

## ■ Arrays MLCC

### ◆ Feature

- \* There is high reliability on monolithic structure of laminated layers.
- \* And its character of excellent soldering ability and soldering resistance ability is suitable for reflow soldering and peak soldering.
- \* It includes high and stable capacitance.



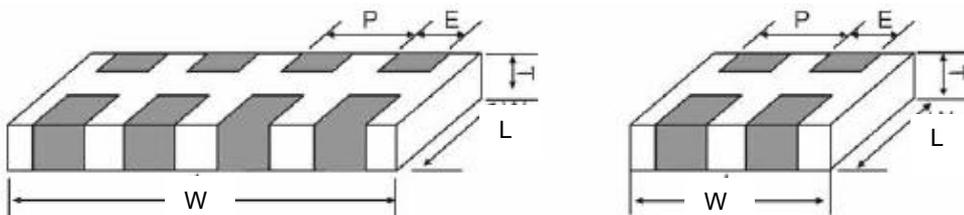
- \* Space saving: CA can save 50% space of the PC board and improve the assembling density.
  - \* Provide more capacitance per volumetric area: Efficiently use the side margins and thickness. Promoting mounting efficiency. One chip of CA equals to four chips of 0603 type capacitor. So it can reduce times of picking and placing.
  - \* Cost saving: Reduce times for picking and placing, reduce manufacturing time, reduce the cost for manage the equipments and reduce the cost of PCB.
  - \* Easy to picking and placing: SMT package, easy to mounting.
  - \* Improve the working efficiency of the printed board: Reduce the amount of printed circuits and promote the working speed of the printed circuit.
- \*Executive Standard: GB/T 21041-2007 GB/T 21042-2007

### ◆ Application

- \* Applied in PCB which require strictly about space speed, such as notebook computer, PDA and portable telephone, etc.
- \* CA is best suitable to use in I/O interface circuit.

**◆ How To Order**

6124	B	103	K	500	N	T																																																					
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**◆ Product shape and size**


Type	mm				
	L	W	T	P	E
6124	$1.60 \pm 0.20$	$3.20 \pm 0.20$	$0.80 \pm 0.10$ $1.00 \pm 0.10$	$0.80 \pm 0.20$	$0.40 \pm 0.10$
5084	$1.25 \pm 0.20$	$2.00 \pm 0.20$	$0.80 \pm 0.10$ $1.00 \pm 0.10$	$0.50 \pm 0.05$	$0.25 \pm 0.05$
5082	$1.25 \pm 0.20$	$2.00 \pm 0.20$	$0.80 \pm 0.10$ $1.00 \pm 0.10$	$1.00 \pm 0.10$	$0.50 \pm 0.05$

**◆ Temperature Coefficient /Characteristics**

Dielectric	Reference Temperature Point	Temperature Coefficient	Operation Temperature Range
COG	20°C	0±30 ppm/°C	-55°C~125°C
X7R	20°C	±15%	-55°C~125°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**

Dimension	6124							
	COG				X7R			
Rated Voltage	16V	25V	50V	100V	16V	25V	50V	100V
Capacitance								
0.5PF								
5 PF								
10 PF								
15 PF								
20 PF								
22 PF								
33 PF								
47 PF								
100 PF								
150 PF								
220 PF								
330 PF								
470 PF								
1000 PF								
2.2 nF								
3.3nF								
4.7nF								
6.8nF								
10 nF								
22 nF								
33 nF								
47 nF								
68 nF								
100 nF								
220 nF								

Note: 1、  Normal production 2、 We can design according to the customer requirements.

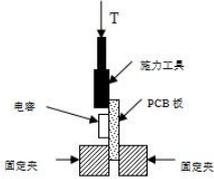
Dimension	5084					
Dielectric	COG			X7R		
Rated Voltage	16V	25V	50V	16V	25V	50V
Capacitance						
0.5PF						
5 PF						
10 PF						
15 PF						
20 PF						
22 PF						
33 PF						
47 PF						
100 PF						
150 PF						
220 PF						
330 PF						
470 PF						
1000 PF						
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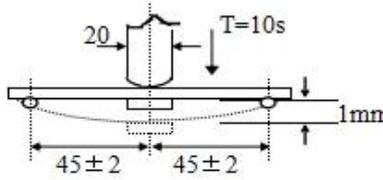
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Dimension	5082					
Dielectric	COG			X7R		
Rated Voltage	16V	25V	50V	16V	25V	50V
Capacitance						
0.5PF						
5 PF						
10 PF						
15 PF						
20 PF						
22 PF						
33 PF						
47 PF						
100 PF						
150 PF						
220 PF						
330 PF						
470 PF						
1000 PF						
2.2nF						
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6.8nF						
10 nF						
22 nF						
33 nF						
47 nF						
68 nF						
100 nF						
220nF						

Note: 1、  Normal production 2、 We can design according to the customer requirements.

