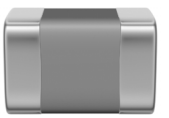
Multilayer ceramic capacitor

X7R

Series/Type: **Chip**
Ordering code: **B37921...**

Date: 2005-12-05

SMD



Features

- High volumetric efficiency
- Non-linear capacitance change
- High insulation resistance
- High pulse strength

Applications

- Blocking and coupling
- Decoupling
- Interference suppression

Termination

- For soldering: Nickel-barrier termination (Ni) for case sizes 0402 to 1210
  Silver-palladium termination (AgPd) for case sizes 1812 and 2220
  (capacitance values ≤1 µF)
- For conductive adhesion: Silver-palladium termination (AgPd) for all case sizes on request

Options

- Alternative capacitance tolerances available on request

Delivery mode

- Cardboard and blister tape (blister tape for chip thickness ≥1.2 ±0.1 mm and case sizes ≥1210), 180-mm and 330-mm reel available
- Bulk case for case sizes 0603 (16 V, 25 V, 50 V) and 0805 (50 V)

Electrical data

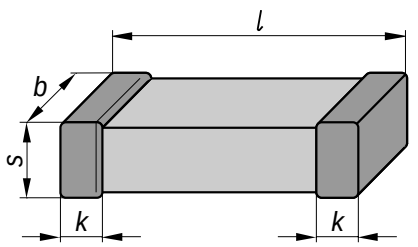
Temperature characteristic		X7R	
Climatic category (IEC 60068-1)		55/125/56	
Standard		EIA	
Dielectric		Class 2	
Rated voltage[1)]	V_R	10, 16, 25, 50,100, 200, 500	VDC
Test voltage	V_{test}	2.5 · V_R/5 s	VDC
Capacitance range[2)] / E series	C_R	100 pF … 1 µF (E3/E6)	
Max. relative capacitance change	ΔC/C	±15	%
Dissipation factor (limit value)	tan δ	<25 · 10^{-3}	
		<35 · 10^{-3} for 16 V	
Insulation resistance[3)] at + 25 °C	R_{ins}	>10^5	MΩ
Insulation resistance[3)] at +125 °C	R_{ins}	>10^4	MΩ
Time constant[3)] at + 25 °C	τ	>1000	s
Time constant[3)] at +125 °C	τ	>100	s
Operating temperature range	T_{op}	–55 … +125	°C
Ageing[4)]		yes	

1) Note: No operation on AC line.
2) See also HighCap series in data book or Internet
3) For C_R >10 nF the time constant $\tau = C \cdot R_{ins}$ is given.
4) Refer to data book 2003 “General Techn. Inform.”, page 197.

Capacitance tolerances

Code letter	J	K (standard)	M
Tolerance	±5%	±10%	±20%

Dimensional drawing



KKE0329-N

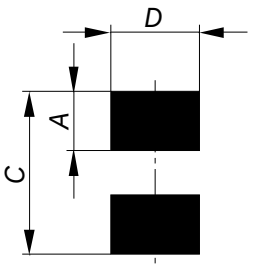
Dimensions (mm)

Case size **(inch)** (mm)	**0402** 1005	**0603** 1608	**0805** 2012	**1206** 3216
l	1.0 ±0.10	1.6 ±0.15	2.0 ±0.20	3.2 ±0.20
b	0.5 ±0.05	0.8 ±0.10	1.25 ±0.15	1.6 ±0.15
s	0.5 ±0.05	0.8 ±0.10	1.35 max.	1.30 max.
k	0.1 –0.4	0.1 –0.4	0.13 –0.75	0.25 –0.75

Case size **(inch)** (mm)	**1210** 3225	**1812** 4532	**2220** 5750
l	3.2 ±0.30	4.5 ±0.30	5.7 ±0.40
b	2.5 ±0.30	3.2 ±0.30	5.0 ±0.40
s	1.70 max.	1.30 max.	1.30 max.
k	0.25 –0.75	0.25 –1.0	0.25 –1.0

Tolerances to CECC 32101-801

Recommended solder pad

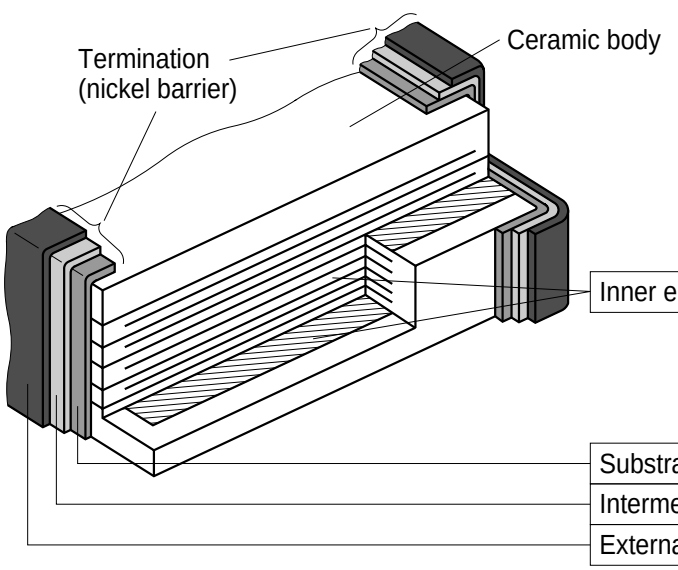


KKE0308-1

Maximum dimensions (mm)

