SPECIFICATION FOR APPROVAL

CUSTOMER					
PARTNAME	Radio Frequency High Q Multilayer Chip Ceramic Capacitor				
MODEL NO					
ISSUE NO					
ISSUED DATE					
MANUFACTURER			CUSTOMER		
APPROVED	CHECKED	PREPARED	APPROVED	CHECKED	PREPARED

CW

Catalog

1. Capacitor Features and Applications

1.1 Features

- Serial size, suitable for hybrid integrated circuit or printed circuit surface mount components;;
- High Q value, low ESR, high reliability;
- Low loss, high capacitance stability, operating frequency up to 3GHz;
- It is suitable for high-frequency circuits, VHF-microwave bands, radio frequency and amplification circuits in various equipment;

1.2 Main performance indicators

- Temperature coefficient: C0G: 0±30ppm/ ℃
- Capacitance drift: not more than ±0.2% or ±0.05pF,whichever is greater.
- Quality factor (Q value) : greater than 2,000 at frequency of 1MHz/1KHz
- Insulation resistance: At 20℃ : ≥100000MΩ
- Operating temperature: -55 ~ 125℃

2. Product model name

2.1 CuiWei Specifications

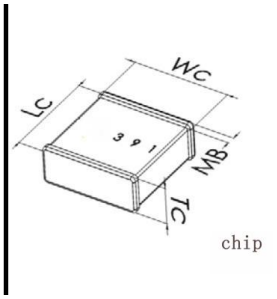
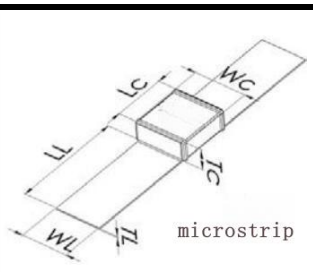
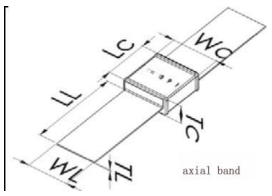
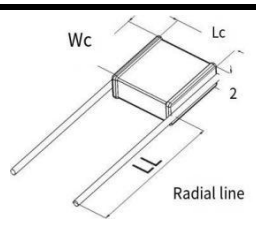
HQ- | 1111 | C0G | 1R0 | B | 501 | N | T

Product Series	Size specifications	Type of medium	Nominal electrical capacity (Unit: pF)	Error level	Rated voltage	End type	Form of packaging
HQ:HQ series Rf High Q capacitor	0402 2525 0603 3838 0805 6243 0505 7676 1111	C0G: ±30ppm/℃	The first two digits are significant digits, and the last digit is a power of 10;	A:±0.05pF B:±0.10pF C:±0.25pF D:±0.50pF F:±1.0% G:±2.0% J:±5.0%	The first two digits are significant digits, and the last digit is a power of 10;	N: Leading end: silver- nickel-tin; Z: leading end: Silver -nickel - tinlead; M: microstrip ; A: axialstrip; RW: radial line RN: No magnetic radial line	T: taping packaging; C: Grid boxed; B/Vacancy: Bulk packaging

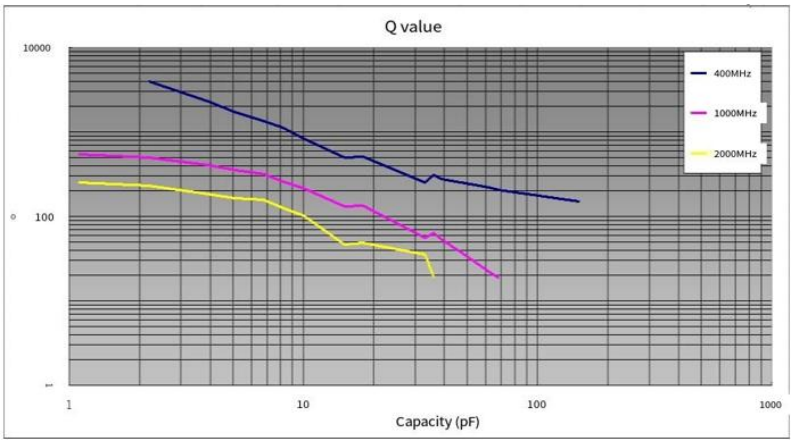
2.2 The corresponding relationship between CuiWei product series and ATC

CuiWei series	Corresponds to ATC
HQ-0402	ATC600L
HQ-0603	ATC600S
HQ-0805	ATC600F
HQ-0505	ATC100A/700A
HQ-1111	ATC100B
HQ-2525	ATC100C
HQ-3838	ATC100E
HQ-7676	ATC100H

