

1. Capacitor characteristics and applications

1.1 Features

- The size specifications are serialized, suitable for surface mount components of hybrid integrated circuits or printed circuits;
- High Q value, Low ESR, High reliability;
- Low loss, High capacitance stability, and high operating frequency;
- Applicable to high-frequency circuits in various types of equipment, VHF-In microwave section, radio frequency and amplification circuits.

1.2 Key performance indicators

- Temperature coefficient: C0G ($0 \pm 30 \text{ ppm}/^\circ\text{C}$)
- Capacitance drift: no more than $\pm 0.2\%$ or $\pm 0.05 \text{ pF}$, whichever is larger
- Quality factor (Qvalue) at the frequency 1MHz/1KHz: greater than 2,000
- Insulation resistance at $+20^\circ\text{C}$: $\geq 100000 \text{ M}\Omega$
- Operating temperature: $-55^\circ\text{C} \sim +125^\circ\text{C}$



2. Product model naming

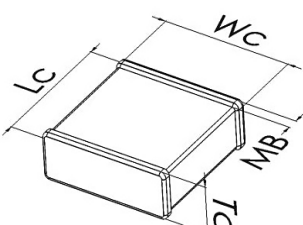
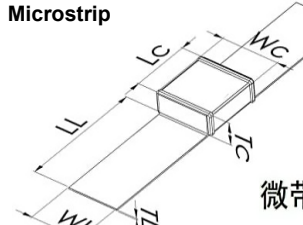
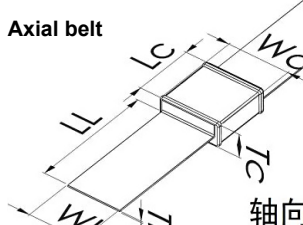
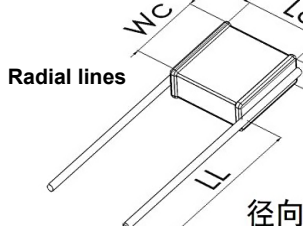
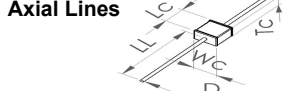
2.1 Farohm partnumber

<u>FSQ-</u>	<u>4R7</u>	<u>C0G</u>	<u>2525</u>	<u>D</u>	<u>250</u>	<u>AW</u>	<u>C</u>
Product series	Nominal Capacitance (unit: pF)	Dielectric Type	Size code	Accuracy level	Rated voltage	Terminal Type	Packaging
FSQ: RF High Q capacitance	The first two digits indicate the nominal value of the capacity in pF, and the third digit indicates the power of 10 this number should be multiplied by.	C0G: $\pm 30 \text{ ppm}/^\circ\text{C}$	0402 2525 0603 3838 0805 6243 0505 7676 1111	A: $\pm 0.05 \text{ pF}$ B: $\pm 0.10 \text{ pF}$ C: $\pm 0.25 \text{ pF}$ D: $\pm 0.50 \text{ pF}$ F: $\pm 1.0\%$ G: $\pm 2.0\%$ J: $\pm 5.0\%$	The first two digits indicate the nominal value of the voltage in volts, and the third digit indicates the power of 10 this number should be multiplied by.	N: Lead-out terminal: Silver-nickel-tin; Z: Lead-out terminal: Silver-nickel-tin-lead; M: Microstrip; A: Axial belt; RW: Radial Lines; RN: Non-magnetic Radial Lines; AW: Axial Lines	T: Taping packaging; C: grid boxed; B/Vacancy: Bulk Packaging

