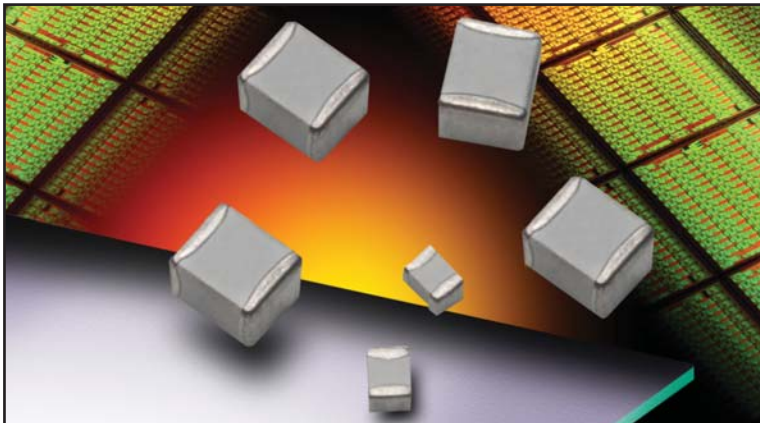


# Microwave MLC's



## SQ A Case & B Case Ultra Low ESR MLC



### FEATURES:

- Low ESR
- High Q
- High Self Resonance
- Capacitance Range 0.1 pF to 5100 pF
- 175°C Capability SQCB

### APPLICATIONS:

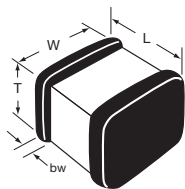
- RF Power Amplifiers
- Low Noise Amplifiers
- Filter Networks
- MRI Systems

### HOW TO ORDER

<p><b>SQ</b></p> <p>AVX Style</p>	<p><b>CB</b></p> <p><b>Case Size</b> CA = * CB = *</p> <p>* See mechanical dimensions below</p>	<p><b>7</b></p> <p><b>Voltage Code</b></p> <p>5 = 50V 1 = 100V E = 150V 2 = 200V V = 250V 9 = 300V 7 = 500V</p>	<p><b>M</b></p> <p><b>Temperature Coefficient Code</b></p> <p>M = +90±20ppm/°C A = 0±30ppm/°C C = 15% ("J" Termination only)</p>	<p><b>100</b></p> <p><b>Capacitance</b></p> <p>EIA Capacitance Code in pF. First two digits = significant figures or "R" for decimal place. Third digit = number of zeros or after "R" significant figures.</p>	<p><b>J</b></p> <p><b>Capacitance Tolerance Code</b></p> <p>B = ±.1 pF C = ±.25 pF D = ±.5 pF F = ±1% G = ±2% J = ±5% K = ±10% M = ±20% N = ±30%</p>	<p><b>A</b></p> <p><b>Failure Rate Code</b></p> <p>A = Not Applicable</p>	<p><b>T</b></p> <p><b>Termination Style Code</b></p> <p>**1 = Pd/Ag **7 = Ag/Ni/Au J = Nickel Barrier Sn/Pb (60/40) **T = 100% Tin H = Cu/Sn (Non-Magnetic)</p>	<p><b>1A</b></p> <p><b>Packaging Code</b></p> <p>1A = 7" Reel Unmarked 6A = Waffle Pack Unmarked ME = 7" Reel Marked WE = Waffle Pack Marked</p> <p>* Vertical T&amp;R available</p>
-----------------------------------	---	---	--	---	--	---	---	--

**\*\*RoHS compliant**

### MECHANICAL DIMENSIONS: inches (millimeters)



Case	Length (L)	Width (W)	Thickness (T)	Band Width (bw)
SQCA*	.055 + .015 - .010 (1.40+ .381 - .254)	.055±.015 (1.40±.381)	.020/.057 (.508/1.45)	.010 + .010 - .005 (.254 + .254 - .127)
SQCB*	.110 + .020 - .010 (2.79 + .508 - .254)	.110±.010 (2.79±.254)	.030/.102 (.762/2.59)	.015±.010 (.381±.254)

**TAPE & REEL:** All tape and reel specifications are in compliance with EIA RS481 (equivalent to IEC 286 part 3).

- 8mm carrier
- 7" reel: SQCA/SQCB = 1000 pcs

### WAFFLE PACK

- SQCA 100 pcs
- SQCB 100 pcs

**Not RoHS Compliant**



LEAD-FREE  
LEAD-FREE COMPATIBLE  
COMPONENT

RoHS  
COMPLIANT

For RoHS compliant products,  
please select correct termination style.



