

■ Microwave MLCC (RF Series)

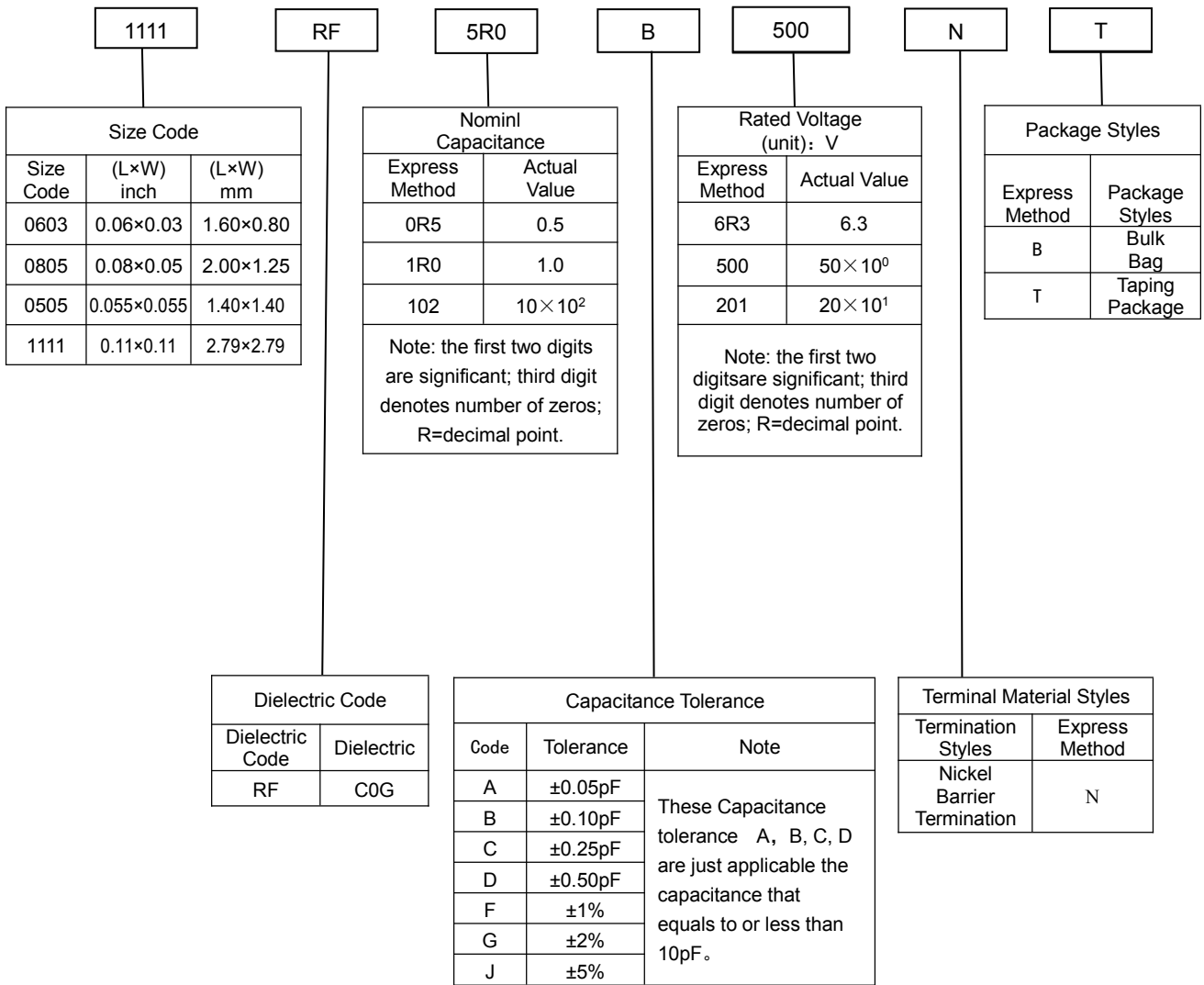
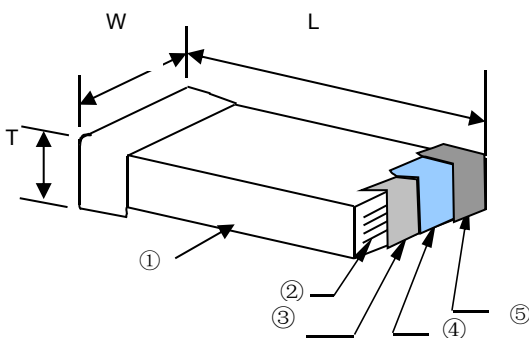
◆ Feature

- * 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.
- * High Q
- * Low equivalent series resistance
- * High self-resonant frequency
- * Executive Standard: GB/T 21041-2007

