

CERAMIC CHIP CAPACITORS NPO (COG) DIELECTRIC

APPLICATION

NPO (COG) dielectric properties; suited for precision circuits, requiring stable dielectric characteristics:

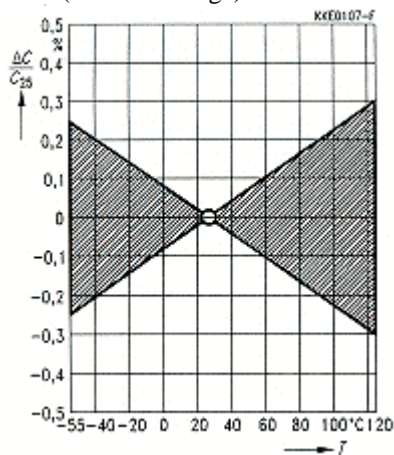
- ◇ Negligible dependence of capacitance and dissipation factor on time, voltage, and frequency
- ◇ Low-loss (High Q)
- ◇ Predictable linear temperature coefficient
- ◇ No piezoelectric behavior

General Specification

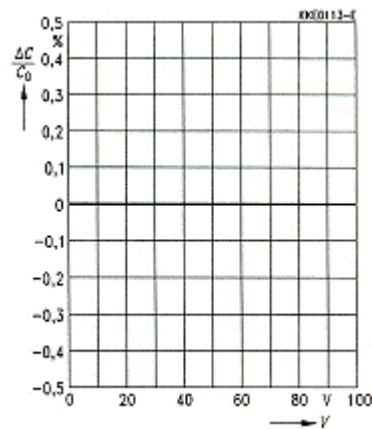
- **Operating temperature range** : $-55^{\circ}\text{C} \sim +125^{\circ}\text{C}$
- **Temperature coefficient**: $0 \pm 30 \text{ppm}/^{\circ}\text{C}$
- **Capacitance Range**: $0.5 \text{pF} \sim 0.22 \mu\text{F}$ (Test condition: $1.0 \pm 0.2 \text{Vrms}$, 1KHz, for $\leq 1000 \text{pF}$ use 1 MHz)
- **Capacitance Tolerance**: Preferred $\pm 1\%$, $\pm 2\%$, $\pm 5\%$, $\pm 10\%$. ($10 \text{PF} < : \pm 0.05 \text{pF}$, $\pm 0.1 \text{pF}$, $\pm 0.25 \text{pF}$, $\pm 0.5 \text{PF}$)
- **Rated Voltage**: 25VDC, 50VDC, 100VDC, 250VDC, 500VDC, 1KVDC, 2KVDC, 3KVDC
- **Q value** : $C < 30 \text{pF} : Q \geq 400 + 20C$, $C \geq 30 \text{pF} : Q \geq 1000$ (Test condition: 1MHz, 1KHZ for $C \geq 1000 \text{pF}$, 1Vrms, 25°C)
- **Insulation resistance**: 100,000 M Ω or 1,000 Ω -F min, whichever is less. (rated voltage applied at 25°C)
- **Dielectric strength**: $> 250\%$ of rated voltage for 10~100V, 200% for 200&250V, 150% for 500V, 120% for $\geq 1000 \text{V}$

Characteristics

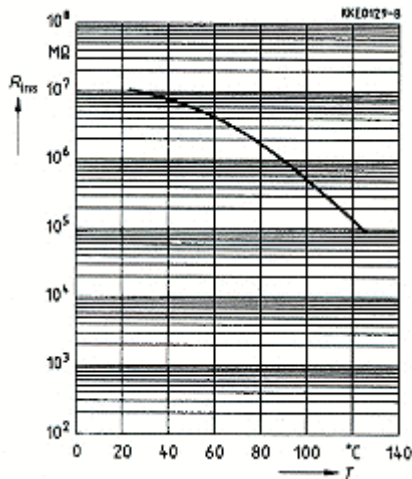
Capacitance change $\Delta C/C_{25}$ versus temperature T (tolerance range)



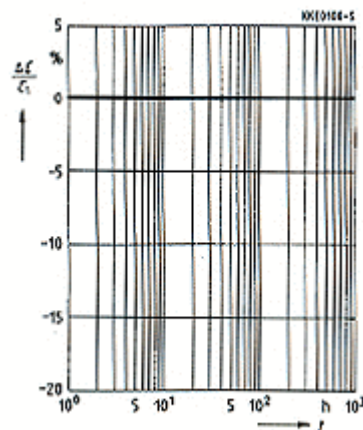
Capacitance change $\Delta C/C_0$ versus superimposed dc voltage V



