

■ COG/COH MLCC for general-use

COG MLCC for General-use is class I high frequency capacitor, its capacitance is very stable, almost will not change along with the temperature, voltage and time. Specially be suitable for high frequency circuits.



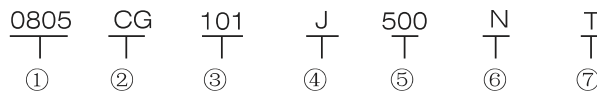
● Features

- * The capacitance is very stable, its operating temperature is $-55^{\circ}\text{C}\sim 125^{\circ}\text{C}$, within the range, the temperature coefficient is $0\pm 30\text{ppm}/^{\circ}\text{C}$, $0\pm 60\text{ppm}/^{\circ}\text{C}$.
- * It has multi-layer monolithic structure, has high reliability.
- * It has good solderability and soldering resistance, suitable for flow/reflow soldering.

● Application

- * It is suitable for all kinds of high frequency circuits.

● Product Part Number Expression



①Dimensions		
Type	British (Inch)	Metric (mm)
0402	0.04×0.02	1.00×0.50
0603	0.06×0.03	1.60×0.80
0805	0.08×0.05	2.00×1.25
1206	0.12×0.06	3.20×1.60

②Dielectric Type	
Code	Dielectric
CG	COG or NPO
CH	COH

③Normal Capacitance(PF)	
Expression Method	Actual Value
100	10×10^0
101	10×10^1
102	10×10^2

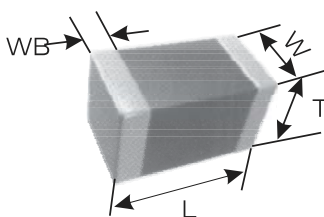
④Capacitance Tolerance	
Code	Tolerance
J	$\pm 5.00\%$
G	$\pm 2.00\%$
C	$\pm 0.25\text{PF}$
B	$\pm 0.10\text{PF}$
D	$\pm 0.50\text{PF}$

⑤Rated Voltage	
Expression Method	Actual Value
500	50V
250	25V
101	100V
201	200V

⑥Termination Type	
Expression Method	Termination Material
S	Pure Silver
C	Pure Copper
N	Three Layers Plating Terminal (Silver or Copper layer/ Nickel layer /Tin layer)

⑦Package Method	
Expression Method	Packaging
No Mark	Bulk Packaging in a Bag
T	Taping Packaging
B	Bulk Plastic Box Packaging

● Outside Dimension



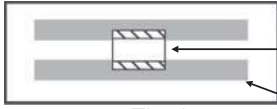
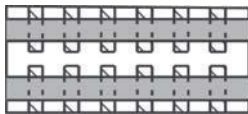
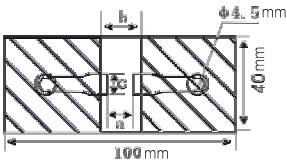
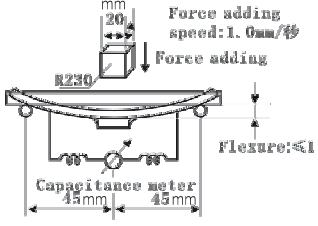
Type		Dimension (mm)			
British Expression	Metric Expression	L	W	T	WB
0402	1005	1.00 ± 0.05	0.50 ± 0.05	0.50 ± 0.05	0.25 ± 0.10
0603	1608	1.60 ± 0.10	0.80 ± 0.10	0.80 ± 0.10	0.30 ± 0.10
0805	2012	2.00 ± 0.20	1.25 ± 0.20	0.80 ± 0.10 1.00 ± 0.10 1.25 ± 0.20	0.50 ± 0.25
1206	3216	3.20 ± 0.30	1.60 ± 0.20	0.80 ± 0.10 1.00 ± 0.10 1.25 ± 0.20	0.50 ± 0.25

■ Capacitance Range

Item	COG/COH MLCC for general-use																			
Dimension	0402					0603					0805					1206				
Rated Voltage	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
Capacitance																				
0.5PF																				
1PF																				
2PF																				
3PF																				
4PF																				
5PF																				
6PF																				
7PF																				
10PF																				
22PF																				
33PF																				
47PF																				
68PF																				
100PF																				
120PF																				
150PF																				
180PF																				
220PF																				
330PF																				
470PF																				
560PF																				
680PF																				
1000PF																				
2200PF																				
2700PF																				
3300PF																				
4700PF																				
5600PF																				
6800PF																				
10nF																				
12nF																				
15nF																				
22nF																				
27nF																				
33nF																				
47nF																				