Case size	(inch/mm)	Type	A	C	D
	0402/1005	single chip	0.6	1.7	0.6
	0603/1608	single chip	1.0	3.0	1.0
	0805/2012	single chip	1.2	3.4	1.3
	1206/3216	single chip	1.2	4.5	1.8
	1210/3225	single chip	1.2	4.5	2.8
	1812/4532	single chip	1.5	6.0	3.6
	2220/5750	single chip	1.5	7.2	5.5

Termination



	NME	BME
Inner electrode	AgPd	Ni

	NME	BME
Substrate electrode	Ag	Cu
Intermediate electrode	Ni	Ni
External electrode	Sn	Sn

NME: Noble Metal Electrode
BME: Base Metal Electrode

KKE0485-5-E

Product range chip capacitors

	X7R								
Size[1)] **inch** mm	**0402** 1005				**0603** 1608				
Type	B37921				B37931				
V_R (VDC) / C_R	10	16	25	50	10	16	25	50	100
100 pF									
150 pF									
220 pF									
330 pF									
470 pF									
680 pF									
1.0 nF									
1.5 nF									
2.2 nF									
3.3 nF									
4.7 nF									
6.8 nF									
10 nF									
15 nF									
22 nF									
33 nF									
47 nF									
68 nF									
100 nF								2)	
150 nF									
220 nF						2)	2)		

1) l × b (inch) / l × b (mm)

2) See HighCV product range.

Product range chip capacitors

	X7R										
Size[1)] **inch** mm	**0805** 2012					**1206** 3216					
Type	B37941					B37872					
V_R (VDC) / C_R	16	25	50	100	200	16	25	50	100	200	500
100 pF											
220 pF											
330 pF											
470 pF											
680 pF											
820 pF											
1.0 nF											
1.5 nF											
2.2 nF											
3.3 nF											
4.7 nF											
6.8 nF											
10 nF											
15 nF											
22 nF											
33 nF											
47 nF											
68 nF											
100 nF											
150 nF											
220 nF	2)	2)	2)								
330 nF	2)	2)									
470 nF	2)	2)									
1.0 µF	2)	2)				2)	2)	2)			
2.2 µF						2)	2)				

1) l × b (inch) / l × b (mm)
2) See HighCV product range.

Product range chip capacitors

	X7R						
Size[1)] **inch** mm	**1210** 3225					**1812** 4532	**2220** 5750
Type	B37950					B37953	B37956
V_R (VDC) / C_R	25	50	100	200	500	50	50
1.0 nF					■		
1.5 nF					■		
2.2 nF					■		
3.3 nF					■		
3.9 nF				■			
4.7 nF				■	■		
6.8 nF				■	■		
10 nF		■	■	■	■		
15 nF			■	■			
22 nF		■	■	■			
33 nF			■	■			
47 nF		■	■	■			
68 nF			■				
100 nF		■	■			■	
150 nF			■				
220 nF		■				■	
330 nF							
470 nF		■				■	■

1) l × b (inch) / l × b (mm)
2) See HighCV product range.

Ordering codes and packing for X7R, 10, 16, 25 and 50 VDC, nickel-barrier terminations

C_R[1)]	Ordering code[2)]	Chip thickness mm	Cardboard tape, ∅ 180-mm reel ** ≙ 60 pcs./reel	Cardboard tape, ∅ 330-mm reel ** ≙ 70 pcs./reel
Case size 0402, 10 VDC				
33 nF	B37921K8333K0**	0.5 ± 0.05	10000	50000
47 nF	B37921K8473K0**	0.5 ± 0.05	10000	50000
Case size 0402, 16 VDC				
10 nF	B37921K9103K0**	0.5 ± 0.05	10000	50000
22 nF	B37921K9223K0**	0.5 ± 0.05	10000	50000
Case size 0402, 25 VDC				
4.7 nF	B37921K0472K0**	0.5 ± 0.05	10000	50000
6.8 nF	B37921K0682K0**	0.5 ± 0.05	10000	50000
Case size 0402, 50 VDC				
220 pF	B37921K5221K0**	0.5 ± 0.05	10000	50000
470 pF	B37921K5471K0**	0.5 ± 0.05	10000	50000
1.0 nF	B37921K5102K0**	0.5 ± 0.05	10000	50000
2.2 nF	B37921K5222K0**	0.5 ± 0.05	10000	50000
3.3 nF	B37921K5332K0**	0.5 ± 0.05	10000	50000

1) Other capacitance values on request.
2) The table contains the ordering codes for the standard capacitance tolerance. For other available capacitance tolerances see page 3.