Insulation resistance R_{ins} versus Temperature T



Capacitance change $\Delta C/C_1$ versus time (aging rate)



CERAMIC CHIP CAPACTIORS NPO (COG) DIELECTRIC

SIZE AND VALUES AVAILABLE (NPO) 100V – 630V (Medium Voltage)

Size		0402				0603				0805					1206					1210					1812				
(L)	mm	1.00±0.05				1.60±0.10				2.00±0.20					3.20±0.20					3.20±0.30					4.50±0.30				
(W)	mm	0.50±0.05				0.80±0.10				1.25±0.20					1.60±0.20					2.50±0.20					3.20±0.30				
(T)	mm	0.50±0.05				0.80±0.10				1.25±0.10					1.65±0.20					2.50±0.30					3.00±0.30				
(t)	mm	0.15±0.35				0.27~0.60				0.30~0.70					0.30~0.70					0.30~0.70					0.35~1.00				
Cap./ W.V.		100	100	200	250	100	200	250	500	630	100	200	250	500	630	100	200	250	500	630	100	200	250	500	630				
10	pF	S	P	P	P	A	A	A	A	A	H	H	H	H	H	C	C	C	C	C	X	X	X	X	X				
12	pF	S	P	P	P	A	A	A	A	A	H	H	H	H	H	C	C	C	C	C	X	X	X	X	X				
15	pF	S	P	P	P	A	A	A	A	A	H	H	H	H	H	C	C	C	C	C	X	X	X	X	X				
18	pF	S	P	P	P	A	A	A	A	A	H	H	H	H	H	C	C	C	C	C	X	X	X	X	X				
22	pF	S	P	P	P	A	A	A	A	A	H	H	H	H	H	C	C	C	C	C	X	X	X	X	X				
27	pF	S	P	P	P	A	A	A	A	A	H	H	H	H	H	C	C	C	C	C	X	X	X	X	X				
33	pF	S	P	P	P	A	A	A	A	A	H	H	H	H	H	C	C	C	C	C	X	X	X	X	X				
39	pF	S	P	P	P	A	A	A	A	A	H	H	H	H	H	C	C	C	C	C	X	X	X	X	X				
47	pF	S	P	P	P	A	A	A	A	A	H	H	H	H	H	C	C	C	C	C	X	X	X	X	X				
56	pF	S	P	P	P	A	A	A	A	A	H	H	H	H	H	C	C	C	C	C	X	X	X	X	X				
68	pF	S	P	P	P	A	A	A	A	A	H	H	H	H	H	C	C	C	C	C	X	X	X	X	X				
82	pF	S	P	P	P	A	A	A	H	H	H	H	H	H	H	C	C	C	C	C	X	X	X	X	X				
100	pF	S	P	P	P	A	A	H	H	H	H	H	H	H	H	C	C	C	C	C	X	X	X	X	X				
120	pF	S	P	P	P	A	A	H	X	X	H	H	H	H	H	C	C	C	C	C	X	X	X	X	X				
150	pF	S	P	P	P	A	H	X	X	X	H	H	H	H	H	C	C	C	C	C	X	X	X	X	X				
180	pF	S	P	P	P	A	H	X	X	X	H	H	H	H	H	C	C	C	C	C	X	X	X	X	X				
220	pF	S	P	P	P	A	X	X	X	X	H	H	H	H	H	C	C	C	C	C	X	X	X	X	X				
270	pF		P			A	X	X	X	X	H	H	C	C	C	C	C	C	C	C	X	X	X	X	X				
330	pF		P			A	X	X	X	X	H	H	C	C	C	C	C	C	C	C	X	X	X	X	X				
390	pF		P			H	X	X	X	X	H	H	C	C	C	C	C	C	C	C	X	X	X	X	X				
470	pF		P			H	X	X	X	X	H	C	C	C	C	C	C	C	C	C	X	X	X	X	X				
560	pF		P			H	X	X	X	X	H	C	X	X	X	C	C	C	C	C	X	X	X	X	X				
680	pF		P			H	X	X			H	C	X	X	X	C	C	C	C	C	X	X	X	X	X				
820	pF		P			H	X	X			H	C	L	L	L	C	C	C	C	C	X	X	X	X	X				
1000	pF		P			H	X	X			H	C	L	L	L	C	X	X	X	X	X	X	X	X	X				
1200	pF					H	X	X			H	C	L	L	L	C	X	X	X	X	X	X	X	X	X				
1500	pF					H	X	X			H	X	L	L	L	C	X	X	X	X	X	X	X	X	X				
1800	pF					H					H	X	L	L	L	C	X	X	X	X	X	X	X	X	X				
2200	pF					H					H	X	L	L	L	C	X	X	X	X	X	X	X	X	X				
2700	pF					X					H					C	X	X	X	X	X	X	X	X	X				
3300	pF					X					H					C	X	X	X	X	X	X	X	X	X				
3900	pF					X					H					C	X	X	L	L	X	X	X	X	X				
4700	pF					X					H					C	X	X	L	L	X	X	X	X	X				
5600	pF										H					C	X	X			X	X	X	X	X				
6800	pF										C					C	L	L			X	X	X	L	L				
8200	pF										X					C	L	L			X	X	X	L	L				
10	nF										X					C	L	L			X	X	X	Z	Z				
12	nF															X					X	L	L	G	G				
15	nF															X					X	L	L	G	G				
18	nF																				X	Z	Z	G	G				
22	nF																				X	G	G	G	G				
33	nF																				X	G	G						

