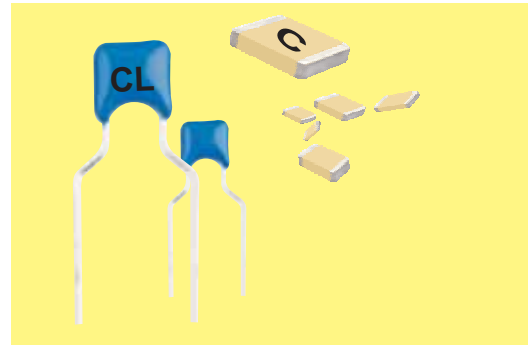


## MULTILAYER CERAMIC CAPACITORS C and CL SERIES

### Description

Multilayer ceramic capacitors cover capacitance range from 1pF to 10μF, operating voltages from 16Vdc up to 10kVdc. KEKO VARICON offers THD( leaded) and SMD products.

Such capacitors are suited for by-pass and coupling applications or for frequency discriminating circuits. KEKO VARICON also offers multilayer ceramic chip SAFETY capacitors (class X and Y) and Line-by-pass and Across the Line Capacitors.



### Features

- Capacitance range .....1 pF to 10μF.
- Rated DC Voltage  $U_r$  ..... 16,24,50,100,250,300,500, 1kV to 10kV.
- 19 Model sizes available .....0603 up to 9080 for SMD components.
- 4 Model sizes available..... 602, 802, 902, 1103 for Leaded components.
- Dielectric Types ..... NPo, X7R / Y5V / Z5U.
  - Npo(CG) - dielectric constant around 90 (very stable characteristics-T,f,U, low capacitance).*
  - X7R(2R1) - dielectric constant around 3000 (higher capacitance in the same case size as Npo).*
  - Y5V,Z5U(2F4) - dielectric constant around 15000 (very high capacitance in small case sizes).*
- Maximum operating temperature - +85 °C.
- Safety capacitors class X and Y, Line-by-pass and Across the Line Capacitors
- Available with straight and crimped leads.
- Lead free components. <sup>us</sup>
- UL, CSA approval.

	DIELECTRIC		
	NPo (CG)	X7R (2R1)	Y5V (2F4)
Capacitance range	1 pF to 10μF		
Capacitance tolerance *	C, D, G, J, K, M	K, M, S, Z	M, S, Z
Dissipation Factor tg δ	15*10 <sup>-4</sup> for C≥50pF or 1.5*(150/C+7)*10 <sup>-4</sup>	350*10 <sup>-4</sup>	350*10 <sup>-4</sup>
Measuring Frequency (for C and tg δ)	1 MHz for C≤1000pF 1 kHz for C>1000pF	1 MHz for C≤100pF 1 kHz for C>100pF	1 kHz
Measuring Voltage (C, tg δ)	1 Vrms	0.3 Vrms	0.3 Vrms
Rated Voltage	16V - 10kV		
Test Voltage (16V -10kV)**	16V-100V = 2,5*Ur ..... 200V-500V = 1,5*Ur+100V ..... > 500V = 1,2*Ur		
Insulating Resistance Ri	Ri≥10000MΩ (for Cr≤10nF) Ri≥100/Cr [Ω] (for Cr>10nF)	Ri≥4000MΩ (for Cr≤25nF) Ri≥100/Cr [Ω] (for Cr>25nF)	
Measuring Voltage for Ri	16 - 1kV= Ur		
Temperature Range	-55°C to +125°C	-55°C to +125°C	-25°C to +85°C
Temperature Characteristics	0±30ppm/°C	±15%	±30% / -80%
Climatic Categoroz	55 / 125 / 56	55 / 125 / 56	25 / 85 / 21
Temperature Range	23°C		
Voltage Dependence	No	Yes	Yes
Aging (per hour decade)	0	<2%	<6%
Termination (chip)	AgPd or Ni barrier		
Packaging	Bulk or Taped		
Standard	IEC 60384-21,22 for SMD; IEC 60384-8,9 for leaded THD IEC 60286-3 for taped SMD; IEC 60286-3 for taped leaded THD		

