HIGH-Q MULTILAYER CERAMIC CHIP CAPACITORS

FEATURES

Capacitance ranging from 0.1pF to 0.1μF
Voltage ratings of 25V~3600V
Size 0402 to 4040
Operating temperature rang of -55°C to +125°C
Lead-free termination,RoHS Compliant

APPLICATIONS

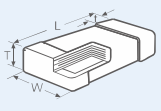
Applications include RF power amplifiers, low noise amplifiers.

ORDERING INFORMATION

CC41AC	0805	101	J	251	N	T
Series	Size code	Capacitance	Capacitance tolerance	Rated voltage	Termination finish	Packaging
CC41AC	0402 1210 0505 1111 0603 2225 0805 4040 1206	First two digits represent ignificant figures.Third digit specifies number of zeros.	B=±0.1pF C=±0.25pF D=±0.5pF F=±1% G=±2% J=±5%	First two digits represent ignificant figures.Third digit specifies number of zeros.	N=100%Sn	Packaging code

DIMENSIONS

Unit:mm

Appearance	Case Size	0402	0505	0603	0805	1206	1210	1111	2225	4040
	L	1.00±0.15	1.40±0.40	1.60±0.25	2.00±0.30	3.18±0.25	3.18±0.25	2.80±0.50	5.70±0.80	10.50±0.70
	W	0.50±0.15	1.40±0.40	0.80±0.25	1.25±0.30	1.58±0.25	2.41±0.25	2.80±0.50	6.35±0.80	9.50±0.50
	Tmax	0.61	1.45	1.00	1.40	1.27	1.52	2.60	4.50	4.50
	t	0.25±0.15	0.40±0.30	0.40±0.25	0.50±0.35	0.50±0.25	0.50±0.25	0.45±0.30	0.80±0.60	0.80±0.60

HIGH-Q MULTILAYER CERAMIC CHIP CAPACITORS

ELECTRICAL CHARACTERISTICS

No.	Dissipation Factor	Dielectric Strength	Insulation Resistance (25°C)	Q or Dissipation Factor C≥3pF	ESR C≥3pF	Temperature characteristic
CC41AC	tg δ ≤10X10^{-4}	U_R≤100V 2.5U_R 100V<U_R≤200V 1.5U_R+100V 200V<U_R≤500V 1.3U_R+100V U_R>500V 1.3U_R	IR≥10^{5}MΩ	0402 Q×f×C≥400 0505 Q×f×C≥500 0603 Q×f×C≥600 0805、1206、1210 & 1111 Q×f×C≥800 2225 Q×f×C≥1000	0402 ESR≤0.40Ω 0505、0603 ESR≤0.35Ω 0805 ESR≤0.30Ω 1206、1210、1111、2225 ESR≤0.25Ω	-55°C~125°C