**◆ 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°C±3°C Test Frequency: 1KHz±10% Test Voltage: 1.0±0.2Vrms			
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°C±3°C Test Current: ≤50mA		
	Class II	C≤25 nF, Ri≥10000MΩ C> 25 nF, Ri•CR≥100S						
(DF, tanδ) Dissipation Factor	Class I	DF				Capacitance	Measuring Frequency	Measuring Voltage
		≤1/ (400+20C)				C<30 pF	1MHz±10%	1.0±0.2Vrms
	≤0.1%				C≥30pF			
Class II	X7R	≥50V	25V	16V	Test Temperature: 25°C±3°C Test Frequency: 1KHz±10% Test Voltage: 1.0±0.2Vrms			
≤2.5%		≤3.5%	≤5.0%					
Dielectric Withstanding Voltage	No breakdown or damage.				Measuring Voltage: Class I :300% Rated voltage    Class II :250% Rated voltage Duration: 1~5s    Charge/ Discharge Current: 50mA max.			
Termination Adhesion	No visible damage.				As shown in the picture , Slowly apply a T force to the porcelain body on the side of the capacitor and hold for 60+1 seconds. 			
Solderability	At least 95% of the terminal electrode is covered by new solder. Visual Appearance: No visible damage.				Preheating conditions:80 to 120°C; 10~30s.			
					Pb-Sn soldering Solder Temperature: 235±5°C Duration: 2±0.5s		Lead-free soldering Solder Temperature: 245±5°C Duration: 2±0.5s	

Item	Technical Specification			Test Method and Remarks															
Resistance to Soldering Heat	Item	Class I	Class II	Preheating conditions: 100 to 200°C; 60-120s. Solder Temperature: 265±5°C Duration: 10±1s Clean the capacitor with solvent and examine it with a 10X(min.) microscope. Recovery Time: 24±2h. Recovery condition: Room temperature															
	ΔC/C	≤±2.5% or ±0.25PF, whichever is larger	±15%																
	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.																		
Resistance to Flexure of Substrate (Bending Strength)	Appearance: No visible damage.			Test Board:PCB Warp: 1mm Speed: 1mm/sec. Unit: mm The measurement should be made with the board in the bending position. 															
	ΔC/C:	Class I : ≤±5% or ±0.5pF, whichever is larger. Class II : ≤±10%																	
Temperature Cycle	Item	Class I	Class II	Preheating conditions: up-category temperature, 1h Recovery time: 24±1h Initial Measurement Cycling Times: 5 times, 1 cycle, 4 steps: <table border="1" data-bbox="893 996 1436 1220"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>(Time)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Low- category temp: C0G/X7R: -55</td> <td>30min</td> </tr> <tr> <td>2</td> <td>Normal temp : +20</td> <td>2~3min</td> </tr> <tr> <td>3</td> <td>Up- category temp: C0G/X7R: +125</td> <td>30min</td> </tr> <tr> <td>4</td> <td>Normal temp. : +20</td> <td>2~3min</td> </tr> </tbody> </table> Recovery time after test:24±2h	Step	Temperature (°C)	(Time)	1	Low- category temp: C0G/X7R: -55	30min	2	Normal temp : +20	2~3min	3	Up- category temp: C0G/X7R: +125	30min	4	Normal temp. : +20	2~3min
	Step	Temperature (°C)	(Time)																
	1	Low- category temp: C0G/X7R: -55	30min																
2	Normal temp : +20	2~3min																	
3	Up- category temp: C0G/X7R: +125	30min																	
4	Normal temp. : +20	2~3min																	
ΔC/C	≤±1% or ±1pF , whichever is larger	-15% ~+15%																	
No visible damage.																			
Humidity load	ΔC/C	Class I : ±7.5% or ±0.75pF, whichever is larger. Class II : ≤±12.5%		※ Pretreatment (Class II) : After preheating at 140°C~150°C for 1h±10min, place at room temperature for 24±2h. Temperature: 40±2°C Humidity: 90~95%RH Voltage: Rated Voltage Duration: 500h Recovery conditions: Room temperature Recovery Time::24h±2h															
	DF	Not more than twice of initial value.																	
	IR	Class I	Ri≥5000MΩ或 Ri•Cr≥50S whichever is smaller.																
		Class II	Ri≥1000MΩ或 Ri•Cr≥10S whichever is smaller.																
	Appearance: No visible damage.																		

