LOW ESR / HIGH-Q CAPACITOR SELECTION CHART

Cap. Value \ EIA Size					RF Power Applications							
			0201 (R05) NPO (R05L)	0402 (R07S)	0603 (R14S)	0805 (R15S)	0805 (R15L)	1111 (S42E)		2525 (S48E)	3838 (S58E)	
Capacitance pF	Code											
0.1	0R1	A B C D	25/50 V	50/250 V	250 V							
0.2	0R2		25/50 V	50/250 V	250 V			500V	1500V			
0.3	0R3		25/50 V	50/250 V	250 V	250 V		500V	1500V			
0.4	0R4		25/50 V	50/250 V	250 V	250 V		500V	1500V			
0.5	0R5		25/50 V	50/250 V	250 V	250 V		500V	1500V	3600V		
0.6	0R6		25/50 V	50/250 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
0.7	0R7		25/50 V	50/250 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
0.8	0R8		25/50 V	50/250 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
0.9	0R9		25/50 V	50/250 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
1.0	1R0		25/50 V	50/250 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
1.1	1R1		25/50 V	50/250 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
1.2	1R2		25/50 V	50/250 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
1.3	1R3		25/50 V	50/250 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
1.4	1R4		25/50 V	50/250 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
1.5	1R5		25/50 V	50/250 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
1.6	1R6		25/50 V	50/250 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
1.7	1R7		25/50 V	50/250 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
1.8	1R8		25/50 V	50/250 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
1.9	1R9		25/50 V	50/250 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
2.0	2R0		25/50 V	50/250 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
2.1	2R1		25/50 V	50/250 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
2.2	2R2		25/50 V	50/250 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
2.4	2R4		25/50 V	50/250 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
2.7	2R7		25/50 V	50/250 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
3.0	3R0		25/50 V	50/250 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
3.3	3R3		25/50 V	50/250 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
3.6	3R6		25/50 V	50/200 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
3.9	3R9		25/50 V	50/200 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
4.3	4R3		25/50 V	50/200 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
4.7	4R7		25/50 V	50/200 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
5.1	5R1	A** B C D	25/50 V	50/200 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
5.6	5R6		25/50 V	50/200 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
6.2	6R2		25/50 V	50/200 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
6.8	6R8		25/50 V	50/200 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
7.5	7R5		25/50 V	50/200 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
8.2	8R2		25/50 V	50/200 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
9.1	9R1		25/50 V	50/200 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
10	100	F G J K	25/50 V	50/200 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
11	110		25/50 V	50/200 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
12	120		25/50 V	50/200 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
13	130		25/50 V	50/200 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
15	150		25/50 V	50/200 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
16	160		25/50 V	50/200 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
18	180		25/50 V	50/200 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
20	200		25/50 V	50/200 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
22	220		25/50 V	50/200 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
24	240		25/50 V	50/200 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
27	270		25/50 V	50/200 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
30	300		25/50 V	50 V	250 V	250 V		500V	1500V	3600V	3600V	7200V
33	330		25/50 V	50 V	250 V	250 V		500V	1500V	3600V	3600V	7200V

Consult factory for Non-Standard values.
**A tolerance only available for R07S (0402) and R14S(0603) caps

LOW ESR / HIGH-Q CAPACITOR SELECTION CHART

EIA Size / Cap. Value					RF Power Applications							
			0201 (R05) NPO (R05L)	0402 (R07S)	0603 (R14S)	0805 (R15S)	0805 (R15L)	1111 (S42E)		2525 (S48E)	3838 (S58E)	
Capacitance pF	Code	Toler-ance										
36	360	F G J K	25/50 V		250 V	250 V		500V	1500V	3600V	3600V	7200V
39	390		25/50 V		250 V	250 V		500V	1500V	3600V	3600V	7200V
43	430		25/50 V		250 V	250 V		500V	1500V	3600V	3600V	7200V
47	470		25/50 V		250 V	250 V		500V	1500V	3600V	3600V	7200V
51	510		25/50 V		250 V	250 V		500V	1500V	3600V	3600V	7200V
56	560		25/50 V		250 V	250 V		500V	1500V	3600V	3600V	7200V
62	620		25/50 V		250 V	250 V		500V	1500V	3600V	3600V	7200V
68	680		25/50 V		250 V	250 V		500V	1500V	3600V	3600V	7200V
75	750		25/50 V		250 V	250 V		500V	1500V	3600V	3600V	7200V
82	820		25/50 V		250 V	250 V		500V	1500V	3600V	3600V	7200V
91	910		25/50 V		250 V	250 V		500V	1500V	3600V	3600V	7200V
100	101		25/50 V		250 V	250 V		500V	1500V	3600V	3600V	7200V
110	111					250 V		300V	1500V	2500V	3600V	7200V
120	121					250 V		300V	1000V	2500V	3600V	7200V
130	131					250 V		300V	1000V	2500V	3600V	7200V
150	151					250 V		300V	1000V	2500V	3600V	7200V
160	161					250 V		300V	1000V	2500V	3600V	7200V
180	181					250 V		300V	1000V	2500V	3600V	7200V
200	201					250 V		300V	1000V	2500V	3600V	
220	221					250 V		200V	1000V	2500V	3600V	
240	241						200/500V	200V	600V	2500V	3600V	
270	271						200/500V	200V	600V	2500V	3600V	
300	301						200/500V	200V	600V	1500V	3600V	
330	331						200/500V	200V	600V	1500V	3600V	
360	361						200/500V	200V	600V	1500V	3600V	
390	391						200/500V	200V	500V	1500V	3600V	
430	431	F G J K					200/500V	200V	500V	1500V	2500V	
470	471						500V	200V	500V	1500V	2500V	
510	511						100V	200V	500V	1000V	2500V	
560	561						100V	200V	500V	1000V	2500V	
620	621						100V	200V	500V	1000V	2500V	
680	681						50V	200V		1000V	2500V	
750	751						50V	200V		1000V	2500V	
820	821						50V	200V		1000V	2500V	
910	911						50V	200V		1000V	1000V	
1000	102						50V	200V		1000V	1000V	
1200	122						50V			1000V	1000V	
1500	152						50V			500V	1000V	
1800	182						50V			500V	1000V	
2200	222						50V			300V	1000V	
2700	272									300V	500V	
3300	332										500V	
3900	392										500V	
4700	472										500V	
5100	512										500V	
10000	103											

Consult factory for Non-Standard values.

