MULTILAYER CERAMIC

CAPACITORS

AUTOMOTIVE AEC-Q200

Revision: A

Frontier Electronics Corp.®
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TABLE OF CONTENTS

Contents

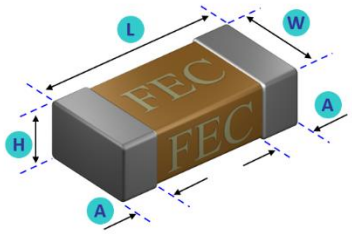
PART NUMBER DESCRIPTION

0402	A	250	N	4R7	B	C	T
Size	Series	Rated Voltage	Dielectric	Capacitance	Tolerance	Termination	Packaging
0201 (0603) **0402** (1005) **0603** (1608) **0805** (2012) **1206** (3216) **1210** (3225) **1812** (4532)	**A**: Automotive with AEC-Q200	**100**: 10V **160**: 16V **250**: 25V **500**: 50V **101**: 100V **201**: 200V **251**: 250V **501**: 500V **631**: 630V **102**: 1,000V	**N**: NP0 **X**: X7R	**R47**: 0.47pF **0R5**: 0.5pF **1R0**: 1.0pF **4R7**: 4.7pF **100**: 10pF **101**: 100pF **225**: 2.2µF	**A**: ±0.05pF **B**: ±0.1pF **C**: ±0.25pF **D**: ±0.5pF **F**: ±1% **G**: ±2% **J**: ±5% **K**: ±10%	**C**: Cu/Ni/Sn (Standard) **F**: Cu/Special resin/Ni/Sn (Soft Termination)	**T**: 7" Paper Tape **U**: 13" Paper Tape **E**: 7" Plastic Tape **Q**: 13" Plastic Tape **Z** or blank: Bulk

GENERAL ELECTRICAL DATA

Dielectric	NP0	X7R
Size	0201, 0402, 0603, 0805, 1206, 1210	0201, 0402, 0603, 0805, 1206,1210
Capacitance	0.1pF to 0.047µF	100pF to 2.2µF
Capacitance tolerance	Cap≤5pF: A (±0.05pF), B (±0.1pF), C (±0.25pF) 5pF<Cap<10pF: C (±0.25pF), D (±0.5pF) Cap≥10pF: F (±1%), G (±2%), J (±5%)	J (±5%), K (±10%), M (±20%)
Rated voltage (WVDC)	10, 16, 25, 50, 100, 200, 250, 500, 630, 1,000	
Operating temperature	-55 to +125°C	
Capacitance change	±30ppm/°C	±15%
Termination	"C" Cu/Ni/Sn, Cu/Special Resin/Ni/Sn. "F" Cu/Special Resin/Ni/Sn Soft Termination. Lead-free terminations	