Ordering codes and packing for X7R, 16 and 25 VDC, nickel-barrier terminations

C_R[1)]	Ordering code[2)]	Chip thickness	Cardboard tape, ∅ 180-mm reel	Cardboard tape, ∅ 330-mm reel	Bulk case
			** ≙ 60	** ≙ 70	** ≙ 01
		mm	pcs./reel	pcs./reel	pcs.
Case size 0603, 16 VDC					
22 nF	B37931K9223K0**	0.8 ± 0.1	4000	16000	15000
33 nF	B37931K9333K0**	0.8 ± 0.1	4000	16000	15000
47 nF	B37931K9473K0**	0.8 ± 0.1	4000	16000	15000
68 nF	B37931K9683K0**	0.8 ± 0.1	4000	16000	15000
100 nF	B37931K9104K0**	0.8 ± 0.1	4000	16000	15000
Case size 0603, 25 VDC					
10 nF	B37931K0103K0**	0.8 ± 0.1	4000	16000	15000
15 nF	B37931K0153K0**	0.8 ± 0.1	4000	16000	15000
22 nF	B37931K0223K0**	0.8 ± 0.1	4000	16000	15000
33 nF	B37931K0333K0**	0.8 ± 0.1	4000	16000	15000
47 nF	B37931K0473K0**	0.8 ± 0.1	4000	16000	15000
68 nF	B37931K0683K0**	0.8 ± 0.1	4000	16000	15000
100 nF	B37931K0104K0**	0.8 ± 0.1	4000	16000	15000

1) Other capacitance values on request.
2) The table contains the ordering codes for the standard capacitance tolerance. For other available capacitance tolerances see page 3.

Ordering codes and packing for X7R, 50 and 100 VDC, nickel-barrier terminations

C_R[1]	Ordering code[2]	Chip thickness	Cardboard tape, ∅ 180-mm reel	Cardboard tape, ∅ 330-mm reel	Bulk case
			** ≙ 60	** ≙ 70	** ≙ 01
		mm	pcs./reel	pcs./reel	pcs.
Case size 0603, 50 VDC					
220 pF	B37931K5221K0**	0.8 ± 0.1	4000	16000	15000
330 pF	B37931K5331K0**	0.8 ± 0.1	4000	16000	15000
470 pF	B37931K5471K0**	0.8 ± 0.1	4000	16000	15000
680 pF	B37931K5681K0**	0.8 ± 0.1	4000	16000	15000
1.0 nF	B37931K5102K0**	0.8 ± 0.1	4000	16000	15000
1.5 nF	B37931K5152K0**	0.8 ± 0.1	4000	16000	15000
2.2 nF	B37931K5222K0**	0.8 ± 0.1	4000	16000	15000
3.3 nF	B37931K5332K0**	0.8 ± 0.1	4000	16000	15000
4.7 nF	B37931K5472K0**	0.8 ± 0.1	4000	16000	15000
6.8 nF	B37931K5682K0**	0.8 ± 0.1	4000	16000	15000
10 nF	B37931K5103K0**	0.8 ± 0.1	4000	16000	15000
15 nF	B37931K5153K0**	0.8 ± 0.1	4000	16000	15000
22 nF	B37931K5223K0**	0.8 ± 0.1	4000	16000	15000
33 nF	B37931K5333K0**	0.8 ± 0.1	4000	16000	15000
47 nF	B37931K5473K0**	0.8 ± 0.1	4000	16000	15000
Case size 0603, 100 VDC					
100 pF	B37931K1101K0**	0.8 ± 0.1	4000	16000	–
150 pF	B37931K1151K0**	0.8 ± 0.1	4000	16000	–
220 pF	B37931K1221K0**	0.8 ± 0.1	4000	16000	–
330 pF	B37931K1331K0**	0.8 ± 0.1	4000	16000	–
470 pF	B37931K1471K0**	0.8 ± 0.1	4000	16000	–
680 pF	B37931K1681K0**	0.8 ± 0.1	4000	16000	–
1.0 nF	B37931K1102K0**	0.8 ± 0.1	4000	16000	–
1.5 nF	B37931K1152K0**	0.8 ± 0.1	4000	16000	–
2.2 nF	B37931K1222K0**	0.8 ± 0.1	4000	16000	–
3.3 nF	B37931K1332K0**	0.8 ± 0.1	4000	16000	–
4.7 nF	B37931K1472K0**	0.8 ± 0.1	4000	16000	–

1) Other capacitance values on request.
2) The table contains the ordering codes for the standard capacitance tolerance. For other available capacitance tolerances see page 3.

