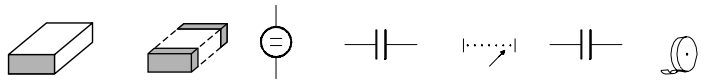
Multilayer ceramic capacitors

Chip capacitors, C0G

Date: October 2006

Ordering code system



B37940 K 5 010 C 5 60

Packaging

60 ≙ cardboard tape, 180-mm reel
62 ≙ blister tape, 180-mm reel
70 ≙ cardboard tape, 330-mm reel
72 ≙ blister tape, 330-mm reel
01 ≙ bulk case

Decimal place for cap. values <10 pF, otherwise 0

Capacitance tolerance

C_R <10 pF:
B ≙ ±0.1 pF
C ≙ ±0.25 pF (standard for capacitance values ≤4.7 pF)
D ≙ ±0.5 pF (standard for capacitance values ≤8.2 pF)

C_R ≥10 pF:
F ≙ ± 1%
G ≙ ± 2%
J ≙ ± 5% (standard)
K ≙ ±10%

Capacitance, coded (example)
010 ≙ 1 · 10^0 pF = 1 pF
100 ≙ 10 · 10^0 pF = 10 pF
221 ≙ 22 · 10^1 pF = 220 pF

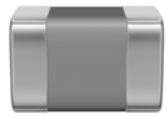
Rated voltage

Rated voltage [VDC]	50	100	200
Code	5	1	2

Termination
Standard: K ≙ nickel barrier for all case sizes
On request: J ≙ silver-palladium for conductive adhesion: all case sizes

Type and size	
Chip size (**inch** / mm)	Temperature characteristic C0G
0402 / 1005	B37920
0603 / 1608	B37930
0805 / 2012	B37940
1206 / 3216	B37871
1210 / 3225	B37949

SMD



Features

- Good thermal stability
- High insulation resistance
- Low dissipation factor
- Low inductance
- To AEC-Q200

Applications

- Resonant circuits
- Filter circuits
- Timing elements
- Coupling and filtering, particularly in RF circuits

Termination

- For soldering: Nickel barrier terminations (Ni)
- For conductive adhesion: Silver-palladium terminations (AgPd) 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 size 1210), 180-mm and 330-mm reel available
- Bulk case for case sizes 0402, 0603 (50 V) and 0805 (50 V) on request

Electrical data

Temperature characteristic		C0G	
Climatic category (IEC 60068-1)		55/125/56	
Standard		EIA	
Dielectric		Class 1	
Rated voltage	V_R	50, 100, 200	VDC
Test voltage	V_{test}	$2.5 \cdot V_R$/5 s	VDC
Capacitance range / E series	C_R	1 pF … 10 nF (E6/E12)	
Temperature coefficient		$0 \pm 30 \cdot 10^{-6}$/K	
Dissipation factor (limit value)	tan δ	$<1.0 \cdot 10^{-3}$	
Insulation resistance[1)] at + 25 °C	R_{ins}	$>10^5$	MΩ
Insulation resistance[1)] at +125 °C	R_{ins}	$>10^4$	MΩ
Time constant[1)] at + 25 °C	τ	>1000	s
Time constant[1)] at +125 °C	τ	>100	s
Operating temperature range	T_{op}	–55 … +125	°C
Ageing		none	

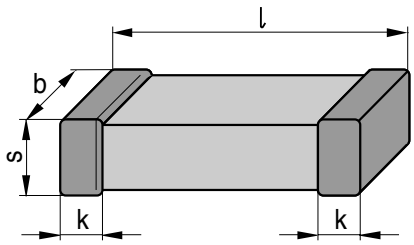
1) For C_R >10 nF the time constant $\tau = C \cdot R_{ins}$ is given.

Capacitance tolerances

	$C_R \leq 4.7$ pF			5.6 pF $\leq C_R \leq$ 8.2 pF		
Code letter	B	C (standard)	D	B	C	D (standard)
Tolerance	±0.1 pF (on request)	±0.25 pF	±0.5 pF	±0.1 pF (on request)	±0.25 pF (on request)	±0.5 pF

	$C_R \geq 10$ pF			
Code letter	F	G	J (standard)	K
Tolerance	±1% (on request for 50 V and 100 V; not available for 200 V)	±2% (on request for 50 V and 100 V; not available for 200 V)	±5%	±10%

Dimensional drawing



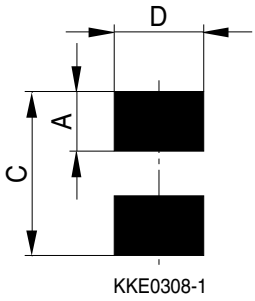
KKE0329-N

Dimensions (mm)

Case size (inch) (mm)	0402 1005	0603 1608	0805 2012	1206 3216	1210 3225
l	1.0 ±0.10	1.6 ±0.15	2.00 ±0.20	3.20 ±0.20	3.20 ±0.30
b	0.5 ±0.05	0.8 ±0.10	1.25 ±0.15	1.60 ±0.15	2.50 ±0.30
s	0.5 ±0.05	0.8 ±0.10	1.30 max.	1.30 max.	1.70 max.
k	0.1 –0.40	0.1 –0.40	0.13 –0.75	0.25 –0.75	0.25 –0.75