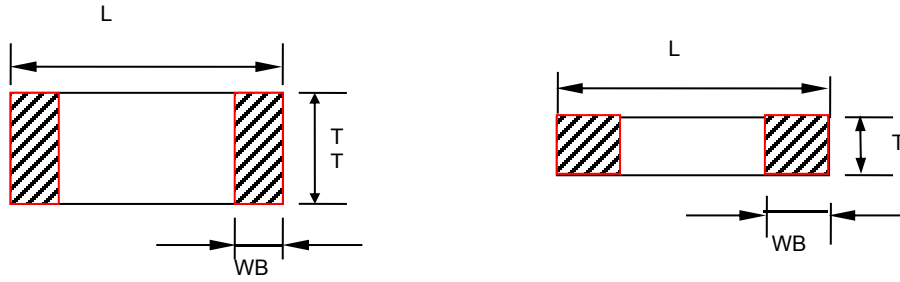


◆ Application

- * Mobile communication base station
- * Wireless communication products
- * RF power amplifier
- * Impedance matching network
- * Filter network
- * VCO

◆How To Order

◆Product Structure


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

◆ Product Dimensions


Type		Dimensions (mm)			
British expression	Metric expression	L	W	T	WB
0603	1608	1.60±0.10	0.80±0.10	0.80±0.10	0.35±0.20
0805	2012	2.00±0.20	1.25±0.20	0.80±0.20 1.25±0.20	0.50±0.20
0505	1414	1.40±0.38	1.40±0.38	≤1.45	0.30±0.10
1111	2828	2.79±0.50	2.79±0.50	≤2.59	0.80±0.30

Note: We can design according to customer special requirements


◆ Temperature Coefficient /Characteristics

介质种类 Dielectric	参考温度点 Reference Temperature Point	标称温度系数 Temperature Coefficient	工作温度范围 Operation Temperature Range
C0G	20°C	0±30ppm/°C	-55°C~125°C

◆ Capacitance Range and Operating Voltage

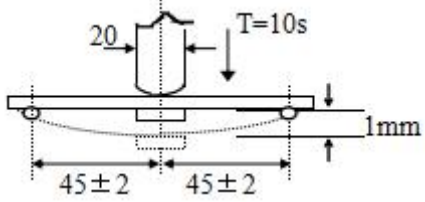
Dielectric	C0G						
	0603	0805	0505	1111			
Dimension	0603	0805	0505	1111			
Voltage	25V~250V	25V~250V	25V~250V	≤50V	100V	200V/ 250V	500V
Capacitance							
0.3pF							
0.4pF							
0.5pF							
0.6 pF							
0.7pF							
1.0pF							
1.2pF							
1.5pF							
1.8pF							
2.0pF							
2.2pF							
3.3pF							
3.9pF							
4.7pF							
5.6pF							
6.8pF							
8.2pF							

Dielectric	C0G						
	0603	0805	0505	1111			
Dimension							
Voltage	25V~250V	25V~250V	25V~250V	≤50V	100V	200V/ 250V	500V
Capacitance							
10pF							
12pF							
15pF							
18pF							
22pF							
27pF							
33pF							
39pF							
47pF							
56pF							
68pF							
82pF							
100pF							
120pF							
150pF							
180pF							
220pF							
270pF							
330pF							
390pF							
470pF							
560pF							
680pF							
820pF							
1000pF							

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

◆ Reliability Test

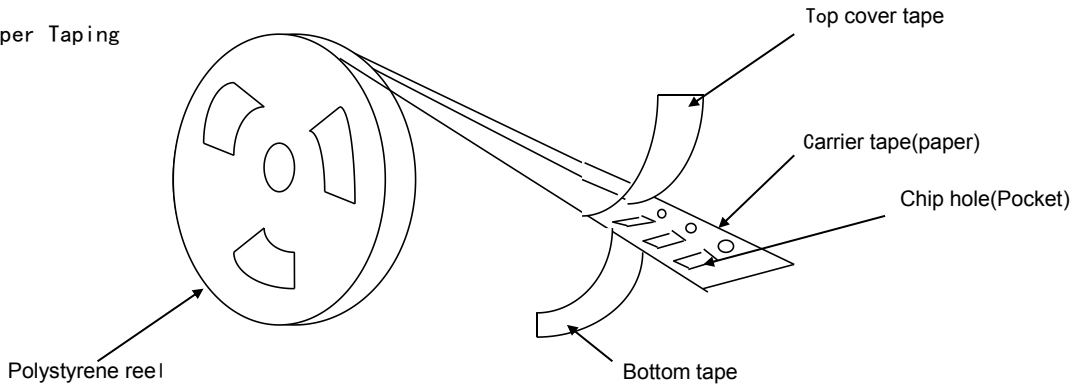
Item	Technical Specification	Test Method and Remarks		
		Capacitance	Measuring Frequency	Measuring Voltage
Capacitance	Should be within the specified tolerance.	≤1000pF	1MHz±10%	1.0±0.2Vrms
		> 1000 pF	1KHz±10%	
Q	C≥30pF, Q≥1000 C<30pF, Q≥400+20C	Test Frequency: 1MHz±10% Test Voltage: 1.0±0.2Vrms		

