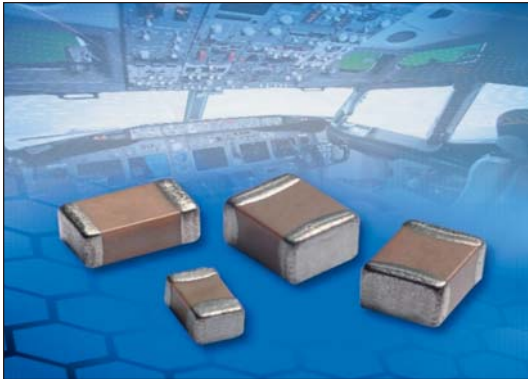


COTS Plus - BC Series



General Specifications



GENERAL DESCRIPTION

Extended range MLCCs for avionic, defense, and space applications have been available from AVX for many years, typically to customer specification control documents. The COTS PLUS - BC series now consolidates the main test options into standard catalog offerings, eliminating the need to generate custom specifications for each application. Key test options from MIL-PRF-55681 are applied to BME and PME devices in NP0 and X7R temperature characteristic dielectrics.

PRODUCT ADVANTAGES

- Higher CV capability than standard PME
- BME and PME technology
- Voltage Range up to 500V

APPLICATIONS

Defense/Aerospace

- Extended Range MLCC for all Applications
- Low weight/payload, small footprint
- Low Voltage Ratings to Maximize Capacitance for High Speed Decoupling

HOW TO ORDER

BC T	03 T	5 T	C T	102 T	K* T	Z T	T T	9 T	AA T	1 T
Series	Size	Voltage	Dielectric	Capacitance Code (In pF)	Capacitance Tolerance	Failure Rate	Termination	Packaging	Base Group A Test Level	Extended Test Level
02 = 0402	Z = 10V	A = COG (NP0)	2 Sig. Digits + Number of Zeros	B = ±.10 pF	Z = COTS Plus	T = 100% TN	1 = 7" T&R	AA = Group A per MIL-PRF-55681	0 = Not Applicable	
03 = 0603	Y = 16V	C = X7R		C = ±.25 pF		B = Tin/Lead (5% min Lead)	3 = 13" T&R	SA = Group A per MIL-PRF-55681 with SLDC	1 = DPA IAW EIA-469	
05 = 0805	3 = 25V			D = ±.50 pF		J = Tin/Lead (60/40)	6 = Waffle Pack	(SLDC = Single Lot Date Code)	2 = 85/85 @ RV for 96 hours	
06 = 1206	5 = 50V			F = ±1% (≥ 10 pF)			9 = Bulk		3 = DPA and 85/85 @ RV	
10 = 1210	1 = 100V			G = ±2% (≥ 10 pF)						
12 = 1812	2 = 200V			J = ±5%						
13 = 1825	V = 250V			K = ±10%						
	7 = 500V			M = ±20%						

* B, C & D tolerance for ≤10 pF values.