SIZE CODES/PACKAGING STYLE & QUANTITY



Case Size	Size Code	Length L (mm)	Width W (mm)	Thickness T (mm)	A (mm)	Soldering Method	Reel Quantity: Paper Tape 7" Reel	Reel Quantity: Paper Tape 13" Reel	Reel Quantity: Embossed Plastic Tape 7" Reel	Reel Quantity: Embossed Plastic Tape 13" Reel
0201 (0603)	AA	0.60 ±0.03	0.30 ±0.03	0.30 ±0.03	0.15 ±0.05	R	15,000	70,000	-	-
0402 (1005)	BA	1.00 ±0.05	0.50 ±0.05	0.50 ±0.05	0.25 +0.05/-0.1	R	10,000	50,000	-	-
	BC	1.0 ±0.20	0.50 ±0.20	0.50 ±0.2	0.25 +0.05/-0.1	R	10,000	-	-	-
0603 (1608)	CA	1.6 ±0.1	0.8 ±0.1	0.8±0.07	0.40 ±0.15	R/W	4,000	15,000	-	-
	CB	1.6 +0.15/-0.1	0.8 +0.15/-0.1	0.5 ±0.1	0.40 ±0.15	R/W	4,000	15,000	-	-
	CC	1.6 +0.15/-0.1	0.8 +0.15/-0.1	0.8 +0.15/-0.1	0.40 ±0.15	R/W	4,000	15,000		
0805 (2012)	DA	2.0 ±0.15	1.25 ±0.1	0.5 ±0.1	0.50 ±0.20	R/W	4,000	15,000	-	-
	DB	2.0 ±0.15	1.25 ±0.1	0.6 ±0.1	0.50 ±0.20	R/W	4,000	15,000	-	-
	DC	2.0 ±0.15	1.25 ±0.1	0.8 ±0.1	0.50 ±0.20	R/W	4,000	15,000	-	-
	DD	2.0 ±0.15	1.25 ±0.1	1.25 ±0.1	0.50 ±0.20	R	-	-	3,000	10,000
	DE	2.0 ±0.2	1.25 ±0.2	0.85 ±0.1	0.50 ±0.20	R/W	4,000	15,000	-	-
	DF	2.0 ±0.2	1.25 ±0.2	1.25 ±0.2	0.50 ±0.20	R	-	-	3,000	10,000
1206 (3216)	EA	3.2 ±0.15	1.6 ±0.15	0.8 ±0.1	0.6 ±0.20	R/W	4,000	15,000	-	-
	EH	3.2 ±0.2	1.6 ±0.2	0.85 ±0.1	0.6 ±0.20	R	4,000	15,000	-	-
	EB	3.2 ±0.15	1.6 ±0.15	0.95 ±0.1	0.6 ±0.20	R	-	-	3,000	10,000
	EC	3.2 ±0.15	1.6 ±0.15	1.25 ±0.1	0.6 ±0.20	R	-	-	3,000	10,000
	EE	3.2 ±0.2	1.6 ±0.2	1.6 ±0.2	0.6 ±0.20	R/W	-	-	2,000	10,000
	EG	3.2 +0.3/-0.1	1.6 +0.3/-0.1	1.6 +0.3/-0.1	0.6 ±0.20	R	-	-	2,000	9,000
1210 (3225)	FA	3.2 ±0.3	2.5 ±0.2	0.95 ±0.1	0.75 ±0.25	R	-	-	3,000	10,000
	FC	3.2 ±0.3	2.5 ±0.2	1.25 ±0.1	0.75 ±0.25	R	-	-	3,000	10,000
	FD	3.2 ±0.4	2.5 ±0.3	1.6 ±0.2	0.75 ±0.25	R	-	-	2,000	-
	FF	3.2 ±0.4	2.5 ±0.3	2.5 ±0.3	0.75 ±0.25	R	-	-	1,000	6,000
1812 (4532)	HA	4.5 ±0.4	3.2 ±0.3	1.25 ±0.1	0.75 ±0.25	R	-	-	1,000	5,000
	HB	4.5 ±0.4	3.2 ±0.3	1.6 ±0.2	0.75 ±0.25	R	-	-	1,000	
	HC	4.5 ±0.4	3.2 ±0.3	2.0 ±0.2	0.75 ±0.25	R	-	-	1,000	-
	HD	4.5 ±0.4	3.2 ±0.3	2.5 ±0.3	0.75 ±0.25	R	-	-	500	3,000

Size 0201: For values between 0.1µF < Cap < 0.68µF Tolerance changes to ±0.03 for the L, W and T, For values Cap≧ 0.68µF Tolerance changes to ±0.03 for the L, W and T
Size 0603: For size code "CC" values Cap>1.0µF (Voltage >10Vdc), Cap≧4.7µF (Voltage≦6.3Vdc) or Cap ≧10µF
Sizes 1008,1812,1825: Tolerances for the "L" is +0.5/-0.3 and for the "A" 0.5±0.25, apply to V≧200Vdc and Safety Capacitors
Size 1206: Tolerance for the "A" 0.5±0.25, it applies to V≧1,000 Vdc
Size 1210: Tolerances for the "L" is ±0.60 and for the "W" & "T" is ±0.50 apply to Cap>1.0µF (100Vdc) or Cap>0.47µF (250Vdc) or Cap >0.22µF(400Vdc→630Vdc)

