

1 Features

- 1) Ultra-low ESR, ESL, high self-resonance frequency, ultra-high Q;
- 2) High frequency-selection characteristic;
- 3) No Capacitance shift with Tempearture variance.



2 Applications

Function: Bypass, Coupling, Tuning, Feedback, Impedance Matching and DC Blocking.
Circuits: MW/RF/Mid-frequency Amplifier, Frequency Mixer, Oscillator, low-noise Amplifier, Filter Network, Timing and Time Delay.
Terminal Applications: Broadcast Station, RF Plasma, Mobile Base Station, Mobile Phone, WIFI, IoT, Etc.

3 How to Order

MQ	30	0805	COG	2E	241	J	N	D	R
Type	Series	Case Size Code	TCC	Rated V.	Nominal Capacitance	Capacitance Tolerance	Termination Type	Thickness Code	Packaging
Table 1	Table2	Table3	Table4	Table5	Table6	Table7	Table8	Table9	Table10

Table 1 Product Type			Table2 Product Series						
MQ	High-Q MLCC		30	Ultra-low ESR, applicable to consumer electronics. Case sizes of 0402,0603,0805 available					

Table3 Case Size Code(mm)								
Drawing	Case Size Code	0402	0603	0805	0505	1111	0709	
	L	1.00 ± 0.15	1.60 ± 0.15	2.00 ± 0.20	1.40 ± 0.64	2.79 ^{+0.89} _{-0.51}	1.78 ± 0.38	
	W	0.50 ± 0.10	0.90 ± 0.15	1.25 ± 0.20	1.40 ± 0.38	2.79 ± 0.51	2.13 ± 0.25	
	Tmin	/	/	/	0.51	0.76	/	
	Tmax	0.55	0.90	1.30	1.45	2.59	2.92	
	B	0.25 ± 0.10	0.35 ± 0.15	0.50 ± 0.25	0.25 ^{+0.25} _{-0.13}	0.38 ^{+0.50} _{-0.25}	0.25 ^{+0.25} _{-0.13}	
Unit: mm								

Table4 Temperature Coefficient			Table 5 Rated Voltage					
Code	Temperature Coefficient	Operating Temperature	1H	50V	2H	500V	3E	2500V
			2A	100V	2J	600V	3F	3000V
COG	0±30ppm/°C	-55 °C ~125 °C	2C	150V	2K	800V	3V	3600V
			2D	200V	3A	1000V	3H	5000V
			2E	250V	3C	1500V	3L	7200V
			2F	300V	3D	2000V		

Table6 Nominal Capacitance									
EIA Capacitance code in pF.1st two digit are significant figures of capacitance; 3rd digit denotes number of Zeros; R=decimal point; For examples: 103=10,000pF; 3R9=3.9pF.									

Table7 Capacitance Tolerance Code			Table8 Termination Type	
B	±0.1pF	C _R < 10pF	N	Silver/Nickle/Tin
C	±0.25pF		D	Silver/Nickel/Gold
D	±0.5pF			
F	± 1%	C _R ≥ 10pF	Z	Silver/Nickle/Tin&Lead
G	± 2%			
J	± 5%		TN	Silver/Copper/Tin
K	± 10%			
M	± 20%			

Table9 Thickness Code				
Case Size Code	Capacitance (pF)	Thickness Code	Standard Thickness(mm)	Thickness Tolerance(mm)
0402	0.1~27	B	0.50	± 0.05
0603	0.1~100	8	0.80	± 0.15
0805	0.1~240	D	1.00	± 0.15
0505	0.1	A	0.60	± 0.15
	0.2~100	D	1.00	± 0.15
1111	0.1	D	1.00	± 0.15
	0.2	F	1.25	± 0.20
	0.3~1000	H	1.60	± 0.20
0709	1.0~100	V	2.50	± 0.35

Table10 Packaging		
B- Bulk with Bag	R- Reel	C- Waffle

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4 MQ 30 Series COG Capacitance Value

