X	C/X	M/C	M/C	C	C	M/C	M/C	M/C/E	C	C	C	F	F
1000	102	X	C/X	C	X/C	C	C	M/C	C	M/C/E	C	C	C/E	C/D/E	F
1200	122	X	C/X	E	E	E		M/C	G	M/C/E	C	C/F	C/F	F	
1500	152	C	C/X	E	E	E		M/C	G	F	C	C/F	C/F	F	
1800	182	C	C/X	E	E	E		M/C	G	F	C	C/F	C/F	F	
2200	222	C	C/X	E	E	E		M/C	G	F	C	E/F	E/F	F	
2700	272	C	C/X	E	E	E		M/C	G	G	C	F	F	F	
3300	332	C	C/X	E	E	E		M/C	G	G	C	F	F	F	
3900	392	C	C/X	E	E	E		M/E	G	G	C	F	F	F	
4700	472	C	C/X	E	E	E		M/E	G/F	E/F/G	C	F	F	F	
5600	562	C	C/X	E*				M/E	G	G	C/F	F	F	F	
6800	682	C	M/C	E*				M/E	G	G	C/F	F	F	F	
8200	822	C	M/C	E*				M/E	G	G	C/F	F	F	F	
10000	103	C	M/C	E*				C/E	G	G	C/F	F	F	F	
12000	123		C/E					C/E	G		E/F				
15000	153		E					E	G		E/F				
18000	183		E					E	G		F				
22000	223		E					E	G		F				
27000	273							E	G		F				
33000	333							E	G		F				
39000	393							F			F				
47000	473							G			F				
56000	563										F				
68000	683														



7. CAPACITANCE RANGE(Con.)

7-2. X7R

Dimension		1812						1825				
Cap.(pF)	Code	1000V	1500V	2000V	3000V	3500V	4000V	1000V	1500V	2000V	3000V	4000V
150	151					C						
180	181					C						
220	221			C		C						
270	271	C	C	C	F	C	F					F
330	331	C	C	C	F	C	F					F
390	391	C	C	C	F	C	F					F
470	471	C	C	C	F	C	F					F
560	561	C	C	C	F	C	F					F
680	681	C	C	C	F	C	F					F
820	821	C	C	C	F	C	F					F
1000	102	C	C	C	F	C	F	F	F	F	F	F
1200	122	C	C	C	F	C	G	F	F	F	F	G
1500	152	C	C	C	F	C	G	F	F	F	F	G
1800	182	C	C	C	G	C	G	F	F	F	F	G
2200	222	C	C	C/E	E/F/G	E		F	F	F	F	
2700	272	C	C	C	G	E		F	F	F	F	
3300	332	C	E/F	C/F	G	E		F	F	F	F	
3900	392	C	F	F	G	F		F	F	F	F	
4700	472	C	F	F	G	F		F	F	F	F	
5600	562	C	G	G		F		F	F	F	G	
6800	682	C	G	G		G		F	F	F	G	
8200	822	C	G	G		G		F	F	F	G	
10000	103	C	E/G/F	E/G/F		G		F	F	F	G	
12000	123	C/F	E/G/F	G				F	G	G	H	
15000	153	C/F	E/G/F	G				F	G	G	H	
18000	183	E/G	E/G/F	G				F	G	G	H	
22000	223	C/E/G	F/G	G				F	G	G		
27000	273	G						F	H	H		
33000	333	G						F	H	H		
39000	393	G						F	H	H		
47000	473	G/F						F	H	H		
56000	563	G						F	H			
68000	683	G						F				
82000	823	G						F				
100000	104	G						G				