NP0: SIZES 0201, 0402, 0603, 0805, 1206 & 1210

Dielectric		Size	0201		0402		0603			0805				1206				1210			
NP0		Tolerance	10 16 25 50	100	10 16 25 50	100	10 16 25 50	100	200 250	10 16 25 50	100	200 250	500 630	10 16 25 50 100	200	250 500 630	1,000	10 16 25 50 100	200 250	500 630	1,000
Code	Value		DC Volts																		
0R1	0.1pF		AA	AA	BA	BA															
0R2	0.2pF		AA	AA	BA	BA															
0R3	0.3pF		AA	AA	BA	BA															
0R4	0.4pF		AA	AA	BA	BA															
0R5	0.5pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB								
0R6	0.6pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB								
0R7	0.7pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB								
0R8	0.8pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB								
0R9	0.9pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB								
1R0	1.0pF	A	AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB								
1R2	1.2pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB	EA	EA	EA					
1R5	1.5pF	B	AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB	EA	EA	EA	EA				
1R8	1.8pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB	EA	EA	EA	EA				
2R0	2.0pF	C	AA	AA	BA	BA	CA	CA	CA												
2R2	2.2pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB	EA	EA	EA	EA				
2R7	2.7pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB	EA	EA	EA	EA				
3R0	3.0pF		AA	AA	BA	BA	CA	CA	CA												
3R3	3.3pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB	EA	EA	EA	EA				
3R9	3.9pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB	EA	EA	EA	EA				
4R0	4.0pF		AA	AA	BA	BA	CA	CA	CA												
4R7	4.7pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB	EA	EA	EA	EA				
5R0	5.0pF		AA	AA	BA	BA	CA	CA	CA												
5R6	5.6pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB	EA	EA	EA	EA				
6R0	6.0pF	B	AA	AA	BA	BA	CA	CA	CA												
6R8	6.8pF	C	AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB	EA	EA	EA	EA				
7R0	7.0pF	D	AA	AA	BA	BA	CA	CA	CA												
8R0	8.0pF		AA	AA	BA	BA	CA	CA	CA												
8R2	8.2pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB	EA	EA	EA	EA				
9R0	9.0pF		AA	AA	BA	BA	CA	CA	CA												
100	10pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB	EA	EA	EA	EA	FA	FA	FA	FA
120	12pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB	EA	EA	EA	EA	FA	FA	FA	FA
150	15pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB	EA	EA	EA	EA	FA	FA	FA	FA
180	18pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB	EA	EA	EA	EA	FA	FA	FA	FA
220	22pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB	EA	EA	EA	EC	FA	FA	FA	FA
270	27pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB	EA	EA	EA	EC	FA	FA	FA	FA
330	33pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB	EA	EA	EA	EC	FA	FA	FA	FA
390	39pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB	EA	EA	EA	EC	FA	FA	FA	FA
470	47pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB	EA	EA	EA	EC	FA	FA	FA	FA
560	56pF		AA	AA	BA	BA	CA	CA	CA	DB	DB	DB	DB	EA	EA	EA	EC	FA	FA	FA	FA
680	68pF		AA		BA	BA	CA	CA	CA	DB	DB	DB	DB	EA	EA	EA	EC	FA	FA	FA	FA
820	82pF		AA		BA	BA	CA	CA	CA	DB	DB	DB	DC	EA	EA	EA	EC	FA	FA	FA	FA
101	100pF		AA		BA	BA	CA	CA	CA	DB	DB	DC	DC	EA	EA	EA	EC	FA	FA	FA	FC
121	120pF		AA		BA	BA	CA	CA	CA	DB	DB	DC	DD	EA	EA	EA	EC	FA	FA	FA	FC
151	150pF				BA	BA	CA	CA	CA	DB	DB	DD	DD	EA	EA	EA	EC	FA	FA	FA	FC
181	180pF				BA	BA	CA	CA	CA	DB	DB	DD	DD	EA	EA	EA	EE	FA	FA	FA	FC
221	220pF				BA	BA	CA	CA	CA	DB	DB	DD	DD	EA	EA	EA	EE	FA	FA	FA	FD
271	270pF				BA		CA	CA	CC	DB	DB	DD	DD	EA	EA	EB	EE	FA	FA	FA	FD
331	330pF				BA		CA	CA	CC	DB	DB	DD	DD	EA	EA	EB	EE	FA	FA	FA	FD
391	390pF				BA		CA	CA	CC	DC	DC	DD	DD	EA	EA	EB	EE	FA	FA	FA	FD
471	470pF	F			BA		CA	CA	CC	DC	DC	DD	DF	EA	EB	EB	EE	FA	FA	FA	FD
561	560pF				BA		CA	CA		DC	DC	DD	DF	EA	EB	EC	EE	FA	FA	FA	FD
681	680pF	G			BA		CA	CA		DC	DC	DD	DF	EA	EB	EC	EE	FA	FA	FA	FD
821	820pF				BA		CA	CA		DC	DC	DD	DF	EA	EB	EE	EE	FA	FA	FA	FD
102	1,000pF	J			BA		CA	CA		DC	DC	DD	DF	EA	EB	EE	EE	FA	FC	FC	FD
122	1,200pF						CC			DC	DC	DD		EA	EB	EE		FA	FC	FC	
152	1,500pF						CC			DC	DC	DD		EA	EC	EE		FA	FC	FC	
182	1,800pF						CC			DC	DC	DD		EA	EC	EE		FA	FC	FC	
222	2,200pF						CC			DC	DC	DD		EA	EC	EE		FA	FC	FC	
272	2,700pF						CC			DD	DD			EA	EC	EE		FA	FC	FC	
332	3,300pF						CC			DD	DD			EA	EC	EE		FA	FC	FC	
392	3,900pF									DD	DD			EA	EC	EE		FA	FC	FC	
472	4,700pF									DD	DD			EA	EC	EE		FA	FD		
562	5,600pF									DD	DD			EA				FA	FD		
682	6,800pF									DD	DD			EB				FA	FD		
822	8,200pF									DD				EC				FA	FD		
103	0.01µF									DD				EC				FA	FD		
123	0.012µF																	FC			
153	0.015µF																	FC			
183	0.018µF																	FE			
223	0.022µF																	FE			
273	0.027µF																	FE			
333	0.033µF																	FE			
393	0.039µF																	FE			
473	0.047µF																	FE			