Dielectric Characteristics NPO

TEMPERATURE COEFFICIENT:	0 ± 30ppm /°C, -55 to 125°C
QUALITY FACTOR / DF:	Q >1,000 @ 1KHz (C>1,000pF), Typical 10,000 (C<1,000 pF)
INSULATION RESISTANCE:	>100 GΩ @ 25°C,WVDC[1]; 125°C IR is 10% of 25°C rating
TEST PARAMETERS:	1MHz ±50kHz, 1.0±0.2VRMS for capacitance values ≤ 1,000pF 1kHZ ±50Hz, 1.0±0.2VRMS for capacitance values > 1,000pF
DIELECTRIC STRENGTH:	500 V ≤ 2.5 X WVDC[1] Min., 25°C, 50 mA max 1000 V ≤ 1.5 X WVDC[1] Min., 25°C, 50 mA max > 1500 = 1 X WVDC[1] Min., 25°C, 50 mA max

AVAILABLE CAPACITANCE:

Size 0201:	0.2 - 100 pF	Size 1111:	0.2 - 1000 pF
Size 0402:	0.2 - 33 pF	Size 2525:	1.0 - 2700 pF
Size 0603:	0.2 - 100 pF	Size 3838:	1.0 - 5100 pF
Size 0805:	0.3 - 220 pF		

*ON REQUEST, WE CAN EXTEND THE HIGHEST TEMPERATURE TO +150° C FOR ANY OF OUR HIGH-Q SERIES

Mechanical & Environmental Characteristics

	SPECIFICATION	TEST PARAMETERS
SOLDERABILITY:	Solder coverage ≥ 90% of metalized areas No termination degradation	Preheat chip to 120°-150°C for 60 sec., dip terminals in rosin flux then dip in Sn62 solder @ 240°±5°C for 5±1 sec
RESISTANCE TO SOLDERING HEAT:	No mechanical damage Capacitance change: ±2.5% or 0.25pF Q>500 I.R. >10 G Ohms DWV[2]: 2.5 x WVDC[1]	Preheat device to 80°-100°C for 60 sec. followed by 150°-180°C for 60 sec. Dip in 260°±5°C solder for 10±1 sec. Measure after 24±2 hour cooling period
TERMINAL ADHESION:	Termination should not pull off. Ceramic should remain undamaged.	Linear pull force[3] exerted on axial leads soldered to each terminal.
PCB DEFLECTION:	No mechanical damage. Capacitance change: 5% or 0.5pF whichever is greater.	Glass epoxy PCB: 2 mm deflection
LIFE TEST:	MIL-STD-202, Method 108I No mechanical damage Capacitance change: ±3.0% or 0.3 pF Q>500 I.R. >1 G Ohms DWV[2]: 2.5 x WVDC[1]	Applied voltage: 200% of WVDC[1] for capacitors rated at 500 volts DC or less. 100% of WVDC[1] for capacitors rated at 1250 volts DC or less. Temperature: 125°±3°C Test time: 1000+48-0 hours
THERMAL CYCLE:	No mechanical damage. Capacitance change: ±2.5% or 0.25pF Q>2000 I.R. >10 G Ohms DWV[2]: 2.5 x WVDC[1]	5 cycles of: 30±3 minutes @ -55°+0/-3°C, 2-3 min. @ 25°C, 30±3 min. @ +125°+3/-0°C, 2-3 min. @ 25°C Measure after 24±2 hour cooling period
HUMIDITY, STEADY STATE:	No mechanical damage. Capacitance change: ±5.0% or 0.50pF max. Q>300 I.R. ≥ 1 G-Ohm DWV[2]: 2.5 x WVDC[1]	Relative humidity: 90-95% Temperature: 40°±2°C Test time: 500 +12/-0 Hours Measure after 24±2 hour cooling period
HUMIDITY, LOW VOLTAGE:	No mechanical damage. Capacitance change: ±5.0% or 0.50pF max. Q>300 I.R. = 1 G-Ohm min. DWV[2]: 2.5 x WVDC[1]	Applied voltage: 1.5 VDC, 50 mA max. Relative humidity: 85±2% Temperature: 40°±2°C Test time: 240 +12/-0 Hours Measure after 24±2 hour cooling period
VIBRATION:	No mechanical damage. Capacitance change: ±2.5% or 0.25pF Q>1000 I.R. ≥ 10 G-Ohm DWV[2]: 2.5 x WVDC[1]	Cycle performed for 2 hours in each of three perpendicular directions Frequency range 10Hz to 55 Hz to 10 Hz traversed in 1 minute. Harmonic motion amplitude: 1.5mm

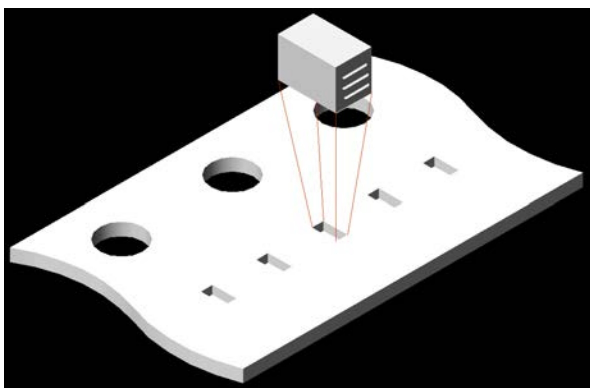
[1] - WVDC - Working Voltage DC.
[2] - DWV - Dielectric Withstanding Voltage.
[3] - 0402 ≥ 2.0lbs, 0603 ≥ 4.0lbs (min).
AEC-Q200: Qualification required for automotive application - Not available for all series - Call factory for info.