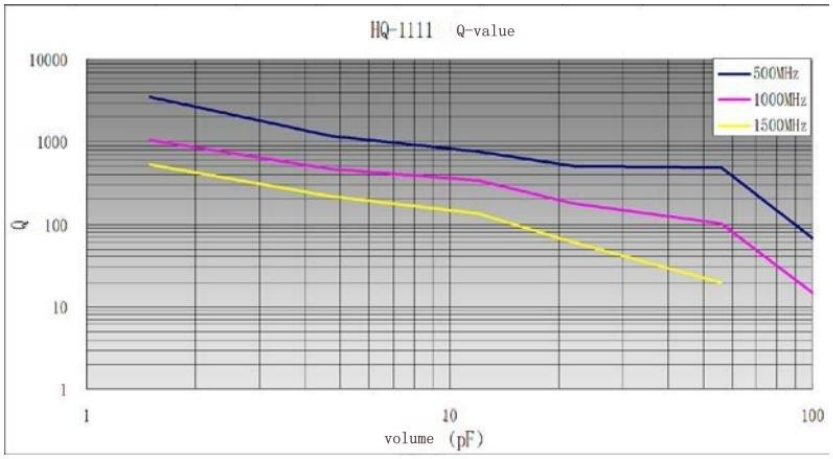
3. Product size

product type	Dimensions (Imperial system))	Capacitance size (mm)			Outlet size (mm)			
		Lc	Wc	Tc max	MB	L_L min	W_L	T_L
 chip	0402	1.00±0.20	0.50±0.20	0.55	0.25±0.10	—		
	0603	1.52±0.25	0.76±0.25	1.01	0.35±0.15			
	0805	2.00±0.25	1.25±0.25	1.45	0.50±0.20			
	0505	1.40 -0.25~+0.38	1.40±0.38	1.45	0.40±0.15			
	1111	2.79 -0.25~+0.51	2.79±0.38	2.59	0.60±0.20			
	2525	5.84 -0.25~+0.51	6.35±0.38	3.68	0.80±0.30			
	3838(L thickness)	9.90 -0.25~+0.38	8.89±0.25	4.0	1.00±0.50			
	3838(M thickness)	9.65 -0.25~+0.38	9.65±0.25	4.5	1.00±0.50			
	6243	15.60 -0.25~+0.51	10.92±0.38	5.0	1.20±0.50			
	7676	19.30 -0.25~+0.51	19.30±0.38	5.0	1.50±0.50			
 microstrip	2525	6.35±0.38	6.35±0.38	3.68	—	12.70	6.10±0.13	0.20±0.05
	3838(M thickness)	9.65 -0.25~+0.89	9.65±0.25	4.50		19.05	8.64±0.25	0.25±0.10
	6243	15.60 -0.25~+0.89	10.92±0.38	5.0		19.05	8.64±0.25	0.25±0.10
	7676	19.30 -0.25~+0.89	19.30±0.38	5.0		19.05	15.00±0.25	0.25±0.10
	2525	6.35±0.38	6.35±0.38	3.68		12.70	6.10±0.13	0.20±0.05
	3838(M thickness)	9.65 -0.25~+0.89	9.65±0.25	4.50		19.05	8.64±0.25	0.25±0.10
	6243	15.60 -0.25~+0.89	10.92±0.38	5.0		19.05	8.64±0.25	0.25±0.10
	7676	19.30 -0.25~+0.89	19.30±0.38	5.0		19.05	15.00±0.25	0.25±0.10
	1111	3.90±0.51	2.79±0.38	2.59		12.70	Lead diameter 0.40±0.05	
	2525	5.84 -0.25~+1.91	6.35±0.38	3.68		25.40	Lead diameter 0.80±0.05	
	3838(L thickness)	9.90 -0.25~+2.16	8.89±0.25	4.0				
	3838(M thickness)	9.65 -0.25~+2.16	9.65±0.25	4.50				

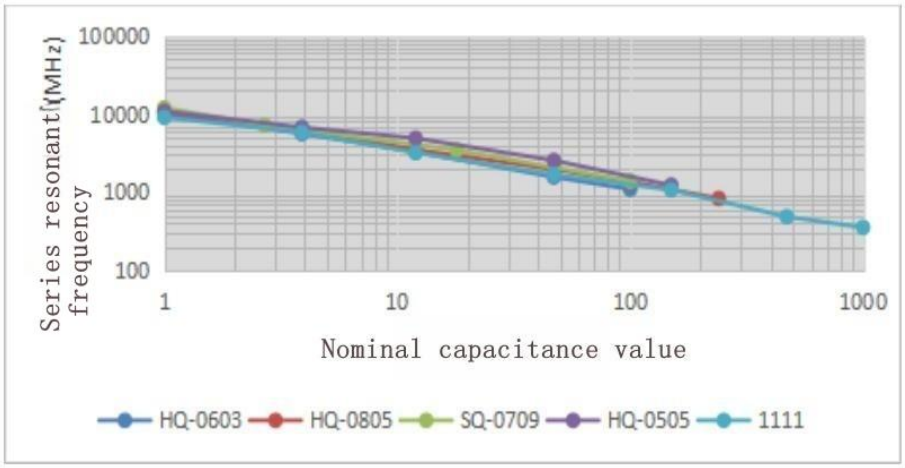
HQ-0505 Q value versus capacity valued



HQ-1111 Capacity of the Q pair



0603\0805\0709\0505\1111 nominal capacitance of resonant frequency pair



5. Capacity range

5.1 0402 Specification Capacity table

HQ-0402 Specification capacity table

Capacitance code	Capacitance (pF)	Accuracy	Maximum DC operating voltage (V)	Tolerance code	Capacitance (pF)	precision	Maximum DC operating voltage (V)	Capacitance code	Capacitance (pF)	Accuracy	Maximum DC operating voltage (V)
0R1	0.1	A, B, C.	250	2R1	2.1	B, C, D.	250	130	13	F, G, J.	200
0R2	0.2			2R2	2.2			150	15		
0R3	0.3			2R4	2.4			160	16		50
0R4	0.4			2R7	2.7			180	18		
0R5	0.5	A, B, C, D.		3R0	3			200	20		
0R6	0.6			3R3	3.3			220	22		
0R7	0.7			3R6	3.6		200	240	24		
0R8	0.8			3R9	3.9			270	27		
0R9	0.9			4R3	4.3			300	30		
1R0	1			4R7	4.7			330	33		
1R1	1.1			5R1	5.1			360	36		
1R2	1.2			5R6	5.6			390	39		
1R3	1.3			6R2	6.2			430	43		
1R4	1.4			6R8	6.8			470	47		
1R5	1.5			7R5	7.5						
1R6	1.6			8R2	8.2						
1R7	1.7			9R1	9.1						
1R8	1.8			100	10	F, G, J.					
1R9	1.9			110	11						
2R0	2			120	12						

Note: If there is a special capacity, precision requirements, please contact CuiWei Company.

