

## MULTILAYER CHIP CERAMIC CAPACITOR

### **AN016C—SMD MLCC**

Dielectric material: COG,NPO,X7R,Y5V,Y5U  
Terminations: Silver/Palladium, Silver  
Voltage: 16,25,50,100,160,200,250,500,1000,2000,2500,5000VDC  
Packing: Bulk, tape and reel  
Capacitance: 0.5Pf ~ 20Uf  
Tolerance: +/-0.1Pf ~ +80-20%



### **DIELECTRIC MATERIAL TYPE**

**NPO(COG):**The electrical properties of this kind of capacitor are the most stable one and have little change with temperature, voltage and time.They are suited of applications where low-losses and high stability are required , such as filters,oscillators,and timing circuits.

**X7R:** X7R material is a kind of material, which has high dielectric constant. The capacitance of this kind of capacitors is higher than that of NPO . These capacitors are classified as having a semisatble temperature characteristic and used over a wide temperature range, such as blocking, coupling, bypassing and frequency discriminating circuit.

**Y5V:** These capacitors have the highest dielectric constant of all ceramic capacitors. They are used over a moderate temperature range in application where high capacitance is required because of its unstable temperature coefficient,but where moderate losses and capacitance changes can be tolerated. Its capacitance and dissipation factors are sensible to and measuring conditions, such as temperature and voltage, etc.

### **CAPACITANCE AND CAPACITANCE TOLERANCE**

Different circuit needs different capacitance and capacitance tolerance. So the selection of capacitance is depended on the need of customers.

### **VOLTAGE**

The selection of voltage is depended on the customer's requirements.

### **OUTER ELECTRODE(TERMINATIONS)**

We can provide two kinds of teminations.One is Silver/Palladium. The other is built up of three plating layers,Silverlayer, Nickel layer and Tin layer. What kind of termination to be chosen is depended on the soldering method.

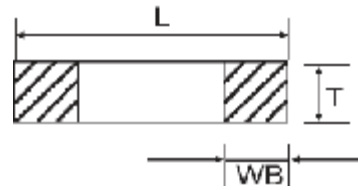
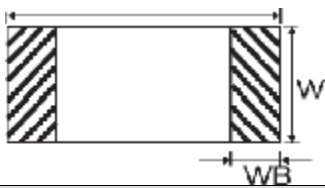
### **PACKAGE**

There are two types of package. One is bulk package, including bulk case and bulk bag. The other is taping package, including paper tape and embossed tape.

### **NONSTANDARD ITEMS**

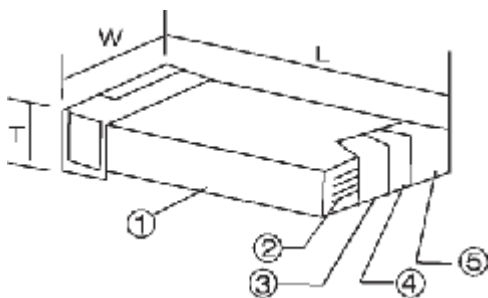
For nonstandard items, we can test the extra items according to customers' special requirements.

**DIMENSIONS**



Type	L		W		Dimensions (mm)		WB	
					T			
0402	1.00	0.05	0.50	0.05	0.5	0.05	0.25	0.10
0603	1.60	0.10	0.80	0.10	0.80	0.1	0.30	0.10
0805	2.00	0.20	1.25	0.20	0.70 0.20 1.00 0.20 1.25 0.20		0.50	0.20
1206	3.20	0.30	1.6	0.2	0.70 0.20 1.00 0.20 1.25 0.20		0.50	0.25
1210	3.20	0.30	2.50	0.30	1.25 0.30 1.50 0.30		0.75	0.25
1808	4.50	0.40	2.00	0.20	2.0		0.75	0.25
1812	4.50	0.40	3.20	0.30	2.5		0.75	0.20
2225	5.70	0.50	6.30	0.50	2.5		1.00	0.25
3035	7.60	0.50	9.00	0.50	3.0		1.00	0.25