### ELECTRICAL SPECIFICATIONS

		M & A	C
Temperature Coefficient (TCC)		(M) $+90 \pm 20$ PPM/°C ( -55°C to +125°C) (M) $+90 \pm 30$ PPM/°C ( +125°C to +175°C)* (A) $0 \pm 30$ PPM/°C	$\pm 15\%$ (-55°C to 125°C)
Capacitance Range		(M) 0.1 pF to 1000 pF (A) 0.1 pF to 5100 pF	0.001 $\mu$ F to 0.1 $\mu$ F
Operating Temperature		0.1 pF to 330 pF: from -55°C to +175°C* 360 pF to 5100 pF: from -55°C to +125°C	-55°C to +125°C
Quality Factor (Q)	M Dielectric A & B Case	Greater than 10,000 at 1 MHz	2.5% @ 1kHz
	A Dielectric B Case	Greater than 10,000 at 1 MHz Greater than 2,000 at 1 MHz Greater than 2,000 at 1 KHz	0.1 - 200 pF 220 - 1000 pF 1100 - 5100 pF
	A Dielectric A Case	Greater than 10,000 at 1 MHz Greater than 2,000 at 1 MHz	0.1 - 100 pF 110 - 1000 pF
Insulation Resistance (IR)		0.2 pF to 470 pF 10 <sup>9</sup> Megohms min. @ 25°C at rated WVDC 10 <sup>8</sup> Megohms min. @ 125°C at rated WVDC 510 pF to 5100 pF 10 <sup>9</sup> Megohms min. @ 25°C at rated WVDC 10 <sup>8</sup> Megohms min. @ 125°C at rated WVDC	10 <sup>4</sup> Megohms min. @ 25°C at rated WVDC 10 <sup>3</sup> Megohms min. @ 125°C at rated WVDC
Working Voltage (WVDC)		See Capacitance Values table	See Capacitance Values table
Dielectric Withstanding Voltage (DWW)		250% of rated WVDC for 5 secs (for 500V rated 150% of rated voltage)	250% of rated WVDC for 5 secs
Aging Effects		None	<3% per decade hour
Piezoelectric Effects		None	None
Capacitance Drift		$\pm$ (0.02% or 0.02 pF), whichever is greater	Not Applicable

\* 175 SQCB & SQLB only

### ENVIRONMENTAL CHARACTERISTICS

AVX SQ will meet and exceed the requirements of EIA-198, MIL-PRF-55681 and MIL-PRF-123

Thermal Shock	Mil-STD-202, Method 107, Condition A
Moisture Resistance	Mil-STD-202, Method 106
Low Voltage Humidity	Mil-STD-202, Method 103, condition A, with 1.5 VDC applied while subjected to an environment of 85°C with 85% relative humidity for 240 hours
Life Test	Mil-STD-202, Method 108, for 2000 hours at 125°C
Shock	Mil-STD-202, Method 213, Condition J
Vibration	Mil-STD-202, Method 204, Condition B
Immersion	Mil-STD-202, Method 104, Condition B
Salt Spray	Mil-STD-202, Method 101, Condition B
Solderability	Mil-STD-202, Method 208
Terminal Strength	Mil-STD-202, Method 211
Temperature Cycling	Mil-STD-202, Method 102, Condition C
Barometric Pressure	Mil-STD-202, Method 105, Condition B
Resistance to Solder Heat	Mil-STD-202, Method 210, Condition C

# Microwave MLC's



SQ Series Available Capacitance/Size/WVDC/T.C.