5.2 0603 Specification tolerance table

HQ-0603 Specification capacity table

Capacitance code	Capacitance (pF)	Accuracy	Maximum DC operating voltage (V)	Tolerance code	Capacitance (pF)	precision	Maximum DC operating voltage (V)	Capacitance code	Capacitance (pF)	Accuracy	Maximum DC operating voltage (V)
0R1	0.1	A, B, C.	250	3R3	3.3	B, C, D.	250	360	36	F, G, J, K, M.	250
0R2	0.2			3R6	3.6			390	39		
0R3	0.3			3R9	3.9			430	43		
0R4	0.4			4R3	4.3			470	47		
0R5	0.5	A, B, C, D.		4R7	4.7			510	51		
0R6	0.6			5R1	5.1			560	56		
0R7	0.7			5R6	5.6			620	62		
0R8	0.8			6R2	6.2			680	68		
0R9	0.9			6R8	6.8			750	75		
1R0	1			7R5	7.5			820	82		
1R1	1.1			8R2	8.2			910	91		150
1R2	1.2			9R1	9.1			101	100		
1R3	1.3			100	10	F, G, J, K, M.					
1R4	1.4			110	11						
1R5	1.5			120	12						
1R6	1.6			130	13						
1R7	1.7			150	15						
1R8	1.8			160	16						
1R9	1.9			180	18						
2R0	2			200	20						
2R1	2.1			220	22						
2R2	2.2			240	24						
2R4	2.4			270	27						
2R7	2.7			300	30						
3R0	3			330	33						

Note: If there is a special capacity, precision requirements, please contactCuiWei Company.

5.3 0505 Specification tolerance table

HQ-0505 Specification Tolerance table

Capacitance code	Capacitance (pF)	Accuracy	Maximum DC operating voltage (V)	Tolerance code	Capacitance (pF)	precision	Maximum DC operating voltage (V)	Capacitance code	Capacitance (pF)	Accuracy	Maximum DC operating voltage (V)
0R2	0.2	B, C.	250	3R6	3.6	B, C, D.	250	390	39	F, G, J, K, M.	250
0R3	0.3			3R9	3.9			430	43		
0R4	0.4			4R3	4.3			470	47		
0R5	0.5	B, C, D.		4R7	4.7			510	51		
0R6	0.6			5R1	5.1			560	56		
0R7	0.7			5R6	5.6			620	62		
0R8	0.8			6R2	6.2			680	68		
0R9	0.9			6R8	6.8			750	75		
1R0	1			7R5	7.5			820	82		
1R1	1.1			8R2	8.2			910	91		
1R2	1.2			9R1	9.1			101	100		
1R3	1.3			100	10	F, G, J, K, M.		111	110		
1R4	1.4			110	11			121	120		
1R5	1.5			120	12			131	130		
1R6	1.6			130	13			151	150		150
1R7	1.7			150	15			161	160		
1R8	1.8			160	16			181	180		
1R9	1.9			180	18			201	200		100
2R0	2			200	20			221	220		
2R1	2.1			220	22						
2R2	2.2			240	24						
2R4	2.4			270	27						
2R7	2.7			300	30						
3R0	3			330	33						
3R3	3.3			360	36						

5.4 0805 Specification tolerance table

HQ-0805 Specification capacity table

Capacitance code	Capacitance (pF)	Accuracy	Maximum DC operating voltage (V)	Tolerance code	Capacitance (pF)	precision	Maximum DC operating voltage (V)	Capacitance code	Capacitance (pF)	Accuracy	Maximum DC operating voltage (V)
0R2	0.2	B, C.	250	3R6	3.6	B, C, D.	250	390	39	F, G, J, K.	250
0R3	0.3			3R9	3.9			430	43		
0R4	0.4			4R3	4.3			470	47		
0R5	0.5	B, C, D.		4R7	4.7			510	51		
0R6	0.6			5R1	5.1			560	56		
0R7	0.7			5R6	5.6			620	62		
0R8	0.8			6R2	6.2			680	68		
0R9	0.9			6R8	6.8			750	75		
1R0	1			7R5	7.5			820	82		
1R1	1.1			8R2	8.2			910	91		
1R2	1.2			9R1	9.1			101	100		
1R3	1.3			100	10	F, G, J, K.		111	110		
1R4	1.4			110	11			121	120		
1R5	1.5			120	12			131	130		
1R6	1.6			130	13			151	150		
1R7	1.7			150	15			161	160		150
1R8	1.8			160	16			181	180		
1R9	1.9			180	18			201	200		
2R0	2			200	20			221	220		100
2R1	2.1			220	22			241	240		
2R2	2.2			240	24						
2R4	2.4			270	27						
2R7	2.7			300	30						
3R0	3			330	33						
3R3	3.3			360	36						

5.5 1111 Specification tolerance table

HQ-1111 Specification tolerance table

Tolerance code	Tolerance value (pF)	Accuracy	Maximum DC operating voltage (V)	Tolerance code	Tolerance value (pF)	accuracy	Maximum DC operating voltage (V)	Tolerance code	Tolerance value (pF)	Accuracy	Maximum DC operating voltage (V)	Tolerance code	Tolerance value (pF)	Accuracy	Maximum DC operating voltage (V)
0R1	0.1	A, B, C.	1500	3R3	3.3	A, B, C, D.	1500	360	36	F, G, J, K.	1500	391	390	F, G, J, K.	500
0R2	0.2			3R6	3.6			390	39			431	430		250
0R3	0.3			3R9	3.9			430	43			471	470		
0R4	0.4			4R3	4.3			470	47			511	510		
0R5	0.5	A, B, C, D.		4R7	4.7			510	51			561	560		
0R6	0.6			5R1	5.1			560	56			621	620		
0R7	0.7			5R6	5.6			620	62		1000	681	680		
0R8	0.8			6R2	6.2			680	68			751	750		
0R9	0.9			6R8	6.8			750	75			821	820		
1R0	1			7R5	7.5			820	82			911	910		
1R1	1.1			8R2	8.2			910	91			102	1000		
1R2	1.2			9R1	9.1			101	100						
1R3	1.3			100	10	F, G, J, K.		111	110						
1R4	1.4	A, B, C, D.		110	11			121	120						
1R5	1.5			120	12			131	130						
1R6	1.6			130	13			151	150						
1R7	1.7			150	15			161	160						
1R8	1.8			160	16			181	180						
1R9	1.9			180	18			201	200		600				
2R0	2			200	20			221	220						
2R1	2.1			220	22			241	240						
2R2	2.2			240	24			271	270						
2R4	2.4			270	27			301	300						
2R7	2.7			300	30			331	330		500				
3R0	3			330	33			361	360						