7. CAPACITANCE RANGE(Con.)

7-2. X7R

Dimension		2211		2220						2225					
Cap.(pF)	Code	3000V	4000V	1000V	1500V	2000V	3000V	4000V	5000V	1000V	1500V	2000V	3000V	4000V	5000V
270	271	F	F					F	F					F	F
330	331	F	F					F	F					F	F
390	391	F	F					F	F					F	F
470	471	F	F					F	F				E	F	F
560	561	F	F					F	F					F	F
680	681	F	F					F	F					F	F
820	821	F	F					F	F					F	F
1000	102	F	F	F	F	F	F	F	F	F	F	F	F	F	F
1200	122	G	G	F	F	F	F	G	F	F	F	F	F	G	F
1500	152	G	G	F	F	F	F	G	F	F	F	F	F	G	F
1800	182	G	G	F	F	F	F	G	F	F	F	F	F	G	F
2200	222	G		F	F	F	F	F	F	F	F	F	F		F
2700	272	G		F	F	F	F	F	F	F	F	F	F		F
3300	332	G		F	F	F	F	F	F	F	F	F	F		F
3900	392			F	F	F	F	F	F	F	F	F	F		F
4700	472			F	F	F	F	F/G	F	F	F	F	F		F/G
5600	562			F	F	F	F	F	F	F	F	F	G		
6800	682			F	F	F	G	F	F	F	F	F	G		
8200	822			F	G	G	G	F	F	F	F	G			
10000	103			F	G/F	E/G/F	G	F	F	F	F	G			
12000	123			F	G	G	H	F	G	G	G	G			
15000	153			F	G	G	H	F	G	G	G	G			
18000	183			F	H	H	H	F	G	G	G/H				
22000	223			F	H	H/G		F	G/F	G/F	F				
27000	273			F	H	H/G		F	G	G					
33000	333			F	H	H/F		F	G	G					
39000	393			F	H	H		F	G	H					
47000	473			F	H	H		F	G	H					
56000	563			F	H	H		F	G	H					
68000	683			F				F	G						
82000	823			F				F	G						
100000	104			G/F				G	G						
120000	124			G/F				H							
150000	154			H				G/H							
180000	184			H				H							
220000	224			H/F				H							
270000	274			H				F/G/H							
330000	334			H				G/H							

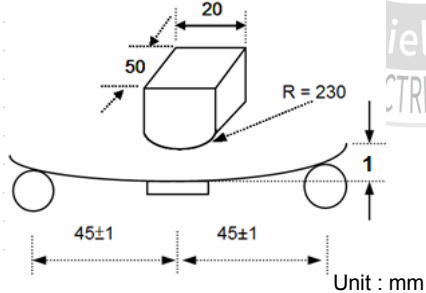
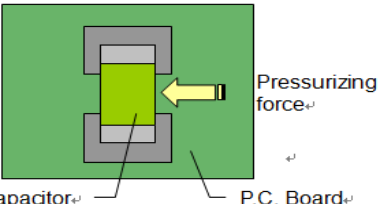


