

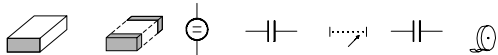


Multilayer Ceramic Capacitors

Chip

Z5U (Y5U)

Ordering code system



B37942 K 5 104 M 0 60

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

Internal coding

Capacitance tolerance
 M \triangleq $\pm 20\%$ (standard)

Capacitance, coded (example)
 104 $\triangleq 10 \cdot 10^4$ pF = 100 nF
 105 $\triangleq 10 \cdot 10^5$ pF = 1 μ F
 224 $\triangleq 22 \cdot 10^4$ pF = 220 nF

Rated voltage	Rated voltage [VDC]	25	50
	Code	0	5

Termination Standard: K \triangleq nickel barrier for case sizes 0603, 0805, 1206, 1210
 J \triangleq silver palladium for case sizes 1812, 2220

Type and size	
Chip size (inch / mm)	Temperature characteristic Z5U (Y5U)
0603 / 1608	B37932
0805 / 2012	B37942
1206 / 3216	B37873
1210 / 3225	B37951
1812 / 4532	B37954
2220 / 5750	B37957



Multilayer Ceramic Capacitors

Chip

Z5U (Y5U)



Features

- Extremely high volumetric efficiency
- Non-linear capacitance change
- Y5U characteristic is also fulfilled

Applications

- Blocking
- Coupling
- Decoupling
- Interference suppression

Termination

- For soldering: Nickel-barrier termination (Ni) for case sizes 0603 to 1210
Silver-palladium termination (AgPd) for case sizes 1812 and 2220

Delivery mode

- Cardboard and blister tape (blister tape for chip thickness $\geq 1,2 \pm 0,1$ mm and case sizes ≥ 1210), 180-mm and 330-mm reel available
- Bulk case for case sizes 0603 and 0805 (≥ 68 nF)

Electrical data

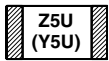
Temperature characteristic		Z5U (Y5U) ¹⁾	
Climatic category (IEC 60068-1)		30/85/56	
Standard		EIA	
Dielectric		Class 2	
Rated voltage ²⁾	V_R	25, 50	VDC
Test voltage	V_{test}	$2,5 \cdot V_R/5$ s	VDC
Capacitance range	C_R	10 nF ... 4,7 μ F	
Max. relative capacitance change	$\Delta C/C$	+22/-56	%
Dissipation factor (limit value)	$\tan \delta$	$< 50 \cdot 10^{-3}$	
Insulation resistance ³⁾ at +25 °C	R_{ins}	$> 10^4$	M Ω
Time constant ³⁾ at +25 °C	τ	> 500	s
Operating temperature range	T_{op}	-30 ... +85	°C
Ageing ⁴⁾		yes	

1) Y5U specification is also fulfilled.

2) Note: No operation on AC line.

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

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



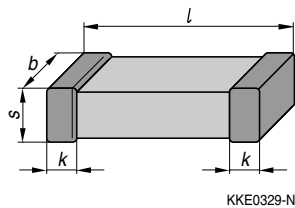
Multilayer Ceramic Capacitors

Z5U (Y5U)

Capacitance tolerances

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

Dimensional drawing



Dimensions (mm)

Case size (inch) (mm)	0603 1608	0805 2012	1206 3216	1210 3225
<i>l</i>	$1,6 \pm 0,15$	$2,0 \pm 0,20$	$3,2 \pm 0,20$	$3,2 \pm 0,30$
<i>b</i>	$0,8 \pm 0,10$	$1,25 \pm 0,15$	$1,6 \pm 0,15$	$2,5 \pm 0,30$
<i>s</i>	$0,8 \pm 0,10$	1,30 max.	1,30 max.	1,30 max.
<i>k</i>	0,1 – 0,4	0,13 – 0,75	0,25 – 0,75	0,25 – 0,75

