

DATA SHEET

SURFACE-MOUNT CERAMIC MULTILAYER CAPACITORS

Class 1, NP0
25 V



Surface-mount ceramic multilayer capacitors

Class 1, NP0
25 V

FEATURES

- Five standard sizes
- High capacitance per unit volume
- Supplied in bulk case or in tape on reel.

APPLICATIONS

- Consumer electronics
- Telecommunications
- Automotive
- Data processing.

DESCRIPTION

The capacitor consists of a rectangular block of ceramic dielectric in which a number of interleaved precious metal electrodes are contained. This structure gives rise to a high capacitance per unit volume.

The inner electrodes are connected to the two terminations, silver dipped with a barrier layer of plated nickel and finally covered with a layer of plated tin (NiSn). A cross section of the structure is shown in Fig.1.

QUICK REFERENCE DATA

DESCRIPTION	VALUE
Rated voltage U_R (DC)	25 V (IEC)
Capacitance range (E12 series); Class 1, subclass 1B, letter code CG (NP0): case size 0402 case size 0603 case size 0805 case size 1206 case size 1210	150 pF to 220 pF 820 pF to 1.5 nF 3.3 nF to 4.7 nF 8.2 nF to 10 nF 12 nF to 22 nF
Tolerance on capacitance at $T_{amb} = 20\text{ °C}$	$\pm 5\%$, $\pm 2\%$ and $\pm 1\%$
Test voltage (DC) for 1 minute	$2.5 \times U_R$
Sectional specifications	IEC 60384-10, second edition 1989-04; also based on CECC 32 100
Detailed specification	based on CECC 32 101-801
Climatic category (IEC 60068)	55/125/56

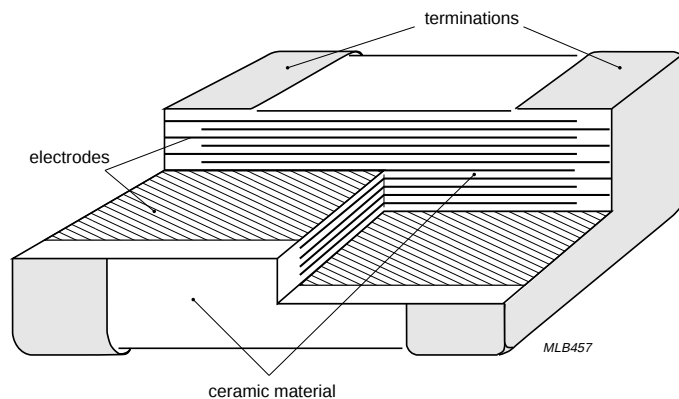
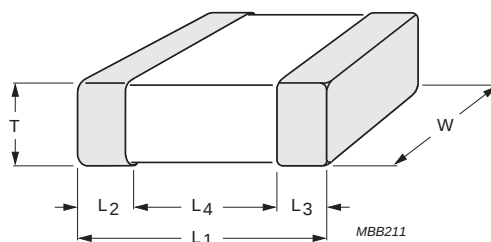


Fig.1 Construction of a ceramic multilayer capacitor.

Surface-mount ceramic multilayer capacitors

Class 1, NP0 25 V

MECHANICAL DATA



For dimensions see Table 1.

Fig.2. Component outline.

Physical dimensions

Table 1 Capacitor dimensions

CASE SIZE	L ₁	W	T		L ₂ and L ₃		L ₄ MIN.
			MIN.	MAX.	MIN.	MAX.	
Dimensions in millimetres							
0402	1.0 ±0.05	0.5 ±0.05	0.45	0.55	0.20	0.30	0.40
0603	1.6 ±0.10	0.8 ±0.07	0.73	0.87	0.25	0.65	0.40
0805	2.0 ±0.10	1.25 ±0.10	0.75	1.35	0.25	0.75	0.55
1206	3.2 ±0.15	1.6 ±0.15	0.75	0.95	0.25	0.75	1.40
1210	3.2 ±0.20	2.5 ±0.20	0.50	1.30	0.25	0.75	1.40
Dimensions in inches							
0402	0.040 ±0.002	0.020 ±0.002	0.018	0.022	0.008	0.012	0.016
0603	0.063 ±0.004	0.032 ±0.003	0.029	0.035	0.010	0.026	0.016
0805	0.079 ±0.004	0.049 ±0.004	0.030	0.053	0.010	0.030	0.022
1206	0.126 ±0.006	0.063 ±0.006	0.030	0.037	0.010	0.030	0.056
1210	0.126 ±0.008	0.098 ±0.008	0.020	0.051	0.010	0.030	0.056