Tolerances to CECC 32101-801

Recommended solder pad



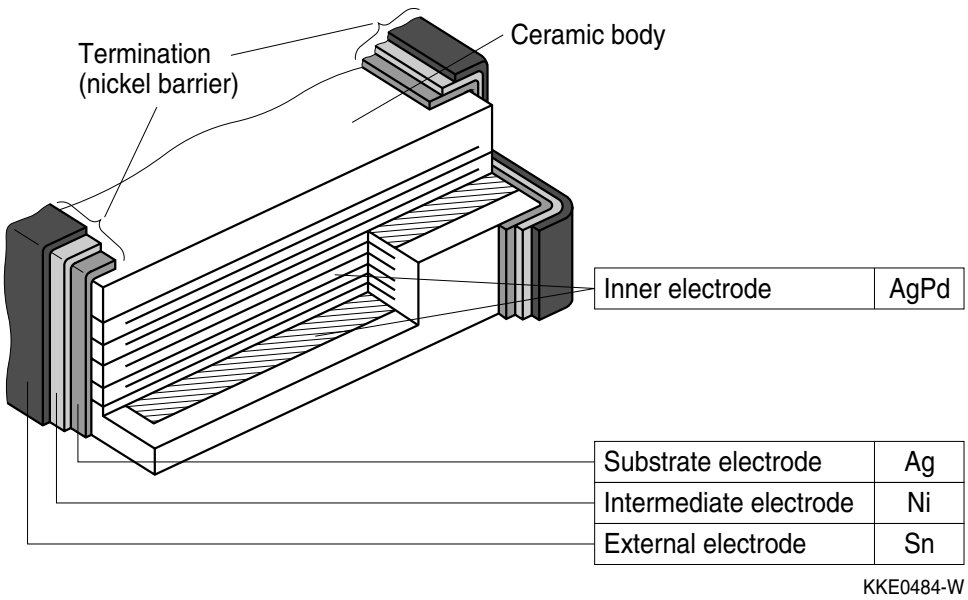
Recommended dimensions (mm) for reflow soldering

Case size	(inch/mm)	Type	A	C	D
	0402/1005	single chip	0.35 … 0.45	1.0 … 1.40	0.4 … 0.6
	0603/1608	single chip	0.60 … 0.70	1.8 … 2.20	0.6 … 0.8
	0805/2012	single chip	0.60 … 0.70	2.2 … 2.60	0.8 … 1.1
	1206/3216	single chip	0.80 … 0.90	3.8 … 4.32	1.0 … 1.4
	1210/3225	single chip	1.00 … 1.20	4.0 … 4.80	1.8 … 2.3

Recommended dimensions (mm) for wave soldering

Case size	(inch/mm)	Type	A	C	D
	0603/1608	single chip	0.8 … 0.9	2.2 … 2.8	0.6 … 0.8
	0805/2012	single chip	0.9 … 1.0	2.8 … 3.2	0.8 … 1.1
	1206/3216	single chip	1.0 … 1.1	4.2 … 4.8	1.0 … 1.4

Termination



Product range chip capacitors, C0G

Size[1)] inch / mm	0402 / 1005		0603 / 1608		0805 / 2012			1206 / 3216			1210 / 3225		
Type	B37920		B37930		B37940			B37871			B37949		
V_R (VDC) / C_R	50		50	100	50	100	200	50	100		50	100	
1.0 pF			■	■	■	■		■	■				
1.2 pF			■		■	■		■					
1.5 pF			■	■	■	■		■	■				
1.8 pF			■		■	■		■					
2.2 pF			■	■	■	■	■	■	■				
2.7 pF			■		■	■		■					
3.3 pF	■		■	■	■	■	■	■	■				
3.9 pF	■		■		■	■		■					
4.7 pF	■		■	■	■	■	■	■	■				
5.6 pF	■		■		■	■		■					
6.8 pF	■		■	■	■	■	■	■	■				
8.2 pF	■		■		■	■		■					
10 pF	■		■	■	■	■	■	■	■				
12 pF	■		■		■	■		■					
15 pF	■		■	■	■	■	■	■	■				
18 pF	■		■		■	■		■					
22 pF	■		■	■	■	■	■	■	■				
27 pF	■		■		■	■		■					
33 pF	■		■	■	■	■	■	■	■				
39 pF	■		■		■	■		■					
47 pF	■		■	■	■	■	■	■	■				
56 pF	■		■		■	■		■					
68 pF	■		■	■	■	■	■	■	■				
82 pF	■		■		■	■		■					

1) l × b (inch) / l × b (mm)

Product range chip capacitors, C0G

Size[1)] inch / mm	0402 / 1005		0603 / 1608		0805 / 2012			1206 / 3216			1210 / 3225		
Type	B37920		B37930		B37940			B37871			B37949		
V_R (VDC) / C_R	50		50	100	50	100	200	50	100		50	100	
100 pF	■		■	■	■	■	■	■	■				
120 pF			■		■	■		■					
150 pF			■	■	■	■	■	■	■				
180 pF			■		■	■		■					
220 pF			■	■	■	■	■	■	■				
270 pF			■		■	■		■					
330 pF			■		■	■	■	■	■				
390 pF			■		■	■		■					
470 pF			■		■	■		■	■				
560 pF					■	■		■					
680 pF					■	■		■	■				
820 pF					■	■		■					
1.0 nF					■	■		■	■		■	■	
1.2 nF					■			■					
1.5 nF					■			■	■		■	■	
1.8 nF					■			■					
2.2 nF					■			■	■		■	■	
2.7 nF								■					
3.3 nF								■			■	■	
3.9 nF								■					
4.7 nF								■			■	■	
5.6 nF								■					
6.8 nF											■	■	
8.2 nF													
10 nF											■		

1) l × b (inch) / l × b (mm)

Ordering codes and packing for C0G, 50 VDC, nickel barrier terminations

Case size 0402, 50 VDC

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
3.3 pF	B37920K5030C3**	0.5 ±0.05	10000	50000
3.9 pF	B37920K5030C9**	0.5 ±0.05	10000	50000
4.7 pF	B37920K5040C7**	0.5 ±0.05	10000	50000
5.6 pF	B37920K5050D6**	0.5 ±0.05	10000	50000
6.8 pF	B37920K5060D8**	0.5 ±0.05	10000	50000
8.2 pF	B37920K5080D2**	0.5 ±0.05	10000	50000
10 pF	B37920K5100J0**	0.5 ±0.05	10000	50000
12 pF	B37920K5120J0**	0.5 ±0.05	10000	50000
15 pF	B37920K5150J0**	0.5 ±0.05	10000	50000
18 pF	B37920K5180J0**	0.5 ±0.05	10000	50000
22 pF	B37920K5220J0**	0.5 ±0.05	10000	50000
27 pF	B37920K5270J0**	0.5 ±0.05	10000	50000
33 pF	B37920K5330J0**	0.5 ±0.05	10000	50000
39 pF	B37920K5390J0**	0.5 ±0.05	10000	50000
47 pF	B37920K5470J0**	0.5 ±0.05	10000	50000
56 pF	B37920K5560J0**	0.5 ±0.05	10000	50000
68 pF	B37920K5680J0**	0.5 ±0.05	10000	50000
82 pF	B37920K5820J0**	0.5 ±0.05	10000	50000
100 pF	B37920K5101J0**	0.5 ±0.05	10000	50000

1) Capacitance values < 3.3 pF and > 100 pF on request.
2) The table contains the ordering codes for the standard capacitance tolerance. For other available capacitance tolerances see page 4.