»» CAPACITANCE AND RATED VOLTAGE RANGE

CC41AC（(0±30)ppm/K）

Case size	0402		0505		0603	0805	1206			1111				1210			2225					4040					
Rated voltage(V)	25	50	150	250	250	250	100	200	500	50	100	200	500	100	200	500	300	500	1200	1500	2500	200	500	1000	1600	2500	3600
0R1		■																									
0R2		■		■	■																						
0R3		■		■	■	■							■														
0R4		■		■	■	■			■				■														
0R5		■		■	■	■			■				■														
0R6		■		■	■	■			■				■														
0R7		■		■	■	■			■				■														
0R8		■		■	■	■			■				■														
0R9		■		■	■	■			■				■														
1R0		■		■	■	■			■				■			■					■						■
1R1		■		■	■	■			■				■			■					■						■
1R2		■		■	■	■			■				■			■					■						■
1R3		■		■	■	■			■				■			■					■						■
1R4		■		■	■	■			■				■			■					■						■
1R5		■		■	■	■			■				■			■					■						■
1R6		■		■	■	■			■				■			■					■						■
1R7		■		■	■	■			■				■			■					■						■
1R8		■		■	■	■			■				■			■					■						■
1R9		■		■	■	■			■				■			■					■						■
2R0		■		■	■	■			■				■			■					■						■
2R2		■		■	■	■			■				■			■					■						■
2R4		■		■	■	■			■				■			■					■						■
2R7		■		■	■	■			■				■			■					■						■
3R0		■		■	■	■			■				■			■					■						■
3R3		■		■	■	■			■				■			■					■						■
3R6		■		■	■	■			■				■			■					■						■
3R9		■		■	■	■			■				■			■					■						■
4R3		■		■	■	■			■				■			■					■						■
4R7		■		■	■	■			■				■			■					■						■
5R1		■		■	■	■			■				■			■					■						■
5R6		■		■	■	■			■				■			■					■						■
6R2		■		■	■	■			■				■			■					■						■
6R8		■		■	■	■			■				■			■					■						■
7R5		■		■	■	■			■				■			■					■						■
8R2		■		■	■	■			■				■			■					■						■
9R1		■		■	■	■			■				■			■					■						■
100		■		■	■	■			■				■			■					■						■
110		■		■	■	■			■				■			■					■						■
120		■		■	■	■			■				■			■					■						■
150		■		■	■	■			■				■			■					■						■
160		■		■	■	■			■				■			■					■						■
180		■		■	■	■			■				■			■					■						■
200		■		■	■	■			■				■			■					■						■
220		■		■	■	■			■				■			■					■						■
240		■		■	■	■			■				■			■					■						■
270		■		■	■	■			■				■			■					■						■
300	■			■	■	■			■				■			■					■						■
330	■			■	■	■			■				■			■					■						■
360			■		■	■			■				■			■					■						■
390			■		■	■			■				■			■					■						■
430			■		■	■			■				■			■					■						■
470			■		■	■		■					■			■					■						■
510			■		■	■		■					■			■					■						■
560			■		■	■		■					■			■					■						■
620			■		■	■		■					■			■					■						■
680			■		■	■		■					■			■					■						■
750			■		■	■		■					■			■					■						■
820			■		■	■		■					■			■					■						■