8. RELIABILITY TEST CONDITIONS AND REQUIREMENTS

No.	Item	Test Condition	Requirements															
1.	Visual and Dimensions	---	* No remarkable defect. * Dimensions to confirm to individual specification sheet.															
2.	Capacitance		* Shall not exceed the limits given in the detailed spec.															
3.	Q/D.F. (Dissipation Factor)	* Class I : C0G Cap.≤1000pF, 1.0±0.2Vrms, 1MHz±10%. Cap.>1000pF, 1.0±0.2Vrms, 1KHz±10%. * Class II : X7R 1.0±0.2Vrms, 1KHz±10%.	<table border="1"> <thead> <tr> <th>Dielectric</th> <th>Rated Vol.(V)</th> <th>Q/D.F.</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Class I (C0G)</td> <td rowspan="2">All</td> <td>Q≥1000</td> <td>Cap.≥30pF</td> </tr> <tr> <td>Q≥400+20C</td> <td>Cap.<30pF</td> </tr> <tr> <td>Class II (X7R)</td> <td>All</td> <td>D.F.≤2.5%</td> <td></td> </tr> </tbody> </table>	Dielectric	Rated Vol.(V)	Q/D.F.	Remark	Class I (C0G)	All	Q≥1000	Cap.≥30pF	Q≥400+20C	Cap.<30pF	Class II (X7R)	All	D.F.≤2.5%		
Dielectric	Rated Vol.(V)	Q/D.F.	Remark															
Class I (C0G)	All	Q≥1000	Cap.≥30pF															
		Q≥400+20C	Cap.<30pF															
Class II (X7R)	All	D.F.≤2.5%																
4.	Temperature Coefficient	* With no electrical load. <table border="1"> <thead> <tr> <th>T.C.</th> <th>Operating Temp.</th> </tr> </thead> <tbody> <tr> <td>C0G</td> <td>-55~125°C at 25°C</td> </tr> <tr> <td>X7R</td> <td>-55~125°C at 25°C</td> </tr> </tbody> </table>	T.C.	Operating Temp.	C0G	-55~125°C at 25°C	X7R	-55~125°C at 25°C	<table border="1"> <thead> <tr> <th>T.C.</th> <th>Capacitance Change</th> </tr> </thead> <tbody> <tr> <td>C0G</td> <td>Within ±30ppm/°C</td> </tr> <tr> <td>X7R</td> <td>Within ±15%</td> </tr> </tbody> </table>	T.C.	Capacitance Change	C0G	Within ±30ppm/°C	X7R	Within ±15%			
T.C.	Operating Temp.																	
C0G	-55~125°C at 25°C																	
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T.C.	Capacitance Change																	
C0G	Within ±30ppm/°C																	
X7R	Within ±15%																	
5.	Insulation Resistance	<table border="1"> <thead> <tr> <th>Rated Vol.(V)</th> <th>Apply Voltage</th> <th>Test Condition</th> </tr> </thead> <tbody> <tr> <td>>500</td> <td>500Vdc</td> <td>60 sec.</td> </tr> </tbody> </table>	Rated Vol.(V)	Apply Voltage	Test Condition	>500	500Vdc	60 sec.	<table border="1"> <thead> <tr> <th>Dielectric</th> <th>Requirements</th> </tr> </thead> <tbody> <tr> <td>Class I</td> <td>≥100GΩ or RxC≥500Ω-F, whichever is smaller</td> </tr> <tr> <td>Class II</td> <td>≥10GΩ or RxC≥100Ω-F, whichever is smaller</td> </tr> </tbody> </table>	Dielectric	Requirements	Class I	≥100GΩ or RxC≥500Ω-F, whichever is smaller	Class II	≥10GΩ or RxC≥100Ω-F, whichever is smaller			
Rated Vol.(V)	Apply Voltage	Test Condition																
>500	500Vdc	60 sec.																
Dielectric	Requirements																	
Class I	≥100GΩ or RxC≥500Ω-F, whichever is smaller																	