Item	Technical Specification		Test Method and Remarks	
(IR) Insulation Resistance	≥10,000MΩ		Measuring Voltage: Rated Voltage (Max 500V) Duration: 60±5s Test Humidity: ≤75% Test Temperature: 25°C±3°C Test Current: ≤50mA	
(DW) Dielectric Withstanding Voltage	No breakdown or damage.		Measuring Voltage: Class I :300% Rated voltage Duration: 1~5s Charge/ Discharge Current: 50mA max.	
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.	
			Solder Temperature: 235±5°C Duration: 2±0.5s	Solder Temperature: 245±5°C Duration: 2±0.5s
Resistance to Soldering Heat	ΔC/C	≤±2.5% or ±0.25PF, whichever is larger	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	
	Q	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	Within ±5% or ±0.5pF, whichever is larger		
Termination Adhesion	No visible damage.		Applied Force: 5N Duration: 10±1S	

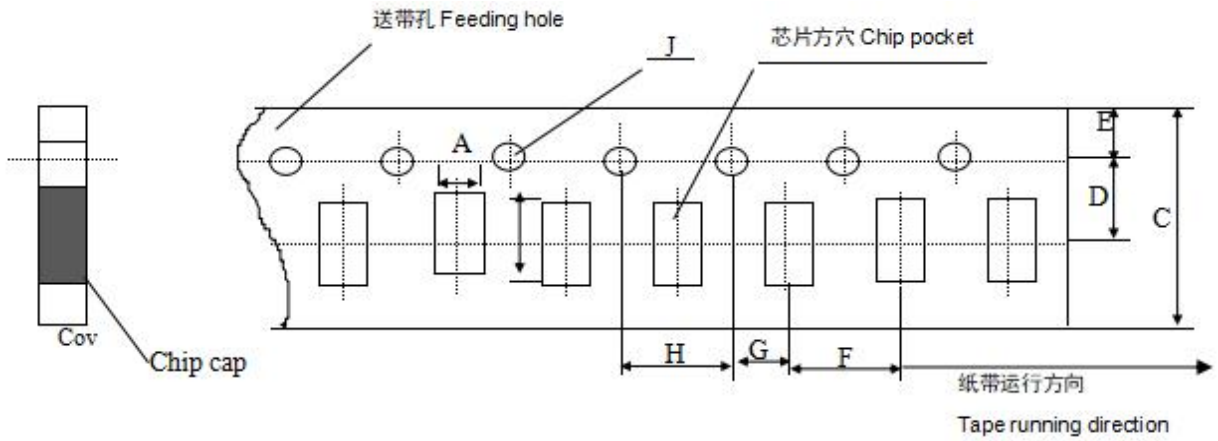
Item	Technical Specification	Test Method and Remarks																							
Temperature Cycle	<table border="1" data-bbox="335 324 837 537"> <thead> <tr> <th data-bbox="335 324 422 347">Item</th> <th data-bbox="422 324 837 347">COG</th> </tr> </thead> <tbody> <tr> <td data-bbox="335 347 422 380">$\Delta C/C$</td> <td data-bbox="422 347 837 380">$\leq \pm 1\%$ or $\pm 1\text{pF}$, whichever is larger</td> </tr> <tr> <td data-bbox="335 380 422 459">Q</td> <td data-bbox="422 380 837 459">Same to initial value.</td> </tr> <tr> <td data-bbox="335 459 422 537">IR</td> <td data-bbox="422 459 837 537">Same to initial value.</td> </tr> </tbody> </table> <p data-bbox="335 560 837 593">No visible damage.</p>	Item	COG	$\Delta C/C$	$\leq \pm 1\%$ or $\pm 1\text{pF}$, whichever is larger	Q	Same to initial value.	IR	Same to initial value.	<p data-bbox="909 280 1441 313">Initial Measurement</p> <p data-bbox="909 313 1441 336">Cycling Times: 5 times, 1 cycle, 4 steps:</p> <table border="1" data-bbox="909 336 1441 548"> <thead> <tr> <th data-bbox="909 336 989 358">Step</th> <th data-bbox="989 336 1324 358">(Temperature) (°C)</th> <th data-bbox="1324 336 1441 358">时间 (Time)</th> </tr> </thead> <tbody> <tr> <td data-bbox="909 358 989 414">1</td> <td data-bbox="989 358 1324 414">(Low- category temp.): (COG: -55)</td> <td data-bbox="1324 358 1441 414">30min</td> </tr> <tr> <td data-bbox="909 414 989 459">2</td> <td data-bbox="989 414 1324 459">(Normal temp.) : +20°C</td> <td data-bbox="1324 414 1441 459">2~3min</td> </tr> <tr> <td data-bbox="909 459 989 515">3</td> <td data-bbox="989 459 1324 515">(Up- category temp.) (COG: +125)</td> <td data-bbox="1324 459 1441 515">30min</td> </tr> <tr> <td data-bbox="909 515 989 548">4</td> <td data-bbox="989 515 1324 548">(Normal temp.) : +20°C</td> <td data-bbox="1324 515 1441 548">2~3min</td> </tr> </tbody> </table> <p data-bbox="909 571 1441 638">试验后放置 (恢复) 时间: 24±2h Recovery time after test: 24±2h</p>	Step	(Temperature) (°C)	时间 (Time)	1	(Low- category temp.): (COG: -55)	30min	2	(Normal temp.) : +20°C	2~3min	3	(Up- category temp.) (COG: +125)	30min	4	(Normal temp.) : +20°C	2~3min