Ordering codes and packing for C0G, 50 VDC, nickel barrier terminations

Case size 0603, 50 VDC

C_R	Ordering code[1)]	Chip thickness	Cardboard tape, ∅ 180-mm reel	Cardboard tape, ∅ 330-mm reel	Bulk case
			** ≙ 60	** ≙ 70	** ≙ 01
		mm	pcs/reel	pcs/reel	pcs
1.0 pF	B37930K5010C0**	0.8 ±0.1	4000	16000	15000
1.2 pF	B37930K5010C2**	0.8 ±0.1	4000	16000	15000
1.5 pF	B37930K5010C5**	0.8 ±0.1	4000	16000	15000
1.8 pF	B37930K5010C8**	0.8 ±0.1	4000	16000	15000
2.2 pF	B37930K5020C2**	0.8 ±0.1	4000	16000	15000
2.7 pF	B37930K5020C7**	0.8 ±0.1	4000	16000	15000
3.3 pF	B37930K5030C3**	0.8 ±0.1	4000	16000	15000
3.9 pF	B37930K5030C9**	0.8 ±0.1	4000	16000	15000
4.7 pF	B37930K5040C7**	0.8 ±0.1	4000	16000	15000
5.6 pF	B37930K5050D6**	0.8 ±0.1	4000	16000	15000
6.8 pF	B37930K5060D8**	0.8 ±0.1	4000	16000	15000
8.2 pF	B37930K5080D2**	0.8 ±0.1	4000	16000	15000
10 pF	B37930K5100J0**	0.8 ±0.1	4000	16000	15000
12 pF	B37930K5120J0**	0.8 ±0.1	4000	16000	15000
15 pF	B37930K5150J0**	0.8 ±0.1	4000	16000	15000
18 pF	B37930K5180J0**	0.8 ±0.1	4000	16000	15000
22 pF	B37930K5220J0**	0.8 ±0.1	4000	16000	15000
27 pF	B37930K5270J0**	0.8 ±0.1	4000	16000	15000
33 pF	B37930K5330J0**	0.8 ±0.1	4000	16000	15000
39 pF	B37930K5390J0**	0.8 ±0.1	4000	16000	15000
47 pF	B37930K5470J0**	0.8 ±0.1	4000	16000	15000
56 pF	B37930K5560J0**	0.8 ±0.1	4000	16000	15000
68 pF	B37930K5680J0**	0.8 ±0.1	4000	16000	15000
82 pF	B37930K5820J0**	0.8 ±0.1	4000	16000	15000
100 pF	B37930K5101J0**	0.8 ±0.1	4000	16000	15000
120 pF	B37930K5121J0**	0.8 ±0.1	4000	16000	15000
150 pF	B37930K5151J0**	0.8 ±0.1	4000	16000	15000
180 pF	B37930K5181J0**	0.8 ±0.1	4000	16000	15000
220 pF	B37930K5221J0**	0.8 ±0.1	4000	16000	15000
270 pF	B37930K5271J0**	0.8 ±0.1	4000	16000	15000
330 pF	B37930K5331J0**	0.8 ±0.1	4000	16000	15000
390 pF	B37930K5391J0**	0.8 ±0.1	4000	16000	15000
470 pF	B37930K5471J0**	0.8 ±0.1	4000	16000	15000

1) The table contains the ordering codes for the standard capacitance tolerance.
For other available capacitance tolerances see page 4.

Ordering codes and packing for C0G, 100 VDC, nickel barrier terminations

Case size 0603, 100 VDC

C_R	Ordering code[1)]	Chip thickness	Cardboard tape, ∅ 180-mm reel	Cardboard tape, ∅ 330-mm reel	Bulk case
			** ≙ 60	** ≙ 70	** ≙ 01
		mm	pcs/reel	pcs/reel	pcs
1.0 pF	B37930K1010C0**	0.8 ±0.1	4000	16000	15000
1.5 pF	B37930K1010C5**	0.8 ±0.1	4000	16000	15000
2.2 pF	B37930K1020C2**	0.8 ±0.1	4000	16000	15000
3.3 pF	B37930K1030C3**	0.8 ±0.1	4000	16000	15000
4.7 pF	B37930K1040C7**	0.8 ±0.1	4000	16000	15000
6.8 pF	B37930K1060D8**	0.8 ±0.1	4000	16000	15000
10 pF	B37930K1100J0**	0.8 ±0.1	4000	16000	15000
15 pF	B37930K1150J0**	0.8 ±0.1	4000	16000	15000
22 pF	B37930K1220J0**	0.8 ±0.1	4000	16000	15000
33 pF	B37930K1330J0**	0.8 ±0.1	4000	16000	15000
47 pF	B37930K1470J0**	0.8 ±0.1	4000	16000	15000
68 pF	B37930K1680J0**	0.8 ±0.1	4000	16000	15000
100 pF	B37930K1101J0**	0.8 ±0.1	4000	16000	15000
150 pF	B37930K1151J0**	0.8 ±0.1	4000	16000	15000
220 pF	B37930K1221J0**	0.8 ±0.1	4000	16000	15000

1) The table contains the ordering codes for the standard capacitance tolerance.
For other available capacitance tolerances see page 4.

