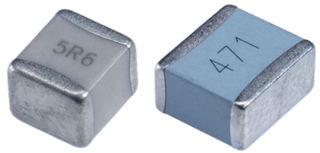
MQ10 High-Q MLCC

1 Features

1) Low ESR, low ESL, high self-resonance frequency, high Q and low noise;
2) Ultra-high density ceramic body, ultra-high stability;
3) Ultra-high reliability, wide-range applications.



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: Phased Array Radars, MRI, Radio Stations, RF Plasma, Laser Devices, Etc.

3 How to order

MQ	10	0505	M7G	2D	101	J	N	D	R	02
Type	Series	Case Size Code	TCC	Rated V.	Norminal Capacitance	Capacitanc Tolerancee	Termination Type	Thickness Code	Packing	Micro Strip Type
Table1	Table2	Table3	Table4	Table5	Table6	Table7	Table8	Table9	Table10	Table 11

Table1 Type		Table 2 Series	
MQ	High-Q MLCC	10	High reliability application .The case sizes of 0505, 1111, 2525, 3838, etc. are available.

Table 3 Case Size Code Dimensions(mm)

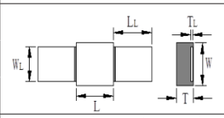
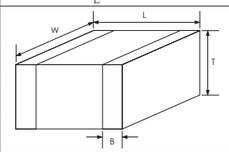
Case Size Code	Termination Type	Drawing	L	W	T(min)	T(max)	B	L_L(Min)	W_L	T_L
1111	MS/MN		$2.79^{+0.89}_{-0.51}$	2.79 ± 0.51	0.76	2.59	/	6.35	2.36 ± 0.15	0.10 ± 0.03
2525	MS/MN		$5.84^{+0.51}_{-0.25}$	6.50 ± 0.25	/	4.19	/	12.7	6.10 ± 0.25	0.10 ± 0.03
3838	MS/MN		$9.65^{+0.38}_{-0.25}$	9.85 ± 0.30	/	4.32	/	19.05	8.89 ± 0.25	0.25 ± 0.13
0505	N/D/TN		1.40 ± 0.64	1.40 ± 0.38	0.51	1.45	$0.25^{+0.25}_{-0.13}$	/	/	/
1111	N/D/TN		$2.79^{+0.89}_{-0.51}$	2.79 ± 0.51	0.76	2.59	$0.38^{+0.50}_{-0.25}$	/	/	/
2525	N/D/TN		$5.84^{+0.51}_{-0.25}$	6.50 ± 0.25	/	4.19	1.0max	/	/	/
3838	N/D/TN		$9.65^{+0.38}_{-0.25}$	9.85 ± 0.30	/	4.32	1.2max	/	/	/

Table4 Temperature Coefficient		Table 5 Rated Voltage							
Code	M7G	1H	50V	2F	300V	3C	1500V	3H	5000V
		2A	100V	2H	500V	3D	2000V	3L	7200V
Temperature Coefficiente	(100 ± 30)ppm/℃	2C	150V	2J	600V	3E	2500V		
		2D	200V	2K	800V	3F	3000V		
Operating Temperature	−55℃ ~125℃	2E	250V	3A	1000V	3V	3600V		

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.

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Table7 Capacitance Tolerance Code			Table8 Termination Type	
B	± 0.1pF	C_R < 10pF	N	Silver/Nickle/Tin
C	± 0.25pF		D	Silver/Nickel/Gold （Gold Thickness≥ 1μm）
D	± 0.5pF		Z	Silver/Nickle/Tin&Lead
			TN	Silver/Copper/Tin
			ZN	Silver/Copper/Tin&Lead
			AW	Axial Lead (Silver plated over Copper Wire for 1111,2525,3838)
F	± 1%	C_R ≥ 10pF	BN	Non-Magnetic Axial Lead(Silver plated over Copper Wire for 1111,2525,3838)
G	± 2%		RW	Radial Lead(for 1111,2525,3838)
J	± 5%		RN	Non-Magnetic Radial Lead(for 1111,2525,3838)
K	± 10%		MS	Micro Strip(Silver plated over Copper for 1111,2525,3838)
M	± 20%		MA	Micro Strip(Silver for 1111,2525,3838)
			MN	Non-magnetic Micro Strip(Silver plated over Copper for 1111,2525,3838)
			FN	Radial Non-magnetic Micro Strip(Silver plated over Copper for 1111,2525,3838)
			AR	Axial Micro Strip(Silver for 1111,2525,3838)
			AN	Axial Non-Magnetic Micro Strip(Silver for 1111,2525,3838)