Value of 0.1pF is available in "B" tolerance ONLY.
NP0 test conditions: Relative humidity 30% - 70%, Temperature 25°C, 1.0MHz, 1.0V for Capacitance ≤ 1,000pF, 1.0KHz, 1.0V for Capacitance > 1,000pF

X7R: SIZES 0201, 0402, 0603, 0805, 1206 & 1210

Dielectric		Size	0201			0402		0603			0805					1206						1210							
X7R		Tolerance	10	16 25	50	10 16 25	50	10 16 25	50	100	10 16 25	50	100	200 250	500 630	10 16	25	50	100	200 250	500 630	10	16	25	50	100	250	500	1,000
Code	Value		DC Volts																									
101	100pF		AA	AA	AA	BA	BA	CA	CA	CA	DC	DC	DC	DC	DC					EC	EC						FC	FC	FC
121	120pF		AA	AA	AA	BA	BA	CA	CA	CA	DC	DC	DC	DC	DC					EC	EC						FC	FC	FC
151	150pF		AA	AA	AA	BA	BA	CA	CA	CA	DC	DC	DC	DC	DC	EA	EA	EA	EA	EC	EC						FC	FC	FC
181	180pF		AA	AA	AA	BA	BA	CA	CA	CA	DC	DC	DC	DC	DC	EA	EA	EA	EA	EC	EC						FC	FC	FC
221	220pF		AA	AA	AA	BA	BA	CA	CA	CA	DC	DC	DC	DC	DC	EA	EA	EA	EA	EC	EC						FC	FC	FC
271	270pF		AA	AA	AA	BA	BA	CA	CA	CA	DC	DC	DC	DC	DC	EA	EA	EA	EA	EC	EC						FC	FC	FC
331	330pF		AA	AA	AA	BA	BA	CA	CA	CA	DC	DC	DC	DC	DC	EA	EA	EA	EA	EC	EC						FC	FC	FC
391	390pF		AA	AA	AA	BA	BA	CA	CA	CA	DC	DC	DC	DC	DC	EA	EA	EA	EA	EC	EC						FC	FC	FC
471	470pF		AA	AA	AA	BA	BA	CA	CA	CA	DC	DC	DC	DC	DC	EA	EA	EA	EA	EC	EC						FC	FC	FC
561	560pF		AA	AA	AA	BA	BA	CA	CA	CA	DC	DC	DC	DC	DC	EA	EA	EA	EA	EC	EC						FC	FC	FC
681	680pF		AA	AA	AA	BA	BA	CA	CA	CA	DC	DC	DC	DC	DC	EA	EA	EA	EA	EC	EC						FA	FC	FC
821	820pF		AA	AA	AA	BA	BA	CA	CA	CA	DC	DC	DC	DC	DC	EA	EA	EA	EA	EC	EC						FA	FC	FC
102	1,000pF		AA	AA	AA	BA	BA	CA	CA	CA	DC	DC	DC	DC	DC	EA	EA	EA	EA	EC	EC	FA	FA	FA	FA	FA	FA	FC	FC
122	1,200pF		AA	AA		BA	BA	CA	CA	CA	DC	DC	DC	DC	DC	EA	EA	EA	EA	EC	EC	FA	FA	FA	FA	FA	FA	FC	FC
152	1,500pF		AA	AA		BA	BA	CA	CA	CA	DC	DC	DC	DC	DC	EA	EA	EA	EA	EC	EC	FA	FA	FA	FA	FA	FA	FC	FC
182	1,800pF		AA	AA		BA	BA	CA	CA	CA	DC	DC	DC	DC	DC	EA	EA	EA	EA	EC	EC	FA	FA	FA	FA	FA	FA	FC	FC
222	2,200pF		AA	AA		BA	BA	CA	CA	CA	DC	DC	DC	DC	DC	EA	EA	EA	EA	EC	EC	FA	FA	FA	FA	FA	FA	FC	FC
272	2,700pF		AA	AA		BA	BA	CA	CA	CA	DC	DC	DC	DC	DC	EA	EA	EA	EA	EC	EC	FA	FA	FA	FA	FA	FA	FC	FC
332	3,300pF		AA	AA		BA	BA	CA	CA	CA	DC	DC	DC	DC	DC	EA	EA	EA	EA	EC	EC	FA	FA	FA	FA	FA	FA	FC	FC
392	3,900pF		AA	AA		BA	BA	CA	CA	CA	DC	DC	DC	DC	DC	EA	EA	EA	EA	EC	EC	FA	FA	FA	FA	FA	FA	FC	FD
