38 8954. +

DATA SHEET

Class 2, Y5V 10 V
Surface mounted ceramic multilayer capacitors

Product specification
Supersedes data of 6th December 1999
File under Discrete Ceramics, ACM2

2000 May 24

Philips
Components

PHILIPS

Surface mounted ceramic multilayer capacitors

Class 2, Y5V 10 V

FEATURES

- Three standard sizes
- High capacitance per unit volume
- Supplied in tape on reel or in bulk case
- Nickel-barrier end terminations.

APPLICATIONS

Consumer electronics, for example:

- Tuners
- Television receivers
- Video recorders
- All types of cameras.

DESCRIPTION

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

The inner electrodes are connected to the two terminations 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)	10 V
Capacitance range (E6 series)	1.0 to 10 µF; note 1
Tolerance on capacitance after 1000 hours	−20% to +80% (Z)
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
End terminations	NiSn
Climatic category (IEC 60068)	25/085/21

Note

1. Measured at 25 °C, 1 V and 1 kHz, using a four-gauge method.

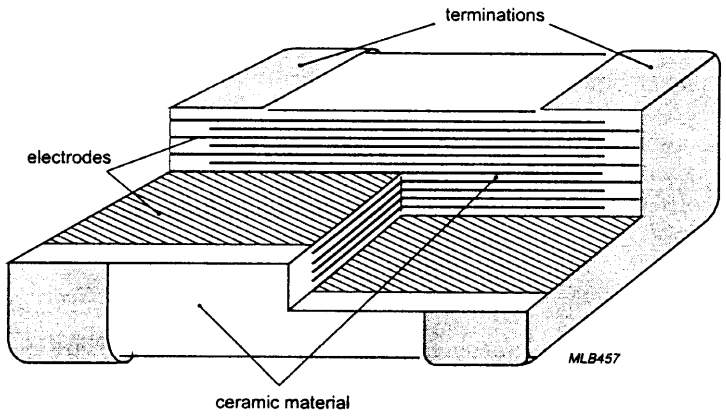
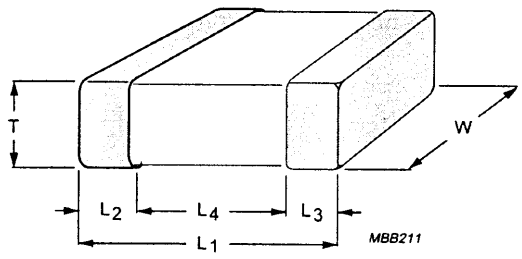


Fig.1 Construction of a ceramic multilayer capacitor.

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							
0603	1.6 ±0.10	0.8 ±0.07	0.73	0.87	0.25	0.65	0.40
0805	2.0 ±0.1	1.25 ±0.1	0.50	1.35	0.25	0.75	0.55
1206	3.2 ±0.15	1.6 ±0.15	0.50	1.75	0.25	0.75	1.40
Dimensions in inches							
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	0.020	0.053	0.010	0.030	0.022
1206	0.126 ±0.006	0.063 ±0.006	0.020	0.069	0.010	0.030	0.056

Surface mounted ceramic multilayer capacitors

Class 2, Y5V 10 V

SELECTION CHART FOR 10 V

C (nF)	LAST TWO DIGITS OF 12NC	10 V		
		0603	0805	1206
1000	63	0.8 ±0.07		0.85 ±0.10
1500	65			
2200	67			
3300	69		1.25 ±0.10	1.15 ±0.10
4700	72			
6800	74	Values in shaded cells indicate thickness classification.		1.60 ±0.15
10000	76			

Thickness classification and packaging quantities

THICKNESS CLASSIFICATION (mm)	8 mm TAPE WIDTH AMOUNT PER REEL				AMOUNT PER BULK CASE	
	Ø180 mm; 7"		Ø330 mm; 13"		0603	0805
	PAPER	BLISTER	PAPER	BLISTER		
0.8 ±0.07	4000	–	15000	–	15000	–
0.85 ±0.10	4000	–	15000	–	–	–
1.15 ±0.10	–	3000	–	10000	–	–
1.25 ±0.10	–	3000	–	10000	–	5000
1.60 ±0.15	–	2500	–	7000	–	–

ORDERING INFORMATION

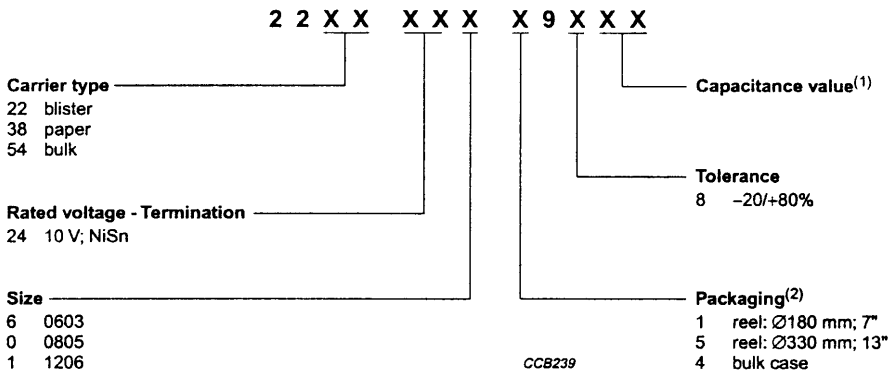
Components may be ordered by using either a simple 15-digit clear text code or Philips unique 12NC.

