



Traditional High Q (>10,000) Low ESR  
Multi-Layer Ceramic Capacitors

**0505C/P (0.055" x 0.055")**

### Product Features

- High Q
- High Power
- Low ESR/ESL
- Low Noise
- High Self-Resonance
- Ultra Stable Performance
- Capacitance Range:  
0.1pF to 1000pF
- Working Voltage: 150V
- Extended Voltage: 300V

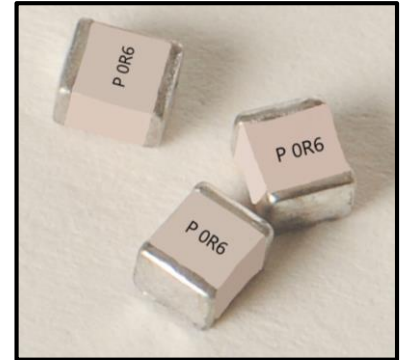
### Product Applications

#### Typical Functional Applications:

- Tuning • Bypass • Coupling
- Feedback • D.C. Blocking
- Impedance Matching

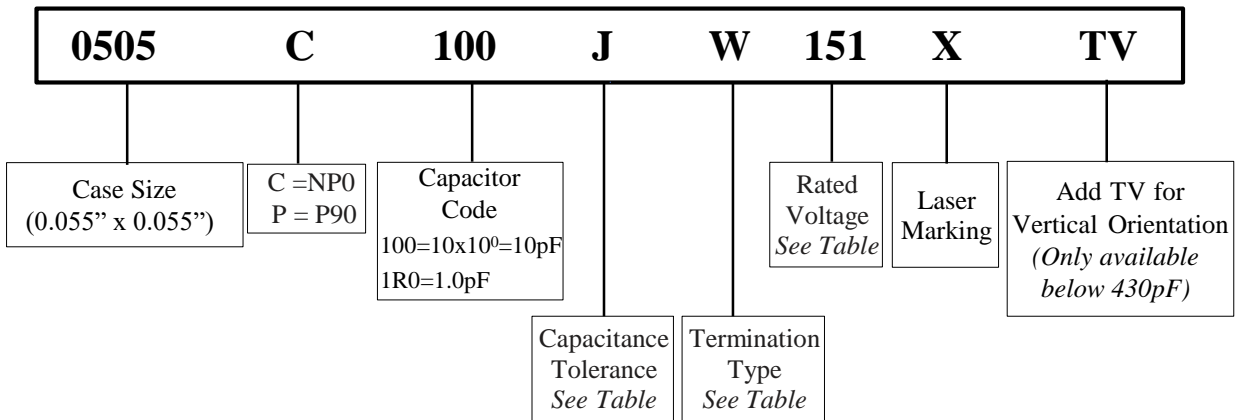
#### Typical Circuit Applications:

- UHF/Microwave RF Power Amplifiers
- Mixers • Oscillators • Filter Networks
- Low Noise Amplifiers • Timing Circuits and Delay Lines



Marking shown for illustration purposes only.  
Actual marking may differ.

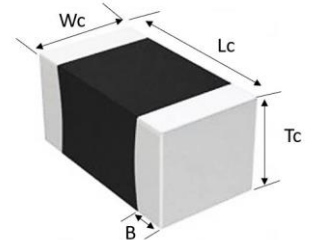
### Part Numbering



### Capacitor Dimensions

Unit: inch (millimeter)

Length	Width	Thickness	Overlap
Lc	Wc	Tc	B
0.055 + 0.015 to -0.010 (1.40 + 0.38 to -0.25)	0.055 ± .010 (1.40 ± 0.25)	0.057 (1.45 max)	0.020 (0.51 max)



### Temperature Coefficient

- C:** -55° to 125°C 0± 30ppm/°C;  
>125°C to 200°C 0± 60ppm/°C
- P:** ±90 ±20ppm/°C



Traditional High Q (>10,000) Low ESR  
Multi-Layer Ceramic Capacitors

**0505C/P (0.055" x 0.055")**

≠ 0505C/P Capacitance Values

- NP0=C; P90=P
- **Maximum Capacitance: 0505P=100pF; 0505C=1000pF**
- \* - Available in NP0 only.

Special capacitances, tolerances and WVDC are available. Please contact PPI.