HIGH-Q MULTILAYER CERAMIC CHIP CAPACITORS

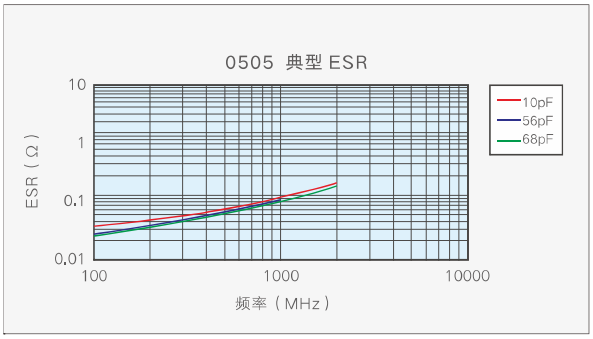
CAPACITANCE AND RATED VOLTAGE RANGE

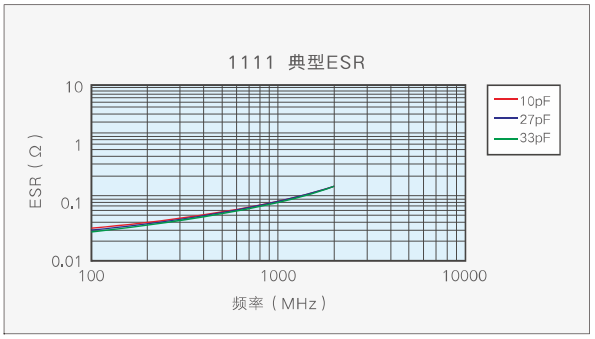
CC41AC（(0±30)ppm/K）

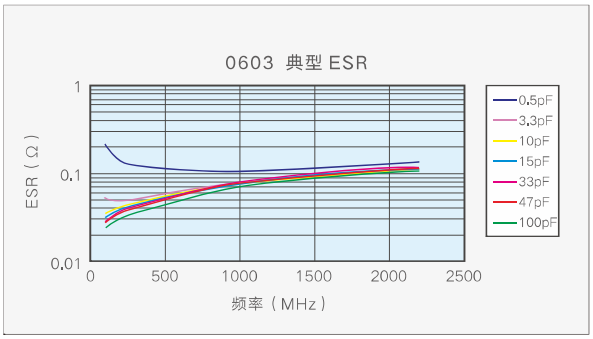
Case size	0402		0505		0603	0805	1206			1111				1210			2225					4040					
Rated voltage(V)	25	50	150	250	250	250	100	200	500	50	100	200	500	100	200	500	300	500	1200	1500	2500	200	500	1000	1600	2500	3600
910			■		■	■		■					■			■					■						■
101			■		■	■		■					■			■					■						■
111						■	■						■		■						■						■
121						■	■						■		■						■						■
131						■	■						■		■						■						■
151						■	■						■		■						■						■
161						■	■					■			■						■						■
181						■	■					■			■						■						■
201						■	■					■			■						■						■
221						■	■					■			■						■						■
241						■						■		■							■						■
271												■		■							■						■
301												■		■						■							■
331												■		■						■							■
361												■		■						■							■
391												■		■						■							■
431												■		■						■						■	
471												■		■						■						■	
511											■			■					■							■	
561											■			■					■							■	
621											■			■					■							■	
681											■			■					■							■	
751										■				■					■							■	
821										■				■					■						■		
911										■				■					■						■		
102										■				■					■					■	■		
112																			■					■			
122																			■					■			
132																		■						■			
152																		■						■			
162																	■							■			
182																	■						■				
202																							■				
222																							■				
242																							■				
272																							■				
302																							■				
332																							■				
362																						■					
392																						■					
432																						■					
472																						■					
502																											
512																											

