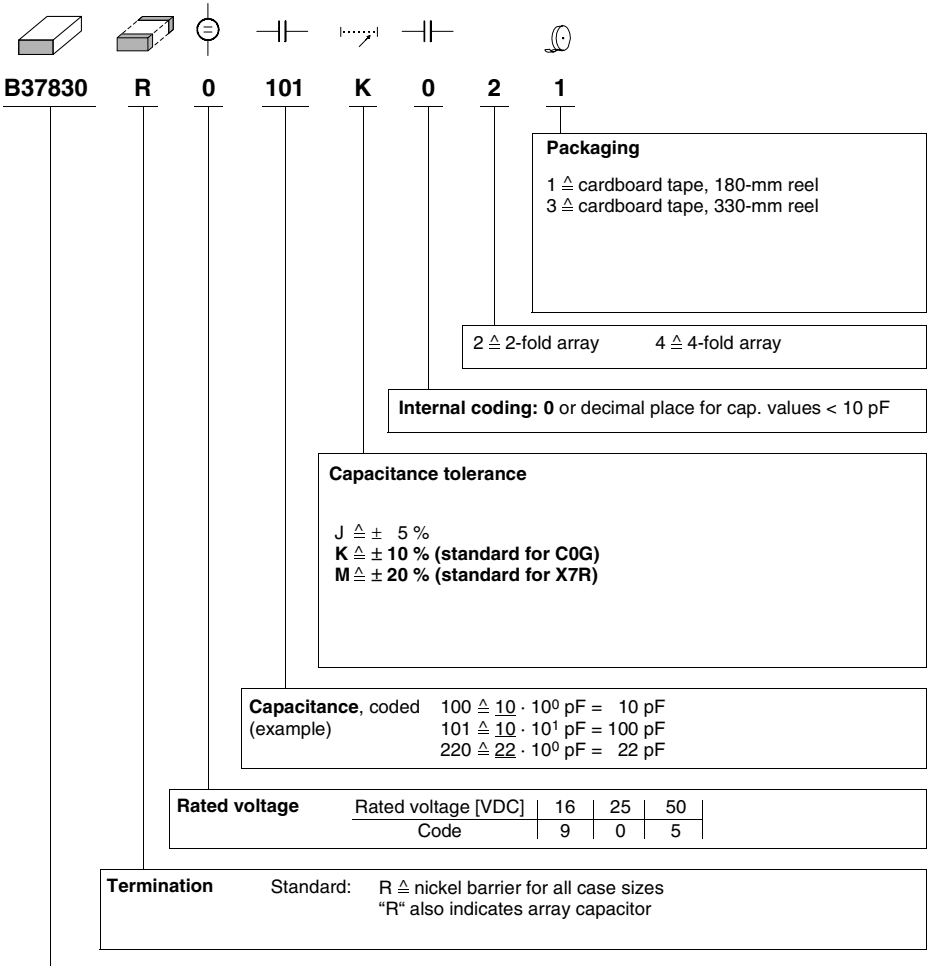


Ordering code system



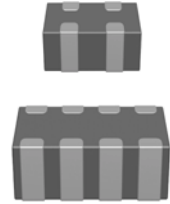
Type and size			
Chip size (inch / mm)	Temperature characteristic		
	C0G	X7R	
<b>0405</b> / 1012	B37830	B37831	
<b>0508</b> / 1220	B37940	B37941	
<b>0612</b> / 1632	B37871	B37872	

**Features**

- Reduction of mounting time and mounting costs
- Space saving on the PCB

**Applications**

- Suitable for electronic circuits with parallel line layout
- Decoupling
- Coupling
- Blocking
- Interference suppression


**Termination**

- For soldering: Nickel-barrier terminations (Ni)