Ordering codes and packing for X7R, 25 and 50 VDC, nickel-barrier terminations

C_R[1]	Ordering code[2]	Chip thickness	Cardboard tape, ∅ 180-mm reel	Cardboard tape, ∅ 330-mm reel	Bulk case
			** ≙ 60	** ≙ 70	** ≙ 01
		mm	pcs./reel	pcs./reel	pcs.
Case size 0805, 25 VDC					
100 nF	B37941K0104K0**	1.25 ± 0.1	3000[3]	12000[4]	–
Case size 0805, 50 VDC					
470 pF	B37941K5471K0**	0.6 ± 0.1	5000	20000	10000
680 pF	B37941K5681K0**	0.6 ± 0.1	5000	20000	10000
1.0 nF	B37941K5102K0**	0.6 ± 0.1	5000	20000	10000
1.5 nF	B37941K5152K0**	0.6 ± 0.1	5000	20000	10000
2.2 nF	B37941K5222K0**	0.6 ± 0.1	5000	20000	10000
3.3 nF	B37941K5332K0**	0.6 ± 0.1	5000	20000	10000
4.7 nF	B37941K5472K0**	0.6 ± 0.1	5000	20000	10000
6.8 nF	B37941K5682K0**	0.6 ± 0.1	5000	20000	10000
10 nF	B37941K5103K0**	0.6 ± 0.1	5000	20000	10000
15 nF	B37941K5153K0**	0.6 ± 0.1	5000	20000	10000
22 nF	B37941K5223K0**	0.6 ± 0.1	5000	20000	10000
33 nF	B37941K5333K0**	0.6 ± 0.1	5000	20000	10000
47 nF	B37941K5473K0**	0.6 ± 0.1	5000	20000	10000
68 nF	B37941K5683K0**	0.8 ± 0.1	4000	16000	–
68 nF	B37941K5683K0**	1.25 ± 0.1	3000[3]	12000[4]	–
100 nF	B37941K5104K0**	0.8 ± 0.1	4000	16000	–
100 nF	B37941K5104K0**	1.25 ± 0.1	3000[3]	12000[4]	–

1) Other capacitance values on request.
2) The table contains the ordering codes for the standard capacitance tolerance. For other available capacitance tolerances see page 3.
3) Blister tape, 180-mm reel, ordering code ** ≙ 62
4) Blister tape, 330-mm reel, ordering code ** ≙ 72

Ordering codes and packing for X7R, 100 and 200 VDC, nickel-barrier terminations

C_R[1]	Ordering code[2]	Chip thickness	Cardboard tape, ∅ 180-mm reel	Cardboard tape, ∅ 330-mm reel
			** ≙ 60	** ≙ 70
		mm	pcs./reel	pcs./reel
Case size 0805, 100 VDC				
470 pF	B37941K1471K0**	0.6 ± 0.1	5000	20000
680 pF	B37941K1681K0**	0.6 ± 0.1	5000	20000
1.0 nF	B37941K1102K0**	0.6 ± 0.1	5000	20000
1.5 nF	B37941K1152K0**	0.6 ± 0.1	5000	20000
2.2 nF	B37941K1222K0**	0.6 ± 0.1	5000	20000
3.3 nF	B37941K1332K0**	0.6 ± 0.1	5000	20000
4.7 nF	B37941K1472K0**	0.6 ± 0.1	5000	20000
6.8 nF	B37941K1682K0**	0.6 ± 0.1	5000	20000
10 nF	B37941K1103K0**	0.6 ± 0.1	5000	20000
15 nF	B37941K1153K0**	0.6 ± 0.1	5000	20000
22 nF	B37941K1223K0**	0.8 ± 0.1	4000	16000
Case size 0805, 200 VDC				
220 pF	B37941K2221K0**	0.8 ± 0.1	4000	16000
330 pF	B37941K2331K0**	0.8 ± 0.1	4000	16000
470 pF	B37941K2471K0**	0.8 ± 0.1	4000	16000
680 pF	B37941K2681K0**	0.8 ± 0.1	4000	16000
1.0 nF	B37941K2102K0**	0.8 ± 0.1	4000	16000
1.5 nF	B37941K2152K0**	0.8 ± 0.1	4000	16000
2.2 nF	B37941K2222K0**	0.8 ± 0.1	4000	16000
3.3 nF	B37941K2332K0**	0.8 ± 0.1	4000	16000
4.7 nF	B37941K2472K0**	1.2 ± 0.1	3000[3]	12000[4]
6.8 nF	B37941K2682K0**	1.2 ± 0.1	3000[3]	12000[4]

1) Other capacitance values on request.
2) The table contains the ordering codes for the standard capacitance tolerance. For other available capacitance tolerances see page 3.
3) Blister tape, 180-mm reel, ordering code ** ≙ 62
4) Blister tape, 330-mm reel, ordering code ** ≙ 72