472	4,700pF		AA	AA		BA	BA	CA	CA	CA	DC	DC	DC	DC	DD	EA	EA	EA	EA	EC	EC	FA	FA	FA	FA	FA	FA	FC	FD
562	5,600pF		AA	AA		BA	BA	CA	CA	CA	DC	DC	DC	DC	DD	EA	EA	EA	EA	EC	EC	FA	FA	FA	FA	FA	FA	FC	FD
682	6,800pF		AA			BA	BA	CA	CA	CA	DC	DC	DC	DC	DD	EA	EA	EA	EA	EC	EC	FA	FA	FA	FA	FA	FA	FC	FD
822	8,200pF		AA			BA	BA	CA	CA	CA	DC	DC	DC	DC	DD	EA	EA	EA	EA	EC	EC	FA	FA	FA	FA	FA	FA	FC	FD
103	0.010µF	J	AA			BA	BA	CA	CA	CA	DC	DC	DC	DD	DD	EA	EA	EA	EA	EC	EC	FA	FA	FA	FA	FA	FA	FC	FD
123	0.012µF	K				BA		CA	CA	CC	DC	DC	DC	DD		EA	EA	EA	EA	EC		FA	FA	FA	FA	FA	FA	FC	
153	0.015µF	M				BA		CA	CA	CC	DC	DC	DC	DD		EA	EA	EA	EA	EC		FA	FA	FA	FA	FA	FA	FC	
183	0.018µF					BA		CA	CA	CC	DC	DC	DC	DD		EA	EA	EA	EA	EC		FA	FA	FA	FA	FA	FA	FC	
223	0.022µF					BA		CA	CA	CC	DC	DC	DC	DD		EA	EA	EA	EA	EC		FA	FA	FA	FA	FA	FA	FC	
273	0.027µF					BA		CA	CA	CC	DC	DC	DD			EA	EA	EA	EA			FA	FA	FA	FA	FA	FA		
333	0.033µF					BA		CA	CC	CC	DC	DC	DD			EA	EA	EA	EA			FA	FA	FA	FA	FA	FA		
393	0.039µF					BA		CA	CC	CC	DC	DC	DD			EA	EA	EA	EA			FA	FA	FA	FA	FA	FA		
473	0.047µF					BA		CA	CC	CC	DC	DC	DD			EA	EA	EA	EA			FA	FA	FA	FA	FA	FC		
563	0.056µF					BA		CA	CC		DC	DC	DD			EA	EA	EA	EA			FA	FA	FA	FA	FA			
683	0.068µF					BA		CA	CC		DC	DC	DD			EA	EA	EA	EA			FA	FA	FA	FA	FA			
823	0.082µF					BA		CA	CC		DC	DD	DD			EA	EA	EA	EC			FA	FA	FA	FA	FA			
104	0.10µF					BA		CA	CC		DC	DD	DD			EA	EA	EA	EC			FA	FA	FA	FA	FA			
124	0.12µF							CC			DC	DD				EA	EA	EA	EC			FA	FA	FA	FA				
154	0.15µF							CC	CC		DD	DD				EB	EB	EB	EE			FA	FA	FA	FA				
184	0.18µF							CC			DD	DD				EB	EB	EB	EE			FA	FA	FA	FA				
224	0.22µF							CC	CC		DD	DD				EB	EB	EB	EE			FA	FA	FA	FA				
274	0.27µF										DD	DF				EB	EB	EC				FA	FA	FA	FA				
334	0.33µF							CC	CC		DD	DF				EB	EB	EC				FA	FA	FA	FC				
394	0.39µF										DD	DF				EB	ED	EG				FA	FA	FA	FC				
474	0.47µF										DD	DF				ED	ED	EG				FA	FA	FA	FC				
564	0.56µF										DD					ED	ED	EG				FC	FC	FC	FC				
684	0.68µF										DD	DF				ED	ED	EG				FC	FC	FC	FC				
824	0.82µF										DD					ED	ED	EG				FC	FC	FC	FC				
105	1.0µF										DD	DF				ED	ED	EG				FC	FC	FC	FC				
155	1.5µF																						FE						
225	2.2µF																						FE						