CONFORMANCE TEST LEVELS

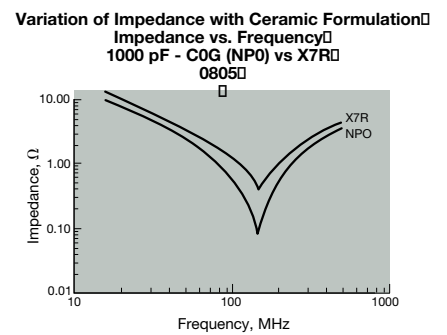
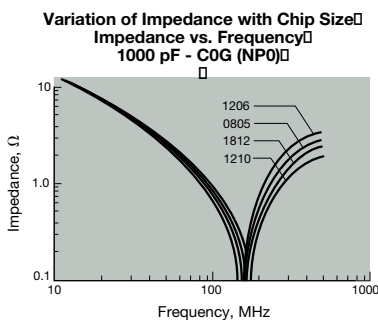
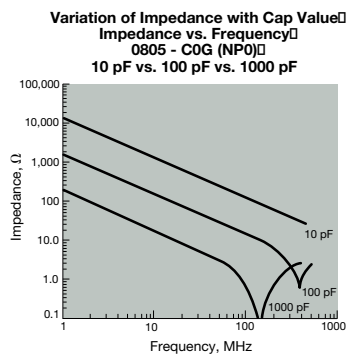
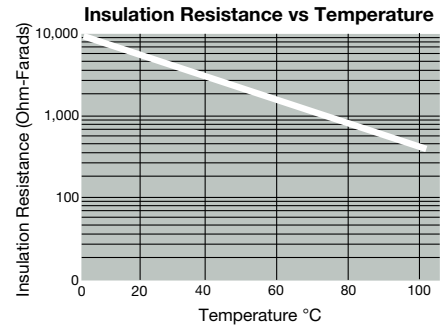
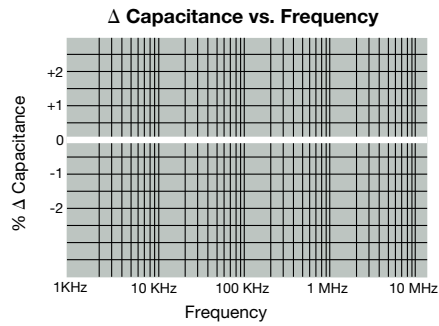
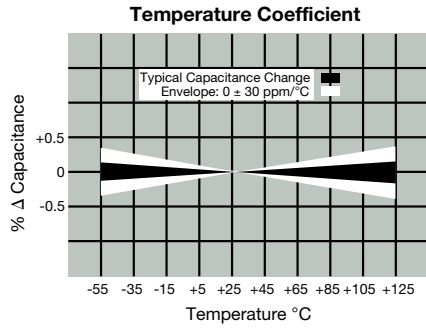
Base Group A Test Options	AA	SA
Voltage Conditioning IAW MIL-PRF-55681	✓	✓
Elevated IR Sample	✓	✓
Visual and Mechanical Inspection	✓	✓
Solderability	✓	✓
Single Lot Date Code (SLDC)	✓	✓
Group A Data Summary	✓	✓

Extended Test Options	Code
Not Applicable	0
DPA IAW EIA-469	1
85°C/85% RH @ Rated Voltage / 96 Hrs	2
DPA and 85/85 @ Rated Voltage	3

