

# High Q Capacitors - Q(MS) & U ranges

The "Q(MS)" and "U" ranges offers a very stable High Q material system that provides excellent, low loss, performance in systems below 3GHz. Optimised for lowest possible ESR, this range of high frequency capacitors is suitable for many applications where economical, high performance is required.

Available in 0402 to 3640 case sizes (0603 & 0805 case sizes only available in the "U" range) with various termination options including FlexiCap™.

CapCad™ capacitor modelling software is now available and has been developed with an easy to use and readily accessible comparison tool for choosing the best MLCC to suit the customer's needs. Please consult the Knowles website to launch the software.

## Operating Temperature

-55°C to +125°C

## Temperature Coefficient (Typical)

0 ± 30 ppm/°C (COG/NPO)

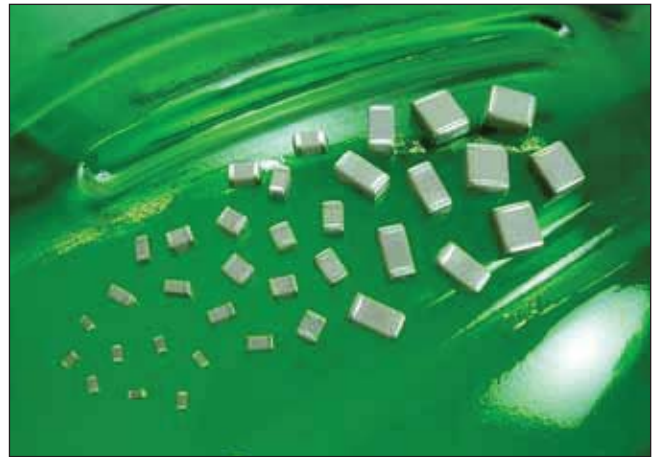
## Insulation resistance

MS range: >100GΩ at +25°C; >10GΩ +125°C

U range: 100GΩ or 1000s (whichever is the least)

## Q Factor

>2000 @ 1MHz

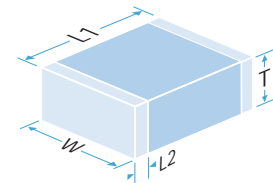


0603 S-parameter downloads are available from: <http://www.knowlesc capacitors.com/syfer/en/products/mlc-capacitors/ultra-low-esr-capacitors> and the Syfer MVP page on the Modelithics website. Please visit the Syfer MVP page for more information at: <http://www.modelithics.com/mvp/syfer>

## Minimum/maximum capacitance values - Q(MS) & U ranges - High Q capacitors

Chip Size	0402*	0603†	0505	0805†	1206	1111	1210	1812	2220	2225	3640
Min Cap	0.1pF	0.1pF	0.2pF	0.2pF	0.5pF	0.3pF	0.3pF	1.0pF	2.0pF	2.0pF	4.0pF
50V 63V	33pF	-	330pF	-	2.2nF	-	-	-	-	-	-
100V	22pF	-	220pF	-	1.5nF	3.3nF	3.3nF	6.8nF	15nF	18nF	-
150V	18pF	-	180pF	-	1.2nF	2.7nF	2.7nF	4.7nF	12nF	15nF	-
200V 250V	15pF	100pF	150pF	240pF	1.0nF	2.2nF	2.2nF	3.9nF	10nF	10nF	-
300V	-	-	100pF	-	680pF	1.5nF	1.5nF	3.3nF	6.8nF	8.2nF	-
500V	-	-	-	-	330pF	820pF	820pF	2.2nF	4.7nF	5.6nF	15nF
630V	Below 1pF capacitance values are available in 0.1pF steps ~ above 1pF capacitance values are available in E24 series values.			-	150pF	390pF	390pF	1.0nF	2.2nF	3.3nF	6.8nF
1000V				-	82pF	220pF	220pF	680pF	1.5nF	2.2nF	4.7nF
2000V				-	18pF	68pF	68pF	150pF	470pF	560pF	1.5nF
3000V	-	-	-	-	-	-	-	68pF	150pF	220pF	470pF
Tape quantities	7" reel 5000	7" reel 4000	7" reel 2500	7" reel 3000	7" reel 2500	7" reel 1000	7" reel 2000	7" reel 500	7" reel 500	7" reel 500	13" reel only
	13" reel quantities available on request										