X7R test conditions: Relative humidity 30% - 70%, Temperature 25°C, 1KHz,1.0V for Capacitance ≤ 10µF, 120Hz ,0.5V for Capacitance > 10µF

A SERIES Automotive Soft Termination

X7R: SIZE 1812

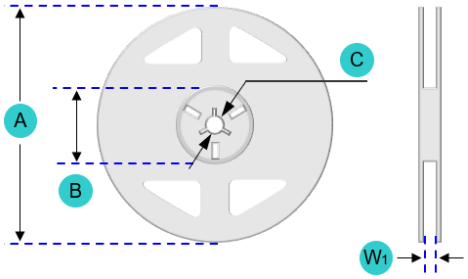
Dielectric		Size	1812	
X7R		Tolerance	50 100	200 250
Code	Value			
101	100pF	J K M		
121	120pF		HA	HA
151	150pF		HA	HA
181	180pF		HA	HA
221	220pF		HA	HA
271	270pF		HA	HA
331	330pF		HA	HA
391	390pF		HA	HA
471	470pF		HA	HA
561	560pF		HA	HA
681	680pF		HA	HA
821	820pF		HA	HA
102	1,000pF		HA	HA
122	1,200pF		HA	HA
152	1,500pF		HA	HA
182	1,800pF		HA	HA
222	2,200pF		HA	HA
272	2,700pF		HA	HA
332	3,300pF		HA	HA
392	3,900pF		HA	HA
472	4,700pF		HA	HA
562	5,600pF		HA	HA
682	6,800pF		HA	HA
822	8,200pF		HA	HA
103	0.010µF		HA	HA
123	0.012µF		HA	HA
153	0.015µF		HA	HA
183	0.018µF		HA	HA
223	0.022µF		HA	HA
273	0.027µF		HA	HA
333	0.033µF		HA	HA
393	0.039µF		HA	HA
473	0.047µF		HA	HA
563	0.056µF		HA	HA
683	0.068µF		HA	HA
823	0.082µF		HA	HA
104	0.10µF		HA	HA
124	0.12µF		HA	HA
154	0.15µF		HA	HA
184	0.18µF		HA	HA
224	0.22µF		HA	HA
274	0.27µF		HA	HB
334	0.33µF		HA	HB
394	0.39µF		HA	HC
474	0.47µF		HA	
564	0.56µF		HA	
684	0.68µF		HA	
824	0.82µF		HA	
105	1.0µF		HA	
155	1.5µF		HA	
185	1.8µF		HB	
225	2.2µF			