Mechanical Characteristics

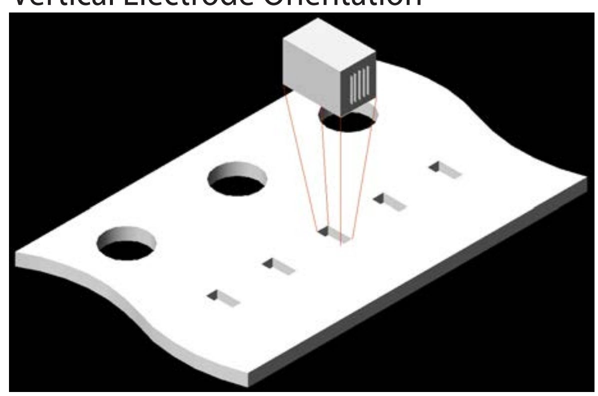
Size	Units	Length	Width	Thickness	End Band
EIA 0201	In	.024 ±.001	.012 ±.001	.012 ±.001	.008 Max.
Metric (0603)	mm	(0.60 ±0.03)	(0.30 ±0.03)	(0.30 ±0.03)	(0.20 Max.)
EIA 0402	In	.040 ±.004	.020 ±.004	.020 ±.004	.010 ±.006
Metric (1005)	mm	(1.02 ±0.1)	(0.51 ±0.1)	(0.51 ±0.1)	(0.25 ±.15)
EIA 0603	In	.062 ±.006	.032 ±.006	.030 +.005/-.003	.014 ±.006
Metric (1608)	mm	(1.57 ±0.15)	(0.81 ±0.15)	(0.76 +.13-.08)	(0.35 ±.15)
EIA 0805	In	.080 ±.008	.050 ±.008	.040 ±.006	.020 ±.010
Metric (2012)	mm	(2.03 ±0.20)	(1.27 ±0.20)	(1.02 ±.15)	(0.50 ±.25)

Horizontal and Verticle Oriented Capacitors

Horizontal Electrode Orientation



Vertical Electrode Orientation



Applications & Features

Size: EIA 0201, 0805, 1111

Performance: SRF's up to 20 GHz, Ultra High Q, Tight tolerance, Ultralow ESR

Termination: Ni/Au, Ni/Sn, Ni/SnPb

Applications: High Frequency Wireless Communications, Portable Wireless Products, Battery Powered Products

RoHS Compliant

Benifits of using Oriented Capacitors

- Consistent Orientation - Improved repeatability of production circuits.
- Consistent Orientation - More consistent filter performance.
- Vertical Orientation - The elimination of parallel frequencies.
- Vertical Orinetation - Lower inductance for a given capacitor.
- Horizontal Orientation - Lower coupling between adjacent capacitors.

E-Series Terminations and Leads

CHIP DIMENSIONS

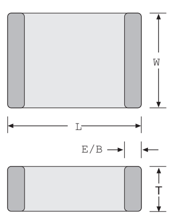
Termination	Size	Units	L	Tol	W	Tol	T	E / B	Tol
V, T, U, C	S42E	In	0.110	+.020 -.010	0.110	+/- .015	0.102 Max.	0.015 Typ.	+/- 0.008
		mm	2.79	+0.51 -0.25	2.79	+/- 0.38	2.59 Max.	0.38 Typ.	+/- 0.20
T, U, C	S48E	In	0.230	+.025 -.010	0.250	+/- .015	0.150 Max.	0.025 Typ.	
		mm	5.84	+0.63 -0.25	6.35	+/- 0.38	3.81 Max.	0.63 Typ.	
T, U, C	S58E	In	0.380	+.015 -.010	0.380	+/- .010	0.170 Max.	0.025 Typ.	
		mm	9.65	+0.38 -0.25	9.65	+/- 0.25	4.32 Max.	0.63 Typ.	

For all E-Series Models:

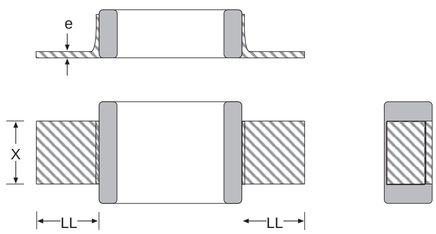
OPERATING TEMP. :	-55 to +150°C
INSULATION RESISTANCE:	>10G Ω @ 25°C
TEMPERATURE COEFFICIENT:	0 ± 30ppm /°C, -55 to 125°C
DISSIPATION FACTOR (TYP.):	< 0.05% @ 1 MHz

Drawings not to scale

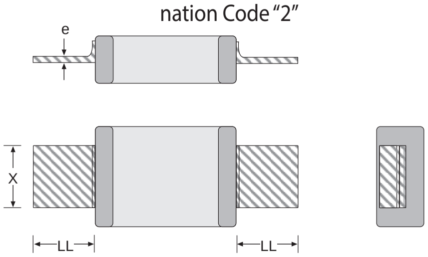
S42E Family Termination Codes "V", "T", "U", or "C"
S48E and S58E Families Termination Codes "U", "C"



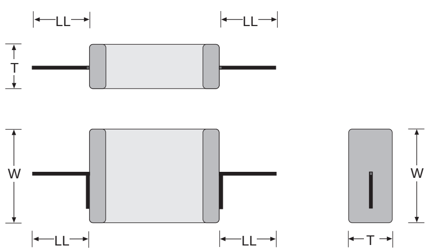
Microstrip Ribbon Leads (Non-Magnetic), Termination Code "1"



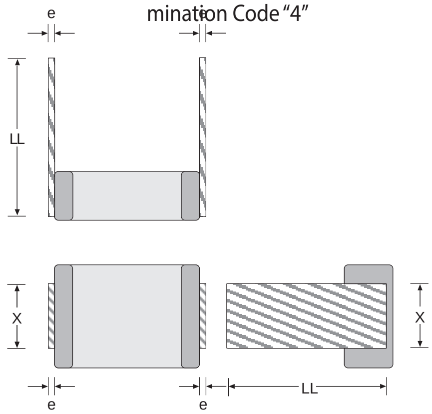
Axial Ribbon Leads (Non-Magnetic), Termination Code "2"



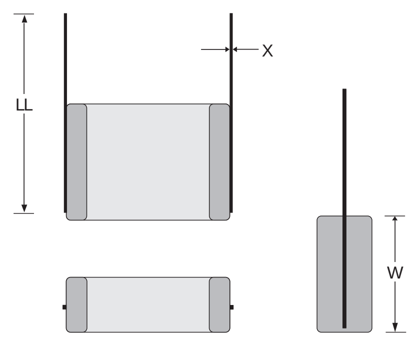
Axial Wire Leads (Non-Magnetic), Termination Code "3"



Radial Ribbon Leads (Non-Magnetic), Termination Code "4"



