

# DATA SHEET

## **SURFACE-MOUNT CERAMIC MULTILAYER CAPACITORS**

High-voltage: Class 1, NP0  
1/2/3/4 KV



## Surface-mount ceramic multilayer capacitors

## High-voltage: Class 1, NP0 1/2/3/4 KV

### FEATURES

- Sizes 1206; 1808; 1812
- High capacitance per unit volume
- Supplied in tape on reel
- NiSn terminations.

### APPLICATIONS

These surface mounted high voltage capacitors were developed specifically for circuits requiring voltage up to 4 kV. Typical applications are:

- Inverter circuits for the backlights of liquid crystal displays
- Snubber circuits of power supplies
- Voltage multiplier circuits
- Surge protection.

Due to high voltage across the terminations, circuit applications of 1 to 4 kV or higher may need a coating on the surface to prevent external arcing. This is especially true under humid conditions.

### 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)	1 kV; 2 kV; 3 kV; 4 kV (IEC)
Capacitance range (E12 series); note 1	3.3 pF to 1500 pF
Tolerance on capacitance at $T_{amb} = 20\text{ }^\circ\text{C}$	$\pm 5$ ; note 2
Test voltage (DC) for 1 minute $U_R = 1000\text{ V}$ $U_R > 1000\text{ V}$	$1.5 \times U_R$ $1.2 \times U_R$
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

### Notes

1. Other values are available on request.
2. Special tolerance on capacitance is available on request.

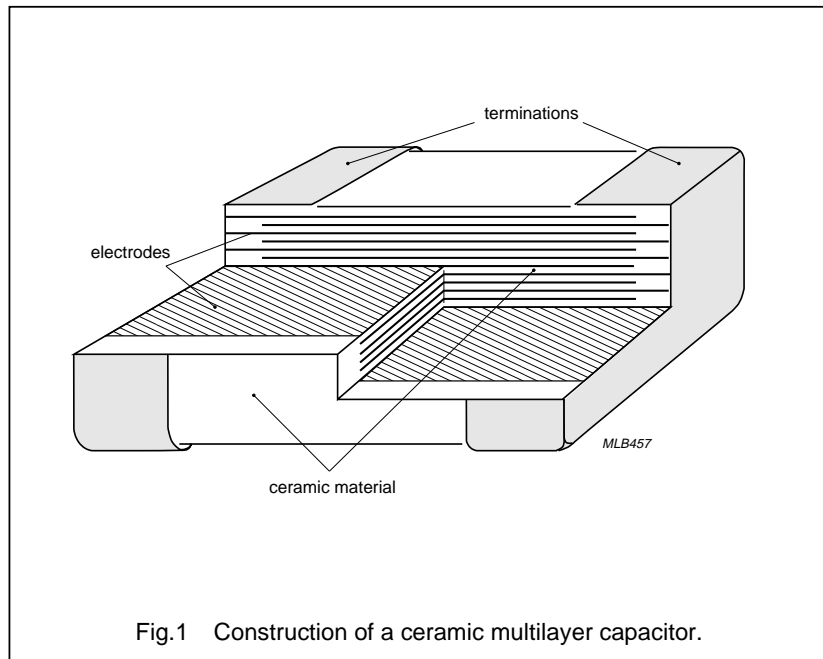
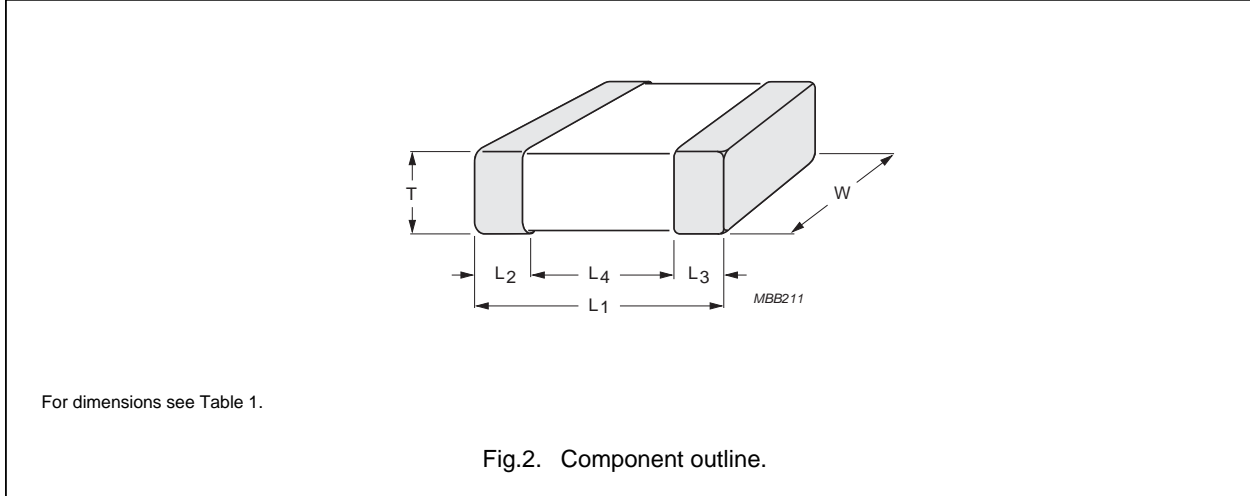


