

MULTILAYER CERAMIC SMD CAPACITOR

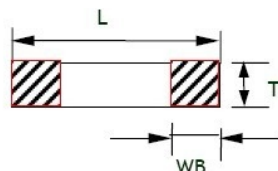
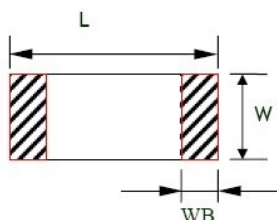
CC41 CT41

FEATURE

- Miniature size, large capacitance, tape and reel packaging suitable for auto-placement
- Epoxy resin coating creates excellent performance in humidity resistance, mechanical strength and heat resistance
- Standard size, various lead configuration

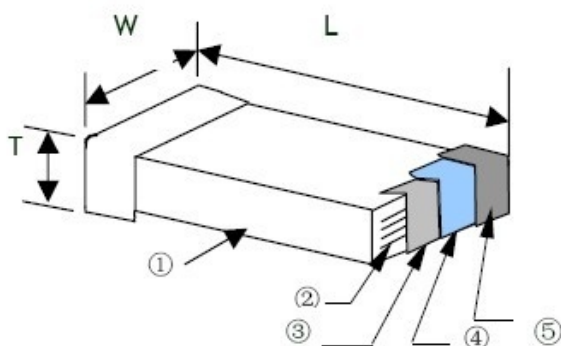
STRUCTURE AND DIMENSIONS

DIMENSIONS



Type		Dimensions (mm)			
British expression	Metric expression	L	W	T	WB
0402	1005	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.10
0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	0.30±0.10
0805	2012	2.00±0.20	1.25±0.20	≤0.55	0.50±0.20
				0.80±0.20	
				1.00±0.20	
				1.25±0.20	
1206	3216	3.20±0.30	1.60±0.30	0.80±0.20	0.60±0.30
				1.00±0.20	
				1.25±0.20	
				1.60±0.30	
1210	3225	3.20±0.30	2.50±0.30	≤2.80	0.80±0.30
1808	4520	4.50±0.40	2.00±0.20	≤2.20	0.80±0.30
1812	4532	4.50±0.40	3.20±0.30	≤3.50	0.80±0.30
2225	5763	5.70±0.50	6.30±0.50	≤6.20	1.00±0.40
3035	7690	7.60±0.50	9.00±0.50	≤8.10	1.00±0.40

STRUCTURE



NO	Name
①	Ceramic dielectric
②	Inner electrode
③	Substrate electrode
④	Nickel Layer
⑤	Tin Layer

HOW TO ORDER

0805	CG	101	J	500	N	T
①	②	③	④	⑤	⑥	⑦

NOTES:

① DIMENSIONS

(unit): inch/ mm

Size Code	0402	0603	0805	1206	1210	1808	1812	2225	3035
(L × W) inch	0.04×0.02	0.06×0.03	0.08×0.05	0.12×0.06	0.12×0.10	0.18×0.08	0.18×0.12	0.22×0.25	0.30×0.35
(L × W) mm	1.00×0.50	1.60×0.80	2.00×1.25	3.20×1.60	3.20×2.50	4.50×2.00	4.50×3.20	5.70×6.30	7.60×9.00

② DIELECTRIC STYLE

(Dielectric Code)	CG	CH	HG	LG	PH	RH	SH	TH	UJ	SL	X	B	E	F
(Dielectric)	COG	COH	HG	LG	PH	RH	SH	TH	UJ	SL	X5R	X7R	Z5U	Y5V

③ NOMINAL CAPACITANCE

(Unit):pF

(Express Method)	(Actual Value)
0R5	0.5
1R0	1.0
102	10×10^2
224	22×10^4
...	...

Note: the first two digits are significant; third digit denotes number of zeros; R=decimal point.

④ CAPACITANCE TOLERANCE

(Code)	B	C	D	F	G	J	K	M	S	Z
(Tolerance)	± 0.10 pF	± 0.25 pF	± 0.5 pF	$\pm 1.0\%$	$\pm 2.0\%$	$\pm 5.0\%$	$\pm 10\%$	$\pm 20\%$	+50% -20%	+80% -20%

Note: These capacitance tolerance B, C, D are just applicable the capacitance that equals to or less than 10pF.

⑥ TERMINAL MATERIAL STYLES

(Termination Styles)	(Express Method)
(Silver Solderable Termination)	S
(Copper Solderable Termination)	C
(Nickel Barrier Termination)	N

⑤ RATED VOLTAGE

(Unit):V

(Express Method)	(Actual Value)
6R3	6.3
500	50×10^0
201	20×10^1
102	10×10^2
...	...

Note: the first two digits are significant; third digit denotes number of zeros; R=decimal point.

⑦ PACKAGE STYLES

B	T
(Bulk Bag)	(Taping Package)

TEMPERATURE COEFFICIENT/CHARACTERISTICS

Dielectric	Reference Temperature Point	Temperature Coefficient	Operation Temperature Range
COG	20°C	0±30 ppm/°C	-55°C ~ 125°C
COH	20°C	0±60 ppm/°C	-55°C ~ 125°C
HG	20°C	-33±30 ppm/°C	-25°C ~ 85°C
LG	20°C	-75±30 ppm/°C	-25°C ~ 85°C
PH	20°C	-150± 60 ppm/°C	-25°C ~ 85°C
RH	20°C	-220± 60 ppm/°C	-25°C ~ 85°C
SH	20°C	-330± 60 ppm/°C	-25°C ~ 85°C
TH	20°C	-470± 60 ppm/°C	-25°C ~ 85°C
UJ	20°C	-750± 120 ppm/°C	-25°C ~ 85°C
SL	20°C	-1000~+140 ppm/°C	-25°C ~ 85°C
X7R	20°C	±15%	-55°C ~ 125°C
X5R	20°C	±15%	-55°C ~ 85°C
Z5U	20°C	-56%~+22%	10°C ~ 85°C
Y5V	20°C	-80%~+30%	-25°C ~ 85°C

Note: Nominal temperature coefficient and allowed tolerance of class I are decided by the changing of the capacitance between 20°C and 85°C. Nominal temperature coefficient of class II are decided by the temperature of 20°C.