**STRUCTUR**



序號	名稱	材料
NO	Name	Material
1.	Ceramic dielectric	ceramic Powder
2.	Inner electrode	Palladium/silver/Nickel
3.	substrate electrode	Silver/Copper
4.	Nickel Plating Layer	Nickel
5.	Tin Plating Layer	Tin

**General COG MLCC**

**DIMENSIONS CAPACITANCE RANGE & OPERATING VOLTAGE**

SIZE CODE	DIMENSIONS(mm)				OPERATING VOLTAGE(V)	CAPACITANCE(pF)
	L	W		T W B		
0402	1.00 0.05	0.50 0.05	0.50 0.05	0.25 0.10	25	1.0 470
					50	1.0 220
0603	1.60 0.10	0.80 0.10	0.80 0.10	0.30 0.10	25	1.0 1000
					50	0.5 820
					100	0.5 820
					200	0.5 330
0805	2.00 0.20	1.25 0.20	0.70 0.20 1.00 0.20 1.25 0.20	0.50 0.20	25	0.5 3300
					50	0.5 2200
					100	0.5 1000
					200	0.5 820
					500	0.5 470
1206	3.20 0.30	1.60 0.20	0.70 0.20 1.00 0.20 1.25 0.20	0.50 0.25	25	0.5 4700
					50	0.5 3900
					100	0.5 2700
					200	0.5 1000
					500	0.5 820
					1000	0.5 470
1210	3.20 0.30	2.50 0.30	1.25 0.30 1.50 0.30	0.75 0.25	25	560 10000
					50	560 7500
					100	10 4700
					200	10 2700
					500	10 1800
					1000	10 820
					2000	10 220
					5000	10 1000
1808	4.50 0.40	2.00 0.20	2.0	0.75 0.25	25	10 8200
					50	10 6800
					100	10 4700
					200	10 2700
					500	10 1800
					1000	10 820
1812	4.50 0.40	3.20 0.30	2.5	1.00 0.25	25	10 15000
					50	10 10000
					100	10 10000
					200	10 5600
					500	10 2700
					1000	10 1000
					2000	10 330
					3000	10 270
2225	5.70 0.50	6.30 0.50	2.5	1.00 0.25	25	1000 4700
					50	1000 22000
					100	10 22000
					200	10 12000
					500	10 3900
					1000	10 2200
					2000	10 1000
					3000	10 680
3035	7.60 0.50	9.00 0.50	3.0	1.00 0.25	25	1000 100000
					50	1000 47000
					100	1000 33000
					200	1000 22000
					500	1000 18000
					1000	1000 8200
2000	1000 3300					

**MULTILAYER CHIP CERAMIC CAPACITOR**

**GENERAL X7R MLCC**

**DIMENSIONS CAPACITANCE RANGE & OPERATING VOLTAGE**

SIZE CODE	DIMENSIONS(mm)				OPERATING VOLTAGE(V)	CAPACITANCE(pF)	
	L	W	T	WB		X7R(B)	
0402	1.00 0.05	0.50 0.05	0.50 0.05	0.25 0.10	16	100	10000
					25	100	10000
					50	100	10000
0603	1.60 0.10	0.80 0.10	0.80 0.10	0.30 0.10	25	100	100000
					50	100	100000
					100	100	10000
					200	100	5600
0805	2.00 0.20	1.25 0.20	0.70 0.20 1.00 0.20 1.25 0.20	0.50 0.20	25	150	220000
					50	150	220000
					100	150	33000
					200	150	22000
					500	150	12000
1206	3.20 0.30	1.60 0.20	0.70 0.20 1.00 0.20 1.25 0.20	0.50 0.25	25	1000	220000
					50	470	150000
					100	150	100000
					200	150	68000
					500	150	15000
					1000	150	3300
1210	3.20 0.30	2.50 0.30	1.25 0.30 1.50 0.30	0.75 0.25	2000	150	1000
					25	1000	330000
					50	470	220000
					100	150	220000
					200	150	100000
					500	150	27000
					1000	150	10000
1808	4.50 0.40	2.00 0.20	2.0	0.75 0.25	2000	150	2200
					25	3300	470000
					50	3300	330000
					100	150	220000
					200	150	100000
					500	150	27000
					1000	150	10000
1812	4.50 0.40	3.20 0.30	2.5	0.75 0.25	2000	150	1000
					25	4700	470000
					50	4700	330000
					100	150	330000
					200	150	100000
					500	150	33000
					1000	150	15000
					2000	150	2200
2225	5.70 0.50	6.30 0.50	2.5	1.00 0.25	3000	150	1000
					25	10000	2000000
					50	10000	1200000
					100	150	1200000
					200	150	100000
					500	150	68000
3035	7.60 0.50	9.00 0.50	3.0	1.00 0.25	1000	150	33000
					2000	150	10000
					3000	150	3300
					25	10000	4700000
					50	10000	2200000
					100	1000	2200000
					200	1000	1000000
500	1000	150000					
1000	1000	100000					
2000	1000	22000					
3000	1000	10000					

