0505C/P (.055" x .055")

◆ Product Features

High Q, High Power, Low ESR/ESL, Low Noise, High Self-Resonance, Ultra-Stable Performance.

◆ Product Application

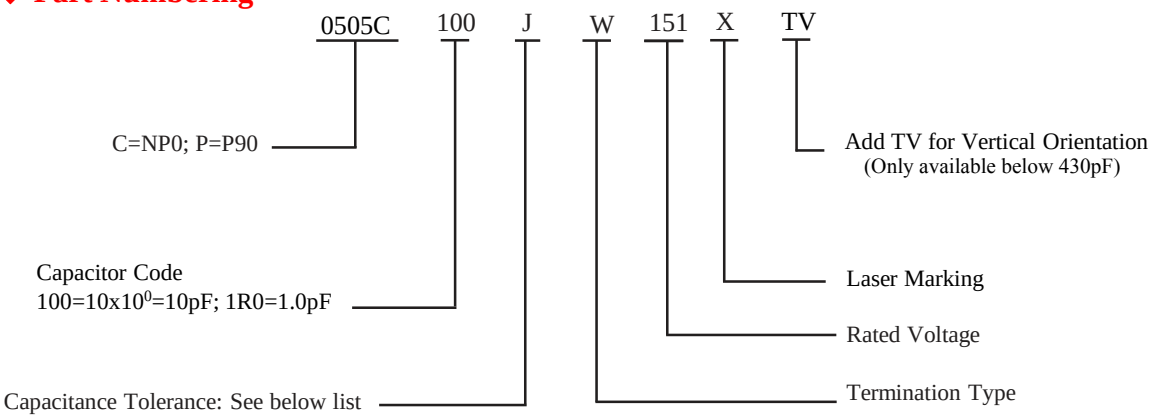
Typical Functional Applications: Tuning, Bypass, Coupling, Feedback, D.C. Blocking and Impedance Matching.
Typical Circuit Applications: UHF/Microwave RF Power Amplifiers, Mixers, Oscillators, Low Noise Amplifiers, Filter Networks, Timing Circuits and Delay Lines.

◆ 0505C/P Capacitance Table NP0=C; P90=P **Max. capacitance: 0505P=100pF; 0505C=1000pF**

Cap. pF	Code	Tol.	Rated WVDC	Cap. pF	Code	Tol.	Rated WVDC	Cap. pF	Code	Tol.	Rated WVDC	Cap. pF	Code	Tol.	Rated WVDC
0.1	0R1	A,B, C,D	150V Code 151 or 250V Code 251 or 300V Code 301	2.4	2R4	A,B, C,D	150V Code 151 or 250V Code 251 or 300V Code 301	20	200	F,G, J,K	150V Code 151 or 250V Code 251 or 300V Code 301	160	161*	F,G, J,K	150V Code 151 or 200V Code 201
0.2	0R2			2.7	2R7			22	220			180	181*		
0.3	0R3			3.0	3R0			24	240			200	201*		
0.4	0R4			3.3	3R3			27	270			220	221*		
0.5	0R5			3.6	3R6			30	300			240	241*		
0.6	0R6			3.9	3R9			33	330			270	271*		
0.7	0R7			4.3	4R3			36	360			300	301*		
0.8	0R8			4.7	4R7			39	390			330	331*		150V Code 151
0.9	0R9			5.1	5R1			43	430			360	361*		
1.0	1R0			5.6	5R6			47	470			390	391*		
1.1	1R1			6.2	6R2			51	510		150V Code 151 or 200V Code 201	430	431*		
1.2	1R2			6.8	6R8			56	560			470	471*		
1.3	1R3			7.5	7R5			62	620			510	511*		
1.4	1R4			8.2	8R2			68	680			560	561*		
1.5	1R5			9.1	9R1			75	750			620	621*		
1.6	1R6			10	100	F,G, J,K		82	820			680	681*		50V Code 500 or 100V Code 101
1.7	1R7			11	110			91	910			750	751*		
1.8	1R8			12	120			100	101			820	821*		
1.9	1R9			13	130			110	111*			910	911*		
2.0	2R0			15	150			120	121*			1000	102*		
2.1	2R1			16	160			130	131*						
2.2	2R2			18	180			150	151*						

Remark: special capacitance, tolerance and WVDC are available, consult with PASSIVE PLUS.
* - Available in NP0 only.