Ordering codes and packing for C0G, 50 VDC, nickel barrier terminations

Case size 0805, 50 VDC

C_R	Ordering code[1)]	Chip thickness	Cardboard tape, ∅ 180-mm reel	Cardboard tape, ∅ 330-mm reel	Bulk case
			** ≙ 60	** ≙ 70	** ≙ 01
		mm	pcs/reel	pcs/reel	pcs
1.0 pF	B37940K5010C0**	0.6 ±0.1	5000	20000	10000
1.2 pF	B37940K5010C2**	0.6 ±0.1	5000	20000	10000
1.5 pF	B37940K5010C5**	0.6 ±0.1	5000	20000	10000
1.8 pF	B37940K5010C8**	0.6 ±0.1	5000	20000	10000
2.2 pF	B37940K5020C2**	0.6 ±0.1	5000	20000	10000
2.7 pF	B37940K5020C7**	0.6 ±0.1	5000	20000	10000
3.3 pF	B37940K5030C3**	0.6 ±0.1	5000	20000	10000
3.9 pF	B37940K5030C9**	0.6 ±0.1	5000	20000	10000
4.7 pF	B37940K5040C7**	0.6 ±0.1	5000	20000	10000
5.6 pF	B37940K5050D6**	0.6 ±0.1	5000	20000	10000
6.8 pF	B37940K5060D8**	0.6 ±0.1	5000	20000	10000
8.2 pF	B37940K5080D2**	0.6 ±0.1	5000	20000	10000
10 pF	B37940K5100J0**	0.6 ±0.1	5000	20000	10000
12 pF	B37940K5120J0**	0.6 ±0.1	5000	20000	10000
15 pF	B37940K5150J0**	0.6 ±0.1	5000	20000	10000
18 pF	B37940K5180J0**	0.6 ±0.1	5000	20000	10000
22 pF	B37940K5220J0**	0.6 ±0.1	5000	20000	10000
27 pF	B37940K5270J0**	0.6 ±0.1	5000	20000	10000
33 pF	B37940K5330J0**	0.6 ±0.1	5000	20000	10000
39 pF	B37940K5390J0**	0.6 ±0.1	5000	20000	10000
47 pF	B37940K5470J0**	0.6 ±0.1	5000	20000	10000
56 pF	B37940K5560J0**	0.6 ±0.1	5000	20000	10000
68 pF	B37940K5680J0**	0.6 ±0.1	5000	20000	10000
82 pF	B37940K5820J0**	0.6 ±0.1	5000	20000	10000
100 pF	B37940K5101J0**	0.6 ±0.1	5000	20000	10000
120 pF	B37940K5121J0**	0.6 ±0.1	5000	20000	10000
150 pF	B37940K5151J0**	0.6 ±0.1	5000	20000	10000
180 pF	B37940K5181J0**	0.6 ±0.1	5000	20000	10000
220 pF	B37940K5221J0**	0.6 ±0.1	5000	20000	10000
270 pF	B37940K5271J0**	0.6 ±0.1	5000	20000	10000
330 pF	B37940K5331J0**	0.6 ±0.1	5000	20000	10000
390 pF	B37940K5391J0**	0.6 ±0.1	5000	20000	10000
470 pF	B37940K5471J0**	0.6 ±0.1	5000	20000	10000

1) The table contains the ordering codes for the standard capacitance tolerance.
For other available capacitance tolerances see page 4.

Ordering codes and packing for C0G, 50 VDC, nickel barrier terminations

Case size 0805, 50 VDC					
		Chip thickness	Cardboard tape, ∅ 180-mm reel	Cardboard tape, ∅ 330-mm reel	Bulk case
			** ≙ 60	** ≙ 70	** ≙ 01
C_R	Ordering code[1)]	mm	pcs/reel	pcs/reel	pcs
560 pF	B37940K5561J0**	0.6 ±0.1	5000	20000	10000
680 pF	B37940K5681J0**	0.6 ±0.1	5000	20000	10000
820 pF	B37940K5821J0**	0.6 ±0.1	5000	20000	10000
1.0 nF	B37940K5102J0**	0.6 ±0.1	5000	20000	10000
1.2 nF	B37940K5122J0**	0.8 ±0.1	4000	16000	–
1.5 nF	B37940K5152J0**	0.8 ±0.1	4000	16000	–
1.8 nF	B37940K5182J0**	1.2 ±0.1	3000[2)]	12000[3)]	–
2.2 nF	B37940K5222J0**	1.2 ±0.1	3000[2)]	12000[3)]	–

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

Ordering codes and packing for C0G, 100 VDC, nickel barrier terminations

Case size 0805, 100 VDC

C_R	Ordering code[1)]	Chip thickness mm	Cardboard tape, ∅ 180-mm reel ** ≙ 60 pcs/reel	Cardboard tape, ∅ 330-mm reel ** ≙ 70 pcs/reel
1.0 pF	B37940K1010C0**	0.6 ±0.1	5000	20000
1.2 pF	B37940K1010C2**	0.6 ±0.1	5000	20000
1.5 pF	B37940K1010C5**	0.6 ±0.1	5000	20000
1.8 pF	B37940K1010C8**	0.6 ±0.1	5000	20000
2.2 pF	B37940K1020C2**	0.6 ±0.1	5000	20000
2.7 pF	B37940K1020C7**	0.6 ±0.1	5000	20000
3.3 pF	B37940K1030C3**	0.6 ±0.1	5000	20000
3.9 pF	B37940K1030C9**	0.6 ±0.1	5000	20000
4.7 pF	B37940K1040C7**	0.6 ±0.1	5000	20000
5.6 pF	B37940K1050D6**	0.6 ±0.1	5000	20000
6.8 pF	B37940K1060D8**	0.6 ±0.1	5000	20000
8.2 pF	B37940K1080D2**	0.6 ±0.1	5000	20000
10 pF	B37940K1100J0**	0.6 ±0.1	5000	20000
12 pF	B37940K1120J0**	0.6 ±0.1	5000	20000
15 pF	B37940K1150J0**	0.6 ±0.1	5000	20000
18 pF	B37940K1180J0**	0.6 ±0.1	5000	20000
22 pF	B37940K1220J0**	0.6 ±0.1	5000	20000
27 pF	B37940K1270J0**	0.6 ±0.1	5000	20000
33 pF	B37940K1330J0**	0.6 ±0.1	5000	20000
39 pF	B37940K1390J0**	0.6 ±0.1	5000	20000
47 pF	B37940K1470J0**	0.6 ±0.1	5000	20000
56 pF	B37940K1560J0**	0.6 ±0.1	5000	20000
68 pF	B37940K1680J0**	0.6 ±0.1	5000	20000
82 pF	B37940K1820J0**	0.6 ±0.1	5000	20000
100 pF	B37940K1101J0**	0.6 ±0.1	5000	20000
120 pF	B37940K1121J0**	0.6 ±0.1	5000	20000
150 pF	B37940K1151J0**	0.6 ±0.1	5000	20000
180 pF	B37940K1181J0**	0.6 ±0.1	5000	20000
220 pF	B37940K1221J0**	0.6 ±0.1	5000	20000
270 pF	B37940K1271J0**	0.6 ±0.1	5000	20000
330 pF	B37940K1331J0**	0.6 ±0.1	5000	20000
390 pF	B37940K1391J0**	0.6 ±0.1	5000	20000
470 pF	B37940K1471J0**	0.6 ±0.1	5000	20000

1) The table contains the ordering codes for the standard capacitance tolerance.
For other available capacitance tolerances see page 4.