• General COG、COH、PH~SL MLCC reliability test method

Number	Item	Standard		Test Method									
		COG、COH MLCC for General-use	PH, RH, SH, TH, UJ, SL MLCC for General-use										
1	Operating Temperature Range	-55℃~125℃	-55℃~85℃										
2	Appearance	1.Good ceramic body color continuity. 2.The chips have no visual damages and must be very smooth. 3.No exposed inner- electrode, no cracks or holes. 4.The outer electrode should have no cracks, holes, damages or surface oxidation. 5.Outer electrode no prolongation or the prolongation is less than half of that of the termination width.		※Check by using microscope $\geq 10\times$.									
3	Dimensions	Within the specified dimensions		※Using micrometer or vernier calipers									
4	Capacitance	Within the specified tolerance		※Measuring Equipments:HP4278 capacitance meter,HP4284 capacitance,									
5	Dissipation Factor (DF)	$Cr < 5PF \quad \leq 0.56\%$ $5PF < Cr < 50PF \quad 1.5 [(150/Cr)+7] \times 10^{-4}$ $Cr \geq 50PF \quad \leq 0.15\%$		※Measuring Conditions: 1.Measuring Temperature:25℃±5℃.Humidity: 30%~75%. 2.Measuring Voltage:1.0±0.2V. 3.Measuring Frequency:C<1000PF, 1.0±0.1MHz C≥1000PF, 1.0±0.1KHz									
6	Insulation Resistance	$C \leq 10nF \quad Ri \geq 5 \times 10^{10} \Omega$ $C > 10nF \quad Ri \cdot Cr \geq 500s$		※Measuring Equipment:Insulation resistance meter (such as Sf2511 insulation resistance). ※Measuring Method:Must measure at rated voltage, and measure the IR within 60±5 seconds.									
7	Withstanding Voltage	>3x rated continuous working voltage		※Must measure at 3 times rated voltage, dwell time: 60±1 seconds, no short and the changing/discharging current less than 50mA.									
8	Capacitance Temperature Characteristic	Must meet the capacitor character temperature coefficient requirements within the operating temperature range.		※First, pre-heat: heat treat 60±5 minutes at 150+0/-10℃, then set it for 24±2 hours at room temperature. ※Measure the capacitance at -55~125℃ or -55~85℃, the capacitance change ratio comparing to that of 25℃ must be within the specified range.									
9	Solderability	Tin coverage should be 75% of the outer electrode		※Dip the capacitor into ethanol or colophony solution, and then dip it into 235±5℃(or 245±5℃ leadless eutectic solder solution) eutectic solder solution having lead for 2±0.5 seconds. Dipping speed: 25±2.5mm/second.									
10	Resistance to Soldering	Appearance	No defects visible	※First pre-heat: heat treat for 60±5 minutes at 150+0/-10℃, then set it for 24±2 hours at room temperature. ※Then pre-heat the capacitance according to the following chart. Dip the capacitor into 260±5℃ eutectic solder solution for 10±1 seconds. Then set it for 24±2 hours at room temperature, then measure. Dipping speed: 25±2.5mm/second. ※Preheat conditions: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Stage</th> <th>Temperature</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>100℃—120℃</td> <td>1minute</td> </tr> <tr> <td>2</td> <td>170℃—200℃</td> <td>1minute</td> </tr> </tbody> </table>	Stage	Temperature	Time	1	100℃—120℃	1minute	2	170℃—200℃	1minute
		Stage	Temperature		Time								
		1	100℃—120℃		1minute								
		2	170℃—200℃		1minute								
Cap. Change ratio	$\leq \pm 5\%$ or $\pm 0.5PF$ (whichever is larger)												
DF	Same as original spec												
IR	Same as original spec												