\*0402 size and other values (inc. values < than 0.3pF) and taping quantities may be available on request, consult the Sales Office.  
†0603 and 0805 sizes only available in the "U" range and not Q(MS)

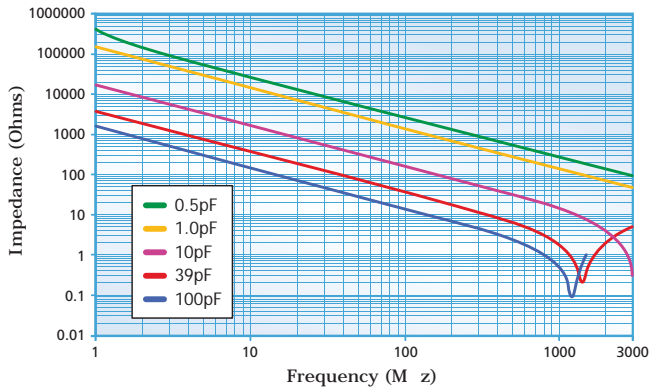


## Dimensions

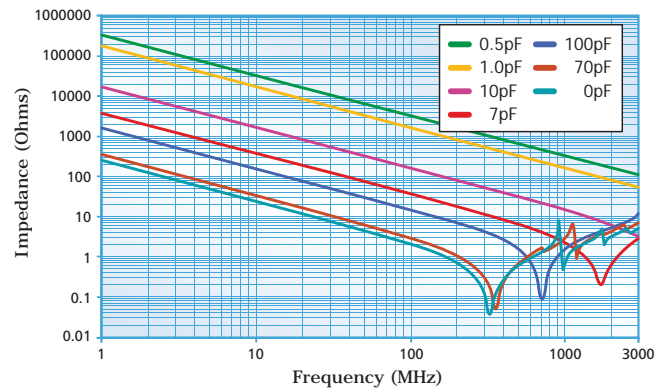
Range	Case Size	Length (L1) mm ~ inches	Width (W) mm ~ inches	Max. Thickness (T) mm ~ inches	Termination Band (L2) mm ~ inches	
					min	max
MS	0402	1.0 ± 0.10 ~ 0.04 ± 0.006	0.50 ± 0.10 ~ 0.02 ± 0.003	0.60 ~ 0.031	0.10 ~ 0.004	0.40 ~ 0.015
U	0603	1.6 ± 0.2 ~ 0.063 ± 0.008	0.8 ± 0.2 ~ 0.032 ± 0.008	0.80 ~ 0.032	0.10 ~ 0.004	0.40 ~ 0.016
MS	0505	1.4 +0.35 -0.25 ~ 0.055 +0.014 -0.01	1.4 ± 0.25 ~ 0.055 ± 0.01	1.27 ~ 0.05	0.13 ~ 0.005	0.5 ~ 0.02
U	0805	2.0 ± 0.3 ~ 0.079 ± 0.012	1.25 ± 0.20 ~ 0.049 ± 0.008	1.3 ~ 0.051	0.13 ~ 0.005	0.75 ~ 0.03
MS	1206	3.2 ± 0.3 ~ 0.126 ± 0.012	1.6 ± 0.20 ~ 0.063 ± 0.008	1.6 ~ 0.063	0.25 ~ 0.01	0.75 ~ 0.03
MS	1111	2.79 +0.51 -0.25 ~ 0.11 +0.02 -0.01	2.79 ± 0.38 ~ 0.113 ± 0.015	1.78 ~ 0.07	0.13 ~ 0.005	0.63 ~ 0.025
MS	1210	3.2 ± 0.3 ~ 0.126 ± 0.012	2.5 ± 0.3 ~ 0.10 ± 0.012	2.0 ~ 0.08	0.25 ~ 0.01	0.75 ~ 0.03
MS	1812	4.5 ± 0.35 ~ 0.18 ± 0.014	3.2 ± 0.3 ~ 0.126 ± 0.012	2.5 ~ 0.10	0.25 ~ 0.01	1.0 ~ 0.04
MS	2220	5.7 ± 0.40 ~ 0.225 ± 0.016	5.0 ± 0.40 ~ 0.197 ± 0.016	4.2 ~ 0.16	0.25 ~ 0.01	1.0 ~ 0.04
MS	2225	5.7 ± 0.40 ~ 0.225 ± 0.016	6.30 ± 0.40 ~ 0.25 ± 0.016	4.2 ~ 0.16	0.25 ~ 0.01	1.0 ~ 0.04
MS	3640	9.2 ± 0.50 ~ 0.36 ± 0.02	10.16 ± 0.50 ~ 0.40 ± 0.02	2.5 ~ 0.10	0.50 ~ 0.02	1.5 ~ 0.06