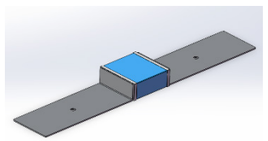
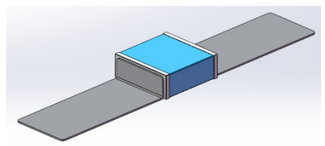
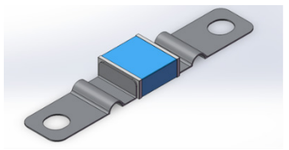
Table9 Thickness Code

Case Size Code	Capacitance （pF）	Thickness Code	Standard Thickness(mm)	Thickness Tolerance(mm)
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
	0.3~0.4	H	1.60	± 0.20
	0.5~1000	M	2.30	± 0.20
2525	1~2700	L	3.20	± 0.40
3838	1~5100	N	3.80	± 0.50

Table10 Packaging

B- Bulk with Bag	R- Reel	C- Waffle

Table 11 Micro-Strip Style

Blank	01	02
There are φ1mm holes in the center of Micro-strip	Micro-strip with no Holes	Micro-strip with cushion function,2 4.2mm holes for assembly,Distance of 2 holes is 39mm
		

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4 MQ 10 Series M7G Capacitance Values

0505

Cap. code	Cap. (pF)	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	150	Extended Voltage 250	2R2	2.2	B、C、D	150	Extended Voltage 250	160	16	F、G、J、K、M	150	Extended Voltage 250
0R2	0.2				2R4	2.4				180	18			
0R3	0.3	B、C			2R7	2.7				200	20			
0R4	0.4				3R0	3.0				220	22			
0R5	0.5	B、C、D			3R3	3.3				240	24			
0R6	0.6				3R6	3.6				270	27			
0R7	0.7				3R9	3.9				300	30			
0R8	0.8				4R3	4.3				330	33			
0R9	0.9				4R7	4.7				360	36			
1R0	1.0	B、C、D			5R1	5.1				390	39			
1R1	1.1				5R6	5.6				430	43			
1R2	1.2				6R2	6.2				470	47			
1R3	1.3				6R8	6.8				510	51			
1R4	1.4				7R5	7.5				560	56			
1R5	1.5				8R2	8.2				620	62			
1R6	1.6				9R1	9.1				680	68			
1R7	1.7				100	10	F、G、J、K、M			750	75			Extended Voltage 200
1R8	1.8				110	11				820	82			
1R9	1.9				120	12				910	91			
2R0	2.0				130	13				101	100			
2R1	2.1				150	15								

1111

0R1	0.1	B	500	Extended Voltage 1500	4R7	4.7	B、C、D	500	Extended Voltage 1500	750	75	F、G、J、K、M	500	Extended Voltage 1500
0R2	0.2				5R1	5.1				820	82			
0R3	0.3	B、C			5R6	5.6				910	91			
0R4	0.4				6R2	6.2				101	100			
0R5	0.5	B、C、D			6R8	6.8				111	110		300	Extended Voltage 1000
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	F、G、J、K、M			161	160			
1R0	1.0	B、C、D			110	11				181	180		200	Extended Voltage 600
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		100	Extended Voltage 300
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		50	
3R6	3.6				560	56				911	910			
3R9	3.9				620	62				102	1000			
4R3	4.3				680	68								

