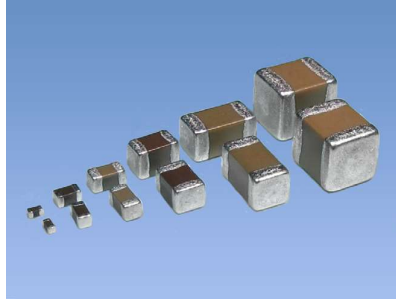




Multilayer Ceramic Chip Capacitors

How to Order



■Features

- Kyocera's series of Multilayer Ceramic Chip Capacitors are designed to meet a wide variety of needs. We offer a complete range of products for both general and specialized applications.
- We have a network worldwide in order to supply our global customer bases quickly and efficiently.
- All our products are highly reliable due to their monolithic structure of high-purity and superfine uniform ceramics and their integral internal electrodes.
- Our stringent quality control in every phase of production from material procurement to shipping ensures consistent manufacturing and superior quality.
- Kyocera components are available in a wide choice of dimensions, temperature characteristics, rated voltages, and terminations to meet specific configurational requirements.

■KYOCERA PART NUMBER

CM 03 X5R 225 M 06 A H □□□
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ OPTION :

Above digits are used to track individual specification or thickness.

(Example)

- ①Series : CM Series(General)
- ②Size : 0201
- ③Dielectric : X5R
- ④Capacitance : 2.2 μ F
- ⑤Tolerance : $\pm 20\%$
- ⑥Voltage : 6.3Vdc
- ⑦Termination : Sn
- ⑧Packaging : Cavity pitch 2mm / Reel Size $\phi 180$

①Series Code

CODE	Type
CM	General
CT	Low Profile
CU	High-Q
AR	Automotive
KNH	Three Terminal Capacitors

②Size Code

CODE	EIA	JIS
02	01005	0402
03	0201	0603
05	0402	1005
105	0603	1608
21	0805	2012
316	1206	3216
32	1210	3225

③Dielectric Code

Temperature Compensation Type		
CODE	Temperature Range (°C)	ppm/°C
CG	-55 to 125	0 ± 30
CH		± 60

- All parts of COG will be marked as "CG" but will conform to the above table.
- Temperature coefficients are determined by calculation based on measurement at 20°C and 85°C.

High Dielectric Constant Type			
CODE	Temperature Range (°C)	ΔC (%)	Standard Temperature (°C)
X5R	-55 to 85	± 15	25
X6S	-55 to 105	± 22	
X6T		+22/-33	
X7R		± 15	
X7S	-55 to 125	± 22	
X7T		+22/-33	

④Capacitance Code

Capacitance expressed in pF.
Two significant digits plus number of zeros.
For Values < 10pF, Letter R denotes decimal point,
102=1,000pF=1nF
(Example)

CODE	Capacitance
R50	0.5pF
1R0	1pF
100	10pF
101	100pF
102	1nF
103	10nF
104	100nF
105	1 μ F
106	10 μ F
107	100 μ F

⑤Tolerance Code

Temperature Compensation Type (COG)	
CODE	Tolerance
A*	± 0.05 pF
B	± 0.1 pF
C	± 0.25 pF
D	± 0.5 pF
G*	$\pm 2\%$
J	$\pm 5\%$
K	$\pm 10\%$

* : Option

⑥Voltage Code

CODE	Rated Voltage
02	2.5Vdc
04	4Vdc
06	6.3Vdc
10	10Vdc
16	16Vdc
25	25Vdc
35	35Vdc
50	50Vdc
100	100Vdc

⑦Termination Code

CODE	Termination
A	Nickel Barrier/ Tin

• Please contact us if Au termination is needed.

⑧Packaging Code

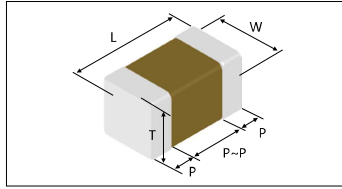
CODE	Size Code	Cavity pitch	Reel size
T	105 to 32	4mm	$\phi 180$
H	02 to 05	2mm	
Q	03/05	1mm	
P	02	1mm	$\phi 330$
L	105 to 32	4mm	
N	02 to 05	2mm	
W	03/05	1mm	

High Dielectric Constant Type (X5R/X6S/X6T/X7R/X7S/X7T)	
CODE	Tolerance
J*	$\pm 5\%$
K	$\pm 10\%$
M	$\pm 20\%$

* : Option

Dimension

■CM/CT/CU/AR Series (Two Terminal Capacitors)



■Packaging Code

20kp (E 8 / 2)

kp means
1000 pieces

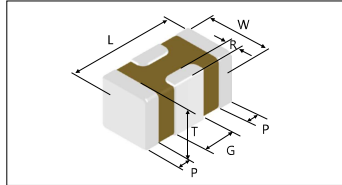
Taping		Material	
Code	Material		
E	Plastic		
P	Paper		

Taping Width	
Code	Width
4	4mm
8	8mm

Pitch	
Code	Pitch
1	1mm
2	2mm
4	4mm

Size	Code		Dimension Code	Dimension (mm)						Quantity per reel			
	EIA	JIS		L	W	T	P min.	P max.	P to P min.	φ180 Reel	φ330 Reel		
02	01005	0402	A	0.4±0.02	0.2±0.02	0.2±0.02	0.07	0.14	0.13	40kp(E4/1) 20kp(P8/2)	— 80kp(P8/2)		
03	0201	0603	A	0.6±0.03	0.3±0.03	0.22 max.	0.1	0.2	0.2	30kp(P8/1) 15kp(P8/2)	150kp(P8/1) 50kp(P8/2)		
			B			0.3±0.03							
			C			0.3±0.05							
			D	0.22 max.	0.13	0.23	0.19	15kp(P8/2)	50kp(P8/2)				
			E	0.6±0.09								0.3±0.09	
			F	0.5±0.05									
05	0402	1005	A	1.0±0.05	0.5±0.05	0.33 max.	0.15	0.35	0.3	20kp(P8/1) 10kp(P8/2)	100kp(P8/1) 50kp(P8/2)		
			B			0.5±0.05							
			C			1.0±0.1						0.22 max.	10kp(P8/2)
			D	1.0±0.15	0.5±0.15	0.5±0.15						10kp(P8/2)	40kp(P8/2)
			E	1.0±0.2	0.5±0.2	0.33 max.				10kp(P8/2)	50kp(P8/2)		
			F			0.5 max.							
			G			0.55 max.							
			H			0.5±0.2						10kp(P8/2)	40kp(P8/2)
			J			0.8 max.						10kp(P8/2)	30kp(P8/2)
			A			0.55 max.							
105	0603	1608	B	1.6±0.1	0.8±0.1	0.8±0.1	0.2	0.6	0.5	4kp(P8/4)	10kp(P8/4)		
			C			1.6±0.15						0.8±0.15	
			D			1.6±0.2						0.8±0.2	0.8±0.2
			A			2.0±0.1						1.25±0.1	1.25±0.1
B	2.0±0.15	1.25±0.15	0.95 max.										
C	2.0±0.2	1.25±0.2	0.95 max.										
D			1.25±0.2										
316	1206	3216	A	3.2±0.2	1.6±0.2	0.95 max.	0.3	0.85	1.4	2.5kp(E8/4)	5kp(E8/4)		
			B			1.6±0.15						1.6±0.15	
			C										1.6±0.2
			D			3.2±0.3						1.6±0.3	1.6±0.3
32	1210	3225	A	3.2±0.3	2.5±0.2	2.5±0.2	0.3	1.0	1.4	1kp(E8/4)	4kp(E8/4)		

■KNH Series (Three Terminal Capacitors)



Size	Code		Dimension Code	Dimension (mm)						Packaging	
	EIA	JIS		L	W	T	G	P	R	φ180 Reel	φ330 Reel
KNH 05	0402	1005	A	1.0±0.1	0.5±0.2	0.5 max.	0.3±0.1	0.15±0.1	≥0.05	10kp(P8/2)	—
			B	1.0±0.15	0.5±0.15	0.5±0.15					
			C	1.0±0.2	0.5±0.2	0.5±0.2					



■Features

We offer a diverse product line ranging from ultra-compact (0.4×0.2mm) to large (3.2×2.5mm) components configured for a variety of temperature characteristics, rated voltages, and packages. We offer the choice and flexibility for almost any applications.

■Applications

This standard type is ideal for use in a wide range of applications, from commercial to industrial equipment.

Temperature Compensation Dielectric

●Capacitance chart ■ Standard Spec.1

Size (EIA Code)		CM02 (01005)	
Rated Voltage(Vdc)		16	25
Capacitance			
1R0	1 pF		
1R5	1.5 pF		
2R0	2 pF		
3R0	3 pF		
4R0	4 pF		
5R0	5 pF		
6R0	6 pF		
7R0	7 pF		
8R0	8 pF		
9R0	9 pF		
100	10 pF		
120	12 pF		
150	15 pF		
180	18 pF		
220	22 pF		
270	27 pF		
330	33 pF		
390	39 pF		
470	47 pF		
560	56 pF		
680	68 pF		
820	82 pF		
101	100 pF		
121	120 pF		
151	150 pF		
181	180 pF		
221	220 pF		

Please contact for capacitance value other than standard.
Please refer to [here](#) for the test method and specifications of Standard Specification 1.

Alphabets in capacitance chart denote dimensions. Please refer to the below table for detail.

(Example) In case of "A" for CM02;
L: 0.4±0.02mm, W: 0.2±0.02mm, T: 0.2±0.02mm

Size	Dimension Code	Dimension (mm)			Packaging									
					φ180 Reel					φ330 Reel				
		L	W	T	Code	Quantity (pcs.)	Taping Material	Taping Width (mm)	Cavity Pitch (mm)	Code	Quantity (pcs.)	Taping Material	Taping Width (mm)	Cavity Pitch (mm)
02	A	0.4±0.02	0.2±0.02	0.2±0.02	P	40,000	Plastic	4	1	—	—	—	—	—
					H	20,000	Paper	8	2	N	80,000	Paper	8	2



Multilayer Ceramic Chip Capacitors



General

CM Series

RoHS Compliant Products

X5R Dielectric

● Capacitance chart ■ Standard Spec.1 ■ Standard Spec.2 ▨ Optional Spec.

Size (EIA Code)	CM02 (01005)			CM03 (0201)					CM05 (0402)						
Rated Voltage (Vdc) Capacitance	6.3	10	16	4	6.3	10	16	25	4	6.3	10	16	25	35	
101 100 pF			A8												
151 150 pF															
221 220 pF															
331 330 pF															
471 470 pF															
681 680 pF															
102 1000 pF															
152 1500 pF															
222 2200 pF															
332 3300 pF															
472 4700 pF															
682 6800 pF															
103 10000 pF															
153 15000 pF	A8														
223 22000 pF															
333 33000 pF															
473 47000 pF															
683 68000 pF						B7									
104 0.1 μF		A8													
224 0.22 μF	A8							E8	E8						
474 0.47 μF					B8 C8										
105 1 μF						C8/E10 E9	E10				B8 B7 H8	B8	B3		
225 2.2 μF															
475 4.7 μF												B7 B8 H8	B7 G8/H8 H8	B7 H8	
106 10 μF				E8											
156 15 μF									D8 H8	H8 J8					
226 22 μF															
476 47 μF															

Size (EIA Code)	CM105 (0603)					CM21 (0805)						CM316 (1206)				CM32 (1210)		
Rated Voltage (Vdc) Capacitance	6.3	10	16	25	35	4	6.3	10	16	25	50	16	25	50	100	16	25	50
105 1 μF			B8								A8							
225 2.2 μF										D8			B3		C3			
475 4.7 μF		C8		D8 D9	D8 D9				D8				C8	C3		A3	A8	A3
106 10 μF								D8										
226 22 μF								D8		D8								
476 47 μF	⊠ D8 ⊠	D8	D8				D7					C8						
107 100 μF						⊠ D8 ⊠												

Please contact for capacitance value other than standard.

Please refer to [here](#) for the test method and specifications of Standard Specification 1.

Please refer to [here](#) for the test method and specifications of Standard Specification 2.

Tan δ Code	Tan δ
3	5.0% max.
7	10.0% max.
8	12.5% max.
9	15.0% max.
10	20.0% max.

Two digits alphanumeric in capacitance chart denote dimensions and tan δ. Please refer to the above table for detail.

(Example) In case of "B7" for CM03;

L: 0.6±0.03mm, W: 0.3±0.03mm, T: 0.3±0.03mm, Tanδ: 10.0% max.

Size	Dimension Code	Dimension (mm)			Packaging									
		L	W	T	φ180 Reel					φ330 Reel				
					Code	Quantity (pcs.)	Taping Material	Taping Width (mm)	Cavity Pitch (mm)	Code	Quantity (pcs.)	Taping Material	Taping Width (mm)	Cavity Pitch (mm)
02	A	0.4±0.02	0.2±0.02	0.2±0.02	P	40,000	Plastic	4	1	—	—	—	—	—
					H	20,000	Paper	8	2	N	80,000	Paper	8	2
03	B	0.6±0.03	0.3±0.03	0.3±0.03	Q	30,000	Paper	8	1	W	150,000	Paper	8	1
					H	15,000	Paper	8	2	N	50,000	Paper	8	2
	C	0.6±0.05	0.3±0.05	0.3±0.05	Q	30,000	Paper	8	1	W	150,000	Paper	8	1
					H	15,000	Paper	8	2	N	50,000	Paper	8	2
	E	0.6±0.09	0.3±0.09	0.3±0.09	H	15,000	Paper	8	2	N	50,000	Paper	8	2
	F	0.6±0.09	0.3±0.09	0.5±0.05	H	10,000	Paper	8	2	—	—	—	—	—
05	B	1.0±0.05	0.5±0.05	0.5±0.05	Q	20,000	Paper	8	1	W	100,000	Paper	8	1
					H	10,000	Paper	8	2	N	50,000	Paper	8	2
	D	1.0±0.15	0.5±0.15	0.5±0.15	H	10,000	Paper	8	2	N	40,000	Paper	8	2
	G	1.0±0.2	0.5±0.2	0.55 max.	H	10,000	Paper	8	2	N	50,000	Paper	8	2
	H	1.0±0.2	0.5±0.2	0.5±0.2	H	10,000	Paper	8	2	N	40,000	Paper	8	2
	J	1.0±0.2	0.5±0.2	0.8 max.	H	10,000	Paper	8	2	N	30,000	Paper	8	2
105	B	1.6±0.1	0.8±0.1	0.8±0.1	T	4,000	Paper	8	4	L	10,000	Paper	8	4
	C	1.6±0.15	0.8±0.15	0.8±0.15	T	4,000	Paper	8	4	L	10,000	Paper	8	4
	D	1.6±0.2	0.8±0.2	0.8±0.2	T	4,000	Paper	8	4	L	10,000	Paper	8	4
21	A	2.0±0.1	1.25±0.1	1.25±0.1	T	3,000	Plastic	8	4	L	10,000	Plastic	8	4
	D	2.0±0.2	1.25±0.2	1.25±0.2	T	3,000	Plastic	8	4	L	10,000	Plastic	8	4
316	B	3.2±0.2	1.6±0.15	1.6±0.15	T	2,500	Plastic	8	4	L	5,000	Plastic	8	4
	C	3.2±0.2	1.6±0.2	1.6±0.2	T	2,500	Plastic	8	4	L	5,000	Plastic	8	4
32	A	3.2±0.3	2.5±0.2	2.5±0.2	T	1,000	Plastic	8	4	L	4,000	Plastic	8	4



Multilayer Ceramic Chip Capacitors



General

CM Series

RoHS Compliant Products

X6S/X6T Dielectric

●Capacitance chart Standard Spec.2 Optional Spec.

Size (EIA Code)	X6S																
	CM03 (0201)				CM05 (0402)					CM105 (0603)				CM21 (0805)			
Rated Voltage (Vdc) Capacitance	2.5	4	6.3	10	4	6.3	10	16	25	4	6.3	10	16	4	6.3	10	16
104 0.1 μF																	
224 0.22 μF																	
474 0.47 μF																	
105 1 μF		E10	E10	E10			B8	B8	B8								
225 2.2 μF								G8									
475 4.7 μF	F9					D8/H8	H8										
106 10 μF																	
226 22 μF					J8					D8	D8	D9	D9		D8	D8	D8
476 47 μF										D8		D8					
107 100 μF															D7 D8		

Size (EIA Code)	X6T		
	CM03 (0201)		
	2.5	4	10
Rated Voltage (Vdc)			
Capacitance			
224 0.22 μ F			
474 0.47 μ F			
105 1 μ F			
225 2.2 μ F			
475 4.7 μ F			
106 10 μ F			

Please contact for capacitance value other than standard.

Please refer to [here](#) for the test method and specifications of Standard Specification 2.

Two digits alphanumeric in capacitance chart denote dimensions and tan δ . Please refer to the above table for detail.

(Example) In case of "D9" for CM105;

L: 1.6 ± 0.2 mm, W: 0.8 ± 0.2 mm, T: 0.8 ± 0.2 mm, Tan δ : 15.0% max.

Tan δ Code	Tan δ
7	10.0% max.
8	12.5% max.
9	15.0% max.
10	20.0% max.

Size	Dimension Code	Dimension (mm)			Packaging									
		L	W	T	ϕ 180 Reel					ϕ 330 Reel				
					Code	Quantity (pcs)	Taping Material	Taping Width (mm)	Cavity Pitch (mm)	Code	Quantity (pcs)	Taping Material	Taping Width (mm)	Cavity Pitch (mm)
03	C	0.6 ± 0.05	0.3 ± 0.05	0.3 ± 0.05	Q	30,000	Paper	8	1	W	150,000	Paper	8	1
					H	15,000	Paper	8	2	N	50,000	Paper	8	2
	E	0.6 ± 0.09	0.3 ± 0.09	0.3 ± 0.09	H	15,000	Paper	8	2	N	50,000	Paper	8	2
	F	0.6 ± 0.09	0.3 ± 0.09	0.3 ± 0.05	H	10,000	Paper	8	2	—	—	—	—	—
05	B	1.0 ± 0.05	0.5 ± 0.05	0.5 ± 0.05	Q	20,000	Paper	8	1	W	100,000	Paper	8	1
					H	10,000	Paper	8	2	N	50,000	Paper	8	2
	D	1.0 ± 0.15	0.5 ± 0.15	0.5 ± 0.15	H	10,000	Paper	8	2	N	40,000	Paper	8	2
	G	1.0 ± 0.2	0.5 ± 0.2	0.55 max.	H	10,000	Paper	8	2	N	50,000	Paper	8	2
	H	1.0 ± 0.2	0.5 ± 0.2	0.5 ± 0.2	H	10,000	Paper	8	2	N	40,000	Paper	8	2
	J	1.0 ± 0.2	0.5 ± 0.2	0.8 max.	H	10,000	Paper	8	2	N	30,000	Paper	8	2
105	D	1.6 ± 0.2	0.8 ± 0.2	0.8 ± 0.2	T	4,000	Paper	8	4	L	10,000	Paper	8	4
21	D	2.0 ± 0.2	1.25 ± 0.2	1.25 ± 0.2	T	3,000	Plastic	8	4	L	10,000	Plastic	8	4



Multilayer Ceramic Chip Capacitors



General

CM Series

RoHS Compliant Products

X7R Dielectric

•Capacitance chart ■ Standard Spec.1 ■ Standard Spec.2 ▨ Optional Spec.

Size (EIA Code)	CM02 (01005)	CM05 (0402)	CM105 (0603)	CM21 (0805)					
Rated Voltage (Vdc) Capacitance	16	6.3	25	6.3	25	6.3	16	25	50
101 100 pF	A8								
151 150 pF									
221 220 pF									
331 330 pF									
471 470 pF									
681 680 pF									
102 1000 pF									
152 1500 pF									
222 2200 pF									
332 3300 pF									
472 4700 pF									
682 6800 pF									
103 10000 pF									
153 15000 pF									
223 22000 pF									
333 33000 pF									
473 47000 pF									
683 68000 pF									
104 0.1 μF			B8						
224 0.22 μF									
474 0.47 μF		B8							
105 1 μF					B3				D3
225 2.2 μF				C8				D8	
475 4.7 μF							D8		
106 10 μF						D8			

Size (EIA Code)	CM316 (1206)					CM32 (1210)		
Rated Voltage (Vdc) Capacitance	6.3	10	16	25	50	16	25	50
225 2.2 μF					C3			
475 4.7 μF								
106 10 μF			C8	C3			A8	A3
226 22 μF	C8	C5				A8		

Please contact for capacitance value other than standard.

Please refer to [here](#) for the test method and specifications of Standard Specification 1.

Please refer to [here](#) for the test method and specifications of Standard Specification 2.

Two digits alphanumeric in capacitance chart denote dimensions and tan δ. Please refer to the above table for detail.

(Example) In case of "A8" for CM02;

L: 0.4±0.02mm, W: 0.2±0.02mm, T: 0.2±0.02mm, Tanδ: 12.5% max.

Tan δCode	Tan δ
3	5.0% max.
5	7.5% max.
8	12.5% max.

Size	Dimension Code	Dimension (mm)			Packaging									
					φ180 Reel					φ330 Reel				
		L	W	T	Code	Quantity (pcs.)	Taping Material	Taping Width (mm)	Cavity Pitch (mm)	Code	Quantity (pcs.)	Taping Material	Taping Width (mm)	Cavity Pitch (mm)
02	A	0.4±0.02	0.2±0.02	0.2±0.02	P	40,000	Plastic	4	1	—	—	—	—	—
					H	20,000	Paper	8	2	N	80,000	Paper	8	2
05	B	1.0±0.05	0.5±0.05	0.5±0.05	Q	20,000	Paper	8	1	W	100,000	Paper	8	1
					H	10,000	Paper	8	2	N	50,000	Paper	8	2
105	B	1.6±0.1	0.8±0.1	0.8±0.1	T	4,000	Paper	8	4	L	10,000	Paper	8	4
	C	1.6±0.15	0.8±0.15	0.8±0.15	T	4,000	Paper	8	4	L	10,000	Paper	8	4
21	D	2.0±0.2	1.25±0.2	1.25±0.2	T	3,000	Plastic	8	4	L	10,000	Plastic	8	4
316	C	3.2±0.2	1.6±0.2	1.6±0.2	T	2,500	Plastic	8	4	L	5,000	Plastic	8	4
32	A	3.2±0.3	2.5±0.2	2.5±0.2	T	1,000	Plastic	8	4	L	4,000	Plastic	8	4



Multilayer Ceramic Chip Capacitors



General

CM Series

RoHS Compliant Products

X7S/X7T Dielectric

●Capacitance chart ■ Standard Spec.1 ■ Standard Spec.2 ▨ Optional Spec.

Size (EIA Code)	X7S							X7T					
	CM03 (0201)	CM05 (0402)			CM21 (0805)	CM316 (1206)		CM03 (0201)	CM05 (0402)	CM105 (0603)	CM21 (0805)		
Rated Voltage (Vdc) Capacitance	6.3	4	6.3	10	100	10	100	6.3	10	6.3	10	6.3	10
104 0.1 μF	B7												
224 0.22 μF													
474 0.47 μF													
105 1 μF		B8	B8		D3			F8					
225 2.2 μF		D3	D3	D3			C3 D3						
475 4.7 μF									H8		D8		
106 10 μF										D9	D9		
226 22 μF						C5						D8	D8

Please contact for capacitance value other than standard.

Please refer to [here](#) for the test method and specifications of Standard Specification 1.

Please refer to [here](#) for the test method and specifications of Standard Specification 2.

Two digits alphanumerics in capacitance chart denote dimensions and tan δ . Please refer to the above table for detail.

(Example) In case of "D9" for CM105;

L: 1.6 ± 0.2 mm, W: 0.8 ± 0.2 mm, T: 0.8 ± 0.2 mm, Tan δ : 15.0% max.

Tan δ Code	Tan δ
3	5.0% max.
5	7.5% max.
7	10.0% max.
8	12.5% max.
9	15.0% max.

Size	Dimension Code	Dimension (mm)			Packaging									
		L	W	T	ϕ 180 Reel					ϕ 330 Reel				
					Code	Quantity (pcs.)	Taping Material	Taping Width (mm)	Cavity Pitch (mm)	Code	Quantity (pcs.)	Taping Material	Taping Width (mm)	Cavity Pitch (mm)
03	B	0.6 ± 0.03	0.3 ± 0.03	0.3 ± 0.03	Q	30,000	Paper	8	1	W	150,000	Paper	8	1
					H	15,000	Paper	8	2	N	50,000	Paper	8	2
	E	0.6 ± 0.09	0.3 ± 0.09	0.3 ± 0.09	H	15,000	Paper	8	2	N	50,000	Paper	8	2
05	B	1.0 ± 0.05	0.5 ± 0.05	0.5 ± 0.05	Q	20,000	Paper	8	1	W	100,000	Paper	8	1
					H	10,000	Paper	8	2	N	50,000	Paper	8	2
	D	1.0 ± 0.15	0.5 ± 0.15	0.5 ± 0.15	H	10,000	Paper	8	2	N	40,000	Paper	8	2
	H	1.0 ± 0.2	0.5 ± 0.2	0.5 ± 0.2	H	10,000	Paper	8	2	N	40,000	Paper	8	2
105	D	1.6 ± 0.2	0.8 ± 0.2	0.8 ± 0.2	T	4,000	Paper	8	4	L	10,000	Paper	8	4
21	D	2.0 ± 0.2	1.25 ± 0.2	1.25 ± 0.2	T	3,000	Plastic	8	4	L	10,000	Plastic	8	4
316	C	3.2 ± 0.2	1.6 ± 0.2	1.6 ± 0.2	T	2,500	Plastic	8	4	L	5,000	Plastic	8	4
	D	3.2 ± 0.3	1.6 ± 0.3	1.6 ± 0.3	T	2,000	Plastic	8	4	—	—	—	—	—



Test Conditions and Standards

Test Conditions and Specifications for Temperature Compensation Type (CA Characteristics) CM /CT /CU Series (Standard Spec.1)

Test Items		Test Conditions (Complies with JIS C5101)	Specifications									
Capacitance Value (C)		<table><tr><th>Capacitance</th><th>Frequency</th><th>Volt</th></tr><tr><td>C≤1000pF</td><td>1MHz±10%</td><td rowspan="2">0.5 to 5Vrms</td></tr><tr><td>C>1000pF</td><td>1kHz±10%</td></tr></table>	Capacitance	Frequency	Volt	C≤1000pF	1MHz±10%	0.5 to 5Vrms	C>1000pF	1kHz±10%	Within tolerance	
Capacitance	Frequency	Volt										
C≤1000pF	1MHz±10%	0.5 to 5Vrms										
C>1000pF	1kHz±10%											
Q			C≥30pF : Q≥1000 C<30pF : Q≥400+20C									
Insulation Resistance (IR)		Apply the rated voltage for 1minute, and measure it in normal temperature and humidity. The charge and discharge current of the capacitor must not exceed 50mA.	Over 10000MΩ or 500MΩ•μF, whichever is less									
Dielectric Resistance		Apply*3 times of the rated voltage for 1 to 5 seconds. *CU02C△R20-120/25V: twice The charge and discharge current of the capacitor must not exceed 50mA.	No problem observed									
Appearance		Microscope	No problem observed									
Termination Strength		Apply a sideward force of 500g (5N) to a PCB-mounted sample. note: 1N for 01005 size.	No problem observed									
Bending Strength		Glass epoxy PCB: Fulcrum spacing: 90mm, duration time 10 seconds.	No significant damage with 1mm bending.									
Vibration Test	Appearance	Vibration frequency: 10 to 55 (Hz) Amplitude: 1.5mm Sweeping condition: 10→55→10Hz/ 1 minute in X, Y and Z directions: 2 hours each, 6 hours in total.	No problem observed									
	Capacitance		Within Tolerance									
	Q		C≥30pF : Q≥1000 C<30pF : Q≥400+20C									
Soldering Heat Resistant	Appearance	Soak the sample in 260°C±5°C solder for 10±0.5 seconds and place in normal temperature and humidity, and measure the sample after 24±2 hours. (Pre-heating conditions) <table><tr><th>Order</th><th>Temperature</th><th>Time</th></tr><tr><td>1</td><td>80 to 100°C</td><td>2 minutes</td></tr><tr><td>2</td><td>150 to 200°C</td><td>2 minutes</td></tr></table> The charge and discharge current of the capacitor must not exceed 50mA for IR and withstanding voltage measurement.	Order	Temperature	Time	1	80 to 100°C	2 minutes	2	150 to 200°C	2 minutes	No problem observed
	Order		Temperature	Time								
	1		80 to 100°C	2 minutes								
	2		150 to 200°C	2 minutes								
	Capacitance Variation		Within±2.5% or±0.25pF, whichever is larger									
Q	C≥30pF : Q≥1000 C<30pF : Q≥400+20C											
IR	Over 10000MΩ or 500MΩ•μF whichever is less											
Withstanding Voltage	Resist without problem											
Solderability		Soaking condition <table><tr><td>Sn-3Ag-0.5Cu</td><td>245±5°C</td><td>3±0.5 sec.</td></tr><tr><td>Sn63 Solder</td><td>235±5°C</td><td>2±0.5 sec.</td></tr></table>	Sn-3Ag-0.5Cu	245±5°C	3±0.5 sec.	Sn63 Solder	235±5°C	2±0.5 sec.	Solder coverage : 95% min.			
Sn-3Ag-0.5Cu	245±5°C	3±0.5 sec.										
Sn63 Solder	235±5°C	2±0.5 sec.										
Temperature Cycle	Appearance	(Cycle) Room temperature (3 min.)→ Lowest operation temperature (30 min.)→ Room temperature (3 min.)→ Highest operation temperature(30 min.) After 5 cycles, measure after 24±2 hours. The charge and discharge current of the capacitor must not exceed 50mA for IR and withstanding voltage measurement.	No problem observed									
	Capacitance Variation		Within±2.5% or ±0.25pF, whichever is larger									
	Q		C≥30pF : Q≥1000 C<30pF : Q≥400+20C									
	IR		Over 10000MΩ or 500MΩ•μF, whichever is less									
	Withstanding Voltage		Resist without problem									
Moisture Resistant Load	Appearance	After applying the rated voltage for 500+12/-0 hours in the condition of 40°C±2°C and 90 to 95%RH, allow the parts to stabilize in normal temperature and humidity for 24±2 hours, before measurement. The charge and discharge current of the capacitor must not exceed 50mA for IR measurement.	No problem observed									
	Capacitance Variation		Within±7.5% or ±0.75pF, whichever is larger									
	Q		C≥30pF : Q≥200 C<30pF : Q≥100+10C/ 3									
	IR		Over 500MΩ or 25MΩ•μF, whichever is less									
High-Temperature Load	Appearance	After applying *twice the rated voltage in the temperature of 125±3°C for 1000+12/-0 hours, measure the sample after 24±2 hours in normal temperature and humidity. The charge and discharge current of the capacitor must not exceed 50mA for IR measurement. *Applied voltages for respective products are indicated in the chart below.	No problem observed.									
	Capacitance Variation		Within ±3% or ±0.3pF, whichever is larger									
	Q		C≥30pF : Q≥350 10pF<C<30pF : Q≥275+5C/ 2 C<10pF : Q≥200+10C									
	IR		Over 1000MΩ or 50MΩ•μF, whichever is less									

Please ask for individual specification for the hatched range in previous chart.

Voltage to be applied in the High Temperature Load (Applied voltage is the multiple of the rated voltage)

Applied Voltage	Rated Voltage	Products
× 1.0	16V	CM02CA221
× 1.2	25V	CM02CA△R20-120



Test Conditions and Standards

Test Conditions and Specifications for High Dielectric Type (X5R, X7R, X7S) CM /CT Series (Standard Spec.1)

Test Items		Test Conditions (Complies with JIS C5101)	Specifications											
Capacitance Value (C)		Measure after heat treatment	Within tolerance											
Tanδ		<table><tr><th>Capacitance</th><th>Frequency</th><th>Volt</th></tr><tr><td rowspan="2">C ≤ 10μF</td><td>1kHz±10%</td><td>1.0±0.2Vrms</td></tr><tr><td>*1kHz±10%</td><td>0.5±0.2Vrms</td></tr><tr><td>C > 10μF</td><td>120Hz±10%</td><td>0.5±0.2Vrms</td></tr></table>	Capacitance	Frequency	Volt	C ≤ 10μF	1kHz±10%	1.0±0.2Vrms	*1kHz±10%	0.5±0.2Vrms	C > 10μF	120Hz±10%	0.5±0.2Vrms	Refer to capacitance chart
	Capacitance	Frequency	Volt											
	C ≤ 10μF	1kHz±10%	1.0±0.2Vrms											
		*1kHz±10%	0.5±0.2Vrms											
C > 10μF	120Hz±10%	0.5±0.2Vrms												
	*CM02X5R104□06A# The charge and discharge current of the capacitor must not exceed 50mA.													
Insulation Resistance (IR)		Apply the rated voltage for 1 minute, and measure it in normal temperature and humidity. The charge and discharge current of the capacitor must not exceed 50mA.	Over 10000MΩ or 500MΩ•μF, whichever is less											
Dielectric Resistance		Apply *2.5 times of the rated voltage for 1 to 5 seconds. *CM316X5R225, CM316X7S225/100V: twice The charge and discharge current of the capacitor must not exceed 50mA.	No problem observed											
Appearance		Microscope	No problem observed											
Termination Strength		Apply a sideward force of 500g (5N) to a PCB-mounted sample. note : 2N for 0201 size, and 1N for 01005 size. Exclude CT series with thickness of less than 0.66mm.	No problem observed											
Bending Strength		Glass epoxy PCB: Fulcrum spacing: 90mm, duration time 10 seconds. Exclude CT series with thickness of less than 0.66mm.	No significant damage with 1mm bending											
Vibration Test	Appearance	Take the initial value after heat treatment. Vibration frequency: 10 to 55 (Hz) Amplitude: 1.5mm	No problem observed											
	Capacitance	Sweeping condition: 10→55→10Hz/ 1 minute in X, Y and Z directions: 2 hours each, 6 hours in total, and place in normal temperature and humidity, then measure the sample after heat treatment.	Within tolerance											
	Tanδ		Within tolerance											
Soldering Heat Resistant	Appearance	Take the initial value after heat treatment.	No problem observed											
	Capacitance Variation	Soak the sample in 260°C±5°C solder for 10±0.5 seconds and place in normal temperature and humidity, and measure after heat treatment. (Pre-heating conditions)	Within±7.5%											
	Tanδ	<table><tr><th>Order</th><th>Temperature</th><th>Time</th></tr><tr><td>1</td><td>80 to 100°C</td><td>2 minutes</td></tr><tr><td>2</td><td>150 to 200°C</td><td>2 minutes</td></tr></table>	Order	Temperature	Time	1	80 to 100°C	2 minutes	2	150 to 200°C	2 minutes	Within tolerance		
	Order	Temperature	Time											
	1	80 to 100°C	2 minutes											
2	150 to 200°C	2 minutes												
IR		Over 10000MΩ or 500MΩ•μF, whichever is less												
Withstanding Voltage	The charge and discharge current of the capacitor must not exceed 50mA for IR and withstanding voltage measurement.	Resist without problem												
Solderability		Soaking condition <table><tr><td>Sn-3Ag-0.5Cu</td><td>245±5°C</td><td>3±0.5 sec.</td></tr><tr><td>Sn63 Solder</td><td>235±5°C</td><td>2±0.5 sec.</td></tr></table>	Sn-3Ag-0.5Cu	245±5°C	3±0.5 sec.	Sn63 Solder	235±5°C	2±0.5 sec.	Solder coverage : 95% min.					
Sn-3Ag-0.5Cu	245±5°C	3±0.5 sec.												
Sn63 Solder	235±5°C	2±0.5 sec.												
Temperature Cycle	Appearance	Take the initial value after heat treatment.	No problem observed											
	Capacitance Variation	(Cycle) Room temperature (3 min.)→ Lowest operation temperature (30 min.)→ Room temperature (3 min.)→ Highest operation temperature(30 min.) After 5 cycles, measure after heat treatment.	Within±7.5%											
	Tanδ		Within tolerance											
	IR		Over 10000MΩ or 500MΩ•μF, whichever is less											
	Withstanding Voltage	The charge and discharge current of the capacitor must not exceed 50mA for IR and withstanding voltage measurement.	Resist without problem											
Moisture Resistant Load	Appearance	Take the initial value after heat treatment.	No problem observed											
	Capacitance Variation	After applying rated voltage for 500+12/-0 hours in the condition of 40°C±2°C and 90 to 95%RH, and place in normal temperature and humidity, then measure the sample after heat treatment.	Within±12.5%											
	Tanδ	The charge and discharge current of the capacitor must not exceed 50mA for IR measurement.	200% max. of initial value											
	IR		Over 500MΩ or 25MΩ•μF, whichever is less											
High-Temperature Load	Appearance	Take the initial value after heat treatment.	No problem observed											
	Capacitance Variation	After applying *twice the rated voltage at the highest operation temperature for 1000+12/-0 hours, and measure the sample after heat treatment in normal temperature and humidity. The charge and discharge current of the capacitor must not exceed 50mA for IR measurement.	Within±12.5%											
	Tanδ	*Apply 1.5 times when the rated voltage is 10V or less. Applied voltages for respective products are indicated in the chart below.	200% max. of initial value											
	IR		Over 1000MΩ or 50MΩ•μF, whichever is less											
Heat treatment		Expose sample in the temperature of 150+0/-10°C for 1 hour and leave the sample in normal temperature and humidity for 24±2 hours.												

Voltage to be applied in the High Temperature Load (Applied voltage is the multiple of the rated voltage)

Applied Voltage	Rated Voltage	Products
×1.0	10V	CM02X5R104
	100V	CM316X5R225, CM316X7S225
×1.3	6.3V	CM02X5R153-104, CT03X5R104
		CM02X5R101-103, CM05X5R224, CM105X5R225, CM21X5R106, CM316X5R226, CM02X7R101-222, CM316X7R106, CM32X7R226, CT105X5R105, CT21X5R475
×1.5	16V	CM21X5R225, CM316X5R106, CM32X5R106-226, CM05X7R104, CM21X7R225, CM32X7R106
	25V	CM21X5R105, CM316X5R475, CM32X5R106, CM21X7R105, CM32X7R106, CT21X5R225,
	50V	

Please contact us for the optional specifications of the capacitance chart.



Test Conditions and Standards

Test Conditions and Specifications for High Dielectric Type (X5R, X6S, X7R, X7S, X7T)
CM /CT Series (Standard Spec.2)

Test Items		Test Conditions (Complies with JIS C5101)	Specifications											
Capacitance Value (C)		Measure after heat treatment	Within tolerance											
Tanδ		<table><tr><th>Capacitance</th><th>Frequency</th><th>Volt</th></tr><tr><td rowspan="2">C≤10μF</td><td>1kHz±10%</td><td>1.0±0.2Vrms</td></tr><tr><td>*1kHz±10%</td><td>0.5±0.2Vrms</td></tr><tr><td>C>10μF</td><td>120Hz±10%</td><td>0.5±0.2Vrms</td></tr></table>	Capacitance	Frequency	Volt	C≤10μF	1kHz±10%	1.0±0.2Vrms	*1kHz±10%	0.5±0.2Vrms	C>10μF	120Hz±10%	0.5±0.2Vrms	Refer to capacitance chart
	Capacitance	Frequency	Volt											
	C≤10μF	1kHz±10%	1.0±0.2Vrms											
		*1kHz±10%	0.5±0.2Vrms											
C>10μF	120Hz±10%	0.5±0.2Vrms												
	*CM02X5R474M06A#, CM03X5R225□06A#, CM03X5R225M06A#035, CM03X5R475M06A#055, CM03X5R475M04A#, CM05X5R106M06A#, CT05X5R475M06A#033													
	The charge and discharge current of the capacitor must not exceed 50mA.													
Insulation Resistance (IR)		Apply the rated voltage for 1minute, and measure it in normal temperature and humidity. The charge and discharge current of the capacitor must not exceed 50mA.	Over 50MQ•μF											
Dielectric Resistance		Apply *2.5 times of the rated voltage for 1 to 5 seconds. *CM21X7S105, CM316X7S475/100V: twice The charge and discharge current of the capacitor must not exceed 50mA.	No problem observed											
Appearance		Microscope	No problem observed											
Termination Strength		Apply a sideward force of 500g (5N) to a PCB-mounted sample. note : 2N for 0201 size, and 1N for 01005 size. Exclude CT series with thickness of less than 0.66mm.	No problem observed											
Bending Strength		Glass epoxy PCB: Fulcrum spacing: 90mm, duration time 10 seconds. Exclude CT series with thickness of less than 0.66mm.	No significant damage with 1mm bending											
Vibration Test	Appearance	Take the initial value after heat treatment. Vibration frequency: 10 to 55 (Hz) Amplitude: 1.5mm	No problem observed											
	Capacitance	Sweeping condition: 10→55→10Hz/ 1 minute in X, Y and Z directions: 2 hours each, 6 hours in total, and place in normal temperature and humidity, then measure the sample after heat treatment.	Within tolerance											
	Tanδ		Within tolerance											
Soldering Heat Resistant	Appearance	Take the initial value after heat treatment.	No problem observed											
	Capacitance Variation	Soak the sample in 260°C±5°C solder for 10±0.5 seconds and place in normal temperature and humidity, and measure after heat treatment. (Pre-heating conditions)	Within±7.5%											
	Tanδ	<table><tr><th>Order</th><th>Temperature</th><th>Time</th></tr><tr><td>1</td><td>80 to 100°C</td><td>2 minutes</td></tr><tr><td>2</td><td>150 to 200°C</td><td>2 minutes</td></tr></table>	Order	Temperature	Time	1	80 to 100°C	2 minutes	2	150 to 200°C	2 minutes	Within tolerance		
	Order	Temperature	Time											
	1	80 to 100°C	2 minutes											
	2	150 to 200°C	2 minutes											
IR			Over 50MQ•μF											
Withstanding Voltage	The charge and discharge current of the capacitor must not exceed 50mA for IR and withstanding voltage measurement.		Resist without problem											
Solderability		Soaking condition <table><tr><td>Sn-3Ag-0.5Cu</td><td>245±5°C</td><td>3±0.5 sec.</td></tr><tr><td>Sn63 Solder</td><td>235±5°C</td><td>2±0.5 sec.</td></tr></table>	Sn-3Ag-0.5Cu	245±5°C	3±0.5 sec.	Sn63 Solder	235±5°C	2±0.5 sec.	Solder coverage : 95% min.					
Sn-3Ag-0.5Cu	245±5°C	3±0.5 sec.												
Sn63 Solder	235±5°C	2±0.5 sec.												
Temperature Cycle	Appearance	Take the initial value after heat treatment.	No problem observed											
	Capacitance Variation	(Cycle) Room temperature (3 min.)→Lowest operation temperature (30 min.)→Room temperature (3 min.)→Highest operation temperature(30 min.)	Within±7.5%											
	Tanδ		Within tolerance											
	IR	After 5 cycles, measure after heat treatment.	Over 50MQ•μF											
	Withstanding Voltage	The charge and discharge current of the capacitor must not exceed 50mA for IR and withstanding voltage measurement.	Resist without problem											
Moisture Resistant Load	Appearance	Take the initial value after heat treatment.	No problem observed											
	Capacitance Variation	After applying rated voltage for 500+12/-0 hours in the condition of 40°C±2°C and 90 to 95%RH, and place in normal temperature and humidity, then measure the sample after heat treatment.	Within±12.5%											
	Tanδ	The charge and discharge current of the capacitor must not exceed 50mA for IR measurement.	200% max. of initial value											
	IR		Over 10MQ•μF											
High-Temperature Load	Appearance	Take the initial value after heat treatment.	No problem observed											
	Capacitance Variation	After applying *□ times the rated voltage at the highest operation temperature for 1000+12/-0 hours, and measure the sample after heat treatment in normal temperature and humidity.	Within±12.5%											
	Tanδ	The charge and discharge current of the capacitor must not exceed 50mA for IR measurement.	200% max. of initial value											
	IR	*Apply 1.0 times when the rated voltage is 4V or less. Applied voltages for respective products are indicated in the chart below.	Over 10MQ•μF											

Heat treatment Expose sample in the temperature of 150 ± 0/ -10°C for 1 hour and leave the sample in normal temperature and humidity for 24 ± 2 hours.

Voltage to be applied in the High Temperature Load (Applied voltage is the multiple of the rated voltage)

Applied Voltage	Rated Voltage	Products	Applied Voltage	Rated Voltage	Products
×1.0	6.3V	CM02X5R224, CM02X5R474, CM03X5R225, CM03X5R475, CM05X5R106	×1.2	6.3V	CM03X5R105
		CM05X5R156, CM05X5R226, CM21X5R476, CM03X6S105, CM105X6S226		6.3V	CM03X5R474
		CT05X5R105, CT05X5R225, CT05X5R475	×1.3	10V	CM03X5R223-224, CM05X5R105-225
	10V	CM03X5R225, CM105X5R226, CM21X6S226		16V	CM05X5R105
		16V		CM03X5R105, CM05X5R225, CM05X5R475, CM105X5R226	×1.5
	CM05X6S225, CM21X6S226, CM21X7R475		CM105X7T106, CM21X7T226		
	25V	CM05X5R105, CM05X5R225, CM05X5R475, CM105X5R475	10V	CM03X5R105, CM05X5R474, CM05X5R475,	
		CM105X5R106, CM21X5R226, CM05X6S105	CM21X5R226, CM105X6S106, CM105X7T475		
	35V	CM05X5R105, CM105X5R475, CM105X5R106	25V	CM105X7R105, CM316X7R106	
	100V	CM21X7S105, CM316X7S475	50V	CM316X7R475	

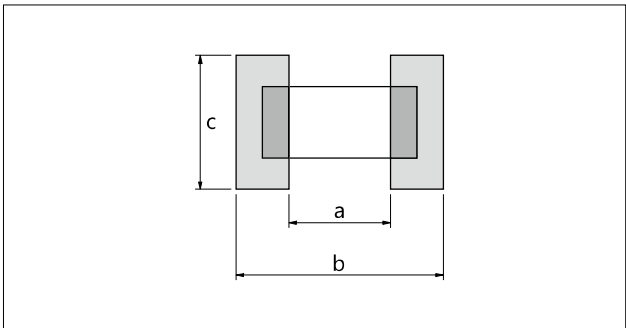
Please contact us for the optional specifications of the capacitance chart.



Test Conditions and Standards

Substrate for Adhesion Strength Test, Vibration Test, Soldering Heat Resistance Test, Temperature Cycle Test, Load Humidity Test, High-Temperature with Loading Test.

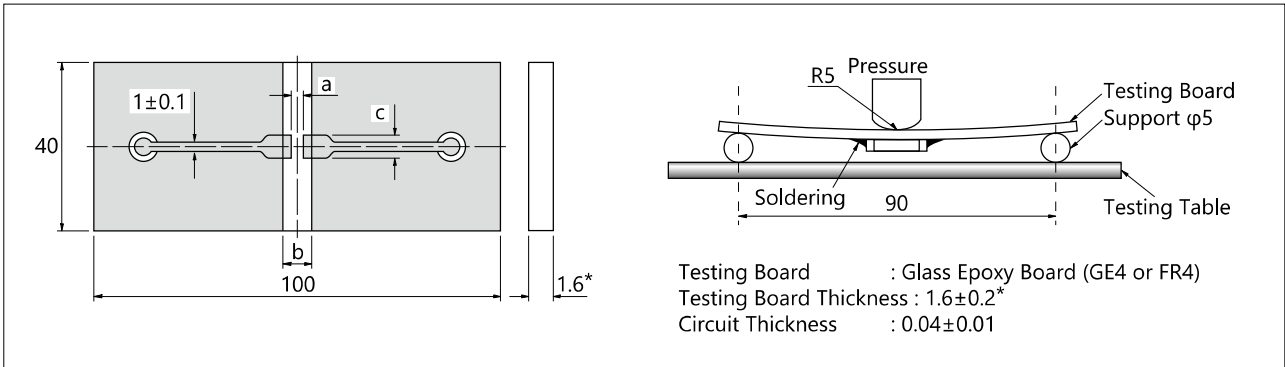
(Unit: mm)



Size (EIA Code)	a	b	c
02 (01005)	0.15	0.5	0.2
03 (0201)	0.26	0.92	0.32
05 (0402)	0.4	1.4	0.5
105 (0603)	1.0	3.0	1.2
21 (0805)	1.2	4.0	1.65
316 (1206)	2.2	5.0	2.0
32 (1210)	2.2	5.0	2.9

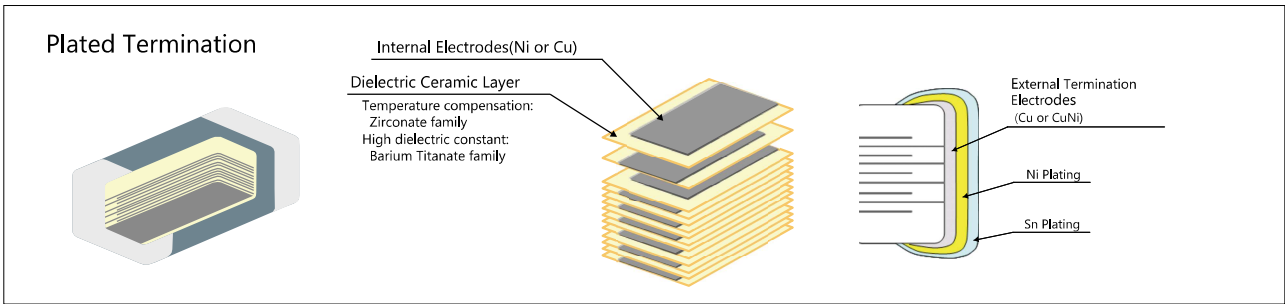
Substrate for Bending Test

(Unit: mm)



* 02, 03, 05 size 0.8±0.1mm

Structure



■Certification status

<ISO>

Acquired ISO 9001 quality management system certification.

<IATF>

Acquired IATF 16949 quality management system certification.

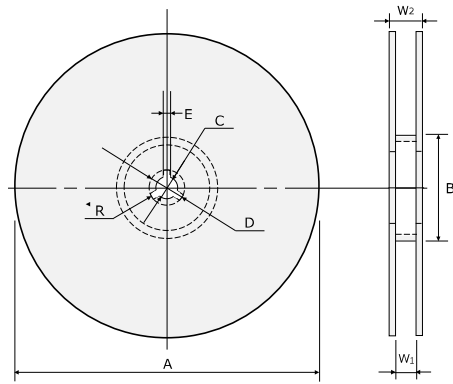
■Production plant

Kagoshima kokubu plant



Packaging Options Tape and Reel

Reel



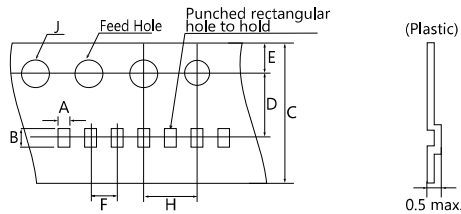
(Unit: mm)

Code Reel	A	B	C	D
7-inch Reel (CODE: T, H, Q)	180 $^{+0}_{-2.0}$	$\phi 60$ min.	13 ± 0.5	21 ± 0.8
7-inch Reel (CODE: P)	178 ± 2.0			
13-inch Reel (CODE: L, N, W)	330 ± 2.0			
Code Reel	E	W1	W2	R
7-inch Reel (CODE: T, H, Q)	2.0 ± 0.5	10.5 ± 1.5	16.5 max.	1.0
7-inch Reel (CODE: P)		4.35 ± 0.3	6.95 ± 1.0	
13-inch Reel (CODE: L, N, W)		9.5 ± 1.0	16.5 max.	

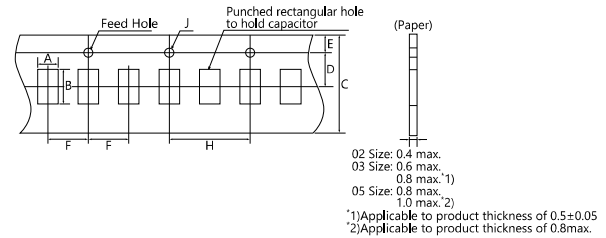
Carrier Tape

(Unit: mm)

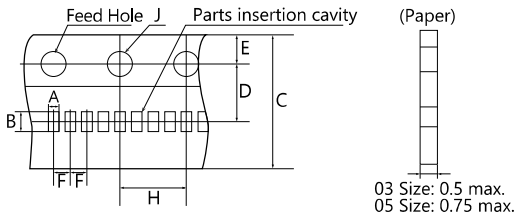
F=1mm (02 Size)



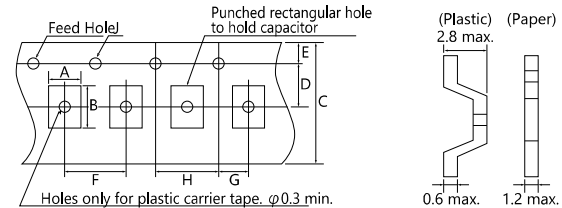
F=2mm (02, 03, 05 Size)



F=1mm (03, 05 Size)



F=4mm (105, 21, 316, 32 Size)



(Unit: mm)

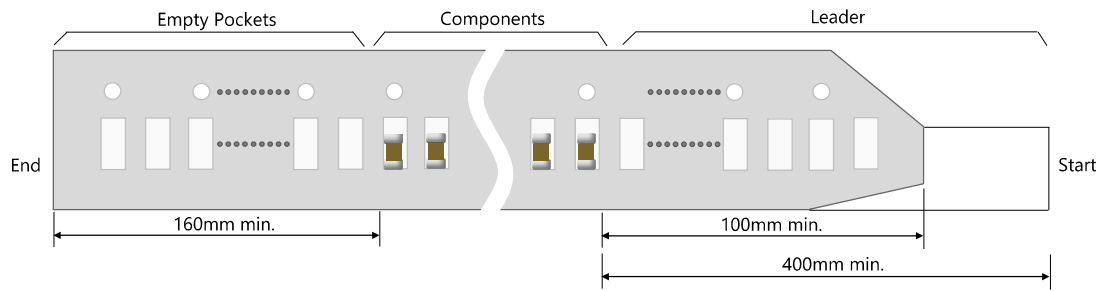
Size (EIA Code)	A	B	C	D	E	F	G	H	J	Carrier Tape	
										Width	Material
02 (01005)*	0.24 ± 0.02	0.44 ± 0.02	4.0 ± 0.08	1.8 ± 0.02	0.9 ± 0.05	1.0 ± 0.02	—	2.0 ± 0.04	0.8 ± 0.04	4	Plastic
	0.25 ± 0.03	0.45 ± 0.03	8.0 ± 0.3	3.5 ± 0.05	1.75 ± 0.1	2.0 ± 0.05	—	4.0 ± 0.1	$1.5 \pm 0.1/-0$	8	Paper
03 (0201)*	0.37 ± 0.03	0.67 ± 0.03	8.0 ± 0.3	3.5 ± 0.05	1.75 ± 0.1	1.0 ± 0.05	—	4.0 ± 0.05	$1.5 \pm 0.1/-0$	8	Paper
	0.39 ± 0.03	0.69 ± 0.03	8.0 ± 0.3	3.5 ± 0.05	1.75 ± 0.1	2.0 ± 0.05	—	4.0 ± 0.1	$1.5 \pm 0.1/-0$		
	0.42 ± 0.03	0.72 ± 0.03	8.0 ± 0.3	3.5 ± 0.05	1.75 ± 0.1	2.0 ± 0.05	—	4.0 ± 0.1	$1.5 \pm 0.1/-0$		
	0.44 ± 0.05	0.74 ± 0.05	8.0 ± 0.3	3.5 ± 0.05	1.75 ± 0.1	2.0 ± 0.05	—	4.0 ± 0.1	$1.5 \pm 0.1/-0$		
05 (0402)*	0.65 ± 0.1	1.15 ± 0.1	8.0 ± 0.3	3.5 ± 0.05	1.75 ± 0.1	1.0 ± 0.05	—	4.0 ± 0.05	$1.5 \pm 0.1/-0$	8	Paper
	0.75 ± 0.1		8.0 ± 0.3	3.5 ± 0.05	1.75 ± 0.1	2.0 ± 0.05	—	4.0 ± 0.1	$1.5 \pm 0.1/-0$		
	0.8 ± 0.1		8.0 ± 0.3	3.5 ± 0.05	1.75 ± 0.1	2.0 ± 0.05	—	4.0 ± 0.1	$1.5 \pm 0.1/-0$		
105 (0603)*	1.0 ± 0.2	1.8 ± 0.2	8.0 ± 0.3	3.5 ± 0.05	1.75 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	4.0 ± 0.1	$1.5 \pm 0.1/-0$	8	Paper
	1.1 ± 0.2	1.9 ± 0.2	8.0 ± 0.3	3.5 ± 0.05	1.75 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	4.0 ± 0.1	$1.5 \pm 0.1/-0$		
21 (0805)	1.5 ± 0.2	2.3 ± 0.2	8.0 ± 0.3	3.5 ± 0.05	1.75 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	4.0 ± 0.1	$1.5 \pm 0.1/-0$	8	Paper
										8	Plastic
316 (1206)	2.0 ± 0.2	3.6 ± 0.2	8.0 ± 0.3	3.5 ± 0.05	1.75 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	4.0 ± 0.1	$1.5 \pm 0.1/-0$	8	Paper
										8	Plastic
32 (1210)	2.9 ± 0.2	3.6 ± 0.2	8.0 ± 0.3	3.5 ± 0.05	1.75 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	4.0 ± 0.1	$1.5 \pm 0.1/-0$	8	Plastic

* Option



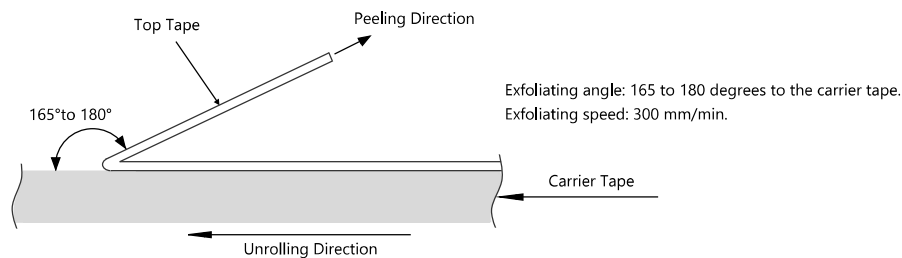
Packaging Options

Detail of leader and trailer



Adhesive tape

- 1) The exfoliative strength when peeling off the top tape from the carrier tape by the method of the following figure shall be *0.1 to 0.7N. *02 Size: 0.1 to 0.5N
- 2) When the top tape is peeled off, the adhesive stays on the top tape.
- 3) Chip capacitors will be in a state free without being stuck on the thermal adhesive tape.



Carrier tape

- 1) Chip will not fall off from carrier tape or carrier tape will not be damaged by bending than within a radius of 25mm.
- 2) The chip are inserted continuously without any empty pocket.
- 3) Chip will not be mis-mounted because of too big clearance between components and cavity. Also the waste of carrier tape will not fill a nozzle hole of mounting machine.

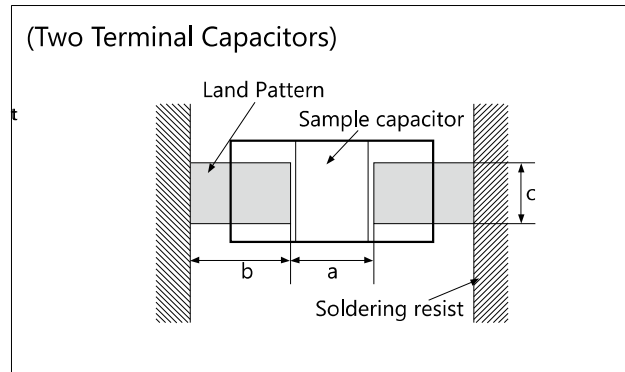


Surface Mounting Information

Dimensions for recommended typical land

Since the amount of solder (size of fillet) to be used has direct influence on the capacitor after mounting, the sufficient consideration is necessary.

When the amounts of solder is too much, the stress that a capacitor receives becomes larger. It may become the cause of a crack in the capacitor. When the land design of printed wiring board is considered, it is necessary to set up the form and size of land pattern so that the amount of solder is suitable.



Two Terminal Capacitors

(Unit: mm)

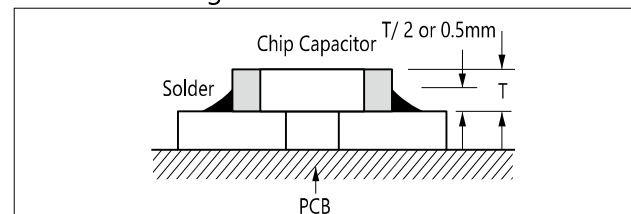
Size (EIA Code)	Dimension		Recommended land dimensions		
	L	W	a	b	c
02 (01005)	0.4±0.02	0.2±0.02	0.13 to 0.2	0.12 to 0.18	0.2 to 0.23
	0.6±0.03	0.3±0.03			
03 (0201)	0.6±0.05	0.3±0.05	0.2 to 0.25	0.25 to 0.35	0.3 to 0.4
	0.6±0.09	0.3±0.09			
05 (0402)	1.0±0.05	0.5±0.05	0.3 to 0.5	0.35 to 0.45	0.4 to 0.6
	1.0±0.15	0.5±0.15			
105 (0603)	1.0±0.2	0.5±0.2	0.4 to 0.6	0.4 to 0.5	0.5 to 0.75
	1.6±0.1	0.8±0.1	0.7 to 1.0	0.8 to 1.0	0.6 to 0.9
	1.6±0.15	0.8±0.15			
	1.6±0.2	0.8±0.2	0.8 to 1.0	0.8 to 1.0	0.8 to 1.1
21 (0805)	1.6±0.25	0.8±0.25			
	2.0±0.1	1.25±0.1	1.0 to 1.3	1.0 to 1.2	1.0 to 1.45
	2.0±0.15	1.25±0.15			
316 (1206)	2.0±0.2	1.25±0.2	1.0 to 1.3	1.0 to 1.2	1.25 to 1.55
	3.2±0.2	1.6±0.15	2.1 to 2.5	1.1 to 1.3	1.4 to 1.9
	3.2±0.2	1.6±0.2			
32 (1210)	3.2±0.3	1.6±0.3	2.1 to 2.5	1.1 to 1.3	1.6 to 2.0
	3.2±0.3	2.5±0.2	2.1 to 2.5	1.1 to 1.3	1.9 to 2.8

* Recommended land dimensions may differ depending on dimensional tolerance.

Design of printed circuit and Soldering

The recommended fillet height shall be 1/2 of the thickness of capacitors or 0.5mm. When mounting two or more capacitors in the common land, it is necessary to separate the land with the solder resist strike so that it may become the exclusive land of each capacitor.

Ideal Solder Height



Item	Prohibited	Recommended example : Separation by solder resist
Multiple parts mount		
Mount with leaded parts		
Wire soldering after mounting		
Side by side layout		

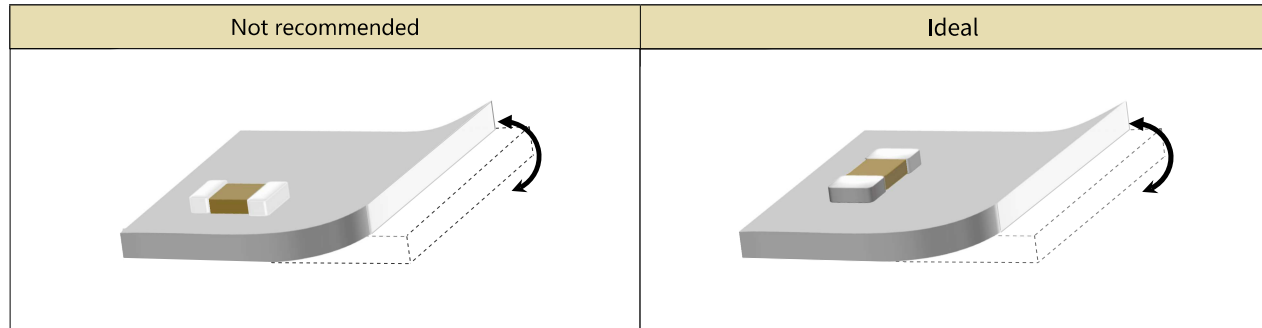


Surface Mounting Information

Mounting Design

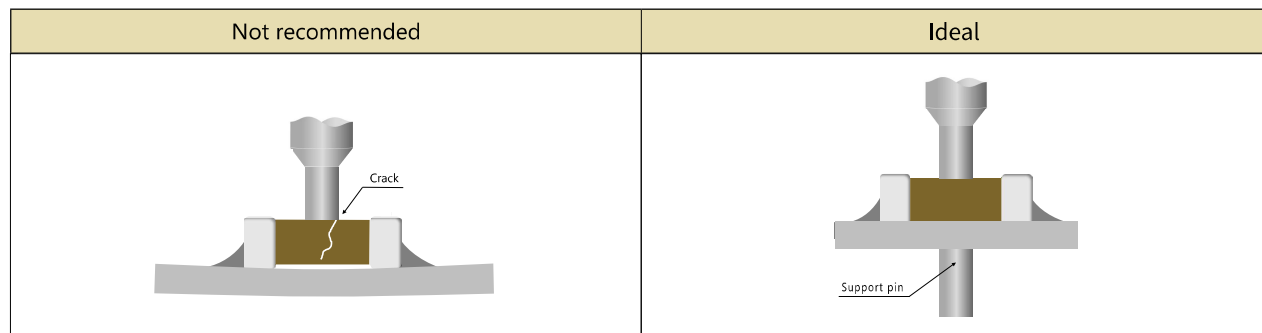
The chip could crack if the PCB warps during processing after the chip has been soldered.

Recommended chip position on PCB to minimize stress from PCB warpage



Actual Mounting

- 1) If the position of the vacuum nozzle is too low, a large force may be applied to the chip capacitor during mounting, resulting in cracking.
- 2) During mounting, set the nozzle pressure to a static load of 1 to 3 N.
- 3) To minimize the shock of the vacuum nozzle, provide a support pin on the back of the PCB to minimize PCB flexure.
- 4) Bottom position of pick up nozzle should be adjusted to the top surface of a substrate which camber is corrected.



Resin Mold

- 1) If a large amount of resin is used for molding the chip, cracks may occur due to contraction stress during curing. To avoid such cracks, use a low shrinkage resin.
- 2) The insulation resistance of the chip will degrade due to moisture absorption. Use a low moisture absorption resin.
- 3) Check carefully that the resin does not generate a decomposition gas or reaction gas during the curing process or during normal storage. Such gases may crack the chip capacitor or damage the device itself.



Surface Mounting Information

Soldering Method

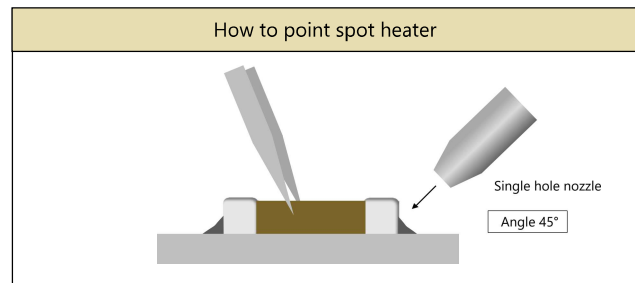
- 1) Ceramic is easily damaged by rapid heating or cooling. If some heat shock is unavoidable, preheat enough to limit the temperature difference (ΔT) to within 150 degree Celsius.
- 2) The product size $1.6 \times 0.8 \text{ mm}$ to $3.2 \times 1.6 \text{ mm}$ can be used in reflow and wave soldering, and the product size of bigger than $3.2 \times 1.6 \text{ mm}$, or smaller than $1.6 \times 0.8 \text{ mm}$ can be used in reflow.

Circuit shortage and smoking can be created by using capacitors which are used neglecting the above caution.

- 3) Please see our recommended soldering conditions.
- 4) In case of using Sn-Zn Solder, please contact us in advance.
- 5) The following condition is recommended for spot heater application.

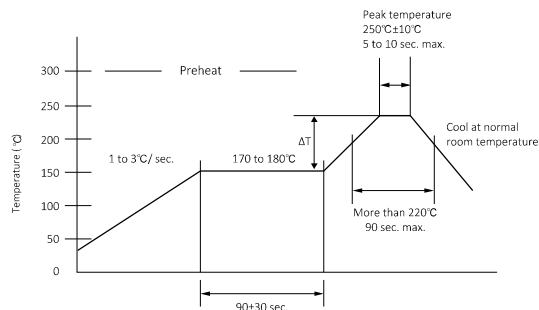
Recommended spot heater condition

Item	Condition
Distance	5mm min.
Angle	45°
Projection Temp.	400°C max.
Flow rate	Set at the minimum
Nozzle diameter	2φ to 4φ (Single hole type)
Application time	10 sec. max. (1206 and smaller) 30 sec. max. (1210 and larger)



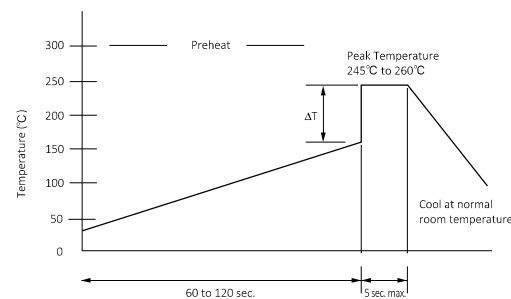
Recommended Temperature Profile (Sn-3Ag-0.5Cu)

Reflow



- ① Minimize soldering time.
- ② Ensure that allowable temperature difference does not exceed 150°C.
- ③ Ensure that allowable temperature difference does not exceed 130°C for $3.2 \times 2.5 \text{ mm}$ size or larger.
- ④ MLCC can withstand the above reflow conditions up to 3 times.
- ⑤ N₂ atmosphere is recommended for reflow of products of $0.4 \text{ mm} \times 0.2 \text{ mm}$ size or smaller.

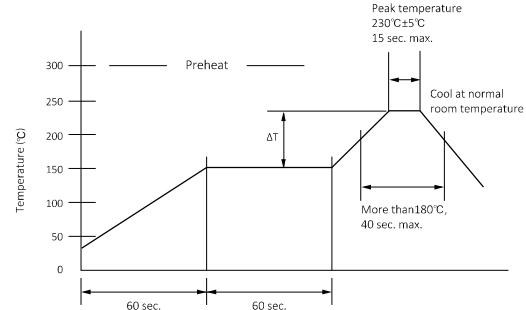
Wave



- ① Ensure that the chip capacitor is preheated adequately.
- ② Ensure that the temperature difference (ΔT) does not exceed 150°C.
- ③ Cool naturally after soldering.
- ④ Wave soldering is not applicable for chips with size of $3.2 \times 2.5 \text{ mm}$ or larger or $1.0 \times 0.5 \text{ mm}$ or smaller and capacitor arrays.

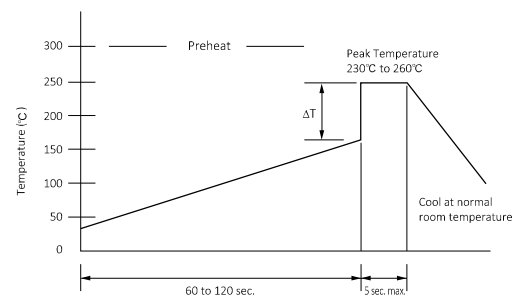
Recommended Temperature Profile (63Sn Solder)

Reflow



- ① Minimize soldering time.
- ② Ensure that the temperature difference (ΔT) does not exceed 150°C.
- ③ Ensure that the temperature difference (ΔT) does not exceed 130°C for $3.2 \times 2.5 \text{ mm}$ size or larger.
- ④ MLCC can withstand the above reflow conditions up to 3 times.

Wave



- ① Ensure that the chip capacitor is preheated adequately.
- ② Ensure that the temperature difference (ΔT) does not exceed 150°C.
- ③ Cool naturally after soldering.
- ④ Wave soldering is not applicable for chips with size of $3.2 \times 2.5 \text{ mm}$ or larger or $1.0 \times 0.5 \text{ mm}$ or smaller and capacitor arrays.



Precautions

Circuit Design

1. Once application and assembly environments have been checked, the capacitor may be used in conformance with the rating and performance which are provided in both the catalog and the specifications. Use exceeding that which is specified may result in inferior performance or cause a short, open, smoking, or flaming to occur, etc.
2. Please consult the manufacturer in advance when the capacitor is used in devices such as: devices which deal with human life, i.e. medical devices; devices which are highly public orientated; and devices which demand a high standard of liability.
Accident or malfunction of devices such as medical devices, space equipment and devices having to do with atomic power could generate grave consequence with respect to human lives or, possibly, a portion of the public. Capacitors used in these devices may require high reliability design different from that of general purpose capacitors.
3. Please use the capacitors in conformance with the operating temperature provided in both the catalog and the specifications.
Be especially cautious not to exceed the maximum temperature. In the situation the maximum temperature set forth in both the catalog and specifications is exceeded, the capacitor's insulation resistance may deteriorate, power may suddenly surge and short-circuit may occur.
The capacitor has a loss, and may self-heat due to equivalent series resistance when alternating electric current is passed therethrough. As this effect becomes especially pronounced in high frequency circuits, please exercise caution.
When using the capacitor in a (self-heating) circuit, please make sure the surface of the capacitor remains under the maximum temperature for usage. Also, please make certain temperature rises remain below 20°C.
4. Please keep voltage under the rated voltage which is applied to the capacitor. Also, please make certain the peak voltage remains below the rated voltage when AC voltage is super-imposed to the DC voltage.
In the situation where AC or pulse voltage is employed, ensure average peak voltage does not exceed the rated voltage.
Exceeding the rated voltage provided in both catalog and specifications may lead to defective withstanding voltage or, in worst case situations, may cause the capacitor to smoke or flame.
5. When the capacitor is to be employed in a circuit in which there is continuous application of a high frequency voltage or a steep pulse voltage, even though it is within the rated voltage, please inquire to the manufacturer.
In the situation the capacitor is to be employed using a high frequency AC voltage or a extremely fast rising pulse voltage, even though it is within the rated voltage, it is possible capacitor reliability will deteriorate.
6. It is a common phenomenon of high-dielectric products to have a deteriorated amount of static electricity due to the application of DC voltage.
Due caution is necessary as the degree of deterioration varies depending on the quality of capacitor materials, capacity, as well as the load voltage at the time of operation.
7. Do not use the capacitor in an environment where it might easily exceed the respective provisions concerning shock and vibration specified in the catalog and specifications.
In addition, it is a common piezo phenomenon of high dielectric products to have some voltage due to vibration or to have noise due to voltage change. Please contact sales in such case.
8. If the electrostatic capacity value of the delivered capacitor is within the specified tolerance, please consider this when designing the respective product in order that the assembled product function appropriately.
9. Please contact us upon using conductive adhesives.

Storage

Please note the following regarding the storage of delivered products.

1. Set the storage temperature to + 5 to + 40 °C and humidity to 20 ~ 70% RH. Other meteorological conditions are in accordance with classification 1 K2 of JIS C 60721 -3 -1.
2. Store in a place where corrosive gas (H₂S, SO₂, NO₂, Cl₂, etc.) does not exist in the atmosphere. Also, avoid exposure to salty moisture. In either case, this may cause oxidation corrosion of the terminal electrode, reducing solderability.

If you store the above delivered products according to the conditions listed above, it will satisfy the solderability standard for 6 months from the shipping date.

Safety application guideline and detailed information of electrical properties are also provided in kyocera web site;
URL: <https://ele.kyocera.com/en/product/capacitor/>



Multilayer Ceramic Chip Capacitors



Part Number List

General CM02 Series Size (JIS Code) : 01005(0402) # Packaging Code (Packaging quantity) : H(20,000pcs.) / N(80,000pcs.) / P(40,000pcs.)

Dielectric code CA	Capacitance	□:Tolerance	Voltage [V]	Part Number	Q	Dimension			# Packaging Code (quantity)
						L[mm]	W[mm]	T[mm]	
CG/CH	1pF	B:±0.1pF / C:±0.25pF	25	CM02CA1R0□25A#	420	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	1.5pF			CM02CA1R5□25A#	430	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	2pF			CM02CA2R0□25A#	440	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	3pF			CM02CA3R0□25A#	460	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	4pF			CM02CA4R0□25A#	480	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	5pF			CM02CA5R0□25A#	500	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	6pF	C:±0.25pF / D:±0.5pF	25	CM02CA6R0□25A#	520	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	7pF			CM02CA7R0□25A#	540	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	8pF			CM02CA8R0□25A#	560	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	9pF			CM02CA9R0□25A#	580	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	10pF			CM02CA100□25A#	600	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	12pF			CM02CA120□25A#	640	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	15pF	J:±5% / K:±10%	25	CM02CA150□25A#	700	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	18pF			CM02CA180□25A#	760	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	22pF			CM02CA220□25A#	840	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	27pF	J:±5% / K:±10%	16	CM02CA270□16A#	940	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	33pF			CM02CA330□16A#	1000	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	39pF			CM02CA390□16A#	1000	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	47pF			CM02CA470□16A#	1000	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	56pF			CM02CA560□16A#	1000	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	68pF			CM02CA680□16A#	1000	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	82pF			CM02CA820□16A#	1000	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	100pF			CM02CA101□16A#	1000	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	220pF			CM02CA221□16A#	1000	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P

General CM02 Series Size (JIS Code) : 01005(0402) # Packaging Code (Packaging quantity) : H(20,000pcs.) / N(80,000pcs.) / P(40,000pcs.)

Dielectric code	Capacitance	□:Tolerance	Voltage [V]	Part Number	Tanδ [%]	Dimension			# Packaging Code (quantity)
						L[mm]	W[mm]	T[mm]	
X5R	100pF	K:±10% / M:±20%	16	CM02X5R101□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	150pF			CM02X5R151□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	220pF			CM02X5R221□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	330pF			CM02X5R331□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	470pF			CM02X5R471□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	680pF			CM02X5R681□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	1000pF			CM02X5R102□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	1500pF			CM02X5R152□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	2200pF			CM02X5R222□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	3300pF			CM02X5R332□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	4700pF			CM02X5R472□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	6800pF			CM02X5R682□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	10000pF			CM02X5R103□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	15000pF	K:±10% / M:±20%	6.3	CM02X5R153□06A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	22000pF			CM02X5R223□06A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	33000pF			CM02X5R333□06A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	47000pF			CM02X5R473□06A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	68000pF			CM02X5R683□06A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	0.1μF	K:±10% / M:±20%	10	CM02X5R104□10A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	0.22μF		6.3	CM02X5R104□06A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	0.47μF			CM02X5R224□06A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
X7R	100pF	K:±10% / M:±20%	16	CM02X7R101□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	150pF			CM02X7R151□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	220pF			CM02X7R221□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	330pF			CM02X7R331□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	470pF			CM02X7R471□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	680pF			CM02X7R681□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	1000pF			CM02X7R102□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	1500pF			CM02X7R152□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	2200pF			CM02X7R222□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P

General CM03 Series Size (JIS Code) : 0201(0603) # Packaging Code (Packaging quantity) : H(15,000pcs.)(*10,000pcs.) / N(50,000pcs.) / Q(30,000pcs.) / W(150,000pcs.)

Dielectric code	Capacitance	□:Tolerance	Voltage [V]	Part Number	Tanδ [%]	Dimension			# Packaging Code (quantity)
						L[mm]	W[mm]	T[mm]	
X5R	22000pF	K:±10% / M:±20%	10	CM03X5R223□10A#	10.0	0.6±0.03	0.3±0.03	0.3±0.03	H / N / Q / W
	33000pF			CM03X5R333□10A#	10.0	0.6±0.03	0.3±0.03	0.3±0.03	H / N / Q / W
	47000pF			CM03X5R473□10A#	10.0	0.6±0.03	0.3±0.03	0.3±0.03	H / N / Q / W
	68000pF			CM03X5R683□10A#	10.0	0.6±0.03	0.3±0.03	0.3±0.03	H / N / Q / W
	0.1μF			CM03X5R104□10A#	10.0	0.6±0.03	0.3±0.03	0.3±0.03	H / N / Q / W
				CM03X5R224□25A#	12.5	0.6±0.09	0.3±0.09	0.3±0.09	H / N
	0.22μF	M:±20%	16	CM03X5R224□16A#	12.5	0.6±0.09	0.3±0.09	0.3±0.09	H / N
			10	CM03X5R224□10A#	10.0	0.6±0.03	0.3±0.03	0.3±0.03	H / N / Q / W
	0.47μF		6.3	CM03X5R474□06A#	12.5	0.6±0.03	0.3±0.03	0.3±0.03	H / N / Q / W
			16	CM03X5R105M16A#	20.0	0.6±0.09	0.3±0.09	0.3±0.09	H / N
	1μF		10	CM03X5R105M10A#	20.0	0.6±0.09	0.3±0.09	0.3±0.09	H / N
		K:±10% / M:±20%	6.3	CM03X5R105M10A#035	12.5	0.6±0.05	0.3±0.05	0.3±0.05	H / N / Q / W
			10	CM03X5R105□06A#	12.5	0.6±0.05	0.3±0.05	0.3±0.05	H / N / Q / W
	2.2μF	K:±10% / M:±20%	6.3	CM03X5R225M10A#	15.0	0.6±0.09	0.3±0.09	0.3±0.09	H / N
				CM03X5R225□06A#	12.5	0.6±0.09	0.3±0.09	0.3±0.09	H / N
				CM03X5R225M06A#035	12.5	0.6±0.05	0.3±0.05	0.3±0.05	H / N / Q / W
				CM03X5R475M06A#055	15.0	0.6±0.09	0.3±0.09	0.5±0.05	H(*)
X6S	4.7μF	M:±20%	4	CM03X6S105M10A#	12.5	0.6±0.09	0.3±0.09	0.3±0.09	H / N
			10	CM03X6S105M10A#	20.0	0.6±0.09	0.3±0.09	0.3±0.09	H / N
			6.3	CM03X6S105M06A#039	20.0	0.6±0.09	0.3±0.09	0.3±0.09	H / N
			4	CM03X6S105M04A#039	20.0	0.6±0.09	0.3±0.09	0.3±0.09	H / N
	4.7μF		2.5	CM03X6S475M02AH055	15.0	0.6±0.09	0.3±0.09	0.5±0.05	H(*)
X6T	0.22μF	K:±10% / M:±20%	10	CM03X6T224□10A#	12.5	0.6±0.09	0.3±0.09	0.3±0.09	H / N
	1μF		2.5	CM03X6T105M02A#035	12.5	0.6±0.05	0.3±0.05	0.3±0.05	H / N / Q / W
	2.2μF		4	CM03X6T225M04A#	12.5	0.6±0.09	0.3±0.09	0.3±0.09	H / N
X7S	0.1μF	K:±10% / M:±20%	2.5	CM03X6T225M02A#	12.5	0.6±0.09	0.3±0.09	0.3±0.09	H / N
X7T	1μF	M:±20%	6.3	CM03X7S104□06A#	10.0	0.6±0.03	0.3±0.03	0.3±0.03	H / N / Q / W
			6.3	CM03X7T105M06A#	12.5	0.6±0.09	0.3±0.09	0.3±0.09	H / N



Multilayer Ceramic Chip Capacitors



Part Number List



General CM05 Series Size (JIS Code) : 0402(1005) # Packaging Code (Packaging quantity) : H(10,000pcs.) / N(50,000pcs.)(*40,000pcs./*30,000pcs.) / Q(20,000pcs.) / W(100,000pcs.)

Dielectric code	Capacitance	□:Tolerance	Voltage [V]	Part Number	Tanδ [%]	Dimension			# Packaging Code (quantity)	
						L[mm]	W[mm]	T[mm]		
X5R	0.1μF	K:±10% / M:±20%	25	CM05X5R104□25A#	5.0	1.0±0.05	0.5±0.05	0.5±0.05	H / N / Q / W	
	0.22μF		16	CM05X5R224□16A#	12.5	1.0±0.05	0.5±0.05	0.5±0.05	H / N / Q / W	
	0.47μF		10	CM05X5R474□10A#	12.5	1.0±0.05	0.5±0.05	0.5±0.05	H / N / Q / W	
	1μF		35	CM05X5R105□35A#	10.0	1.0±0.05	0.5±0.05	0.5±0.05	H / N / Q / W	
			25	CM05X5R105□25A#	10.0	1.0±0.05	0.5±0.05	0.5±0.05	H / N / Q / W	
			16	CM05X5R105□16A#	10.0	1.0±0.05	0.5±0.05	0.5±0.05	H / N / Q / W	
			10	CM05X5R105□10A#	10.0	1.0±0.05	0.5±0.05	0.5±0.05	H / N / Q / W	
	2.2μF	M:±20%	35	CM05X5R225M35A#	12.5	1.0±0.2	0.5±0.2	0.5±0.2	H / N(*)	
			25	CM05X5R225M25A#	12.5	1.0±0.2	0.5±0.2	0.5±0.2	H / N(*)	
		K:±10% / M:±20%	16	CM05X5R225□16A#	12.5	1.0±0.05	0.5±0.05	0.5±0.05	H / N / Q / W	
			10	CM05X5R225□10A#	12.5	1.0±0.05	0.5±0.05	0.5±0.05	H / N / Q / W	
			4.7μF	M:±20%	25	CM05X5R475M25A#	12.5	1.0±0.2	0.5±0.2	0.5±0.2
	16				CM05X5R475M16A#	12.5	1.0±0.2	0.5±0.2	0.5±0.2	H / N(*)
	10μF	M:±20%		10	CM05X5R475M10A#	12.5	1.0±0.2	0.5±0.2	0.5±0.2	H / N(*)
				10	CM05X5R475M10A#065	12.5	1.0±0.15	0.5±0.15	0.5±0.15	H / N(*)
			6.3	CM05X5R106M10A#	12.5	1.0±0.2	0.5±0.2	0.5±0.2	H / N(*)	
			6.3	CM05X5R106M06A#	12.5	1.0±0.2	0.5±0.2	0.5±0.2	H / N(*)	
			6.3	CM05X5R156M06A#	12.5	1.0±0.15	0.5±0.15	0.5±0.15	H / N(*)	
			6.3	CM05X5R156M04A#	12.5	1.0±0.15	0.5±0.15	0.5±0.15	H / N(*)	
			6.3	CM05X5R226M06A#	12.5	1.0±0.2	0.5±0.2	0.5±0.2	H / N(*)	
			4	CM05X5R226M06A#080	12.5	1.0±0.2	0.5±0.2	0.8 max.	H / N(**)	
			4	CM05X5R226M04A#	12.5	1.0±0.2	0.5±0.2	0.5±0.2	H / N(*)	
16			CM05X6S474M16A#	12.5	1.0±0.05	0.5±0.05	0.5±0.05	H / N / Q / W		
X6S	M:±20%	10	CM05X6S474M10A#	12.5	1.0±0.05	0.5±0.05	0.5±0.05	H / N / Q / W		
		25	CM05X6S105□25A#	12.5	1.0±0.05	0.5±0.05	0.5±0.05	H / N / Q / W		
	K:±10% / M:±20%	10	CM05X6S105M10A#	12.5	1.0±0.05	0.5±0.05	0.5±0.05	H / N / Q / W		
		16	CM05X6S225M16A#055	12.5	1.0±0.2	0.5±0.2	0.55 max.	H / N		
		4.7μF	M:±20%	10	CM05X6S475M10A#	12.5	1.0±0.2	0.5±0.2	0.5±0.2	H / N(*)
				6.3	CM05X6S475M06A#	12.5	1.0±0.2	0.5±0.2	0.5±0.2	H / N(*)
	6.3			CM05X6S475M06A#065	12.5	1.0±0.15	0.5±0.15	0.5±0.15	H / N(*)	
	6.3			CM05X6S106M06A#	12.5	1.0±0.2	0.5±0.2	0.5±0.2	H / N(*)	
	4	CM05X6S226M04A#080	12.5	1.0±0.2	0.5±0.2	0.8 max.	H / N(**)			
	X7R	K:±10% / M:±20%	25	CM05X7R104□25A#	12.5	1.0±0.05	0.5±0.05	0.5±0.05	H / N / Q / W	
6.3			CM05X7R474□06A#	12.5	1.0±0.05	0.5±0.05	0.5±0.05	H / N / Q / W		
X7S	1μF	K:±10% / M:±20%	6.3	CM05X7S105□06A#	12.5	1.0±0.05	0.5±0.05	0.5±0.05	H / N / Q / W	
			4	CM05X7S105□04A#	12.5	1.0±0.05	0.5±0.05	0.5±0.05	H / N / Q / W	
	2.2μF	K:±10% / M:±20%	10	CM05X7S225□10A#065	5.0	1.0±0.15	0.5±0.15	0.5±0.15	H / N(*)	
			6.3	CM05X7S225□06A#065	5.0	1.0±0.15	0.5±0.15	0.5±0.15	H / N(*)	
			4	CM05X7S225M04A#065	5.0	1.0±0.15	0.5±0.15	0.5±0.15	H / N(*)	
X7T	4.7μF	M:±20%	10	CM05X7T475M10A#	12.5	1.0±0.2	0.5±0.2	0.5±0.2	H / N(*)	



General CM105 Series Size (JIS Code) : 0603(1608) # Packaging Code (Packaging quantity) : T(4,000pcs.) / L(10,000pcs.)

Dielectric code	Capacitance	□:Tolerance	Voltage [V]	Part Number	Tanδ [%]	Dimension			# Packaging Code (quantity)
						L[mm]	W[mm]	T[mm]	
X5R	2.2μF	K:±10% / M:±20%	16	CM105X5R225□16A#	12.5	1.6±0.1	0.8±0.1	0.8±0.1	T / L
	4.7μF		35	CM105X5R475□35A#	12.5	1.6±0.2	0.8±0.2	0.8±0.2	T / L
			25	CM105X5R475□25A#	12.5	1.6±0.2	0.8±0.2	0.8±0.2	T / L
			10	CM105X5R475□10A#	12.5	1.6±0.15	0.8±0.15	0.8±0.15	T / L
	10μF	M:±20%	35	CM105X5R106M35A#	15.0	1.6±0.2	0.8±0.2	0.8±0.2	T / L
	22μF	K:±10% / M:±20%	25	CM105X5R106□25A#	15.0	1.6±0.2	0.8±0.2	0.8±0.2	T / L
		M:±20%	16	CM105X5R226M16A#	12.5	1.6±0.2	0.8±0.2	0.8±0.2	T / L
	47μF		6.3	CM105X5R226M10A#	12.5	1.6±0.2	0.8±0.2	0.8±0.2	T / L
X6S	10μF	M:±20%	16	CM105X6S106M16A#	15.0	1.6±0.2	0.8±0.2	0.8±0.2	T / L
	22μF	K:±10% / M:±20%	10	CM105X6S106□10A#	15.0	1.6±0.2	0.8±0.2	0.8±0.2	T / L
		M:±20%	6.3	CM105X6S226M10A#	12.5	1.6±0.2	0.8±0.2	0.8±0.2	T / L
			4	CM105X6S226M06A#	12.5	1.6±0.2	0.8±0.2	0.8±0.2	T / L
			47μF	CM105X6S226M04A#	12.5	1.6±0.2	0.8±0.2	0.8±0.2	T / L
X7R	1μF	K:±10% / M:±20%	25	CM105X7R105□25A#	5.0	1.6±0.1	0.8±0.1	0.8±0.1	T / L
	2.2μF		6.3	CM105X7R225□06A#	12.5	1.6±0.15	0.8±0.15	0.8±0.15	T / L
X7T	4.7μF	K:±10% / M:±20%	10	CM105X7T475□10A#	12.5	1.6±0.2	0.8±0.2	0.8±0.2	T / L
	10μF	M:±20%	10	CM105X7T106M10A#	15.0	1.6±0.2	0.8±0.2	0.8±0.2	T / L
			6.3	CM105X7T106M06A#	15.0	1.6±0.2	0.8±0.2	0.8±0.2	T / L



General CM21 Series Size (JIS Code) : 0805(2012) # Packaging Code (Packaging quantity) : T(3,000pcs.) / L(10,000pcs.)

Dielectric code	Capacitance	□:Tolerance	Voltage [V]	Part Number	Tanδ [%]	Dimension			# Packaging Code (quantity)
						L[mm]	W[mm]	T[mm]	
X5R	1μF	K:±10% / M:±20%	50	CM21X5R105□50A#	12.5	2.0±0.1	1.25±0.1	1.25±0.1	T / L
	2.2μF		25	CM21X5R225□25A#	12.5	2.0±0.2	1.25±0.2	1.25±0.2	T / L
	10μF		16	CM21X5R106□16A#	12.5	2.0±0.2	1.25±0.2	1.25±0.2	T / L
	22μF	M:±20%	25	CM21X5R226M25A#	12.5	2.0±0.2	1.25±0.2	1.25±0.2	T / L
	47μF		10	CM21X5R226M10A#	12.5	2.0±0.2	1.25±0.2	1.25±0.2	T / L
	100μF		6.3	CM21X5R476M06A#	10.0	2.0±0.2	1.25±0.2	1.25±0.2	T / L
			4	CM21X5R107M04A#	12.5	2.0±0.2	1.25±0.2	1.25±0.2	T / L
X6S	22μF	M:±20%	16	CM21X6S226M16A#	12.5	2.0±0.2	1.25±0.2	1.25±0.2	T / L
	10		CM21X6S226M10A#	12.5	2.0±0.2	1.25±0.2	1.25±0.2	T / L	
	6.3		CM21X6S226M06A#	12.5	2.0±0.2	1.25±0.2	1.25±0.2	T / L	
	47μF		10.0	CM21X6S476M04A#	10.0	2.0±0.2	1.25±0.2	1.25±0.2	T / L
			100μF	4	CM21X6S107M04A#	12.5	2.0±0.2	1.25±0.2	1.25±0.2
X7R	1μF	K:±10% / M:±20%	50	CM21X7R105□50A#	5.0	2.0±0.2	1.25±0.2	1.25±0.2	T / L
	2.2μF		25	CM21X7R225□25A#	12.5	2.0±0.2	1.25±0.2	1.25±0.2	T / L
	4.7μF		16	CM21X7R475□16A#	12.5	2.0±0.2	1.25±0.2	1.25±0.2	T / L
	10μF		6.3	CM21X7R106□06A#	12.5	2.0±0.2	1.25±0.2	1.25±0.2	T / L
X7S	1μF	K:±10% / M:±20%	100	CM21X7S105□100A#	5.0	2.0±0.2	1.25±0.2	1.25±0.2	T / L
X7T	22μF	M:±20%	10	CM21X7T226M10A#	12.5	2.0±0.2	1.25±0.2	1.25±0.2	T / L
			6.3	CM21X7T226M06A#	12.5	2.0±0.2	1.25±0.2	1.25±0.2	T / L



Multilayer Ceramic Chip Capacitors



Part Number List



General CM316 Series Size (JIS Code) : 1206(3216) # Packaging Code (Packaging quantity) : T(2,500pcs.)(*2,000pcs.) / L(5,000pcs.)

Dielectric code	Capacitance	□:Tolerance	Voltage [V]	Part Number	Tanδ [%]	Dimension			# Packaging Code (quantity)
						L[mm]	W[mm]	T[mm]	
X5R	2.2μF	K:±10% / M:±20%	100	CM316X5R225□100A#	5.0	3.2±0.2	1.6±0.2	1.6±0.2	T / L
	4.7μF		25	CM316X5R225□25A#	5.0	3.2±0.2	1.6±0.15	1.6±0.15	T / L
	10μF		50	CM316X5R475□50A#	5.0	3.2±0.2	1.6±0.2	1.6±0.2	T / L
	22μF		25	CM316X5R106□25A#	12.5	3.2±0.2	1.6±0.2	1.6±0.2	T / L
	22μF		16	CM316X5R226□16A#	12.5	3.2±0.2	1.6±0.2	1.6±0.2	T / L
X7R	4.7μF	K:±10% / M:±20%	50	CM316X7R475□50A#	5.0	3.2±0.2	1.6±0.2	1.6±0.2	T / L
	10μF		25	CM316X7R106□25A#	5.0	3.2±0.2	1.6±0.2	1.6±0.2	T / L
	22μF		16	CM316X7R106□16A#	12.5	3.2±0.2	1.6±0.2	1.6±0.2	T / L
	22μF		10	CM316X7R226□10A#	7.5	3.2±0.2	1.6±0.2	1.6±0.2	T / L
	22μF		6.3	CM316X7R226□06A#	12.5	3.2±0.2	1.6±0.2	1.6±0.2	T / L
X7S	2.2μF	K:±10% / M:±20%	100	CM316X7S225□100A#	5.0	3.2±0.2	1.6±0.2	1.6±0.2	T / L
	4.7μF			CM316X7S475□100AT	5.0	3.2±0.3	1.6±0.3	1.6±0.3	T(*)
	22μF			CM316X7S226□10A#	7.5	3.2±0.2	1.6±0.2	1.6±0.2	T / L



General CM32 Series Size (JIS Code) : 1210(3225) # Packaging Code (Packaging quantity) : T(1,000pcs.) / L(4,000pcs.)

Dielectric code	Capacitance	□:Tolerance	Voltage [V]	Part Number	Tanδ [%]	Dimension			# Packaging Code (quantity)
						L[mm]	W[mm]	T[mm]	
X5R	10μF	K:±10% / M:±20%	50	CM32X5R106□50A#	5.0	3.2±0.3	2.5±0.2	2.5±0.2	T / L
			25	CM32X5R106□25A#	12.5	3.2±0.3	2.5±0.2	2.5±0.2	T / L
			16	CM32X5R106□16A#	5.0	3.2±0.3	2.5±0.2	2.5±0.2	T / L
			25	CM32X5R226□25A#	12.5	3.2±0.3	2.5±0.2	2.5±0.2	T / L
X7R	10μF	K:±10% / M:±20%	50	CM32X7R106□50A#	5.0	3.2±0.3	2.5±0.2	2.5±0.2	T / L
			25	CM32X7R106□25A#	12.5	3.2±0.3	2.5±0.2	2.5±0.2	T / L
			16	CM32X7R226□16A#	12.5	3.2±0.3	2.5±0.2	2.5±0.2	T / L



Notes for Using the Catalog

1. Specifications described in this catalog are for references. Products specifications shall be based on written documents agreed by each party.
2. Contents in this catalog are subject to change without notice. It is recommended to confirm the latest information at the time of usage. Also, Kyocera Electronic Components Catalog is revised once a year. We may not be able to accept requests based on old catalogs.
3. Products in this catalog are intended to be used in general electronic equipment such as office equipment, audio and visual equipment, communication equipment, measurement instrument and home appliances. It is absolutely recommended to consult with our sales representatives in advance upon planning to use our products in applications which require extremely high quality and reliability such as aircraft and aerospace equipment, traffic systems, safety systems, power plant and medical equipment including life maintenance systems.
4. Even though we strive for improvements of quality and reliability of products, it is requested to design with enough safety margin in equipment or systems in order not to threaten human lives directly or damage human bodies or properties by an accidental result of products.
5. It is requested to design based on guaranteed specifications for such as maximum ratings, operating voltage and operating temperature. It is not the scope of our guarantee for unsatisfactory results due to misuse or inadequate usage of products in the catalog.
6. Operation summaries and circuit examples in this catalog are intended to explain typical operation and usage of the product. It is recommended to perform circuit and assembly design considering surrounding conditions upon using products in this catalog.
7. Technical information described in this catalog is meant to explain typical operations and applications of products, and it is not intended to guarantee or license intellectual properties or other industrial rights of the third party or Kyocera.
8. Trademarks, logos and brand names used in this catalog are owned by Kyocera or the corresponding third party.
9. Certain products in this catalog are subject to the Foreign Exchange and Foreign Trade Control Act of Japan, and require the license from Japanese Government upon exporting the restricted products and technical information under the law.
Besides, it is requested not to use products and technical information in the catalog for the development and/or manufacture of weapons of mass destruction or other conventional weapons, nor to provide them to any third party with the possibility of having such purposes.
10. It is prohibited to reprint and reproduce a part or whole of this catalog without permission.
11. Contents described herein are as of October 2022.