**Options**

- Alternative capacitance tolerances available on request

**Delivery mode**

- Cardboard tape, 180-mm and 330-mm reel available

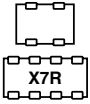
**Electrical data**

Temperature characteristic		X7R	
Climatic category (IEC 60068-1)		55/125/56	
Standard		EIA	
Dielectric		Class 2	
Rated voltage <sup>1)</sup>	$V_R$	16, 25, 50	VDC
Test voltage	$V_{test}$	$2,5 \cdot V_R/5 s$	VDC
Capacitance range	$C_R$	1 nF ... 22 nF	
Max. relative capacitance change	$\Delta C/C$	$\pm 15$	%
Dissipation factor (limit value)	$\tan \delta$	$< 25 \cdot 10^{-3}$ $< 35 \cdot 10^{-3}$ for 16V	
Insulation resistance <sup>2)</sup> at + 25 °C	$R_{ins}$	$> 10^5$	M $\Omega$
Insulation resistance <sup>2)</sup> at +125 °C	$R_{ins}$	$> 10^4$	M $\Omega$
Time constant <sup>2)</sup> at + 25 °C	$\tau$	$> 1000$	s
Time constant <sup>2)</sup> at +125 °C	$\tau$	$> 100$	s
Operating temperature range	$T_{op}$	-55 ... +125	°C
Ageing <sup>3)</sup>		yes	

1) Note: No operation on AC line.

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

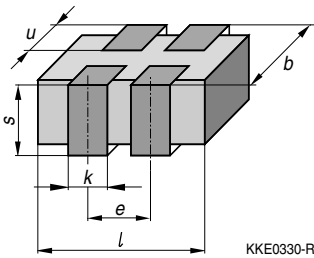
3) Refer to chapter "General Technical Information", page 197.


**Capacitance tolerances**

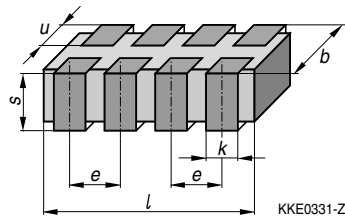
Code letter	K	M (standard)
Tolerance	$\pm 10\%$	$\pm 20\%$

**Dimensional drawing**

2-fold array (case size 0405)

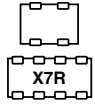


4-fold array (case sizes 0508 and 0612)


**Dimensions (mm)**

Case size (inch) (mm)	2-fold array	4-fold array	
	0405 1012	0508 1220	0612 1632
<i>l</i>	$1,37 \pm 0,15$	$2,0 \pm 0,2$	$3,2 \pm 0,2$
<i>b</i>	$1,0 +0/-0,15$	$1,25 \pm 0,15$	$1,6 \pm 0,2$
<i>s</i>	0,70 max.	$0,85 \pm 0,1$	$0,85 \pm 0,1$
<i>k</i>	$0,36 \pm 0,1$	$0,3 \pm 0,1$	$0,4 \pm 0,15$
<i>e</i>	0,64	$0,5 \pm 0,1$	$0,8 \pm 0,15$
<i>u</i>	$0,2 \pm 0,1$	$0,2 +0,3/-0,1$	$0,2 +0,3/-0,1$

Tolerances to CECC 32101-801

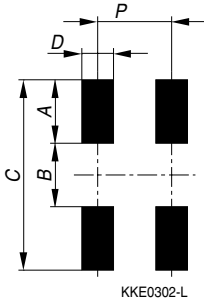


## Multilayer Ceramic Capacitors

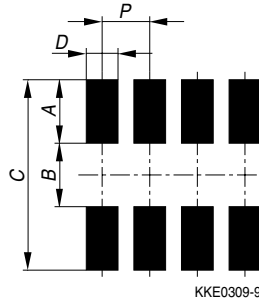
X7R

### Recommended solder pad

2-fold array (case size 0405)



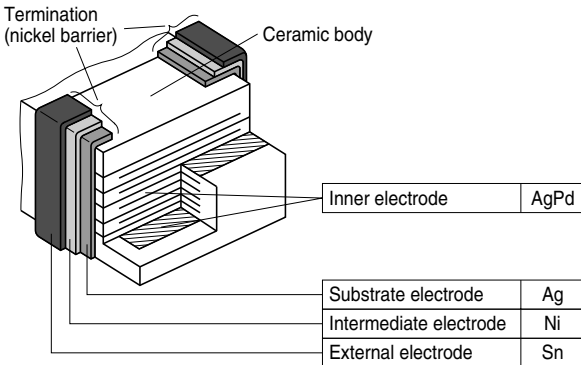
4-fold array (case sizes 0508 and 0612)