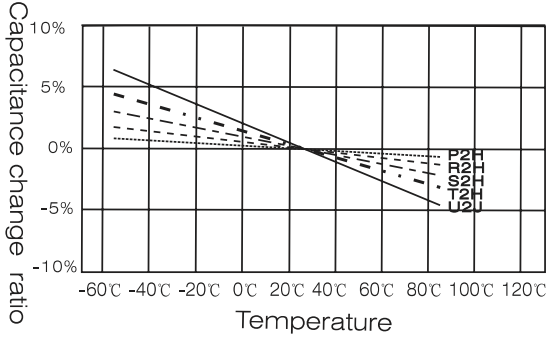
Number	Items	Standard		Test Method																								
11	Adhesive Strength of Termination	No removal of the terminations or other defect shall occur		<p>※Solder the capacitor to the test jig (glass epoxy resin board) shown in Fig.1 using a eutectic solder. Then apply a 10N force in the direction shown as the arrowhead. The soldering shall be done either with an iron or using the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock, etc.</p>  <p>10N, 10±1s Speed: 1.0mm/s Glass epoxy resinboard</p> <p>Fig.1</p>																								
12	Vibration Resistance	Appearance	No defects or abnormalities	<p>※Solder the capacitor to the test jig (glass epoxy resin board). The capacitor should be subjected to a simple harmonic motion having a total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55Hz, shall be traversed (from 10 Hz to 55 Hz then 10 Hz again) in approximately 1 minute. This motion shall be applied for a period of 2 hours in each 3 mutually perpendicular directions (total is 6 hours).</p>  <p>Fig.2</p>																								
		Capacitance	Within the specified tolerance range																									
		DF	Same as original spec																									
13	Bending Resistance	No cracks or other defects shall occur		<p>※Solder the capacitor to the test jig (glass epoxy resin board) shown in Fig.3 using a eutectic solder. Then apply a 10N force in the direction shown as Fig.4. The soldering shall be done either with an iron or using the reflow method and shall be conducted with care so that the soldering is uniform and free of defects such as heat shock, etc.</p>  <p>Fig. 3</p>  <p>Fig. 4</p> <table border="1" data-bbox="823 1608 1173 1753"> <thead> <tr> <th rowspan="2">L×W (mm)</th> <th colspan="4">Dimension</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> </tr> </thead> <tbody> <tr> <td>4.5×2.0</td> <td>3.5</td> <td>7.0</td> <td>2.4</td> <td></td> </tr> <tr> <td>4.5×3.2</td> <td>3.5</td> <td>7.0</td> <td>3.7</td> <td>1.0</td> </tr> <tr> <td>5.7×6.3</td> <td>4.5</td> <td>8.0</td> <td>5.6</td> <td></td> </tr> </tbody> </table>	L×W (mm)	Dimension				a	b	c	d	4.5×2.0	3.5	7.0	2.4		4.5×3.2	3.5	7.0	3.7	1.0	5.7×6.3	4.5	8.0	5.6	
L×W (mm)	Dimension																											
	a	b	c	d																								
4.5×2.0	3.5	7.0	2.4																									
4.5×3.2	3.5	7.0	3.7	1.0																								
5.7×6.3	4.5	8.0	5.6																									
14	Temperature Cycle	Appearance	No defects or abnormalities	<p>※Pre-treatment: Heat-treat the capacitor for 60±5 minutes at 150+0/-10℃, then set it for 24±2 hours at room temperature.</p> <p>※Perform five cycles according to the four heat treatments listed in the following table. Set it for 24±2 hours at room temperature, then measure.</p>																								