Ordering codes and packing for C0G, 100 VDC, nickel barrier terminations

Case size 0805, 100 VDC

C_R	Ordering code[1]	Chip thickness mm	Cardboard tape, ∅ 180-mm reel ** ≙ 60 pcs/reel	Cardboard tape, ∅ 330-mm reel ** ≙ 70 pcs/reel
560 pF	B37940K1561J0**	0.8 ±0.1	4000	16000
680 pF	B37940K1681J0**	0.8 ±0.1	4000	16000
820 pF	B37940K1821J0**	1.2 ±0.1	3000[3]	12000[4]
1.0 nF	B37940K1102J0**	1.2 ±0.1	3000[3]	12000[4]

Ordering codes and packing for C0G, 200 VDC, nickel barrier terminations

Case size 0805, 200 VDC

C_R[2]	Ordering code[1]	Chip thickness mm	Cardboard tape, ∅ 180-mm reel ** ≙ 60 pcs/reel	Cardboard tape, ∅ 330-mm reel ** ≙ 70 pcs/reel
2.2 pF	B37940K2020C2**	0.6 ±0.1	5000	20000
3.3 pF	B37940K2030C3**	0.6 ±0.1	5000	20000
4.7 pF	B37940K2040C7**	0.6 ±0.1	5000	20000
6.8 pF	B37940K2060D8**	0.6 ±0.1	5000	20000
10 pF	B37940K2100J0**	0.6 ±0.1	5000	20000
15 pF	B37940K2150J0**	0.6 ±0.1	5000	20000
22 pF	B37940K2220J0**	0.6 ±0.1	5000	20000
33 pF	B37940K2330J0**	0.6 ±0.1	5000	20000
47 pF	B37940K2470J0**	0.6 ±0.1	5000	20000
68 pF	B37940K2680J0**	0.6 ±0.1	5000	20000
100 pF	B37940K2101J0**	0.6 ±0.1	5000	20000
150 pF	B37940K2151J0**	0.8 ±0.1	4000	16000
220 pF	B37940K2221J0**	0.8 ±0.1	4000	16000
330 pF	B37940K2331J0**	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 4.
3) Blister tape, 180-mm reel, ordering code ** ≙ 62
4) Blister tape, 330-mm reel, ordering code ** ≙ 72

Ordering codes and packing for C0G, 50 VDC, nickel barrier terminations

Case size 1206, 50 VDC

C_R	Ordering code[1)]	Chip thickness mm	Cardboard tape, ∅ 180-mm reel ** ≙ 60 pcs/reel	Cardboard tape, ∅ 330-mm reel ** ≙ 70 pcs/reel
1.0 pF	B37871K5010C0**	0.8 ±0.1	4000	16000
1.2 pF	B37871K5010C2**	0.8 ±0.1	4000	16000
1.5 pF	B37871K5010C5**	0.8 ±0.1	4000	16000
1.8 pF	B37871K5010C8**	0.8 ±0.1	4000	16000
2.2 pF	B37871K5020C2**	0.8 ±0.1	4000	16000
2.7 pF	B37871K5020C7**	0.8 ±0.1	4000	16000
3.3 pF	B37871K5030C3**	0.8 ±0.1	4000	16000
3.9 pF	B37871K5030C9**	0.8 ±0.1	4000	16000
4.7 pF	B37871K5040C7**	0.8 ±0.1	4000	16000
5.6 pF	B37871K5050D6**	0.8 ±0.1	4000	16000
6.8 pF	B37871K5060D8**	0.8 ±0.1	4000	16000
8.2 pF	B37871K5080D2**	0.8 ±0.1	4000	16000
10 pF	B37871K5100J0**	0.8 ±0.1	4000	16000
12 pF	B37871K5120J0**	0.8 ±0.1	4000	16000
15 pF	B37871K5150J0**	0.8 ±0.1	4000	16000
18 pF	B37871K5180J0**	0.8 ±0.1	4000	16000
22 pF	B37871K5220J0**	0.8 ±0.1	4000	16000
27 pF	B37871K5270J0**	0.8 ±0.1	4000	16000
33 pF	B37871K5330J0**	0.8 ±0.1	4000	16000
39 pF	B37871K5390J0**	0.8 ±0.1	4000	16000
47 pF	B37871K5470J0**	0.8 ±0.1	4000	16000
56 pF	B37871K5560J0**	0.8 ±0.1	4000	16000
68 pF	B37871K5680J0**	0.8 ±0.1	4000	16000
82 pF	B37871K5820J0**	0.8 ±0.1	4000	16000
100 pF	B37871K5101J0**	0.8 ±0.1	4000	16000
120 pF	B37871K5121J0**	0.8 ±0.1	4000	16000
150 pF	B37871K5151J0**	0.8 ±0.1	4000	16000
180 pF	B37871K5181J0**	0.8 ±0.1	4000	16000
220 pF	B37871K5221J0**	0.8 ±0.1	4000	16000
270 pF	B37871K5271J0**	0.8 ±0.1	4000	16000
330 pF	B37871K5331J0**	0.8 ±0.1	4000	16000
390 pF	B37871K5391J0**	0.8 ±0.1	4000	16000
470 pF	B37871K5471J0**	0.8 ±0.1	4000	16000

1) The table contains the ordering codes for the standard capacitance tolerance.
For other available capacitance tolerances see page 4.