X7R: SIZES 0603, 0805, 1206, 1210 & 1812

Dielectric		Size	0603		0805		1206		1210			1812		
X7R		Tolerance	10 16 25	50	10 16 25 50	100	50	100	10 16 25 50	100	500	50	100	200
Code	Value		DC Volts											
101	100pF	J K M												
121	120pF													
151	150pF													
181	180pF													
221	220pF		CA	CA	DD	DD	EE	EE	FA	FA				
271	270pF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
331	330pF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
391	390pF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
471	470pF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
561	560pF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
681	680pF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
821	820pF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
102	1,000pF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
122	1,200pF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
152	1,500pF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
182	1,800pF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
222	2,200pF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
272	2,700pF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
332	3,300pF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
392	3,900pF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
472	4,700pF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
562	5,600pF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
682	6,800pF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
822	8,200pF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
103	0.010µF		CA	CA	DD	DD	EE	EE	FA	FA	FC	HD	HD	
123	0.012µF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
153	0.015µF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
183	0.018µF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
223	0.022µF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
273	0.027µF		CA	CA	DD	DD	EE	EE	FA	FA		HD	HD	
333	0.033µF		CA	CC	DD	DD	EE	EE	FA	FA		HD	HD	HA
393	0.039µF		CA	CC	DD		EE	EE	FA	FA		HD	HD	
473	0.047µF		CA	CC	DD		EE	EE	FA	FA/FC		HD	HA/HD	
563	0.056µF		CA	CC	DD		EE	EE	FA	FA		HD	HD	
683	0.068µF		CA	CC	DD		EE	EE	FA	FA/FD		HD	HD	
823	0.082µF		CA	CC	DD		EE	EE	FA	FA		HD	HA/HD	
104	0.10µF		CA	CC	DD		EE	EE	FA	FA/FD		HD	HD	
124	0.12µF		CC						FA	FD		HD	HD	
154	0.15µF		CC						FA	FD		HD	HD	
184	0.18µF		CC						FA	FD		HD	HD	
224	0.22µF		CC						FA	FD		HD	HD	
274	0.27µF								FA	FE		HD	HD	
334	0.33µF								FA	FE		HD	HD	
394	0.39µF								FC	FF		HD	HC/HD	
474	0.47µF								FC	FF		HC		
564	0.56µF								EE	FF				
684	0.68µF								EE	FF				
824	0.82µF								FE	FF				
105	1.0µF								FE	FF		HC	HD	
125	1.2µF								FE	FF				
155	1.5µF								FE	FF				
185	1.8µF								FF	FF				
225	2.2µF								FF	FF				
275	2.7µF								FF					
335	3.3µF								FF					
395	3.9µF								FF					
475	4.7µF								FF					

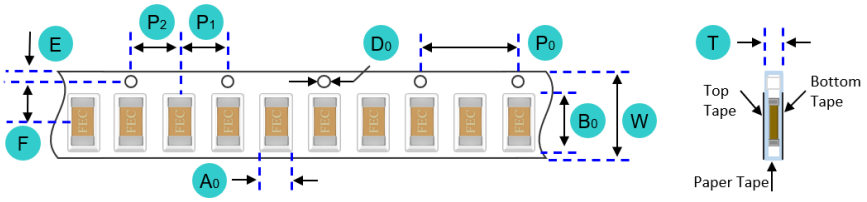
Soft Termination: Cu/Special Resin/Ni/Sn (lead-free termination). Only X7R

PACKAGING SPECIFICATIONS

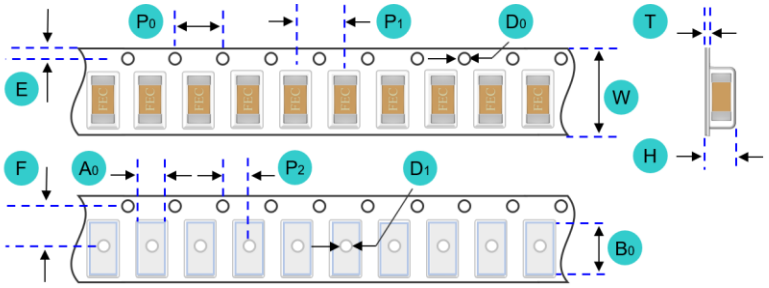


Size	0201, 0402, 0603, 0805,1206,1210 & 1812	
Reel Size	7"	13"
C (mm)	13.0±0.5	13.0±0.5
B (mm)	60.0+1.0/-0	50 min
A (mm)	178.0±2.0	330.0±2.0
W1 (mm)	10.0±1.5	10.0±1.5