CAPACITANCE RANGE AND OPERATING VOLTAGE

Unit:pF

Size Code	Rated Voltage	Capacitance		
		COG (NPO)	X7R (X5R)	Y5V (Z5U)
0402	6.3V	0.1~470	100~4700000	1000~1000000
	10V	0.1~470	100~1000000	1000~1000000
	16V	0.1~470	100~47000	1000~220000
	25V	0.1~470	100~22000	1000~100000
	50V	0.1~470	100~10000	1000~100000

Size Code	Rated Voltage	Capacitance		
		COG (NPO)	X7R (X5R)	Y5V (Z5U)
0603	6.3V	0.1~4700	100~4700000	1000~4700000
	10V	0.1~4700	100~1000000	1000~2200000
	16V	0.1~4700	100~1000000	1000~1000000
	25V	0.1~4700	100~150000	1000~1000000
	50V	0.1~4700	100~100000	1000~220000
0805	6.3V	0.3~10000	100~22000000	1000~22000000
	10V	0.3~10000	100~22000000	1000~22000000
	16V	0.3~10000	100~1000000	1000~1000000
	25V	0.3~10000	100~2200000	1000~2200000
	50V	0.3~10000	100~1000000	1000~1000000
1206	6.3V	0.5~33000	100~47000000	1000~47000000
	10V	0.5~33000	100~22000000	1000~22000000
	16V	0.5~33000	100~22000000	1000~22000000
	25V	0.5~33000	100~4700000	1000~4700000
	50V	0.5~12000	100~2200000	1000~2200000
1210	6.3V	10~10000	220~100000000	4700~100000000
	10V	10~10000	220~47000000	4700~47000000
	16V	10~10000	220~22000000	4700~22000000
	25V	10~10000	220~10000000	4700~10000000
	50V	10~8200	220~3300000	4700~3300000
1808	6.3V	10~10000	220~100000000	4700~100000000
	10V	10~10000	220~47000000	4700~47000000
	16V	10~10000	220~33000000	4700~33000000
	25V	10~10000	220~22000000	4700~22000000
	50V	10~6800	220~10000000	4700~10000000
1812	6.3V	10~15000	470~100000000	10000~100000000
	10V	10~15000	470~47000000	10000~47000000
	16V	10~15000	470~33000000	10000~33000000
	25V	10~15000	470~22000000	10000~22000000
	50V	10~12000	470~10000000	10000~10000000
2225	6.3V	10~47000	470~100000000	10000~100000000
	10V	10~47000	470~100000000	10000~100000000
	16V	10~47000	470~47000000	10000~47000000
	25V	10~47000	470~47000000	10000~47000000
	50V	10~33000	470~10000000	10000~10000000
3035	6.3V	10~100000	470~100000000	10000~100000000
	10V	10~100000	470~100000000	10000~100000000
	16V	10~100000	470~100000000	10000~100000000
	25V	10~100000	470~47000000	10000~47000000
	50V	10~47000	470~10000000	10000~10000000

Note: We can design according to customer special requirements

Hi-Q COG MLCC

● Application:

Hi-Q COG capacitors are ideally suited for RF and microwave application requiring high Q, low ESR, and high resonant frequency.

● Note for CQ and CG:

※ The following Q value is just confirmed by general customer. If there is a higher requirement for Q value requirements,

we can design and produce according to the special requirements.

※For the customer whose requirements for frequency is between 1MHz and 2.4GHz or higher frequency, we can design it according to their requirements.

※The frequency of CQ is a little higher than that of CG. Please choose them according to your requirements.

● CQ Capacitance value and Q value

Capacitance (pF)	Q value at 300MHz		Capacitance (pF)	Q value at 300MHz		Capacitance (pF)	Q value at 300MHz	
	0805	0603		0805	0603		0805	0603
4.7	1000	800	11	450	360	24	200	160
5.2	900	720	12	400	320	27	175	140
5.6	850	680	13	375	300	30	150	120
6.2	800	640	14	350	280	33	140	112
6.8	700	560	15	325	260	36	130	104
7.5	650	520	16	300	240	39	120	96
8.2	575	460	18	250	200	43	110	88
9.1	525	420	20	225	180	47	100	80
10	500	400	22	215	172	...	...	...

HIGH VOLTAGE MLCC

Middle & high voltage MLCC is a kind of special design 、special technology MLCC that bases on the technology of general MLCC. This kind of MLCC has stable high voltage reliability and suitable to SMT. Middle & high MLCC is widely applicable for many direct high voltage circuits in which it can improve the performance of the circuit.

- Application: Analog & Digital Modems
- LAN/WAN Interface
- Lighting Ballast Circuits
- Voltage Multipliers
- DC-DC Converters
- Back-lighting Inverters

Unit:pF

Size Code	Rated Voltage	Capacitance		
		NPO	X7R	Y5V
0603	100V	0.5~820	150~10000	2200~68000
	200V	0.5~470	150~6800	.....
0805	100V	0.5~1500	150~33000	10000~100000
	200V	0.1~1500	150~22000	10000~56000
	250V	0.1~1500	150~22000	10000~56000
	500V	0.1~560	150~10000	.....
	1000V	0.1~100	.....	.....
1206	100V	0.5~3300	150~100000	15000~330000
	200V	0.1~2700	150~47000	10000~150000
	250V	0.1~2700	150~33000	10000~150000
	500V	0.1~1500	150~22000	.....
	1000V	0.1~1000	150~5600	.....
	2000V	0.1~270	150~1500	.....
1210	100V	1.0~4700	150~220000	10000~820000
	200V	1.0~3300	150~100000	10000~390000
	250V	1.0~3300	150~82000	10000~390000
	500V	1.0~2000	150~33000	.....
	1000V	1.0~820	150~10000	.....
	2000V	1.0~470	150~6800	.....
1808	100V	2.0~4700	150~220000	150000~1000000
	200V	2.0~3300	150~100000	10000~390000
	250V	2.0~3300	150~82000	10000~390000
	500V	2.0~1800	150~39000	.....
	1000V	2.0~820	150~10000	.....
	2000V	2.0~470	150~6800	.....
	3000V	2.0~470	150~2200	.....
	4000V	2.0~56	150~1000	.....
	5000V	2.0~27	.....	.....