◆ Part Numbering



Capacitance Tolerance								
Code	A	B	C	D	F	G	J	K
Tolerance	±0.05pF	±0.1pF	±0.25pF	±0.5pF	±1%	±2%	±5%	±10%

◆0505C/P Magnetic and Non-Magnetic Dimensions

unit:inch(millimeter)

Series	Term. Code	Type/Outlines	Capacitor Dimensions				Plated Material
			Length Lc	Width Wc	Thickness Tc	Overlap B	
0505C 0505P	W	 Chip	.055 +.015 to -.010 (1.40 +0.38 to -0.25)	.055±.010 (1.40±0.25)	.057 (1.45max)	.020 (0.51max)	100%Sn Solder over Nickel Plating RoHS Compliant
0505C 0505P	L						90%Sn10%Pb Tin/Lead Solder over Nickel Plating
0505C 0505P	P (Non-Mag)	 Chip (Non-Mag)					100%Sn Solder over Copper Plating RoHS Compliant

Note: "Non-Mag" means no magnetic materials.

◆ Performance

Item	Specifications
Quality Factor (Q)	greater than 10,000 at 1MHz.
Insulation Resistance (IR)	10^5 Megohms min. @ +25 ℃ at rated WVDC. 10^4 Megohms min. @ +125 ℃ at rated WVDC.
Rated Voltage	See Rated Voltage Table.
Dielectric Withstanding Voltage (DWV)	250% of rated Voltage for 5 seconds.
Operating Temperature Range	-55℃ to +200℃
Temperature coefficient (TC)	C: -55°C to 125°C 0±30ppm/°C; >125°C to 200°C 0±60ppm/°C P: +90±20ppm/°C
Capacitance Drift	±0.02% or ±0.02pF, whichever is greater.
Piezoelectric Effects	None
Termination Type	See Termination Type Table.

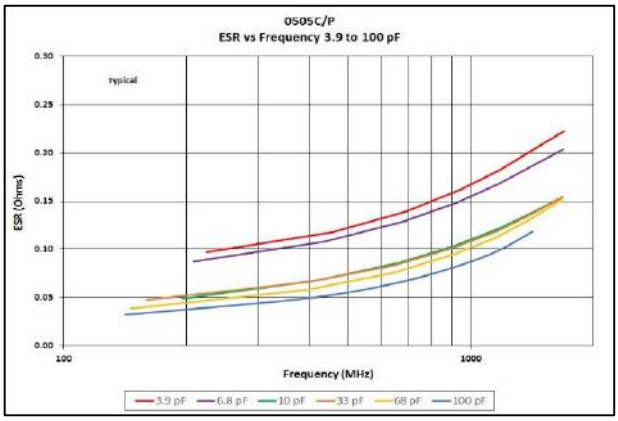
Capacitors are designed and manufactured to meet the requirements of MIL-PRF-55681 and MIL-PRF-123.

◆ Environmental Tests

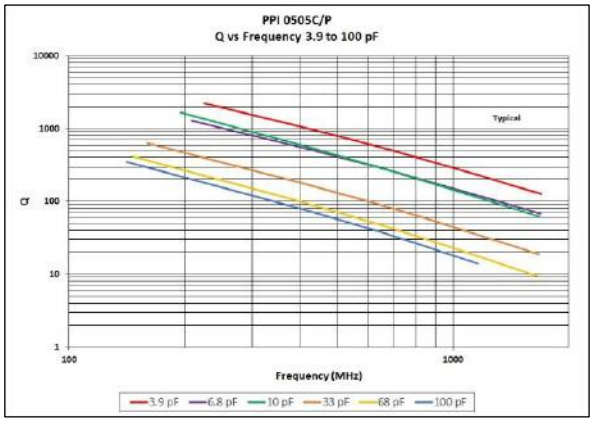
Item	Specifications	Method
Thermal shock	DWV: the initial value IR: Shall not be less than 30% of the initial value Capacitance change: no more than 0.5% or 0.5 pF, whichever is greater.	MIL-STD-202, Method 107, Condition A. At the maximum rated temperature (-55℃ and 200℃) stay 30 min,the time of removing shall not be more than 3 minutes. Perform the five cycles.
Moisture resistance		MIL-STD-202, Method 106.
Humidity (steady state)	DWV: the initial value IR: the initial value Capacitance change: no more than 0.3% or 0.3pF, whichever is greater.	MIL-STD-202, Method 103, Condition A, With 1.5 Volts D.C. applied while subjected to an environment of 85℃ with 85% relative humidity for 240 hours minimum.
Life	IR: Shall not be less than 30% of the initial value Capacitance change: no more than 2.0% or 0.5pF, whichever is greater.	MIL-STD-202, Method 108, for 2000 hours, at 200℃. 200% Rated voltage D.C. applies.
Terminal strength	Force : 10lbs typical, 5 lbs min., Duration time: 5 to 10 seconds.	MIL-STD-202, Method 211A, Test condition A. Applied a force and maintained for a period of 5 to 10 seconds. The force shall be in the direction of the axes of the terminations.