**Device Ratings and Characteristics**

**NPo(CG), X7R(2R1), Y5V(2F4) // 16V and 25V**

Size	NPo (CG)						X7R (2R1)						Y5V (2F4)						
	0603		0805		1206		0603		0805		1206		0603		0805		1206		
	Rated Voltage						Rated Voltage						Rated Voltage						
Cn	Code	16V	25V	16V	25V	16V	25V	16V	25V	16V	25V	16V	25V	16V	25V	16V	25V	16V	25V
1 - 8,2pF																			
10	100																		
12	120																		
15	150																		
18	180																		
22	220																		
27	270																		
33	330																		
39	390																		
47	470																		
56	560																		
68	680																		
82	820																		
100	101							101		101		101							
120	121																		
150	151																		
180	181																		
220	221																		
270	271																		
330	331																		
390	391																		
470	471																		
560	561																		
680	681																		
820	821																		
1nF	102																		
1.2	122																		
1.5	152																		
1.8	182																		
2.2	222													222		222		222	
2.7	272																		
3.3	332																		
3.9	392																		
4.7	472																		
5.6	562																		
6.8	682																		
8.2	822																		
10	103																		
12	123	103																	
15	153																		
18	183																		
22	223																		
27	273																		
33	333																		
39	393			333															
47	473																		
56	563																		
68	683																		
82	823																		
100	104																		
120	124					104		104											
...	...																		
220	224							224											
...	...																		
470	474																		
...	...																		
1µF	105																		
...	...																		
2.2	225													105					
...	...																		
4.7	475																		
...	...																		
10	106																		
...	...																		

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**Device Ratings and Characteristics**

**NPo(CG) // 50V and 100V**

**NPo (CG)**


Size	0603		0805		1206		1210		1808		1812		2220		2225	
	Rated Voltage															
Cn Code	50V	100V	50V	100V	50V	100V	50V	100V	50V	100V	50V	100V	50V	100V	50V	100V
<b>1 - 8,2pF</b>							100	100	100							
10 100																
12 120																
15 150																
18 180																
22 220																
27 270													270		270	
33 330																
39 390																
47 470																
56 560																
68 680																
82 820																
100 101																
120 121																
150 151																
180 181																
220 221																
270 271																
330 331																
390 391																
470 471																
560 561																
680 681																
820 821		681														
<b>1nF</b> 102																
1.2 122																
1.5 152																
1.8 182																
2.2 222																
2.7 272																
3.3 332				272												
3.9 392	332															
4.7 472																
5.6 562																
6.8 682																
8.2 822						682										
10 103								822		822						
12 123			103													
15 153																
18 183																
22 223																
27 273												223				
33 333																
39 393						333	333	333	333							
47 473																
56 563														473		473
68 683													563		563	
82 823																
100 104																
120 124																
150 154																
180 184																
220 224																
270 274																
330 334																
390 394																

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**Device Ratings and Characteristics**

**X7R(2R1) // 50V and 100V**

**X7R (2R1)**


Size																
	0603		0805		1206		1210		1808		1812		2220		2225	
Cn Code	Rated Voltage															
	50V		100V		50V		100V		50V		100V		50V		100V	
100 pF	101															
120	121															
150	151															
180	181															
220	221															
270	271					331										
330	331															
390	391						471		471							
470	471															
560	561															
680	681															
820	821										102					
1 nF	102															
1.2	122															
1.5	152															
1.8	182												222		222	
2.2	222															
2.7	272															
3.3	332															
3.9	392															
4.7	472															
5.6	562															
6.8	682															
8.2	822															
10	103															
12	123															
15	153															
18	183															
22	223															
27	273		223													
33	333															
39	393															
47	473															
56	563															
68	683															
82	823															
100	104															
120	124	104			104											
150	154															
180	184															
220	224															
270	274															
330	334															
390	394			334												
470	474															
560	564					474		474		474						
680	684															
820	824										684					
1 μF	105															
1.2	125					105		105		105				105		105
1.5	155															
1.8	185															
2.2	225												155		155	
2.7	275															
3.3	335															
3.9	395															
4.7	475															
5.6	565															
6.8	685															

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**Device Ratings and Characteristics**

**Y5V, Z5U (2F4) // 50V and 100V**

**Y5V (Z5U)**

Size																
	0603		0805		1206		1210		1808		1812		2220		2225	
Cn Code	Rated Voltage															
	50V	100V	50V	100V	50V	100V	50V	100V	50V	100V	50V	100V	50V	100V	50V	100V
2.2nF 222																
2.7 272																
3.3 332																
3.9 392																
4.7 472						472										
5.6 562																
6.8 682																
8.2 822																
10 103							103		103							
12 123																
15 153																
18 183																
22 223																
27 273																
33 333																
39 393		333														
47 473																
56 563											222					
68 683																
82 823																
100 104												104		104		
120 124																
150 154																
180 184																
220 224				184												
270 274	224															
330 334																
390 394																
470 474																
560 564																
680 684																
820 824						684										
1 uF 105																
1.2 125			105													
1.5 155								125		125						
1.8 185																
2.2 225																
2.7 275						225		225		225						
3.3 335																
3.9 395												275				
4.7 475																
5.6 565																
6.8 685																
8.2 825																
10 106																
12 126																
15 156																
18 186																
22 226																
27 276																
33 336																
39 396																
47 476																
56 566																
68 686																
82 826																