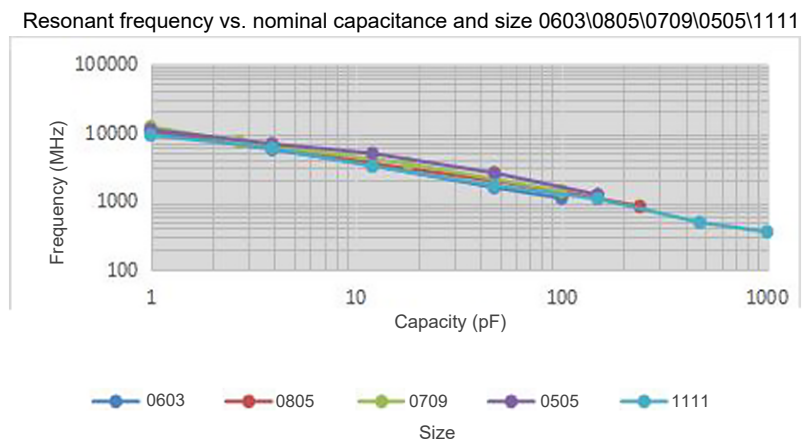
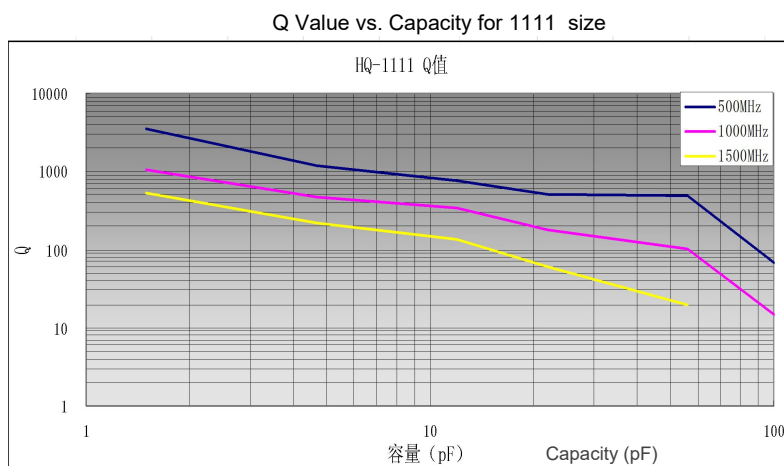
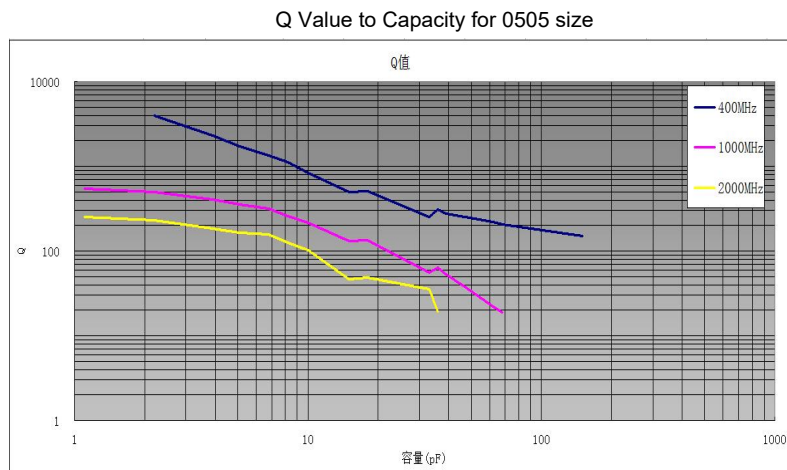
2.2 Farohm product series and ATC Product Series analogs

Size of FSQ-Series Farohm capasitor	correspond ATC Series	correspond Dalicap Series
0402	ATC600L	DLC75H
0603	ATC600S	DLC75P
0805	ATC600F	DLC75D
0505	ATC100A / ATC700A / ATC800A	DLC75A
1111	ATC100B / ATC800B	DLC75B
2525	ATC100C	
3838	ATC100E	
7676	ATC100H	
0709	ATC800R	DLC75R

3. Product size

Terminal Type	Size code	Capacitor size (mm)			Lead terminal size (mm)			
		Lc	W	Tc max	MB	LL min	WL	TL
Lead-out terminal 	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	0.30±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  微带	1111	3.50±0.38	2.79±0.25	2.54	—	6.35	2.36±0.13	0.20±0.05
	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
Axial belt  轴向带	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
Radial lines  径向线	1111	3.90±0.51	2.79±0.38	2.59		12.70	Lead wire diameter 0.40±0.05	
	2525	5.84 -0.25~+1.91	6.35±0.38	3.68		25.40	Lead wire 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				
Axial Lines  轴向线	2525	6.35±0.64	6.35±0.38	3.68		25.40	Lead wire diameter 0.80±0.05	
	3838 (M thickness)	9.65 -0.25~+2.16	9.65±0.25	4.50				

4. Characteristic curve



Note: The above charts are obtained using Agilent4287A and N5222A.
The test results are for reference only and cannot represent factory inspection.

5. Capacity range

5.1 0402 Specifications Capacitance Table

0402 Specifications Capacitance Table

Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)		
0R1	0.1	A, B, C.	250	2R1	2.1	B, C, D.	250	130	13		200		
0R2	0.2			2R2	2.2			150	15				
0R3	0.3			2R4	2.4			160	16			F, G, J.	50
0R4	0.4			2R7	2.7			180	18				
0R5	0.5	3R0		3	200			20					
0R6	0.6	3R3		3.3	220			22					
0R7	0.7	3R6		3.6	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									

5.2 0603 Specifications Capacitance Table

0603 Specifications Capacitance Table

Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	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	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	A, B, C, D.		100	10	F, G, J, K, M.		150			
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						

5.3 0505 Specifications Capacitance Table

0505 Specifications Capacitance Table

Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	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	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			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 Specifications Capacitance Table

0805 Specifications Capacitance Table

Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	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	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			
1R8	1.8			160	16	181		180			
1R9	1.9			180	18	201		200			
2R0	2			200	20	221		220			
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							
											150
											100