◆ 0505C/P Performance Curves

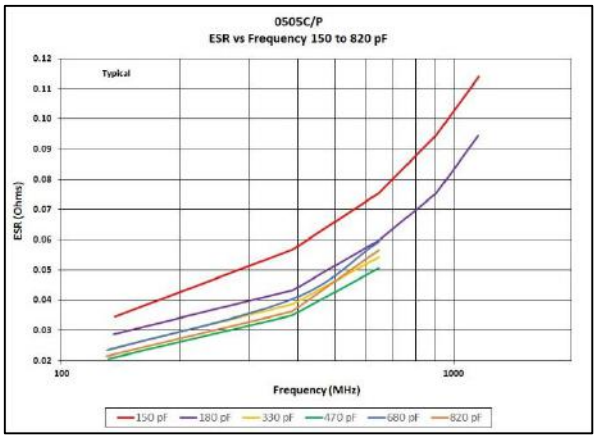
0505C/P ESR vs Capacitance



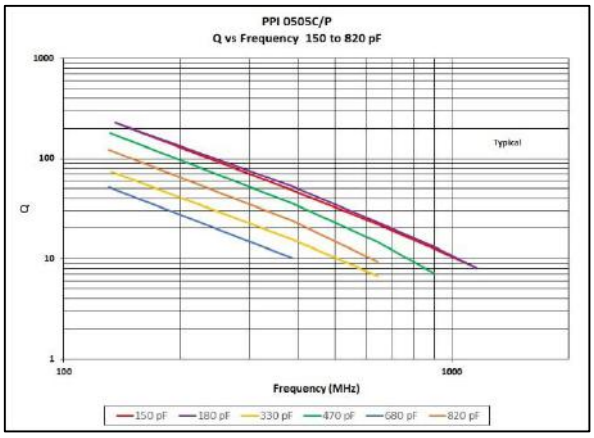
0505C/P Q vs Capacitance



0505C ESR vs Capacitance



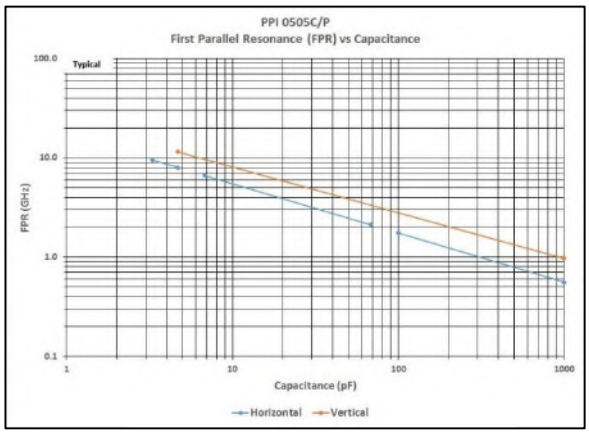
0505C Q vs Capacitance



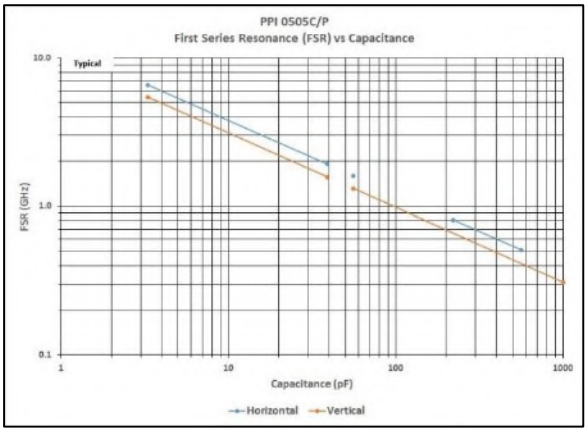
Definitions and Measurement Conditions

For a capacitor in a series configuration, i.e., mounted across a gap in a microstrip trace, with 50-Ohm source and termination resistances, the First Series Resonance, FSR, is defined as the lowest frequency at which the imaginary part of the input impedance, Im[Zin], equals zero when reference planes are at the sample edges. The FSR shall be considered as undefined (gap in plot above) if, over the measured or model-validated frequency range: (a) Im[Zin] never reaches zero; or, (b) at frequencies lower than that at which Im[Zin] = 0, Im[Zin] is not monotonic with frequency and/or the real part of the input impedance, Re[Zin], deviates more than once from monotonicity. The First Series Resonance, FSR, is defined as the lowest frequency at which the imaginary part of the input impedance, Im[Zin], equals zero. Should Im[Zin] or the real part of the input impedance, Re[Zin], not be monotonic with frequency at frequencies lower than those at which Im[Zin] = 0, the FSR shall be considered as undefined. FSR is dependent on internal capacitor structure; substrate thickness and dielectric constant; capacitor orientation, as defined alongside the FPR plot; and mounting pad dimensions. The measurement conditions are: substrate – Rogers RO4350; substrate dielectric constant = 3.66; horizontal mount substrate thickness (mils) = 25; gap in microstrip trace (mils) = 15; horizontal mount