Item	COG																								
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2	(Normal temp.) : +20°C	2~3min																							
3	(Up- category temp.) (COG: +125)	30min																							
4	(Normal temp.) : +20°C	2~3min																							
Humidity load	<table border="1" data-bbox="335 694 861 1019"> <tbody> <tr> <td data-bbox="335 694 422 806">$\Delta C/C$</td> <td data-bbox="422 694 861 806">Class I : $\pm 7.5\%$ or $\pm 0.75\text{pF}$, whichever is larger.</td> </tr> <tr> <td data-bbox="335 806 422 873">Q</td> <td data-bbox="422 806 861 873">Not more than twice of initial value.</td> </tr> <tr> <td data-bbox="335 873 422 952">IR</td> <td data-bbox="422 873 861 952">$R_i \geq 1000\text{M}\Omega$</td> </tr> <tr> <td colspan="2" data-bbox="335 952 861 1019">Appearance: No visible damage.</td> </tr> </tbody> </table>	$\Delta C/C$	Class I : $\pm 7.5\%$ or $\pm 0.75\text{pF}$, whichever is larger.	Q	Not more than twice of initial value.	IR	$R_i \geq 1000\text{M}\Omega$	Appearance: No visible damage.		<p data-bbox="909 806 1441 952">Temperature: 40±2°C Humidity: 90~95%RH Voltage: Rated Voltage Duration: 500h Recovery conditions: Room temperature Recovery Time: 24h</p>															
$\Delta C/C$	Class I : $\pm 7.5\%$ or $\pm 0.75\text{pF}$, whichever is larger.																								
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IR	$R_i \geq 1000\text{M}\Omega$																								
Appearance: No visible damage.																									
Life Test	<table border="1" data-bbox="335 1064 869 1355"> <tbody> <tr> <td data-bbox="335 1064 422 1131">$\Delta C/C$</td> <td data-bbox="422 1064 869 1131">COG $\pm 2\%$ or $\pm 1\text{pF}$, whichever is larger.</td> </tr> <tr> <td data-bbox="335 1131 422 1164">Q</td> <td data-bbox="422 1131 869 1164">Not more than twice of initial value.</td> </tr> <tr> <td data-bbox="335 1164 422 1299">IR</td> <td data-bbox="422 1164 869 1299">$R_i \geq 4000\text{M}\Omega$ or $R_i \cdot C_R \geq 40\text{S}$ whichever is smaller.</td> </tr> <tr> <td colspan="2" data-bbox="335 1299 869 1355">Appearance: No visible damage.</td> </tr> </tbody> </table>	$\Delta C/C$	COG $\pm 2\%$ or $\pm 1\text{pF}$, whichever is larger.	Q	Not more than twice of initial value.	IR	$R_i \geq 4000\text{M}\Omega$ or $R_i \cdot C_R \geq 40\text{S}$ whichever is smaller.	Appearance: No visible damage.		<p data-bbox="909 1142 1441 1377">Applied Voltage: Rated Voltage < 100V: 2Ur 100V ≤ Rated Voltage ≤ 200V: 1.5 Ur 200V < Rated Voltage ≤ 500V: 1.3 Ur Duration: 1000h Temperature: 125°C Charge/ Discharge Current: 50mA max. Recovery Conditions: Room Temperature Recovery Time: 24h</p>															
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Appearance: No visible damage.																									