Fig.1 Construction of a ceramic multilayer capacitor.

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### MECHANICAL DATA



### Physical dimensions

Table 1 Capacitor dimensions; see Fig.2

CASE SIZE	L <sub>1</sub>	W	T MAX.	L <sub>2</sub> AND L <sub>3</sub> MAX.	L <sub>4</sub> MIN.
<b>Dimensions in millimetres</b>					
1206	3.2 ±0.15	1.6 ±0.15	1.30	0.75	1.40
1808	4.5 ±0.20	2.0 ±0.20	1.75	0.75	2.20
1812	4.5 ±0.20	3.2 ±0.20	1.75	0.75	2.20
<b>Dimensions in inches</b>					
1206	0.126 ±0.006	0.063 ±0.006	0.051	0.030	0.055
1808	0.177 ±0.008	0.079 ±0.008	0.069	0.030	0.088
1812	0.177 ±0.008	0.126 ±0.008	0.069	0.030	0.088

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### SELECTION CHART

C (pF)	LAST TWO DIGITS OF 12NC	1 kV		2 kV	3 kV		4 kV	
		1206	1812	1206	1808	1812	1808	1812
3.3	17							
3.9	18							
4.7	19							
5.6	20							
6.8	21							
8.2	22							
10	23							
12	24							
15	25						1.2 to 1.75	
18	26				0.9 to 1.3			
22	27							1.2 to 1.75
27	28							
33	29							
39	31					0.9 to 1.3		
47	32			0.9 to 1.3				
56	33							
68	34							
82	35							
100	36							
120	37							
150	38							
180	39							
220	41	0.9 to 1.3						
270	42							
330	43		0.5 to 1.0					
390	44							
470	45							
560	46							
680	47							
820	48							
1000	49							
1200	51		0.9 to 1.3					
1500	52							

#### Note

1. Values in shaded cells indicate thickness class.

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**Thickness classification and packing quantities**

THICKNESS CLASSIFICATION (mm)	8 mm TAPE WIDTH QUANTITY PER REEL	12 mm TAPE WIDTH QUANTITY PER REEL	
	Ø180 mm; 7" BLISTER	Ø180 mm; 7" BLISTER	
	1206	1808	1812
0.5 to 1.0	–	–	2000
0.9 to 1.	3000	1500	1500
1.2 to 1.75	–	1000	1000