5.5 1111 Specifications Capacitance Table

1111 Specifications Capacitance Table

Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)
0R1	0.1	A, B, C.	1500	3R3	3.3		1500	360	36		1000	391	390		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	4R7		4.7	510	51		561	560	F, G, J, K.					
0R6	0.6	5R1		5.1	560	56		621	620						
0R7	0.7	5R6		5.6	620	62		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	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									
1R8	1.8	160		16	181	180									
1R9	1.9	180		18	201	200									
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	1000	331	330	500							
3R0	3	330		33		361	360								

5.6 2525 Specifications Capacitance Table

2525 Specifications Capacitance Table

Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	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	111		110	122			1200					
1R4	1.4	B, C, D.		110	11	F, G, J, K, M.		121	120			152	1500		500		
1R5	1.5			120	12			131	130			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		2500	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								
3R3	3.3			360	36			391	390			1500					
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 Specifications Capacitance Table

3838 Specifications Capacitance Table

Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	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		
1R3	1.3			100	10			111	110			122	1200		
1R4	1.4	B, C, D.	7200	110	11	F, G, J, K, M.	7200	121	120	F, G, J, K, M.	5000	152	1500	F, G, J, K, M.	500
1R5	1.5			120	12			131	130			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			242	2400		
1R9	1.9			180	18			201	200			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		3600	362	3600		
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		250
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		1500				
5R6	5.6			620	62			681	680						
6R2	6.2			680	68			751	750						
6R8	6.8			750	75			821	820						

5.8 6243 Specifications Capacitance Table

6243 Specifications Capacitance Table

Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)
1R0	1.0	B, C.		7R5	7.5	B, C, D.		820	82		10000	911	910		3000
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			111	110			152	1500		
1R4	1.4	B, C, D.	10000	110	11	F, G, J, K, M.	10000	121	120	F, G, J, K, M.	7200	182	1800	F, G, J, K, M.	2000
1R5	1.5			120	12			131	130			202	2000		1500
1R6	1.6			130	13			151	150			222	2200		1000
1R7	1.7			150	15			161	160			242	2400		
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		3000				
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						

5.9 7676 Specifications Capacitance Table

7676 Specifications Capacitance Table

Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)	Capacity Code	Capacity (pF)	Accuracy level	Maximum DC Operating voltage (V)
1R0	1.0	B, C.		7R5	7.5	B, C, D.		820	82			911	910		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			111	110			152	1500		
1R4	1.4	B, C, D.	10000	110	11	F, G, J, K, M.	10000	121	120	F, G, J, K, M.		182	1800	F, G, J, K, M.	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	F, G, J, K, M.	2000
1R9	1.9			180	18			201	200			392	3900		
2R0	2.0			200	20			221	220			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		3600				
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						

5.10 Design Tool Boxes for FSQ-series capacitors

Size	Sample box model	Capacity range (pF)	Capacitance (pF)	kinds	Accuracy
0402	FHQ-0402-DK01	0.1 ~ 2.1	0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 2.0, 2.1	21	±0.1pF
	FHQ-0402-DK02	2.2 ~ 15	2.2,2.4,2.7,3.0,	21	±0.1pF
			3.3,3.6,3.9,4.3,4.7,5.1,5.6,6.2,6.8,7.5,8.2,9.1,		±0.25pF
			10,11,12,13,15		±5%
0603	FHQ-0603-DK01	0.1 ~ 3.0	0.1,0.2,0.3,0.4,0.5,0.6,0.7,0.8,0.9,1.0, 1.1,1.2,1.5,1.6,1.8,2.0,	21	±0.1pF
			2.0,2.2,2.4,2.7,3.0		±0.25pF
	FHQ-0603-DK02	3.0 ~ 68	3.0,3.3,3.9,4.7,5.6,6.8,8.2,	21	±0.25pF
			10,12,15,18,20,22,24,27,30,33,39,47,56,68		±5%
	FHQ-0603-DK03	0.1 ~ 2.0	0.1,0.2,0.3,0.4,0.5,0.6,0.7,0.8,0.9,1.0, 1.1,1.2,1.3,1.4,1.5,1.6,1.7,1.8,1.9,2.0	20	±0.1pF
	FHQ-0603-DK04	2.0 ~ 10	2.0,2.1,2.2,2.4,2.7,3.0,	19	±0.1pF
			3.3,3.6,3.9,4.3,4.7,5.1,5.6,6.2,6.8,7.5,8.2,9.1,		±0.25pF
			10		±5%
	FHQ-0603-DK05	10 ~ 68	10,11,12,13,15,16,18,20,22,24, 27,30,33,36,39,43,47,51,56,62,68	21	±5%
0805	FHQ-0805-DK01	0.1 ~ 2.0	0.1,0.2,0.3,0.5,0.7,0.8,0.9,1.0, 1.3,1.5,1.7,1.9,2.0,	13	±0.1pF
	FHQ-0805-DK02	2.0 ~ 10	2.0,2.2,2.4,2.7,3.0,3.3,3.9,4.7,5.6,6.8,8.2,	12	±0.25pF
			10		±5%
	FHQ-0805-DK03	10 ~ 68	10,13,15,18,20,22,27,30,39,47,56,68	12	±5%
	FHQ-0805-DK04	0.1 ~ 2.0	0.1,0.2,0.3,0.4,0.5,0.6,0.7,0.8,0.9,1.0, 1.1,1.2,1.3,1.4,1.5,1.6,1.7,1.8,1.9,2.0	20	±0.1pF
	FHQ-0805-DK05	2.0 ~ 10	2.0,2.1,2.2,2.4,2.7,3.0,	19	±0.1pF
			3.3,3.6,3.9,4.3,4.7,5.1,5.6,6.2,6.8,7.5,8.2,9.1,		±0.25pF
			10		±5%
	FHQ-0805-DK06	10 ~ 68	10,11,12,13,15,16,18,20,22,24, 27,30,33,36,39,43,47,51,56,62,68	21	±5%
	FHQ-0805-DK07	68 ~ 240	68,75,82,91,100,110,120,130,150,160,180, 200,220,240	14	±5%