COTS Plus - BC Series

NP0 – Characteristics

TYPICAL ELECTRICAL CHARACTERISTICS



COTS Plus - BC Series



NP0 – Specifications and Test Methods

Parameter/Test		NP0 Specification Limits	Measuring Conditions	
Operating Temperature Range		-55°C to +125°C	Temperature Cycle Chamber	
Capacitance		Within specified tolerance	Freq.: 1.0 MHz ± 10% for cap ≤ 1000 pF 1.0 kHz ± 10% for cap > 1000 pF Voltage: 1.0Vrms ±0.2V	
Q		<30 pF: Q ≥ 400+20 x Cap Value ≥30 pF: Q ≥ 1000		
Insulation Resistance		100,000MΩ or 1000MΩ - μF, whichever is less	Charge device with rated voltage for 120 ± 5 secs @ room temp/humidity	
Dielectric Strength		No breakdown or visual defects	Charge device with 250% of rated voltage for 1-5 seconds, w/charge and discharge current limited to 50 mA (max)	
Resistance to Flexure Stresses	Appearance	No defects		
	Capacitance Variation	±5% or ±.5 pF, whichever is greater		
	Q	Meets Initial Values (As Above)		
	Insulation Resistance	≥ Initial Value x 0.3		
Solderability		≥ 85% of each terminal should be covered with fresh solder	Dip device in eutectic solder at 245 ± 5°C for 5.0 ± 0.5 seconds	
Resistance to Solder Heat	Appearance	No defects, <25% leaching of either end terminal	MIL-STD-202 / method 210 / Condition J (Reflow Mounting plus 1 Reflow Cycle @ 235°C ±5°C)	
	Capacitance Variation	≤ ±2.5% or ±.25 pF, whichever is greater		
	Q	Meets Initial Values (As Above)		
	Insulation Resistance	Meets Initial Values (As Above)		
Thermal Shock	Appearance	No visual defects	Step 1: -55°C ± 2°	30 ± 3 minutes
	Capacitance Variation	≤ ±3.0% or ±0.3 pF, whichever is greater	Step 2: Room Temp	≤ 3 minutes
	Q	Meets Initial Values (As Above)	Step 3: +125°C ± 2°	30 ± 3 minutes
	Insulation Resistance	Meets Initial Values (As Above)	Step 4: Room Temp	≤ 3 minutes
	Dielectric Strength	Meets Initial Values (As Above)	Repeat for 5 cycles and measure after 24 hours at room temperature	
Load Life	Appearance	No visual defects	Load in test chamber set at 125°C±2°C for 1000 hours (+48, -0) with twice rated voltage applied. Remove from test chamber and stabilize at room temperature before measuring.	
	Capacitance Variation	≤ ±3.0% or ±0.3 pF, whichever is greater		
	Q	≥ 30 pF: Q ≥ 350 ≥10 pF, <30 pF: Q ≥ 275 +5°C/2 <10 pF: Q ≥ 200 +10°C		
	Insulation Resistance	≥ Initial Value x 0.3 (See Above)		
Load Humidity	Dielectric Strength	Meets Initial Values (As Above)		
	Appearance	No visual defects	Load in test chamber set at 85°C±2°C/85% ±5% relative humidity for 250 hours (+48, -0) with rated voltage applied. Remove from test chamber and stabilize at room temperature before measuring.	
	Insulation Resistance	≥ Initial Value x 0.3 (See Above)		

COTS Plus - BC Series



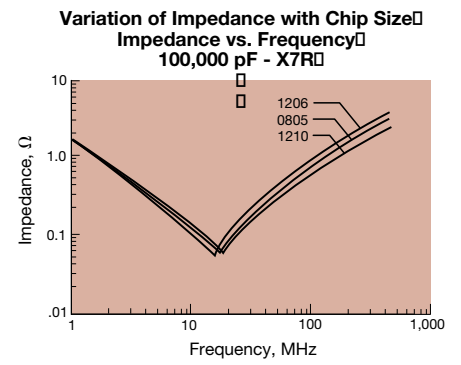
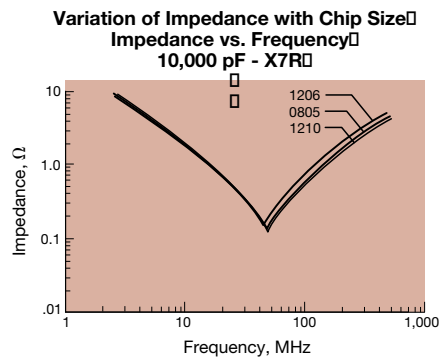
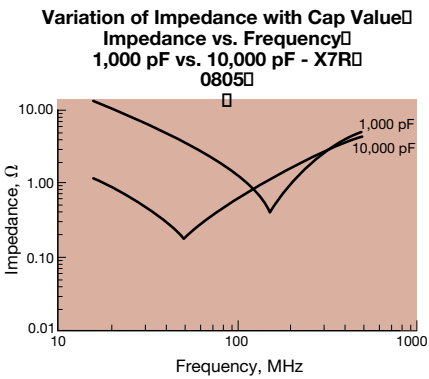
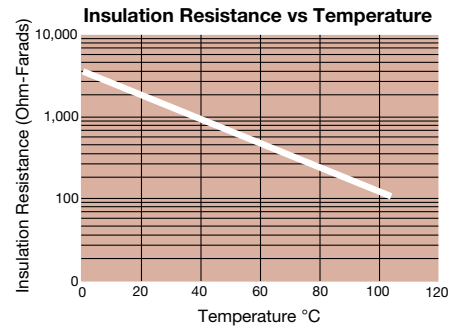
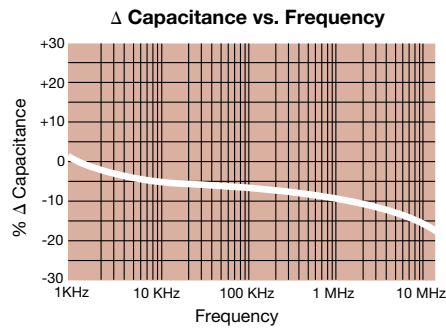
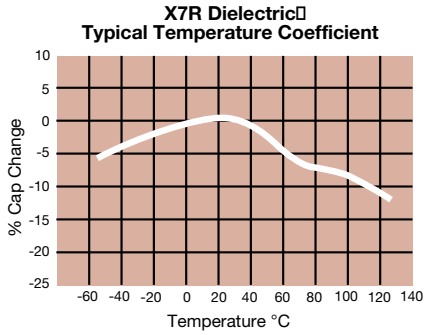
NP0 – Capacitance Range