## Case Size A

**TABLE I: TC: M (+90±20PPM/°C)**

Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC
0.1	B	150, 250	1.7	B, C, D	150, 250	6.2	B, C, D	150, 250	27	F, G, J, K	150, 250
0.2	B	150, 250	1.8	B, C, D	150, 250	6.8	B, C, J, K	150, 250	30	F, G, J, K	150, 250
0.3	B,C	150, 250	1.9	B, C, D	150, 250	7.5	B, C, J, K	150, 250	33	F, G, J, K	150, 250
0.4	B,C	150, 250	2.0	B, C, D	150, 250	8.2	B, C, J, K	150, 250	36	F, G, J, K	150, 250
0.5	B, C, D	150, 250	2.2	B, C, D	150, 250	9.1	B, C, J, K	150, 250	39	F, G, J, K	150, 250
0.6	B, C, D	150, 250	2.4	B, C, D	150, 250	10	F, G, J, K	150, 250	43	F, G, J, K	150, 250
0.7	B, C, D	150, 250	2.7	B, C, D	150, 250	11	F, G, J, K	150, 250	47	F, G, J, K	150, 250
0.8	B, C, D	150, 250	3.0	B, C, D	150, 250	12	F, G, J, K	150, 250	51	F, G, J, K	150, 250
0.9	B, C, D	150, 250	3.3	B, C, D	150, 250	13	F, G, J, K	150, 250	56	F, G, J, K	150, 250
1.0	B, C, D	150, 250	3.6	B, C, D	150, 250	15	F, G, J, K	150, 250	62	F, G, J, K	150, 250
1.1	B, C, D	150, 250	3.9	B, C, D	150, 250	16	F, G, J, K	150, 250	68	F, G, J, K	150, 250
1.2	B, C, D	150, 250	4.3	B, C, D	150, 250	18	F, G, J, K	150, 250	75	F, G, J, K	150, 250
1.3	B, C, D	150, 250	4.7	B, C, D	150, 250	20	F, G, J, K	150, 250	82	F, G, J, K	150, 250
1.4	B, C, D	150, 250	5.1	B, C, D	150, 250	22	F, G, J, K	150, 250	91	F, G, J, K	150, 250
1.5	B, C, D	150, 250	5.6	B, C, D	150, 250	24	F, G, J, K	150, 250	100	F, G, J, K	150, 250
1.6	B, C, D	150, 250									