Note: Each tool box contains 10 capacitors of each value, the quality level is industrial grade, the lead end is silver-nickel-tin, and it complies with RoHS requirements.

5.10 Design Tool Boxes for FSQ-series capacitors

Size	Sample box model	Capacity range (pF)	Capacitance (pF)	kinds	Accuracy
0505	FHQ-0505-DK01	0.1 ~ 3.0	0.1,0.2,0.3,0.4,0.5,0.6,0.7,0.8,0.9,1.0, 1.1,1.2,1.5,1.6,1.8,2.0,	21	±0.1pF
			2.0,2.2,2.4,2.7,3.0		±0.25pF
	FHQ-0505-DK02	3.0 ~ 68	3.0,3.3,3.9,4.7,5.6,6.8,8.2,	21	±0.25pF
			10,12,15,18,20,22,24,27,30,33,39,47,56,68		±5%
	FHQ-0505-DK03	68 ~ 220	68,82,100,120,150,180,200,220	8	±5%
	FHQ-0505-DK04	0.1 ~ 2.0	0.1,0.2,0.3,0.4,0.5,0.6,0.7,0.8,0.9,1.0, 1.1,1.2,1.3,1.4,1.5,1.6,1.7,1.8,1.9,2.0	20	±0.1pF
	FHQ-0505-DK05	2.0 ~ 10	2.0,2.1,2.2,2.4,2.7,3.0,	19	±0.1pF
			3.3,3.6,3.9,4.3,4.7,5.1,5.6,6.2,6.8,7.5,8.2,9.1,		±0.25pF
			10		±5%
	FHQ-0505-DK06	10 ~ 68	10,11,12,13,15,16,18,20,22,24, 27,30,33,36,39,43,47,51,56,62,68	21	±5%
	FHQ-0505-DK07	68 ~ 240	68,75,82,91,100,110,120,130,150,160,180, 200,220	13	±5%
1111	FHQ-1111-DK01	1.0 ~ 10	1.0,1.2,1.5,1.8,2.0,2.2,2.4,2.7,	16	±0.1pF
			3.0,3.3,3.9,4.7,5.6,6.8,8.2,		±0.25pF
			10		±5%
	FHQ-1111-DK02	10 ~ 100	10,12,15,18,20,22,24,27, 30,33,39,47,56,68,82,100	16	±5%
	FHQ-1111-DK03	100~1000	100,120,150,180,200,220,240,270, 300,330,390, 470,560,680,820,1000	16	±5%
	FHQ-1111-DK04	0.1 ~ 2.0	0.1,0.2,0.3,0.4,0.5,0.6,0.7,0.8,0.9,1.0, 1.1,1.2,1.3,1.4,1.5,1.6,1.7,1.8,1.9,2.0	20	±0.1pF
	FHQ-1111-DK05	2.0 ~ 10	2.0,2.1,2.2,2.4,2.7,3.0,	19	±0.1pF
			3.3,3.6,3.9,4.3,4.7,5.1,5.6,6.2,6.8,7.5,8.2,9.1,		±0.25pF
			10		±5%
	FHQ-1111-DK06	10 ~ 68	10,11,12,13,15,16,18,20,22,24, 27,30,33,36,39,43,47,51,56,62,68	21	±5%
	FHQ-1111-DK07	68 ~ 470	68,75,82,91,100,110,120,130,150,160,180, 200,220,240,270, 300,330,360,390,430,470	21	±5%
	FHQ-1111-DK08	470~1000	470,510,560,620,680,750,820,910,1000	9	±5%

Note: Each tool box contains 10 capacitors of each value, the quality level is industrial grade, the lead end is silver-nickel-tin, and it complies with RoHS requirements.