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2525

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)	
1R0	1.0	B、C、D	2500	Extended Voltage 3600	120	12	F、G、J、K、M	2500	Extended Voltage 3600	221	220	F、G、J、K、M	2500	Extended Voltage 3000
1R1	1.1				130	13				241	240			
1R2	1.2				150	15				271	270			
1R3	1.3				160	16				301	300		1500	Extended Voltage 2000
1R4	1.4				180	18				331	330			
1R5	1.5				200	20				361	360			
1R6	1.6				220	22				391	390			
1R7	1.7				240	24				431	430			
1R8	1.8				270	27				471	470			
1R9	1.9				300	30				511	510		1000	Extended Voltage 1500
2R0	2.0				330	33				561	560			
2R1	2.1				360	36				621	620			
2R2	2.2				390	39				681	680			
2R4	2.4				430	43				751	750			
2R7	2.7				470	47				821	820		500	Extended Voltage 800
3R0	3.0				510	51				911	910			
3R3	3.3				560	56				102	1000			
3R6	3.6				620	62				112	1100			
3R9	3.9				680	68				122	1200			
4R3	4.3				750	75				152	1500			
4R7	4.7				820	82				182	1800		300	Extended Voltage 500
5R1	5.1				910	91				202	2000			
5R6	5.6				101	100				222	2200			
6R2	6.2				111	110				242	2400			
6R8	6.8				121	120				272	2700			
7R5	7.5				131	130			Extended Voltage 3000					
8R2	8.2				151	150								
9R1	9.1				161	160								
100	10	F、G、J、K、M			181	180								
110	11				201	200								

3838

1R0	1.0	B、C、D	3600	Extended Voltage 7200	130	13	F、G、J、K、M	3600	Extended Voltage 7200	271	270	F、G、J、K、M	3600	
1R1	1.1				150	15				301	300			
1R2	1.2				160	16				331	330			
1R3	1.3				180	18				361	360			
1R4	1.4				200	20				391	390			
1R5	1.5				220	22				431	430		2500	
1R6	1.6				240	24				471	470			
1R7	1.7				270	27				511	510			
1R8	1.8				300	30				561	560			
1R9	1.9				330	33				621	620			
2R0	2.0				360	36			Extended Voltage 7200	681	680			
2R1	2.1				390	39				751	750			
2R2	2.2				430	43				821	820			
2R4	2.4				470	47				911	910		1000	
2R7	2.7				510	51				102	1000			
3R0	3.0				560	56				112	1100			
3R3	3.3				620	62				122	1200			
3R6	3.6				680	68				152	1500			
3R9	3.9				750	75				182	1800			
4R3	4.3				820	82				202	2000			
4R7	4.7				910	91				222	2200			
5R1	5.1				101	100				242	2400			
5R6	5.6				111	110				272	2700		500	
6R2	6.2				121	120				302	3000			
6R8	6.8				131	130			Extended Voltage 5000	332	3300			
7R5	7.5				151	150				362	3600			
8R2	8.2				161	160				392	3900			
9R1	9.1				181	180				432	4300			
100	10	F、G、J、K、M			201	200				472	4700			
110	11				221	220			/	512	5100			
120	12				241	240								

5 Electrical Specifications&Test Conditions

Item	Test Conditions（25℃ ±2℃）	Electrical Specifications
Capacitance	Test Frequency: C_R ≤ 1000pF，1MHz±10% C_R ＞ 1000pF，1kHz±10% Test Voltage: 1.0Vrms±0.2Vrms	Capacitance is up to requirements
Dissipation Factor tanδ		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 or 500V(whichever is smaller) Endurance time：2min±5s	Ri（25℃）≥ 100000MΩ or 1000MΩ·μF(whichever is smaller); Ri（125℃）≥ 10000MΩ or 100MΩ·μF(whichever is smaller)
Withstanding Voltage	Test Voltage: U_R>1250V，1.2U_R; 500V<U_R ≤ 1250V，1.5U_R; U_R ≤ 500V，2.5U_R Endurance time：5s±1s Surge current≤ 50mA	No breakdown, flashover or visible damages