5.6 2525 Specification capacity table

HQ-2525Specification capacity table

Tolerance code	Tolerance value (pF)	Accuracy	Maximum DC operating voltage (V)	Tolerance code	Capacity value (pF)	Accuracy	Maximum DC operating voltage (V)	Tolerance code	Tolerance value (pF)	Accuracy	Maximum DC operating voltage (V)	Tolerance code	Tolerance value (pF)	Accuracy	Maximum DC operating voltage (V)
1R0	1.0	B, C.	3600	7R5	7.5	B, C, D.	3600	820	82	F, G, J, K, M.	3600	911	910	F, G, J, K, M.	1000
1R1	1.1			8R2	8.2			910	91			102	1000		
1R2	1.2			9R1	9.1			101	100			112	1100		
1R3	1.3			100	10	F, G, J, K, M.		111	110			122	1200		
1R4	1.4	B, C, D.		110	11			121	120			152	1500		500
1R5	1.5			120	12			131	130		2500	182	1800		
1R6	1.6			130	13			151	150			202	2000		
1R7	1.7			150	15			161	160			222	2200		
1R8	1.8			160	16			181	180			272	2700		250
1R9	1.9			180	18			201	200						
2R0	2.0			200	20			221	220						
2R1	2.1			220	22			241	240						
2R2	2.2			240	24			271	270						
2R4	2.4			270	27			301	300		2000				
2R7	2.7			300	30			331	330						
3R0	3			330	33			361	360		1500				
3R3	3.3			360	36			391	390						
3R6	3.6			390	39			431	430						
3R9	3.9			430	43			471	470						
4R3	4.3			470	47			511	510		1000				
4R7	4.7			510	51			561	560						
5R1	5.1			560	56			621	620						
5R6	5.6			620	62			681	680						
6R2	6.2			680	68			751	750						
6R8	6.8			750	75			821	820						

5.7 3838 Specification capacity table

HQ-3838Specification capacity table

Tolerance code	Tolerance value (pF)	Accuracy	Maximum DC operating voltage (V)	Tolerance code	Capacity value (pF)	Accuracy	Maximum DC operating voltage (V)	Tolerance code	Tolerance value (pF)	Accuracy	Maximum DC operating voltage (V)	Tolerance code	Tolerance value (pF)	Accuracy	Maximum DC operating voltage (V)
1R0	1.0	B, C.	7200	7R5	7.5	B, C, D.	7200	820	82	F, G, J, K, M.	7200	911	910	F, G, J, K, M.	1500
1R1	1.1			8R2	8.2			910	91			102	1000		
1R2	1.2			9R1	9.1			101	100			112	1100		1000
1R3	1.3			100	10	F, G, J, K, M.		111	110		5000	122	1200		
1R4	1.4	B, C, D.		110	11			121	120			152	1500		
1R5	1.5			120	12			131	130			182	1800		500
1R6	1.6			130	13			151	150			202	2000		
1R7	1.7			150	15			161	160			222	2200		
1R8	1.8			160	16			181	180			242	2400		
1R9	1.9			180	18			201	200		3600	272	2700		
2R0	2.0			200	20			221	220			302	3000		
2R1	2.1			220	22			241	240			332	3300		
2R2	2.2			240	24			271	270			362	3600		250
2R4	2.4			270	27			301	300			392	3900		
2R7	2.7			300	30			331	330			432	4300		
3R0	3			330	33			361	360			472	4700		
3R3	3.3			360	36			391	390			512	5100		
3R6	3.6			390	39			431	430		2500	562	5600		
3R9	3.9			430	43			471	470			622	6200		
4R3	4.3			470	47			511	510			682	6800		
4R7	4.7			510	51			561	560						
5R1	5.1			560	56			621	620						
5R6	5.6			620	62			681	680						
6R2	6.2			680	68			751	750		1500				
6R8	6.8			750	75			821	820						

5.8 6243 Specification capacity table

HQ-6243 Specification capacity table

Tolerance code	Tolerance value (pF)	Accuracy	Maximum DC operating voltage (V)	Tolerance code	Capacity value (pF)	Accuracy	Maximum DC operating voltage (V)	Tolerance code	Tolerance value (pF)	Accuracy	Maximum DC operating voltage (V)	Tolerance code	Tolerance value (pF)	Accuracy	Maximum DC operating voltage (V)
1R0	1.0	B, C.	10000	7R5	7.5	B, C, D.	10000	820	82	F, G, J, K, M.	10000	911	910	F, G, J, K, M.	3000
1R1	1.1			8R2	8.2			910	91			102	1000		
1R2	1.2			9R1	9.1			101	100		7200	122	1200		
1R3	1.3			100	10	F, G, J, K, M.		111	110			152	1500		2500
1R4	1.4	B, C, D.		110	11			121	120			182	1800		2000
1R5	1.5			120	12			131	130			202	2000		
1R6	1.6			130	13			151	150			222	2200		1500
1R7	1.7			150	15			161	160			242	2400		1000
1R8	1.8			160	16			181	180			272	2700		
1R9	1.9			180	18			201	200		3600	302	3000		
2R0	2.0			200	20			221	220			332	3300		
2R1	2.1			220	22			241	240			392	3900		500
2R2	2.2			240	24			271	270			472	4700		
2R4	2.4			270	27			301	300						
2R7	2.7			300	30			331	330						
3R0	3			330	33			361	360						
3R3	3.3			360	36			391	390						
3R6	3.6			390	39			431	430						
3R9	3.9			430	43			471	470						
4R3	4.3			470	47			511	510						
4R7	4.7			510	51			561	560						
5R1	5.1			560	56			621	620						
5R6	5.6			620	62			681	680						
6R2	6.2			680	68			751	750		3000				
6R8	6.8			750	75			821	820						