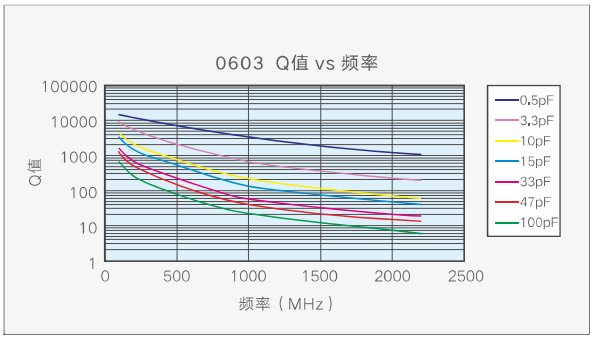
CHARACTERISTIC

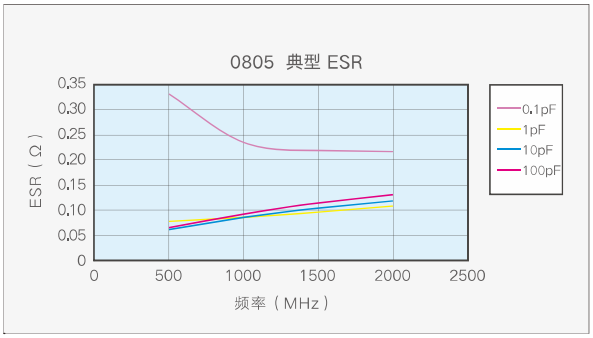
CC41AC（(0±30)ppm/K）

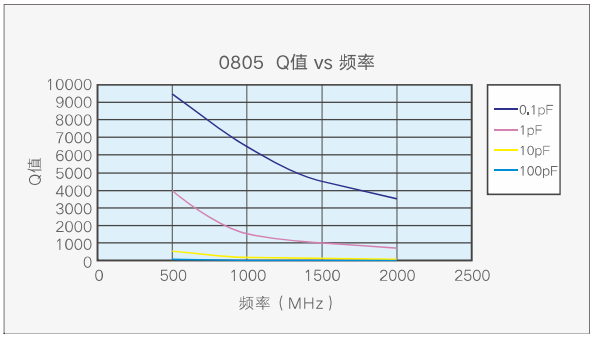


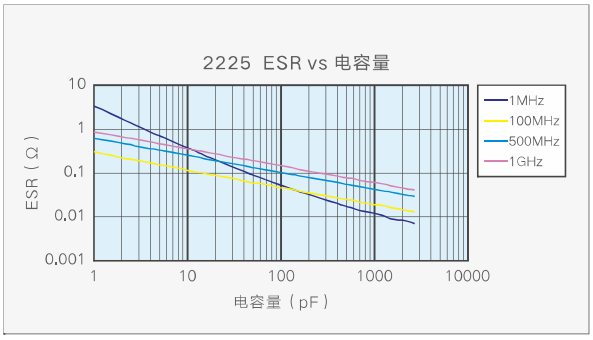


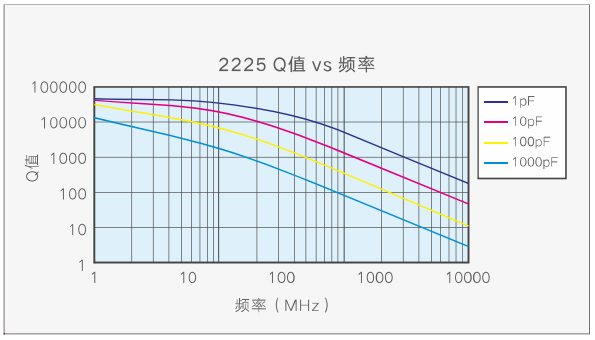






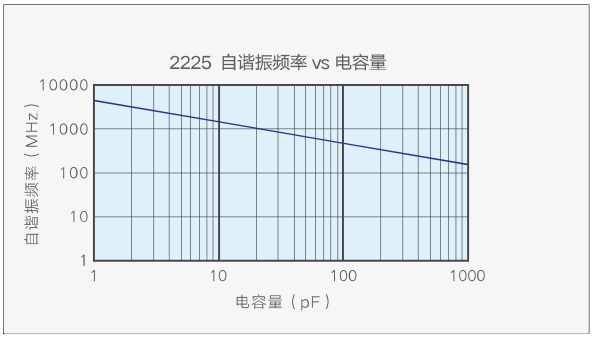


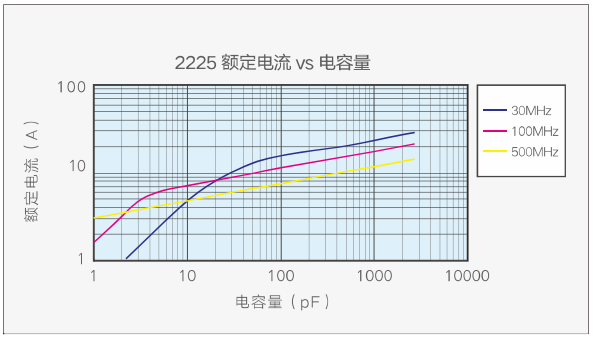


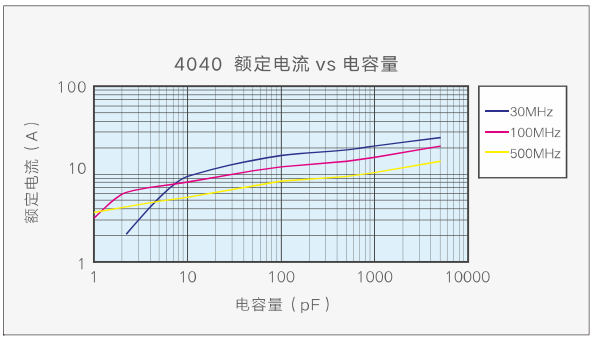


HIGH-Q MULTILAYER CERAMIC CHIP CAPACITORS

CHARACTERISTIC







APPLICATION GUIDE FOR MULTIPLAYER CERAMIC CAPACITORS

STORAGE

To maintain the solderability of terminal electrodes and to keep packaging materials in good condition, care must be taken to control temperature and humidity.

・Recommended conditions

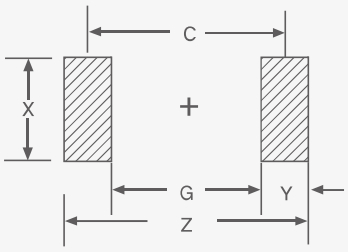
Temperature : Below 40℃ , Humidity : Below 70% RH

Even under ideal storage conditions, solderability of capacitor is deteriorated as time passes, so capacitors shall be used within 12 months from the time of delivery. If exceeding the above period, please check solderability before using the capacitors.