**General Y5V,Z5U MLCC**

**DIMENSIONS CAPACITANCE RANGE & OPERATING VOLTAGE**

SIZE CODE	L		W		DIMENSIONS (mm) T		WB	OPERATING VOLTAGE	CAPACITANCE(pF)	
									Y5V(F)	Z5U(E)
0402	1.00	0.05	0.50	0.05	0.50	0.05	0.25	16	1000	100000
								25	1000	100000
								50	1000	100000
0603	1.60	0.10	0.80	0.10	0.80	0.10	0.30	25	2200	1000000
								50	2200	1000000
								100	2200	68000
0805	2.00	0.20	1.25	0.20	0.70	0.20	0.50	25	10000	1000000
					1.00	0.20		50	10000	1000000
					1.25	0.20		100	10000	100000
								200	10000	56000
1206	3.20	0.30	1.60	0.20	0.70	0.20	0.50	25	10000	1200000
					1.00	0.20		50	10000	1000000
					1.25	0.20		100	10000	220000
								200	10000	1000000
1210	3.200	.30	2.500	.30	1.25	0.30	0.750	25	100000	1500000
					1.500	.30		50	100000	1500000
								100	10000	560000
								200	10000	150000
1808	4.50	0.40	2.00	0.20	2.0		0.75	25	100000	2200000
								50	100000	2000000
								100	10000	560000
								200	10000	150000
1812	4.500	.40	3.200	.30	2.5		0.750	25	100000	3300000
								50	100000	2200000
								100	10000	1000000
								200	10000	220000
2225	5.70	0.50	6.30	0.50	2.5		1.00	25	150000	4700000
								50	150000	3300000
								100	10000	2000000
								200	10000	220000
3035	7.60	0.50	9.00	0.50	3.0		1.00	25	220000	10000000
								50	220000	6800000
								100	150000	2000000
								200	150000	680000

**TEMPERATURE COMPENSATING MLCC ( HG, LG, PH, RH, SH, TH, UJ, SL )**

**DIMENSIONS CAPACITANCE RANGE & OPERATING VOLTAGE**

SIZE CODE	Dimensions(mm)				VOLTAGE (V)	Capacitance(Pf)							
	L		W			T		WB		HG LG	PH RH SH TH	SL	UJ
0603	1.600.10		0.800.10		0.800.10		0.300.10		25	0.5 100	0.5 270	0.2 1000	0.2 330
									50	0.5 100	0.5 270	0.2 1000	0.2 330
									100	0.5 100	0.5 220	0.2 470	0.2 270
									200	0.5 100	0.5 150	0.2 330	0.2 220
0805	2.00 0.20		1.25 0.20		0.70 0.20 1.00 0.20 1.25 0.20		0.50 0.20		25	0.5 220	0.5 390	0.5 1000	0.5 470
									50	0.5 220	0.5 390	0.5 1000	0.5 470
									100	0.5 220	0.5 390	0.5 470	0.5 390
									200	0.5 220	0.5 330	0.5 330	0.5 330
									500	0.5 220	0.5 270	0.5 330	0.5 270
1206	3.20 0.30		1.60 0.20		0.70 0.20 1.00 0.20 1.25 0.20		0.50 0.25		25	0.5 470	0.5 680	0.5 4700	0.5 470
									50	0.5 470	0.5 680	0.5 4700	0.5 470
									100	0.5 470	0.5 680	0.5 2200	0.5 680
									200	0.5 470	0.5 560	0.5 560	0.5 560
									500	0.5 330	0.5 470	0.5 470	0.5 470
									1000	0.5 220	0.5 330	0.5 390	0.5 390
									2000	0.5 100	0.5 150	0.5 220	0.5 220