Unit:pF

Size Code	Rated Voltage	Capacitance		
		NPO	X7R	Y5V
1812	100V	3.0~180 220~10000	150~330000	150000~1500000
	200V	3.0~5600	150~150000	100000~470000
	250V	3.0~5600	150~120000	100000~470000
	500V	3.0~3900	150~100000	.....
	1000V	3.01200	150~27000	.....
	2000V	3.0~680	150~10000	.....
	3000V	3.0~470	150~2200	.....
	4000V	3.0~220	150~1500	.....
	5000V	3.0~56	.....	.....
2225	100V	5.0~27000	150~1000000	250000~3300000
	200V	5.0~12000	150~470000	22000~680000
	250V	5.0~12000	150~470000	22000~680000
	500V	5.0~6800	150~330000	.....
	1000V	5.0~2200	150~56000	.....
	2000V	5.0~1000	150~27000	.....
	3000V	5.0~680	150~3900	.....
	4000V	5.0~560	150~3300	.....
	5000V	5.0~100	.....	.....

Note: We can design according to customer special requirements

Measurement method for high voltage MLCC

Rated voltage range	Measuring Method
$100V \leq V_r < 500V$	Force 200% Rated voltage for 5 second. Max..current should not exceed 50 mA.
$500V \leq V_r \leq 1000V$	Force 150% Rated voltage for 5 second. Max..current should not exceed 50 mA.
$1000V < V_r \leq 2000V$	Force 120% Rated voltage for 5 seconds. Max..current should not exceed 50 mA.
$2000V < V_r \leq 5000V$	Force 120% Rated voltage for 5 seconds. Max..current should not exceed 10 mA.

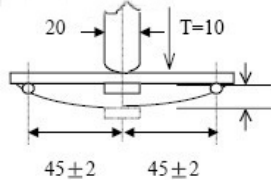
RELIABILITY TEST

Item	Technical Specification		Test Method and Remarks		
Capacitance	Class I	Should be within the specified tolerance.	Capacitance	Measuring Frequency	Measuring Voltage
			≤1000pF	1MHZ ± 10%	1.0 ± 0.2Vrms
			> 1000 pF	1KHZ ± 10%	
	Class II	Should be within the specified tolerance.	Test Temperature: 25℃ ± 3℃		
			C≤10 μ F: Test Frequency: 1KHZ ± 10% Test Voltage: 1.0 ± 0.2Vrms C > 10 μ F X7R、Y5V: Test Frequency: 120 ± 24 HZ Test Voltage: 0.5 ± 0.1Vrms Z5U: Test Frequency: 1 ± 0.1KHZ Test Voltage: 0.5 ± 0.05Vrms		

Item	Technical Specification				Test Method and Remarks				
(DF, tan δ) Dissipation Factor	Class I	DF			Capacitance		Measuring Frequency		Measuring Voltage
		≤0.56%			Cr < 5 pF		1MHZ ± 10%		1.0±0.2Vrms
		1.5[(150/Cr)+7]×10 ⁻⁴			5pF≤Cr < 50pF		1MHZ ± 10%		
		≤0.15%			5pF≤Cr≤1000pF		1MHZ ± 10%		
		≤0.15%			1000pF		1KHZ ± 10%		
	Class II	X7R	≥50V	25V	16V	10V	6.3V	C≤10 μ F Test Frequency: 1KHZ ± 10% Test Voltage: 1.0 ± 0.2Vrms	
			≤2.5%	≤3.5%	≤3.5%	≤5.0%	≤5.0% (C < 3.3 μ F) ≤10.0% (C ≥ 3.3 μ F)		

Item	Technical Specification				Test Method and Remarks		
(DF, tan δ) Dissipation Factor	Class II	Y5V Z5U	≥25V	16V	10V	6.3V	C > 10 μ F X7R、Y5V Test Frequency: 120 ± 24 HZ Test Voltage: 0.5 ± 0.1Vrms Z5U: Test Frequency: 1 ± 0.1KHZ Test Voltage: 0.5 ± 0.05Vrms
			≤7.0% (C < 1.0 μ F)	≤12.5%	≤12.5%	≤12.5%	
			≤9.0% (C ≥1.0 μ F)				
(IR) Insulation Resistance	Class I	C≤10 nF, Ri≥50000MΩ C> 10 nF, Ri · CR≥500S				Measuring Voltage: Rated Voltage Duration: 60 ± 5s Test Humidity: ≤75% Test Temperature: 25℃ ± 5℃ Test Current:≤50mA	
	Class II	X7R	C≤25 nF, Ri≥10000MΩ C> 25 nF, Ri · CR> 100S				
		Y5V Z5U	C≤25 nF, Ri≥4000MΩ C> 25 nF, Ri · CR> 100S				

Item	Technical Specification				Test Method and Remarks	
Dielectric Withstanding Voltage	No breakdown or damage.				Measuring Voltage: ClassI:300% Rated voltage ClassII:250% Rated voltage Duration: 1 ~ 5s Charge/ Discharge Current: 50mA max. (This method excludes high-voltage MLCC)	
Solderability	At least 95% of the terminal electrode is covered by new solder. Visual Appearance: No visible damage.				Preheating conditions:80 to 120℃; 10~30s.	
					Solder Temperature: 235 ± 5℃ Solder Temperature: 245 ± 5℃	Duration: 2 ± 0.5s Duration: 2 ± 0.5s
Resistance to Soldering Heat	Item	NPO to SL	X7R	Y5V Z5U	Preheating conditions: 100 to 200℃; 10 ± 2min. Solder Temperature: 265 ± 5℃ Duration: 5 ± 1s Clean the capacitor with solvent and examine it with a 10X(min.) microscope. Recovery Time: 24 ± 2h Recovery condition: Room temperature	
	ΔC/C	≤ ± 0.5% or ± 0.5PF, whichever is larger	-5~+10%	-10~+20%		
	DF	Same to initial value.				
	IR	Same to initial value.				
	Appearance:No visible damage.At least 95% of the terminal electrode is covered by new solder.					