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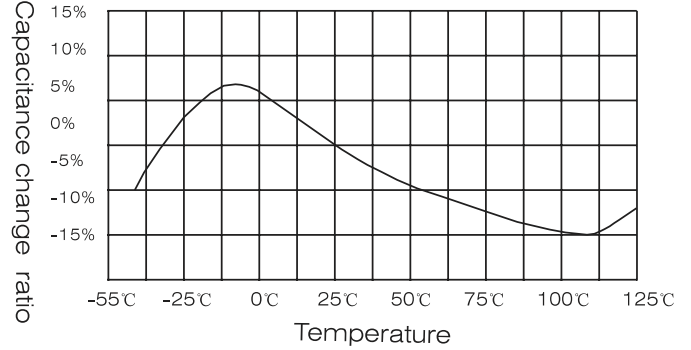
Number	Item	Standard		Test Method															
14	Temperature Cycle	Cap. Change ratio	$\leq \pm 2.5\%$ or ± 0.25 PF (whichever is larger)	※Heat-treatment: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>stage</th> <th>temperature (°C)</th> <th>time (min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>lowest operating temperature ± 3</td> <td>30 \pm 3</td> </tr> <tr> <td>2</td> <td>normal temperature</td> <td>2—3</td> </tr> <tr> <td>3</td> <td>high operating temperature ± 2</td> <td>30 \pm 3</td> </tr> <tr> <td>4</td> <td>normal temperature</td> <td>2—3</td> </tr> </tbody> </table>	stage	temperature (°C)	time (min.)	1	lowest operating temperature ± 3	30 \pm 3	2	normal temperature	2—3	3	high operating temperature ± 2	30 \pm 3	4	normal temperature	2—3
		stage	temperature (°C)		time (min.)														
		1	lowest operating temperature ± 3		30 \pm 3														
		2	normal temperature		2—3														
3	high operating temperature ± 2	30 \pm 3																	
4	normal temperature	2—3																	
D.F.	Same as original spec																		
I.R.	More than 10000M Ω																		
15	Humidity Steady State	Appearance	No defects or abnormalities	※Set the capacitor for 500+24/-0 hours at the condition of 40 \pm 2°C and 90-95% humidity. Then remove and set it for 24 \pm 2 hours at room temperature, then measure.															
		Cap. Change ratio	$\leq \pm 5\%$ or ± 0.5 PF (whichever is larger)																
		D.F.	Same as original spec																
		I.R.	More than 10000M Ω																
16	Humidity Load	Appearance	No defects or abnormalities	※Apply rated voltage to the capacitor for 500+24/-0 hours at the condition of 40 \pm 2°C and 90-95% humidity. Remove and set it for 24 \pm 2 hours at room temperature, then measure.															
		Cap. Change ratio	$\leq \pm 5\%$ or ± 0.5 PF (whichever is larger)																
		D.F.	Same as original spec																
		I.R.	More than 10000M Ω																
17	Life Test	Appearance	No defects or abnormalities	※Apply two times rated voltage to the capacitor for 1000 \pm 12 hours at the upper temperature limits, the charging current should be less than 50mA. Remove and set it for 24 \pm 2 hours at room temperature, then measure.															
		Cap. Change ratio	$\leq \pm 5\%$ or ± 0.5 PF (whichever is larger)																
		D.F.	Same as original spec																
		I.R.	More than 10000M Ω																

■ GENEREL-USE MLCC CHARACTER PROFILES

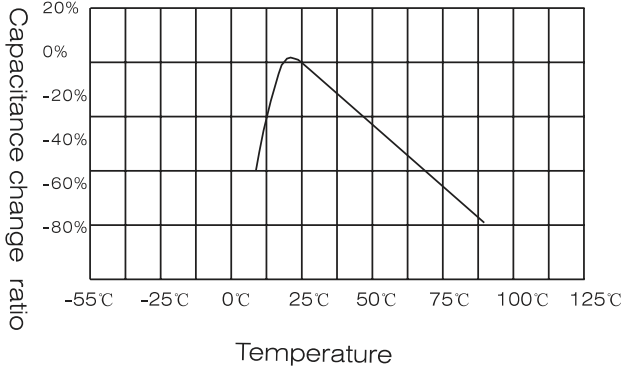
- COG and PH, RH, SH, TH, UH series temperature coefficient