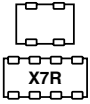
### Maximum dimensions (mm)

Case size	(inch/mm)	Type	A	B	C	D	P
	0405/1012	2-fold array	0,55	0,28	1,38	0,40	0,64
	0508/1220	4-fold array	0,90	0,40	2,20	0,35	0,50
	0612/1632	4-fold array	1,00	1,10	3,10	0,45	0,90

### Termination

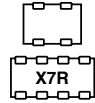


KKE0366-S-E


**Product range array capacitors**

	X7R					
	2-fold arrays			4-fold arrays		
Size <sup>1)</sup>	<b>0405</b>		<b>0508</b>		<b>0612</b>	
inch	1012		1220		1632	
mm	B37831		B37941		B37872	
Type	B37831		B37941		B37872	
$V_R$ (VDC)	16		25		50	
$C_R$	16		25		50	
1,0 nF						
1,5 nF						
2,2 nF						
3,3 nF						
4,7 nF						
6,8 nF						
10 nF						
15 nF						
22 nF						

1)  $l \times b$  (inch) /  $l \times b$  (mm)



## Multilayer Ceramic Capacitors

### X7R; 0405 to 0612

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

$C_R^{1)}$	Ordering code <sup>2)</sup>	Chip thickness	Cardboard tape, ∅ 180-mm reel	Cardboard tape, ∅ 330-mm reel
		mm	* $\triangle$ 1	* $\triangle$ 3
			pcs/reel	pcs/reel

#### Case size 0405, 16 VDC, 2-fold arrays

1,0 nF	B37831R9102M02*	0,6 ± 0,1	5000	20000
2,2 nF	B37831R9222M02*	0,6 ± 0,1	5000	20000
4,7 nF	B37831R9472M02*	0,6 ± 0,1	5000	20000
10 nF	B37831R9103M02*	0,6 ± 0,1	5000	20000

#### Case size 0508, 25 VDC, 4-fold arrays

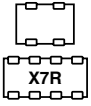
1,0 nF	B37941R0102M04*	0,85 ± 0,1	4000	16000
2,2 nF	B37941R0222M04*	0,85 ± 0,1	4000	16000
4,7 nF	B37941R0472M04*	0,85 ± 0,1	4000	16000
10 nF	B37941R0103M04*	0,85 ± 0,1	4000	16000

#### Case size 0612, 50 VDC, 4-fold arrays

1,0 nF	B37872R5102M04*	0,85 ± 0,1	4000	16000
1,5 nF	B37872R5152M04*	0,85 ± 0,1	4000	16000
2,2 nF	B37872R5222M04*	0,85 ± 0,1	4000	16000
3,3 nF	B37872R5332M04*	0,85 ± 0,1	4000	16000
4,7 nF	B37872R5472M04*	0,85 ± 0,1	4000	16000
6,8 nF	B37872R5682M04*	0,85 ± 0,1	4000	16000
10 nF	B37872R5103M04*	0,85 ± 0,1	4000	16000
15 nF	B37872R5153M04*	0,85 ± 0,1	4000	16000
22 nF	B37872R5223M04*	0,85 ± 0,1	4000	16000

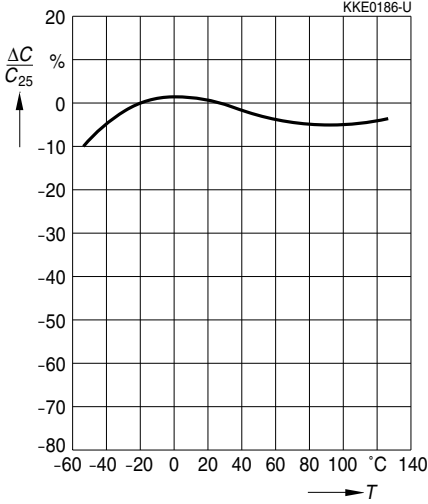
1) Other capacitance values on request.

2) The table contains the ordering codes for the standard capacitance tolerance.  
For other available capacitance tolerances see page 102.