Item	Technical Specification		Test Method and Remarks															
Resistance to Flexure of Substrate (Bending Strength)	Appearance: No visible damage.		 Test Board: Al2O3 or PCB Warp: 1mm Speed: 0.5mm/sec. Unit: mm The measurement should be made with the board in the bending position.															
	ΔC/C	≤ ± 10%																
Termination Adhesion	No visible damage.																	
Temperature Cycle	ClassI: ≤ ± 1% or ± 1pF, whichever is larger. ClassII: B: ≤ ± 10% E,F: ≤ ± 20%		Preheating conditions: up-category temperature, 1h Recovery time: 24 ± 1h Initial Measurement Cycling Times: 5 times, 1 cycle, 4 steps: <table><tr><th>Step</th><th>Temperature(℃)</th><th>Time (min.)</th></tr><tr><td>1</td><td>Low- category temp. (NPO/X7R: -55 Y 5V;-25 Z5U: +10)</td><td>30</td></tr><tr><td>2</td><td>Normal temp. (+20)</td><td>2~3</td></tr><tr><td>3</td><td>Up- category temp. (NPO/X7R: +125 Y 5V/Z5U: +85)</td><td>30</td></tr><tr><td>4</td><td>Normal temp. (+20)</td><td>2~3</td></tr></table> Recovery time after test: 24 ± 2h	Step	Temperature(℃)	Time (min.)	1	Low- category temp. (NPO/X7R: -55 Y 5V;-25 Z5U: +10)	30	2	Normal temp. (+20)	2~3	3	Up- category temp. (NPO/X7R: +125 Y 5V/Z5U: +85)	30	4	Normal temp. (+20)	2~3
	Step	Temperature(℃)	Time (min.)															
1	Low- category temp. (NPO/X7R: -55 Y 5V;-25 Z5U: +10)	30																
2	Normal temp. (+20)	2~3																
3	Up- category temp. (NPO/X7R: +125 Y 5V/Z5U: +85)	30																
4	Normal temp. (+20)	2~3																

Item	Technical Specification		Test Method and Remarks	
Moisture Resistance	$\Delta C/C$	Class I: $\leq \pm 2\%$ or $\pm 1pF$, whichever is larger. Class II: B: $\leq \pm 10\%$ E, F: $\leq \pm 30\%$	Temperature: 40 $\pm$ 2 $^{\circ}$ C Humidity: 90~95%RH	
	DF	Not more than twice of initial value.		

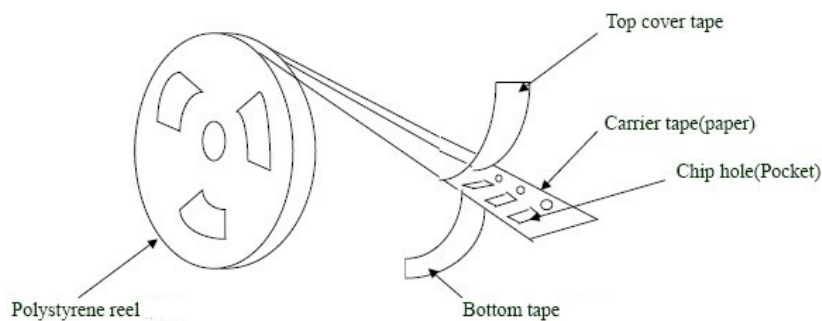
Item	Technical Specification		Test Method and Remarks
Moisture Resistance	IR	Class I: $R_i \geq 2500M\Omega$ or $R_i \cdot C_R \geq 25S$ whichever is smaller.	Duration:500h Recovery conditions:Room temperature Recovery Time:24h (Class1) or 48h (Class2)
		Class II: $R_i \geq 1000M\Omega$ or $R_i \cdot C_R \geq 25S]$ whichever is smaller.	
	Appearance: No visible damage.		
Life Test	$\Delta C/C$	Class I: $\leq \pm 2\%$ or $\pm 1pF$, whichever is larger. Class II: B: $\leq \pm 20\%$ E, F: $\leq \pm 30\%$	Low–Voltage(< 100V): Applied Voltage: $1.5 \times \text{Rated Voltage}$ Duration: 1000h Charge/ Discharge Current: 50mA max. Recovery Conditions: Room Temperature Recovery Time: 24h (Class 1), or 48h (Class2)
	DF	Not more than twice of initial value.	
	IR	Class I: $R_i \geq 4000M\Omega$ or $R_i \cdot C_R \geq 40S$ whichever is smaller.	
		Class II: $R_i \geq 2000M\Omega$ or $R_i \cdot C_R \geq 50S$ whichever is smaller.	
	Appearance: No visible damage.		
Middle & high voltage Life Test	$\Delta C/C$	Class I: $\leq \pm 2\%$ or $\pm 1pF$, whichever is larger. Class II: B: $\leq \pm 20\%$ E, F: $\leq \pm 30\%$	Applied Voltage: $100V \leq \text{Rated Voltage} < 500V$:2 Multiple $500V \leq \text{Rated Voltage} \leq 1000V$:1.5 Multiple $> 1000V$ Rated Voltage:1.2 Multiple Duration:100h Charge/ Discharge Current: 50mA max. Temperature:125℃(NPO X7R);85℃(Y5V) Recovery Conditions: Room Temperature Recovery Time: 24h (Class 1), or 48h (Class2)
	DF	Not more than twice of initial value.	
	IR	Class I: $R_i \geq 4000M\Omega$ or $R_i \cdot C_R \geq 40S$ whichever is smaller.	
		Class II: $R_i \geq 2000M\Omega$ or $R_i \cdot C_R \geq 50S$ whichever is smaller.	
	Appearance: No visible damage.		