PAPER CARRIER



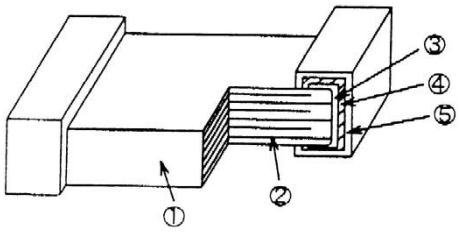
EMBOSSED CARRIER



Size	0201	0402	0603	0805			1206			1210		1812	
Thickness	AA	BA, BC	CA, CB, CC	DA, DB	DC, DE	DD, DF	EA	EB, EC	EE, EG	FA, FC, FD	FF	HA, HB, HC	HD
A0	0.40±0.10	0.70±0.20	1.05±0.30	1.50±0.20	1.50±0.20	< 1.80	2.00±0.10	<2.00	<2.00	<3.05	<3.10	<3.90	<3.90
B0	0.70±0.10	1.20±0.20	1.80±0.30	2.30±0.20	2.30±0.20	< 2.70	3.50±0.10	<3.60	<3.70	<3.80	<4.00	<5.30	<5.30
T	≦0.55	≦0.80	≦1.20	≦1.15	≦1.20	0.23±0.1	0.23±0.05	0.23±0.05	0.23±0.05	0.25±0.05	0.25±0.05	0.23±0.05	0.23±0.05
H						< 2.00	-	<2.50	<2.50	<2.50	<3.50	<2.50	<3.00
W	8.00±0.30	8.00±0.30	8.00±0.30	8.00±0.30	8.00±0.30	8.00±0.30	8.00±0.10	8.00±0.10	8.00±0.10	8.00±0.10	8.00±0.10	12.00±0.20	12.00±0.20
P0	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	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
P1	2.00±0.05	2.00±0.05	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	4.00±0.10	8.00±0.10	8.00±0.10
P2	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05	2.00±0.05	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
D0	1.50 +0.1/-0	1.50 +0.1/-0	1.50 +0.1/-0	1.50 +0.1/-0	1.50 +0.1/-0	1.50 +0.1/-0	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
D1						1.00±0.10	-	1.00±0.10	1.00±0.10	1.00±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	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10	1.75±0.10
F	3.50±0.05	3.50±0.05	3.50±0.05	3.50±0.05	3.50±0.05	3.50±0.05	3.50±0.05	3.50±0.05	3.50±0.05	3.50±0.05	3.50±0.05	5.50±0.05	5.50±0.05

GENERAL INFORMATION

	Name		NP0/X7R
1	Ceramic material		$BaTiO_3$ based
2	Inner electrode		Ni
3	Termination	Inner layer	Cu (Standard Termination) Cu/Special Resin (Soft Termination)
4		Middle layer	Ni
5		Outer layer	Sn



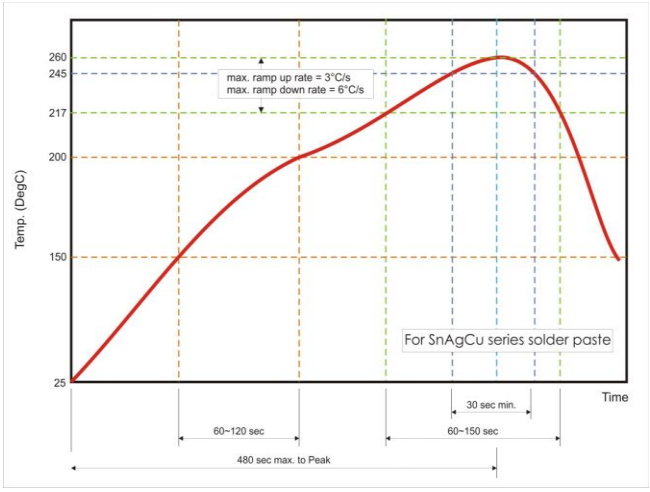
Storage

1) Product in its original packaging should be stored between 5°C and 40°C and a relative humidity range from 20% to 70%.
2) It is recommended that the product be used within one year from shipment. If the product is stored for more than a year it is recommended to check the solder on terminals.

Cautions

1) Corrosive gas reacts with the terminal electrodes of capacitors. Do not store capacitors in the proximity of corrosive gas (e.g., hydrogen sulfide, sulfur dioxide, chlorine, ammonia gas etc.) otherwise there may be solderability issues.
2) In a corrosive atmosphere, solderability might be degraded, and/or silver migration may occur which can cause lower reliability.
3) Dewing caused by rapid humidity changes and/or photochemical changes of the terminal electrode caused by direct contact with sunlight can affect the solderability and electrical performance. Do not store capacitors under direct sunlight or in dewing conditions.

Recommended **reflow** profile for SnAgCu solder paste:



Recommended **wave** profile for SnAgCu solder paste: