KYOCERA AVX

Capacitors

2023

KYOCERA

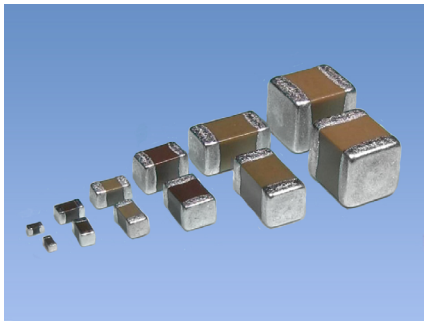
INDEX

Capacitors

- If you have any requests for capacitance value or specifications other than those listed in this catalog, please contact our sales team.

CATM2210MH29100E
As of October 2022

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：2.2μF
⑤Tolerance ：±20%
⑥Voltage ：6.3Vdc
⑦Termination：Sn
⑧Packaging ：Cavity pitch 2mm / Reel Size φ180

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 C0G 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	-55 to 125	±15	
X7S		±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	1μF
106	10μF
107	100μF

⑤Tolerance Code

Temperature Compensation Type (C0G)	
CODE	Tolerance
A*	±0.05pF
B	±0.1pF
C	±0.25pF
D	±0.5pF
G*	±2%
J	±5%
K	±10%

*：Option

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

*：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.

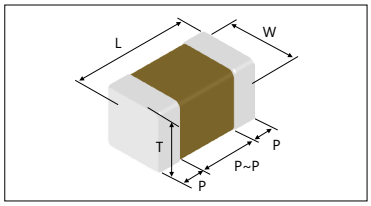
⑧Packaging Code

CODE	Size Code	Cavity pitch	Reel size
T	105 to 32	4mm	φ180
H	02 to 05	2mm	
Q	03/05	1mm	
P	02	1mm	
L	105 to 32	4mm	φ330
N	02 to 05	2mm	
W	03/05	1mm	

CATM2210MH29100E
As of October 2022

Dimension

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



■Packaging Code

20kp（E 8 / 2）

kp means 1000 pieces

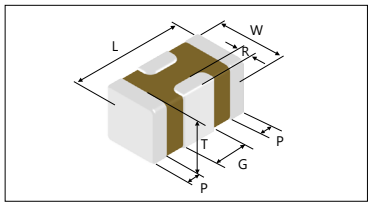
Taping Material	
Code	Material
E	Plastic
P	Paper

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	0.6±0.05	0.3±0.05	0.3±0.05	0.13	0.23	0.19		
			D	0.6±0.09	0.3±0.09	0.22 max.				15kp(P8/2)	50kp(P8/2)
			E			0.3±0.09					
			F			0.5±0.05				10kp(P8/2)	—
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	0.5±0.05	0.22 max.				10kp(P8/2)	50kp(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)	—
			F			0.5 max.				10kp(P8/2)	50kp(P8/2)
			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)
105	0603	1608	A	1.6±0.1	0.8±0.1	0.55 max.	0.2	0.6	0.5	4kp(P8/4)	10kp(P8/4)
			B			0.8±0.1					
			C	1.6±0.15	0.8±0.15	0.8±0.15					
			D	1.6±0.2	0.8±0.2	0.8±0.2					
21	0805	2012	A	2.0±0.1	1.25±0.1	1.25±0.1	0.2	0.75	0.7	3kp(E8/4)	10kp(E8/4)
			B	2.0±0.15	1.25±0.15	0.95 max.				4kp(P8/4)	10kp(P8/4)
			C	2.0±0.2	1.25±0.2	0.95 max.					
			D			1.25±0.2				3kp(E8/4)	10kp(E8/4)
316	1206	3216	A	3.2±0.2	1.6±0.2	0.95 max.	0.3	0.85	1.4	4kp(P8/4)	—
			B	3.2±0.2	1.6±0.15	1.6±0.15				2.5kp(E8/4)	5kp(E8/4)
			C		1.6±0.2	1.6±0.2					
			D	3.2±0.3	1.6±0.3	1.6±0.3	0.3	0.85	1.9	2kp(E8/4)	—
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					

CATM2210MH29100E
As of October 2022

■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

Part Number List：P26

●Capacitance chart ■ Standard Spec.1

Size (EIA Code)		CM02 (01005)	
Rated Voltage(Vdc) / Capacitance		16	25
1R0	1 pF		A
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	A	
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	A	

Please contact for capacitance value other than standard.
Please refer to page 13 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

X5R Dielectric

Part Number List : P26- 28

●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						B7								
473 47000 pF														
683 68000 pF														
104 0.1 μF		A8											B3	
224 0.22 μF	A8						E8	E8				B8		
474 0.47 μF					B8						B8			
105 1 μF					C8	C8 E10	E10				B7	B7	B7	B7
225 2.2 μF					C8/E8	E9					B8	B8	G8/H8	H8
475 4.7 μF				E8	F9						D8 H8	H8	H8	
106 10 μF										H8	H8			
156 15 μF									D8	D8				
226 22 μF									H8	H8 J8				
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											A8							
225 2.2 μF			B8							D8			B3		C3			
475 4.7 μF		C8		D8	D8									C3				
106 10 μF				D9	D9				D8				C8			A3	A8	A3
226 22 μF		D8	D8					D8		D8		C8						
476 47 μF	D8						D7											
107 100 μF						D8												

Please contact for capacitance value other than standard.
Please refer to page 14 for the test method and specifications of Standard Specification 1.
Please refer to page 15 for the test method and specifications of Standard Specification 2.

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

Two digits alphanumerics 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									
					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
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

X6S/X6T Dielectric

Part Number List：P26-27

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

Size (EIA Code)		X6S CM03 (0201)				X6S CM05 (0402)					X6S CM105 (0603)				X6S 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							B8	B8									
105	1 μF		E10	E10	E10					B8								
225	2.2 μF								G8									
475	4.7 μF	F9					D8/H8 H8	H8										
106	10 μF												D9 D8	D9				
226	22 μF					J8					D8 D8	D8			D7 D8	D8	D8	D8
476	47 μF																	
107	100 μF																	

Size (EIA Code)		X6T CM03 (0201)		
Rated Voltage (Vdc) / Capacitance		2.5	4	10
224	0.22 μF			E8
474	0.47 μF			
105	1 μF	C8		
225	2.2 μF	E8	E8	
475	4.7 μF			
106	10 μF			

Please contact for capacitance value other than standard.
Please refer to page 15 for the test method and specifications of Standard Specification 2.

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

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±0.2mm, W: 0.8±0.2mm, T: 0.8±0.2mm, Tanδ: 15.0% max.

Size	Dimension Code	Dimension (mm) L	W	T	Packaging φ180 Reel Code	Quantity (pcs.)	Taping Material	Taping Width (mm)	Cavity Pitch (mm)	φ330 Reel 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

X7R Dielectric

Part Number List : P26-28

●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								
475	4.7 μF					C3			
106	10 μF			C8	C3			A8	A3
226	22 μF	C8	C5				A8		

Please contact for capacitance value other than standard.
Please refer to page 14 for the test method and specifications of Standard Specification 1.
Please refer to page 15 for the test method and specifications of Standard Specification 2.

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

Two digits alphanumerics 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.

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

X7S/X7T Dielectric

Part Number List : P26-28

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

		X7S							X7T					
Size (EIA Code)		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			E8					
225	2.2 μF		D3	D3	D3			C3						
475	4.7 μF							D3		H8		D8		
106	10 μF										D9	D9		
226	22 μF						C5						D8	D8

Please contact for capacitance value other than standard.

Please refer to page 14 for the test method and specifications of Standard Specification 1.
Please refer to page 15 for the test method and specifications of Standard Specification 2.

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

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±0.2mm, W: 0.8±0.2mm, T: 0.8±0.2mm, Tanδ: 15.0% 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)
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	—	—	—	—	—

■Features

This low profile series is ideal where height clearance is limited

■Applications

Circuits requiring a compact, low-profile design, such as module and memory cards.

Temperature Compensation Dielectric

Part Number List：P28

●Capacitance chart ■ Standard Spec.1

Size (EIA Code)		CT316 (1206)
Rated Voltage(Vdc) / Capacitance		50
103	10000 pF	
223	22000 pF	
473	47000 pF	
104	0.1 μF	
134	0.13 μF	A

Please contact for capacitance value other than standard.
Please refer to page 13 for the test method and specifications of Standard Specification 1.

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

(Example) In case of "A" for CT316;
L: 3.2±0.2mm, W: 1.6±0.2mm, T: 0.95mm 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)
316	A	3.2±0.2	1.6±0.2	0.95 max.	T	4,000	Paper	8	4	—	—	—	—	—

X5R Dielectric

Part Number List : P28

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

Size (EIA Code)		CT03 (0201)	CT05 (0402)	CT105 (0603)	CT21 (0805)	
Rated Voltage(Vdc) / Capacitance		6.3	6.3	16	16	50
104	0.1 μF	A8				
224	0.22 μF					
474	0.47 μF					
105	1 μF	D7	A8	A8		
225	2.2 μF					C3
475	4.7 μF		E9		B8	
106	10 μF		F9			

Please contact for capacitance value other than standard.
Please refer to page 14 for the test method and specifications of Standard Specification 1.
Please refer to page 15 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.

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

(Example) In case of "A8" for CT03;
L: 0.6±0.03mm, W: 0.3±0.03mm, T: 0.22mm max., Tanδ: 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)
03	A	0.6±0.03	0.3±0.03	0.22 max.	Q	30,000	Paper	8	1	W	150,000	Paper	8	1
					H	15,000	Paper	8	2	N	50,000	Paper	8	2
	D	0.6±0.09	0.3±0.09	0.22 max.	H	15,000	Paper	8	2	N	50,000	Paper	8	2
05	A	1.0±0.05	0.5±0.05	0.33 max.	Q	20,000	Paper	8	1	W	100,000	Paper	8	1
					H	10,000	Paper	8	2	N	50,000	Paper	8	2
	E	1.0±0.2	0.5±0.2	0.33 max.	H	10,000	Paper	8	2	—	—	—	—	—
	F	1.0±0.2	0.5±0.2	0.5 max.	H	10,000	Paper	8	2	N	50,000	Paper	8	2
105	A	1.6±0.1	0.8±0.1	0.55 max.	T	4,000	Paper	8	4	L	10,000	Paper	8	4
21	B	2.0±0.15	1.25±0.15	0.95 max.	T	4,000	Paper	8	4	L	10,000	Paper	8	4
	C	2.0±0.2	1.25±0.2	0.95 max.	T	4,000	Paper	8	4	L	10,000	Paper	8	4

X6S/X6T Dielectric

Part Number List : P28

●Capacitance chart ▨ Optional Spec.

		X6S	X6T		
Size (EIA Code)		CT03 (0201)	CT03 (0201)	CT05 (0402)	
Rated Voltage(Vdc) / Capacitance		4	4	2.5	4
104	0.1 μF	A8			
224	0.22 μF				
474	0.47 μF				
105	1 μF		D8		C8
225	2.2 μF				
475	4.7 μF				
106	10 μF			F8	

Please contact for capacitance value other than standard.

Tan δ Code	Tan δ
8	12.5% max.

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

(Example) In case of "D8" for CT03;
L: 0.6±0.09mm, W: 0.3±0.09mm, T: 0.22mm max., Tanδ: 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)
03	A	0.6±0.03	0.3±0.03	0.22 max.	Q	30,000	Paper	8	1	W	150,000	Paper	8	1
					H	15,000	Paper	8	2	N	50,000	Paper	8	2
	D	0.6±0.09	0.3±0.09	0.22 max.	H	15,000	Paper	8	2	N	50,000	Paper	8	2
05	C	1.0±0.1	0.5±0.05	0.22 max.	H	10,000	Paper	8	2	N	50,000	Paper	8	2
	F	1.0±0.2	0.5±0.2	0.5 max.	H	10,000	Paper	8	2	N	50,000	Paper	8	2

■Features

Ultra-miniature size (0.4x0.2mm)
Low loss characteristics suitable for high frequency

■Applications

RF power amplifier for mobiles such as impedance matching purpose.

Temperature Compensation Dielectric

Part Number List：P29

●Capacitance chart ■ Standard Spec.1

Size (EIA Code)		CU02 (01005)	
Rated Voltage (Vdc) / Capacitance		16	25
R20	0.2 pF	A	
R50	0.5 pF	A	
1R0	1 pF	A	
1R5	1.5 pF	A	
2R0	2 pF	A	
3R0	3 pF	A	
4R0	4 pF	A	A
5R0	5 pF	A	A
6R0	6 pF	A	A
7R0	7 pF	A	A
8R0	8 pF	A	A
9R0	9 pF	A	A
100	10 pF	A	A
120	12 pF	A	A
150	15 pF	A	
180	18 pF	A	
220	22 pF	A	
240	24 pF	A	

Please contact for capacitance value other than standard.
Please refer to page 13 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 CU02;
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

■Features

With our unique materials and manufacturing technology, we provide products that fully bring out the performance of equipment even in the highly reliable environment required for automotive application.

■Applications

●ECU,ADAS,ESC,ABS,LCD panel

X7R/X7S Dielectric

Part Number List：P29

●Capacitance chart　Standard Spec.3

	X7R	X7S
Size (EIA Code)	AR05 (0402)	AR21 (0805)
Rated Voltage (Vdc) / Capacitance	6.3	10
104 0.1 μF		
224 0.22 μF		
474 0.47 μF		
105 1 μF	B5	
225 2.2 μF		
475 4.7 μF		
106 10 μF		D7

Please contact for capacitance value other than standard.

Please refer to page 16 to 17 for the test method and specifications of Standard Specification 3.

Tan δ Code	Tan δ
5	7.5% max.
7	10.0% max.

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

(Example)　In case of "B5" for AR05;
L: 1.0±0.05mm, W: 0.5±0.05mm, T: 0.5±0.05mm, Tanδ: 7.5% 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)
05	B	1.0±0.05	0.5±0.05	0.5±0.05	H	10,000	Paper	8	2	N	50,000	Paper	8	2
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

■Features

0402 Size. Rated current up to 2A MAX.
With unique circuit structure, this three terminal capacitor enables noise reduction in wide fequency range. With its high capacitance, it is possible to reduce the number of components being used.

■Applications

●Decoupling applications of power supply lines around high-speed operating processors such as smartphones, tablets, and wearable devices.

X5R Dielectric

Part Number List : P29

●Capacitance chart Standard Spec.2

Size (EIA Code)		KNH05 (0402)
Rated Voltage(Vdc) / Capacitance		4
105	1 μF	
435	4.3 μF	A
106	10 μF	C
156	15 μF	B

Please contact for capacitance value other than standard.
Please refer to page 18 for the test method and specifications of Standard Specification 2.

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

(Example) In case of "A" for KNH05;
L: 1.0±0.1mm, W: 0.5±0.2mm, T: 0.5mm max.

Size	Dimension Code	Dimension (mm)						Packaging φ180 Reel				
		L	W	T	G	P	R	Code	Quantity (pcs.)	Taping Material	Taping Width (mm)	Cavity Pitch (mm)
KNH 05	A	1.0±0.1	0.5±0.2	0.5 max.	0.3±0.1	0.15±0.1	≧0.05	H	10,000	Paper	8	2
	B	1.0±0.15	0.5±0.15	0.5±0.15	0.3±0.1	0.15±0.1	≧0.05	H	10,000	Paper	8	2
	C	1.0±0.2	0.5±0.2	0.5±0.2	0.3±0.1	0.15±0.1	≧0.05	H	10,000	Paper	8	2

X6S Dielectric

Part Number List : P29

●Capacitance chart Standard Spec.2 Optional Spec.

Size (EIA Code)		KNH05 (0402)	
Rated Voltage(Vdc) / Capacitance		2.5	4
105	1 μF		
435	4.3 μF	A	A
106	10 μF	C	
156	15 μF		

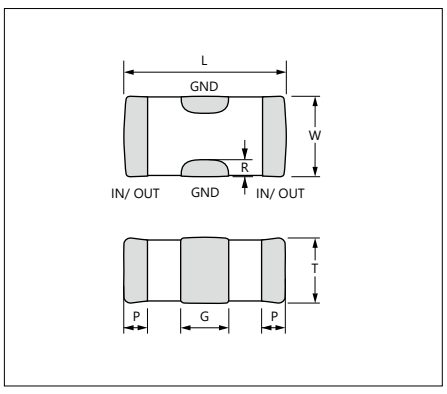
Please contact for capacitance value other than standard.
Please refer to page 18 for the test method and specifications of Standard Specification 2.

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

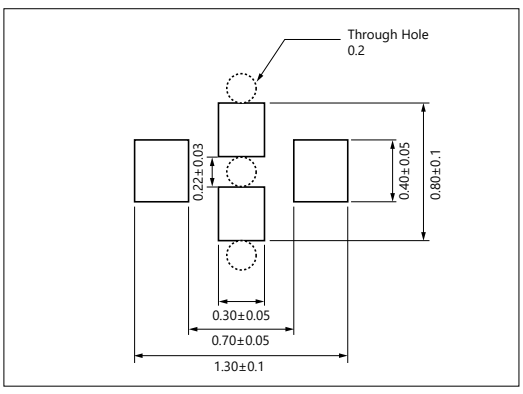
(Example) In case of "A" for KNH05;
L: 1.0±0.1mm, W: 0.5±0.2mm, T: 0.5mm max.

Size	Dimension Code	Dimension (mm)						Packaging φ180 Reel				
		L	W	T	G	P	R	Code	Quantity (pcs.)	Taping Material	Taping Width (mm)	Cavity Pitch (mm)
KNH 05	A	1.0±0.1	0.5±0.2	0.5 max.	0.3±0.1	0.15±0.1	≧0.05	H	10,000	Paper	8	2
	C	1.0±0.2	0.5±0.2	0.5±0.2	0.3±0.1	0.15±0.1	≧0.05	H	10,000	Paper	8	2

■Dimension (Unit: mm)



■Recommended Land Pattern (Unit: mm)



CATM2210MH29100E
As of October 2022

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

<table>
<tr><th colspan="2">Test Items</th><th>Test Conditions (Complies with JIS C5101)</th><th>Specifications</th></tr>
<tr><td colspan="2">Capacitance Value (C)</td><td rowspan="2"><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></td><td>Within tolerance</td></tr>
<tr><td colspan="2">Q</td><td>C≥30pF : Q≥1000
C<30pF : Q≥400+20C</td></tr>
<tr><td colspan="2">Insulation Resistance (IR)</td><td>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.</td><td>Over 10000MΩ or 500MΩ•μF, whichever is less</td></tr>
<tr><td colspan="2">Dielectric Resistance</td><td>Apply*3 times of the rated voltage for 1 to 5 seconds.
*CU02CΔR20-120/25V: twice
The charge and discharge current of the capacitor must not exceed 50mA.</td><td>No problem observed</td></tr>
<tr><td colspan="2">Appearance</td><td>Microscope</td><td>No problem observed</td></tr>
<tr><td colspan="2">Termination Strength</td><td>Apply a sideward force of 500g (5N) to a PCB-mounted sample.
note: 1N for 01005 size.</td><td>No problem observed</td></tr>
<tr><td colspan="2">Bending Strength</td><td>Glass epoxy PCB: Fulcrum spacing: 90mm, duration time 10 seconds.</td><td>No significant damage with 1mm bending.</td></tr>
<tr><td rowspan="3">Vibration Test</td><td>Appearance</td><td rowspan="3">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.</td><td>No problem observed</td></tr>
<tr><td>Capacitance</td><td>Within Tolerance</td></tr>
<tr><td>Q</td><td>C≥30pF : Q≥1000
C<30pF : Q≥400+20C</td></tr>
<tr><td rowspan="4">Soldering Heat Resistant</td><td>Appearance</td><td rowspan="4">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.</td><td>No problem observed</td></tr>
<tr><td>Capacitance Variation</td><td>Within±2.5% or±0.25pF, whichever is larger</td></tr>
<tr><td>Q</td><td>C≥30pF : Q≥1000
C<30pF : Q≥400+20C</td></tr>
<tr><td>IR</td><td>Over 10000MΩ or 500MΩ•μF whichever is less</td></tr>
<tr><td>Withstanding Voltage</td><td>Resist without problem</td></tr>
<tr><td colspan="2">Solderablity</td><td>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></td><td>Solder coverage : 95% min.</td></tr>
<tr><td rowspan="4">Temperature Cycle</td><td>Appearance</td><td rowspan="4">(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.</td><td>No problem observed</td></tr>
<tr><td>Capacitance Variation</td><td>Within±2.5% or ±0.25pF, whichever is larger</td></tr>
<tr><td>Q</td><td>C≥30pF : Q≥1000
C<30pF : Q≥400+20C</td></tr>
<tr><td>IR</td><td>Over 10000MΩ or 500MΩ•μF, whichever is less</td></tr>
<tr><td>Withstanding Voltage</td><td>Resist without problem</td></tr>
<tr><td rowspan="4">Moisture Resistant Load</td><td>Appearance</td><td rowspan="4">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.</td><td>No problem observed</td></tr>
<tr><td>Capacitance Variation</td><td>Within±7.5% or ±0.75pF, whichever is larger</td></tr>
<tr><td>Q</td><td>C≥30pF : Q≥200
C<30pF : Q≥100+10C/ 3</td></tr>
<tr><td>IR</td><td>Over 500MΩ or 25MΩ•μF, whichever is less</td></tr>
<tr><td rowspan="4">High-Temperature Load</td><td>Appearance</td><td rowspan="4">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.</td><td>No problem observed.</td></tr>
<tr><td>Capacitance Variation</td><td>Within ±3% or ±0.3pF, whichever is larger</td></tr>
<tr><td>Q</td><td>C≥30pF : Q≥350
10pF<C<30pF : Q≥275+5C/ 2
C<10pF : Q≥200+10C</td></tr>
<tr><td>IR</td><td>Over 1000MΩ or 50MΩ•μF, whichever is less</td></tr>
</table>

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 volatage)

Applied Voltage	Rated Voltage	Products
×1.0	16V	CM02CΔ221
×1.2	25V	CM02CΔR20-120

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

<table>
<tr><th colspan="2">Test Items</th><th>Test Conditions (Complies with JIS C5101)</th><th>Specifications</th></tr>
<tr><td colspan="2">Capacitance Value (C)</td><td rowspan="2">Measure after heat treatment
<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>*CM02X5R104□06A#
The charge and discharge current of the capacitor must not exceed 50mA.</td><td>Within tolerance</td></tr>
<tr><td colspan="2">Tanδ</td><td>Refer to capacitance chart</td></tr>
<tr><td colspan="2">Insulation Resistance (IR)</td><td>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.</td><td>Over 10000MΩ or 500MΩ•μF, whichever is less</td></tr>
<tr><td colspan="2">Dielectric Resistance</td><td>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.</td><td>No problem observed</td></tr>
<tr><td colspan="2">Appearance</td><td>Microscope</td><td>No problem observed</td></tr>
<tr><td colspan="2">Termination Strength</td><td>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.</td><td>No problem observed</td></tr>
<tr><td colspan="2">Bending Strength</td><td>Glass epoxy PCB: Fulcrum spacing: 90mm, duration time 10 seconds.
Exclude CT series with thickness of less than 0.66mm.</td><td>No significant damage with 1mm bending</td></tr>
<tr><td rowspan="3">Vibration Test</td><td>Appearance</td><td rowspan="3">Take the initial value after heat treatment.
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, and place in normal temperature and humidity, then measure the sample after heat treatment.</td><td>No problem observed</td></tr>
<tr><td>Capacitance</td><td>Within tolerance</td></tr>
<tr><td>Tanδ</td><td>Within tolerance</td></tr>
<tr><td rowspan="5">Soldering Heat Resistant</td><td>Appearance</td><td rowspan="5">Take the initial value after heat treatment.
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)
<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.</td><td>No problem observed</td></tr>
<tr><td>Capacitance Variation</td><td>Within±7.5%</td></tr>
<tr><td>Tanδ</td><td>Within tolerance</td></tr>
<tr><td>IR</td><td>Over 10000MΩ or 500MΩ•μF, whichever is less</td></tr>
<tr><td>Withstanding Voltage</td><td>Resist without problem</td></tr>
<tr><td colspan="2">Solderablity</td><td>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></td><td>Solder coverage : 95% min.</td></tr>
<tr><td rowspan="5">Temperature Cycle</td><td>Appearance</td><td rowspan="5">Take the initial value after heat treatment.
(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.
The charge and discharge current of the capacitor must not exceed 50mA for IR and withstanding voltage measurement.</td><td>No problem observed</td></tr>
<tr><td>Capacitance Variation</td><td>Within±7.5%</td></tr>
<tr><td>Tanδ</td><td>Within tolerance</td></tr>
<tr><td>IR</td><td>Over 10000MΩ or 500MΩ•μF, whichever is less</td></tr>
<tr><td>Withstanding Voltage</td><td>Resist without problem</td></tr>
<tr><td rowspan="4">Moisture Resistant Load</td><td>Appearance</td><td rowspan="4">Take the initial value after heat treatment.
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.
The charge and discharge current of the capacitor must not exceed 50mA for IR measurement.</td><td>No problem observed</td></tr>
<tr><td>Capacitance Variation</td><td>Within±12.5%</td></tr>
<tr><td>Tanδ</td><td>200% max. of initial value</td></tr>
<tr><td>IR</td><td>Over 500MΩ or 25MΩ•μF, whichever is less</td></tr>
<tr><td rowspan="4">High-Temperature Load</td><td>Appearance</td><td rowspan="4">Take the initial value after heat treatment.
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.
*Apply 1.5 times when the rated voltage is 10V or less. Applied voltages for respective products are indicated in the chart below.</td><td>No problem observed</td></tr>
<tr><td>Capacitance Variation</td><td>Within±12.5%</td></tr>
<tr><td>Tanδ</td><td>200% max. of initial value</td></tr>
<tr><td>IR</td><td>Over 1000MΩ or 50MΩ•μF, whichever is less</td></tr>
</table>

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
×1.5	16V	CM02X5R101-103, CM05X5R224, CM105X5R225, CM21X5R106, CM316X5R226, CM02X7R101-222, CM316X7R106, CM32X7R226, CT105X5R105, CT21X5R475
	25V	CM21X5R225, CM316X5R106, CM32X5R106-226, CM05X7R104, CM21X7R225, CM32X7R106
	50V	CM21X5R105, CM316X5R475, CM32X5R106, CM21X7R105, CM32X7R106, CT21X5R225,

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

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

<table>
<tr><th colspan="2">Test Items</th><th>Test Conditions (Complies with JIS C5101)</th><th>Specifications</th></tr>
<tr><td colspan="2">Capacitance Value (C)</td><td rowspan="2">Measure after heat treatment
<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>*CM02X5R474M06A#, CM03X5R225□06A#, CM03X5R225M06A#035, CM03X5R475M06A#055,CM03X5R475M04A#, CM05X5R106M06A#, CT05X5R475M06A#033
The charge and discharge current of the capacitor must not exceed 50mA.</td><td>Within tolerance</td></tr>
<tr><td colspan="2">Tanδ</td><td>Refer to capacitance chart</td></tr>
<tr><td colspan="2">Insulation Resistance (IR)</td><td>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.</td><td>Over 50MΩ•μF</td></tr>
<tr><td colspan="2">Dielectric Resistance</td><td>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.</td><td>No problem observed</td></tr>
<tr><td colspan="2">Appearance</td><td>Microscope</td><td>No problem observed</td></tr>
<tr><td colspan="2">Termination Strength</td><td>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.</td><td>No problem observed</td></tr>
<tr><td colspan="2">Bending Strength</td><td>Glass epoxy PCB: Fulcrum spacing: 90mm, duration time 10 seconds.
Exclude CT series with thickness of less than 0.66mm.</td><td>No significant damage with 1mm bending</td></tr>
<tr><td rowspan="3">Vibration Test</td><td>Appearance</td><td rowspan="3">Take the initial value after heat treatment.
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, and place in normal temperature and humidity, then measure the sample after heat treatment.</td><td>No problem observed</td></tr>
<tr><td>Capacitance</td><td>Within tolerance</td></tr>
<tr><td>Tanδ</td><td>Within tolerance</td></tr>
<tr><td rowspan="5">Soldering Heat Resistant</td><td>Appearance</td><td rowspan="5">Take the initial value after heat treatment.
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)
<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.</td><td>No problem observed</td></tr>
<tr><td>Capacitance Variation</td><td>Within±7.5%</td></tr>
<tr><td>Tanδ</td><td>Within tolerance</td></tr>
<tr><td>IR</td><td>Over 50MΩ•μF</td></tr>
<tr><td>Withstanding Voltage</td><td>Resist without problem</td></tr>
<tr><td colspan="2">Solderablity</td><td>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></td><td>Solder coverage : 95% min.</td></tr>
<tr><td rowspan="5">Temperature Cycle</td><td>Appearance</td><td rowspan="5">Take the initial value after heat treatment.
(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.
The charge and discharge current of the capacitor must not exceed 50mA for IR and withstanding voltage measurement.</td><td>No problem observed</td></tr>
<tr><td>Capacitance Variation</td><td>Within±7.5%</td></tr>
<tr><td>Tanδ</td><td>Within tolerance</td></tr>
<tr><td>IR</td><td>Over 50MΩ•μF</td></tr>
<tr><td>Withstanding Voltage</td><td>Resist without problem</td></tr>
<tr><td rowspan="4">Moisture Resistant Load</td><td>Appearance</td><td rowspan="4">Take the initial value after heat treatment.
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.
The charge and discharge current of the capacitor must not exceed 50mA for IR measurement.</td><td>No problem observed</td></tr>
<tr><td>Capacitance Variation</td><td>Within±12.5%</td></tr>
<tr><td>Tanδ</td><td>200% max. of initial value</td></tr>
<tr><td>IR</td><td>Over 10MΩ•μF</td></tr>
<tr><td rowspan="4">High-Temperature Load</td><td>Appearance</td><td rowspan="4">Take the initial value after heat treatment.
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.
The charge and discharge current of the capacitor must not exceed 50mA for IR measurement.
*Apply 1.0 times when the rated voltage is 4V or less. Applied voltages for respective products are indicated in the chart below.</td><td>No problem observed</td></tr>
<tr><td>Capacitance Variation</td><td>Within±12.5%</td></tr>
<tr><td>Tanδ</td><td>200% max. of initial value</td></tr>
<tr><td>IR</td><td>Over 10MΩ•μF</td></tr>
</table>

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	6.3V	CM02X5R224, CM02X5R474, CM03X5R225, CM03X5R475, CM05X5R106
		CM05X5R156, CM05X5R226, CM21X5R476, CM03X6S105, CM105X6S226
		CT05X5R105, CT05X5R225, CT05X5R475
	10V	CM03X5R225, CM105X5R226, CM21X6S226
	16V	CM03X5R105, CM05X5R225, CM05X5R475, CM105X5R226
		CM05X6S225, CM21X6S226, CM21X7R475
	25V	CM05X5R105, CM05X5R225, CM05X5R475,CM105X5R475
		CM105X5R106, CM21X5R226, CM05X6S105
	35V	CM05X5R105, CM105X5R475, CM105X5R106
	100V	CM21X7S105, CM316X7S475

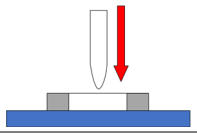
Applied Voltage	Rated Voltage	Products
×1.2	6.3V	CM03X5R105
×1.3	6.3V	CM03X5R474
	10V	CM03X5R223-224, CM05X5R105-225
	16V	CM05X5R105
×1.5	6.3V	CM21X6S226, CM05X7S105
		CM105X7T106, CM21X7T226
	10V	CM03X5R105, CM05X5R474, CM05X5R475,
		CM21X5R226, CM105X6S106, CM105X7T475
	25V	CM105X7R105, CM316X7R106
	50V	CM316X7R475

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

Test Conditions and Specifications for High Dielectric Type (X7R, X7S)
AR Series (Standard Spec.3)

<table>
<tr><th colspan="2">Test Items</th><th>Test Conditions (Complies with AEC-Q200)</th><th>Specifications</th></tr>
<tr><td rowspan="4">High Temperature Exposure (Storage)</td><td>Appearance</td><td rowspan="4">Take the initial value after heat treatment.
Temperature : 150±3°C
Time : 1000±12h
MIL-STD-202 Method 108
Measure after heat treatment.
The charge and discharge current of the capacitor must not exceed 50mA.</td><td>No problem observed</td></tr>
<tr><td>Capacitance Variation</td><td>Within±12.5%</td></tr>
<tr><td>Tanδ</td><td>Within tolerance</td></tr>
<tr><td>IR</td><td>Over 50MΩ･μF</td></tr>
<tr><td rowspan="4">Temperature Cycle</td><td>Appearance</td><td rowspan="4">Take the initial value after heat treatment.
1cycle : refer to the table on the right.
Number of cycles : 1,000cycles
JESD22 Method JA-104
Measurement after heat treatment.
<table><tr><th>Step</th><th>Temperature (℃)</th><th>Time (min.)</th></tr><tr><td>1</td><td>-55+0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room temperature</td><td>1</td></tr><tr><td>3</td><td>125+3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room temperature</td><td>1</td></tr></table>The charge and discharge current of the capacitor must not exceed 50mA.</td><td>No problem observed</td></tr>
<tr><td>Capacitance Variation</td><td>Within±10.0%</td></tr>
<tr><td>Tanδ</td><td>Within tolerance</td></tr>
<tr><td>IR</td><td>Over 50MΩ･μF</td></tr>
<tr><td rowspan="4">Moisture Resistant Load</td><td>Appearance</td><td rowspan="4">Take the initial value after heat treatment.
Temperature : 85±3°C
Humidity : 80~85%RH
Voltage : Rated voltage
Time : 1000±12h
MIL-STD-202 Method 103
Measurement after heat treatment.
The charge and discharge current of the capacitor must not exceed 50mA.</td><td>No problem observed</td></tr>
<tr><td>Capacitance Variation</td><td>Within±12.5%</td></tr>
<tr><td>Tanδ</td><td>200% max. of initial value</td></tr>
<tr><td>IR</td><td>Over 10MΩ ･ μF</td></tr>
<tr><td rowspan="4">High-Temperature Load</td><td>Appearance</td><td rowspan="4">Take the initial value after heat treatment.
Temperature : 125±3°C
Voltage : Rated voltage
Time : 1000±12h
MIL-STD-202 Method 108
Measurement after heat treatment.
The charge and discharge current of the capacitor must not exceed 50mA.</td><td>No problem observed</td></tr>
<tr><td>Capacitance Variation</td><td>Within±12.5%</td></tr>
<tr><td>Tanδ</td><td>200% max. of initial value</td></tr>
<tr><td>IR</td><td>Over 10MΩ ･ μF</td></tr>
<tr><td colspan="2">Appearance</td><td>External Visual
MIL-STD-883 Method 2009</td><td>No problem observed</td></tr>
<tr><td colspan="2">Dimentions</td><td>Physical Dimensions
JESD22 Method JB-100</td><td>Refer to capacitance chart</td></tr>
<tr><td rowspan="4">Resistance to Solvent</td><td>Appearance</td><td rowspan="4">Take the initial value after heat treatment.
The mixing ratio is the volume ratio
Solvent 1 : Solvent of mineral spirits 3 to isopropyl alcohol 1.
Solvent 2 : Terpene defluxer
Solvent 3 : 42 parts (by volume) of water
1 part (by volume) of propylene glycol monomethyl ether 1 part (by volume) of monoethanolamine.
MIL-STD-202 Method 215
Measurement after heat treatment.
The charge and discharge current of the capacitor must not exceed 50mA.</td><td>No problem observed</td></tr>
<tr><td>Capacitance</td><td>Within tolerance</td></tr>
<tr><td>Tanδ</td><td>Within tolerance</td></tr>
<tr><td>IR</td><td>Over 50MΩ･μF</td></tr>
<tr><td rowspan="4">Mechanical Shock</td><td>Appearance</td><td rowspan="4">Take the initial value after heat treatment.
Pulse : half sine shock pulse Time : 0.5ms
Maximum shock : 1500G Speed : 4.7m/s
Shock times : Three shocks in each direction shall be applied along the three mutually perpendicular axes of the test specimen (18 shocks).
MIL-STD-202 Method 213
Measurement after heat treatment.
The charge and discharge current of the capacitor must not exceed 50mA.</td><td>No problem observed</td></tr>
<tr><td>Capacitance</td><td>Within tolerance</td></tr>
<tr><td>Tanδ</td><td>Within tolerance</td></tr>
<tr><td>IR</td><td>Over 50MΩ･μF</td></tr>
<tr><td rowspan="4">Vibration Test</td><td>Appearance</td><td rowspan="4">Take the initial value after heat treatment.
Vibration frequency : 10Hz~2000Hz~10Hz(20 min.)
Acceleration : 5.0g's
Sweep time and duration : This cycle shall be performed 12 times in each of three mutually perpendicular directions(total of 36 times).
MIL-STD-202 Method 204
Measurement after heat treatment.
The charge and discharge current of the capacitor must not exceed 50mA.</td><td>No problem observed</td></tr>
<tr><td>Capacitance</td><td>Within tolerance</td></tr>
<tr><td>Tanδ</td><td>Within tolerance</td></tr>
<tr><td>IR</td><td>Over 50MΩ･μF</td></tr>
</table>

Test Conditions and Specifications for High Dielectric Type (X7R, X7S)
AR Series (Standard Spec.3)

<table>
<tr><th colspan="2">Test Items</th><th>Test Conditions (Complies with AEC-Q200)</th><th>Specifications</th></tr>
<tr><td rowspan="4">Soldering Heat Resistant</td><td>Appearance</td><td rowspan="4">Take the initial value after heat treatment.
Solder melting temperature : 260+/-5°C
Dipping time : 10+/-1sec
MIL-STD-202 Method 210
Measurement after heat treatment.
The charge and discharge current of the capacitor must not exceed 50mA.</td><td>No problem observed</td></tr>
<tr><td>Capacitance Variation</td><td>Within±10.0%</td></tr>
<tr><td>Tanδ</td><td>Within tolerance</td></tr>
<tr><td>IR</td><td>Over 50MΩ•μF</td></tr>
<tr><td rowspan="4">ESD</td><td>Appearance</td><td rowspan="4">Take the initial value after heat treatment.
AEC-Q200-002
Voltage level : 2KV
Measurement after heat treatment.
The charge and discharge current of the capacitor must not exceed 50mA.</td><td>No problem observed</td></tr>
<tr><td>Capacitance</td><td>Within tolerance</td></tr>
<tr><td>Tanδ</td><td>Within tolerance</td></tr>
<tr><td>IR</td><td>Over 50MΩ•μF</td></tr>
<tr><td>Solderablity</td><td>Appearance</td><td>Pretreatment : 155+0/-10°C left for 4h+/-10minutes
Flux : Rosin-Ethanol(25wt%)
Solder composition : Sn-3.0Ag-0.5Cu(SAC305)
Solder melting temperature : 245+/-5℃
Dipping time : 5+/-0.5sec</td><td>Solder coverage : 95% min.</td></tr>
<tr><td rowspan="4">Electrical Characterization</td><td>Capacitance</td><td rowspan="2">Measure after heat treatment.
Measuring frequency : 1kHz±10%
Measuring voltage : 1.0±0.2Vrms</td><td>Within tolerance</td></tr>
<tr><td>Tanδ</td><td>Refer to capacitance chart</td></tr>
<tr><td>IR</td><td>At room temperature and humidity, the rated voltage is applied for one minute and then measured.
The charge and discharge current of the capacitor must not exceed 50mA.</td><td>Over 50MΩ•μF</td></tr>
<tr><td>Withstanding Voltage</td><td>Apply 2.5 times the rated voltage for 1~5 sec.
The charge and discharge current of the capacitor must not exceed 50mA.</td><td>Resist without problem</td></tr>
<tr><td rowspan="4">Bending Strength</td><td>Appearance</td><td rowspan="4">Take the initial value after heat treatment.
Pressing speed : 1.0mm/s
Flexible volume : 2mm
Pressing time : 60+5/-0 sec.
AEC-Q200-005
The charge and discharge current of the capacitor must not exceed 50mA.</td><td>No problem observed</td></tr>
<tr><td>Capacitance Variation</td><td>Within±10.0%</td></tr>
<tr><td>Tanδ</td><td>Within tolerance</td></tr>
<tr><td>IR</td><td>Over 50MΩ•μF</td></tr>
<tr><td rowspan="4">Termination Strength</td><td>Appearance</td><td rowspan="4">Take the initial value after heat treatment.
Pressing force :
AR05 : 2N
AR21 : 18N
Pressing time : 60+/-1sec
AEC-Q200-006
The charge and discharge current of the capacitor must not exceed 50mA.</td><td>No problem observed</td></tr>
<tr><td>Capacitance</td><td>Within tolerance</td></tr>
<tr><td>Tanδ</td><td>Within tolerance</td></tr>
<tr><td>IR</td><td>Over 50MΩ•μF</td></tr>
<tr><td rowspan="2">Beam Load</td><td>Breaking strength</td><td rowspan="2">Set the capacitor on the fixture as shown below and apply the load.
Pressing speed : 0.5mm/s
  </td><td>The Breaking strength exceeds the following load.
AR21 : 20N
AR05 : 8N</td></tr>
<tr><td>Appearance</td><td>No significant damage with the following loads
AR21 : 20N
AR05 : 8N</td></tr>
<tr><td>Temperature characteristics</td><td>Capacitance Variation</td><td>Temperature range : -55~+125°C
Reference temperature : 25°C
Measuring condition:
<table>
<tr><th></th><th>AR05</th><th>AR21</th></tr>
<tr><td>Measuring frequency</td><td>1kHz±10%</td><td>1kHz±10%</td></tr>
<tr><td>Measuring voltage</td><td>0.1±0.02Vrms</td><td>1.0±0.2Vrms</td></tr>
</table></td><td>X7R : Within±15%
X7S : Within±22%</td></tr>
</table>

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.

Test Conditions and Specifications for High Dielectric Type (X5R, X6S)
KNH Series (Standard Spec.2)

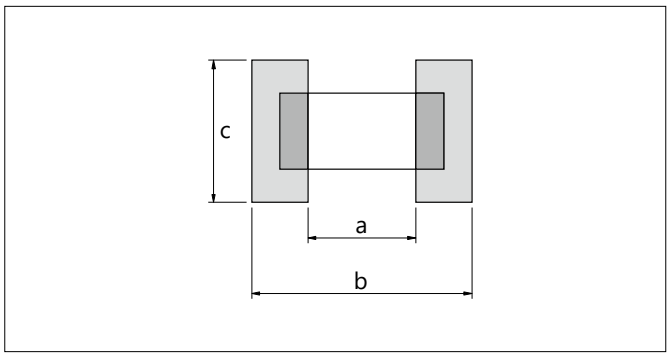
<table>
<tr><th colspan="2">Test Items</th><th>Test Conditions (Complies with JIS C5101)</th><th>Specifications</th></tr>
<tr><td colspan="2">Capacitance Value (C)</td><td>Measure after heat treatment
<table><tr><th>Capacitance</th><th>Frequency</th><th>Volt</th></tr><tr><td rowspan="2">C≤10μF</td><td>1kHz±10%</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>*KNH05X5R106
The charge and discharge current of the capacitor must not exceed 50mA.</td><td>Within tolerance</td></tr>
<tr><td colspan="2">Insulation Resistance (IR)</td><td>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.</td><td>Over 50MΩ•μF</td></tr>
<tr><td colspan="2">Direct current resistance</td><td></td><td>0.03Ω max.</td></tr>
<tr><td colspan="2">Rated current</td><td></td><td>2A(DC)</td></tr>
<tr><td colspan="2">Dielectric Resistance</td><td>Apply 2.5 times of the rated voltage for 1 to 5 seconds.
The charge and discharge current of the capacitor must not exceed 50mA.</td><td>No problem observed</td></tr>
<tr><td colspan="2">Appearance</td><td>Microscope</td><td>No problem observed</td></tr>
<tr><td colspan="2">Bending Strength</td><td>Glass epoxy PCB: Fulcrum spacing: 90mm, duration time 10 seconds.</td><td>No significant damage with 1mm bending</td></tr>
<tr><td rowspan="2">Vibration Test</td><td>Appearance</td><td rowspan="2">Take the initial value after heat treatment.
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, and place in normal temperature and humidity, then measure the sample after heat treatment.</td><td>No problem observed</td></tr>
<tr><td>Capacitance</td><td>Within tolerance</td></tr>
<tr><td rowspan="4">Soldering Heat Resistant</td><td>Appearance</td><td rowspan="4">Take the initial value after heat treatment.
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)<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.</td><td>No problem observed</td></tr>
<tr><td>Capacitance Variation</td><td>Within±30.0%</td></tr>
<tr><td>IR</td><td>Over 50MΩ•μF</td></tr>
<tr><td>Withstanding Voltage</td><td>Resist without problem</td></tr>
<tr><td colspan="2">Solderablity</td><td>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></td><td>Solder coverage : 95% min.</td></tr>
<tr><td rowspan="4">Temperature Cycle</td><td>Appearance</td><td rowspan="4">Take the initial value after heat treatment.
(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.
The charge and discharge current of the capacitor must not exceed 50mA for IR and withstanding voltage measurement.</td><td>No problem observed</td></tr>
<tr><td>Capacitance Variation</td><td>Within±30.0%</td></tr>
<tr><td>IR</td><td>Over 50MΩ•μF</td></tr>
<tr><td>Withstanding Voltage</td><td>Resist without problem</td></tr>
<tr><td rowspan="3">Moisture Resistant Load</td><td>Appearance</td><td rowspan="3">Take the initial value after heat treatment.
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.
The charge and discharge current of the capacitor must not exceed 50mA for IR measurement.</td><td>No problem observed</td></tr>
<tr><td>Capacitance Variation</td><td>Within±30.0%</td></tr>
<tr><td>IR</td><td>Over 10MΩ•μF</td></tr>
<tr><td rowspan="3">High-Temperature Load</td><td>Appearance</td><td rowspan="3">Take the initial value after heat treatment.
After applying 1.0 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.
The charge and discharge current of the capacitor must not exceed 50mA for IR measurement.</td><td>No problem observed</td></tr>
<tr><td>Capacitance Variation</td><td>Within±30.0%</td></tr>
<tr><td>IR</td><td>Over 10MΩ•μF</td></tr>
</table>

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.

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.

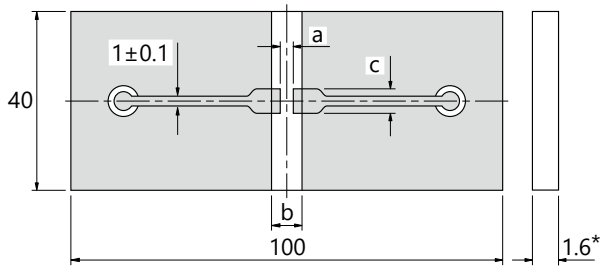
(Unit: mm)

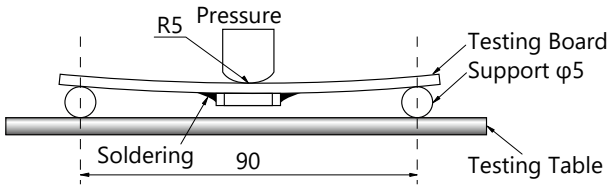


Size (EIA Code)	a	b	c
02 (01005)	0.15	0.5	0.2
03 (0201)	0.26	0.92	0.32
05 (0402)	0.4	1.4	0.5
105 (0603)	1.0	3.0	1.2
21 (0805)	1.2	4.0	1.65
316 (1206)	2.2	5.0	2.0
32 (1210)	2.2	5.0	2.9

Substrate for Bending Test

(Unit: mm)



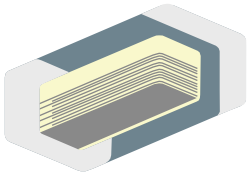


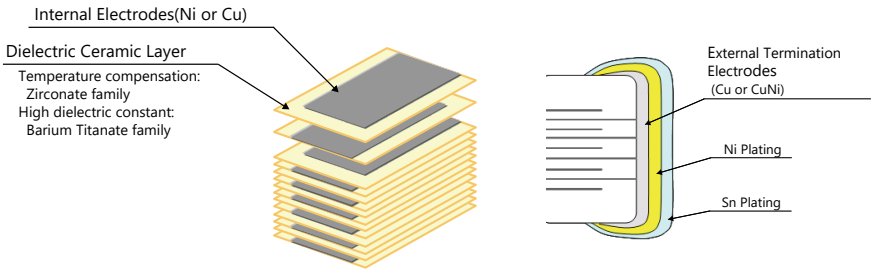
Testing Board : Glass Epoxy Board (GE4 or FR4)
Testing Board Thickness : 1.6±0.2*
Circuit Thickness : 0.04±0.01

*02, 03, 05 size 0.8±0.1mm

Structure

Plated Termination





■Certification status

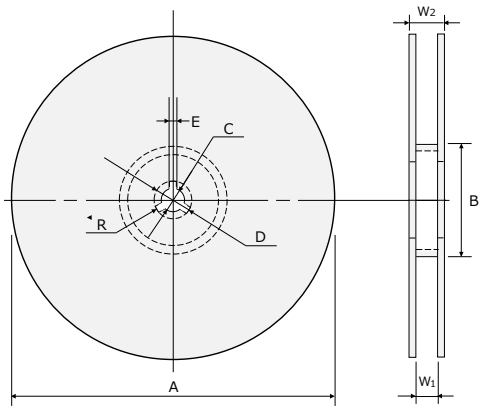
<ISO>
Acquired ISO 9001 quality management system certification.
<IATF>
Acquired IATF 16949 quality management system certification.

■Production plant

Kagoshima kokubu plant

Reel

(Unit: mm)



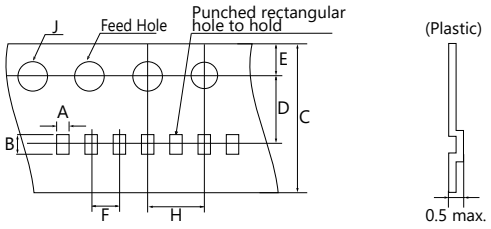
Code / Reel	A	B	C	D
7-inch Reel (CODE: T, H, Q)	180 +0 −2.0	φ60 min.	13±0.5	21±0.8
7-inch Reel (CODE: P)	178±2.0			
13-inch Reel (CODE: L, N, W)	330±2.0			

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.	

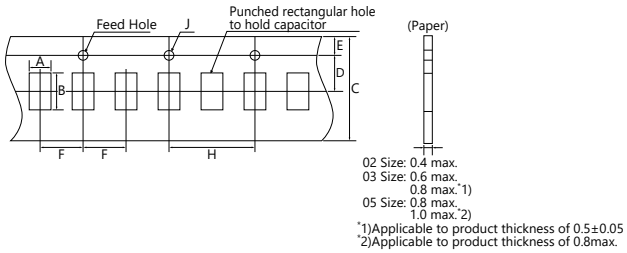
Carrier Tape

(Unit: mm)

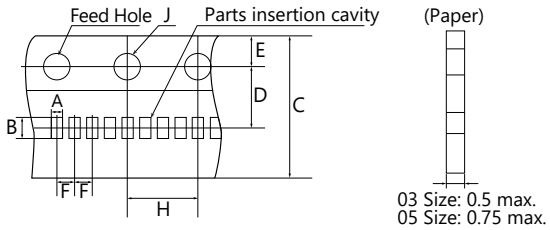
F=1mm (02 Size)



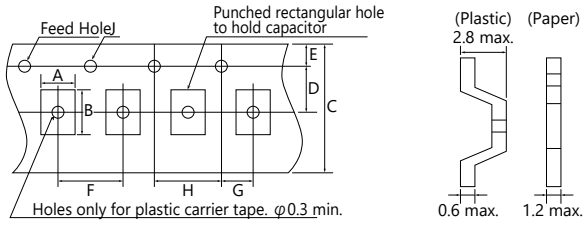
F=2mm (02, 03, 05 Size)



F=1mm (03, 05 Size)



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

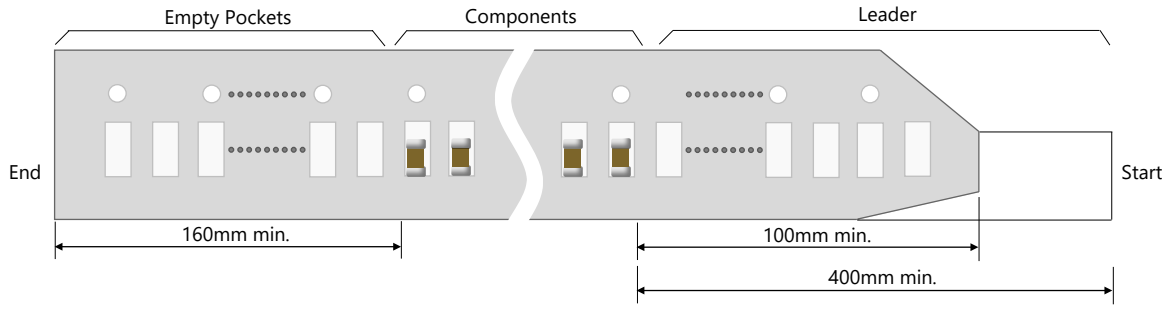


(Unit: mm)

Size (EIA Code)	A	B	C	D	E	F	G	H	J	Carrier Tape Width	Carrier Tape 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+0.1/-0	8	Paper
03 (0201)*	0.37±0.03	0.67±0.03	8.0+0.3/-0.1	3.5±0.05	1.75±0.1	1.0±0.05	—	4.0±0.05	1.5+0.1/-0	8	Paper
			8.0±0.3			2.0±0.05		4.0±0.1			
	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+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+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+0.1/-0		
05 (0402)*	0.65±0.1	1.15±0.1	8.0+0.3/-0.1	3.5±0.05	1.75±0.1	1.0±0.05	—	4.0±0.05	1.5+0.1/-0	8	Paper
	0.75±0.1		8.0±0.3			2.0±0.05	—	4.0±0.1			
	0.8±0.1	1.3±0.1	8.0±0.3	3.5±0.05	1.75±0.1	2.0±0.05	—	4.0±0.1	1.5+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+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+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+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+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+0.1/-0	8	Plastic

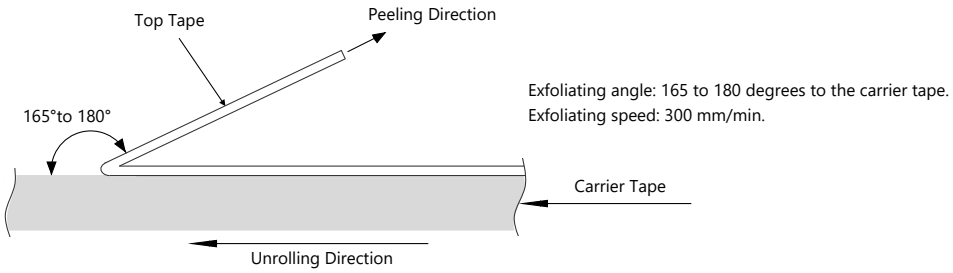
* Option

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.



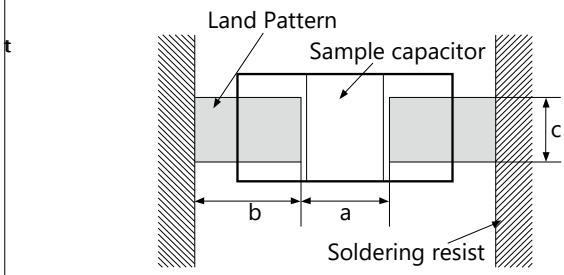
Carrier tape

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.

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)



Two Terminal Capacitors

(Unit: mm)

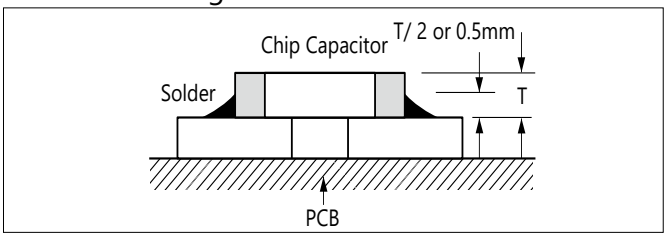
Size (EIA Code)	Dimension		Recommended land dimensions		
	L	W	a	b	c
02 (01005)	0.4±0.02	0.2±0.02	0.13 to 0.2	0.12 to 0.18	0.2 to 0.23
03 (0201)	0.6±0.03	0.3±0.03	0.2 to 0.25	0.25 to 0.35	0.3 to 0.4
	0.6±0.05	0.3±0.05			
	0.6±0.09	0.3±0.09	0.23 to 0.3	0.25 to 0.35	0.3 to 0.45
05 (0402)	1.0±0.05	0.5±0.05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

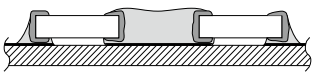
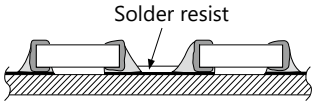
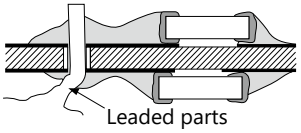
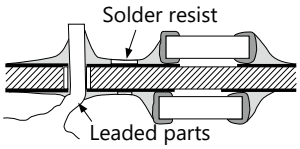
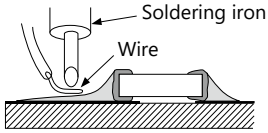
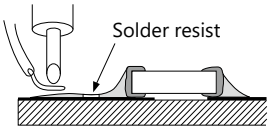
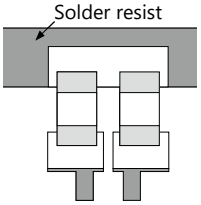
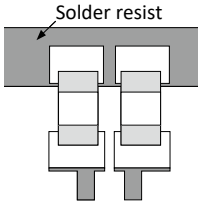
* Recommended land dimensions may differ depending on dimensional tolerance.

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

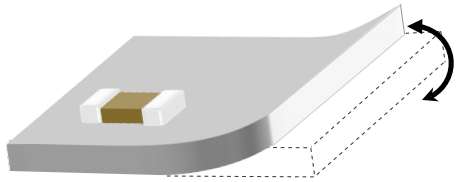
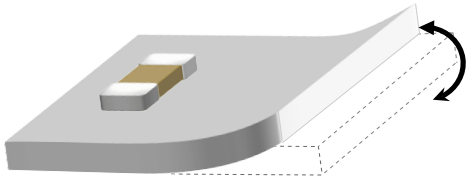


Item	Prohibited	Recommended example : Separation by solder resist
Multiple parts mount		
Mount with leaded parts		
Wire soldering after mounting		
Side by side layout		

Mounting Design

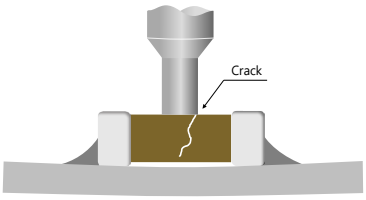
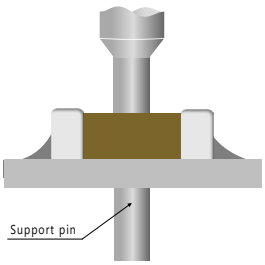
The chip could crack if the PCB warps during processing after the chip has been soldered.

Recommended chip position on PCB to minimize stress from PCB warpage

Not recommended	Ideal
	

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 vaccum nozzle, provide a support pin on the back of the PCB to minimize PCB flexture.
4) Bottom position of pick up nozzle should be adjusted to the top surface of a substrate which camber is corrected.

Not recommended	Ideal
	

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.

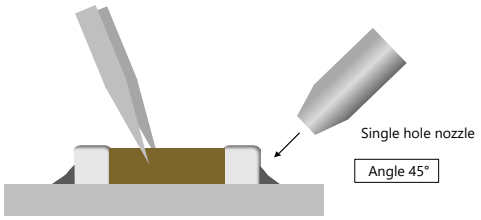
Soldering Method

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

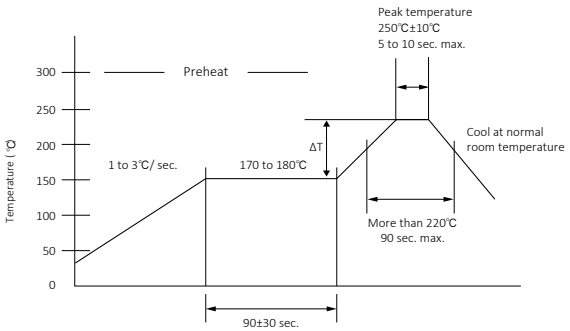
Item	Condition
Distance	5mm min.
Angle	45°
Projection Temp.	400°C max.
Flow rate	Set at the minimum
Nozzle diameter	2φ to 4φ (Single hole type)
Application time	10 sec. max. (1206 and smaller) 30 sec. max. (1210 and larger)

How to point spot heater



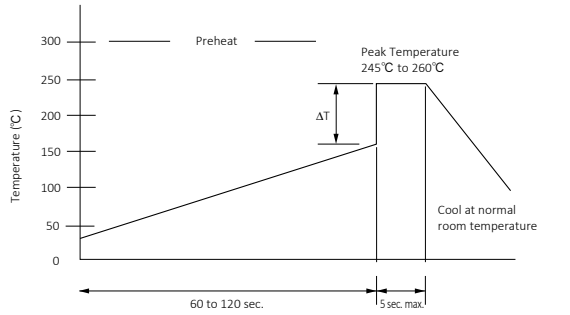
Recommended Temperature Profile (Sn-3Ag-0.5Cu)

Reflow



① Minimize soldering time.
② Ensure that allowable temperature difference does not exceed 150℃.
③ Ensure that allowable temperature difference does not exceed 130℃ for 3.2×2.5mm size or larger.
④ MLCC can withstand the above reflow conditions up to 3 times.
⑤ N_2 atmosphere is recommended for reflow of products of 0.4mm×0.2mm size or smaller.

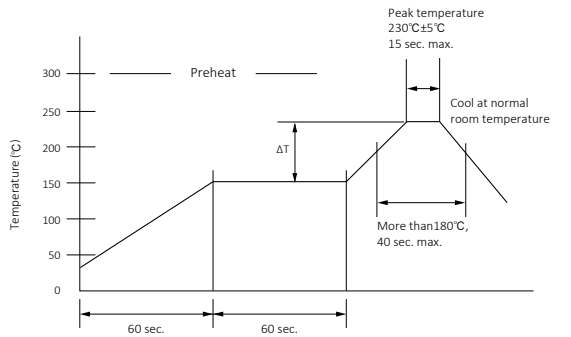
Wave



① Ensure that the chip capacitor is preheated adequately.
② Ensure that the temperature difference (ΔT) does not exceed 150℃.
③ Cool naturally after soldering.
④ Wave soldering is not applicable for chips with size of 3.2×2.5mm or larger of 1.0×0.5mm or smaller and capacitor arrays.

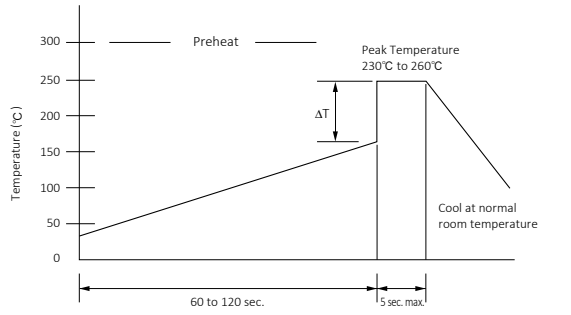
Recommended Temperature Profile (63Sn Solder)

Reflow



① Minimize soldering time.
② Ensure that the temperature difference (ΔT) does not exceed 150℃.
③ Ensure that the temperature difference (ΔT) does not exceed 130℃ for 3.2×2.5mm 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℃.
③ Cool naturally after soldering.
④ Wave soldering is not applicable for chips with size of 3.2×2.5mm or larger of 1.0×0.5mm or smaller and capacitor arrays.

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 (H_2S, SO_2, NO_2, Cl_2, 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/

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 CΔ	Capacitance	□:Tolerance	Voltage [V]	Part Number	Q	Dimension L[mm]	Dimension W[mm]	Dimension T[mm]	# Packaging Code (quantity)
CG/CH	1pF	B:±0.1pF / C:±0.25pF	25	CM02CΔ1R0□25A#	420	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	1.5pF			CM02CΔ1R5□25A#	430	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	2pF			CM02CΔ2R0□25A#	440	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	3pF			CM02CΔ3R0□25A#	460	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	4pF			CM02CΔ4R0□25A#	480	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	5pF			CM02CΔ5R0□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	CM02CΔ6R0□25A#	520	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	7pF			CM02CΔ7R0□25A#	540	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	8pF			CM02CΔ8R0□25A#	560	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	9pF			CM02CΔ9R0□25A#	580	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	10pF	J:±5% / K:±10%	25	CM02CΔ100□25A#	600	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	12pF			CM02CΔ120□25A#	640	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	15pF			CM02CΔ150□25A#	700	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	18pF			CM02CΔ180□25A#	760	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	22pF			CM02CΔ220□25A#	840	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	27pF	J:±5% / K:±10%	16	CM02CΔ270□16A#	940	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	33pF			CM02CΔ330□16A#	1000	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	39pF			CM02CΔ390□16A#	1000	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	47pF			CM02CΔ470□16A#	1000	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	56pF			CM02CΔ560□16A#	1000	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	68pF			CM02CΔ680□16A#	1000	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	82pF			CM02CΔ820□16A#	1000	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	100pF			CM02CΔ101□16A#	1000	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	220pF			CM02CΔ221□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 L[mm]	Dimension W[mm]	Dimension T[mm]	# Packaging Code (quantity)
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
			6.3	CM02X5R104□06A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	0.22μF			CM02X5R224□06A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	0.47μF	M:±20%		CM02X5R474M06A#	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
	1000μF			CM02X7R102□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	1500μF			CM02X7R152□16A#	12.5	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	2200μF			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 L[mm]	Dimension W[mm]	Dimension T[mm]	# Packaging Code (quantity)
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
	0.22μF		25	CM03X5R224□25A#	12.5	0.6±0.09	0.3±0.09	0.3±0.09	H / N
			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
	1μF	M:±20%	16	CM03X5R105M16A#	20.0	0.6±0.09	0.3±0.09	0.3±0.09	H / N
			10	CM03X5R105M10A#	20.0	0.6±0.09	0.3±0.09	0.3±0.09	H / N
				CM03X5R105M10A#035	12.5	0.6±0.05	0.3±0.05	0.3±0.05	H / N / Q / W
		K:±10% / M:±20%	6.3	CM03X5R105□06A#	12.5	0.6±0.05	0.3±0.05	0.3±0.05	H / N / Q / W
	2.2μF	M:±20%	10	CM03X5R225M10A#	15.0	0.6±0.09	0.3±0.09	0.3±0.09	H / N
		K:±10% / M:±20%	6.3	CM03X5R225□06A#	12.5	0.6±0.09	0.3±0.09	0.3±0.09	H / N
		M:±20%		CM03X5R225M06A#035	12.5	0.6±0.05	0.3±0.05	0.3±0.05	H / N / Q / W
	4.7μF			CM03X5R475M06AH055	15.0	0.6±0.09	0.3±0.09	0.5±0.05	H(*)
			4	CM03X5R475M04A#	12.5	0.6±0.09	0.3±0.09	0.3±0.09	H / N
X6S	1μF	M:±20%	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	M:±20%	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
			2.5	CM03X6T225M02A#	12.5	0.6±0.09	0.3±0.09	0.3±0.09	H / N
X7S	0.1μF	K:±10% / M:±20%	6.3	CM03X7S104□06A#	10.0	0.6±0.03	0.3±0.03	0.3±0.03	H / N / Q / W
X7T	1μF	M:±20%	6.3	CM03X7T105M06A#	12.5	0.6±0.09	0.3±0.09	0.3±0.09	H / N

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%		CM05X5R225□25A#055	12.5	1.0±0.2	0.5±0.2	0.55 max.	H / N
			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	H / N(*)
			16	CM05X5R475M16A#	12.5	1.0±0.2	0.5±0.2	0.5±0.2	H / N(*)
			10	CM05X5R475M10A#	12.5	1.0±0.2	0.5±0.2	0.5±0.2	H / N(*)
				CM05X5R475M10A#065	12.5	1.0±0.15	0.5±0.15	0.5±0.15	H / N(*)
	10μF		6.3	CM05X5R106M10A#	12.5	1.0±0.2	0.5±0.2	0.5±0.2	H / N(*)
				CM05X5R106M06A#	12.5	1.0±0.2	0.5±0.2	0.5±0.2	H / N(*)
	15μF			CM05X5R156M06A#	12.5	1.0±0.15	0.5±0.15	0.5±0.15	H / N(*)
			4	CM05X5R156M04A#	12.5	1.0±0.15	0.5±0.15	0.5±0.15	H / N(*)
	22μF		6.3	CM05X5R226M06A#	12.5	1.0±0.2	0.5±0.2	0.5±0.2	H / N(*)
				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(*)
X6S	0.47μF	M:±20%	16	CM05X6S474M16A#	12.5	1.0±0.05	0.5±0.05	0.5±0.05	H / N / Q / W
			10	CM05X6S474M10A#	12.5	1.0±0.05	0.5±0.05	0.5±0.05	H / N / Q / W
	1μF	K:±10% / M:±20%	25	CM05X6S105□25A#	12.5	1.0±0.05	0.5±0.05	0.5±0.05	H / N / Q / W
		M:±20%	10	CM05X6S105M10A#	12.5	1.0±0.05	0.5±0.05	0.5±0.05	H / N / Q / W
	2.2μF		16	CM05X6S225M16A#055	12.5	1.0±0.2	0.5±0.2	0.55 max.	H / N
	4.7μF		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(*)
				CM05X6S475M06A#065	12.5	1.0±0.15	0.5±0.15	0.5±0.15	H / N(*)
	10μF			CM05X6S106M06A#	12.5	1.0±0.2	0.5±0.2	0.5±0.2	H / N(*)
	22μF		4	CM05X6S226M04A#080	12.5	1.0±0.2	0.5±0.2	0.8 max.	H / N(**)
X7R	0.1μF	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
	0.47μF		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(*)
		M:±20%	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
		K:±10% / M:±20%	25	CM105X5R106□25A#	15.0	1.6±0.2	0.8±0.2	0.8±0.2	T / L
	22μF	M:±20%	16	CM105X5R226M16A#	12.5	1.6±0.2	0.8±0.2	0.8±0.2	T / L
			10	CM105X5R226M10A#	12.5	1.6±0.2	0.8±0.2	0.8±0.2	T / L
	47μF		6.3	CM105X5R476M06A#	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
		K:±10% / M:±20%	10	CM105X6S106□10A#	15.0	1.6±0.2	0.8±0.2	0.8±0.2	T / L
	22μF	M:±20%		CM105X6S226M10A#	12.5	1.6±0.2	0.8±0.2	0.8±0.2	T / L
			6.3	CM105X6S226M06A#	12.5	1.6±0.2	0.8±0.2	0.8±0.2	T / L
	47μF		4	CM105X6S226M04A#	12.5	1.6±0.2	0.8±0.2	0.8±0.2	T / L
				CM105X6S476M04A#	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%		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
			10	CM21X5R226M10A#	12.5	2.0±0.2	1.25±0.2	1.25±0.2	T / L
	47μF		6.3	CM21X5R476M06A#	10.0	2.0±0.2	1.25±0.2	1.25±0.2	T / L
	100μF		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		4	CM21X6S476M04A#	10.0	2.0±0.2	1.25±0.2	1.25±0.2	T / L
	100μF			CM21X6S107M04A#	12.5	2.0±0.2	1.25±0.2	1.25±0.2	T / L
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

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
			25	CM316X5R225□25A#	5.0	3.2±0.2	1.6±0.15	1.6±0.15	T / L
	4.7μF		50	CM316X5R475□50A#	5.0	3.2±0.2	1.6±0.2	1.6±0.2	T / L
	10μF		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
			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
			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		10	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
	22μF		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
	22μF		16	CM32X7R226□16A#	12.5	3.2±0.3	2.5±0.2	2.5±0.2	T / L

Low Profile CT316 Series Size (JIS Code)：1206(3216) # Packaging Code (Packaging quantity)：T(4,000pcs.)

Dielectric code CΔ	Capacitance	□:Tolerance	Voltage [V]	Part Number	Q	Dimension			# Packaging Code (quantity)
						L[mm]	W[mm]	T[mm]	
CG/CH	0.13μF	J:±5%	50	CT316CΔ134J50AT095	1000	3.2±0.2	1.6±0.2	0.95 max.	T

Low Profile CT03Series Size (JIS Code)：0201(0603) # Packaging Code (Packaging quantity)：H(15,000pcs.) / 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	0.1μF	K:±10% / M:±20%	6.3	CT03X5R104□06A#022	12.5	0.6±0.03	0.3±0.03	0.22 max.	H / N / Q / W
	1μF			CT03X5R105□06A#022	10.0	0.6±0.09	0.3±0.09	0.22 max.	H / N
X6S	0.1μF	K:±10% / M:±20%	4	CT03X6S104□04A#022	12.5	0.6±0.03	0.3±0.03	0.22 max.	H / N / Q / W
X6T	1μF	M:±20%	4	CT03X6T105M04A#022	12.5	0.6±0.09	0.3±0.09	0.22 max.	H / N

Low Profile CT05 Series Size (JIS Code)：0402(1005) # Packaging Code (Packaging quantity)：H(10,000pcs.) / N(50,000pcs.) / 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	1μF	K:±10% / M:±20%	6.3	CT05X5R105□06A#033	12.5	1.0±0.05	0.5±0.05	0.33 max.	H / N / Q / W
	2.2μF	M:±20%		CT05X5R225M06A#033	12.5	1.0±0.05	0.5±0.05	0.33 max.	H / N / Q / W
	4.7μF			CT05X5R475M06AH033	15.0	1.0±0.2	0.5±0.2	0.33 max.	H
	10μF			CT05X5R106M06A#050	15.0	1.0±0.2	0.5±0.2	0.5 max.	H / N
X6T	1μF	M:±20%	4	CT05X6T105M04A#022	12.5	1.0±0.1	0.5±0.05	0.22 max.	H / N
	10μF		2.5	CT05X6T106M02A#050	12.5	1.0±0.2	0.5±0.2	0.5 max.	H / N

Low Profile CT105 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	1μF	K:±10%/M:±20%	16	CT105X5R105□16A#055	12.5	1.6±0.1	0.8±0.1	0.55 max.	T / L

Low Profile CT21 Series Size (JIS Code)：0805(2012) # 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%	50	CT21X5R225□50A#095	5.0	2.0±0.2	1.25±0.2	0.95 max.	T / L
	4.7μF		16	CT21X5R475□16A#095	12.5	2.0±0.15	1.25±0.15	0.95 max.	T / L

Part Number List

High-Q CU02 Series Size (JIS Code)：01005(0402) # Packaging Code (Packaging quantity)：H(20,000pcs.) / N(80,000pcs.) / P(40,000pcs.)

Dielectric code CΔ	Capacitance	□:Tolerance	Voltage [V]	Part Number	Q	Dimension L[mm]	Dimension W[mm]	Dimension T[mm]	# Packaging Code (quantity)
CG/CH	0.2pF	B:±0.1pF / C:±0.25pF	25	CU02CΔR20□25A#	404	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
			16	CU02CΔR20□16A#	404	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	0.5pF		25	CU02CΔR50□25A#	410	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
			16	CU02CΔR50□16A#	410	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	1pF		25	CU02CΔ1R0□25A#	420	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
			16	CU02CΔ1R0□16A#	420	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	1.5pF		25	CU02CΔ1R5□25A#	430	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
			16	CU02CΔ1R5□16A#	430	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	2pF		25	CU02CΔ2R0□25A#	440	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
			16	CU02CΔ2R0□16A#	440	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	3pF		25	CU02CΔ3R0□25A#	460	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
			16	CU02CΔ3R0□16A#	460	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	4pF		25	CU02CΔ4R0□25A#	480	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
			16	CU02CΔ4R0□16A#	480	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	5pF		25	CU02CΔ5R0□25A#	500	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
			16	CU02CΔ5R0□16A#	500	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	6pF	C:±0.25pF / D:±0.5pF	25	CU02CΔ6R0□25A#	520	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
			16	CU02CΔ6R0□16A#	520	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	7pF		25	CU02CΔ7R0□25A#	540	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
			16	CU02CΔ7R0□16A#	540	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	8pF		25	CU02CΔ8R0□25A#	560	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
			16	CU02CΔ8R0□16A#	560	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	9pF		25	CU02CΔ9R0□25A#	580	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
			16	CU02CΔ9R0□16A#	580	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	10pF	J:±5% / K:±10%	25	CU02CΔ100□25A#	600	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
			16	CU02CΔ100□16A#	600	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	12pF		25	CU02CΔ120□25A#	640	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
			16	CU02CΔ120□16A#	640	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	15pF		16	CU02CΔ150□16A#	700	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	18pF			CU02CΔ180□16A#	760	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	22pF			CU02CΔ220□16A#	840	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P
	24pF			CU02CΔ240□16A#	880	0.4±0.02	0.2±0.02	0.2±0.02	H / N / P

Automotive AR05 Series Size (JIS Code)：0402(1005) # Packaging Code (Packaging quantity)：H(10,000pcs.) / N(50,000pcs.)

Dielectric code	Capacitance	□:Tolerance	Voltage [V]	Part Number	Tanδ [%]	Dimension L[mm]	Dimension W[mm]	Dimension T[mm]	# Packaging Code (quantity)
X7R	1μF	K:±10% / M:±20%	6.3	AR05X7R105□06A#	7.5	1.0±0.05	0.5±0.05	0.5±0.05	H/N

Automotive AR21 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 L[mm]	Dimension W[mm]	Dimension T[mm]	# Packaging Code (quantity)
X7S	10μF	K:±10% / M:±20%	10	AR21X7S106□10A#	10.0	2.0±0.2	1.25±0.2	1.25±0.2	T/L

Three Terminal Capacitors KNH05 Series Size (JIS Code)：0402(1005) Packaging Code (Packaging quantity)：H(10,000pcs.)

Dielectric code	Capacitance	□:Tolerance	Voltage [V]	Part Number	Tanδ [%]	Dimension L[mm]	Dimension W[mm]	Dimension T[mm]	Packaging Code (quantity)
X5R	4.3μF	M:±20%	4	KNH05X5R435M04AH	–	1.0±0.1	0.5±0.2	0.5 max.	H
	10μF			KNH05X5R106M04AH		1.0±0.2	0.5±0.2	0.5±0.2	H
	15μF			KNH05X5R156M04AH		1.0±0.15	0.5±0.15	0.5±0.15	H
X6S	4.3μF	M:±20%	4	KNH05X6S435M04AH		1.0±0.1	0.5±0.2	0.5 max.	H
			2.5	KNH05X6S435M02AH		1.0±0.1	0.5±0.2	0.5 max.	H
	10μF			KNH05X6S106M02AH		1.0±0.2	0.5±0.2	0.5±0.2	H

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.

■ Kyocera Products Sales Offices

Japan

■ HEADQUARTERS
KYOCERA Corporation
6 Takeda, Tobadono-cho, Fushimi-ku, Kyoto 612-8501, Japan
Phone: (81)-(75)604-3500

International Sales Division:
Phone: (81)-(75)604-3424
Fax: (81)-(75)604-3425

■ Contact Information

https://ele.kyocera.com/en/aboutus/officelist/global/

■ Distributor Inventory Search

To search for inventory that can be purchased online, please enter the Series number or part number.

KYOCERA Corporation

CATM2210MH29100E
The information contained in this catalog is current as of October 2022.