6. Technical requirements and test conditions

6.1 General Specifications

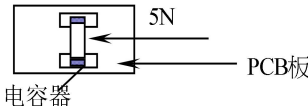
General Specifications:GB/T 21041-2007Fixed capacitors for electronic equipmenttwenty onePartial specification for surface mounting 1 Type 2 Multilayer Ceramic Dielectric Fixed Capacitors.

6.2 Conventional technical indicators and test methods

project	Technical specifications		Test Method			
Operating temperature range	(-55 ~ +125)°C					
Appearance	No obvious defects		Visual inspection			
Electrostatic Capacitance Capacitance	Within specification error		Nominal capacity	Test frequency	Test voltage	environment
			≤1000pF	1MHz(±10%)	(1.0±0.2)Vrms	temperature +25±2°C Humidity<75%
			>1000pF	1KHz(±10%)	(1.0±0.2)Vrms	
Quality factor (Qvalue)	The frequency is1MHzWhen greater than2000		Test method: Same as "static capacity"			
Loss tangent (DF)	The frequency is1MHzWhen less than 0.0005					
Insulation resistance (IR) Insulation Resistance	≥100000MΩ		Test voltage	Testing time	Charge and discharge current	environment
			U _r or1000V, Take the smaller value of the two	≤60 sec	≤50mA	temperature(25±2)°C Humidity<75%
Dielectric strength (DWV) Dielectric Withstanding Voltage	No dielectric should be broken down or damaged.		Rated voltage	Test voltage	time	Charge and discharge current
			U _r <200V	2.5U _r	(1~5) sec	≤50mA
			200V≤U _r ≤1000V	1.5U _r		
			U _r >1000V	1.2U _r		
Capacity temperature coefficient or temperature characteristics	COG: (0±30) ppm/°C		In the following temperature sequence, the temperature is stable30minAfter determination (△CbyT3(			
			step	Temperature (°C)		
			T1	+20±2		
			T2	- 55±3		
			T3	+20±2		
			T4	+125±2		
			T1	+20±2		
Solderability	Appearance	No visible damage, Tinning rate ≥95%	Immerse the capacitor in ethanol and rosin (about25%Weight) solution, take out (80~120)Preheat at °C10~30)sec, and then immerse in solder solution. Tinning temperature: (235±5)°C; Tinning speed: (25±0.25)mm/sec Tinning time: (2±0.5)sec			

Note: When testing the dielectric strength of capacitors, in order to eliminate the influence of external environment, when the test voltage exceeds 1000Vdc When testing, the capacitor should be immersed in insulating oil.

6.3 Reliability Indicators and Periodic Test Methods

project	Technical specifications		Test Method			
Resistant to welding heat	Appearance	No visible damage, tinning rate ≥95%	Immerse the capacitor in ethanol and rosin (about 10%25%weight) solution, take out 100~200Preheat at °C10±2min, and then immerse in solder solution. Tinning temperature:260±5°C; Tinning speed:25±0.25mm/s Tinning time: 10±1sec After taking it out, clean it with solvent.10Observe under a microscope at a magnification of 1000 or more. Place indoors after the test24±2hrsMeasure again later.			
	△C/C	≤±0.5%or±0.5pF, whichever is greater				
	DF	Same as initial standard				
	IR	Same as initial standard				
Terminal electrode adhesion strength	The terminal electrode is not peeled off and there is no visible damage on the appearance		Apply thrust:5N time:10±1sec speed:1±0.5mm/sec			
Bending strength	Appearance	No visible damage	Test substrate:PCB Bending Depth:1mm Pressure speed:1±0.5mm/sec. The measurement should be performed in the bent state.			
	△C/C	≤±5%				
Temperature Cycle	Appearance	No visible damage	Number of cycles:5One cycle is divided into the following4step:			
	△C/C	≤±1%or±1pF Take the larger of the two	stage	Temperature °C	Time (minutes)	
			No.1step	- 55±3	30	
			No.2step	20±3	3	
			No.3step	125±3	30	
	IR	Same as initial standard	No.4step	20±3	3	
After the test, place at room temperature24±2hrsMeasure again later.						
Steady-state humidity test	Appearance	No visible damage	temperature:40±2°C humidity:90~95%RH time:500+24/-0Hour After the test, place at room temperature24±2hrsMeasure again later.			
	△C/C	≤±2%or±1pF Take the larger of the two				
	DF	Same as initial standard				
	IR	Ri≥2500MΩorRi*CR>25S Take the smaller of the two				
Life test	Appearance	No visible damage	Rated voltage		Applied voltage	time
			Ur≤200V		2U	1000h
	△C/C	≤±2%or±1pF Take the larger of the two	200V<Ur≤500V		1.5Ur	1500h
			500V<Ur≤1000V		1.2Ur	2000h
	DF	≤2Times the initial standard	Ur>1000V		Ur	2000h
IR	Ri≥4000MΩorRi*CR>40S Take the smaller of the two	Charge and discharge current: ≤50mA temperature:(125±3)°C After the test, place at room temperature24±2hrsMeasure again later.				