**MULTILAYER CHIP CERAMIC CAPACITOR**

**HIHG FREQUENCY RESPONDING HI-Q (CF,CQ) MLCC**

Size Code	DIMENSIONS (mm)							
	L		W		T		WB	
0603	1.600.10		0.800.10		0.800.10		0.300.10	
0805	2.00	0.20	1.25	0.20	0.70 1.00 1.25	0.20 0.20 0.20	0.50	0.20

**CF 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	400	320	15	130	104	47	40	32
5.2	360	288	16	120	96	51	36	29
5.6	340	272	18	100	80	56	34	28
6.2	320	256	20	90	72	62	32	26
6.8	280	224	22	86	69	68	30	24
7.5	260	208	24	80	64	75	28	23
8.2	230	184	27	70	56	82	26	21
9.1	210	168	30	60	48	91	24	20
10	200	160	33	56	45	100	22	18
11	180	144	36	52	42	110	20	16
12	160	128	39	48	39	120	28	15
13	150	120	43	44	36	130	16	13
14	140	112						

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	960	640	11	432	288	24	192	128
5.2	864	576	12	384	256	27	168	112
5.6	816	544	13	360	240	30	144	96
6.2	768	512	14	336	224	33	125	90
6.8	672	448	15	312	208	36	115	83
7.5	624	416	16	288	192	39	105	77
8.2	552	368	18	240	160	43	96	70
9.1	504	336	20	216	144	47	86	64
10	480	320	22	206	134			

**How to order**

Product Part Number Expression

0805      CG    101      J      500    N      T

①            ②            ③            ④            ⑤            ⑥            ⑦

①Dimensions		
Type	British (Inch)	Metric (mm)
0402	0.04 X 0.02	1.00X 0.50
0603	0.06X0.03	1.60X 0.80
0805	0.08X0.05	2.00X1.25
1206	0.12X0.06	3.20X1.60

②Dielectric Type	
Code	Dielectric
CO	COGorNPO
CH	COH
B	X7R
F	Y5V

③Normal Capacitance(PF)	
Expression Method	Actual Value
100	10X10 <sup>0</sup>
101	10X10 <sup>1</sup>
102	10X10 <sup>2</sup>

④Capacitance Tolerance	
Code	Tolerance
Z	+80-20%
M	±20.00%
K	±10.00%
J	±5.00%
G	±2.00%
C	±0.25PF
B	±0.10PF
D	±0.50PF

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 Palladium/ Copper layer/ Nickel layer/Tin layer)

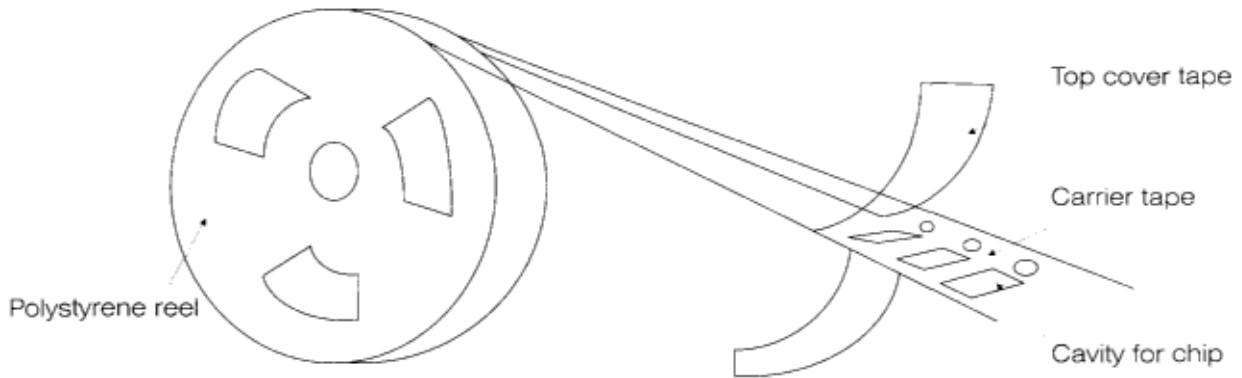
⑦Package Method	
Expression Method	Packaging
No Mark	Bulk Packaging in a Bag
T	Taping Packaging
B	Bulk Plastic Box Packaging