Class II	≥10GΩ or RxC≥100Ω-F, whichever is smaller																	
6.	Solderability	* Solder temperature : 235±5°C for (1206~1210). * Solder temperature : 245±5°C for (1808~2225). * Dipping time : 2±0.5 sec.	* 75% min. coverage of all metalized area.															
7.	Dielectric Strength	<table border="1"> <thead> <tr> <th>Rated Vol.(V)</th> <th>Condition</th> </tr> </thead> <tbody> <tr> <td>630≤V≤3000V</td> <td>1.2 times of UR</td> </tr> <tr> <td>3000<V<5000V</td> <td>1.1 times of UR</td> </tr> <tr> <td>≥5000V</td> <td>1.0 times of UR</td> </tr> </tbody> </table> <p>* Duration : 1 to 5 sec. * Voltage ramp up rate ≤500Vdc/sec. * Charge and discharge current less than 50mA. * Test in insulating fluid.</p>	Rated Vol.(V)	Condition	630≤V≤3000V	1.2 times of UR	3000<V<5000V	1.1 times of UR	≥5000V	1.0 times of UR	* No evidence of damage or flashover during test.							
Rated Vol.(V)	Condition																	
630≤V≤3000V	1.2 times of UR																	
3000<V<5000V	1.1 times of UR																	
≥5000V	1.0 times of UR																	
8.	Resistance to Soldering Heat	* Solder temperature : 260±5°C. * Dipping time : 10±1 sec. * Preheating : 120 to 150°C for 1 minute before immerse the capacitor in a eutectic solder. * Before initial measurement (Class II only) : Perform 150 +0/-10°C for 1 hr and then set for 48±4 hrs at room temp. * Measurement to be made after keeping at room temp. for 24±2 hrs (Class I) or 48±4 hrs (Class II).	* No remarkable damage. * Cap. Change : C0G : Within ±2.5% or ±0.25pF, whichever is larger. X7R : Within ±7.5%. * Q/D.F. & I.R. : To meet the initial requirement. * 25% max. leaching on each edge.															
9.	Temperature Cycle	* Conduct the five cycles according to the temperatures and time. <table border="1"> <thead> <tr> <th>Step</th> <th>Temp.(°C)</th> <th>Time(min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Min. operating temp. +0/-3</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room temp.</td> <td>2~3</td> </tr> <tr> <td>3</td> <td>Max. operating temp. +3/-0</td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Room temp.</td> <td>2~3</td> </tr> </tbody> </table> <p>* Before initial measurement (Class II only) : Perform 150 +0/-10°C for 1 hr and then set for 48±4 hrs at room temp. * Measurement to be made after keeping at room temp. for 24±2 hrs (Class I) or 48±4 hrs (Class II).</p>	Step	Temp.(°C)	Time(min.)	1	Min. operating temp. +0/-3	30±3	2	Room temp.	2~3	3	Max. operating temp. +3/-0	30±3	4	Room temp.	2~3	* No remarkable damage. * Cap. change : C0G : Within ±2.5% or ±0.25pF, whichever is larger. X7R : Within ±7.5%. * Q/D.F. : C0G : To meet the initial requirement. X7R : D.F.≤150% of initial requirement. * I.R. : To meet the initial requirement.
Step	Temp.(°C)	Time(min.)																
1	Min. operating temp. +0/-3	30±3																
2	Room temp.	2~3																
3	Max. operating temp. +3/-0	30±3																
4	Room temp.	2~3																