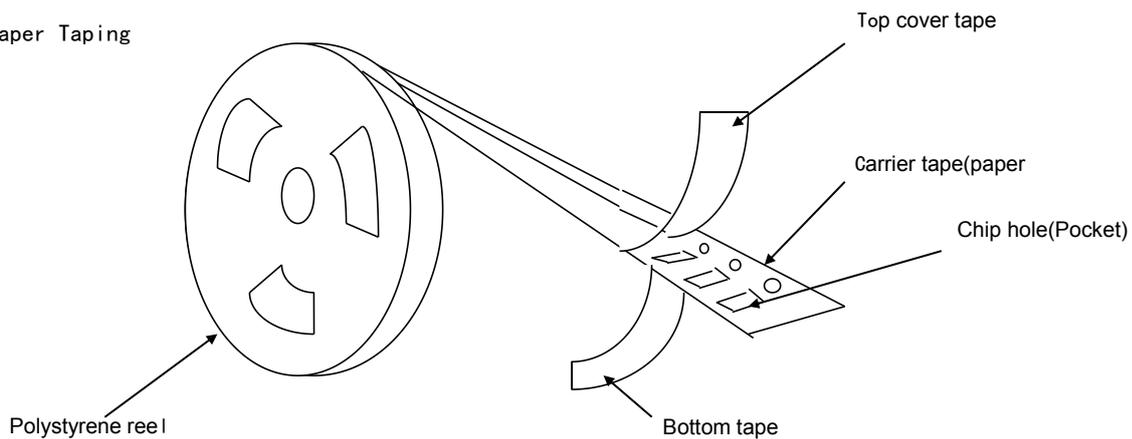
Item	Technical Specification		Test Method and Remarks	
Life Test	Δ C/ C	Class I	≤ ±3%或±0.3pF, whichever is larger.	※ Pretreatment (Class II) : After preheating at 140℃~150℃ for 1h±10min, place at room temperature for 24±2h. Applied Voltage: 2*Ur, except the table 1 Duration: 1000h. Temperature: 125℃(C0G、X7R) Charge/ Discharge Current: 50mA max. Recovery Conditions: Room Temperature Recovery Time: :24h±2h
		Class II	-20% ~ +20%	
	DF	Not more than twice of initial value.		
	IR	Class I	Ri≥4000MΩ or Ri•CR≥40S whichever is smaller.	
		Class II	Ri≥2000MΩ or Ri•CR≥50S whichever is smaller.	
Appearance: No visible damage.				

Note: Pretreatment (only for class2 capacitor)

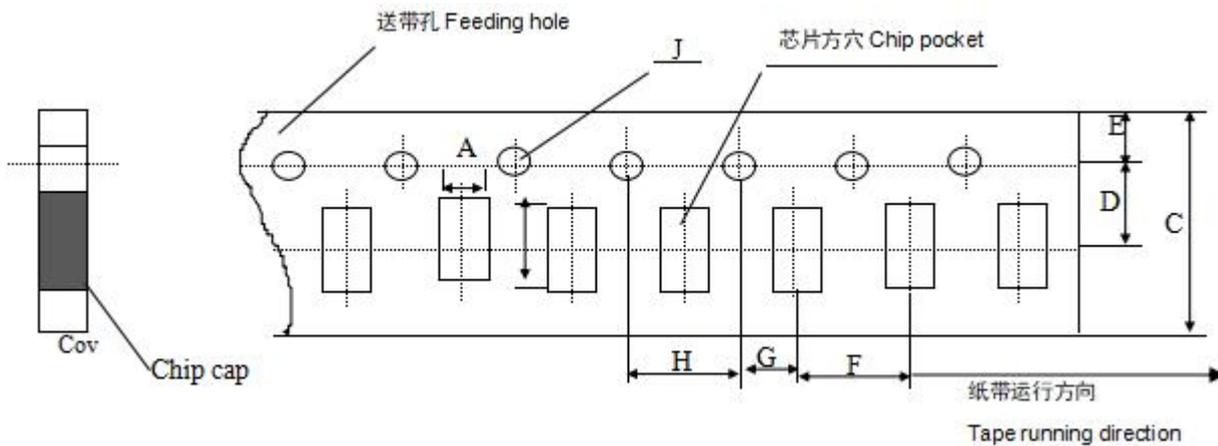
Pretreatment (only for class2 capacitor) is a method to treat the capacitor before measurement. First, place the capacitor in the up-category temperature or other specified higher temperature environment for 1hour. Then recovery the capacitor at standard pressure conditions for 24±1hours.