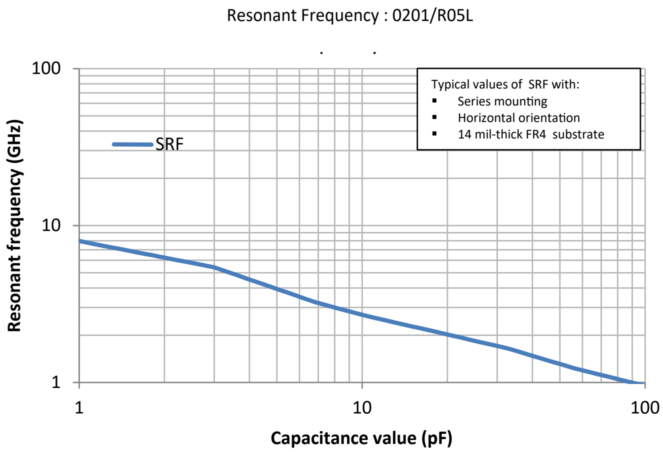
Radial Wire Leads (Non-Magnetic), Termination Code "5"



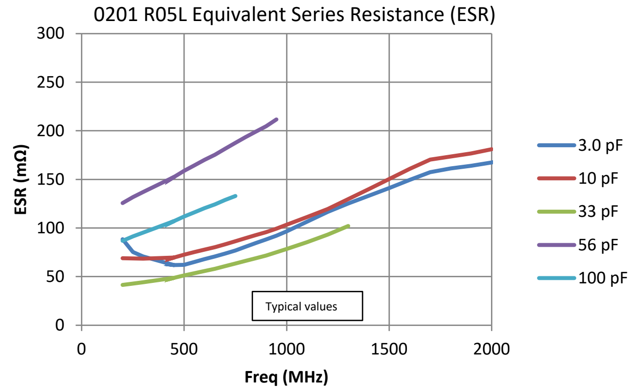
Lead	Size	LL(min)	X	Tol	e	e-Tol
1	S42E	0.25	0.093	+/-0.005	0.004	+/- 0.002
		6.40	2.36	+/- 0.13	0.102	+/- 0.051
	S48E	0.394	0.217	+/- 0.02	0.009	- 0.0019/+ 0.0031
		10.0	5.5	+/- 0.50	0.220	- 0.050/+ 0.080
	S58E	0.748	0.35	+/- 0.02	0.010	- 0.0019/+ 0.0039
		19.00	8.90	+/- 0.50	0.250	- 0.050/+ 0.100
2	S42E	0.25	0.093	+/-0.005	0.004	+/- 0.002
		6.40	2.36	+/- 0.13	0.102	+/- 0.051
	S48E	0.394	0.217	+/- 0.02	0.009	- 0.0019/+ 0.0031
		10.00	5.50	+/- 0.50	0.220	- 0.050/+ 0.080
	S58E	0.748	0.35	+/- 0.02	0.010	- 0.0019/+ 0.0039
		19.00	8.90	+/- 0.50	0.25	- 0.050/+ 0.100
3	S42E	0.25	0.020in (0.511) diameter wire			
		6.40				
	S48E	0.394				
		10.00				
	S58E	0.748				
		19.00				

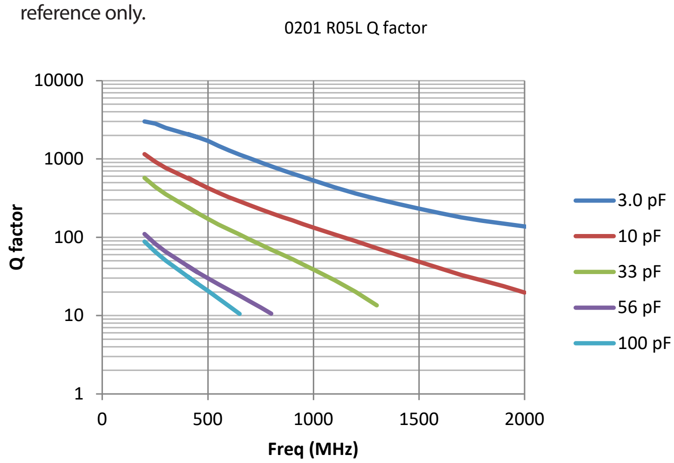
Lead	Size	LL(min)	X	Tol	e	e-Tol
4	S42E	0.352	0.093	+/-0.005	0.004	+/- 0.002
		8.90	2.36	+/- 0.13	0.102	+/- 0.051
	S48E	0.501	0.217	+/- 0.02	0.009	- 0.0019/+ 0.0031
		12.70	5.50	+/- 0.50	0.220	- 0.050/+ 0.080
	S58E	0.886	0.35	+/- 0.02	0.010	- 0.0019/+ 0.0039
		22.50	8.90	+/- 0.50	0.25	- 0.050/+ 0.100
5	S42E	0.25	0.020in (0.511) diameter wire			
		6.40				
	S48E	0.394				
		10.00				
	S58E	0.748				
		19.00				

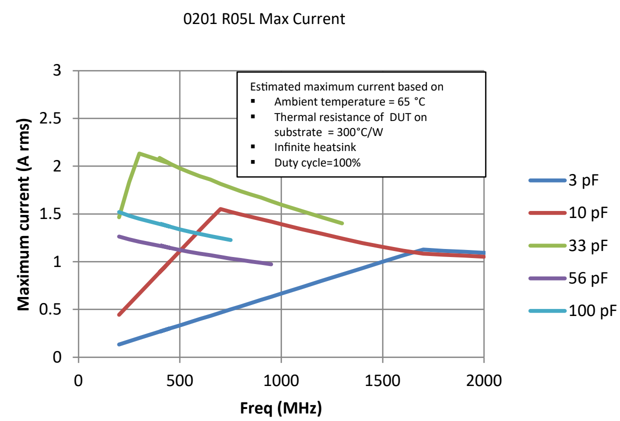
RF CHARACTERISTICS - 0201 R05L SERIES More data at: https://jtisoft.johansontechnology.com



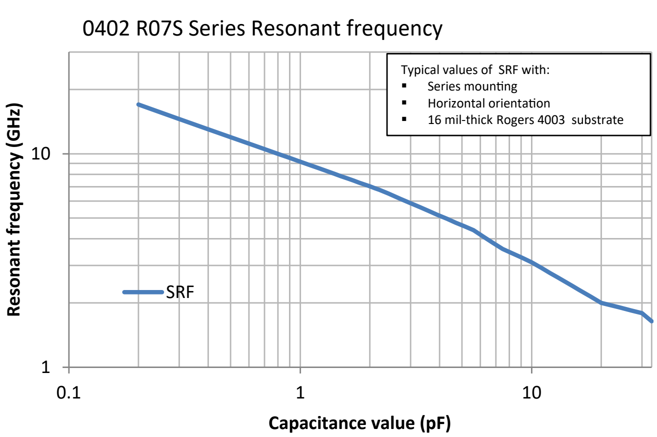
The Series Resonant Frequency is highly dependent on the substrate, pad dimensions, and measurement method. The above chart is for reference only.