Note: Pretreatment (only for class2 capacitor)

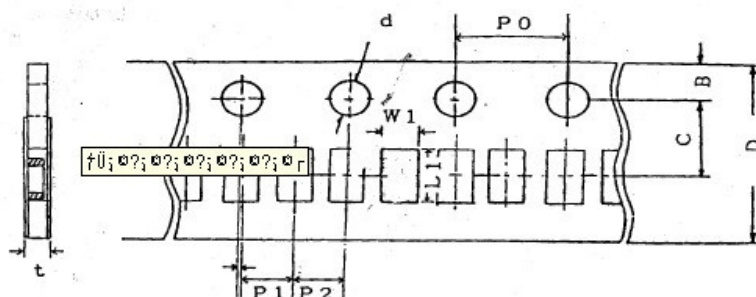
Pretreatment (only for class2 capacitor) is a method to treat the capacitor before measurement. First, place the capacitor in the up-category temperature or other specified higher temperature environment for 1hour. Then recovery the capacitor at standard pressure conditions for 24 ± 1 hours.

PACKAGE

● PAPER TAPING

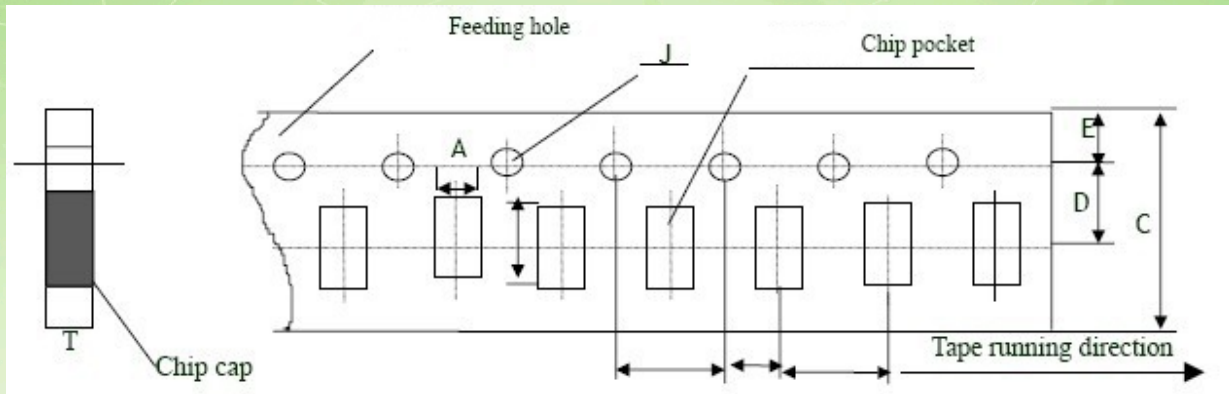


Dimensions of paper taping for 0402 type



Code	W1	L1	D	C	B	P1	P2	P0	d	t
0402	0.65±0.20	1.15±0.20	8.00±0.20	3.50±0.05	1.75±0.10	2.00±0.05	2.00±0.05	4.00±0.10	1.50 -0/+0.10	0.80 Below

Dimensions of paper taping for 0603,0805,1206 types.