◆ **Package**

\* Paper Taping



\* Dimensions of paper taping for 6124, 5084, 5082 types

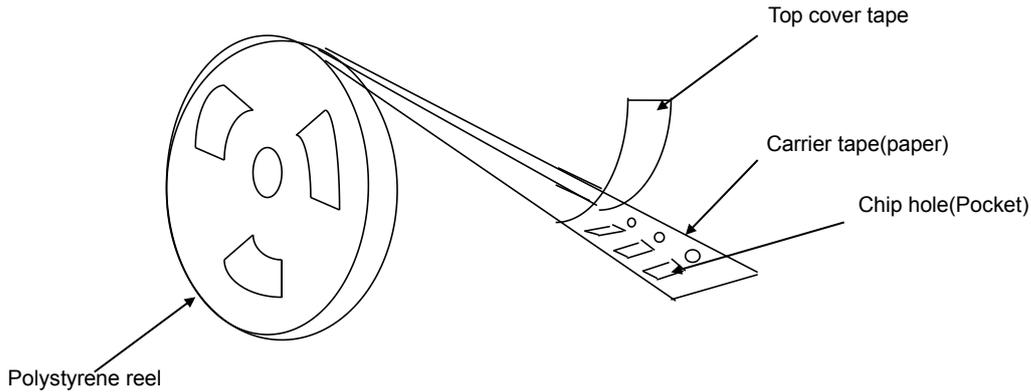


Unit: mm

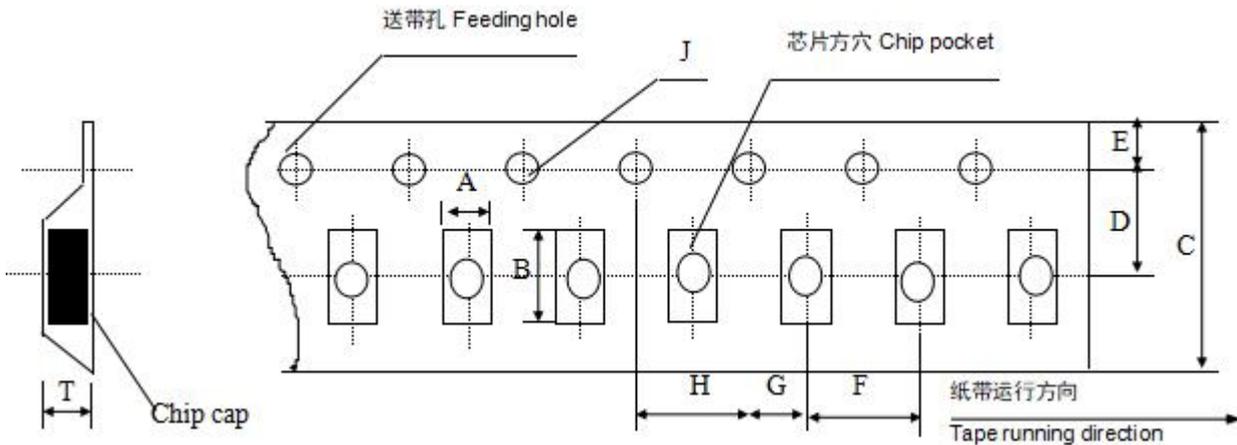
Code paper size	A	B	C	D*	E	F	G*	H	J	T
5082	145 ±0.15	230 ±0.15	8.0 ±0.15	350 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50 -0/+0.10	1.10 Max
5084	145 ±0.15	230 ±0.15	8.0 ±0.15	350 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50 -0/+0.10	1.10 Max
6124	180 ±0.20	340 ±0.20	8.00 ±0.20	350 ±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