microstrip trace width (mils) = 55. Reference planes at sample edges. All data has been derived from electrical models created by Modelithics, Inc., a specialty vendor contracted by PPI. The models are derived from measurements on a large number of parts disposed on several different substrates.

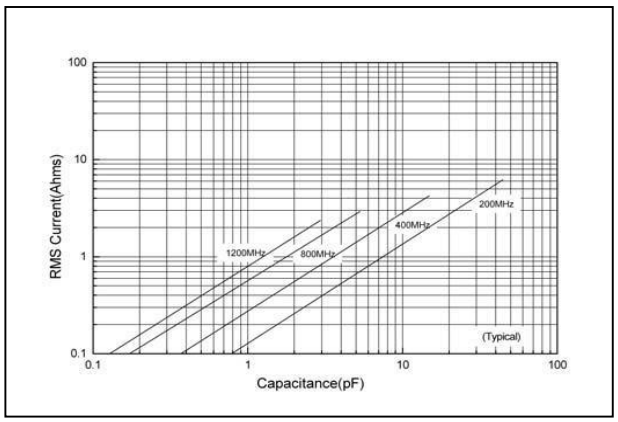
0505C/P First Parallel Resonance (FPRs)



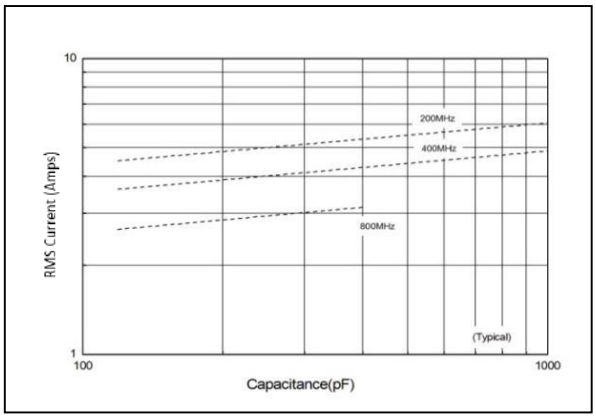
0505C/P First Series Resonance (FSRs)



0505C/P Current Rating vs Capacitance



0505C Current Rating vs Capacitance



The current depends on voltage limited:

$$I = \frac{\sqrt{2}}{2} I_{peak} = \frac{\sqrt{2}}{2} \times \frac{V_{rated}}{X_C} = \sqrt{2}\pi f C V_{rated}$$

The current depends on power dissipation limited: $I = \sqrt{\frac{P_{dissipation}}{ESR}}$

Note: If the thermal resistance of mounting surface is 40°C/W. then a power dissipation of 1.5 W will result in the current limited we can calculate the current limited:

$$I = \sqrt{\frac{P_{dissipation}}{ESR}}$$

Definitions and Measurement conditions:

The First Parallel Resonance, FPR, is defined as the lowest frequency at which a suckout or notch appears in |S21|. It is generally independent of substrate thickness or dielectric constant, but does depend on capacitor orientation. A horizontal orientation means the capacitor electrode planes are parallel to the plane of the substrate; a vertical orientation means the electrode planes are perpendicular to the substrate.

The measurement conditions are: substrate – Rogers RO4350; substrate dielectric constant = 3.66; horizontal mount substrate thickness (mils) = 25; gap in microstrip trace (mils) = 15; horizontal mount microstrip trace width (mils) = 55. Reference planes at sample edges.