Clear text code

Example: 06032F105Z24BB0D

SIZE CODE	TEMP. CHAR.	CAPACITANCE	TOL.	VOLTAGE	TERMINATION	PACKAGING	MARKING	SERIES
0603 0805 1206	2F = Y5V	105 = 1000000 pF; the third digit signifies the multiplying factor: 5 = × 100000 6 = × 1000000	Z = −20%/+80%	6 = 10 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 2 = 2-character marking in North America only	D = BME

Ordering code 12NC



(1) Refer to chapter "Selection chart for 10 V".

(2) Amount on reel depends on thickness classification, see section "Thickness classification and packaging quantities".

ELECTRICAL CHARACTERISTICS

Class 2 capacitors; Y5V dielectric; NiSn terminations

Unless otherwise stated all electrical values apply at an ambient temperature of 25 ±1 °C, an atmospheric pressure of 86 to 105 kPa, and a relative humidity of 63 to 67%.

DESCRIPTION	VALUE
Capacitance range (E6 series); note 1.	1.0 to 10 μF
Tolerance on capacitance after 1000 hours	−20% to +80% (Z)
Tan δ; note 1.	≤12.5%
Insulation resistance after 1 minute at U_R (DC)	$R_{ins} \times C \geq 500$ seconds
Maximum capacitance change as a function of temperature	+30% to −80%
Ageing	typical 7% per time decade
Resistance to soldering heat	260 °C; 10 seconds

Note

1. Measured at 25 °C, 1 V and 1 kHz, using a four-gauge method.

TESTS AND REQUIREMENTS

Table 2 Test procedures and requirements

IEC 60384-10/ CECC 32 100 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS
4.4		mounting	the capacitors may be mounted on printed-circuit boards or ceramic substrates by applying wave soldering, reflow soldering (including vapour phase soldering) or conductive adhesive	no visible damage
4.5		visual inspection and dimension check	any applicable method using ×10 magnification	in accordance with specification
4.6.1		capacitance	f = 1 kHz; Y5V measuring voltage 1 V_{rms} at 25 °C	within specified tolerance
4.6.2		tan δ	f = 1 kHz; Y5V measuring voltage 1 V_{rms} at 25 °C	in accordance with specification
4.6.3		insulation resistance	at U_R (DC) for 1 minute	in accordance with specification
4.6.4		voltage proof	2.5 × U_R for 1 minute	no breakdown or flashover
4.7.1		temperature characteristic	between minimum and maximum temperature	in accordance with specification
4.8		adhesion	a force of 5 N applied for 10 s to the line joining the terminations and in a plane parallel to the substrate	no visible damage
4.9		bond strength of plating on end face	mounted in accordance with CECC 32 100, paragraph 4.4	no visible damage
			conditions: bending 1 mm at a rate of 1 mm/s, radius jig. 340 mm	ΔC/C: ≤30%
4.10	Tb	resistance to soldering heat	precondition: 120 to 150 °C for 1 minute; 260 ±5 °C for 10 ±0.5 s in a static solder bath	the terminations shall be well tinned after recovery ΔC/C: ±20% tan δ: original specification R_{ins}: original specification
		resistance to leaching	260 ±5 °C for 30 ±1 s in a static solder bath	using visual enlargement of ×10, dissolution of the terminations shall not exceed 10%
4.11	Ta	solderability	zero hour test, and test after storage (20 to 24 months) in original packing in normal atmosphere; unmounted chips completely immersed for 2 ±0.5 s in a solder bath at 235 ±5 °C	the terminations shall be well tinned

IEC 60384-10/ CECC 32 100 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS
4.12	Na	rapid change of temperature	preconditioning: –25 to +85 °C; 5 cycles	no visible damage after 48 hours recovery: $\Delta C/C$: ≤20%
4.14	Ca	damp heat, steady state	preconditioning (thermal treatment): 500 ±12 hours at 40 °C; 90 to 95% RH	no visual damage after 48 hours recovery: $\Delta C/C$: +30%/–40% tan δ: ≤15% R_{ins}: 500 MΩ or $R_iC_R \geq 25$ s, whichever is less
		damp heat, with U_R load	initialization: 48 hours after U_R at 40 °C for 1 hour (for initial value measurement); 500 ±12 hours at 40 °C; 90 to 95% RH; U_R applied	pretreatment: U_R at 40 °C for 1 hour after 48 hours recovery: $\Delta C/C$: +30%/–40% tan δ: ≤15% R_{ins}: 500 MΩ or $R_iC_R \geq 25$ s, whichever is less
4.15		endurance	initialization: $2 \times U_R$ at 85 °C for 1 hour (initial value is measured after 48 hours, recovery at room temperature); 1000 hours at 85 °C and $2 \times U_R$ applied	pretreatment: U_R at 40 °C for 1 hour after 48 hours recovery: $\Delta C/C$: +30%/–40% tan δ: ≤15% R_{ins}: 1000 MΩ or $R_iC_R \geq 50$ s, whichever is less