**TABLE II: TC: A (0±30PPM/°C)**

Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC
0.1	B	150, 250	2.7	B, C, D	150, 250	20	F, G, J, K	150, 250	150	F, G, J, K	150
0.2	B	150, 250	3.0	B, C, D	150, 250	22	F, G, J, K	150, 250	160	F, G, J, K	150
0.3	B,C	150, 250	3.3	B, C, D	150, 250	24	F, G, J, K	150, 250	180	F, G, J, K	150
0.4	B,C	150, 250	3.6	B, C, D	150, 250	27	F, G, J, K	150, 250	200	F, G, J, K	150
0.5	B, C, D	150, 250	3.9	B, C, D	150, 250	30	F, G, J, K	150, 250	220	F, G, J, K	150
0.6	B, C, D	150, 250	4.3	B, C, D	150, 250	33	F, G, J, K	150, 250	240	F, G, J, K	150
0.7	B, C, D	150, 250	4.7	B, C, D	150, 250	36	F, G, J, K	150, 250	270	F, G, J, K	150
0.8	B, C, D	150, 250	5.1	B, C, D	150, 250	39	F, G, J, K	150, 250	300	F, G, J, K	150
0.9	B, C, D	150, 250	5.6	B, C, D	150, 250	43	F, G, J, K	150, 250	330	F, G, J, K	150
1.0	B, C, D	150, 250	6.2	B, C, D	150, 250	47	F, G, J, K	150, 250	360	F, G, J, K	150
1.1	B, C, D	150, 250	6.8	B, C, J, K	150, 250	51	F, G, J, K	150, 250	390	F, G, J, K	150
1.2	B, C, D	150, 250	7.5	B, C, J, K	150, 250	56	F, G, J, K	150, 250	430	F, G, J, K	150
1.3	B, C, D	150, 250	8.2	B, C, J, K	150, 250	62	F, G, J, K	150, 200	470	F, G, J, K	150
1.4	B, C, D	150, 250	9.1	B, C, J, K	150, 250	68	F, G, J, K	150, 200	510	F, G, J, K	150
1.5	B, C, D	150, 250	10	F, G, J, K	150, 250	75	F, G, J, K	150, 200	560	F, G, J, K	150
1.6	B, C, D	150, 250	11	F, G, J, K	150, 250	82	F, G, J, K	150, 200	620	F, G, J, K	150
1.7	B, C, D	150, 250	12	F, G, J, K	150, 250	91	F, G, J, K	150, 200	680	F, G, J, K	50
1.8	B, C, D	150, 250	13	F, G, J, K	150, 250	100	F, G, J, K	150	750	F, G, J, K	50
1.9	B, C, D	150, 250	15	F, G, J, K	150, 250	110	F, G, J, K	150	820	F, G, J, K	50
2.0	B, C, D	150, 250	16	F, G, J, K	150, 250	120	F, G, J, K	150	910	F, G, J, K	50
2.2	B, C, D	150, 250	18	F, G, J, K	150, 250	130	F, G, J, K	150	1000	F, G, J, K	50
2.4	B, C, D	150, 250									

**TABLE III: TC: C (±15%)**

Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC
1000	K, M, N	50	2200	K, M, N	50	5100	K, M, N	50
1200	K, M, N	50	2700	K, M, N	50	5600	K, M, N	50
1500	K, M, N	50	3300	K, M, N	50	6800	K, M, N	50
1800	K, M, N	50	3900	K, M, N	50	8200	K, M, N	50
2000	K, M, N	50	4700	K, M, N	50	10000	K, M, N	50

### Case Size B

**TABLE IV: TC: M (+90±20PPM/°C)**

Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC
0.1	B	500	2.7	B, C, D	500	20	F, G, J, K	500	150	F, G, J, K	300
0.2	B	500	3.0	B, C, D	500	22	F, G, J, K	500	160	F, G, J, K	300
0.3	B,C	500	3.3	B, C, D	500	24	F, G, J, K	500	180	F, G, J, K	300
0.4	B,C	500	3.6	B, C, D	500	27	F, G, J, K	500	200	F, G, J, K	300
0.5	B, C, D	500	3.9	B, C, D	500	30	F, G, J, K	500	220	F, G, J, K	200
0.6	B, C, D	500	4.3	B, C, D	500	33	F, G, J, K	500	240	F, G, J, K	200
0.7	B, C, D	500	4.7	B, C, D	500	36	F, G, J, K	500	270	F, G, J, K	200
0.8	B, C, D	500	5.1	B, C, D	500	39	F, G, J, K	500	300	F, G, J, K	200
0.9	B, C, D	500	5.6	B, C, D	500	43	F, G, J, K	500	330	F, G, J, K	200
1.0	B, C, D	500	6.2	B, C, D	500	47	F, G, J, K	500	360	F, G, J, K	200
1.1	B, C, D	500	6.8	B, C, J, K	500	51	F, G, J, K	500	390	F, G, J, K	200
1.2	B, C, D	500	7.5	B, C, J, K	500	56	F, G, J, K	500	430	F, G, J, K	200
1.3	B, C, D	500	8.2	B, C, J, K	500	62	F, G, J, K	500	470	F, G, J, K	200
1.4	B, C, D	500	9.1	B, C, J, K	500	68	F, G, J, K	500	510	F, G, J, K	150
1.5	B, C, D	500	10	F, G, J, K	500	75	F, G, J, K	500	560	F, G, J, K	150
1.6	B, C, D	500	11	F, G, J, K	500	82	F, G, J, K	500	620	F, G, J, K	150
1.7	B, C, D	500	12	F, G, J, K	500	91	F, G, J, K	500	680	F, G, J, K	150
1.8	B, C, D	500	13	F, G, J, K	500	100	F, G, J, K	500	750	F, G, J, K	150
1.9	B, C, D	500	15	F, G, J, K	500	110	F, G, J, K	300	820	F, G, J, K	150
2.0	B, C, D	500	16	F, G, J, K	500	120	F, G, J, K	300	910	F, G, J, K	150
2.2	B, C, D	500	18	F, G, J, K	500	130	F, G, J, K	300	1000	F, G, J, K	150
2.4	B, C, D	500									