0402													
Cap. Code	Cap. (pF)	Cap. Tolerance	Rated DC Voltage(V)	Cap. Code	Cap. (pF)	Cap. Tolerance	Rated DC Voltage(V)	Cap. Code	Cap. (pF)	Cap. Tolerance	Rated DC Voltage(V)		
0R1	0.1	B	200	2R0	2.0	B、C、D	200	9R1	9.1	B、C、D	200		
0R2	0.2			2R2	2.2			100	10				
0R3	0.3			2R4	2.4			110	11				
0R4	0.4	B、C		2R7	2.7			120	12	F、G、J、K、M			
0R5	0.5			3R0	3.0			150	15				
0R6	0.6			3R3	3.3			180	18				
0R7	0.7			3R6	3.6			200	20				
0R8	0.8			3R9	3.9			220	22				
0R9	0.9			4R3	4.3			240	24				
1R0	1.0	B、C、D		4R7	4.7			270	27				
1R1	1.1			5R1	5.1			300	30				
1R2	1.2			5R6	5.6			330	33				
1R3	1.3			6R2	6.2			360	36				
1R5	1.5			6R8	6.8			390	39				
1R6	1.6			7R5	7.5			430	43	50			
1R8	1.8			8R2	8.2			470	47				
0603													
0R1	0.1	B	250	2R7	2.7	B、C、D	250	200	20	F、G、J、K、M	250		
0R2	0.2			3R0	3.0			220	22				
0R3	0.3			3R3	3.3			240	24				
0R4	0.4	B、C		3R6	3.6			270	27				
0R5	0.5			3R9	3.9			300	30				
0R6	0.6			4R3	4.3			330	33				
0R7	0.7			4R7	4.7			360	36				
0R8	0.8			5R1	5.1			390	39				
0R9	0.9	B、C、D		5R6	5.6			430	43				
1R0	1.0			6R2	6.2			470	47				
1R1	1.1			6R8	6.8			510	51				
1R2	1.2			7R5	7.5			560	56				
1R3	1.3			8R2	8.2			620	62				
1R5	1.5			9R1	9.1			680	68				
1R6	1.6			100	10	F、G、J、K、M		750	75				
1R8	1.8			110	11			820	82				
2R0	2.0			120	12			910	91				
2R2	2.2			150	15			101	100				
2R4	2.4			180	18								
0805													
0R1	0.1	B	250	3R3	3.3	B、C、D	250	300	30	F、G、J、K、M	250		
0R2	0.2			3R6	3.6			330	33				
0R3	0.3			3R9	3.9			360	36				
0R4	0.4	B、C		4R3	4.3			390	39				
0R5	0.5			4R7	4.7			430	43				
0R6	0.6			5R1	5.1			470	47				
0R7	0.7			5R6	5.6			510	51				
0R8	0.8			6R2	6.2			560	56				
0R9	0.9			6R8	6.8			620	62				
1R0	1.0	B、C、D		7R5	7.5			680	68				
1R1	1.1			8R2	8.2			750	75				
1R2	1.2			9R1	9.1			820	82				
1R3	1.3			100	10	F、G、J、K、M		910	91				
1R5	1.5			110	11			101	100				
1R6	1.6			120	12			111	110				
1R8	1.8			150	15			121	120				
2R0	2.0			180	18			151	150				
2R2	2.2			200	20			181	180				
2R4	2.4			220	22			201	200				
2R7	2.7			240	24			221	220				
3R0	3.0			270	27			241	240				
0505													
0R1	0.1	B	500	4R7	4.7	B、C、D	500	750	75	F、G、J、K、M	500		
0R2	0.2			5R1	5.1			820	82				
0R3	0.3			5R6	5.6			910	91				
0R4	0.4	B、C		6R2	6.2			101	100				
0R5	0.5			6R8	6.8			111	110				
0R6	0.6			7R5	7.5			121	120				
0R7	0.7			8R2	8.2			131	130				
0R8	0.8			9R1	9.1			151	150				
0R9	0.9	B、C、D		100	10			161	160				
1R0	1.0			110	11			181	180				
1R1	1.1			120	12			201	200				
1R2	1.2			130	13			221	220				
1R3	1.3			150	15			241	240				
1R4	1.4			160	16			F、G、J、K、M				301	300
1R5	1.5			180	18	331						330	
1R6	1.6			200	20	361						360	
1R7	1.7			220	22	391						390	
1R8	1.8			240	24	431						430	
1R9	1.9			270	27	471						470	
2R0	2.0			300	30	511						510	
2R1	2.1			330	33	561						560	
2R2	2.2			360	36	621						620	
2R4	2.4			390	39	681						680	
2R7	2.7			430	43	751						750	
3R0	3.0			470	47	821						820	
3R3	3.3			510	51	911						910	
3R6	3.6			560	56	102						1000	

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0505											
0R1	0.1	B	250	2R7	2.7	B、C、D	250	200	20	F、G、 J、K、M	250
0R2	0.2			3R0	3.0			220	22		
0R3	0.3			3R3	3.3			240	24		
0R4	0.4	B、C		3R6	3.6			270	27		
0R5	0.5			3R9	3.9			300	30		
0R6	0.6			4R3	4.3			330	33		
0R7	0.7			4R7	4.7			360	36		
0R8	0.8	5R1		5.1	390			39			
0R9	0.9	5R6		5.6	430			43			
1R0	1.0	B、C、D		6R2	6.2	470		47			
1R1	1.1			6R8	6.8	510		51			
1R2	1.2			7R5	7.5	560		56			
1R3	1.3		8R2	8.2	620	62					
1R5	1.5		9R1	9.1	680	68					
1R6	1.6		100	10	750	75					
1R8	1.8		110	11	820	82					
2R0	2.0		120	12	910	91					
2R2	2.2		150	15	101	100					
2R4	2.4			180	18						
1111											
0R1	0.1	B	500	4R7	4.7	B、C、D	500	750	75	F、G、 J、K、M	500
0R2	0.2			5R1	5.1			820	82		
0R3	0.3			5R6	5.6			910	91		
0R4	0.4	6R2		6.2	101			100			
0R5	0.5	6R8		6.8	111			110			
0R6	0.6	7R5		7.5	121			120			
0R7	0.7	8R2		8.2	131			130			
0R8	0.8	9R1		9.1	151			150			
0R9	0.9	100		10	161			160			
1R0	1.0	110		11	181	180					
1R1	1.1	120		12	201	200					
1R2	1.2	130		13	221	220					
1R3	1.3	150		15	241	240					
1R4	1.4	160		16	271	270					
1R5	1.5	180		18	301	300					
1R6	1.6	200		20	331	330					
1R7	1.7	220		22	361	360					
1R8	1.8	240		24	391	390					
1R9	1.9	270		27	431	430					
2R0	2.0	300		30	471	470					
2R1	2.1	330		33	511	510					
2R2	2.2	360		36	561	560					
2R4	2.4	390		39	621	620					
2R7	2.7	430		43	681	680					
3R0	3.0	470	47	751	750						
3R3	3.3	510	51	821	820						
3R6	3.6	560	56	911	910						
3R9	3.9	620	62	102	1000						
4R3	4.3	680	68								