8. RELIABILITY TEST CONDITIONS AND REQUIREMENTS

No.	Item	Test Condition	Requirements						
10.	Humidity (Damp Heat) Steady State	<ul style="list-style-type: none"> * Test temp. : 40±2°C. * Humidity : 90~95%RH. * Test time : 500 +24/-0 hrs. * Measurement to be made after keeping at room temp. for 24±2 hrs (Class I) or 48±4 hrs (Class II). 	<ul style="list-style-type: none"> * No remarkable damage. * Cap. change : C0G : Within ±5.0% or ±0.5pF, whichever is larger. X7R : Within ±12.5%. * Q/D.F. : C0G : Cap.>30pF, Q≥350; 10pF≤Cap.≤30pF, Q≥275+2.5C; Cap.<10pF, Q≥200+10C. X7R : D.F.≤200% of initial requirement. * I.R. (Class I) : ≥10GΩ or RxC≥500Ω-F, whichever is smaller. * I.R. (Class II) : ≥1GΩ or RxC≥10Ω-F, whichever is smaller. 						
11.	Humidity (Damp Heat) Load	<ul style="list-style-type: none"> * Reflow solder the capacitors on a P.C. Board before test. * Test temp. : 40±2°C. * Humidity : 90~95% RH. * Test time : 500 +24/-0hrs. * To apply voltage : 500Vdc. * Measurement to be made after keeping at room temp. for 24±2 hrs (Class I) or 48±4 hrs (Class II). 	<ul style="list-style-type: none"> * No remarkable damage. * Cap. change : C0G : Within ±7.5% or ±0.75pF, whichever is larger. X7R : Within ±12.5%. * Q/D.F. : C0G : Cap.≥30pF, Q≥200; Cap.<30pF, Q≥100+10/3C. X7R : D.F.≤200% of initial requirement. * I.R. : ≥500MΩ or RxC≥25Ω-F, whichever is smaller. 						
12.	High Temperature Load (Endurance)	<ul style="list-style-type: none"> * Test temp. : 125±3°C. * Apply voltage : 100% of rated voltage. * Test time : 1000 +24/-0 hrs. * Measurement to be made after keeping at room temp. for 24±2 hrs (Class I) or 48±4 hrs (Class II). 	<ul style="list-style-type: none"> * No remarkable damage. * Cap. change : C0G : Within ±3.0% or ±0.3pF, whichever is larger. X7R : Within ±12.5%. * Q/D.F. : C0G : Cap.>30pF, Q≥350; 10pF≤Cap.≤30pF, Q≥275+2.5C; Cap.<10pF, Q≥200+10C. X7R : D.F.≤200% of initial requirement. * I.R. (Class I) : ≥10GΩ or RxC≥500Ω-F, whichever is smaller. * I.R. (Class II) : ≥1GΩ or RxC≥10Ω-F, whichever is smaller. 						
13	Resistance to Flexure of Substrate	<p>* The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of about 1mm per second until the deflection becomes 1mm.</p>  <p style="text-align: center;">Unit : mm</p>	<p>* No remarkable damage.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Dielectric</th> <th>Cap. Change</th> </tr> </thead> <tbody> <tr> <td>Class I (C0G)</td> <td>Within ±3.0% or ±2.0pF, whichever is larger</td> </tr> <tr> <td>Class II (X7R)</td> <td>Within ±12.5%</td> </tr> </tbody> </table> <p>(This capacitance change means the change of capacitance under specified flexure of substrate from the capacitance measured before the test)</p>	Dielectric	Cap. Change	Class I (C0G)	Within ±3.0% or ±2.0pF, whichever is larger	Class II (X7R)	Within ±12.5%
Dielectric	Cap. Change								
Class I (C0G)	Within ±3.0% or ±2.0pF, whichever is larger								
Class II (X7R)	Within ±12.5%								
14.	Adhesive Strength of Termination	<p>* Capacitors mounted on a substrate. A force of 10N applied perpendicular to the place of substrate and parallel the line joining the center of terminations for 10±1 second.</p> 	<ul style="list-style-type: none"> * No remarkable damage or removal of the terminations. 						
15.	Vibration Resistance	<ul style="list-style-type: none"> * Vibration frequency : 10~55 Hz/min. * Total amplitude : 1.5mm. * Test time : 6 hrs (Two hrs each in three mutually perpendicular directions.) 	<ul style="list-style-type: none"> * No remarkable damage. * Cap. change and Q/D.F. : To meet initial spec. 						