Surface-mount ceramic multilayer capacitors

Class 1, NP0 25 V

SELECTION CHART FOR 25 V

C (pF)	LAST TWO DIGITS OF 12NC	25 V				
		0402	0603	0805	1206	1210
150	38					
180	39	0.5 ±0.05				
220	41					
270	42					
330	43					
390	44					
470	45					
560	46					
680	47					
820	48					
1000	49		0.8 ±0.07			
1200	51					
1500	52					
1800	53					
2200	54					
2700	55					
3300	56			0.85 ±0.1		
3900	57			1.25 ±0.1		
4700	58					
5600	59					
6800	61					
8200	62				0.85 ±0.1	
10000	63					
12000	64					0.6 ±0.1
15000	65					0.95 ±0.1
18 000	66					
22 000	67					1.2 ±0.15

Note

1. Values in shaded cells indicate thickness class.

Surface-mount ceramic multilayer capacitors

Class 1, NP0 25 V

Thickness classification and packing quantities

THICKNESS CLASSIFICATION (mm)	8 mm TAPE WIDTH QUANTITY PER REEL				QUANTITY PER BULK CASE		
	Ø180 mm; 7"		Ø330 mm; 13"				
	PAPER	BLISTER	PAPER	BLISTER	0402	0603	0805
0.5 ±0.05	10 000	–	50 000	–	50 000	–	–
0.8 ±0.07	4 000	–	15 000	–	–	15 000	–
0.85 ±0.1	4 000	–	15 000	–	–	–	8 000
0.5 to 1.0	–	4 000	–	10 000	–	–	–
0.9 to 1.3	–	3 000	–	10 000	–	–	–
1.25 ±0.1	–	3 000	–	10 000	–	–	5 000

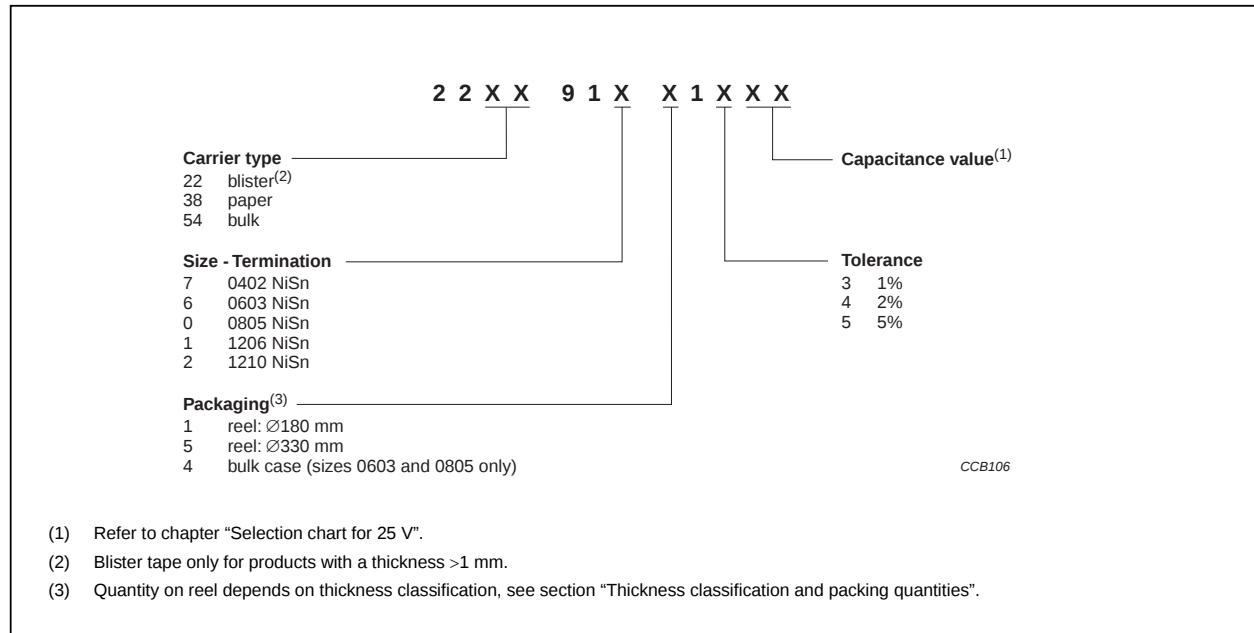
Surface-mount ceramic multilayer capacitors

Class 1, NP0 25 V

ORDERING INFORMATION FOR 25 V

Components may be ordered by using either a Phycomp's unique 12NC or simple 15-digit clear text code.