Ordering codes and packing for C0G, 50 VDC, nickel barrier terminations

Case size 1206, 50 VDC

C_R	Ordering code[1)]	Chip thickness mm	Cardboard tape, ∅ 180-mm reel ** ≙ 60 pcs/reel	Cardboard tape, ∅ 330-mm reel ** ≙ 70 pcs/reel
560 pF	B37871K5561J0**	0.8 ±0.1	4000	16000
680 pF	B37871K5681J0**	0.8 ±0.1	4000	16000
820 pF	B37871K5821J0**	0.8 ±0.1	4000	16000
1.0 nF	B37871K5102J0**	0.8 ±0.1	4000	16000
1.2 nF	B37871K5122J0**	0.8 ±0.1	4000	16000
1.5 nF	B37871K5152J0**	0.8 ±0.1	4000	16000
1.8 nF	B37871K5182J0**	0.8 ±0.1	4000	16000
2.2 nF	B37871K5222J0**	0.8 ±0.1	4000	16000
2.7 nF	B37871K5272J0**	0.8 ±0.1	4000	16000
3.3 nF	B37871K5332J0**	0.8 ±0.1	4000	16000
3.9 nF	B37871K5392J0**	0.8 ±0.1	4000	16000
4.7 nF	B37871K5472J0**	1.2 ±0.1	3000[2)]	12000[3)]
5.6 nF	B37871K5562J0**	1.2 ±0.1	3000[2)]	12000[3)]

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

Ordering codes and packing for C0G, 100 VDC, nickel barrier terminations

Case size 1206, 100 VDC

C_R	Ordering code[1)]	Chip thickness mm	Cardboard tape, ∅ 180-mm reel ** ≙ 60 pcs/reel	Cardboard tape, ∅ 330-mm reel ** ≙ 70 pcs/reel
1.0 pF	B37871K1010C0**	0.8 ±0.1	4000	16000
1.5 pF	B37871K1010C5**	0.8 ±0.1	4000	16000
2.2 pF	B37871K1020C2**	0.8 ±0.1	4000	16000
3.3 pF	B37871K1030C3**	0.8 ±0.1	4000	16000
4.7 pF	B37871K1040C7**	0.8 ±0.1	4000	16000
6.8 pF	B37871K1060D8**	0.8 ±0.1	4000	16000
10 pF	B37871K1100J0**	0.8 ±0.1	4000	16000
15 pF	B37871K1150J0**	0.8 ±0.1	4000	16000
22 pF	B37871K1220J0**	0.8 ±0.1	4000	16000
33 pF	B37871K1330J0**	0.8 ±0.1	4000	16000
47 pF	B37871K1470J0**	0.8 ±0.1	4000	16000
68 pF	B37871K1680J0**	0.8 ±0.1	4000	16000
100 pF	B37871K1101J0**	0.8 ±0.1	4000	16000
150 pF	B37871K1151J0**	0.8 ±0.1	4000	16000
220 pF	B37871K1221J0**	0.8 ±0.1	4000	16000
330 pF	B37871K1331J0**	0.8 ±0.1	4000	16000
470 pF	B37871K1471J0**	0.8 ±0.1	4000	16000
680 pF	B37871K1681J0**	0.8 ±0.1	4000	16000
1.0 nF	B37871K1102J0**	0.8 ±0.1	4000	16000
1.5 nF	B37871K1152J0**	0.8 ±0.1	4000	16000
2.2 nF	B37871K1222J0**	1.2 ±0.1	3000[2)]	12000[3)]

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

Ordering codes and packing for C0G, 50 VDC, nickel barrier terminations

Case size 1210, 50 VDC

C_R	Ordering code[1)]	Chip thickness mm	Blister tape, ∅ 180-mm reel ** ≙ 62 pcs/reel	Blister tape, ∅ 330-mm reel ** ≙ 72 pcs/reel
1.0 nF	B37949K5102J0**	0.8 ±0.1	4000	16000
1.5 nF	B37949K5152J0**	0.8 ±0.1	4000	16000
2.2 nF	B37949K5222J0**	0.8 ±0.1	4000	16000
3.3 nF	B37949K5332J0**	0.8 ±0.1	4000	16000
4.7 nF	B37949K5472J0**	0.8 ±0.1	4000	16000
6.8 nF	B37949K5682J0**	0.8 ±0.1	4000	16000
10 nF	B37949K5103J0**	1.2 ±0.1	3000	12000

Ordering codes and packing for C0G, 100 VDC, nickel barrier terminations

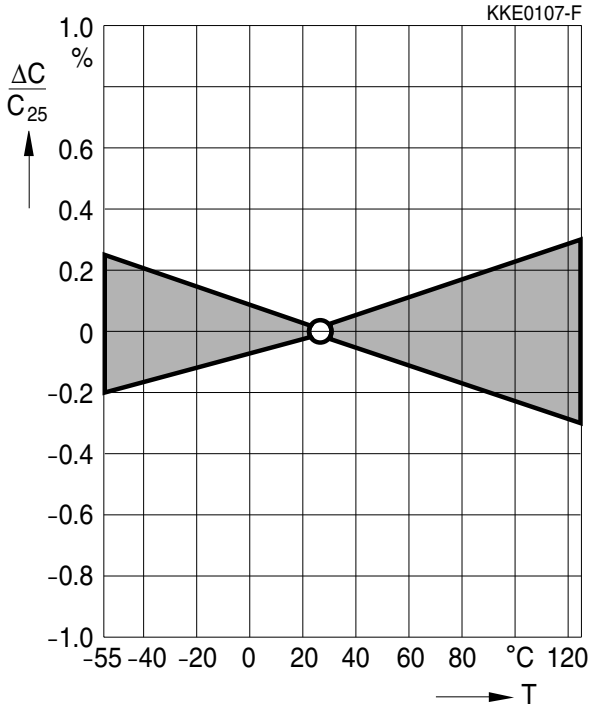
Case size 1210, 100 VDC

C_R	Ordering code[1)]	Chip thickness mm	Blister tape, ∅ 180-mm reel ** ≙ 62 pcs/reel	Blister tape, ∅ 330-mm reel ** ≙ 72 pcs/reel
1.0 nF	B37949K1102J0**	0.8 ±0.1	4000	16000
1.5 nF	B37949K1152J0**	0.8 ±0.1	4000	16000
2.2 nF	B37949K1222J0**	0.8 ±0.1	4000	16000
3.3 nF	B37949K1332J0**	0.8 ±0.1	4000	16000
4.7 nF	B37949K1472J0**	1.2 ±0.1	3000	12000
6.8 nF	B37949K1682J0**	1.2 ±0.1	3000	12000