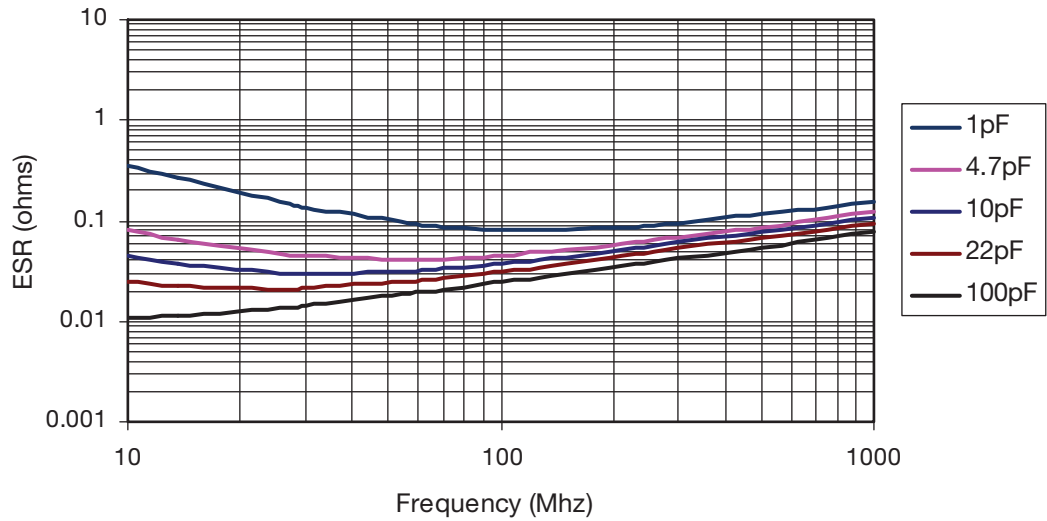
**TABLE V: TC: A (0±30PPM/°C)**

Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC
0.1	B	500	3.9	B, C, D	500	47	F, G, J, K	500	560	F, G, J, K	150
0.2	B	500	4.3	B, C, D	500	51	F, G, J, K	500	620	F, G, J, K	150
0.3	B,C	500	4.7	B, C, D	500	56	F, G, J, K	500	680	F, G, J, K	150
0.4	B,C	500	5.1	B, C, D	500	62	F, G, J, K	500	750	F, G, J, K	150
0.5	B, C, D	500	5.6	B, C, D	500	68	F, G, J, K	500	820	F, G, J, K	150
0.6	B, C, D	500	6.2	B, C, D	500	75	F, G, J, K	500	910	F, G, J, K	150
0.7	B, C, D	500	6.8	B, C, J, K	500	82	F, G, J, K	500	1000	F, G, J, K	150
0.8	B, C, D	500	7.5	B, C, J, K	500	91	F, G, J, K	500	1100	F, G, J, K	50
0.9	B, C, D	500	8.2	B, C, J, K	500	100	F, G, J, K	500	1200	F, G, J, K	50
1.0	B, C, D	500	9.1	B, C, J, K	500	110	F, G, J, K	300	1300	F, G, J, K	50
1.1	B, C, D	500	10	F, G, J, K	500	120	F, G, J, K	300	1500	F, G, J, K	50
1.2	B, C, D	500	11	F, G, J, K	500	130	F, G, J, K	300	1600	F, G, J, K	50
1.3	B, C, D	500	12	F, G, J, K	500	150	F, G, J, K	300	1800	F, G, J, K	50
1.4	B, C, D	500	13	F, G, J, K	500	160	F, G, J, K	300	2000	F, G, J, K	50
1.5	B, C, D	500	15	F, G, J, K	500	180	F, G, J, K	300	2200	F, G, J, K	50
1.6	B, C, D	500	16	F, G, J, K	500	200	F, G, J, K	300	2400	F, G, J, K	50
1.7	B, C, D	500	18	F, G, J, K	500	220	F, G, J, K	200	2700	F, G, J, K	50
1.8	B, C, D	500	20	F, G, J, K	500	240	F, G, J, K	200	3000	F, G, J, K	50
1.9	B, C, D	500	22	F, G, J, K	500	270	F, G, J, K	200	3300	F, G, J, K	50
2.0	B, C, D	500	24	F, G, J, K	500	300	F, G, J, K	200	3600	F, G, J, K	50
2.2	B, C, D	500	27	F, G, J, K	500	330	F, G, J, K	200	3900	F, G, J, K	50
2.4	B, C, D	500	30	F, G, J, K	500	360	F, G, J, K	200	4300	F, G, J, K	50
2.7	B, C, D	500	33	F, G, J, K	500	390	F, G, J, K	200	4700	F, G, J, K	50
3.0	B, C, D	500	36	F, G, J, K	500	430	F, G, J, K	200	5000	F, G, J, K	50
3.3	B, C, D	500	39	F, G, J, K	500	470	F, G, J, K	200	5100	F, G, J, K	50
3.6	B, C, D	500	43	F, G, J, K	500	510	F, G, J, K	150			