All data has been derived from electrical models created by Modelithics, Inc., a specialty vendor contracted by PPI. The models are derived from measurements on a large number of parts disposed on several different substrates.

0505C/P (.055" x.055")

◆ Design Kits

These capacitors are 100% RoHS. Kits are available in Magnetic and Non-Magnetic that contain 10 (ten) pieces per value; 16 values per kit.

DKD0505C01 **DKD0505P01**	0.1pF- 2.0pF	0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.1, 1.2, 1.5pF 1.6, 1.8, 2.0pF	± 0.1pF
DKD0505C02 **DKD0505P02**	1.0pF - 10pF	1.0, 1.2, 1.5, 1.8, 2.0, 2.2, 2.4, 2.7pF 3.0, 3.3, 3.9, 4.7, 5.6, 6.8, 8.2pF	± 0.1pF
		10pF	± 5%
DKD0505C03 **DKD0505P03**	10pF -100pF	10, 12, 15, 18, 20, 22, 24, 27, 30, 33, 39, 47, 56, 68, 82, 100pF	± 5%
DKD0505C04	100pF-1000pF	100, 120, 150, 180, 200, 220, 240, 270, 300, 330pF, 390, 470, 560, 680, 820, 1000pF	± 5%
DKD0505C05 **DKD0505P05**	0.1pF- 2.0pF Non-Magnetic	0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.1, 1.2, 1.5pF 1.6, 1.8, 2.0pF	± 0.1pF
DKD0505C06 **DKD0505P06**	1.0pF - 10pF Non-Magnetic	1.0, 1.2, 1.5, 1.8, 2.0, 2.2, 2.4, 2.7pF 3.0, 3.3, 3.9, 4.7, 5.6, 6.8, 8.2pF	± 0.1pF
		10pF	± 5%
DKD0505C07 **DKD0505P07**	10pF - 100pF Non-Magnetic	10, 12, 15, 18, 20, 22, 24, 27, 30, 33, 39, 47, 56, 68, 82, 100pF	± 5%
DKD0505C08	100pF- 1000pF Non-Magnetic	100, 120, 150, 180, 200, 220, 240, 270, 300, 330pF, 390, 470, 560, 680, 820, 1000pF	± 5%

◆ Recommended Land Pattern Dimensions

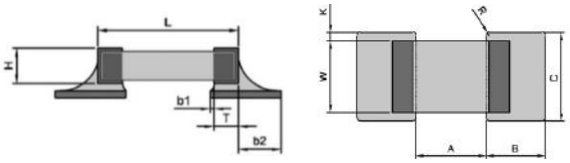
When mounting the capacitor to substrate, it's important to carefully consider that the amount of solder (size of fillet) used has a direct effect upon the capacitor once it's mounted.

1) The greater the amount of solder, the greater the stress to the elements. This may cause the substrate to break or crack.

2) In the situation where two or more devices are mounted onto a common land, be sure to separate the device into exclusive pads by using soldering resist.

● Horizontal Mounting

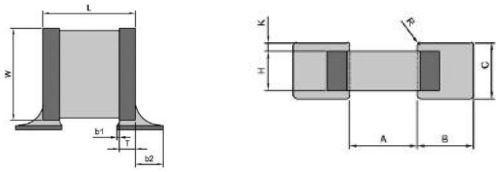
Orientation	EIA	A	B	C
Horizontal	0505	0.5-0.7	0.7-0.9	1.2-1.4



● Vertical Mounting*

Orientation	EIA	A	B	C
Vertical	0505	0.5-0.7	0.7-0.9	1.0-1.2

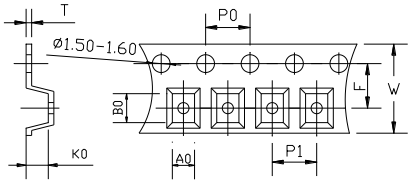
*Only available below 430pF



◆ Tape & Reel Specifications

Orientation	EIA	A0	B0	K0	W	P0	P1	T	F	Qty Min	Qty /reel	Tape material
Horizontal	0505	1.38	1.68	0.98	8.00	4.00	4.00	0.22	3.50	500	3000	Plastic
Vertical	0505	1.10	1.60	1.40	12.00	4.00	4.00	0.30	5.50	300	2000	Plastic

Horizontal Orientation



Vertical Orientation