6 Reliability Characteristics&Test Conditions

Item	Test Conditions	Reliability Characteristics
Thermal Shock	Upper limit：125℃; Lower limit：-55℃; 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℃,endure 30s~60s. Temperature:260℃ ±5℃; Dip time:10s±1s; Dip depth:10mm; Dip time:1 time; 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℃ ±2℃; Relative:90%~95%; Endure:21d(500+10)h; Withstanding Voltage Test within15min 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: 2000h for 2525 3838,Other case size:1000h; Test temperature:125℃; 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, 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.

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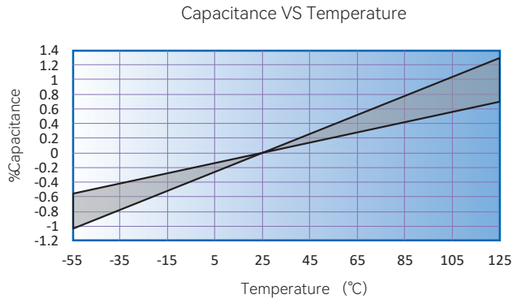
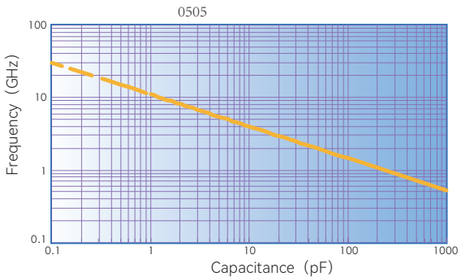
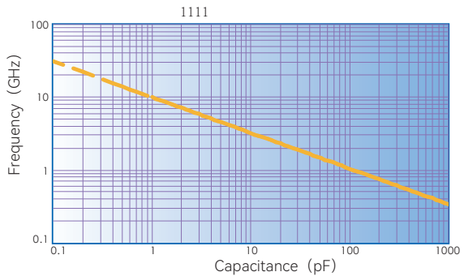
7 Performance Data

1. Temperature Coefficient

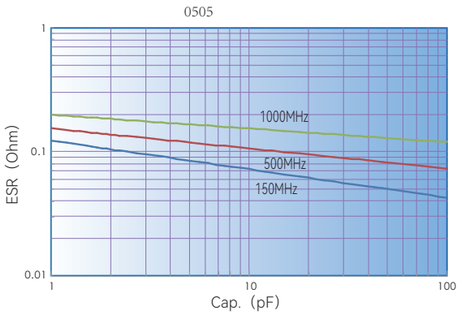


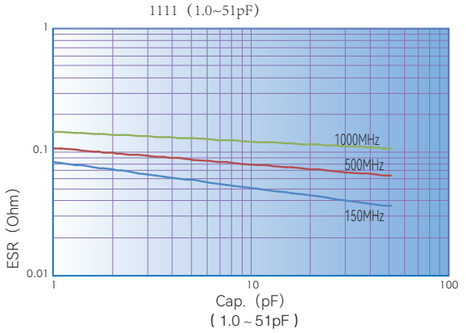
2. Series Resonance Frequency

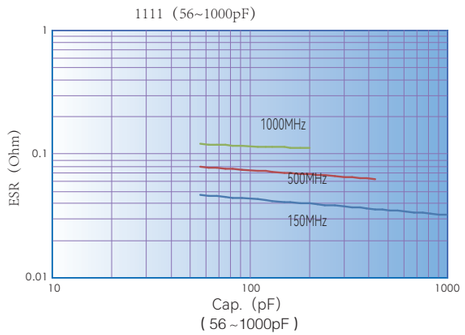




3. ESR







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4.Q Value