SIZE	0402			0603				0805				1206				1210			1812			1825	
Soldering	Reflow/Wave			Reflow/Wave				Reflow/Wave				Reflow/Wave				Reflow Only			Reflow Only			Reflow Only	
Packaging	All Paper			All Embossed				All Embossed				All Embossed				All Embossed			All Embossed			All Embossed	
(L) Length	mm (in.)			mm (in.)				mm (in.)				mm (in.)				mm (in.)			mm (in.)			mm (in.)	
(W) Width	mm (in.)			mm (in.)				mm (in.)				mm (in.)				mm (in.)			mm (in.)			mm (in.)	
(t) Terminal	mm (in.)			mm (in.)				mm (in.)				mm (in.)				mm (in.)			mm (in.)			mm (in.)	
	16V	25V	50V	16V	25V	50V	100V	16V	25V	50V	100V	16V	25V	50V	100V	25V	50V	100V	25V	50V	100V	50V	100V
0R5 cap	0.5	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
1R0	1.0	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
1R2	1.2	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
1R5	1.5	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
1R8	1.8	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
2R2	2.2	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
2R7	2.7	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
3R3	3.3	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
3R9	3.9	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
4R7	4.7	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
5R6	5.6	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
6R8	6.8	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
8R2	8.2	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
100	10	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
120	12	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
150	15	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
180	18	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
220	22	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
270	27	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
330	33	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
390	39	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
470	47	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
560	56	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
680	68	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
820	82	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
101	100	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
121	120	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
151	150	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
181	180	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
221	220	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
271	270	C	C	C	G	G	G	G	J	J	J	J	J	J	J								
331	330	C			G	G	G	G	J	J	J	J	J	J	J								
391	390				G	G	G		J	J	J	J	J	J	J								
471	470				G	G	G		J	J	J	J	J	J	J								
561	560				G	G	G		J	J	J	J	J	J	J								
681	680				G	G	G		J	J	J	J	J	J	J								
821	820				G	G	G		J	J	J	J	J	J	J								
102	1000				G	G	G		J	J	J	J	J	J	J								
122	1200				G	G			J	J	J	J	J	J	J	P	P	P					
152	1500				G	G			J	J	J	J	J	J	J	P	P	P	K	K	N		
182	1800								J	J	J	J	J	J	J	P	P	P	K	K	N		
222	2200								N	N	N				N	N	N	P	P	P	K	K	N
272	2700								N	N								P	P		K	K	N
332	3300								P	P								P	P		K	K	N
392	3900																				K	K	N
472	4700																				K	K	N
562	5600																				K	K	N
682	6800																				K	K	N
822	8200																				K	M	Q
103	10000																				K	M	Q

Letter	A	C	E	G	J	K	M	N	P	Q	X	Y	Z
Max. Thickness	0.33 (0.013)	0.56 (0.022)	0.71 (0.028)	0.90 (0.035)	0.94 (0.037)	1.02 (0.040)	1.27 (0.050)	1.40 (0.055)	1.52 (0.060)	1.78 (0.070)	2.29 (0.090)	2.54 (0.100)	2.79 (0.110)