5.9 7676 Specification tolerance table

HQ-7676 Specification tolerance table

Tolerance code	Tolerance value (pF)	Accuracy	Maximum DC operating voltage (V)	Tolerance code	Capacity value (pF)	Accuracy	Maximum DC operating voltage (V)	Tolerance code	Tolerance value (pF)	Accuracy	Maximum DC operating voltage (V)	Tolerance code	Tolerance value (pF)	Accuracy	Maximum DC operating voltage (V)
1R0	1.0	B, C.	10000	7R5	7.5	B, C, D.	10000	820	82	F, G, J, K, M.	10000	911	910	F, G, J, K, M.	3600
1R1	1.1			8R2	8.2			910	91			102	1000		
1R2	1.2			9R1	9.1			101	100			122	1200		
1R3	1.3			100	10	F, G, J, K, M.		111	110		8000	152	1500		
1R4	1.4	B, C, D.		110	11			121	120			182	1800		3000
1R5	1.5			120	12			131	130			202	2000		
1R6	1.6			130	13			151	150			222	2200		
1R7	1.7			150	15			161	160			272	2700		
1R8	1.8			160	16			181	180			332	3300		2000
1R9	1.9			180	18			201	200			392	3900		
2R0	2.0			200	20			221	220		3600	472	4700		
2R1	2.1			220	22			241	240			562	5600		1000
2R2	2.2			240	24			271	270			682	6800		
2R4	2.4			270	27			301	300			752	7500		
2R7	2.7			300	30			331	330			822	8200		
3R0	3			330	33			361	360						
3R3	3.3			360	36			391	390						
3R6	3.6			390	39			431	430						
3R9	3.9			430	43			471	470						
4R3	4.3			470	47			511	510						
4R7	4.7			510	51			561	560						
5R1	5.1			560	56			621	620						
5R6	5.6			620	62			681	680						
6R2	6.2			680	68			751	750						
6R8	6.8			750	75			821	820						

CW

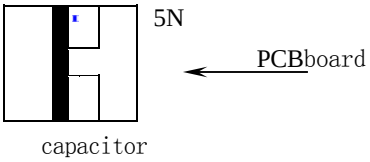
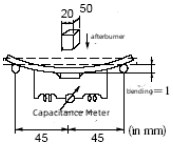
6. Technical requirements and test conditions

6.1 General technical specifications and test methods

<table>
<tr><td>Project</td><td>Technical specifications</td><td colspan="4">Test method</td></tr>
<tr><td>Operating temperature range</td><td>(-55 ~ +125)℃</td><td colspan="4"></td></tr>
<tr><td>Appearance</td><td>No obvious defects</td><td colspan="4">Visual inspection</td></tr>
<tr><td rowspan="3">Capacitance</td><td rowspan="3">Within the specification error margin</td><td>Nominal capacity</td><td>Test frequency</td><td>Test voltage</td><td>Environment</td></tr>
<tr><td>≤1000pF</td><td>1MHz(±10%)</td><td>(1.0±0.2)Vrms</td><td rowspan="2">Temperature (25±2) ℃
Humidity <75%</td></tr>
<tr><td>＞1000pF</td><td>1KHz(±10%)</td><td>(1.0±0.2)Vrms</td></tr>
<tr><td>（Q value）</td><td>Greater than 2000 at 1MHz</td><td colspan="4">Test method: same as "electrostatic capacity"</td></tr>
<tr><td rowspan="2">（I.R.）Insulation Resistance</td><td rowspan="2">≥100000MΩ</td><td>Test voltage</td><td>Test time</td><td>Charge and discharge current</td><td>Environment</td></tr>
<tr><td>Ur or 1000V, whichever is smaller</td><td>≤60 sec</td><td>≤50mA</td><td>Temperature (25±2) ℃
Humidity <75%</td></tr>
<tr><td rowspan="5">Dielectric Withstanding Voltage</td><td rowspan="5">There should be no dielectric breakdown or damage</td><td>Test voltage</td><td>Test voltage</td><td>Time</td><td>Charge and discharge current</td></tr>
<tr><td>UR<200V</td><td>2.5Ur</td><td rowspan="3">(1~5) sec</td><td rowspan="3">≤50mA</td></tr>
<tr><td>200V≤Ur≤1000V</td><td>1.5Ur</td></tr>
<tr><td>Ur＞1000V</td><td>1.2Ur</td></tr>
<tr><td rowspan="6">Capacitance temperature coefficient or temperature characteristic</td><td rowspan="6">C0G: (0±30) ppm/℃</td><td colspan="4">In the following temperature order, the temperature is stable for 30 minutes after measurement (△C is subject to T3).</td></tr>
<tr><td>Steps</td><td colspan="3">Temperature (℃)</td></tr>
<tr><td>T1</td><td colspan="3">20±2</td></tr>
<tr><td>T2</td><td colspan="3">-55±3</td></tr>
<tr><td>T3</td><td colspan="3">20±2</td></tr>
<tr><td>T4</td><td colspan="3">125±2</td></tr>
</table>

			T1	20±2
weldability	Exterior view	No visible damage, tinning rate ≥95%	Soak the capacitor in ethanol and rosin (25% by weight) solution, take it out and preheat (10~30)sec at (80~120)℃, then dip it in solder solution. Dipping temperature: (235±5) ℃; Leaching speed: (25±0.25)mm/sec Immersion time: (2±0.5)sec	
Note: In order to exclude the influence of external environment when testing the dielectric resistance strength of the capacitor, when the test voltage exceeds 1000Vdc, the capacitor should be soaked in insulating oil for testing.				