Ordering codes and packing for X7R, 50 and 100 VDC, nickel-barrier terminations

C_R[1]	Ordering code[2]	Chip thickness mm	Cardboard tape, ∅ 180-mm reel ** ≙ 60 pcs./reel	Cardboard tape, ∅ 330-mm reel ** ≙ 70 pcs./reel
Case size 1206, 50 VDC				
1.0 nF	B37872K5102K0**	0.8 ± 0.1	4000	16000
1.5 nF	B37872K5152K0**	0.8 ± 0.1	4000	16000
2.2 nF	B37872K5222K0**	0.8 ± 0.1	4000	16000
3.3 nF	B37872K5332K0**	0.8 ± 0.1	4000	16000
4.7 nF	B37872K5472K0**	0.8 ± 0.1	4000	16000
6.8 nF	B37872K5682K0**	0.8 ± 0.1	4000	16000
10 nF	B37872K5103K0**	0.8 ± 0.1	4000	16000
15 nF	B37872K5153K0**	0.8 ± 0.1	4000	16000
22 nF	B37872K5223K0**	0.8 ± 0.1	4000	16000
33 nF	B37872K5333K0**	0.8 ± 0.1	4000	16000
47 nF	B37872K5473K0**	0.8 ± 0.1	4000	16000
68 nF	B37872K5683K0**	0.8 ± 0.1	4000	16000
100 nF	B37872K5104K0**	0.8 ± 0.1	4000	16000
220 nF	B37872K5224K0**	1.2 ± 0.1	3000[3]	12000[4]
330 nF	B37872K5334K0**	1.2 ± 0.1	3000[3]	12000[4]
470 nF	B37872K5474K0**	1.2 ± 0.1	3000[3]	12000[4]
Case size 1206, 100 VDC				
1.0 nF	B37872K1102K0**	0.8 ± 0.1	4000	16000
1.5 nF	B37872K1152K0**	0.8 ± 0.1	4000	16000
2.2 nF	B37872K1222K0**	0.8 ± 0.1	4000	16000
3.3 nF	B37872K1332K0**	0.8 ± 0.1	4000	16000
4.7 nF	B37872K1472K0**	0.8 ± 0.1	4000	16000
6.8 nF	B37872K1682K0**	0.8 ± 0.1	4000	16000
10 nF	B37872K1103K0**	0.8 ± 0.1	4000	16000
15 nF	B37872K1153K0**	0.8 ± 0.1	4000	16000
22 nF	B37872K1223K0**	0.8 ± 0.1	4000	16000
33 nF	B37872K1333K0**	0.8 ± 0.1	4000	16000
47 nF	B37872K1473K0**	0.8 ± 0.1	4000	16000
68 nF	B37872K1683K0**	1.2 ± 0.1	3000[3]	12000[4]
100 nF	B37872K1104K0**	1.2 ± 0.1	3000[3]	12000[4]

1) Other capacitance values on request.
2) The table contains the ordering codes for the standard capacitance tolerance. For other available capacitance tolerances see page 3.
3) Blister tape, 180-mm reel, ordering code ** ≙ 62
4) Blister tape, 330-mm reel, ordering code ** ≙ 72

Ordering codes and packing for X7R, 200 and 500 VDC, nickel-barrier terminations

C_R[1)]	Ordering code[2)]	Chip thickness mm	Cardboard tape, ∅ 180-mm reel ** ≙ 60 pcs./reel	Cardboard tape, ∅ 330-mm reel ** ≙ 70 pcs./reel
Case size 1206, 200 VDC				
820 pF	B37872K2821K0**	0.8 ± 0.1	4000	16000
1.0 nF	B37872K2102K0**	0.8 ± 0.1	4000	16000
1.5 nF	B37872K2152K0**	0.8 ± 0.1	4000	16000
2.2 nF	B37872K2222K0**	0.8 ± 0.1	4000	16000
3.3 nF	B37872K2332K0**	0.8 ± 0.1	4000	16000
4.7 nF	B37872K2472K0**	0.8 ± 0.1	4000	16000
6.8 nF	B37872K2682K0**	0.8 ± 0.1	4000	16000
10 nF	B37872K2103K0**	0.8 ± 0.1	4000	16000
15 nF	B37872K2153K0**	1.2 ± 0.1	3000[3)]	12000[4)]
22 nF	B37872K2223K0**	1.2 ± 0.1	3000[3)]	12000[4)]
Case size 1206, 500 VDC				
470 pF	B37872K3471K0**	0.8 ± 0.1	4000	16000
680 pF	B37872K3681K0**	0.8 ± 0.1	4000	16000
1.0 nF	B37872K3102K0**	0.8 ± 0.1	4000	16000
1.5 nF	B37872K3152K0**	0.8 ± 0.1	4000	16000
2.2 nF	B37872K3222K0**	0.8 ± 0.1	4000	16000
3.3 nF	B37872K3332K0**	1.2 ± 0.1	3000[3)]	12000[4)]
4.7 nF	B37872K3472K0**	1.2 ± 0.1	3000[3)]	12000[4)]