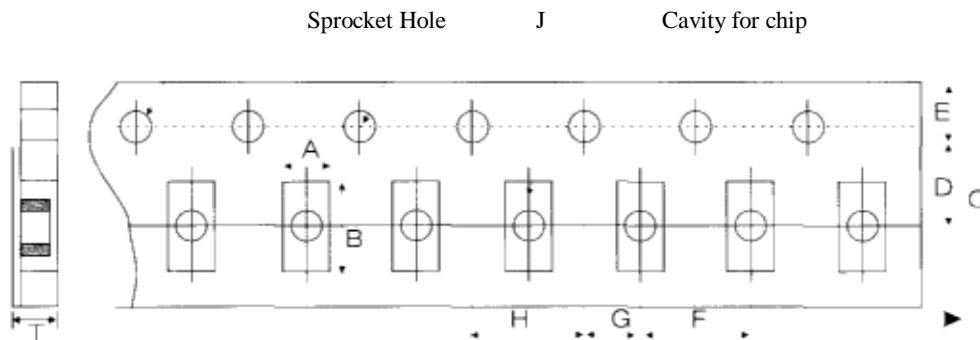
**Packing:**

Multilayer Chip Ceramic Capacitor

- Paper Tape Taping



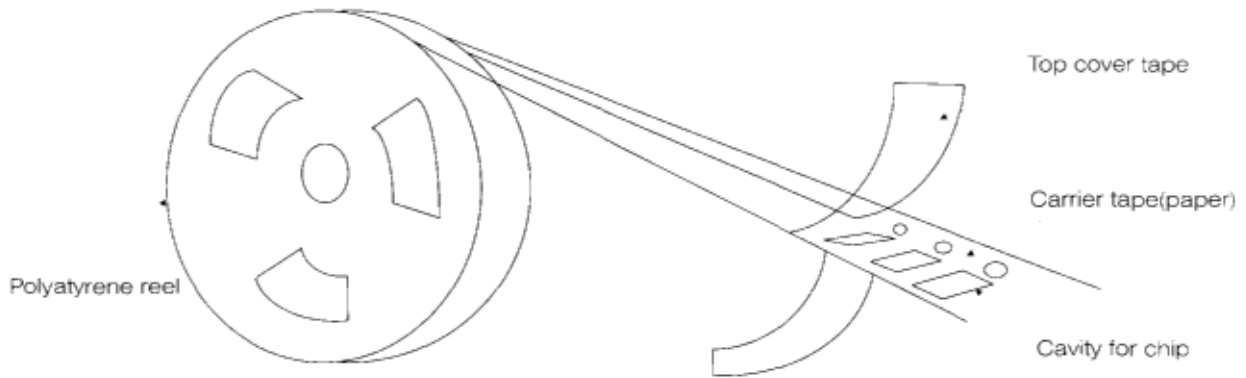
Dimensions of paper take taping for 0402, 0603, 0805, 1206