◆ Package

* Paper Taping



* Dimensions of paper taping for 0603, 0805 types.

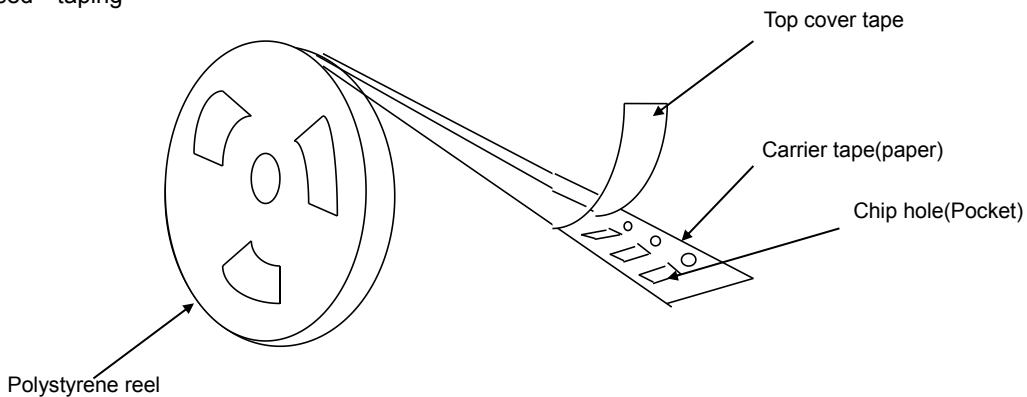


Unit: mm

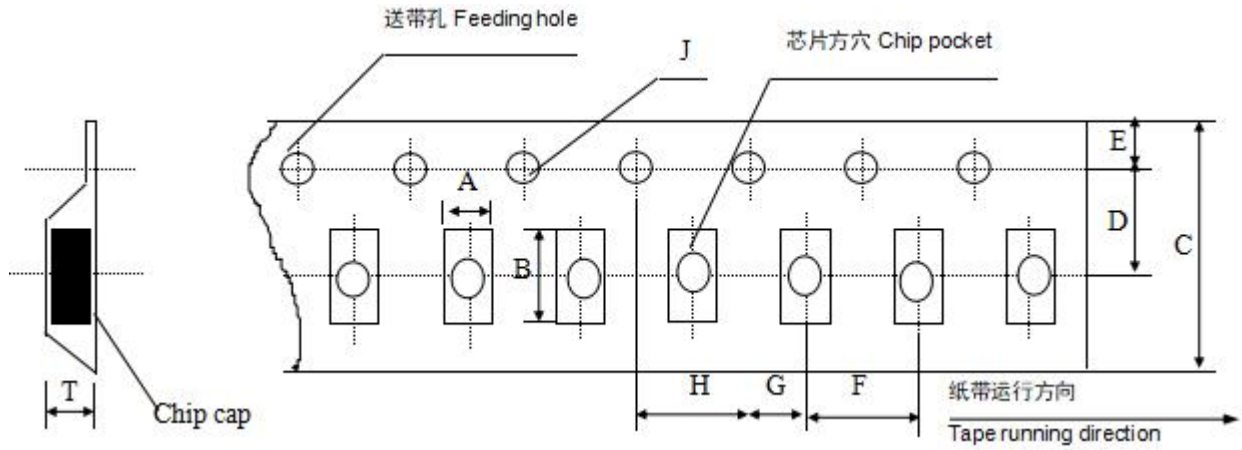
Code paper size	A	B	C	D*	E	F	G*	H	J	T
0603	1.10 ±0.10	1.90 ±0.10	8.00 ±0.10	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50 -0/+0.10	1.10 Max
0805	1.45 ±0.15	2.30 ±0.15	8.0 ±0.15	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50 -0/+0.10	1.10 Max