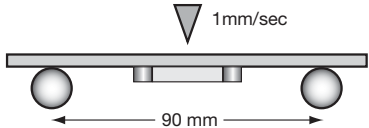
TYPICAL ELECTRICAL CHARACTERISTICS



COTS Plus - BC Series



X7R – Specifications and Test Methods

Parameter/Test		NPO Specification Limits	Measuring Conditions	
Operating Temperature Range		-55°C to +125°C	Temperature Cycle Chamber	
Capacitance		Within specified tolerance	Freq.: 1.0 MHz \pm 10% Voltage: 1.0Vrms \pm 0.2V	
Dissipation Factor		\leq 2.5% for \geq 50V DC rating \leq 3.0% for 25V & 35V DC rating \leq 12.5% for 16V DC rating and lower Contact Factory for DF by PN		
Insulation Resistance		100,000M Ω or 1000M Ω - μ F, whichever is less	Charge device with rated voltage for 120 \pm 5 secs @ room temp/humidity	
Dielectric Strength		No breakdown or visual defects	Charge device with 250% of rated voltage for 1-5 seconds, w/charge and discharge current limited to 50 mA (max)	
Resistance to Flexure Stresses	Appearance	No defects	Deflection: 2mm Test Time: 30 seconds 	
	Capacitance Variation	\leq \pm 12%		
	Dissipation Factor	Meets Initial Values (As Above)		
	Insulation Resistance	\geq Initial Value x 0.3		
Solderability		\geq 85% of each terminal should be covered with fresh solder	Dip device in eutectic solder at 245 \pm 5°C for 5.0 \pm 0.5 seconds	
Resistance to Solder Heat	Appearance	No defects, <25% leaching of either end terminal	MIL-STD-202 / method 210 / Condition J (Reflow Mounting plus 1 Reflow Cycle @ 235°C \pm 5°C)	
	Capacitance Variation	\leq \pm 7.5%		
	Dissipation Factor	Meets Initial Values (As Above)		
	Insulation Resistance	Meets Initial Values (As Above)		
Thermal Shock	Appearance	No visual defects	Step 1: -55°C \pm 2°	30 \pm 3 minutes
	Capacitance Variation	\leq \pm 7.5%	Step 2: Room Temp	\leq 3 minutes
	Dissipation Factor	Meets Initial Values (As Above)	Step 3: +125°C \pm 2°	30 \pm 3 minutes
	Insulation Resistance	Meets Initial Values (As Above)	Step 4: Room Temp	\leq 3 minutes
	Dielectric Strength	Meets Initial Values (As Above)	Repeat for 5 cycles and measure after 24 hours at room temperature	
Load Life	Appearance	No visual defects	Load in test chamber set at 125°C \pm 2°C for 1000 hours (+48, -0) with twice rated voltage applied. Remove from test chamber and stabilize at room temperature before measuring.	
	Capacitance Variation	\leq \pm 12%		
	Dissipation Factor	\leq Initial Value x 2.0 (see above)		
	Insulation Resistance	\geq Initial Value x 0.3 (See Above)		
	Dielectric Strength	Meets Initial Values (As Above)		
Load Humidity	Appearance	No visual defects	Load in test chamber set at 85°C \pm 2°C/85% \pm 5% relative humidity for 250 hours (+48, -0) with rated voltage applied.	
	Insulation Resistance	\geq Initial Value x 0.3 (See Above)	Remove from test chamber and stabilize at room temperature before measuring.	