7. Precautions for use

1. Precautions before use:

MLCC chips may be damaged in harsh working environments or external mechanical overpressure that exceed the use conditions described in the relevant instructions of this accreditation. Therefore, when using them, first consider applying them according to the relevant instructions of this accreditation.

2. PCB board design

2.1 The amount of solder used will affect the chip's ability to resist mechanical stress, which may cause the RF-MLCC to break or crack. Therefore, when designing the substrate, the size and configuration of the pads must be carefully considered, which has a decisive effect on the amount of solder that makes up the substrate.

2.2 When designing the position of the pad and SMD MLCC, the stress should be minimized and the MLCC should be installed in the position on the PC board that is least affected.

3. Issues that should be considered for automatic installation

If the suction tube is lowered beyond the minimum limit, it will exert excessive pressure on the MLCC, causing the MLCC to rupture. When lowering the suction tube, pay attention to the following points:

3.1 After correcting the deviation of the PC board, the lower limit of the pickup tube should be adjusted to the horizontal position of the PC board surface.

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

3.3 In order to reduce the deformation of the PC board caused by the impact force of the suction tube, the support nails 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, The thermoplasticity is poor and the response to heat is slow. Ceramic bodies are susceptible to cracking when subjected to rapid cooling or heating. It is recommended to preheat continuously for more than 1 minute before welding.

4.2 The interior of MLCC is metal electrode.

Thermoplasticity is very good and it responds quickly to heat. When heated, the metal and ceramic parts will definitely In the case of a certain degree of expansion inconsistency, internal Internal stress can easily cause cracks in the porcelain body. It is recommended to Perform continuous preheating for more than 1 minute.

4.3 When soldering manually, use a constant temperature soldering iron with the tip of the soldering iron pointed straight

The maximum diameter is 1.0mm and the maximum power is 25 watts; the soldering iron cannot directly touch the MLCC components.

4.4 It is recommended to avoid using wave soldering for specifications above 1206.

4.5 The manual soldering temperature of tape/lead products should be lower than 350°C.

5. Cleaning

5.1 The temperature difference between the component and the cleaning process cannot be greater than 100°C.

5.2 When using ultrasonic cleaning, if the output power is too high, the PC board will be subjected to excessive vibration, which will cause the MLCC or welding point to crack, or reduce the terminal electrode strength. Therefore, special attention should be paid to the following points: Ultrasonic output: less than 20W/L; Ultrasonic frequency: less than 40KHz; Ultrasonic cleaning time: 5 minutes or less

6. Cutting PCB board

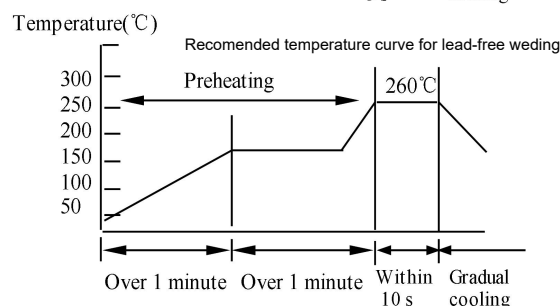
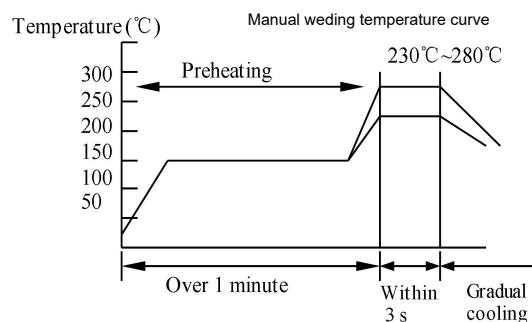
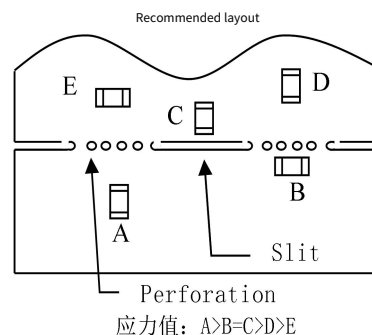
6.1 After installing MLCC and other components, be careful not to apply any force to the PC board when splitting the board. Do not let the MLCC be subjected to excessive mechanical shock.