Remark: Customized size and specification is available upon request. Please contact us for further details

CERAMIC CHIP CAPACTIORS NPO (COG) DIELECTRIC

SIZE AND VALUES AVAILABLE (NPO) 1000V – 6000V (High Voltage)

Size		0805	1206			1210			1808			1812			1825			2211		2220			2225		
(L)	mm	2.00±0.20	3.20±0.20			3.20±0.30			4.50±0.30			4.50±0.30			4.50±0.30			5.70±0.40		5.70±0.40			5.70±0.40		
(W)	mm	1.25±0.20	1.60±0.20			2.50±0.20			2.00±0.20			3.20±0.30			6.30±0.40			2.80±0.40		5.00±0.40			6.30±0.40		
(T)	mm	1.25±0.10	1.65±0.20			2.50±0.30			2.00±0.20			3.00±0.30			2.50±0.30			3.00±0.20		3.00±0.20			3.00±0.20		
(t)	mm	0.30~0.70	0.30~0.70			0.30~0.70			0.35~1.00			0.35~1.00			0.35~1.00			0.35~1.00		0.35~1.00			0.35~1.00		
Cap./ W.V.		1K	1K	2K	3K	1K	2K	3K	1K	2K	3K	1K	2K	3K	1K	2K	3K	5K	6K	1K	2K	3K	1K	2K	3K
1~10	pF	H	H	H	L	C	C	L	X	X	X	X	X	X	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
12	pF	H	H	H	L	C	C	L	X	X	X	X	X	X	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
15	pF	H	H	H	L	C	C	L	X	X	X	X	X	X	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
18	pF	H	H	H	L	C	C	L	X	X	X	X	X	X	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
22	pF	H	H	H	L	C	C	L	X	X	X	X	X	X	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
27	pF	H	H	H	L	C	C	L	X	X	X	X	X	X	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
33	pF	H	H	C	L	C	C	L	X	X	X	X	X	X	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
39	pF	H	H	C	L	C	X	L	X	X	X	X	X	X	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
47	pF	H	C	C	L	C	X	L	X	X	X	X	X	X	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
56	pF	H	C	X	L	C	X	L	X	X	X	X	X	X	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
68	pF	H	C	X	L	C	X	L	X	X	X	X	X	X	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
82	pF	H	X	X	L	C	X	L	X	X	X	X	X	X	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
100	pF		X	X		X	X	L	X	X	Z	X	X	X	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
120	pF		X	L		X	X	L	X	X	Z	X	X	X	Z	Z	Z			Z	Z	Z	Z	Z	Z
150	pF		X	L		X	L	L	X	Z	Z	X	X	X	Z	Z	Z			Z	Z	Z	Z	Z	Z
180	pF		X	L		X	L	L	X	Z	Z	X	X	Z	Z	Z	Z			Z	Z	Z	Z	Z	Z
220	pF		X	L		L	L	L	X	Z	Z	X	X	Z	Z	Z	Z			Z	Z	Z	Z	Z	Z
270	pF		X	L		L	L		Z	Z	Z	X	Z	Z	Z	Z	Z			Z	Z	Z	Z	Z	Z
330	pF		X	L		L	L		Z	Z	Z	X	Z	Z	Z	Z	Z			Z	Z	G	Z	Z	Z
390	pF		X	L		L	L		Z	Z	Z	X	Z	Z	Z	Z	Z			Z	Z	G	Z	Z	Z
470	pF		X	L		L	L		Z	Z	Z	Z	Z	Z	Z	Z	Z			Z	Z	G	Z	Z	Z
560	pF		X			L	L		Z	Z		Z	Z	G	Z	Z	Z			Z	Z	G	Z	Z	Z
680	pF		L			L	L		Z	Z		Z	Z	G	Z	Z	G			Z	Z	G	Z	Z	Z
820	pF		L			L	L		Z	Z		Z	Z	G	Z	Z	G			Z	Z	G	Z	G	G
1000	pF		L			L	L		Z	Z		Z	Z	G	Z	Z	G			Z	Z	G	Z	G	G
1200	pF		L			L	Z		Z	Z		Z	Z		Z	Z	G			G	G	G	Z	G	G
1500	pF					Z	G		Z	Z		Z	Z		Z	G	G			G	G	G	Z	G	G
1800	pF								Z	Z		Z	G		Z	G	G			G	G	G	Z	G	G
2200	pF								Z	Z		Z	G		Z	G	G			G	G		Z	G	G
2700	pF											Z	G		Z	G				G	G		Z	G	G
3300	pF											Z	G		Z	G				G	G		Z	G	
3900	pF											Z			G	G				G	G		Z	G	
4700	pF											Z			G	G				G	G		Z	G	
5600	pF														G	G				G	G		G	G	
6800	pF														G	G				G	G		G	G	
8200	pF														G	G				G			G	G	
10000	pF														G								G	G	
12000	pF																						G		