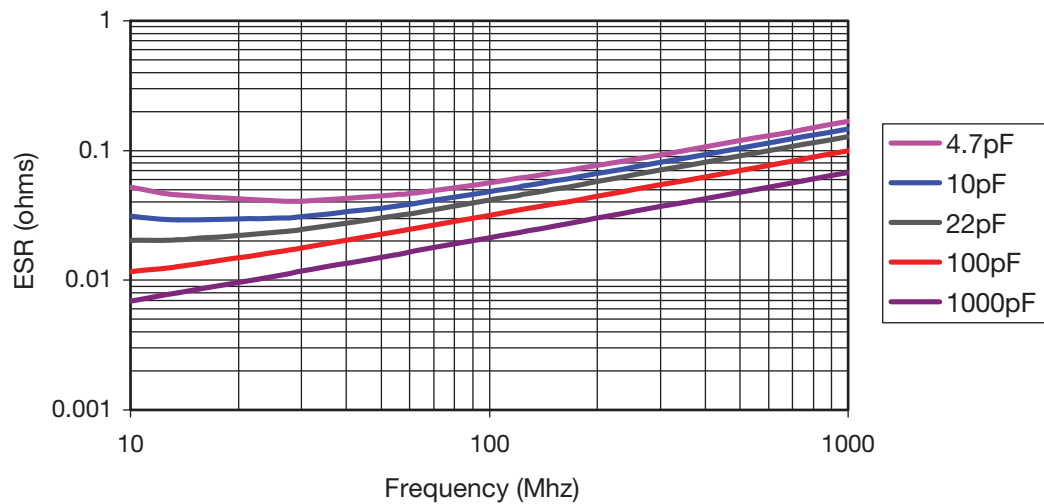
**TABLE VI: TC: C (±15%)**

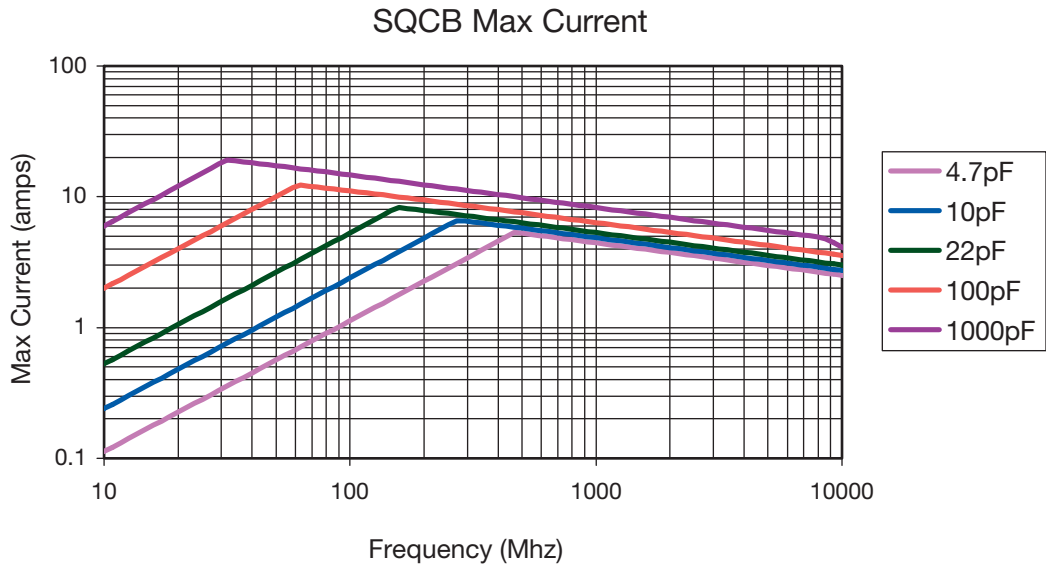
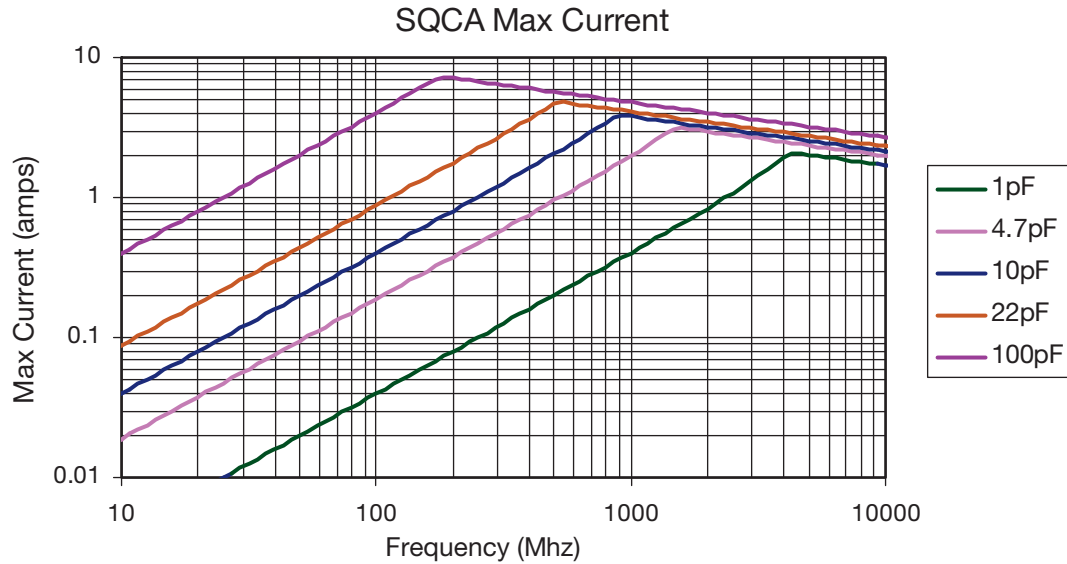
Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC
5000	K, M, N	50	15000	K, M, N	50	47000	K, M, N	50
6800	K, M, N	50	18000	K, M, N	50	68000	K, M, N	50
8200	K, M, N	50				82000	K, M, N	50
10000	K, M, N	50	27000	K, M, N	50	100000	K, M, N	50
12000	K, M, N	50	33000	K, M, N	50			
			39000	K, M, N	50			