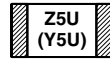
Case size (inch) (mm)	1812 4532	2220 5750
<i>l</i>	$4,5 \pm 0,30$	$5,7 \pm 0,40$
<i>b</i>	$3,2 \pm 0,30$	$5,0 \pm 0,40$
<i>s</i>	1,30 max.	1,30 max.
<i>k</i>	0,25 – 1,0	0,25 – 1,0

Tolerances to CECC 32101-801

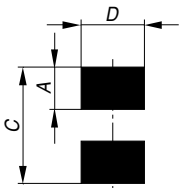


Multilayer Ceramic Capacitors

Z5U (Y5U)



Recommended solder pad



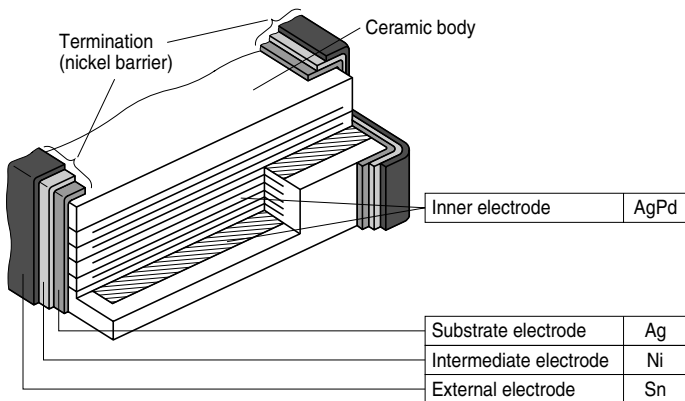
KKE0308-1



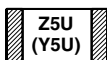
Maximum dimensions (mm)

Case size	(inch/mm)	Type	A	C	D
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



KKE0484-W



Multilayer Ceramic Capacitors

Z5U (Y5U)

Product range chip capacitors

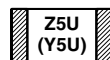
		Z5U (Y5U)											
Size ¹⁾		0603		0805		1206		1210		1812		2220	
inch	mm	1608		2012		3216		3225		4532		5750	
Type		B37932		B37942		B37873		B37951		B37954		B37957	
V_R (VDC)	C_R	25	50	25	50	25	50		50		50		50
10	nF		■		■								
15	nF												
22	nF		■		■								
33	nF												
47	nF		■		■								
68	nF												
100	nF	■			■		■						
150	nF			■			■						
220	nF						■						
330	nF							■	■				
470	nF							■		■			
680	nF									■			
1,0	μF					■			■		■		■
1,5	μF										■		
2,2	μF												■
3,3	μF												
4,7	μF												■

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



Multilayer Ceramic Capacitors

Z5U (Y5U); 0603 to 1206



Ordering codes and packing for Z5U (Y5U), 25 VDC, nickel-barrier terminations

C_R	Ordering code	Chip thickness mm	Cardboard tape, Ø 180-mm reel	Cardboard tape, Ø 330-mm reel	Bulk case
			** \triangleq 60 pcs/reel	** \triangleq 70 pcs/reel	** \triangleq 01 pcs

Case size 0603, 25 VDC

100 nF	B37932K0104M0**	0,8 ± 0,1	4000	16000	15000
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Case size 0805, 25 VDC

150 nF	B37942K0154M0**	0,8 ± 0,1	4000	16000	–
220 nF	B37942K0224M0**	0,8 ± 0,1	4000	16000	–

Case size 1206, 25 VDC

1,0 µF	B37873K0105M0**	1,2 ± 0,1	3000 ¹⁾	12000 ²⁾	–
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1) Blister tape, 180-mm reel, ordering code ** \triangleq 62

2) Blister tape, 330-mm reel, ordering code ** \triangleq 72


Multilayer Ceramic Capacitors
Z5U (Y5U); 0603 to 1210
Ordering codes and packing for Z5U (Y5U), 50 VDC, nickel-barrier terminations