HEAT TREATMENT

The capacitance values of high dielectric constant capacitors will gradually decrease with the passage of time,so care shall be taken to design circuits. Even if capacitance value decreases as time passes, it will get back to the initial value by a heat treatment at 150℃ for 1hour.

CHIP CAPACITOR LAND PATTERN DESIGN RECOMMENDATIONS



Reflow Unit : mm

Size	Z		G		X		Y	
	min	max	min	max	min	max	min	max
0201	0.60	0.90	0.20	0.30	0.25	0.40	0.20	0.30
0402	1.00	1.60	0.40	0.60	0.40	0.60	0.30	0.50
0603	1.70	2.60	0.50	1.00	0.60	1.00	0.60	0.80
0805	2.00	3.80	0.60	1.20	0.90	1.60	0.70	1.30
1206	3.80	5.70	1.80	2.50	1.20	2.00	1.00	1.60
1210	3.80	5.70	1.80	2.50	1.80	3.20	1.00	1.60
1812	4.90	7.50	2.50	3.70	2.30	3.50	1.20	1.90
2220	5.60	9.30	3.20	4.70	3.50	5.00	1.20	2.30
2225	5.60	9.30	3.20	4.70	3.50	6.80	1.20	2.30

Wave Unit : mm

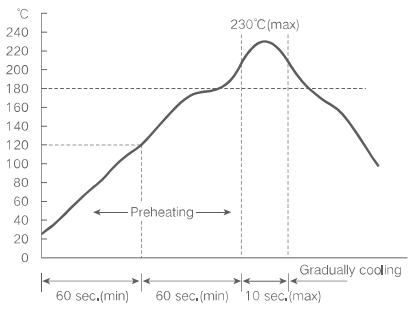
Size	Z		G		X		Y	
	min	max	min	max	min	max	min	max
0603	1.70	2.60	0.50	1.00	0.60	1.00	0.60	0.80
0805	2.60	4.40	1.00	1.40	0.90	1.60	0.70	1.30
1206	3.80	5.70	1.80	2.50	1.20	2.00	1.00	1.60
1210	3.80	5.70	1.80	2.50	1.80	3.20	1.00	1.60

SOLDERING

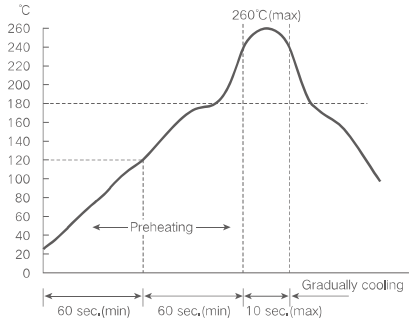
Ceramic chip capacitors are susceptible to thermal shock when exposed to rapid or concentrated heating or rapid cooling.Therefore, the soldering must be conducted with great care so as to prevent malfunction of the components due to excessive thermal shock.

[Reflow Soldering]

Recommended conditions for SnPb

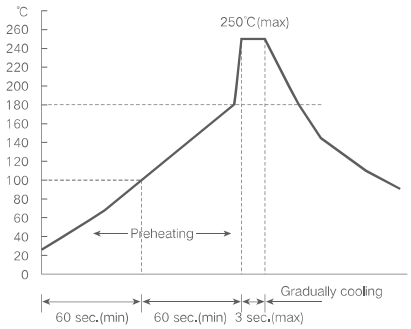


Recommended conditions for Pb-free

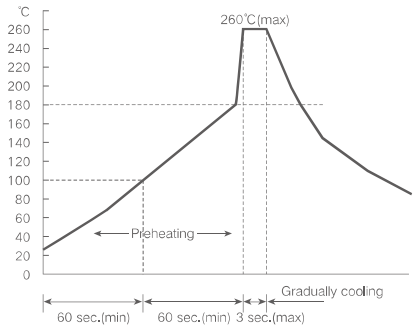


[Wave Soldering]