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

* Embossed taping



* Dimensions of embossed taping for 0505, 1111 type

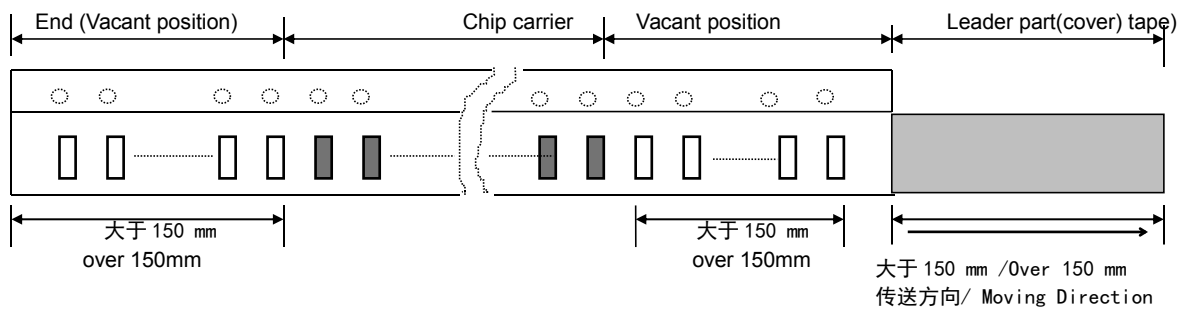


Unit: mm

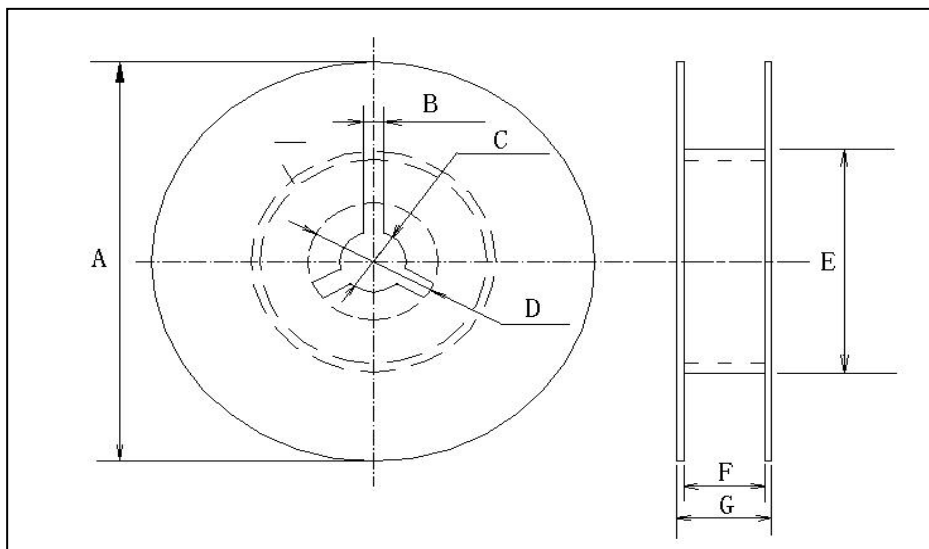
Code paper size	A	B	C	D*	E	F	G*	H	J	T
0505	1.55 ± 0.20	2.35 ± 0.20	8.00 ± 0.20	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	4.00 ± 0.10	1.50 -0/+0.10	1.50 Max
1111	2.70 ± 0.10	3.42 ± 0.10	8.00 ± 0.10	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	1.55 -0/+0.10	3.2 Max

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

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

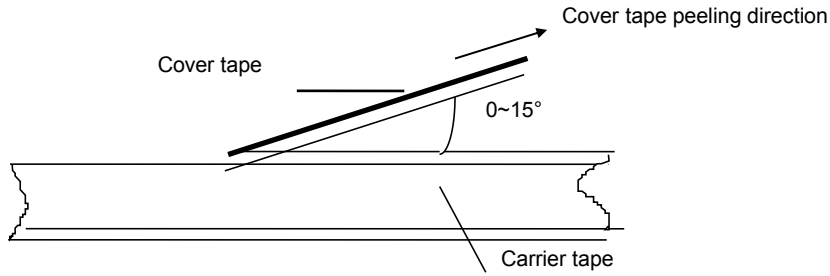


Reel dimensions (unit: mm)

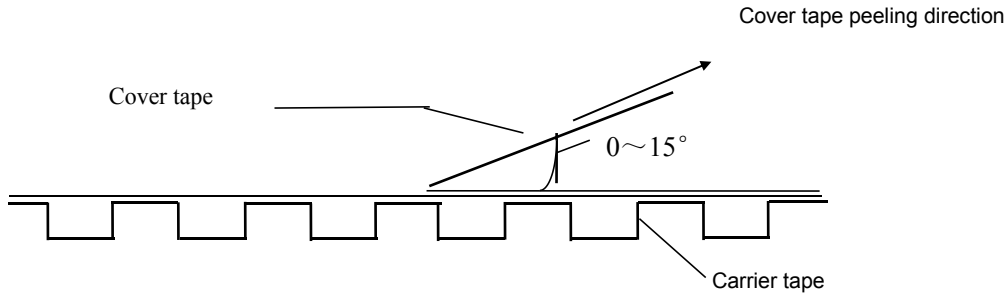


卷盘型号	A	B	C	D	E	F	G
7'REEL	φ178±2.0	3.0	φ13±0.5	φ21±0.8	φ50 or more	10.0±1.5	12max

* 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.