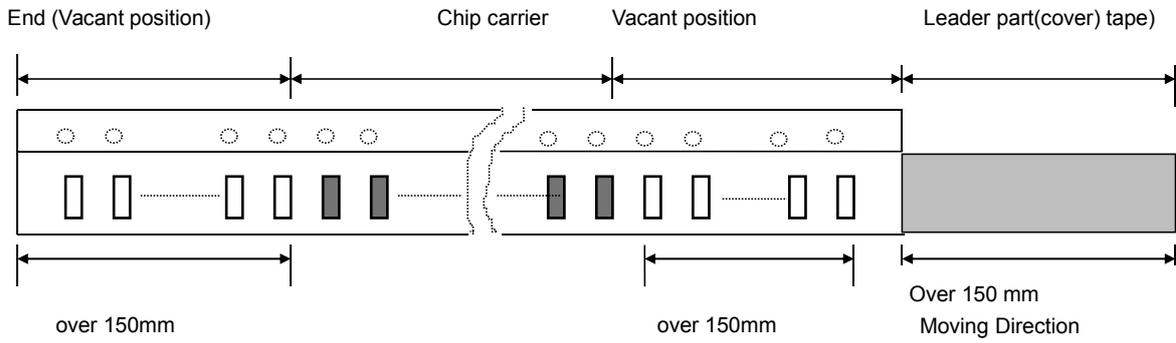
\* Dimensions of embossed taping for 6124, 5084, 5082 type



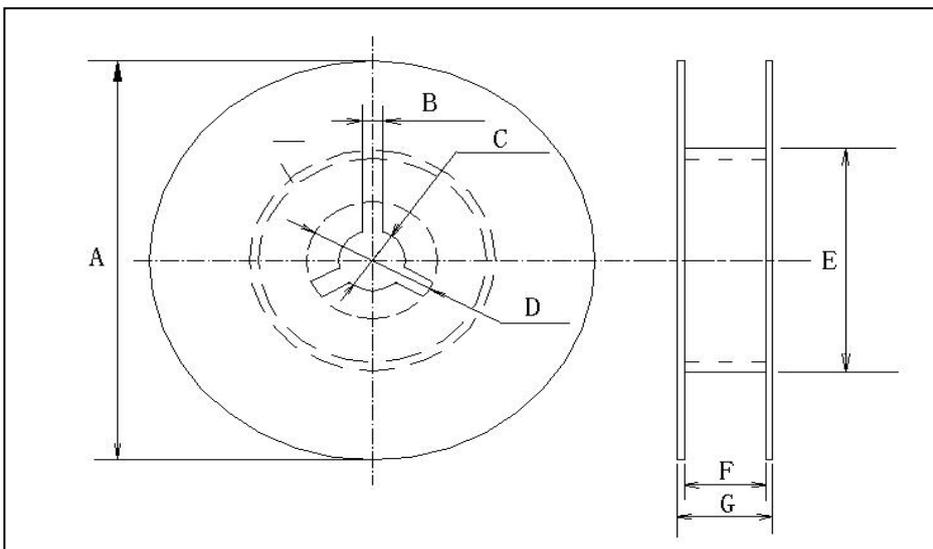
Code Tape size	A	B	C	D*	E	F	G*	H	J	T
5082	1.55 ± 0.20	2.35 ± 0.20	8.00 ±0.20	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	4.00 ± 0.10	1.50 -0/+0.10	1.50 Max
5084	1.55 ± 0.20	2.35 ± 0.20	8.00 ±0.20	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	4.00 ± 0.10	1.50 -0/+0.10	1.50 Max
6124	1.95 ± 0.20	3.60 ± 0.20	8.00 ± 0.20	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	4.00 ± 0.1	1.50 -0/+0.10	1.85 Max

Note: The place with "\*" means where needs exactly dimensions.