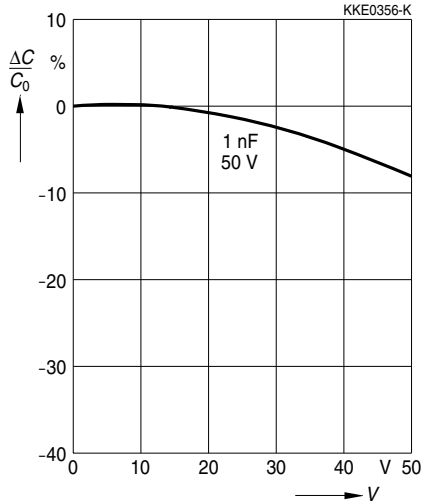


**Typical characteristics**

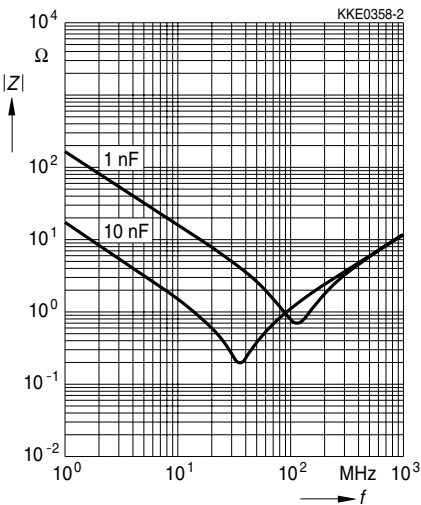
Capacitance change  $\Delta C/C_{25}$  versus temperature  $T$



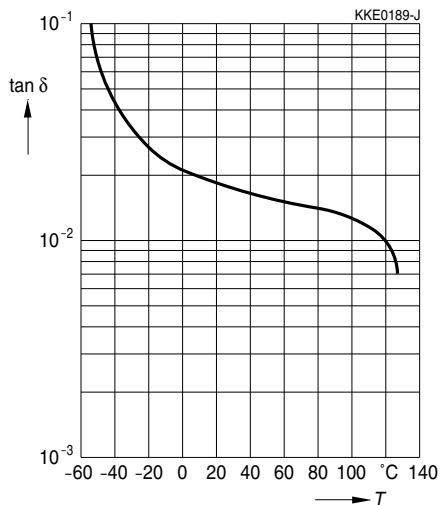
Capacitance change  $\Delta C/C_0$  versus superimposed DC voltage  $V$

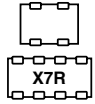


Impedance  $|Z|$  versus frequency  $f$



Dissipation factor  $\tan \delta$  versus temperature  $T$

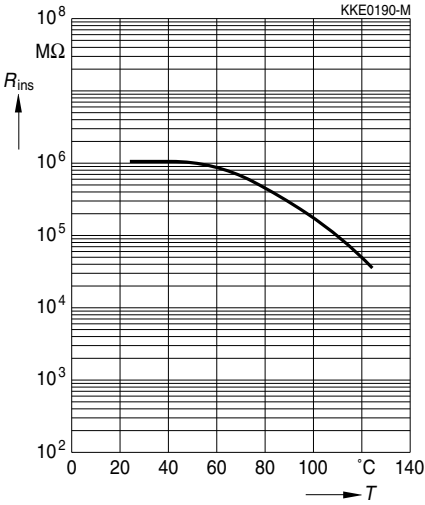




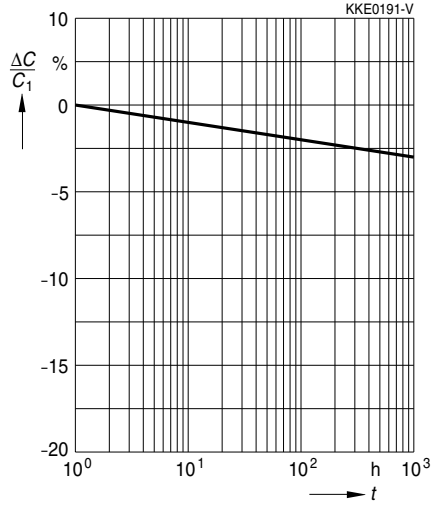
**Multilayer Ceramic Capacitors**  
**X7R**

**Typical characteristics**

Insulation resistance  $R_{ins}$  versus temperature  $T$



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





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