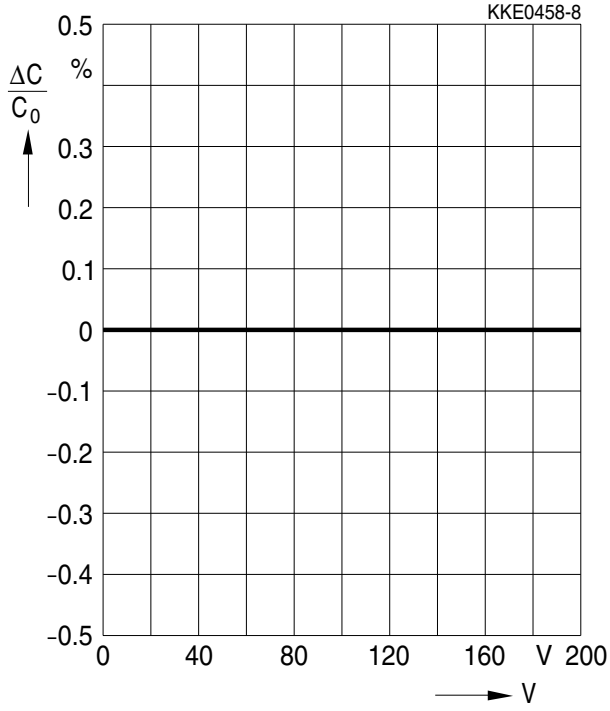
1) The table contains the ordering codes for the standard capacitance tolerance.
For other available capacitance tolerances see page 4.

Typical characteristics[1)]

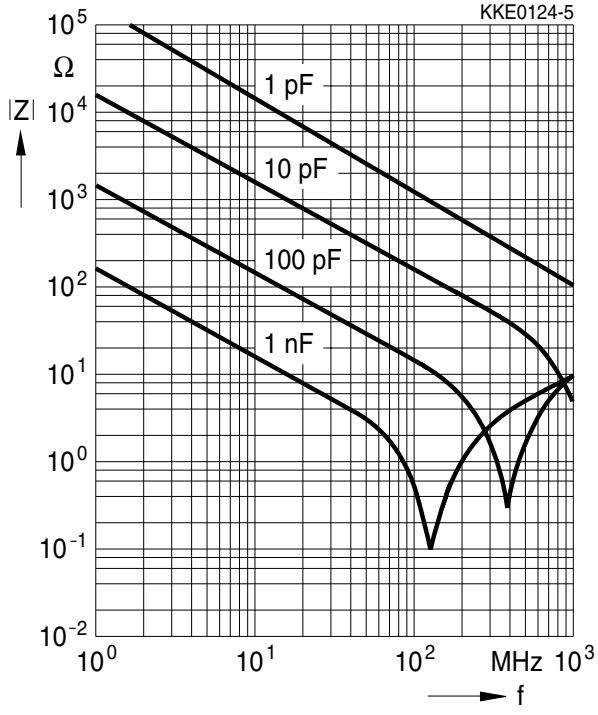
Capacitance change $\Delta C/C_{25}$ versus temperature T (tolerance range ▭)



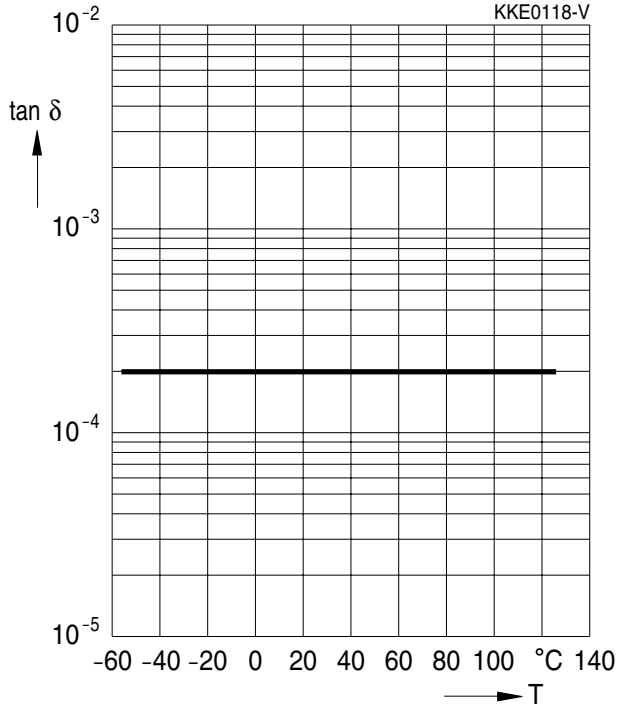
Capacitance change $\Delta C/C_0$ versus superimposed DC voltage V



Impedance |Z| versus frequency f



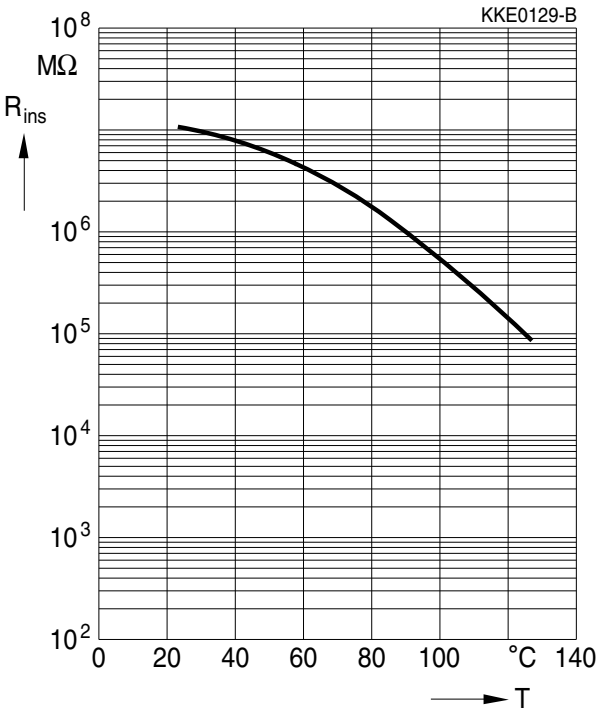
Dissipation factor tan δ versus temperature T