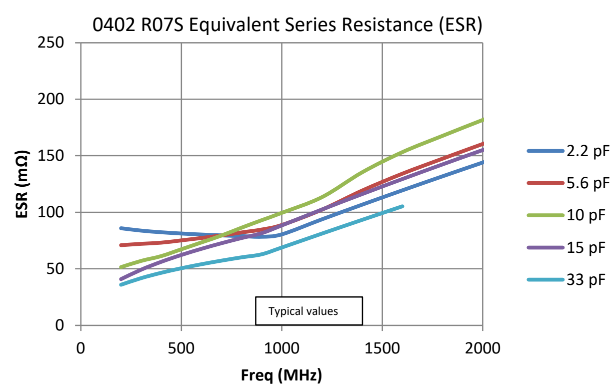






RF CHARACTERISTICS - 0402 R07S SERIES More data at: https://jtisoft.johansontechnology.com





The Series Resonant Frequency is highly dependent on the substrate, pad dimensions, and measurement method. The above chart is for reference only.

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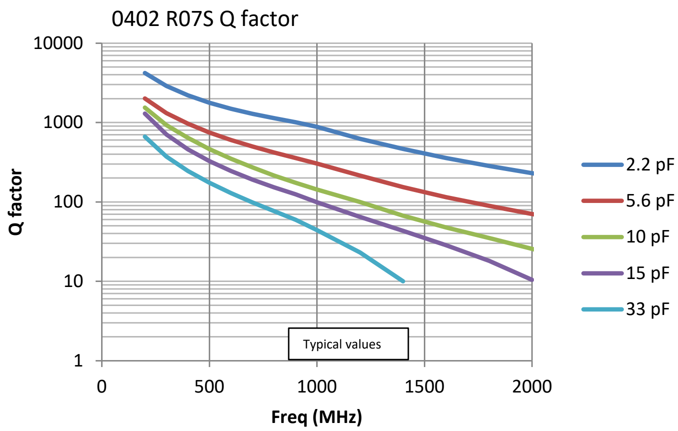

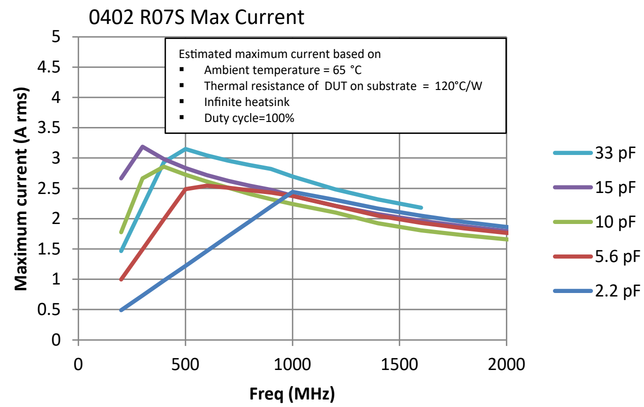

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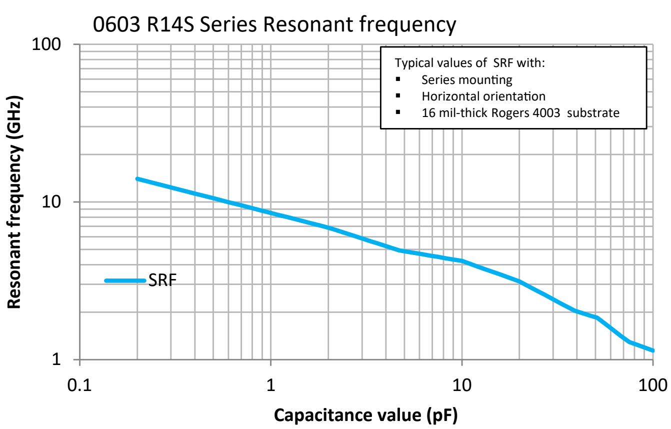

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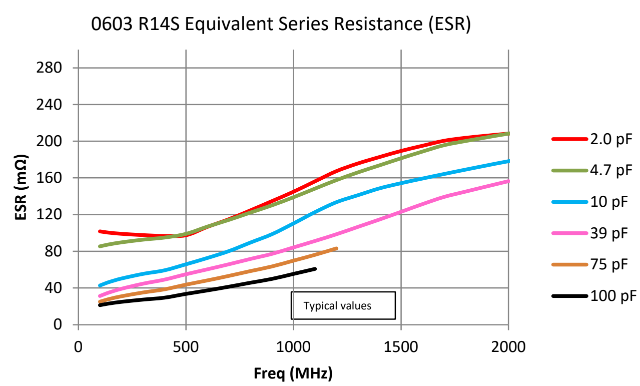