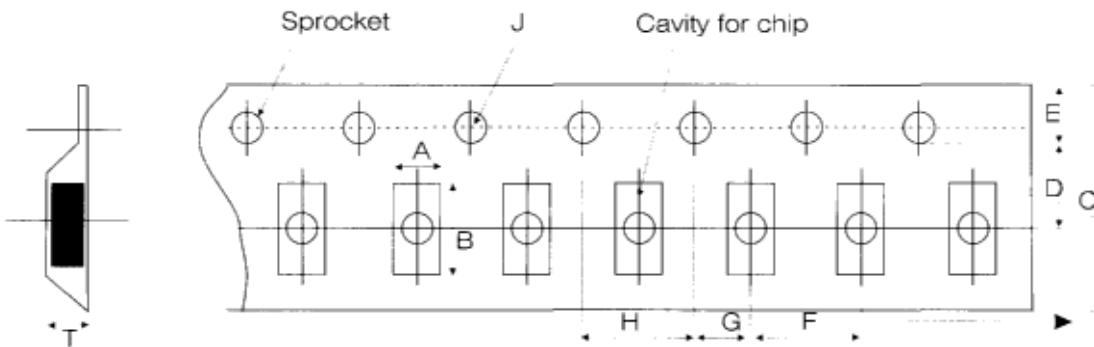
Code Paper size	A	B	C	D	E	F	G	H	J	I
0402	0.65 ±0.20	1.15 ±0.20	8.00 ±0.20	3.50 ±0.05	1.75 ±0.10	2.00 ±0.05	2.00 ±0.05	4.00 ±0.10	1.50-0/ +0.10	Below 0.80
0603	1.10 ±0.20	1.90 ±0.20	8.00 ±0.20	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50-0/ +0.10	Below 1.10
0805	1.45 ±0.20	2.30 ±0.20	8.00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

**Multilayer Chip Ceramic Capacitor**

- Embossed Taping



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

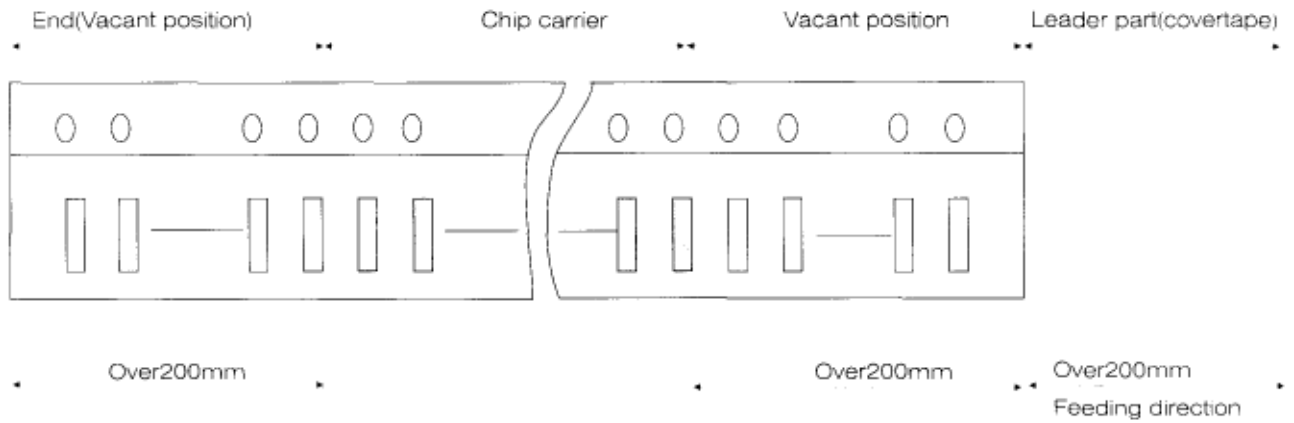


Code	A	B	C	D	E	F*	G	H	U	I
Tape										
0805	1.55 ±0.20	2.35 ±0.20	8.00 ±0.20	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50-0/ +0.10	1.15min
1206	1.95 ±0.20	3.60 ±0.20	8.00 ±0.20	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	4.00 ±0.10	1.50-0/ +0.10	1.50 min
1210	2.70 ±0.10	3.42 ±0.10	8.00 ±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	1.55 min
1 808	2.20 ±0.10	4.95 ±0.10	12.50 ±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	1.80 min
1812	3.66 ±0.10	4.95 ±0.10	12.50 ±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	1.85 min