9. PACKAGE DIMENSION AND QUANTITY

Size	Thickness (mm)	Paper tape		Plastic tape	
		7" reel	13" reel	7" reel	13" reel
0402(1005)	0.50±0.05	10k	50K	-	-
0603(1608)	0.80±0.07	4k	15k	-	-
	0.80 +0.15/-0.10	4k	15k	-	-
0805(2012)	0.60±0.10	4k	15k	-	-
	0.80±0.10	4k	15k	-	-
	1.25±0.10	-	-	3k	10k
	1.25±0.20	-	-	3k	-
1206(3216)	0.80±0.10	4k	15k	-	-
	0.95±0.10	-	-	3k	10k
	1.25±0.10	-	-	3k	10k
	1.60±0.20	-	-	2k	-
1210(3225)	1.60+0.30/-0.10	-	-	2k	-
	0.95±0.10	-	-	3k	10k
	1.25±0.10	-	-	3k	10k
	1.60±0.20	-	-	2k	-
1808(4520)	2.50±0.30	-	-	1k	-
	1.25±0.10	-	-	2k	-
	1.60±0.20	-	-	2k	-
1812(4532)	2.00±0.20	-	-	1k	-
	2.00±0.20	-	-	1k	-
	2.50±0.30	-	-	0.5k	-
1825(4563)	1.60±0.20	-	-	1k	-
	2.00±0.20	-	-	1k	-
	2.50±0.30	-	-	0.5k	-
	2.80±0.30	-	-	0.5k	-
2211(5728)	1.60±0.20	-	-	1k	-
	2.00±0.20	-	-	1k	-
	2.50±0.30	-	-	0.5k	-
	2.80±0.30	-	-	0.5k	-
2220(5750)	1.60±0.20	-	-	1k	-
	2.00±0.20	-	-	1k	-
	2.50±0.30	-	-	0.5k	-
	2.80±0.30	-	-	0.5k	-
	3.10±0.30	-	-	-	1k
2225(5763)	1.60±0.20	-	-	1k	-
	2.00±0.20	-	-	1k	-
	2.50±0.30	-	-	0.5k	-
	2.80±0.30	-	-	0.5k	-

Unit : pcs



9. PACKAGE DIMENSION AND QUANTITY

9.1. EMBOSSED TAPE DIMENSIONS

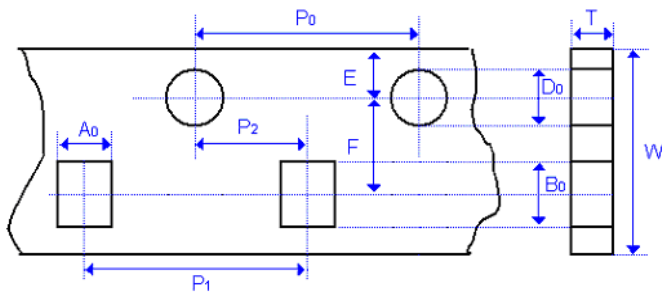


Fig. 9.1 The dimension of paper tape

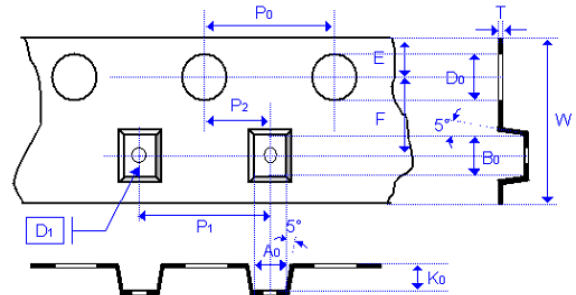


Fig. 9.2 The dimension of plastic tape

Size	0402		0603		0805	
Chip Thickness	0.50±0.05	0.50±0.10	0.80±0.07	0.80 +0.15/-0.1	0.80±0.10	1.25±0.10 1.25±0.20
A ₀	0.70±0.20	0.70±0.20	1.00 +0.05/-0.1	1.02 +0.05/-0.1	1.50±0.10	<1.65
B ₀	1.20±0.20	1.20±0.20	1.80±0.10	1.80±0.10	2.30±0.10	<2.40
T	≤0.80	≤0.80	0.95±0.05	0.97±0.05	0.95±0.05	0.23±0.05
K ₀	-	-	-	-	-	<2.50
W	8.00±0.10	8.00±0.10	8.00±0.10	8.00±0.10	8.00±0.10	8.00±0.10
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
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
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
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
D ₀	1.55±0.05	1.55±0.05	1.55±0.05	1.55±0.05	1.55±0.05	1.50 +0.10/-0
D ₁	-	-	-	-	-	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
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
Unit :	mm	mm	mm	mm	mm	mm