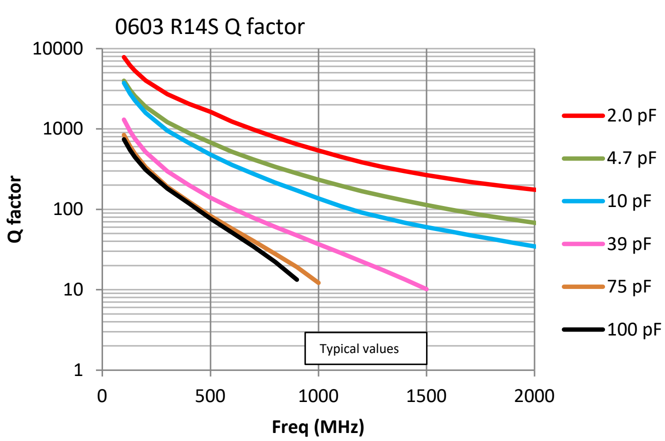

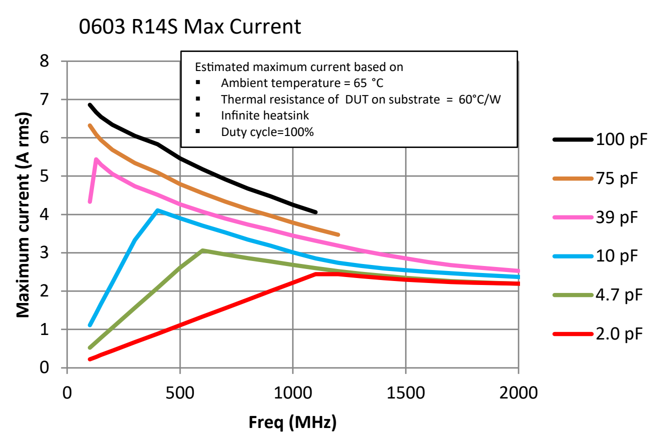

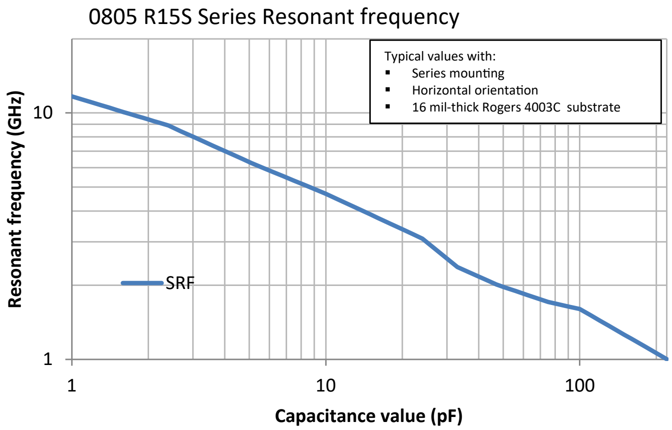

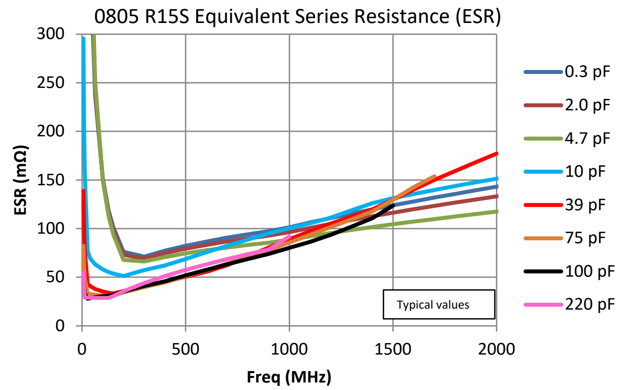

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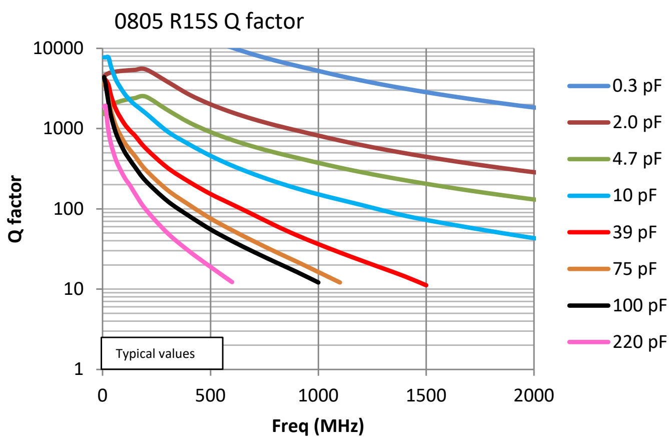