\* Structure of leader part and end part of the carrier paper



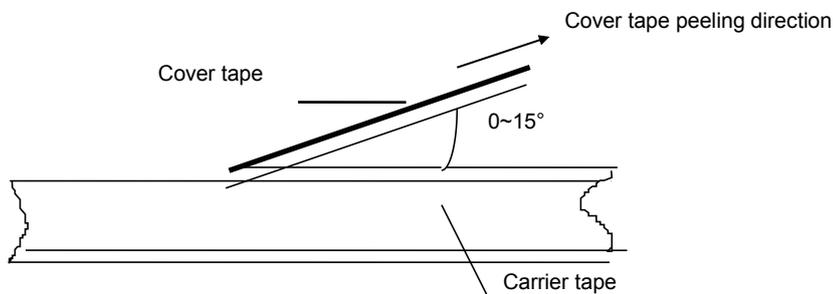
\* Reel dimensions (unit: mm)



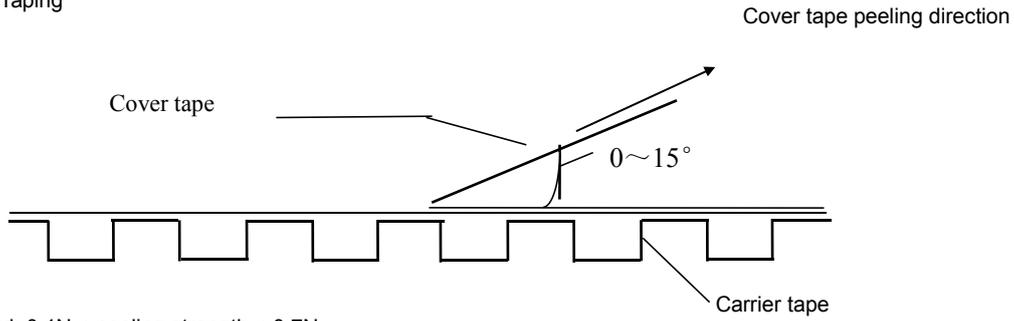
size	A	B	C	D	E	F	G
7"REEL	$\phi 178 \pm 2.0$	3.0	$\phi 13 \pm 0.5$	$\phi 21 \pm 0.8$	$\phi 50$ or more	$10.0 \pm 1.5$	12max

\* Taping specification: top tape peeling strength

\* Paper Taping



\* 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

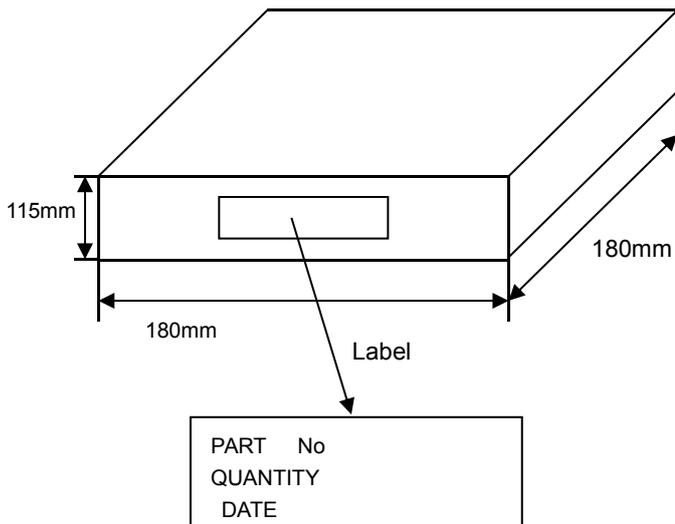
\* Packing Quantity

SIZE	Package Style & Quantity) unit: pcs				
	(EPT)	(PT)	(ET)	(BC)	(BP)
5082 5084	-----	4000	3000	10000	5000
6124	-----	4000	T≤1.35mm 3000 T>1.35mm 2000	5000	5000

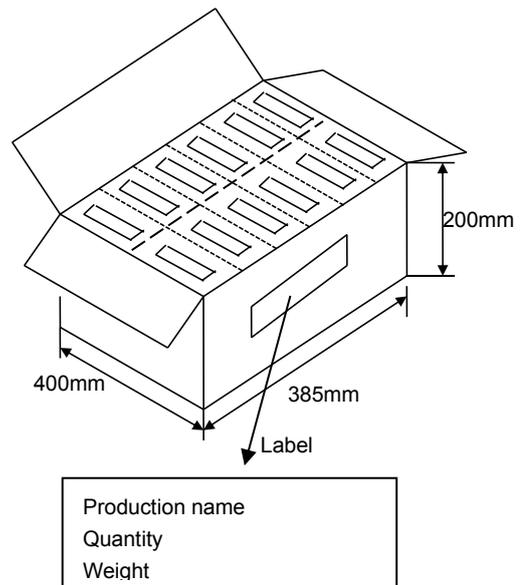
Note: We can choose packing style and quantity can be according to the customer's requirement.