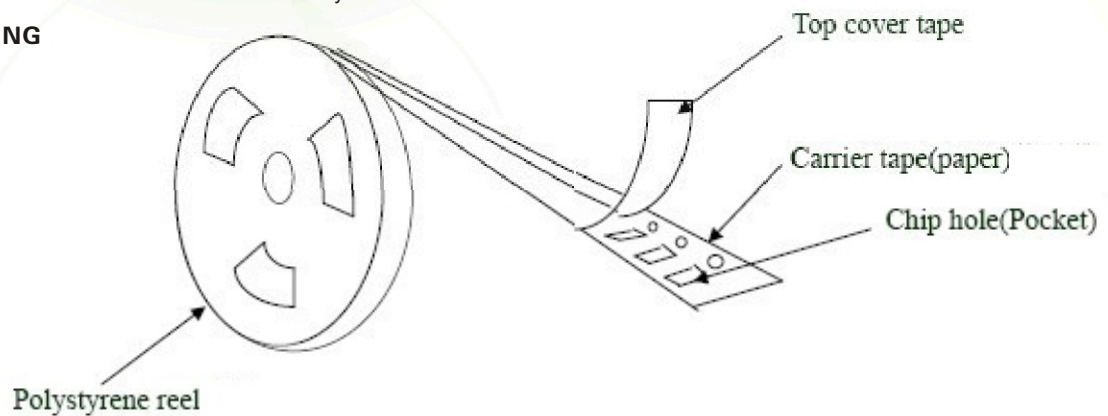


Unit:mm

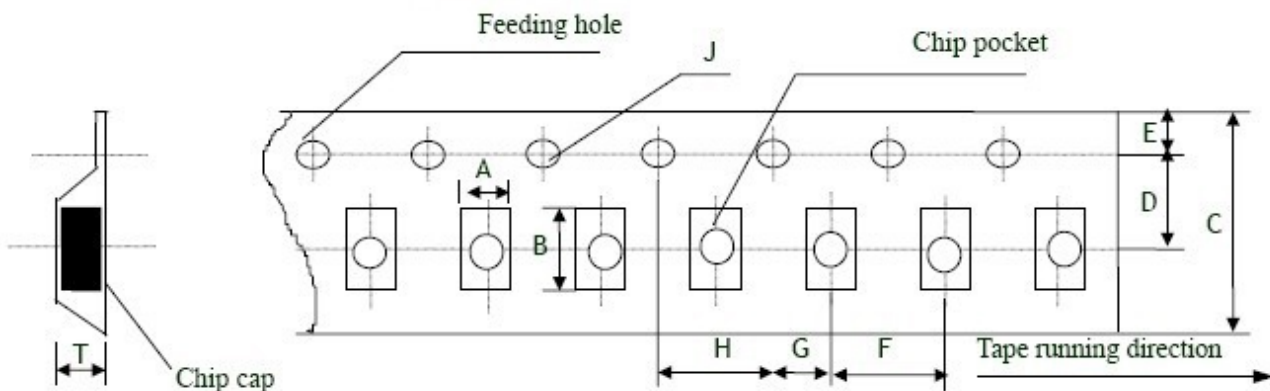
Code paper size	A	B	C	D*	E	F	G*	H	J	T
0603	1.10 ± 0.20	1.90 ± 0.20	8.00 ± 0.20	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	4.00 ± 0.10	1.50 -0/+0.10	1.10 Max
0805	1.45 ± 0.20	2.30 ± 0.20	8.00 ± 0.20	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	4.00 ± 0.10	1.50 -0/+0.10	1.10 Max
1206	1.80 ± 0.20	3.40 ± 0.20	8.00 ± 0.20	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	4.00 ± 0.10	1.50 -0/+0.10	1.10 Max

Note: The place with “*” means where needs exactly dimensions.

● EMBOSSED TAPING



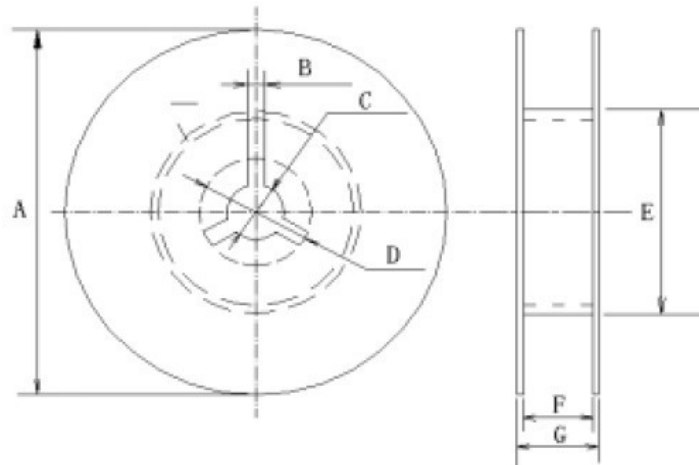
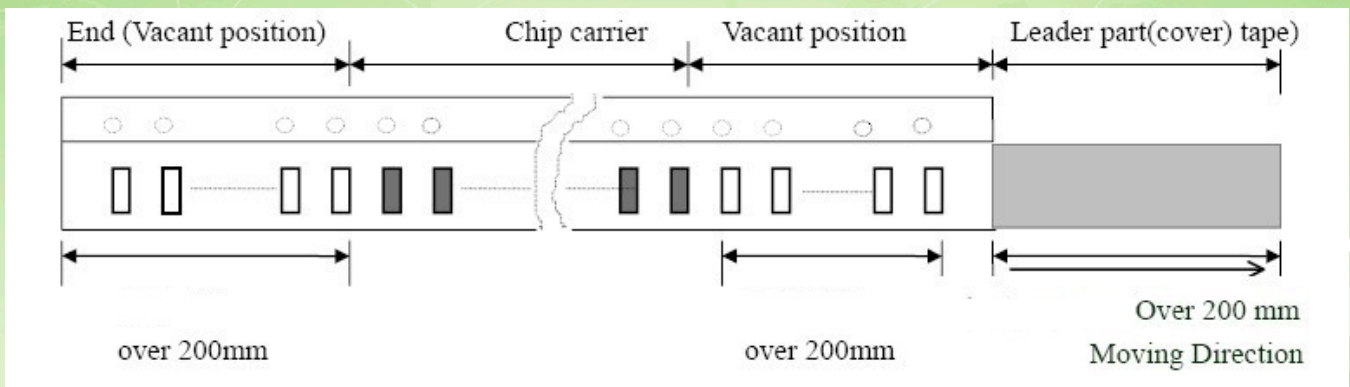
Dimensions of embossed taping for 0805~1812 type



Code paper size	A	B	C	D*	E	F	G*	H	J	T
0805	1.55 ± 0.20	2.35 ± 0.20	8.00 ± 0.20	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	4.00 ± 0.10	1.50 -0/+0.10	1.50 Max
1206	1.95 ± 0.20	3.60 ± 0.20	8.00 ± 0.20	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	4.00 ± 0.10	1.50 -0/+0.10	1.85 Max
1210	2.70 ± 0.10	3.42 ± 0.10	8.00 ± 0.20	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	1.55 -0/+0.10	3.2 Max
1808	2.20 ± 0.10	4.95 ± 0.10	12.00 ± 0.10	5.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	1.50 -0/+0.10	3.0 Max
1812	3.66 ± 0.10	4.95 ± 0.10	12.00 ± 0.10	5.50 ± 0.05	1.75 ± 0.10	8.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	1.55 -0/+0.10	4.0 Max

Note:The place with “*” means where needs exactly dimensions.