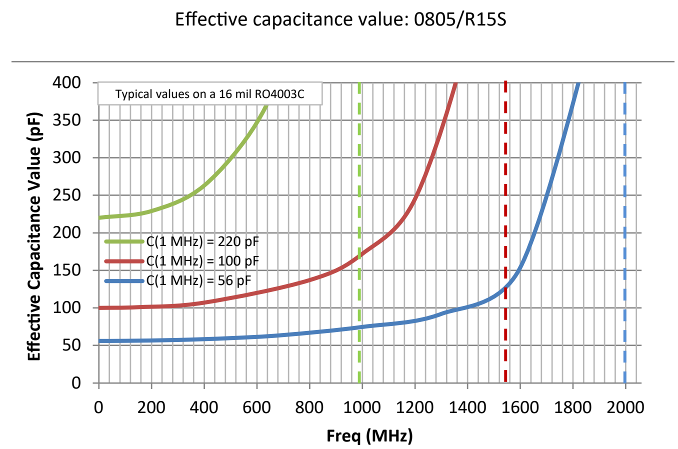

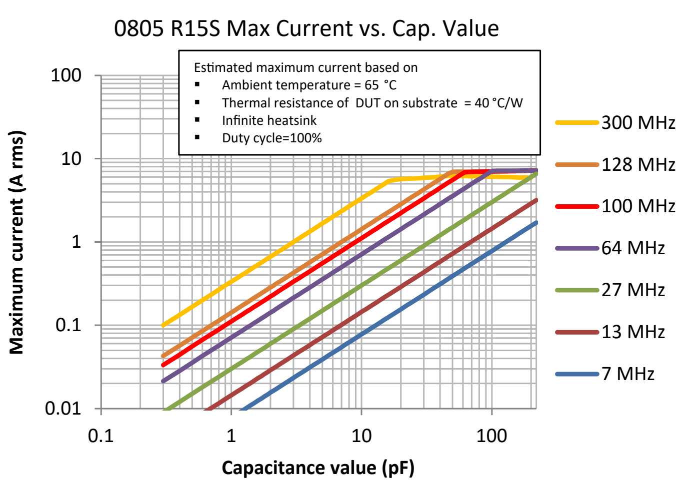

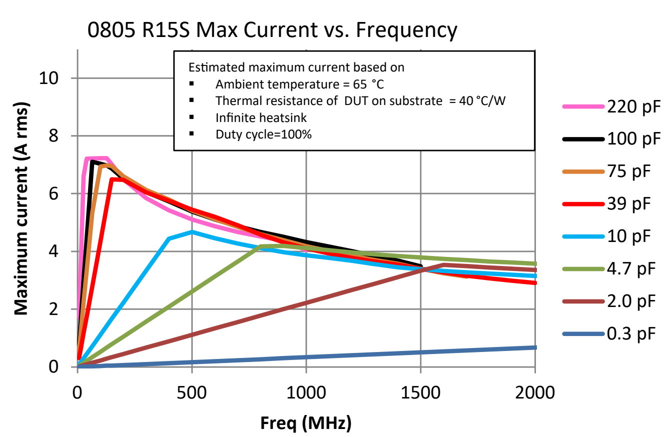

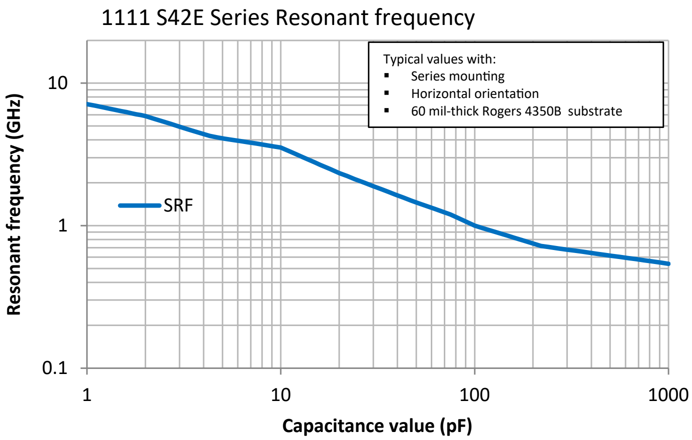

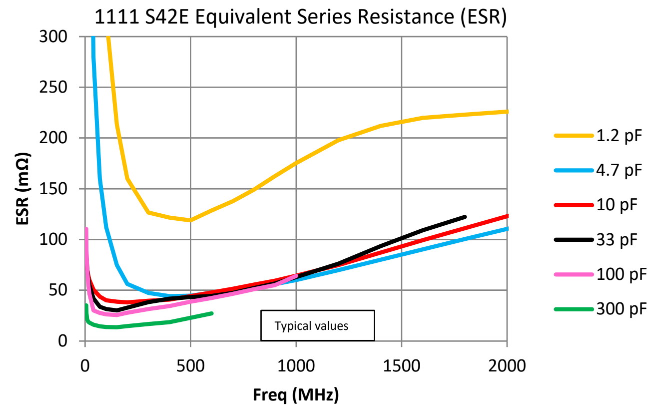

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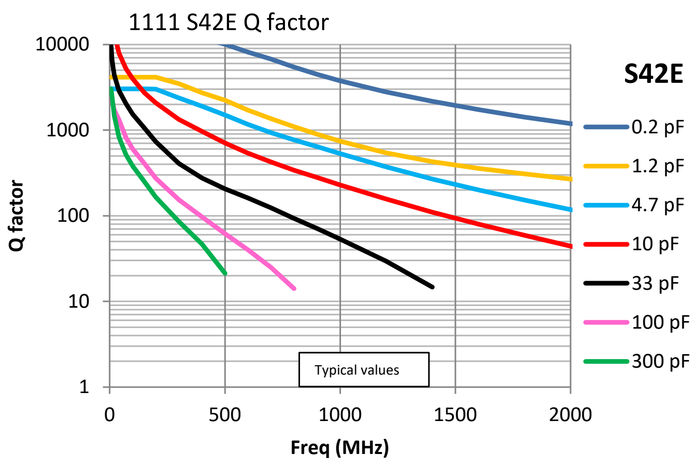

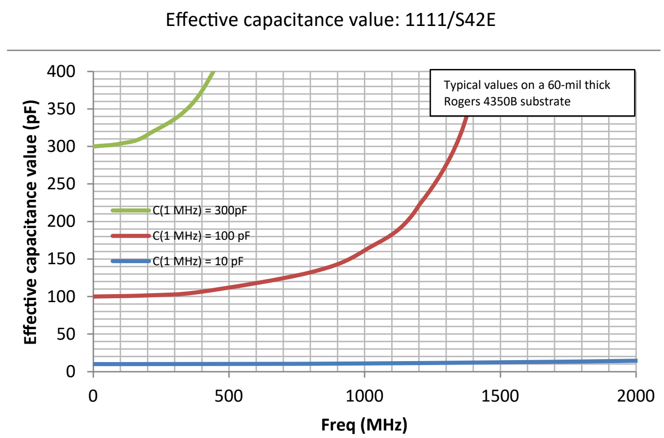

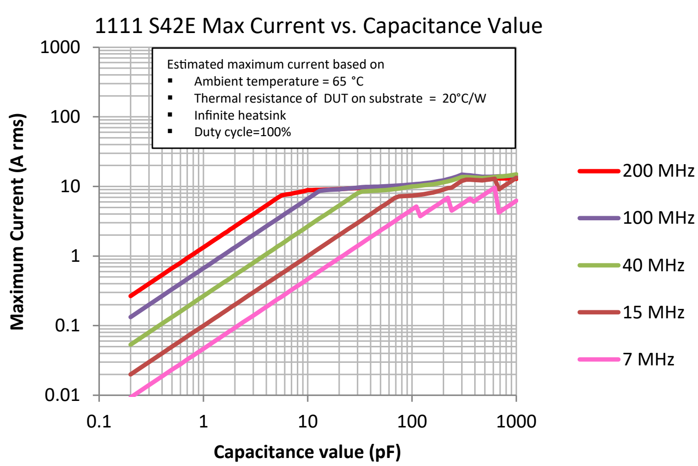

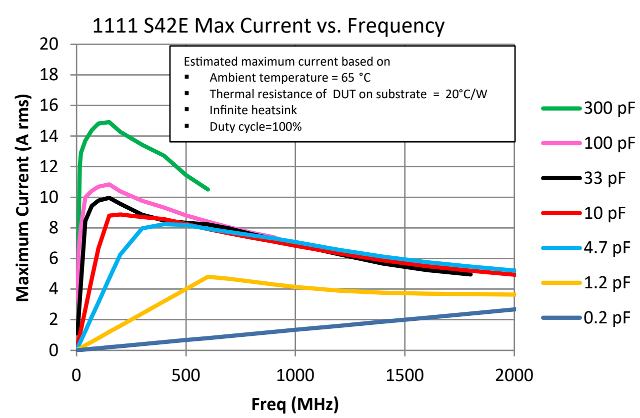

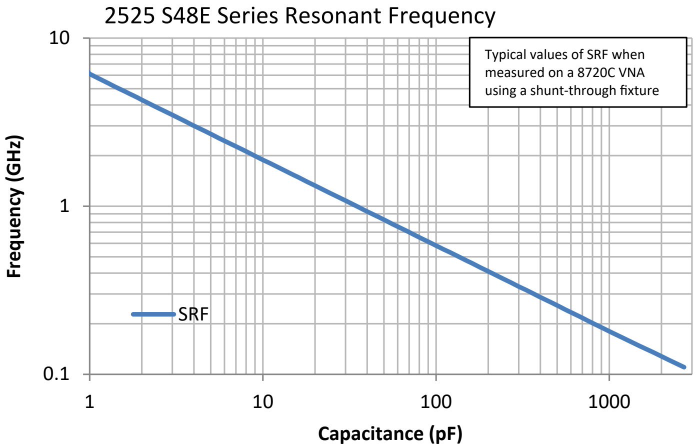

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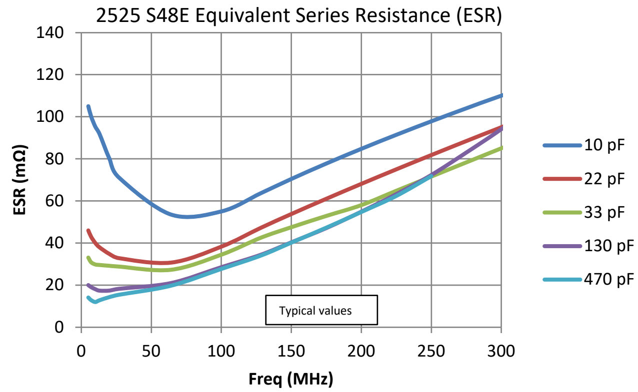