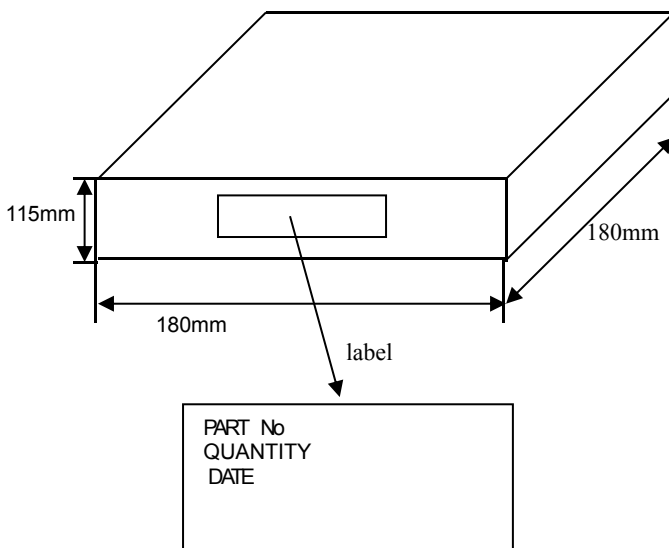
* Packing Quantity

尺寸 (SIZE)	Package Style & Quantity unit: pcs				
	EPT	PT	ET	BC	BP
0603	-----	4000	-----	15000	5000
0805	-----	4000	3000	10000	5000
0505	-----	-----	500	-----	-----
1111	-----	-----	500	-----	-----

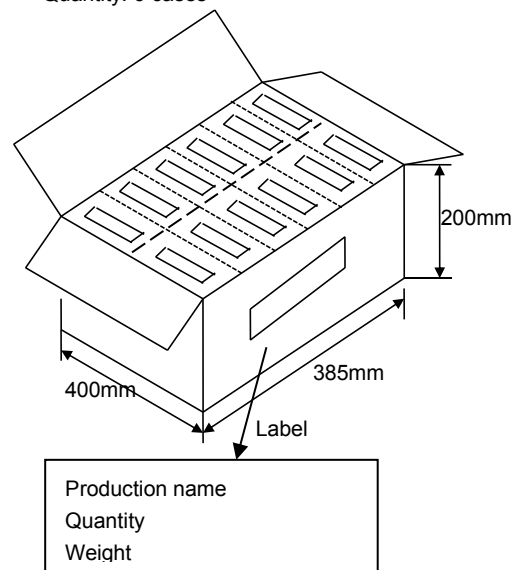
Note: We can choose packing style and quantity can be according to the customer's requirement.

* 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°C 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.

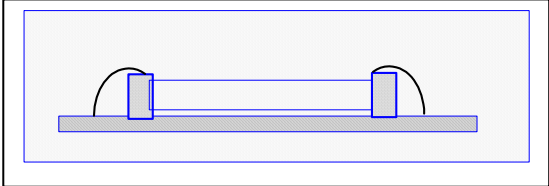
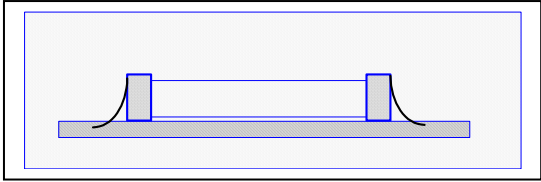
* Soldering Profile

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

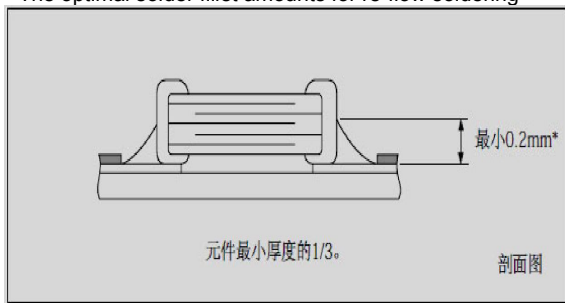
Manual soldering can pose a great risk of creating thermal cracks in capacitors. The hot soldering iron tip comes into direct contact with the end terminations, and operator's careless may cause the tip of the soldering iron to come into direct contact with the ceramic body of the capacitor. Therefore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

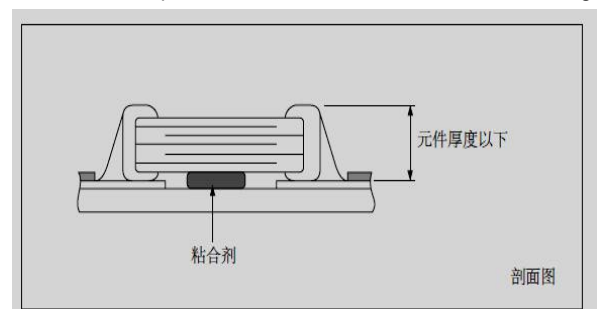
Too much solder		Cracks tend to occur due to large stress.
Not enough solder between the capacitor and PCB.		Weak holding force may cause badconnection