Typical ESR SQCA

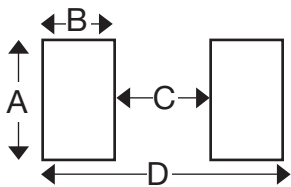
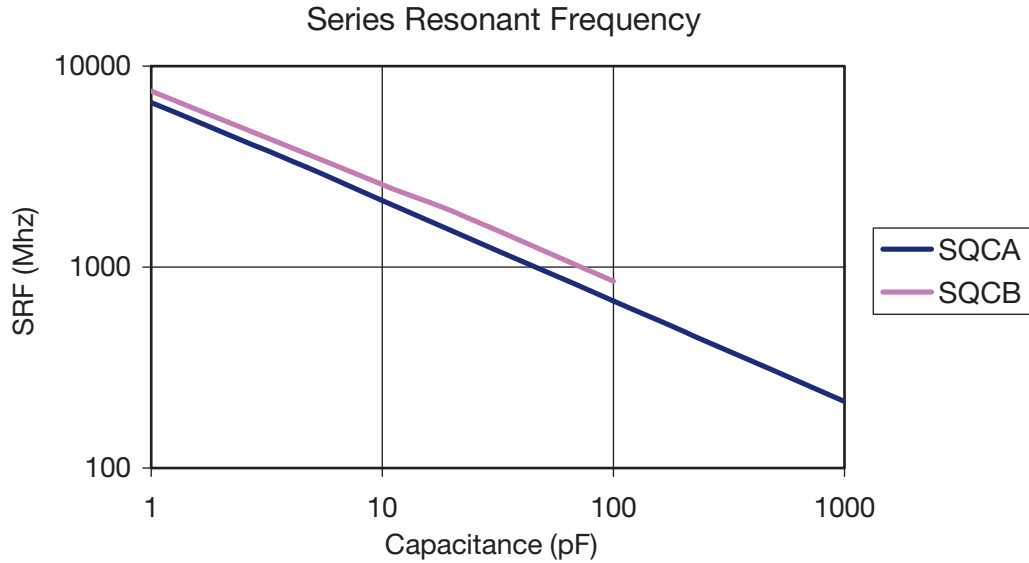


Typical ESR SQCB





8



### MOUNTING PAD DIMENSIONS: inches (millimeters)

Case	A min	B min	C min	D min
SQCA	0.082 (2.083)	0.051 (1.295)	0.032 (0.813)	0.130 (3.302)
SQCB	0.131 (3.327)	0.051 (1.295)	0.074 (1.880)	0.177 (4.496)
SQCS	0.038 (0.965)	0.043 (1.092)	0.025 (0.635)	0.112 (2.845)
SQCF	0.059 (1.499)	0.051 (1.295)	0.024 (0.610)	0.125 (3.175)

### SQCA & SQCB DESIGN KITS

PN	Series	Diel	Term	Range	Different Values	# per value
KITSQ100LF	SQCA	P90	100% Tin RoHS	.1 to 2pF	16	15
KITSQ400LF		C0G				
KITSQ200LF	SQCA	P90	100% Tin RoHS	1 to 10pF	16	15
KITSQ500LF		C0G				
KITSQ300LF	SQCA	P90	100% Tin RoHS	10 to 100pF	16	15
KITSQ600LF		C0G				
KITSQ700LF	SQCA	C0G	100% Tin RoHS	100 to 1000pF	16	15
KITSQ800LF	SQCB	P90	100% Tin RoHS	1 to 10pF	16	15
KITSQ1100LF		C0G				
KITSQ900LF	SQCB	P90	100% Tin RoHS	10 to 100pF	16	15
KITSQ1200LF		C0G				
KITSQ1000LF	SQCB	P90	100% Tin RoHS	100 to 1000pF	16	15
KITSQ1300LF		C0G				
KITSQ1400LF	SQCB	C0G	100% Tin RoHS	1000 to 5100 pF	11	15