\* Outer packing

The first package  
Quantity: 10 reels



The second package  
Quantity: 6 cases



◆Storage Methods

- \* The guaranteed period for solderability is 12 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.

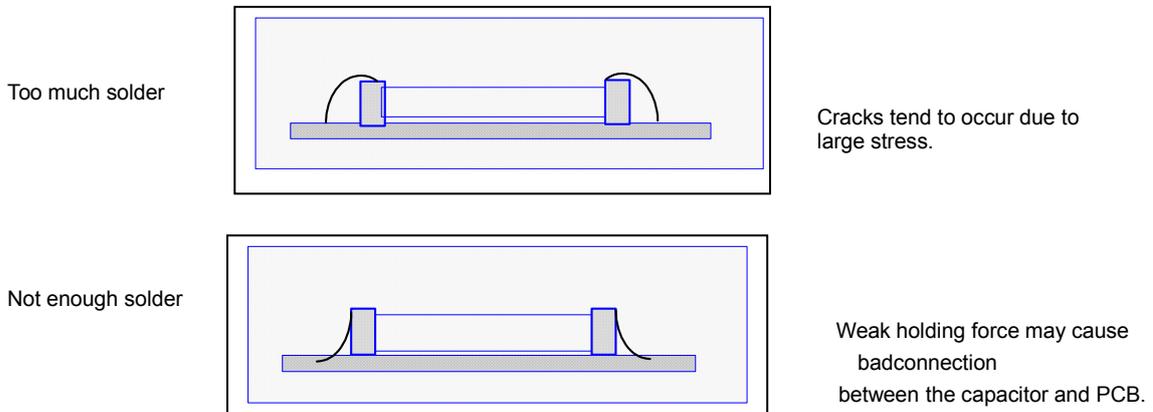
\* Soldering Profile

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).

\* Manual Soldering

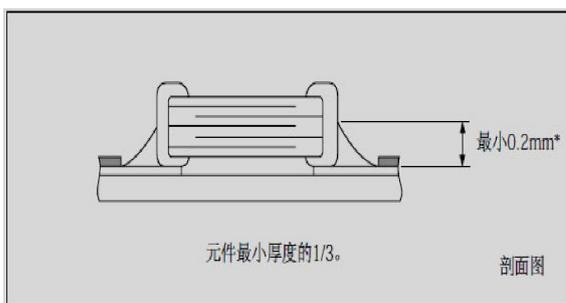
Manual soldering can pose a great risk of creating thermal cracks in capacitors. The hot soldering iron tip comes into direct contact with the end terminations, and operator's careless may cause the tip of the soldering iron to come into direct contact with the ceramic body of the capacitor. Therefore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

\*Optimum Solder Amount for Reflow Soldering

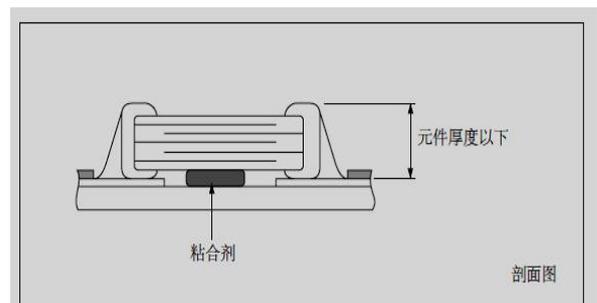


\* Recommended Soldering amounts

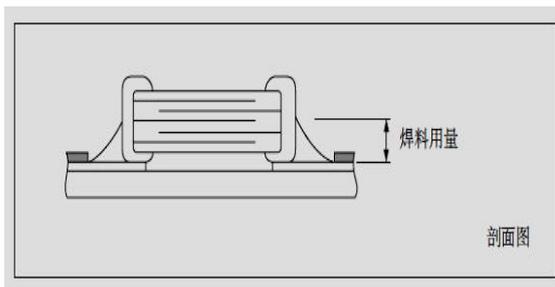
The optimal solder fillet amounts for re-flow soldering