* Recommended Soldering amounts

The optimal solder fillet amounts for re-flow soldering

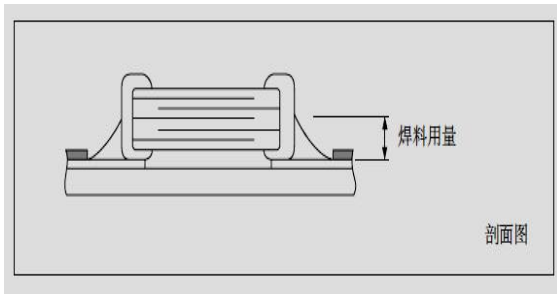


The optimal solder fillet amounts for wave soldering



The optimal solder fillet amounts for reworking by using soldering iron

*



*** Recommended Soldering Method**

Size	Temperature Characteristics	Rated Voltage	Capacitance	Soldering Method
0603	C0G	/	/	R
0805	C0G	/	/	R
0505	C0G	/	/	R
1111	C0G	/	/	R

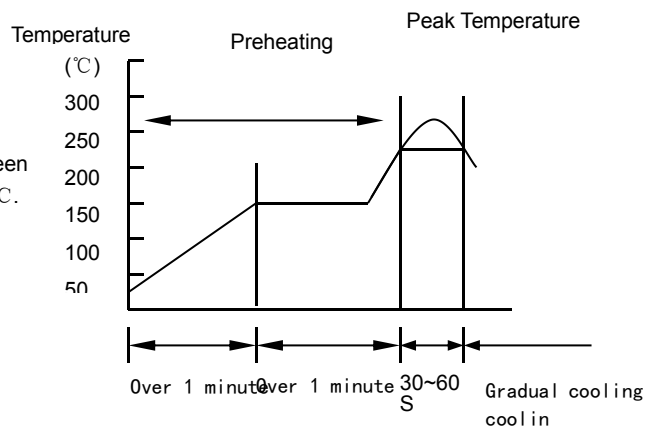
Soldering method: Reflow Solering Wave Soldering

◆ The temperature profile for soldering

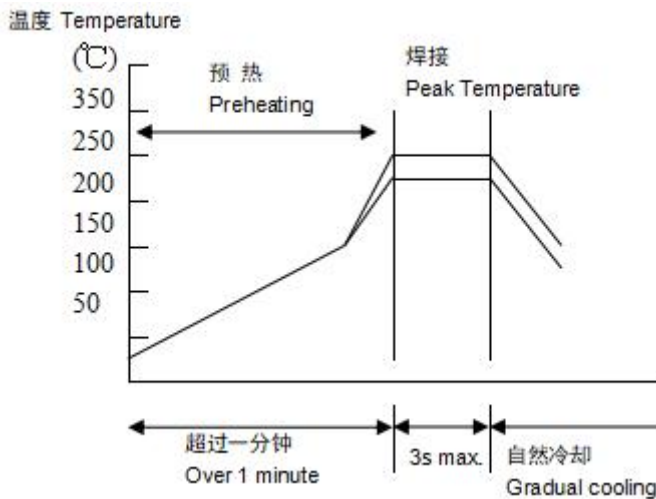
*** Re-flow soldering**

	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: $T \leq 150^\circ\text{C}$.



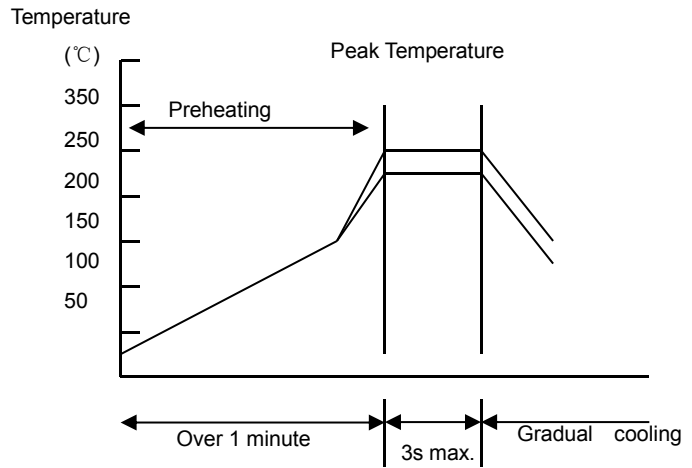
*** Wave soldering**



	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°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