Ordering code 12NC (preferred)



Clear text code

Example: 0603CG102J8B200

Size Code	Temp. Char.	Capacitance	Tol.	Vol.	Termination	Packing	Marking	Series
0402 0603 0805 1206 1210	CG = NP0	102 = 1000 pF; the third digit signifies the multiplying factor: 1 = × 10 2 = × 100 3 = × 1000	F = ±1% G = ±2% J = ±5%	8 = 25 V	B = NiSn	2 = 180 mm; 7" paper 3 = 330 mm; 13" paper B = 180 mm; 7" blister F = 330 mm; 13" blister P = bulk case	0 = no marking	0 = conv. ceramic

Surface-mount ceramic multilayer capacitors

Class 1, NP0 25 V

ELECTRICAL CHARACTERISTICS

Class 1 capacitors; NP0 dielectric; NiSn terminations

Unless otherwise stated all electrical values apply at an ambient temperature of 20 ± 1 °C, an atmospheric pressure of 86 to 106 kPa, and a relative humidity of 63 to 67%.

DESCRIPTION	VALUE
Capacitance range (E12 series); Class 1, subclass 1B, letter code CG (NP0):	
0402	150 pF to 220 pF
0603	820 pF to 1.5 nF
0805	3.3 nF to 4.7 nF
1206	8.2 nF to 10 nF
1210	12 nF to 22 nF
Tolerance on capacitance after 1000 hours	$\pm 5\%$, $\pm 2\%$ and $\pm 1\%$
Tan δ	$\leq 10 \times 10^{-4}$
Insulation resistance after 1 minute at U_R (DC)	$R_{ins} > 100 \text{ G}\Omega$
Temperature coefficient	$(0 \pm 30) \times 10^{-6}/\text{K}$

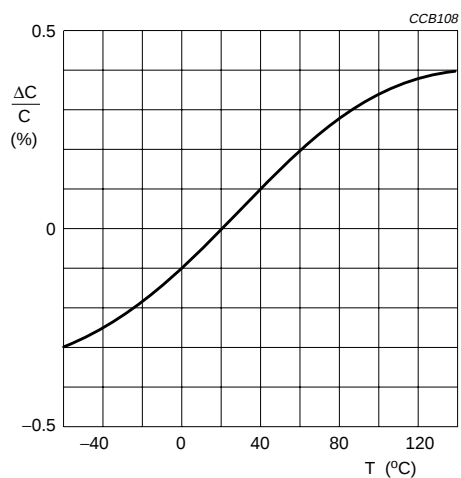


Fig.3 Typical capacitance change as a function of temperature.

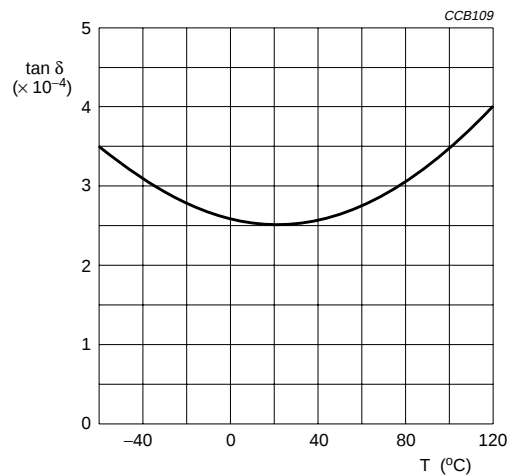


Fig.4 Typical tan δ as a function of temperature.

Surface-mount ceramic
multilayer capacitors

Class 1, NP0
25 V

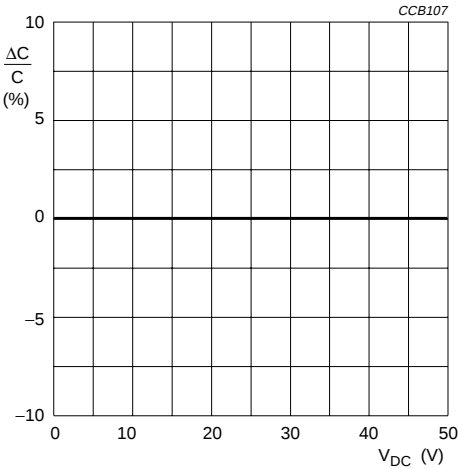


Fig.5 Typical capacitance change with respect to the capacitance at 1 V as a function of DC voltage.

**Surface-mount ceramic
multilayer capacitors****Class 1, NP0
25 V****REVISION HISTORY**

Revision	Date	Change Notification	Description
Rev.5	2001 May 30	-	- Converted to Phycomp brand
Rev.6	2003 Mar 26	-	- Updated company logo
Rev.7	2003 Jul 18	-	- Cover page revised