

MQ20 High-Q MLCC

1 Features

- 1) Low ESR, low ESL, high self-resonance frequency, high Q and low noise;
- 2) High density ceramic body, high stability;
- 3) No Capacitance shift with Temperature 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: Mobile Base Stations, Mobile Phone, WIFI, IoT, Etc.

3 How to Order

MQ	20	0805	C0G	2E	241	J	N	D	R
Type	Series	Case Size Code	TOC	Rated V.	Normal Capacitance	Capacitance Tolerance	Termination Type	Thickness Code	Packaging
Table 1	Table 2	Table 3	Table 4	Table 5	Table 6	Table 7	Table 8	Table 9	Table 10

Table 1 Product Type			Table 2 Product Series		
MQ	High-Q MLCC	20	High reliability application. The case sizes of 0402, 0603, 0805, 1111, etc. are available.		

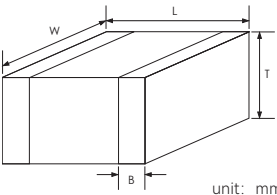
Table 3 Case Size Code (mm)					
Drawing	Case Size Code	0402	0603	0805	1111
	L	1.00 ± 0.15	1.60 ± 0.15	2.00 ± 0.20	3.10 ± 0.20
	W	0.50 ± 0.10	0.90 ± 0.15	1.25 ± 0.20	2.60 ± 0.20
	Tmin	/	/	/	0.76
	Tmax	0.55	0.90	1.30	2.59
	B	0.25 ± 0.10	0.35 ± 0.15	0.50 ± 0.25	0.50 ± 0.25

Table 4 Temperature Coefficient			Table 5 Rated Voltage					
Code	Temperature Coefficient	Working Temperature	1H	50V	2H	500V	3E	2500V
C0G	0±30ppm/°C	-55°C ~ 125°C	2A	100V	2J	600V	3F	3000V
			2C	150V	2K	800V	3V	3600V
			2D	200V	3A	1000V	3H	5000V
X7R	± 15%	-55°C ~ 125°C	2E	250V	3C	1500V	3L	7200V
			2F	300V	3D	2000V		

Table 6 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.	

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Table 7 Capacitance Tolerance Code				Table 8 Termination Type	
B	± 0.1pF	C _R < 10pF	N	Silver/Nickle/Tin	
C	± 0.25pF				
D	± 0.5pF		D	Silver/Nickel/Gold	
F	± 1%	C _R ≥ 10pF	Z	Silver/Nickle/Tin&Lead	
G	± 2%				
J	± 5%		TN	Silver/Copper/Tin	
K	± 10%				
M	± 20%				

Table 9 Thickness Code			
Case Size Code	Thickness Code	Standard Thickness(mm)	Thickness Tolerance(mm)
0402	B	0.50	± 0.05
0603	8	0.80	± 0.15
0805	D	1.00	± 0.15
1111	I	2.00	± 0.20

Table 10 Packaging		
B- Bulk with Bag	R- Reel	C- Waffle with no Box

4 MQ 20 Series X7R Capacitance Value

1111											
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)
502	5000	K、M	50/100	183	18000	K、M	50/100	503	50000	K、M	50/100
562	5600			203	20000			563	56000		
682	6800			223	22000			683	68000		
822	8200			273	27000			823	82000		
103	10000			333	33000			104	100000		
123	12000			393	39000						
153	15000			473	47000						

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MQ 20 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	F、G、J、K、M	
0R3	0.3			2R4	2.4			110	11		
0R4	0.4	2R7		2.7	120			12			
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	B、C、D		4R3	4.3			240	24	50	
1R0	1.0			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		
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	B、C		3R3	3.3			240	24		
0R4	0.4			3R6	3.6			270	27		
0R5	0.5			3R9	3.9			300	30		
0R6	0.6			4R3	4.3			330	33		
0R7	0.7	B、C、D		4R7	4.7			360	36		
0R8	0.8			5R1	5.1			390	39		
0R9	0.9			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	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	B、C		3R9	3.9			360	36		
0R4	0.4			4R3	4.3			390	39		
0R5	0.5			4R7	4.7			430	43		
0R6	0.6			5R1	5.1			470	47		
0R7	0.7	B、C、D		5R6	5.6			510	51		
0R8	0.8			6R2	6.2			560	56		
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1R1	1.1			8R2	8.2	750		75			
1R2	1.2			9R1	9.1	820		82			
1R3	1.3			100	10	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			