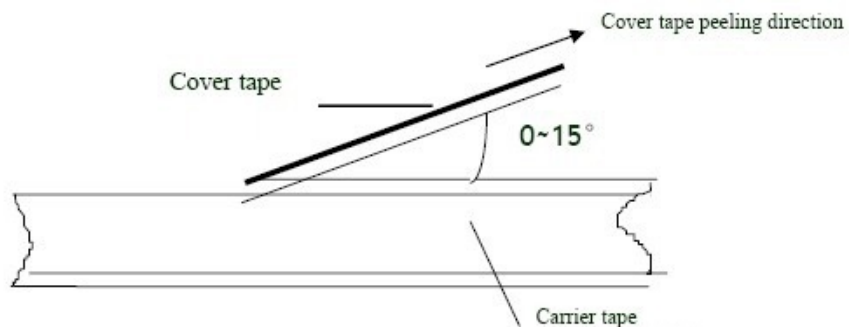
● Structure of leader part and end part of the carrier paper



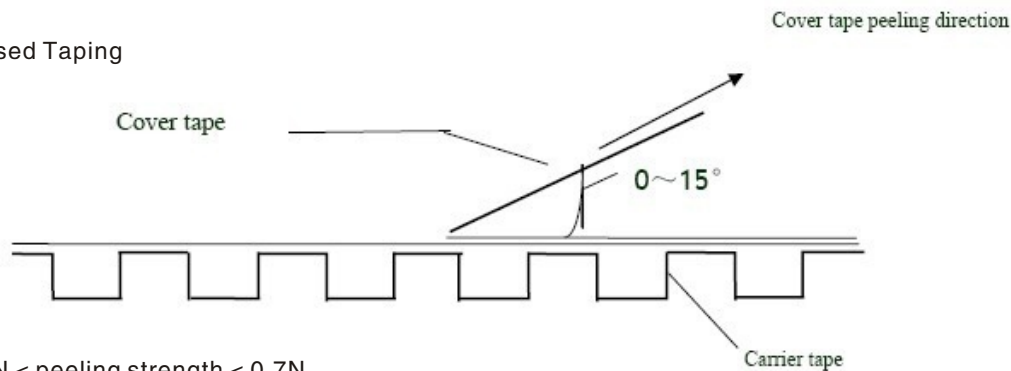
	A	B	C	D	E	F	G
7' REEL	$\phi 178 \pm 2.0$	3.0	$\phi 13 \pm 0.5$	$\phi 21 \pm 0.8$	$\phi 50$ or more	10.0 ± 1.5	12max
13' REEL	$\phi 330 \pm 2.0$	3.0	$\phi 13 \pm 0.5$	$\phi 21 \pm 0.8$	$\phi 50$ or more	10.0 ± 1.5	12max

● Taping specification
Top tape peeling strength

(a) Paper Taping



(b) Embossed Taping



Standard: $0.1N < \text{peeling strength} < 0.7N$

No paper dirty remains on the scotch when peeling, and sticks to top and bottom tape.

Bulk Case Package

(unit):mm

Symbol	A	B	T	C	D	E
Dimension	6.80 ± 0.10	8.80 ± 1.00	12.00 ± 0.10	$15.00+0.10/-0$	$2.00+0/-0.10$	4.70 ± 0.10
Symbol	F	W	G	H	L	I
Dimension	$31.50+0.20/-0$	$36.00+0/-0.20$	19.00 ± 0.35	7.00 ± 0.35	110.00 ± 0.70	5.00 ± 0.35

Packing Quantity

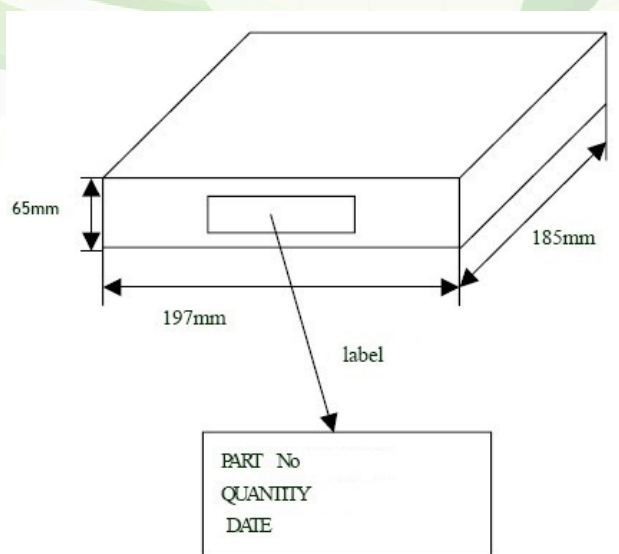
SIZE	PACKAGE STYLE & QUANTITY				unit: pcs
	PT	ET	BC	BP	
0402	10000	-----	20000	5000	
0603	5000	-----	15000	5000	
0805	5000	2500	10000	5000	
1206	5000	2500	5000	5000	
1210	-----	2000	-----	2000	
1808	-----	2000	-----	2000	
1812	-----	2000	-----	2000	
2225	-----	-----	-----	500	
3035	-----	-----	-----	-----	

Note: We can choose packing style and quantity can be according to the customer's requirement.

● Outer packing

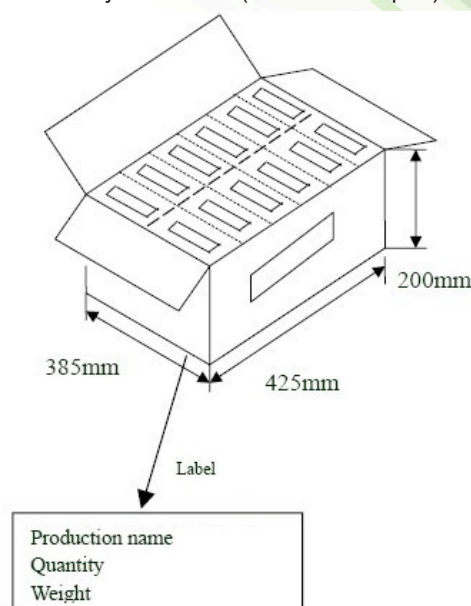
The first package

Quantity: 5 reels (Max 25000pcs)



The second package

Quantity: 12 cases (Max 300000pcs)



STORAGE METHODS

The guaranteed period for solderability is 6 months (Under deliver package condition).

Storage conditions:

Temperature 5~40℃

Relative Humidity 20~70%

PRECAUTIONS FOR USE

The Multi-layer Ceramic Capacitors (MLCC) may fail in a short circuit mode in an open circuit mode when subjected to severe conditions of electrical environment and / or mechanical stress beyond the specified "rating" and specified "conditions" in the specification, which will result in burn out, flaming or glowing in the worst case. Following "precautions for "safety" and Application Notes shall be taken in your major consideration. If you have a question about the precautions for handling, please contact our engineering section or factory.