COTS Plus - BC Series



X7R – Capacitance Range

SIZE		0402			0603						0805							
Soldering		Reflow/Wave			Reflow/Wave						Reflow/Wave							
Packaging		All Paper			All Embossed						All Embossed							
(L) Length	mm (in.)	1.00 ± 0.10 (0.040 ± 0.004)			1.60 ± 0.15 (0.063 ± 0.006)						2.01 ± 0.20 (0.079 ± 0.008)							
(W) Width	mm (in.)	0.50 ± 0.10 (0.020 ± 0.004)			0.81 ± 0.15 (0.032 ± 0.006)						1.25 ± 0.20 (0.049 ± 0.008)							
(t) Terminal	mm (in.)	0.25 ± 0.15 (0.010 ± 0.006)			0.35 ± 0.15 (0.014 ± 0.006)						0.50 ± 0.25 (0.020 ± 0.010)							
		16	25	50	10	16	25	50	100	200	10	16	25	50	100	200	250	
101	cap	100																
121	pF	120																
151		150																
221		220	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	
271		270	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	
331		330	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	
391		390	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	
471		470	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	
561		560	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	
681		680	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	
821		820	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	
102	cap	1	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	
122	nF	1.2	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	
152		1.5	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	
182		1.8	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	
222		2.2	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	
272		2.7	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	
332		3.3	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	
392		3.9	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	
472		4.7	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	
562		5.6	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	
682		6.8	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	
822		8.2	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	
103		10	C	C	C	G	G	G	G	G	J	J	J	J	J	J	J	
123		12	C			G	G	G	G	G	J	J	J	J	M	J		
153		15	C			G	G	G	G	G	J	J	J	J	M	J		
183		18	C			G	G	G	G	G	J	J	J	J	M	J		
223		22	C			G	G	G	G	G	J	J	J	J	M	J		
273		27	C			G	G	G	G	G	J	J	J	J	M			
333		33	C			G	G	G	G	G	J	J	J	J	M			
393		39				G	G	G	G	G	J	J	J	J	M			
473		47				G	G	G	G	G	J	J	J	J	M			
563		56				G	G	G	G	G	J	J	J	J	M			
683		68				G	G	G	G	G	J	J	J	J	M			
823		82				G	G	G	G	G	J	J	J	J	M			
104		100				G	G	G	G	G	J	J	J	M	M			
124		120				G		G			J	J	J	M				
154		150				G		G			M	M	N	M				
224		220				G					M	M	N	M				
334		330									N	N	N	M				
474		470									N	N	N	M				
564		560									N	N	N					
684		680									N	N	N					
824		820									N	N	N					
105	cap	1									N	N	N					
125	pF	1.2																
155		1.5																
185		1.8																
225		2.2																
275		2.7																
335		3.3																
395		3.9																
475		4.7																
			16	25	50	10	16	25	50	100	200	10	16	25	50	100	200	250
			0402			0603						0805						

Letter	A	C	E	G	J	K	M	N	P	Q	X	Y	Z
Max. Thickness	0.33 (0.013)	0.56 (0.022)	0.71 (0.028)	0.90 (0.035)	0.94 (0.037)	1.02 (0.040)	1.27 (0.050)	1.40 (0.055)	1.52 (0.060)	1.78 (0.070)	2.29 (0.090)	2.54 (0.100)	2.79 (0.110)