6.2 The boards should not be cut manually, but with appropriate equipment.

7. Storage Method

To maintain the weldability of the terminal electrodes and ensure that the packaging materials are in good condition, the recommended storage conditions are as follows: Storage temperature: 5-40°C; Storage relative humidity: 20-70%RH

Even under ideal storage conditions, the solderability of MLCC terminals will deteriorate over time, so MLCCs should be used within 6 months from the date of shipment.



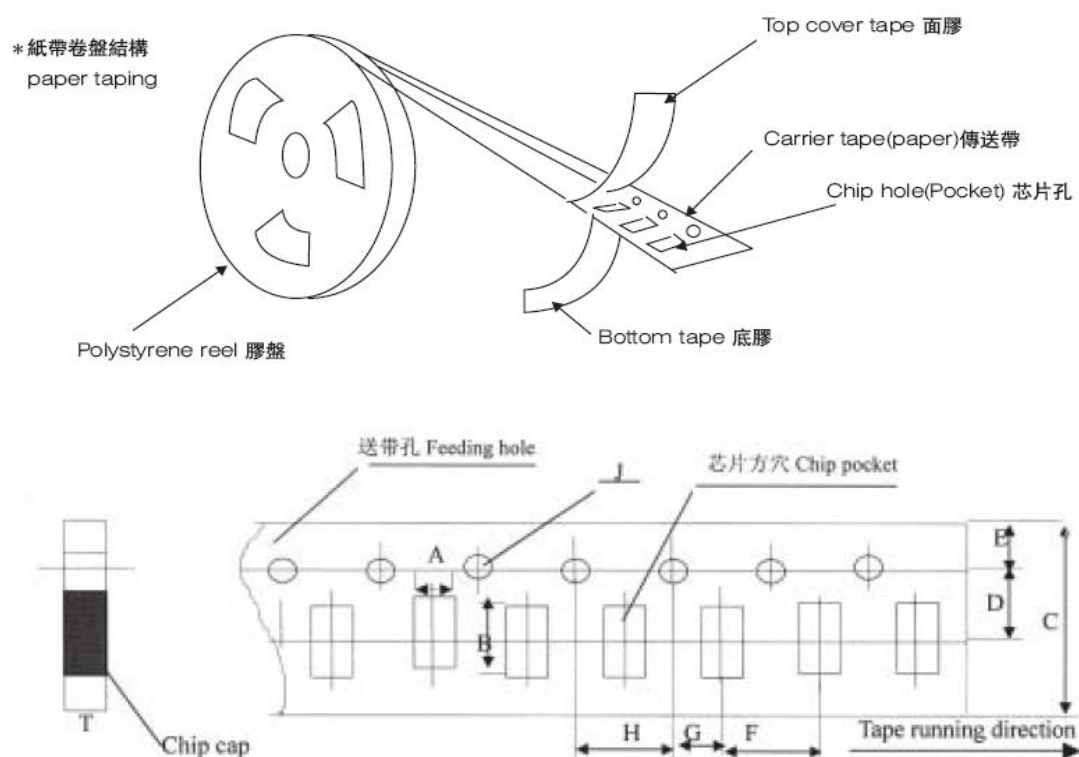
8. Product Packaging

8.1 Bag bulk

Specification	quantity	Remark
0402	10000	Packaging form and quantity can be based on According to customer's requirements
0603	5000	
0805	5000	
0505	5000	
1111	2000	