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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	C0G: C _R ≥ 50pF,tanδ ≤ 0.15%; 5pF <C _R <50pF, tanδ ≤ 1.5(150/C _R +7)×10 ⁻⁴ ; C _R ≤ 5pF,test free; X7R: tanδ ≤ 2.5%.
Insulation Resistance Ri	Test Voltage: Rated Voltage U _R Endurance time: 2min±5s	Ri (25℃) ≥ 100000MΩ 或 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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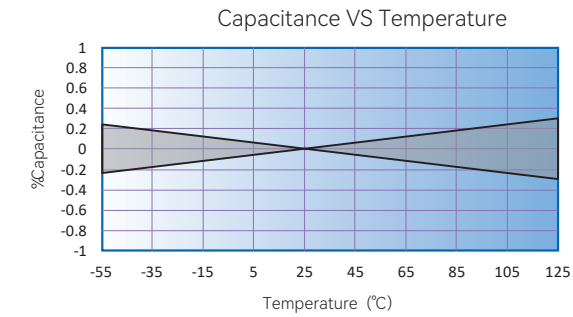
6 Reliability Characteristics&Test Conditions

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 110~140°C,endure 30s~60s. Temperature:260°C±5°C; Dip time:10s±1s; Dip depth:10mm; Dip time:1time; recover:6h~24h.	No visible damages, 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: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, C0G:ΔC/C ≤ 2% or < 1pF, whichever is wider; X7R:No exceeds ±10%; 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: 2000h for 2525 3838, Other case size:1000h; Test temperature:125°C; Test Voltage:U _R >1250V, U _R ; 500<U _R ≤ 1250V, 1.2U _R ; U _R ≤ 500V, 2U _R .	No visible damages, Marks are clear; Capacitance:Compared with initial value, C0G:ΔC/C ≤ 2% or < 1pF, whichever is higher; X7R:No exceeds ±10%; Dissipation factor:No exceeds the initial value or 2x initial requirements, whichever is higher; Insulation resistanceL:R _i ≥ 40000MΩ or R _i × C _R ≥ 400s, whichever is lower.

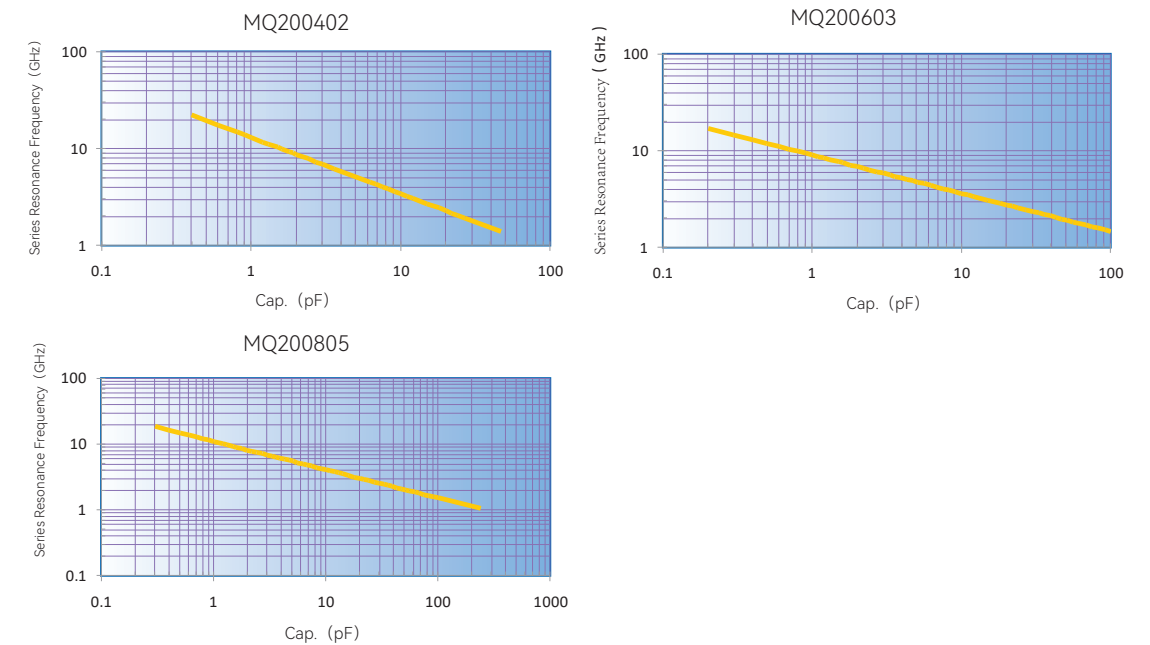
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7 Performance Data

1. Temperature Coefficient



2. Series Resonance Frequency



3. ESR