6.2 Reliability index and periodic test method

<table>
<tr><th>Items</th><th colspan="2">Technical Specifications</th><th>Test method</th></tr>
<tr><td rowspan="4">Resistance to welding heat</td><td>Exterior view</td><td>No visible damage, tinningrate ≥95%</td><td rowspan="4">Soak the capacitor in ethanol and rosin (25% by weight) solution, take it out and preheat it at 100~200℃ for 10±2min, then immerse it in solder solution. Immersion temperature: 260±5℃; Leaching speed: 25±0.25mm/s
Immersion time: 10±1sec
After taking it out, clean it with solvent and observe it under the microscope of 10 times larger. After the test, 24±2hrs were placed in the room before measurement.</td></tr>
<tr><td>△C/C</td><td>≤±0.5% or ±0.5pF, whichever is greater</td></tr>
<tr><td>D.F.</td><td>Same as initial standard</td></tr>
<tr><td>I.R.</td><td>Same as initial standard</td></tr>
<tr><td>End electrode attachment strength</td><td colspan="2">The end electrode is not peeled off, no visible damage inappearance</td><td>Apply thrust: 5N
Time: 10±1sec
Speed：1±0.5mm/sec
 
</td></tr>
<tr><td rowspan="2">Bending strength</td><td>External view</td><td>No visible damage</td><td rowspan="2">Test substrate:
PCB
Bend depth:
1mm
Pressure speed:
1±0.5mm/sec.
Measurements should be madein a bent state
 
</td></tr>
<tr><td>△C/C</td><td>≤±5%</td></tr>
<tr><td rowspan="3">Temperature cycle</td><td>External view</td><td>No visible damage</td><td colspan="2">Number of cycles :5, with a cycle divided into the following 4 steps:</td></tr>
<tr><td>△C/C</td><td>≤±1% or ±1pF is the greater of the two</td><td colspan="2" rowspan="2"><table><tr><th>Stage</th><th>temperature℃</th><th>Time (minutes)</th></tr><tr><td>Step 1</td><td>-55±3</td><td>30</td></tr><tr><td>Step 2</td><td>20±3</td><td>3</td></tr><tr><td>Step 3</td><td>125±3</td><td>30</td></tr></table></td></tr>
<tr><td>D.F.</td><td>Same as initial standard</td></tr>
</table>

	I.R.	Same as initial standard	Step 4	20±3	3
			After the test, the measurement was carried out after 24±2hrs at room temperature.		
Steady-state moisture test	Outside view	No visible damage	Temperature: 40±2 ℃ Humidity: 90～95%RH Time: 500+24/-0hours After the test, it was placed at room temperature for 24±2hrs before measurement.		
	△C/C	≤±2% or ±1pF is the greater of the two			
	D.F.	Same as initial standard			
	I.R.	Ri≥2500MΩ or Ri*C_R＞25S Take the smaller of thetwo			
Life test	External view	No visible damage	Rated voltage	Applied voltage	Time
			Ur ≤200V	2Ur	1000h
	△C/C	≤±2% or ±1pF is the greater of the two	200V＜Ur ≤500V	1.5Ur	1500h
			500V＜Ur ≤1000V	1.2Ur	2000h
	D.F.	≤2 times the initial standard	Ur ＞1000V	Ur	2000h
			Charge and discharge current: ≤50mA Temperature: (125±3)C After the test, place at room temperature for 24±2hrs before measurement.		
	I.R.	Ri≥4000MΩ or Ri*CR>40S Take the smaller of thetwo			

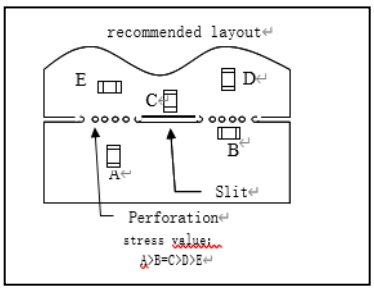
7. Precautions for use

1. Precautions before use:

MLCC chips may be destroyed under the harsh working environment or external mechanical overpressure beyond the conditions of use described in the relevant instructions of this acknowledgement, so when using, first consider applying according to the relevant instructions of this acknowledgement.

2. The design of the PCB board

2.1 The amount of solder used affects the chip's resistance to mechanical stress, which can lead to RF-MLCC breakage or cracking. Therefore, when designing the substrate, the size and configuration of the pads must be carefully considered, which determine the amount of solder that makes up the substrate.



2.2 When designing the location of pads and SMD MLCCs, consideration should be given to minimizing stress and installing MLCCs in the least affected position on the PC board.

3. Issues that should be considered in automatic installation

If the pick-up tube is lowered beyond the minimum limit, excessive pressure is placed on the MLCC, causing the MLCC to rupture. When lowering the pick-up tube, pay attention to the following points:

3.1 After correcting the deviation of the PC board, the low limit of the pick-up tube should be adjusted to the surface level position of the PC board.

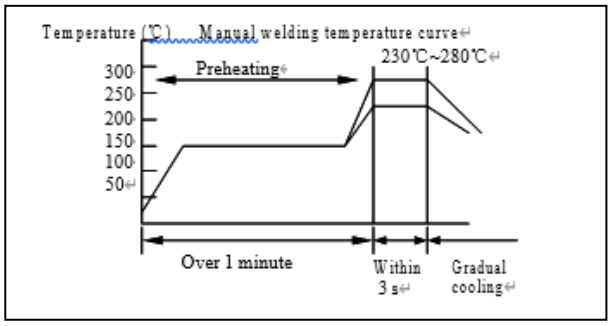
3.2 The suction pressure should be adjusted to between 1 and 3N.

3.3 In order to reduce the degree of deformation of the PC board caused by the impact force of the pick-up tube, the support nail should be placed under the PC board.