8.2 Paper tape packaging

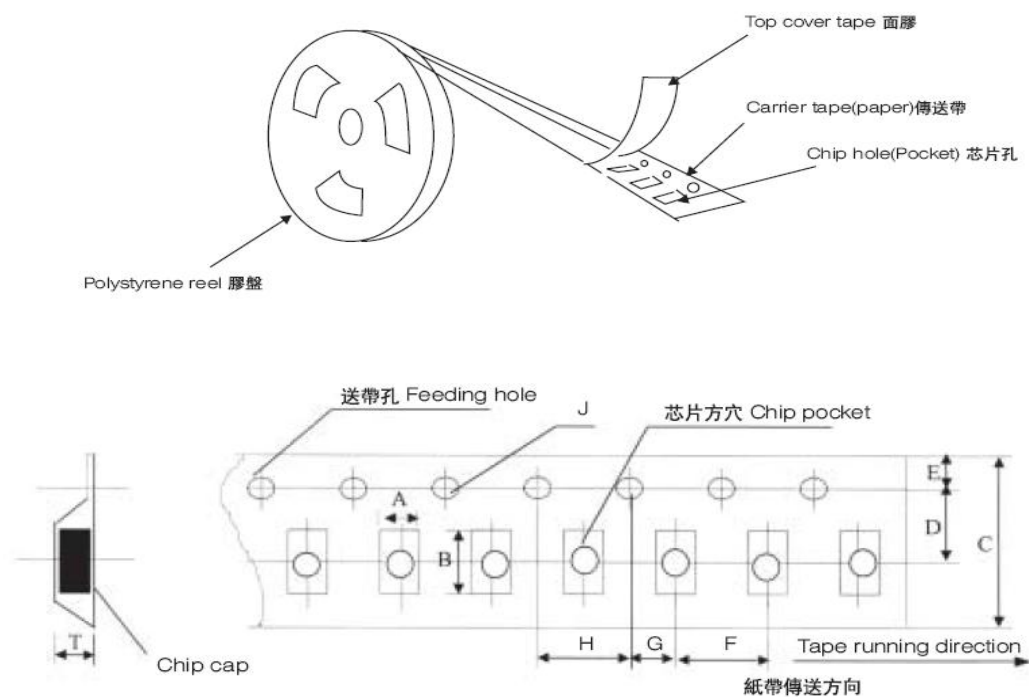
8.2.1 Paper tape reel structure



8.3 Plastic tape packaging

8.3.1 Plastic tape reel structure

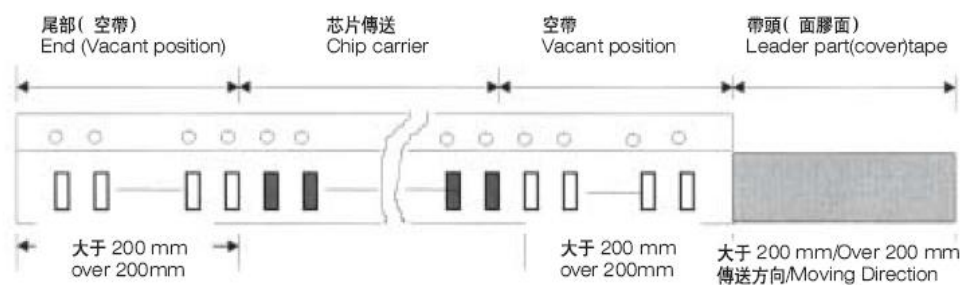
*塑膠卷盤結構
embossed tapping



8.4 Conveyor belt front and rear structure

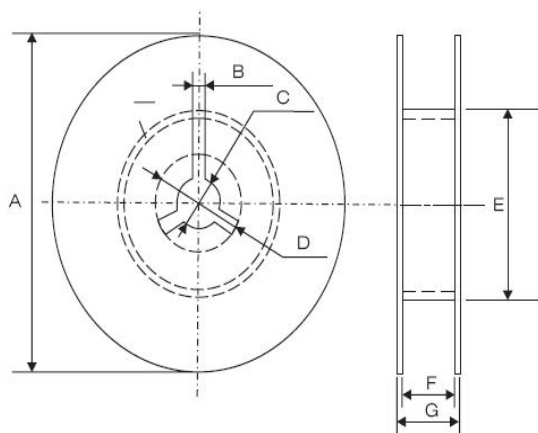
*傳送帶的前後結構

Structure of leader part and end part of the carrier paper



8.5 Reel size

*卷盘尺寸 Reel Dimensions (unit:mm)



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 greater	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 greater	10.00 ± 1.50	12Max

8.6 Taping method

8.6.1 The tape used to package the capacitor is wound clockwise. When the tape is pulled out from top to bottom, the transfer hole is on the right side of the tape.

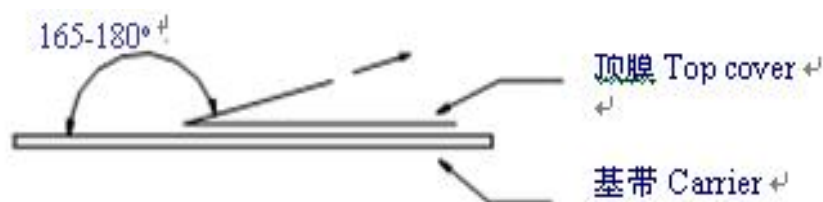
8.6.2 At the front end of the tape, leave at least 5mm. The lead-out strips are spaced apart.

8.6.3 When taping, you must leave a leader portion or blank portion as shown below.

8.6.4 The number of products mis-installed during the installation of the reel must be less than the indicated number per reel. 0.1% or 1. The limit is, no errors occur continuously. 8.6.5 The upper and lower tapes should not extend beyond the edge of the tape and should not block the transfer hole.

8.6.6 The cumulative error of the transmission hole is 10mm. Spacing: ± 0.3 mm. Within millimeters.

8.6.7 The peeling torque of the upper tape should be 0.1 to 0.7N. Within Newton, its direction is shown in the figure below.



9. Product banned substance test results About RoHS

All products comply with RoHS The directive requires:

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

If necessary, the product label may indicate "RoHS" flag or "GP" Logo