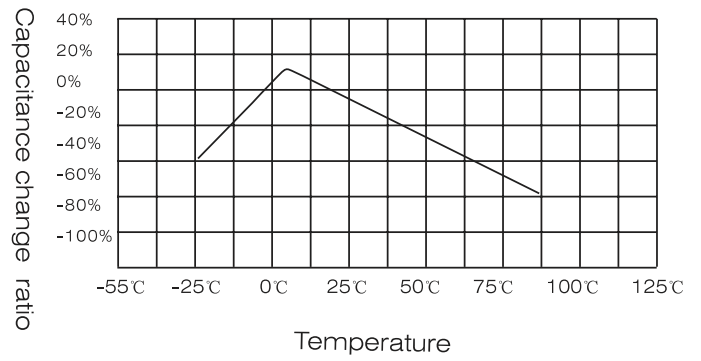
X7R temperature characteristics



Z5U temperature character

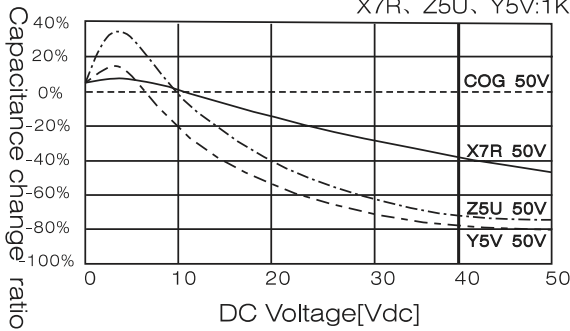


Y5V temperature characteristics



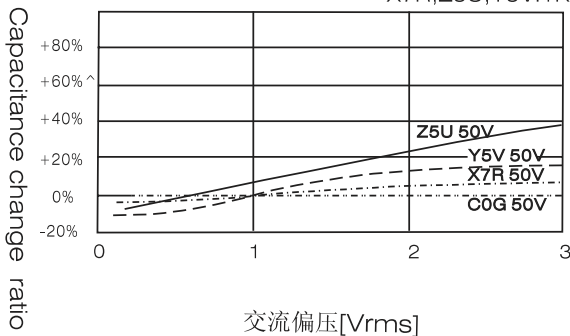
- DC Voltage Characteristics

Measuring condition COG :1MHz
X7R, Z5U, Y5V:1KHz

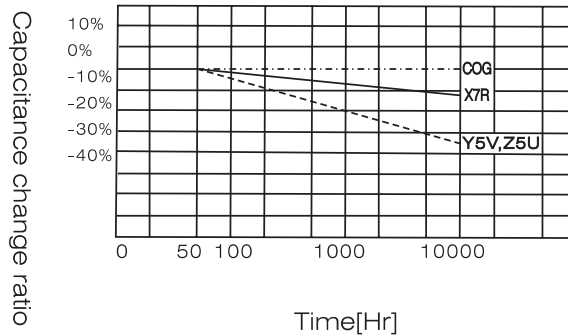


- Capacitance-AC Voltage Characteristics

Measuring condition: COG :1MHz
X7R,Z5U,Y5V:1KHz

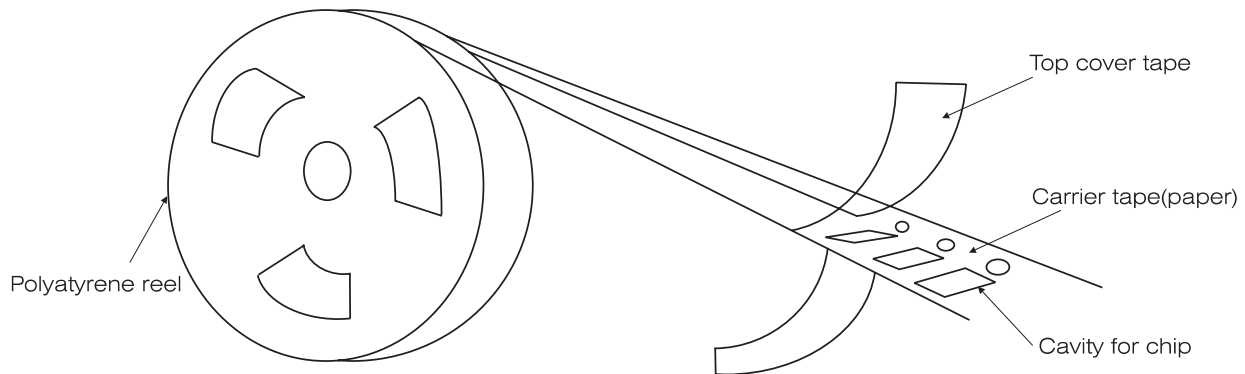


- Capacitance change aging

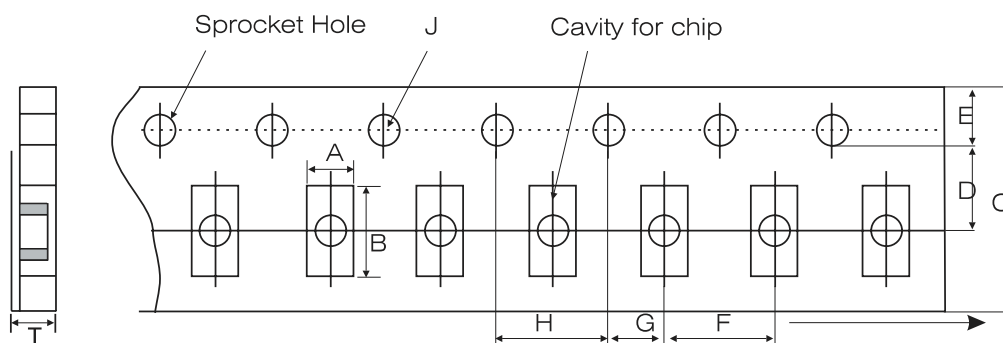


■ Package

- Paper Tape Taping