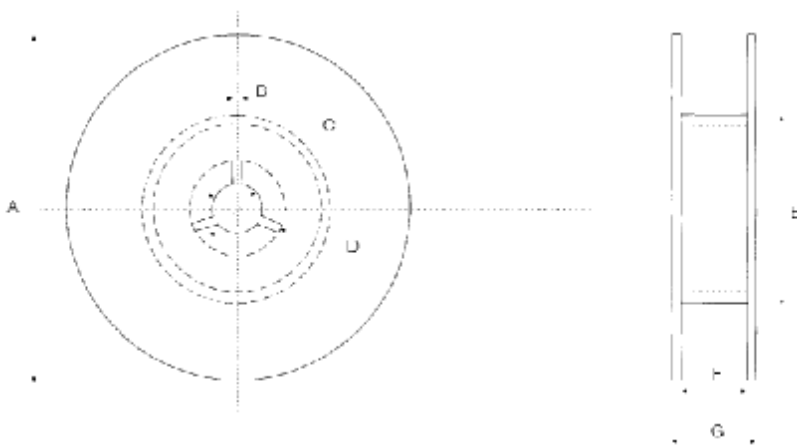
Note: The place with \* means where needs exactly dimensions.

**Multilayer Chip Ceramic Capacitor**

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



• Reel Dimensions (unit: mm)



• Code

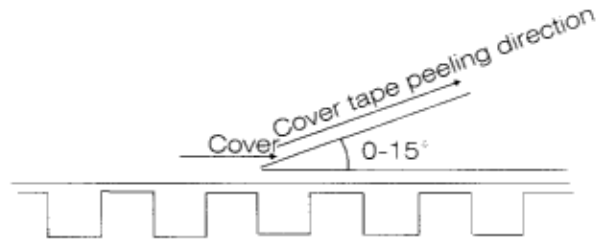
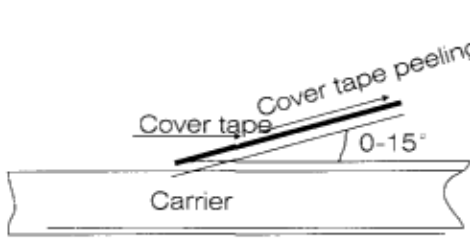
A	B	C	D	F	F	G~
$\Phi 178.00 \pm 2.00$	3.00	$\Phi 13.00 \pm 0.50$	$\Phi 21.00 \pm 0.80$	$\Phi 50.00$ or max	$10.00 \pm 1.50$	12Max
$\Phi 330.00 \pm 2.00$	3.00	$\Phi 13.00 \pm 0.50$	$\Phi 21.00 \pm 0.80$	$\Phi 50.00$ or max	$10.00 \pm 1.50$	12Max

**TAPING SPECIFICATION**

- Top cover tape peeling strength

(A) Paper Taping

(b) Cover tape peeling direction

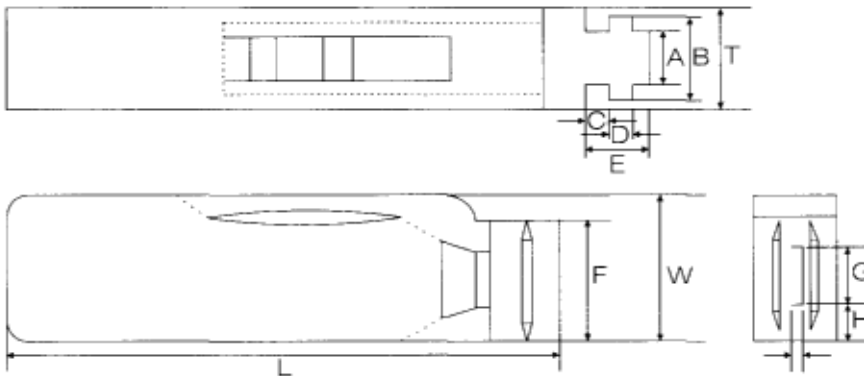


Standard: 0.1 N < peeling force < 0.7N;

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±0.1-0.10	4.70±0.10
Symbol	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	Plastistic embossed taping	Bulk plastic box packaging	Normal bulk packaging
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				
3035				

Note: We can choose packing style and quantity can be according to the customers requirem.