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0709											
1R0	1.0	B、C、D	500	3R9	3.9	B、C、D	500	220	22	F、G、J、K、M	500
1R1	1.1			4R3	4.3			240	24		
1R2	1.2			4R7	4.7			270	27		
1R3	1.3			5R1	5.1			300	30		
1R4	1.4			5R6	5.6			330	33		
1R5	1.5			6R2	6.2			360	36		
1R6	1.6			6R8	6.8			390	39		
1R7	1.7			7R5	7.5			430	43		
1R8	1.8			8R2	8.2			470	47		
1R9	1.9			9R1	9.1			510	51		
2R0	2.0	B、C、D	500	100	10	F、G、J、K、M	500	560	56	F、G、J、K、M	500
2R1	2.1			110	11			620	62		
2R2	2.2			120	12			680	68		
2R4	2.4			130	13			750	75		
2R7	2.7			150	15			820	82		
3R0	3.0			160	16			910	91		
3R3	3.3			180	18			101	100		
3R6	3.6			200	20						

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5 Electrical Specifications&Test Conditions		
Item	Test Conditions (25℃ ±2℃)	Electrical Specifications
Capacitance		Capacitance values are up to requirements
Dissipation Factor tanδ	Test Frequency: C _R ≤ 1000pF, 1MHz±10% C _R > 1000pF, 1kHz±10% Test Voltage: 1.0Vrms±0.2Vrms	C _R ≥ 50pF, tanδ ≤ 0.15%; 5pF < C _R < 50pF, tanδ ≤ 1.5(150/C _R +7)×10 ⁻⁴ ; C _R ≤ 5pF, test free.
Insulation Resistance Ri	Test Voltage: Rated Voltage Endurance time: 2min ± 5s	Ri (25℃) ≥ 100000MΩ or 1000MΩ · μF (whichever is smaller) ; Ri (125℃) ≥ 10000MΩ or 100MΩ · μF (whichever is smaller)
Withstanding Voltage	2.5U _R , 5s ± 1s, Surge current ≤ 50mA	No breakdown, flashover or visible damages

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6 Reliability Characteristics&Test Conditions		
Item	Test Conditions	Reliability Characteristics
Thermal Shock	Upper limit:125°C; Lower limit:-55°C; Recycle times:5; Endurance:30min.	No visible damage to appearance. Capacitance change less than ±1% or ±1pF(Whichever is wider).
Resistance to soldering heat	Slot Weld Preheat at 110°C ~140°C,endure 30s~60s. Temperature:260°C±5°C; Dip time:10s ±1s; Dip depth:10mm; Dip time:1time; recover:6h~24h.	No damagers, cracks or exposure of inner electrodes. The peeling of Termination coating is less than 25%. Capacitance values are up to the permissible capacitance tolerance range.
Resistance to Humidity in Steady State	Temperature:40°C ±2°C; Relative humidity:90%~95%; Endure:21d (500+10) h; Withstanding Voltage Test within 15min after test finish:U _R ,5s; Recover:6h~24h	No visible damages, Marks are clear; Capacitance:Compared with initial value, ΔC /C≤2% or < 1pF, whichever is higher; Dissipation factor:No exceeds the initial value or 2x initial requirements, whichever is higher; Insulation resistance:R _i ≥25000MΩ or R _i ×C _R ≥250s,whichever is lower.
High-temperature Life Test	Endurance:1000h; Test temperature:125°C; Test Voltage 2U _R .	No visible damages, Marks are clear; Capacitance: Compared with initial value, ΔC /C≤2% or 1pF, whichever is higher; Dissipation factor:No exceeds the initial value or 2x initial requirements,whichever is higher; Insulation resistance:R _i ≥40000MΩ or R _i ×C _R ≥400s,whichever is lower.

7 Performance Data

Temperature Coefficient

Capacitance VS Temperature