The optimal solder fillet amounts for wave soldering



The optimal solder fillet amounts for reworking by using soldering iron



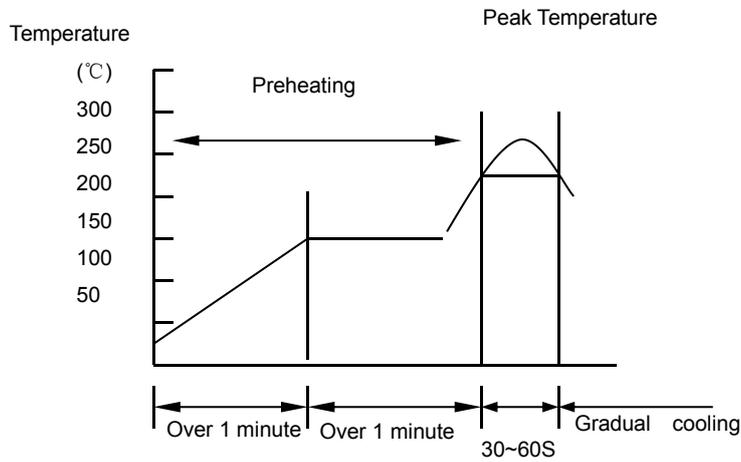
\* Recommended Soldering Method

Size	Temperature Characteristics	Rated Voltage	Capacitance	Soldering Method
5082	C0G、X7R	/	/	R
5084	C0G、X7R	/	/	R
6124	C0G、X7R	/	/	R

Soldering method:  
 Reflow Solering  
 Wave Soldering

◆The temperature profile for soldering

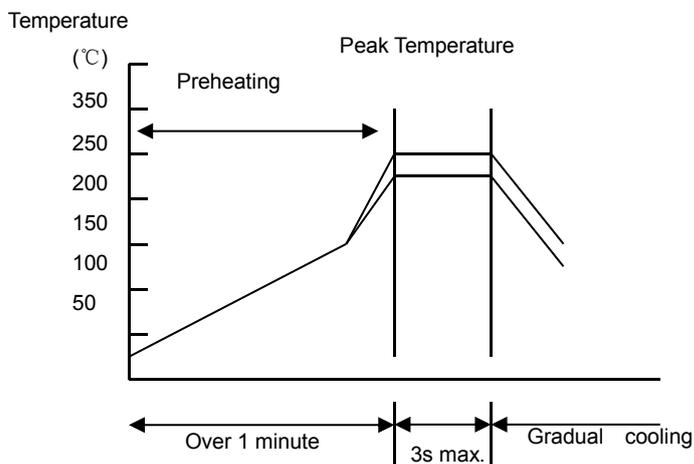
\* Re-flow soldering)



	Pb-Sn soldering	Lead-free soldering
Peak temperature	230°C~250°C	240°C~260°C

While in preheating, please keep the temperature difference between soldering temperature and surface temperature of chips as:  $T \leq 150^\circ\text{C}$ .

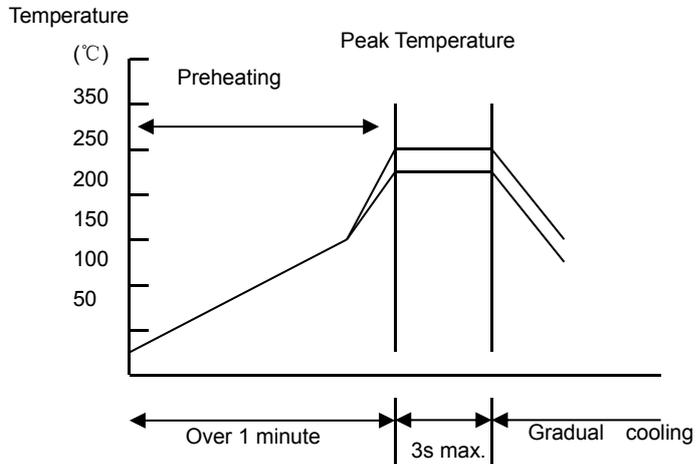
\* Wave soldering



	Pb-Sn soldering	Lead-free soldering
Peak temperature	230°C~260°C	240°C~270°C

While in preheating, please keep the temperature difference between soldering temperature and surface temperature of chips as:  $T \leq 150^\circ\text{C}$ .

\* Hand soldering



Conditions:

Preheating	Temperature of soldering iron head	Power of soldering iron	Diameter of soldering iron head	Soldering time	Solder paste amount	Restricted conditions
$\Delta \leq 130^\circ\text{C}$	Highest temperature: $350^\circ\text{C}$	20W at the highest	1mm recommended	3s at the longest	$\leq 1/2$ chip thickness	Please avoid the direct contact between soldering iron head and ceramic components

\*The latest version prevails