1) Other capacitance values on request.
2) The table contains the ordering codes for the standard capacitance tolerance. For other available capacitance tolerances see page 3.
3) Blister tape, 180-mm reel, ordering code ** ≙ 62
4) Blister tape, 330-mm reel, ordering code ** ≙ 72

Ordering codes and packing for X7R, 50, 100, 200 and 500 VDC, nickel-barrier terminations

C_R[1]	Ordering code[2]	Chip thickness mm	Blister tape, ∅ 180-mm reel ** ≙ 62 pcs./reel	Blister tape, ∅ 330-mm reel ** ≙ 72 pcs./reel
Case size 1210, 50 VDC				
10 nF	B37950K5103K0**	0.8 ± 0.1	4000	16000
22 nF	B37950K5223K0**	0.8 ± 0.1	4000	16000
47 nF	B37950K5473K0**	0.8 ± 0.1	4000	16000
100 nF	B37950K5104K0**	0.8 ± 0.1	4000	16000
220 nF	B37950K5224K0**	1.2 ± 0.1	3000	12000
470 nF	B37950K5474K0**	1.2 ± 0.1	3000	12000
Case size 1210, 100 VDC				
10 nF	B37950K1103K0**	0.8 ± 0.1	4000	16000
15 nF	B37950K1153K0**	0.8 ± 0.1	4000	16000
22 nF	B37950K1223K0**	0.8 ± 0.1	4000	16000
33 nF	B37950K1333K0**	0.8 ± 0.1	4000	16000
47 nF	B37950K1473K0**	0.8 ± 0.1	4000	16000
68 nF	B37950K1683K0**	0.8 ± 0.1	4000	16000
100 nF	B37950K1104K0**	0.8 ± 0.1	4000	16000
150 nF	B37950K1154K0**	1.2 ± 0.1	3000	12000
Case size 1210, 200 VDC				
3.9 nF	B37950K2392K0**	0.8 ± 0.1	4000	16000
4.7 nF	B37950K2472K0**	0.8 ± 0.1	4000	16000
6.8 nF	B37950K2682K0**	0.8 ± 0.1	4000	16000
10 nF	B37950K2103K0**	0.8 ± 0.1	4000	16000
15 nF	B37950K2153K0**	0.8 ± 0.1	4000	16000
22 nF	B37950K2223K0**	1.2 ± 0.1	3000	12000
33 nF	B37950K2333K0**	1.2 ± 0.1	3000	12000
47 nF	B37950K2473K0**	1.6 ± 0.1	2000	8000
Case size 1210, 500 VDC				
1.0 nF	B37950K3102K0**	0.8 ± 0.1	4000	16000
1.5 nF	B37950K3152K0**	0.8 ± 0.1	4000	16000
2.2 nF	B37950K3222K0**	0.8 ± 0.1	4000	16000
3.3 nF	B37950K3332K0**	0.8 ± 0.1	4000	16000
4.7 nF	B37950K3472K0**	1.2 ± 0.1	3000	12000
6.8 nF	B37950K3682K0**	1.2 ± 0.1	3000	12000
10 nF	B37950K3103K0**	1.6 ± 0.1	2000	8000

1) Other capacitance values on request.
2) The table contains the ordering codes for the standard capacitance tolerance. For other available capacitance tolerances see page 3.

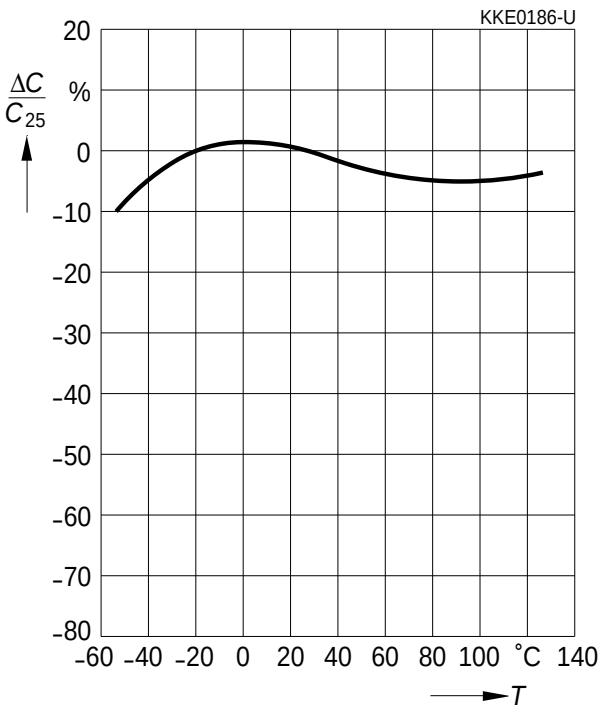
Ordering codes and packing for X7R, 50 VDC, silver-palladium terminations