1. Soldering Profile

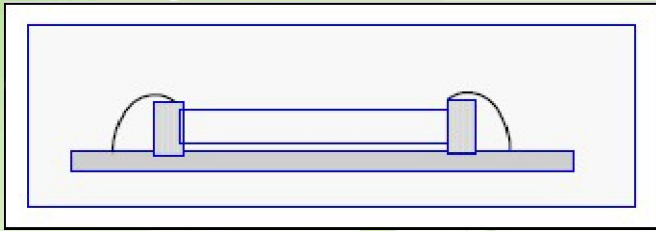
To avoid the crack problem by sudden temperature change, follow the temperature profile in the adjacent graph (refer to the graph in the enclosure page).

2. Manual Soldering

Manual soldering can pose a great risk of creating thermal cracks in capacitors. The hot soldering iron tip comes into direct contact with the end terminations, and operator's careless may cause the tip of the soldering iron to come into direct contact with the ceramic body of the capacitor. Therefore the soldering iron must be handled carefully, and pay much attention to the selection of the soldering iron tip and temperature contact of the tip.

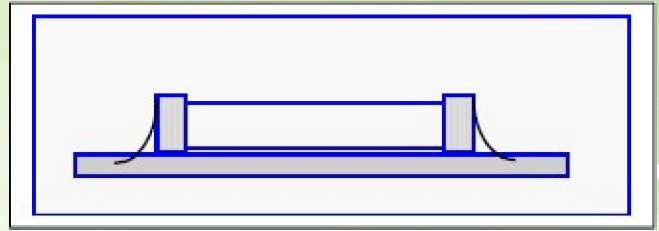
Too much solder

Cracks tend to occur due to large stress.



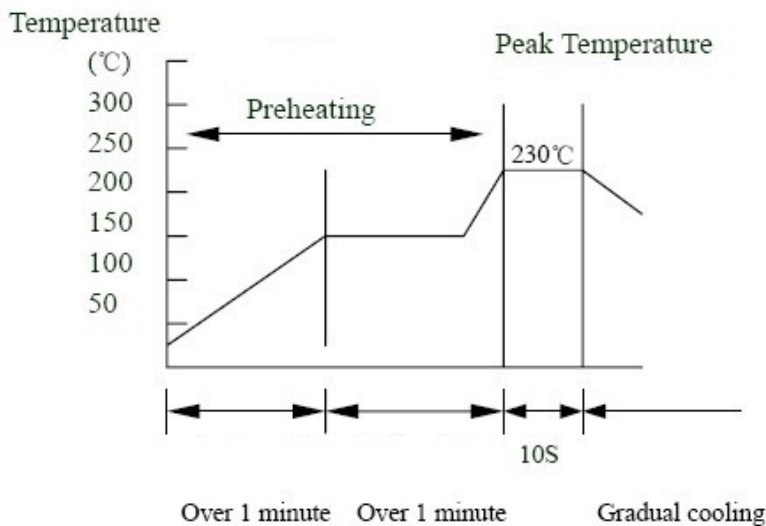
Not enough solder

Weak holding force may cause bad connection between the capacitor and PCB.



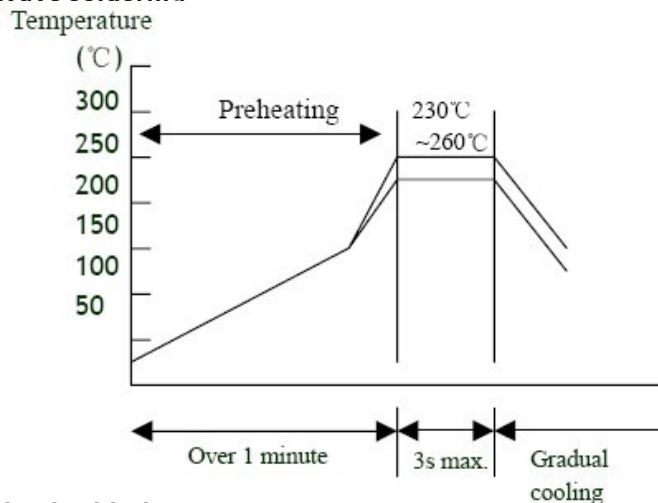
THE TEMPERATURE PROFILE FOR SOLDERING

Re-flow soldering



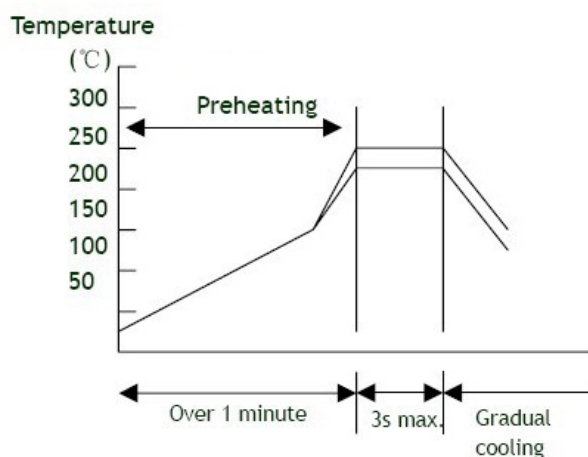
	无铅焊接	尖峰温度
Pb-Sn焊接	230°C ~ 250°C	240°C ~ 260°C

Wave soldering



	无铅焊接	尖峰温度
Pb-Sn焊接	230°C ~ 260°C	240°C ~ 270°C

Hand soldering



预热	烙铁头温度	烙铁功率	烙铁头直径	焊接时间	锡膏量	限制条件
$\Delta \leq 130^\circ\text{C}$	最高300°C	最大20W	建议1mm	最长5s	$\leq 1/2$ 芯片厚度	请勿使用烙铁头直接接触陶瓷元件