C_R	Ordering code	Chip thickness mm	Cardboard tape, Ø 180-mm reel	Cardboard tape, Ø 330-mm reel	Bulk case
			** \triangle 60	** \triangle 70	** \triangle 01
			pcs/reel	pcs/reel	pcs

Case size 0603, 50 VDC

10 nF	B37932K5103M0**	0,8 ± 0,1	4000	16000	15000
22 nF	B37932K5223M0**	0,8 ± 0,1	4000	16000	15000
47 nF	B37932K5473M0**	0,8 ± 0,1	4000	16000	15000

Case size 0805, 50 VDC

10 nF	B37942K5103M0**	0,6 ± 0,1	5000	20000	10000
22 nF	B37942K5223M0**	0,6 ± 0,1	5000	20000	10000
47 nF	B37942K5473M0**	0,6 ± 0,1	5000	20000	10000
100 nF	B37942K5104M0**	0,8 ± 0,1	4000	16000	–

Case size 1206, 50 VDC

100 nF	B37873K5104M0**	0,8 ± 0,1	4000	16000	–
220 nF	B37873K5224M0**	0,8 ± 0,1	4000	16000	–
470 nF	B37873K5474M0**	1,2 ± 0,1	3000 ¹⁾	12000 ²⁾	–

Case size 1210, 50 VDC

470 nF	B37951K5474M0**	0,8 ± 0,1	4000 ¹⁾	16000 ²⁾	–
1,0 μ F	B37951K5105M0**	1,2 ± 0,1	3000 ¹⁾	12000 ²⁾	–

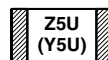
1) Blister tape, 180-mm reel, ordering code ** \triangle 62

2) Blister tape, 330-mm reel, ordering code ** \triangle 72



Multilayer Ceramic Capacitors

Z5U (Y5U); 1812 and 2220



Ordering codes and packing for Z5U (Y5U), 50 VDC, silver-palladium terminations

C_R	Ordering code	Chip thickness mm	Blister tape, Ø 180-mm reel	Blister tape, Ø 330-mm reel
			** \triangle 62 pcs/reel	** \triangle 72 pcs/reel

Case size 1812, 50 VDC

680 nF	B37954J5684M0**	1,2 ± 0,1	1500	5000
1,0 µF	B37954J5105M0**	1,2 ± 0,1	1500	5000
1,5 µF	B37954J5155M0**	1,2 ± 0,1	1500	5000

Case size 2220, 50 VDC

1,0 µF	B37957J5105M0**	1,2 ± 0,1	1500	5000
2,2 µF	B37957J5225M0**	1,2 ± 0,1	1500	5000
4,7 µF	B37957J5475M0**	1,2 ± 0,1	1500	5000



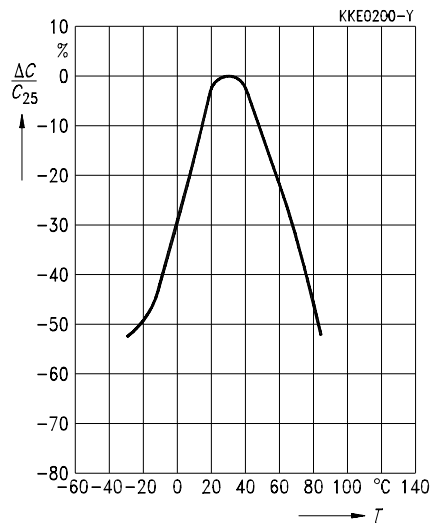
Z5U
(Y5U)

Multilayer Ceramic Capacitors

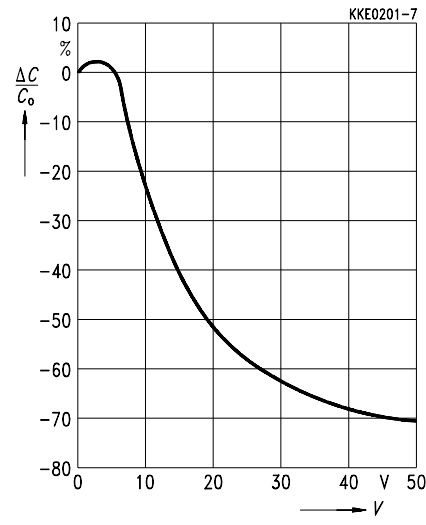
Z5U (Y5U)