4. Welding

4.1 MLCC is a combination of ceramic and metal.

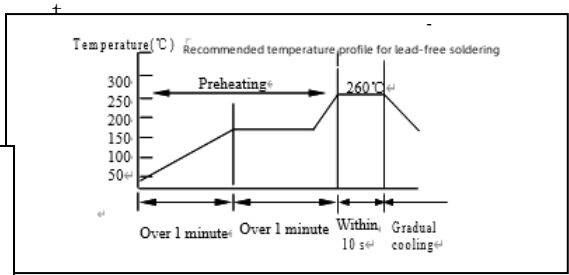
As a ceramic body, especially a large-scale ceramic body, Its thermoplastic property is poor, the response to heat is relatively slow, and the ceramic body is easy to crack when subjected to quenching and heat. It is recommended to perform continuous preheating for more than 1 minute before welding.



4.2

4.3 When soldering by hand, the maximum diameter of the spire using a constant temperature soldering iron is 1.0mm

a n d



Inside the MLCC are metal electrodes, which are thermoplastic and respond quickly to heat. Therefore, in the case of heating, the metal part and the ceramic part must have a certain degree of inconsistency in expansion, resulting in internal stress, which is easy to cause cracking of the porcelain. It is recommended to perform continuous preheating for more than 1 minute before welding.

maximum power is 25 watts; The soldering iron must not touch the MLCC component directly.

4.4 It is recommended to avoid the use of wave soldering for specifications above 1206.

5. Cleaning

5.1 The temperature difference between the element and the cleaning process should not be greater than 100C.

5.2 In the case of ultrasonic cleaning, the output power is too large and will make the PC board subject to excessive vibration.This can lead to cracking of MLCCs or solder joints, or reduce the strength of the termination. Therefore, pay special attention to the following points:Ultrasonic output: less than 20W/L; Ultrasonic frequency: less than 40KHz; Ultrasonic cleaning time: 5 minutes or less

6. Cut PCB board

6.1 After installing the MLCC and other components, be careful not to apply any force to the PC board when dividing the board. MLCCs cannot be subjected to excessive mechanical shock.

6.2 Segmentation of boards cannot be divided by hand, appropriate equipment should be used.

7. Storage method

In order to maintain the solderability of the terminal electrode and ensure that the packaging material is in good condition, the recommended storage conditions are as follows: Storage temperature: 5-40° C; Storage relative humidity: 20-70%RH

Even when stored under ideal storage conditions, MLCC end solderability decreases over time, so MLCC should be used within 6 months from the date of shipment

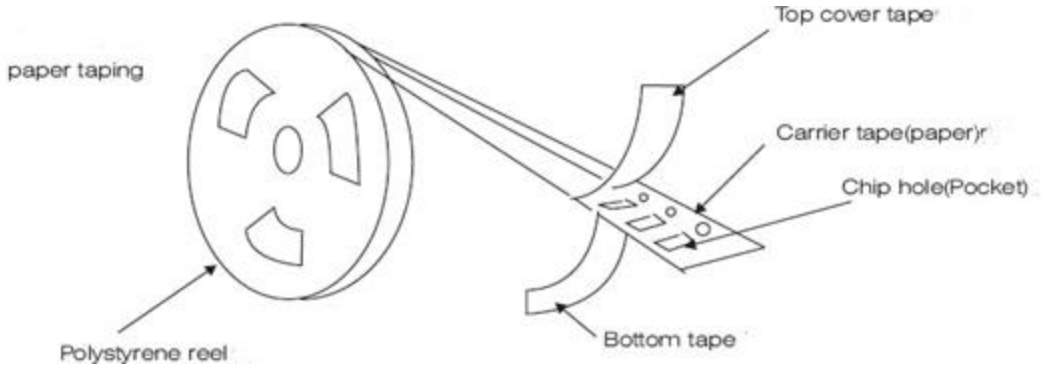
8. Product Packaging

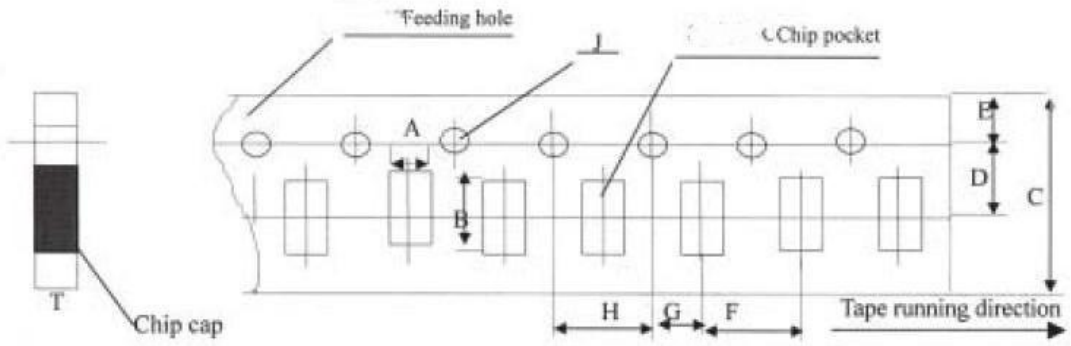
8.1 Bag-type bulk

Specification	quantity	Remarks
0402	10000	Packaging form and quantity can be determined according to customer requirements
0603	5000	
0805	5000	
0505	5000	
1111	2000	