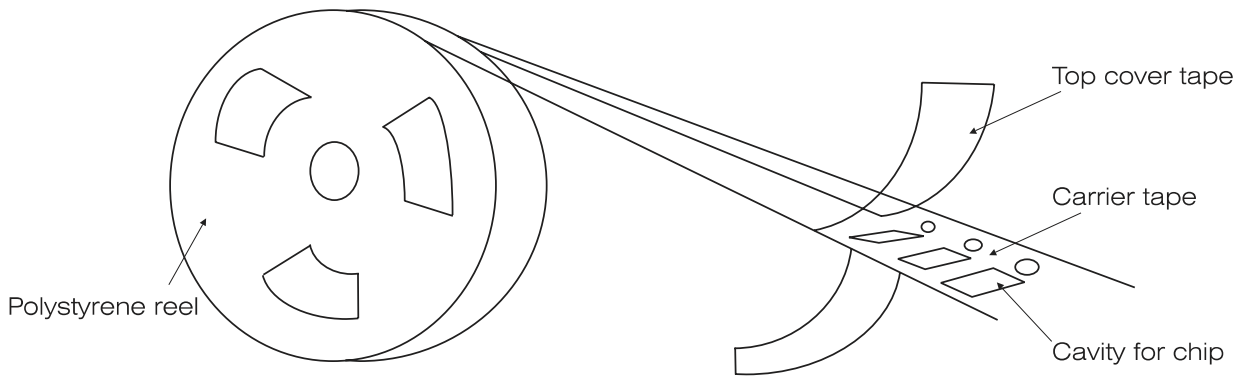


※Dimensions of paper take taping for 0402, 0603, 0805, 1206

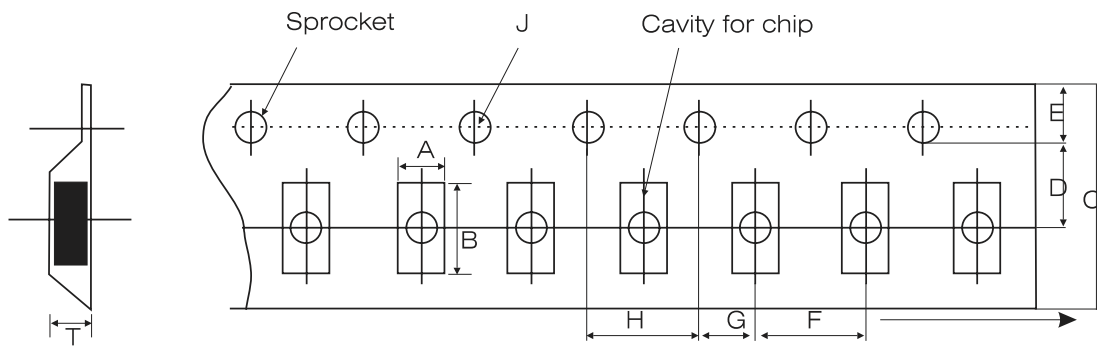


Code Paper size	A	B	C	D	E	F	G	H	J	T*
0402	0.65 ±0.10	1.15 ±0.10	8.00 ±0.10	3.50 ±0.05	1.75 ±0.10	2.00 ±0.05	2.00 ±0.05	4.00 ±0.10	1.50-0/ +0.10	Below 0.80
0603	1.10 ±0.20	1.90 ±0.20	8.00 ±0.20	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50-0/ +0.10	Below 1.10
0805	1.45 ±0.20	2.30 ±0.20	8.00 ±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	Below 1.10
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	Below 1.10