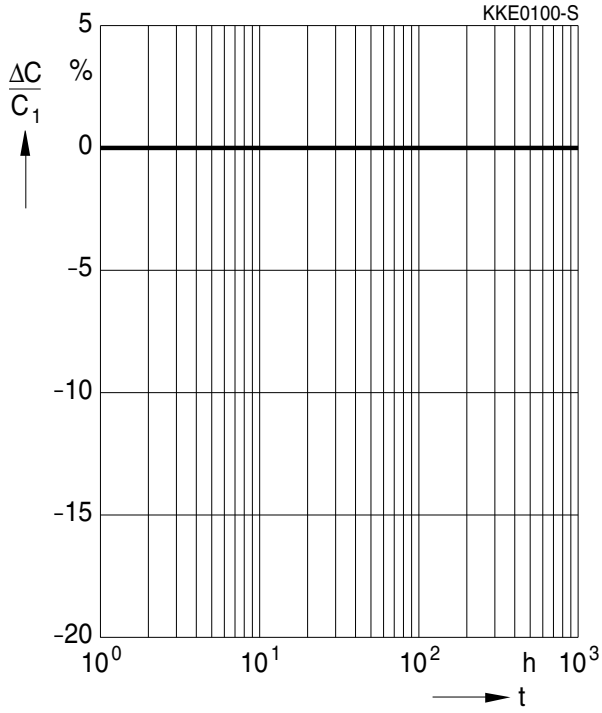
1) For more detailed information on frequency behavior and characteristics see www.epcos.com/mlcc_impedance.

Typical characteristics[1)]

Insulation resistance R_{ins} versus temperature T



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



1) For more detailed information on frequency behavior and characteristics see www.epcos.com/mlcc_impedance.

Notes on the selection of ceramic capacitors

In the selection of ceramic capacitors, the following criteria must be considered:

1. Depending on the application, ceramic capacitors used to meet high quality requirements should at least satisfy the specifications to AEC-Q200. They must meet quality requirements going beyond this level in terms of ruggedness (e.g. mechanical, thermal or electrical) in the case of critical circuit configurations and applications (e.g. in safety-relevant applications such as ABS and airbag equipment or durable industrial goods).
2. At the connection to the battery or power supply (e.g. clamp 15 or 30 in the automobile) and at positions with stranding potential, to reduce the probability of short circuits following a fracture, two ceramic capacitors must be connected in series and/or a ceramic capacitor with integrated series circuit should be used. The MLSC from EPCOS contains such a series circuit in a single component.
3. Ceramic capacitors with the temperature characteristics Z5U and Y5V do not satisfy the requirements to AEC-Q200 and are mechanically and electrically less rugged than C0G or X7R/X8R ceramic capacitors. In applications that must satisfy high quality requirements, therefore, these capacitors should not be used as discrete components (see the chapter “Effects on mechanical, thermal and electrical stress”, point 1.4).
4. For ESD protection, preference should be given to the use of multilayer varistors (MLV) (see the chapter “Effects on mechanical, thermal and electrical stress”, point 1.4).
5. An application-specific derating or continuous operating voltage must be considered in order to cushion (unexpected) additional stresses (see the chapter “Reliability”).

The following should be considered in circuit board design

1. If technically feasible in the application, preference should be given to components having an optimal geometrical design.
2. At least FR4 circuit board material should be used.
3. Geometrically optimal circuit boards should be used, ideally those that cannot be deformed.
4. Ceramic capacitors must always be placed a sufficient minimum distance from the edge of the circuit board. High bending forces may be exerted there when the panels are separated and during further processing of the board (such as when incorporating it into a housing).
5. Ceramic capacitors should always be placed parallel to the possible bending axis of the circuit board.
6. No screw connections should be used to fix the board or to connect several boards. Components should not be placed near screw holes. If screw connections are unavoidable, they must be cushioned (for instance by rubber pads).

The following should be considered in the placement process

1. Ensure correct positioning of the ceramic capacitor on the solder pad.
2. Caution when using casting, injection-molded and molding compounds and cleaning agents, as these may damage the capacitor.
3. Support the circuit board and reduce the placement forces.
4. A board should not be straightened (manually) if it has been distorted by soldering.
5. Separate panels with a peripheral saw, or better with a milling head (no dicing or breaking).
6. Caution in the subsequent placement of heavy or leaded components (e.g. transformers or snap-in components): danger of bending and fracture.
7. When testing, transporting, packing or incorporating the board, avoid any deformation of the board not to damage the components.
8. Avoid the use of excessive force when plugging a connector into a device soldered onto the board.
9. Ceramic capacitors must be soldered only by the mode (reflow or wave soldering) permissible for them (see the chapter “Soldering directions”).
10. When soldering the most gentle solder profile feasible should be selected (heating time, peak temperature, cooling time) in order to avoid thermal stresses and damage.
11. Ensure the correct solder meniscus height and solder quantity.
12. Ensure correct dosing of the cement quantity.
13. Ceramic capacitors with an AgPd external termination are not suited for the lead-free solder process: they were developed only for conductive adhesion technology.

This listing does not claim to be complete, but merely reflects the experience of EPCOS AG.

Important notes

The following applies to all products named in this publication:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application.** As a rule, EPCOS is either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether an EPCOS product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that **in individual cases, a malfunction of passive electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified.** In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of a passive electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of a passive electronic component.
3. **The warnings, cautions and product-specific notes must be observed**.
4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as "hazardous")**. Useful information on this will be found in our Material Data Sheets on the Internet (www.epcos.com/material). Should you have any more detailed questions, please contact our sales offices.
5. We constantly strive to improve our products. Consequently, **the products described in this publication may change from time to time**. The same is true of the corresponding product specifications. Please check therefore to what extent product descriptions and specifications contained in this publication are still applicable before or when you place an order.

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