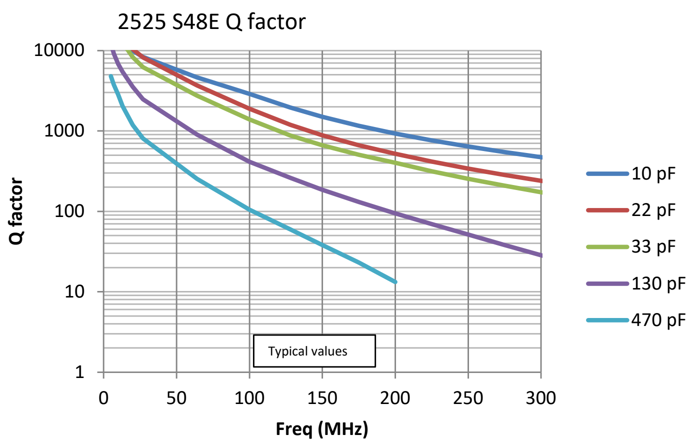

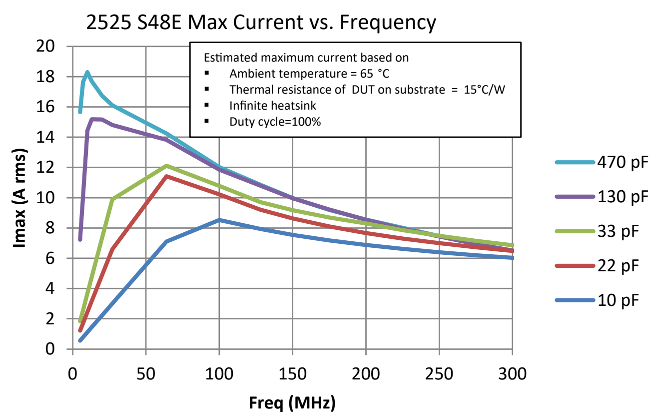

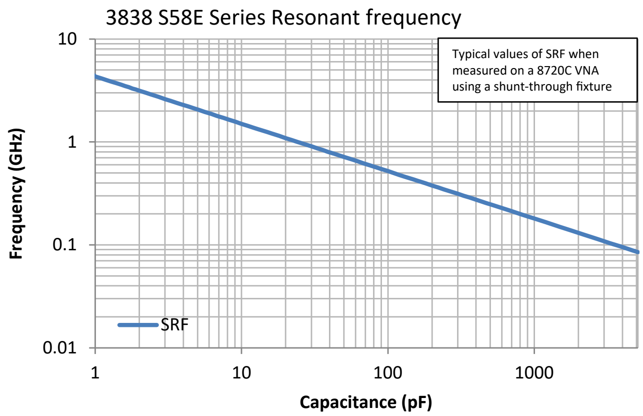

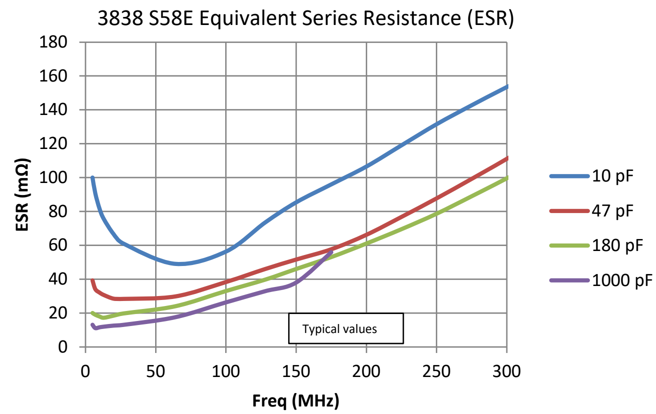

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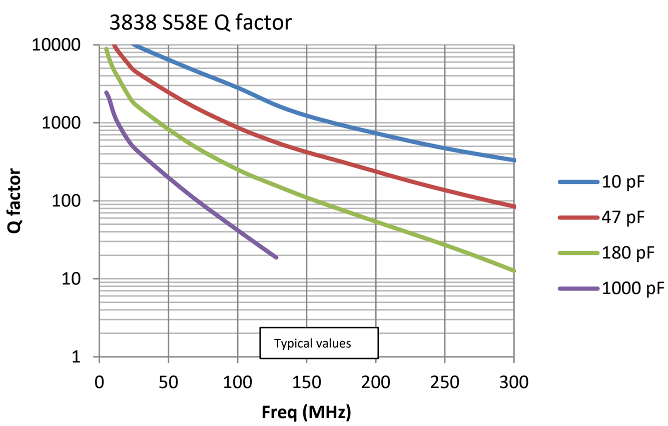

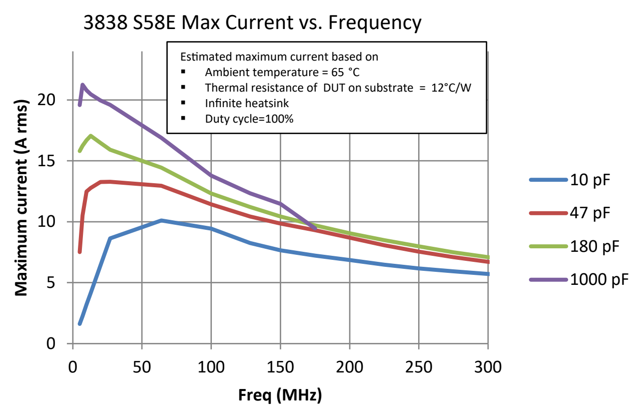

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