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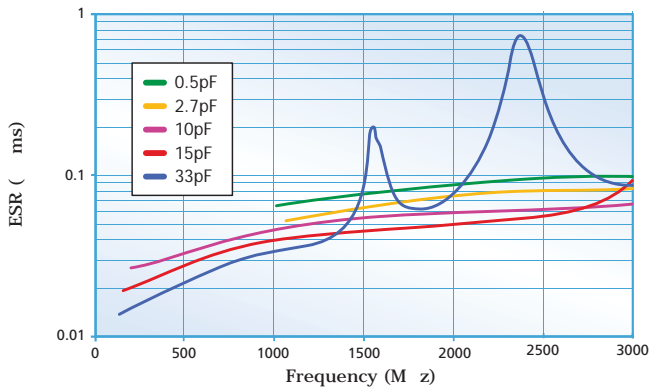
Q(MS) Series - Impedance vs. Frequency - Case size 0505



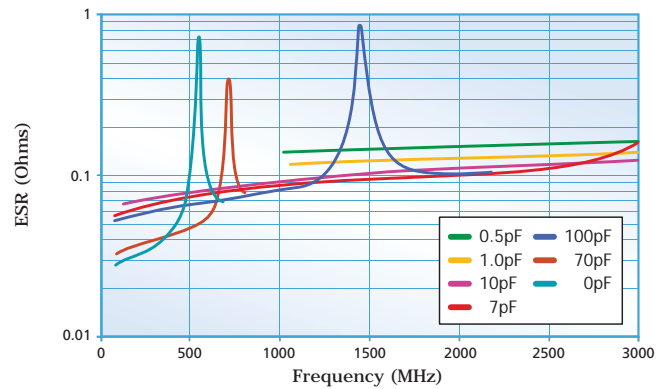
Q(MS) Series - Impedance vs. Frequency - Case size 0505



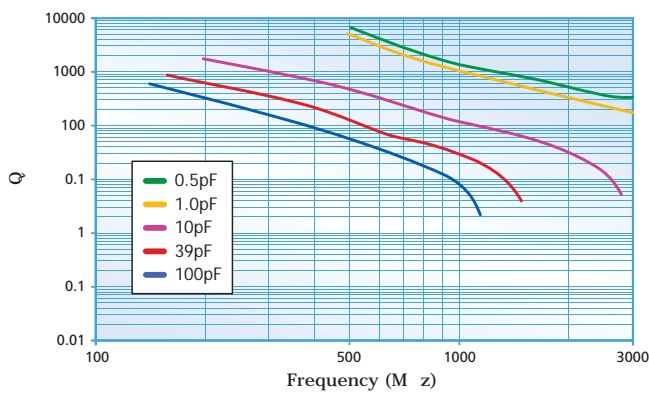
Q(MS) Series - ESR vs. Frequency - Case size 0505



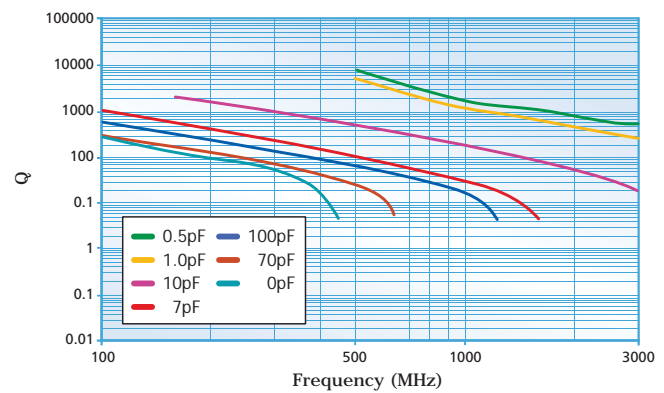
Q(MS) Series - ESR vs. Frequency - Case size 0505



Q(MS) Series Q vs. Frequency - Case size 0505



Q(MS) Series Q vs. Frequency - Case size 0505



All performance curves are based on measurements taken with Boonton 34A resonant tube, Agilent E4991A impedance analyser and Agilent 16197A test fixture. Different test methods or fixtures may give different results. Data is typical and is supplied for indication only.