COTS Plus - BC Series



X7R – Capacitance Range

SIZE		1206								1210								1812			
Soldering		Reflow/Wave								Reflow Only								Reflow Only			
Packaging		All Embossed								All Embossed								All Embossed			
(L) Length	mm (in.)	3.20 ± 0.20 (0.126 ± 0.008)								3.20 ± 0.20 (0.126 ± 0.008)								4.50 ± 0.30 (0.177 ± 0.012)			
(W) Width	mm (in.)	1.60 ± 0.20 (0.063 ± 0.008)								2.50 ± 0.20 (0.098 ± 0.008)								3.20 ± 0.20 (0.126 ± 0.008)			
(t) Terminal	mm (in.)	0.50 ± 0.25 (0.020 ± 0.010)								0.50 ± 0.25 (0.020 ± 0.010)								0.61 ± 0.36 (0.024 ± 0.014)			
		10	16	25	50	100	200	250	500	10	16	25	50	100	200	250	500	50	100	200	250
101	cap	100																			
121	pf	120																			
151		150																			
221		220																			
271		270																			
331		330																			
391		390																			
471		470																			
561		560																			
681		680																			
821		820																			
102	cap	1	J	J	J	J	J	J	J	K	K	K	K	K	J	J	J				
122	nf	1.2	J	J	J	J	J	J	J	K	K	K	K	K	J	J	K				
152		1.5	J	J	J	J	J	J	J	K	K	K	K	K	J	J	K				
182		1.8	J	J	J	J	J	J	J	K	K	K	K	K	J	J	K				
222		2.2	J	J	J	J	J	J	J	K	K	K	K	K	J	J	K				
272		2.7	J	J	J	J	J	J	J	K	K	K	K	K	J	J	K				
332		3.3	J	J	J	J	J	J	J	K	K	K	K	K	J	J	K				
392		3.9	J	J	J	J	J	J	J	K	K	K	K	K	J	J	K				
472		4.7	J	J	J	J	J	J	J	K	K	K	K	K	J	J	K				
562		5.6	J	J	J	J	J	J	J	K	K	K	K	K	J	J	K				
682		6.8	J	J	J	J	J	J	J	K	K	K	K	K	J	J	K				
822		8.2	J	J	J	J	J	J	J	K	K	K	K	K	J	J	K				
103		10	J	J	J	J	J	J	J	K	K	K	K	K	K	K	K			K	K
123		12	J	J	J	J	J	J	J	K	K	K	K	K	K	K	K			K	X
153		15	J	J	J	J	J	J	J	K	K	K	K	K	K	K	P			K	X
183		18	J	J	J	J	J	J	J	K	K	K	K	K	K	K	Q			K	X
223		22	J	J	J	J	J	J	J	K	K	K	K	K	K	K	Q			K	X
273		27	J	J	J	J	J	J	J	K	K	K	K	K	K	K	Q			K	X
333		33	J	J	J	J	J	J	J	K	K	K	K	K	K	K	Q			K	X
393		39	J	J	J	J	M	J		K	K	K	K	K	K	K	Q			K	X
473		47	J	J	J	J	M	J		K	K	K	K	K	K	K	Q			K	X
563		56	J	J	J	J	M	J		K	K	K	K	M	M	M				K	X
683		68	J	J	J	J	M	J		K	K	K	K	M	M	M				K	X
823		82	J	J	J	J	M	J		K	K	K	K	M	M	M				K	X
104		100	J	J	J	J	M	J		K	K	K	K	M	M	Q			K	K	X
124		120	J	J	J	M	M			K	K	K	K	M					K	K	X
154		150	J	J	J	M	M			K	K	K	K	P					K	K	X
224		220	J	J	M	M	Q			K	K	K	K	P					M	M	X
334		330	J	J	M	P	Q			M	M	M	M	P					X	X	
474		470	M	M	M	P	Q			P	P	P	P	Q					X	X	
564		560	M	M	Q	Q				P	P	Q	Q	Q					x	Q	
684		680	M	M	Q	Q				P	P	Q	Q	Q					X	Q	
824		820	M	M	Q	Q				P	P	Q	Q	X					X	Q	
105	cap	1	M	M	Q	Q				P	P	Q	Z						X	Q	
125	uf	1.2	Q	Q	Q														Q	Q	
155		1.5	Q	Q	Q														Q	Q	
185		1.8	Q	Q	Q														Z	Z	
225		2.2	Q	Q	Q														Z	Z	
275		2.7																	Z		
335		3.3																	Z		
395		3.9																	Z		
475		4.7																	Z		
		10	16	25	50	100	200	250	500	10	16	25	50	100	200	250	500	50	100	200	250
		1206								1210								1812			

Letter	A	C	E	G	J	K	M	N	P	Q	X	Y	Z
Max. Thickness	0.33 (0.013)	0.56 (0.022)	0.71 (0.028)	0.90 (0.035)	0.94 (0.037)	1.02 (0.040)	1.27 (0.050)	1.40 (0.055)	1.52 (0.060)	1.78 (0.070)	2.29 (0.090)	2.54 (0.100)	2.79 (0.110)