Typical characteristics

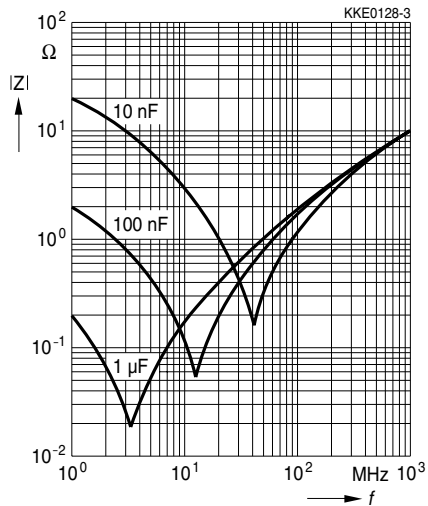
Capacitance change $\Delta C/C_{25}$ versus temperature T



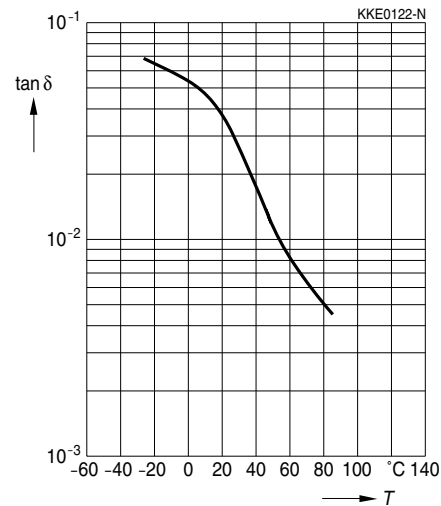
Capacitance change $\Delta C/C_0$ versus superimposed DC voltage V



Impedance $|Z|$ versus frequency f

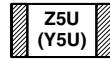


Dissipation factor $\tan \delta$ versus temperature T



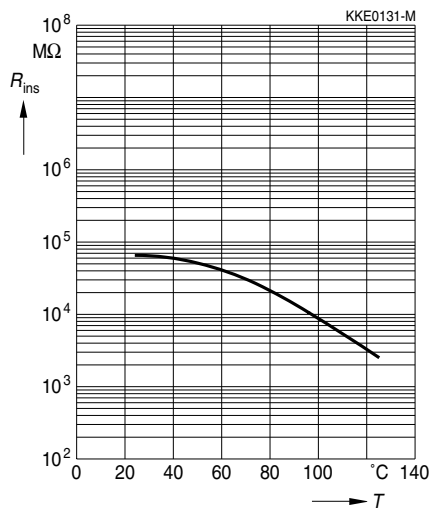


Multilayer Ceramic Capacitors
Z5U (Y5U)

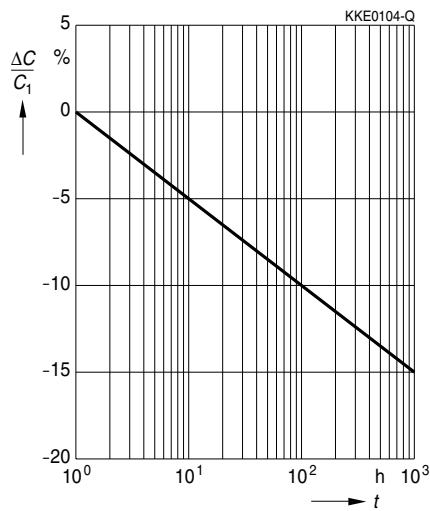


Typical characteristics

Insulation resistance R_{ins} versus temperature T



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



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