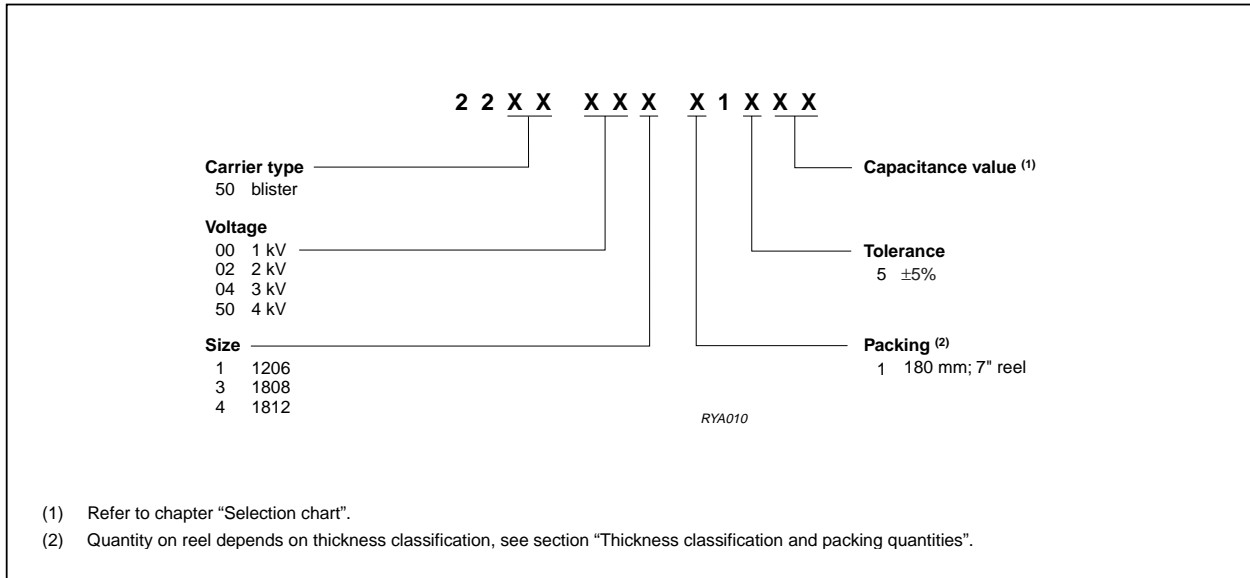
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### ORDERING INFORMATION

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

#### Ordering code 12NC (preferred)



#### Clear text code

EXAMPLE: 1206CG220JFBB00

Size Code	Temp. Char.	Capacitance	Tol.	Vol.	Termination	Packing	Marking	Series
1206 1808 1812	CG = NP0	220 = 22 pF; the third digit signifies the multiplying factor: 0 = × 1 1 = × 10 2 = × 100	J = ±5%	E = 1 kV F = 2 kV G = 3 kV H = 4 kV	B = NiSn	B = 180 mm; 7" blister	0 = no marking	0 = conv. ceramic

## Surface-mount ceramic multilayer capacitors

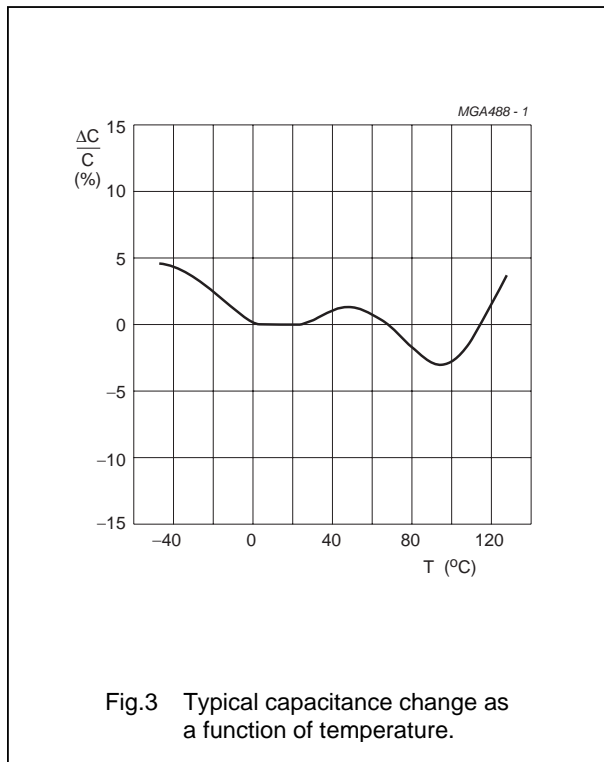
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### ELECTRICAL CHARACTERISTICS

#### Class 1 capacitors; NP0 dielectric; NiSn terminations

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

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Capacitance range (E12 series)	3.3 pF to 1500 pF
Tolerance on capacitance at $T_{amb} = 20$ °C	$\pm 5$
Test voltage (DC) for 1 minute $U_R = 1000$ V $U_R > 1000$ V	$1.5 \times U_R$ $1.2 \times U_R$
Tan $\delta$	$\leq 10 \times 10^{-4}$
Insulation resistance after 1 minute at $U_R$ (DC)	$R_{ins} > 100$ G $\Omega$
Temperature coefficient	$(0 \pm 30) \times 10^{-6}/K$
Ageing	not applicable



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<b>Revision</b>	<b>Date</b>	<b>Change Notification</b>	<b>Description</b>
Rev.5	2001 May 30	-	- Converted to Phycomp brand
Rev.6	2003 Mar 05	-	- Updated company logo
Rev.7	2003 Jul 21	-	- Cover page revised