• Embossed Taping



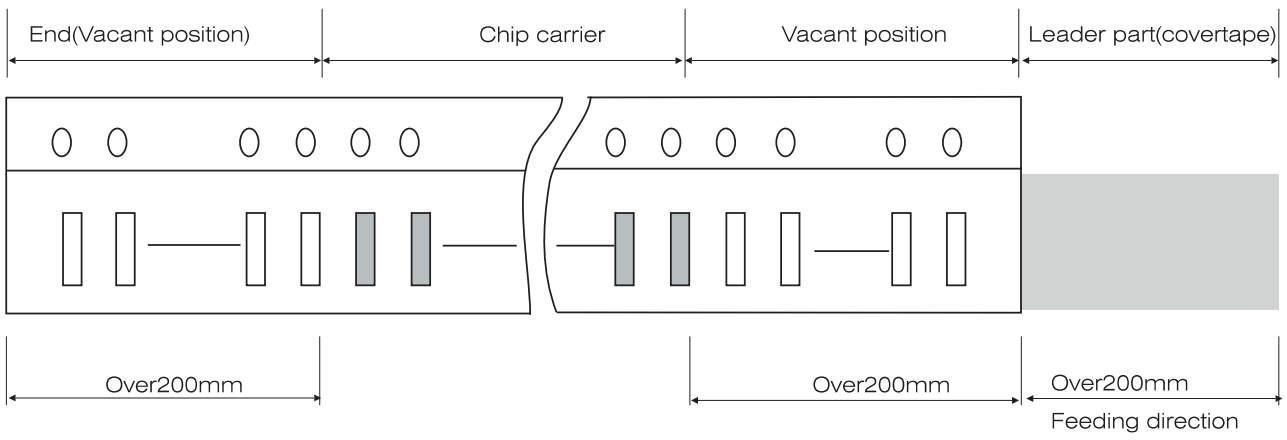
※Dimensions of embossed taping for 0805, 1206, 1210, 1808, 1812 type



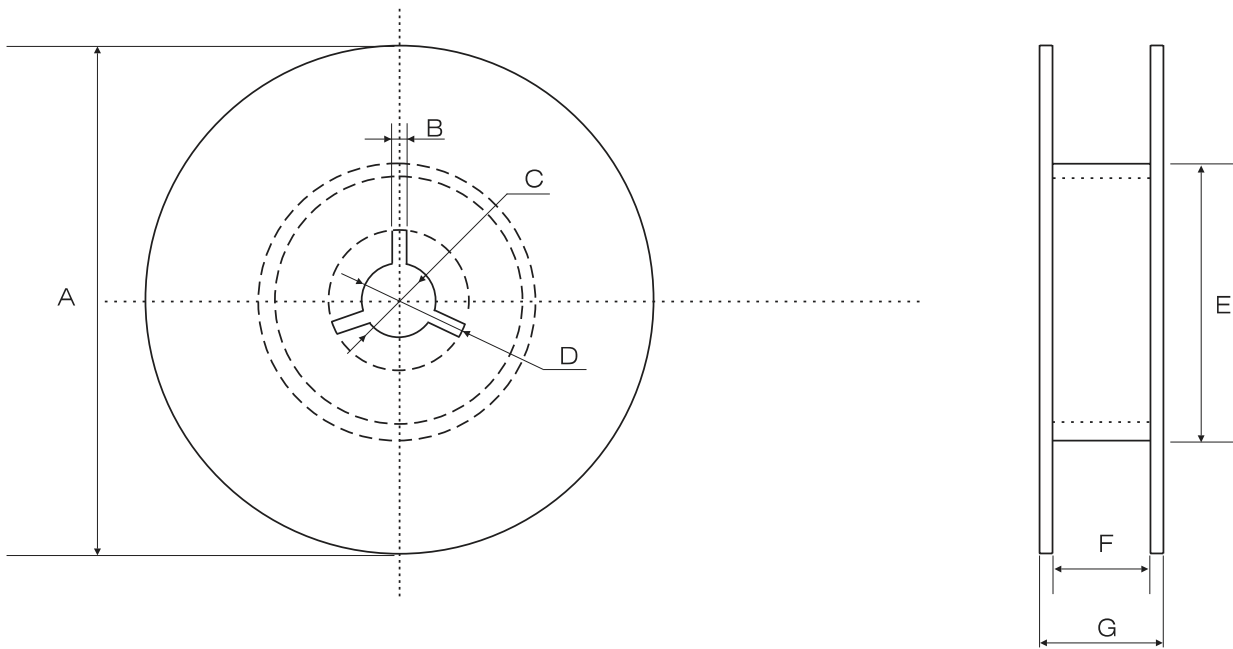
Code Tape size	A	B	C	D	E	F*	G	H	J	T
0805	1.55 ±0.20	2.35 ±0.20	8.00 ±0.20	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50-0/ +0.10	低于 1.50
1206	1.95 ±0.20	3.60 ±0.20	8.00 ±0.20	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50-0/ +0.10	低于 1.85
1210	2.70 ±0.10	3.42 ±0.10	8.00 ±0.10	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50-0/ +0.10	低于 3.2
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	低于 3.0
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	1.50-0/ +0.10	低于 4.0