8.2 Paper tape wrap

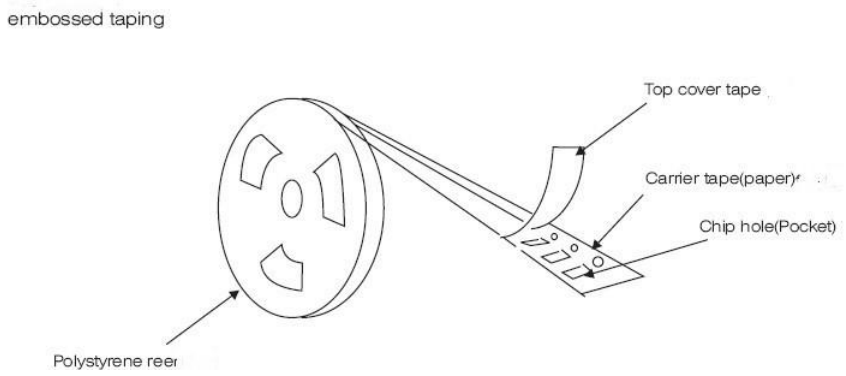
8.2.1 Paper tape reel construction

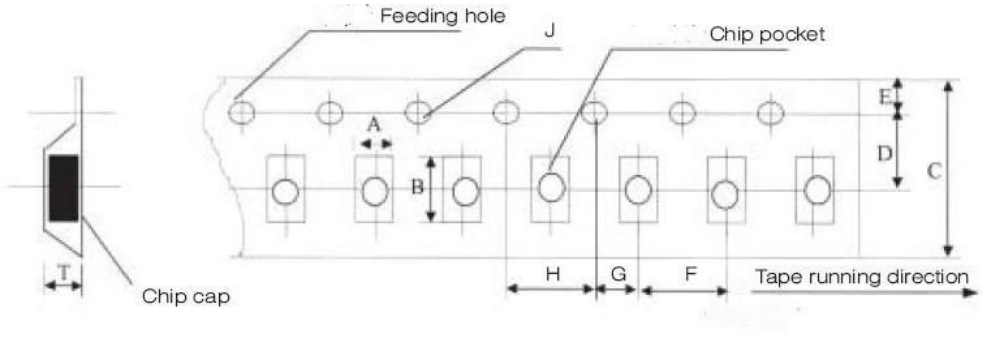




8.3 Plastic tape wrapping

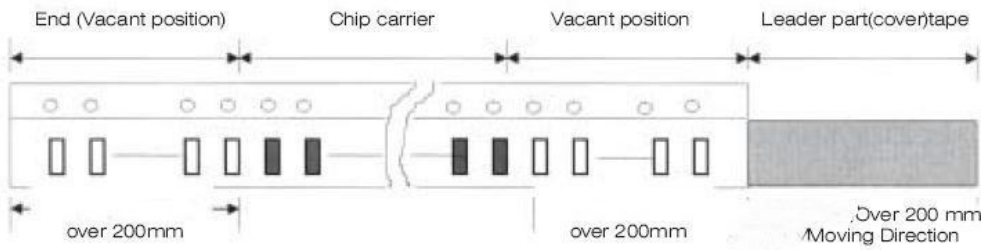
8.3.1 Plastic tape reel structure





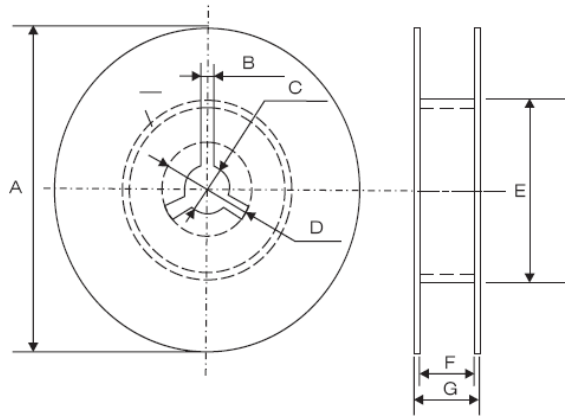
8.4 Front and rear structure of the conveyor belt

Structure of leader part and end part of the carrier paper



8.5 Reel size

Reel Dimensions (unit:mm)



A	B	C	D	E	F	G
Φ178.00±2.00	3.00	Φ13.00±0.50	Φ21.00±0.80	Φ50.00 or larger	10.00±1.50	12Max
Φ330.00±2.00	3.00	Φ13.00±0.50	Φ21.00±0.80	Φ50.00 or larger	10.00±1.50	12Max

8.6 Braid method

8.6.1 The braiding of packing capacitors is wound clockwise, and the transfer hole is on the right side of the braiding when the braiding is pulled out from the top down direction.

8.6.2 At the front end of the braiding, leave at least 5 spaced lead-out strips.

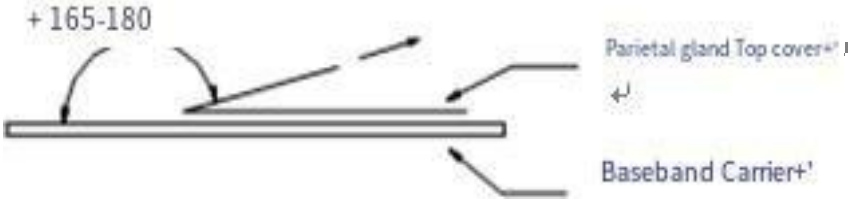
8.6.3 When braid, you must leave the lead or blank parts as shown in the image below.

8.6.4 The number of misinstalled products in the installation of tape must be less than 0.1% of the indicated number or limit to 1, discontinuous errors occur.

8.6.5 Upper and lower tape shall not extend beyond the edge of the tape braid and shall not block the transfer hole.

8.6.6 The cumulative error of the transfer hole is 10 spacing: within ±0.3mm.

8.6.7 The peeling moment of the upper tape should be within 0.1 to 0.7 Newtons, and its direction is shown below.



9. The test result of prohibited substances in the product is About RoHS

All products meet the requirements of RoHS directive:

- Lead(pb) (＜1000ppm)
- Mercury (Hg) (＜1000ppm)
- Cadmium(cd) (＜100ppm)
- Hexavalent Chromium Content(Cr6+) (＜1000ppm)
- Polybrominated Biphenyls(PBBs) (＜1000ppm)
- Polybrominated diphenyl ethers(PBDE) (＜1000ppm)

Mark the "RoHS" mark or the "GP" mark on the product label if necessary