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**Device Ratings and Characteristics**

**NPo(CG) // 250V, 300V and 500V**

**NPo (CG)**








Size	0805			1206			1210			1808			1812			2220			2225		
	Rated Voltage																				
Cn Code	250V	300V	500V	250V	300V	500V	250V	300V	500V	250V	300V	500V	250V	300V	500V	250V	300V	500V	250V	300V	500V
1 - 8,2pF							100			100			100								
10 100																					
12 120																					
15 150																					
18 180																					
22 220																					
27 270																270			270		
33 330																					
39 390																					
47 470																					
56 560																					
68 680																					
82 820																					
100 101																					
120 121																					
150 151																					
180 181																					
220 221																					
270 271																					
330 331																					
390 391																					
470 471																					
560 561			471																		
680 681																					
820 821		681																			
1nF 102																					
1.2 122						102															
1.5 152	122																				
1.8 182																					
2.2 222					182																
2.7 272									222												
3.3 332					272																
3.9 392																					
4.7 472																					
5.6 562																					
6.8 682																					
8.2 822																					
10 103																					
12 123																					
15 153																					
18 183																					
22 223																					
27 273																					
33 333																					
39 393																					
47 473																					
56 563																					
68 683																					
82 823																					
100 104																					
120 124																					
150 154																					
180 184																					
220 224																					
270 274																					
330 334																					
390 394																					

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**Device Ratings and Characteristics**

**X7R (2R1) // 250V, 300V and 500V**

**X7R (2R1)**

Size																						
	0805			1206			1210			1808			1812			2220			2225			
Cn Code	Rated Voltage																					
	250V	300V	500V	250V	300V	500V	250V	300V	500V	250V	300V	500V	250V	300V	500V	250V	300V	500V	250V	300V	500V	
100 pF 101																						
120 121																						
150 151																						
180 181																						
220 221								221		221			221									
270 271																						
330 331																						
390 391																						
470 471																						
560 561																						
680 681																						
820 820																						
1nF 102																	102			102		
1.2 122																						
1.5 152																						
1.8 182																						
2.2 222																						
2.7 272																						
3.3 332																						
3.9 392																						
4.7 472																						
5.6 562																						
6.8 682			562																			
8.2 822																						
10 103																						
12 123		103																				
15 153																						
18 183						153																
22 223	183																					
27 273				223																		
33 333																						
39 393																						
47 473																						
56 563																						
68 683									563					563								
82 823													683									
100 104																						
120 124																						
150 154																						
180 184																						
220 224								184														
270 274										224												
330 334																						
390 394																						
470 474																						
560 564															474							
680 684																						
820 824																						
1.0 uF 105																	824					
1.2 125																						
1.5 155																						
1.8 185																						
2.2 225																						
2.7 275																						
3.3 335																						
3.9 395																						
4.7 475																						
5.6 565																						
6.8 685																						

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**Device Ratings and Characteristics**

**Y5V, Z5U (2F4) // 250V, 300V and 500V**

**Y5V (Z5U)**

Size	0805			1206			1210			1808			1812			2220			2225		
	Rated Voltage																				
Cn Code	250V	300V	500V	250V	300V	500V	250V	300V	500V	250V	300V	500V	250V	300V	500V	250V	300V	500V	250V	300V	500V
2.2 nF 222																					
2.7 272																					
3.3 332								332			332										
3.9 393																					
4.7 472																					
5.6 562																					
6.8 682																					
8.2 822																					
10 103														103							
12 123																					
15 153																					
18 183			153														153			153	
22 223																					
27 273																					
33 333		273																			
39 393																					
47 473																					
56 563						473			473			473									
68 683	563				563																
82 823																					
100 104									104			104									
120 124										104			104								
150 154				124																	
180 184																		154			154
220 224																					
270 274																					
330 334								274			274				274						
390 394																					
470 474																					
560 564																					
680 684													564								
820 824																	684			684	
1.0 uF 105																					
1.2 125																					
1.5 155																	125			125	
1.8 185																					
2.2 225																					
2.7 275																					
3.3 335																					
3.9 395																					
4.7 475																					
5.6 565																					
6.8 685																					
8.2 825																					
10 106																					
12 126																					
15 156																					
18 186																					
22 226																					
27 276																					
33 336																					
39 396																					
47 476																					
56 566																					
68 686																					
82 826																					

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**Device Ratings and Characteristics**

NPo(CG) // 1kV - 10kV

NPo (CG)