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

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



- Reel Dimensions (unit:mm)



- Code

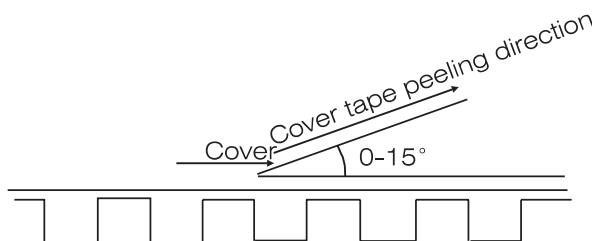
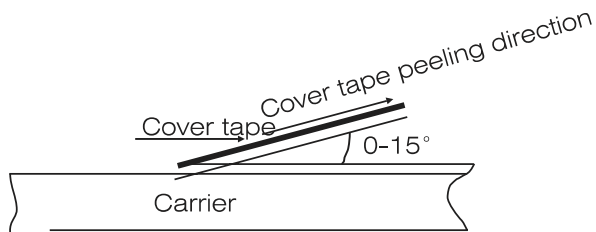
A	B	C	D	E	F	G
$\Phi 178.00 \pm 2.00$	3.00	$\Phi 13.00 \pm 0.50$	$\Phi 21.00 \pm 0.80$	$\Phi 50.00$ or max	10.00 ± 1.50	12MAX
$\Phi 330.00 \pm 2.00$	3.00	$\Phi 13.00 \pm 0.50$	$\Phi 21.00 \pm 0.80$	$\Phi 50.00$ or max	10.00 ± 1.50	12MAX

■ TAPING SPECIFICATION

- Top cover tape peeling strength

(A) Paper Taping

(b) Cover tape peeling direction

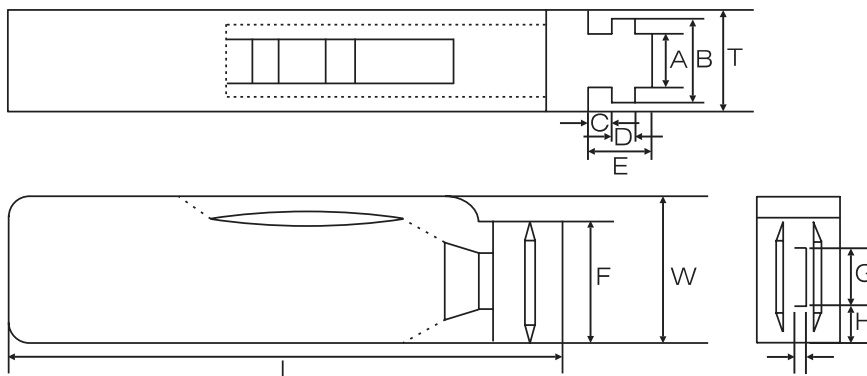


Standard: $0.1N < \text{peeling force} < 0.7N$;

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

- Bulk Case Package

Symbol	A	B	T	C	D	E
Dimension	6.80 ± 0.10	8.80 ± 1.00	12.00 ± 0.10	$15.00 + 0.10 / -1$	$2.00 \pm 0 / -0.10$	4.70 ± 0.10
Symol	F	W	G	H	L	I
Dimension	$31.50 + 0.20 / -0$	$36.00 + 0 / -0.2$	19.00 ± 0.35	7.00 ± 0.35	110.00 ± 0.70	5.00 ± 0.35



- Pack Quantity

Size	Pakaging method and quantity			
	Paper tape taping	Plastic embossed taping	Bulk plastic box packaging	Normal bulk packaging
0402	10000		20000	5000
0603	4000		15000	5000
0805	4000	3000	10000	5000
1206	4000	$T \leq 1.35\text{mm}$ 3000 $T > 1.35\text{mm}$ 2000	5000	5000
1210		$T \leq 1.80\text{mm}$ 2000 $T > 1.80\text{mm}$ 1000		2000
1808		2000		2000
1812		$T \leq 1.85\text{mm}$ 1000 $T > 1.85\text{mm}$ 500		2000
2225		500		500
3035		500		

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