Recommended conditions for SnPb

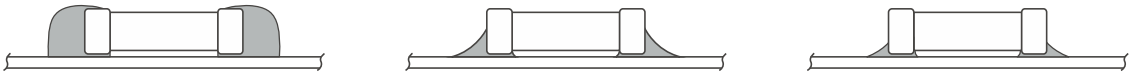


Recommended conditions for Pb-free



CAUTION:

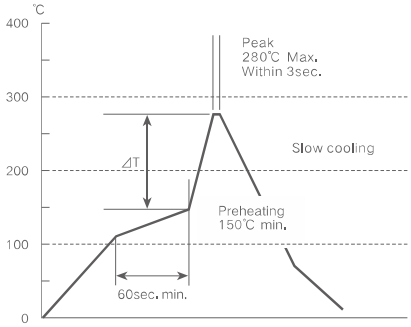
If the solder amount is excessive, the risk of cracking is higher during board bending or any other stressful condition. Too little solder amount results in a lack of adhesive strength on the termination, which may result in chips breaking loose from the PCB.



Too much　　Just right　　Too little

[Hand soldering]

Recommended conditions for Hand-soldering



Size	ΔT
1206 or less	≤150℃
1210 or more	≤130℃

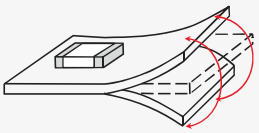
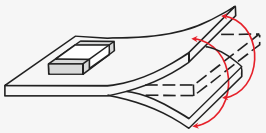
CAUTION:

1.Use a maximum tip diameter of 1.0 mm.

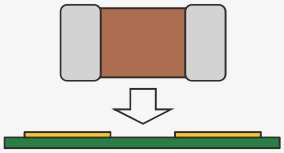
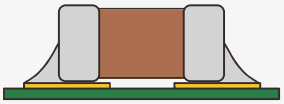
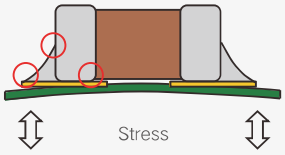
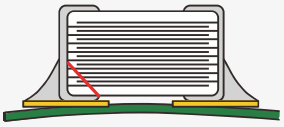
2.The soldering iron shall not directly touch capacitors. soldering for 1 times.

SOLDERING

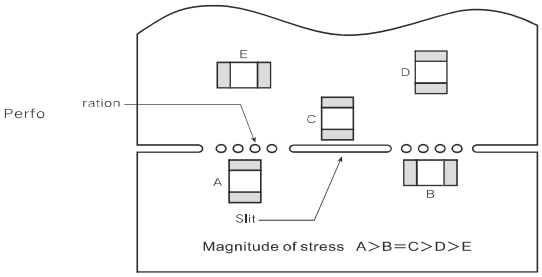
1. The following is examples of good and bad capacitor layouts, capacitors shall be located to minimize any possible mechanical stresses from board warp or deflection.

Not recommended	Recommended	
		Place the product at a right angle to the direction of the anticipated mechanical stress.

Capacitor was cracked by external mechanical stress such as board distortion and twist applied after mounting.

Step 1	Step 2	Step 3	Step 4
Chip mounting	Solder fillet formation	Board stress application	Crack generation
			

2. The amount of mechanical stresses given will vary depending on capacitor layout.Please refer to the right figure.



3. When PCB is split,the amount of mechanical stress on the capacitors can vary according to the method used.The following methods are listed in order from most stressful to least stressful:push-back,slit,V-grooving,and perforation.Thus,please consider the PCB,split methods as well as chip location.

ADJUSTMENT OF MOUNTING MACHINE

When the bottom dead center of a pick-up nozzle is too low,excessive force is imposed on capacitors and causes damages.To avoid this,the following points shall be considerable.

1. The bottom dead center of the pick-up nozzle shall be adjusted to the surface level of PCB without the board deflection.
2. The pressure of nozzle shall be adjusted between 1 and 3 N static loads.
3. To reduce the amount of deflection of the board caused by impact of the pick-up nozzle, supporting pins or back-up pins shall be used on the other side of the PCB.The following diagrams show typical example of good and bad pick-up nozzle placement:

Improper method	Proper method