Size	0805	1206	1210	1515	1808	1812	1825	2220	2225	2520	3640	4012	4032	5040	5550	6660	7565	9080
<b>Cn</b> Code																		
<b>1 - 8,2pF</b>																		
10 100																		
12 120																		
15 150																		
18 180																		
22 220																		
27 270																		
33 330																		
39 390																		
47 470																		
56 560																		
68 680										6kV 820								
82 820																		
100 101																		
120 121					4kV													
150 151																		
180 181						181												
220 221	1kV	2kV										7kV						
270 271		271			3kV	4kV						271						
330 331	331				331	331	5kV	5kV				6kV 391						
390 391												5kV 561	7kV 471					
470 471		1kV	2kV	3kV	2kV	561			561	561		4kV 821	6kV 821	10kV				
560 561				561										102				
680 681		821			821		4kV	4kV			7kV	3kV 122	5kV 152	9kV 152	10kV			
820 821							2kV	4kV	4kV	4kV	4kV	4kV	4kV	8kV 152	10kV			
1nF														8kV 272	10kV			
1.2 122							122	122	122	152	152	152	5kV 272	7kV 272	9kV 272	10kV		
1.5 152			1kV	2kV	1kV	1kV	182	3kV 182	3kV 182	3kV 222	3kV 222	6kV	4kV 272	6kV 272	8kV 272	10kV		
1.8 182			182															
2.2 222				222	222	222							5kV	4kV 272	6kV 272	8kV 272	10kV	
2.7 272																		
3.3 332																		
3.9 392																		
4.7 472																		
5.6 562																		
6.8 682							1kV	1kV		2kV 682	4kV	2kV 682	2kV	5kV 392	8kV	10kV	10kV	
8.2 822							822	822						5kV 392	8kV	9kV	10kV	
10 103										2kV 103	1kV 103	822	4kV	5kV 123	7kV	9kV	10kV	
12 123										1kV 123		3kV 123	1kV 123	4kV 153	5kV 123	6kV	7kV	8kV
15 153													1kV 153	3kV 223	4kV 223	5kV 153	6kV	
18 183														2kV	2kV	2kV	2kV	
22 223														2kV 223	2kV 223	2kV 223	2kV	
27 273														1kV 333	1kV 333	1kV 333	1kV	
33 333																		
39 393																		
47 473																		
56 563																		
68 683																		
82 823																		
100 104																		
120 124																		
150 154																		
180 184																		
220 224																		
270 274																		
330 334																		
390 394																		

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**Device Ratings and Characteristics**

X7R (2R1) // 1kV - 10kV

X7R (2R1)

Size	0805	1206	1210	1515	1808	1812	1825	2220	2225	2520	3640	4012	4032	5040	5550	6660	7565	9080
<b>Cn</b> Code																		
100 pF 101																		
120 121																		
150 151																		
180 181																		
220 221																		
270 271																		
330 331																		
390 391																		
470 471						4kV												
560 561					3kV	561												
680 681		2kV			821													
820 821		821						5kV					6kV					
1 nF 102				3kV				102					102					
1.2 122				122									5kV					
1.5 152						3kV			5kV				152					
1.8 182	1kV					182	4kV	4kV	182				5kV					
2.2 222	222				2kV				182				222					
2.7 272			2kV		272				272				272					
3.3 332				2kV						4kV			332	10kV				
3.9 392				392						392				332				
4.7 472														332				
5.6 562		1kV					2kV	3kV	3kV					472				
6.8 682		682					682	682	682					8kV				
8.2 822									822	3kV	3kV	7kV		822	10kV			
10 103			1kV							822	822			822	822	10kV		
12 123			123								2kV	6kV		123	9kV	103		
15 153					1kV						153	5kV		123	8kV	9kV		
18 183												183		183	7kV	8kV		
22 223												223		223	6kV	7kV	10kV	
27 273				1kV		1kV	2kV	2kV				273		273	223	223	223	10kV
33 333				333		333			2kV					333	3kV	333	8kV	9kV
39 393									393					393	5kV	393	7kV	8kV
47 473														473	4kV	473	6kV	7kV
56 563							1kV								563		563	6kV
68 683							638	1kV									5kV	683
82 823								823		1kV	2kV			2kV	3kV	4kV	823	5kV
100 104									1kV	104	104	1kV		104	104	104		104
120 124									124									124
150 154																		
180 184													1kV		2kV	3kV	4kV	4kV
220 224																		184
270 274																		224
330 334																		274
390 394																		
470 474											1kV							334
560 564											474							474
680 684																		
820 824														1kV				564
1 uF 105																		
1.2 125																1kV		
1.5 155																		
1.8 185																	1kV	
2.2 225																		225
2.7 275																		

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