Size	1206			1210		1808	
Chip Thickness	0.80±0.10	0.95±0.10 1.25±0.10	1.25±0.10 1.60±0.20	1.25±0.10 1.60±0.20	2.50±0.30	1.25±0.10 1.60±0.20	2.00±0.20
A ₀	2.00±0.10	<2.00	<2.50	<2.50	<3.10	<2.50	<2.50
B ₀	3.50±0.10	<3.60	<5.30	<5.30	<4.00	<5.30	<5.30
T	0.95±0.05	0.23±0.05	0.25±0.05	0.25±0.05	0.23±0.05	0.25±0.05	0.25±0.05
K ₀	-	<2.50	<2.50	<2.50	<3.50	<2.50	<2.50
W	8.00±0.10	8.00±0.10	12.00±0.20	12.00±0.20	12.00±0.20	12.00±0.20	12.00±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
10xP ₀	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	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
D ₀	1.55±0.05	1.50 +0.10/-0	1.50+0.10/-0	1.50+0.10/-0	1.50+0.10/-0	1.50+0.10/-0	1.50+0.10/-0
D ₁	-	1.00±0.10	1.50±0.10	1.50±0.10	1.00±0.10	1.50±0.10	1.50±0.10
E	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10
F	3.50±0.05	3.50±0.05	5.50±0.05	5.50±0.05	3.50±0.05	5.50±0.05	5.50±0.05
Unit :	mm	mm	mm	mm	mm	mm	mm



9. PACKAGE DIMENSION AND QUANTITY

Size	1812		1825	
Chip Thickness	1.25±0.10 1.60±0.20 2.00±0.20	2.50±0.30 2.80±0.30	1.60±0.20 2.00±0.20	2.50±0.30 2.80±0.30
A ₀	<3.90	<3.90	<6.80	<6.80
B ₀	<5.30	<5.30	<5.30	<5.30
T	0.25±0.05	0.25±0.05	0.30±0.10	0.30±0.10
K ₀	<2.50	<3.00	<2.50	<3.10
W	12.00±0.20	12.00±0.20	12.00±0.20	12.00±0.20
P ₀	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10
10xP ₀	40.00±0.20	40.00±0.20	40.00±0.20	40.00±0.20
P ₁	8.00±0.10	8.00±0.10	8.00±0.10	8.00±0.10
P ₂	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05
D ₀	1.50 +0.10/-0	1.50 +0.10/-0	1.50 +0.10/-0	1.50 +0.10/-0
D ₁	1.50±0.10	1.50±0.10	1.50±0.10	1.50±0.10
E	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10
F	5.50±0.05	5.50±0.05	5.50±0.05	5.50±0.05
Unit :	mm	mm	mm	mm

Size	2220			2225	
Chip Thickness	1.40±0.15 1.60±0.20 2.00±0.20	2.50±0.30 2.80±0.30	3.10±0.30	1.60±0.20 2.00±0.20	2.50±0.30 2.80±0.30
A ₀	<5.80	<6.80	<5.60	<6.80	<6.80
B ₀	<6.50	<6.50	<6.50	<6.50	<6.50
T	0.30±0.10	0.30±0.10	0.30±0.10	0.30±0.10	0.30±0.10
K ₀	<2.50	<3.10	<4.20	<2.50	<3.10
W	12.00±0.20	12.00±0.20	12.00±0.20	12.00±0.20	12.00±0.20
P ₀	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10
10xP ₀	40.00±0.20	40.00±0.20	40.00±0.20	40.00±0.20	40.00±0.20
P ₁	8.00±0.10	8.00±0.10	8.00±0.10	8.00±0.10	8.00±0.10
P ₂	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05
D ₀	1.50 +0.10/-0	1.50 +0.10/-0	1.50 +0.10/-0	1.50 +0.10/-0	1.50 +0.10/-0
D ₁	1.50±0.10	1.50±0.10	1.50±0.10	1.50±0.10	1.50±0.10
E	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10
F	5.50±0.05	5.50±0.05	5.50±0.05	5.50±0.05	5.50±0.05
Unit :	mm	mm	mm	mm	mm