C_R[1)]	Ordering code[2)]	Chip thickness mm	Blister tape, ∅ 180-mm reel ** ≙ 62 pcs./reel	Blister tape, ∅ 330-mm reel ** ≙ 72 pcs./reel
Case size 1812, 50 VDC				
100 nF	B37953J5104K0**	1.2 ± 0.1	1500	5000
220 nF	B37953J5224K0**	1.2 ± 0.1	1500	5000
470 nF	B37953J5474K0**	1.2 ± 0.1	1500	5000
Case size 2220, 50 VDC				
470 nF	B37956J5474K0**	1.2 ± 0.1	1500	5000
1.0 µF	B37956J5105K0**	1.2 ± 0.1	1500	5000

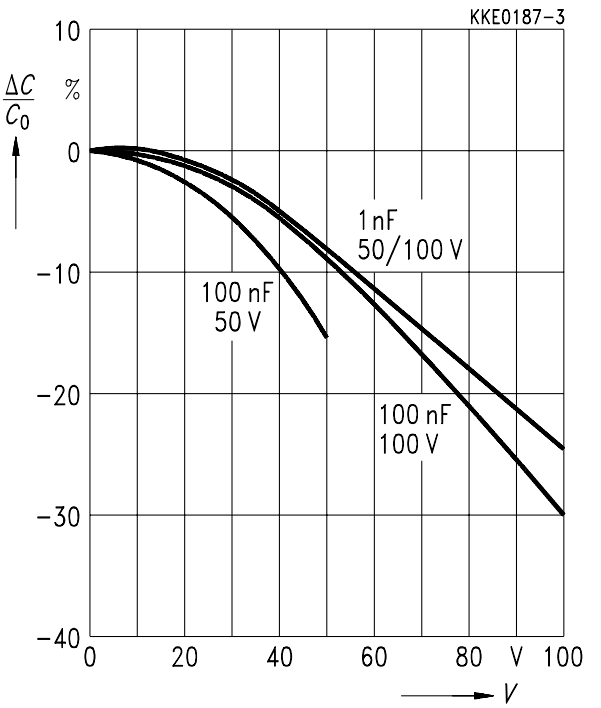
1) Other capacitance values on request.
2) The table contains the ordering codes for the standard capacitance tolerance. For other available capacitance tolerances see page 3.

Typical characteristics

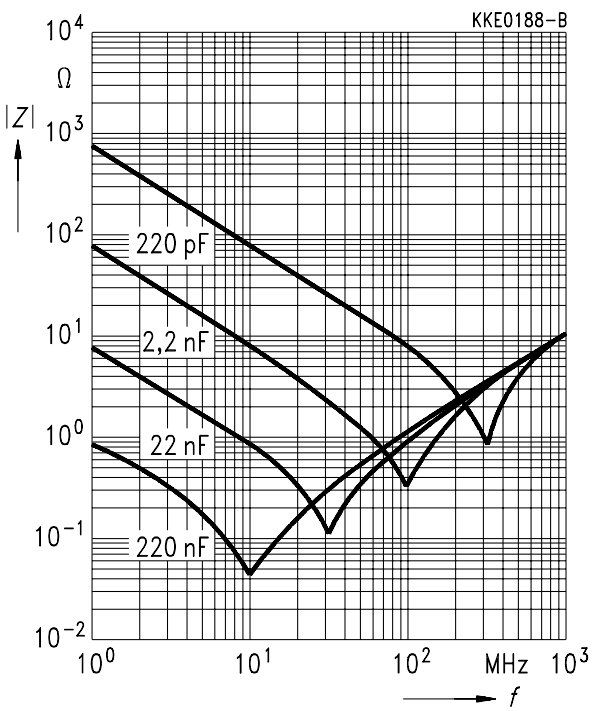
Capacitance change $\Delta C/C_{25}$ versus temperature T