Remark: Customized size and specification is available upon request. Please contact us for further details

CERAMIC CHIP CAPACTIORS NPO (COG) DIELECTRIC

Thickness Code & Standard Packing Q'ty per reel

Thickness Code	Chip Size	Chip Thickness	Max Tape Thickness	Q'ty of carboard tape in		Q'ty of Embosses tape in	
				7" reel	13" reel	7" reel	13" reel
S	0402	0.50±0.05 mm	0.60 mm	10,000	50,000	--	--
P	0603	0.80±0.10 mm	0.95 mm	4,000	15,000	--	--
A	0805	0.60±0.10 mm	0.75 mm	4,000	15,000	--	--
H		0.85±0.10 mm	0.95 mm	4,000	15,000	--	--
X		1.25±0.10 mm	1.80 mm	--	--	3,000	10,000
H	1206	0.85±0.10 mm	0.90 mm	4,000	15,000	--	--
C		0.95±0.10 mm	1.80 mm			3,000	10,000
X		1.25±0.10 mm	1.80 mm	--	--	3,000	10,000
L		1.65±0.20 mm	1.80 mm	--	--	2,000	--
C	1210	0.95±0.10 mm	1.80 mm			3,000	10,000
X		1.25±0.10 mm	1.80 mm	--	--	2,000	--
L		1.65±0.20 mm	1.80 mm	--	--	2,000	--
Z		2.00±0.20 mm	2.20 mm	--	--	2,000	--
G		2.50±0.20 mm	2.75 mm	--	--	1,000	--
X	1808	1.25±0.10 mm	1.80 mm	--	--	2,000	--
F		1.40±0.20 mm	1.80 mm	--	--	2,000	--
L		1.65±0.20 mm	1.80 mm	--	--	2,000	--
Z		2.00±0.20 mm	2.20 mm	--	--	1,000	--
X	1812	1.25±0.20 mm	1.80 mm	--	--	1,000	--
L		1.65±0.20 mm	1.80 mm			1,000	
Z		2.00±0.20 mm	2.20 mm	--	--	1,000	--
G		2.50±0.20 mm	2.75 mm	--	--	500	--
Z	1825	2.00±0.20 mm	2.20 mm	--	--	1,000	--
G		2.50±0.20 mm	2.75 mm	--	--	500	--
Z	2220	2.00±0.20 mm	2.20 mm	--	--	500	--
G		2.50±0.20 mm	2.75 mm	--	--	500	--
L	2211	1.65±0.20 mm	1.80 mm			1,000	
Z		2.00±0.20 mm	2.20 mm	--	--	1,000	--
G		2.50±0.20 mm	2.75 mm	--	--	500	--
Z	2225	2.00±0.20 mm	2.20 mm	--	--	1,000	--
G		2.50±0.20 mm	2.75 mm	--	--	500	--