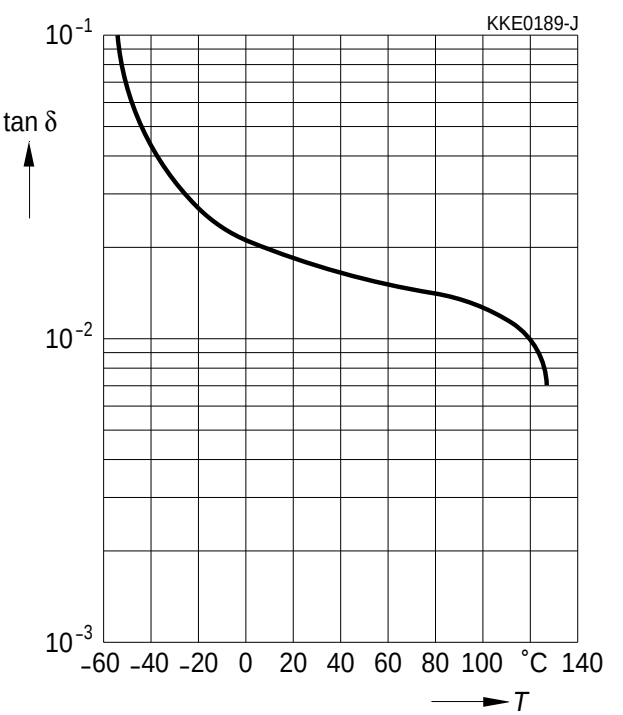
Capacitance change $\Delta C/C_0$ versus superimposed DC voltage V



Impedance $|Z|$ versus frequency f

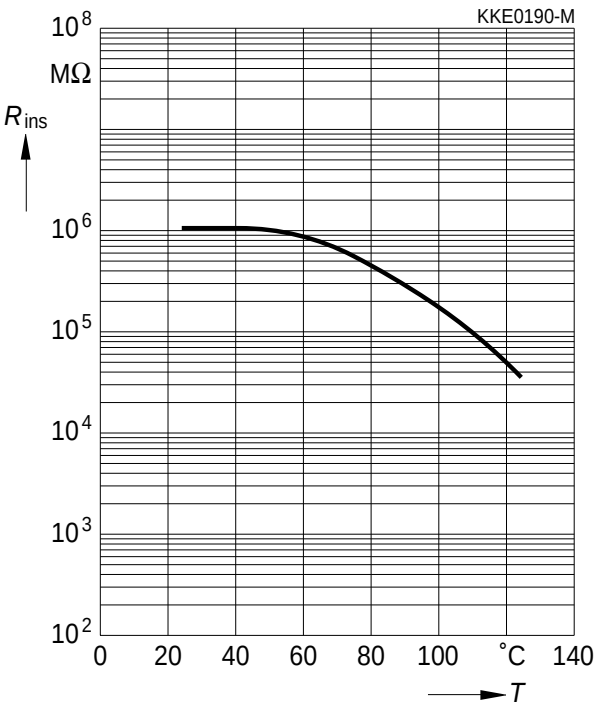


Dissipation factor tan δ versus temperature T

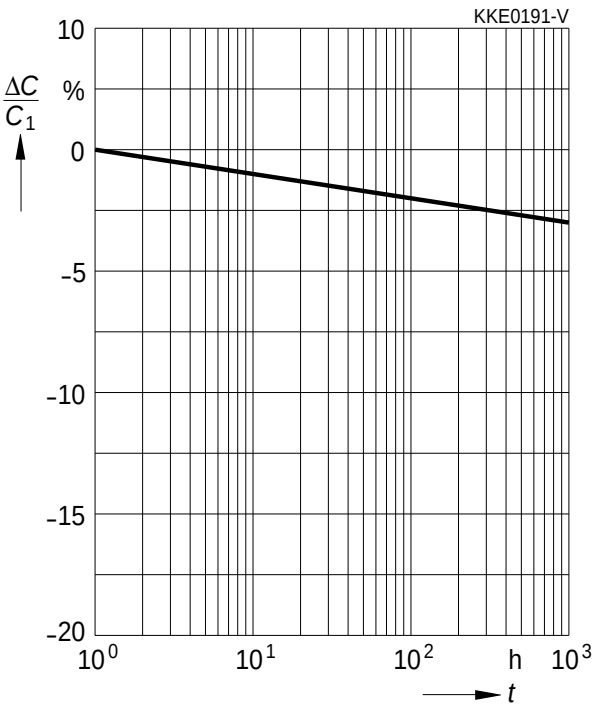


Typical characteristics

Insulation resistance R_{ins} versus temperature T



Capacitance change $\Delta C/C_1$ versus time t



Further information

Please see General Technical Information at www.epcos.com/ceramic_capacitors or the data book "Multilayer Ceramic Capacitors" for further information on:

- Soldering directions
- Taping and packing
- Surface mounting instructions
- Effects of mechanical stress

Cautions and warnings

- Derating: A "state of the art" application design is essential to achieve failures rates at ppb level. Do not use designs based on 100% of specified rated values.
- AC applications may damage MLSC on a much lower level than DC voltage due to power dissipation losses.
- Mechanical stress - Please note EPCOS "General Technical Information", "Surface mounting instructions" and information about the effect of mechanical stress.
- ESD - EPCOS recommends the use of varistors.
- Further processing - care must be taken using moulding processes.
- Combined stresses - the total stress (e.g. DC voltage, AC ripple, pulses and temperature) has to be taken into account to estimate reliability of MLSC.

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The following applies to all products named in this publication:

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