Cap. pF	Cap Code	Tol.	Rated WVDC		Cap. pF	Cap Code	Tol.	Rated WVDC		Cap. pF	Cap Code	Tol.	Rated WVDC		Cap. pF	Cap Code	Tol.	Rated WVDC	
			Std.	Ext.				Std.	Ext.				Std.	Ext.				Std.	Ext.
0.1	0R1	A,B, C,D	150V	250V or 300V	2.4	2R4	A,B, C,D	150V	250V or 300V	20	200	F,G, J,K	150V	250V or 300V	160	161*	F,G, J,K	150V	200V
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*			
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				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	82	820	680	681*												
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*														

\*Available in NP0 only






Traditional High Q (>10,000) Low ESR  
Multi-Layer Ceramic Capacitors

**0505C/P (0.055" x 0.055")**

### ≠ Capacitance Tolerance Codes

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

### ≠ Termination Types

Termination Code	Termination
W	100% Sn Solder over Nickel Plating 
L	90% Sn10%Pb Tin/Lead Solder over Nickel Plating
P (Non-Magnetic) 	100%Sn Solder over Copper Plating 

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

### ≠ Voltage Codes

Voltage	Code
50V	500
100V	101
150V	151
200V	201
250V	251
300V	301





Traditional High Q (>10,000) Low ESR  
Multi-Layer Ceramic Capacitors

**0505C/P (0.055" x 0.055")**

### ≠ Electrical Specifications

Quality Factor (Q)	Greater than 10,000 at 1 MHz
Insulation Resistance (IR)	10 <sup>5</sup> MegaOhms min. @ +25°C rated WVDC 10 <sup>4</sup> MegaOhms min. @ +125°C rated WVDC
Rated Voltage	See Rated Voltage Table
Dielectric Withstanding Voltage (WVDC)	250% of Rated Voltage of 5 seconds
Operating Temperature Range	-55°C to 200°C
Temperature Coefficient (TC)	<b>C:</b> -55°C to 125°C 0±30ppm/°C; >125°C to 200°C 0±60ppm/°C <b>P:</b> +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 Specifications

	Specification	Test Parameters
Thermal Shock	<b>DWV:</b> The initial Value <b>IR:</b> Shall not be less than 30% of the initial value. <b>Capacitance Change:</b>	MIL-STD-202, Method 107, Condition A. At the maximum rated temperature (-55°C and 200°C) stay 30 minutes, the time of removing shall not be more than 3 minutes. Perform five cycles.
Moisture Resistance	No more than 0.5% or 0.5pF, whichever is greater.	MIL-STD-202, Method 106
Humidity (Steady State)	<b>DWV:</b> The initial Value <b>IR:</b> The initial value. <b>Capacitance Change:</b> No more than 0.5% or 0.5pF, whichever is greater.	MIL-STD-202, Method 103, Condition A With 1.5Volts DC applied while subjected to an environment of 85°C with 85% relative humidity for 240 hours minimum.
Life	<b>IR:</b> Shall not be less than 30% of the initial value. <b>Capacitance Change:</b> No more than 2.0% or 0.5pF, whichever is greater.	MIL-STD-202, Method 108. For 2000 hours, at 200°C. Rated Voltage DC applies.
Terminal Strength	<b>Force:</b> 10lbs typical, 5lbs. Minimum. <b>Duration Time:</b> 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.

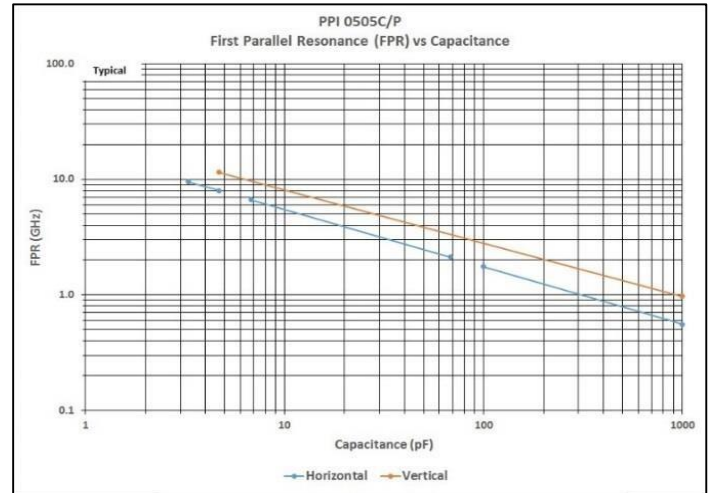


## ≠ FPR -- First Parallel Resonance (FPRs)

### ≠ Definitions and Measurement Conditions

The **First Parallel Resonance, FPR**, is defined as the lowest frequency at which a suckout or notch appears in  $|S_{21}|$ .

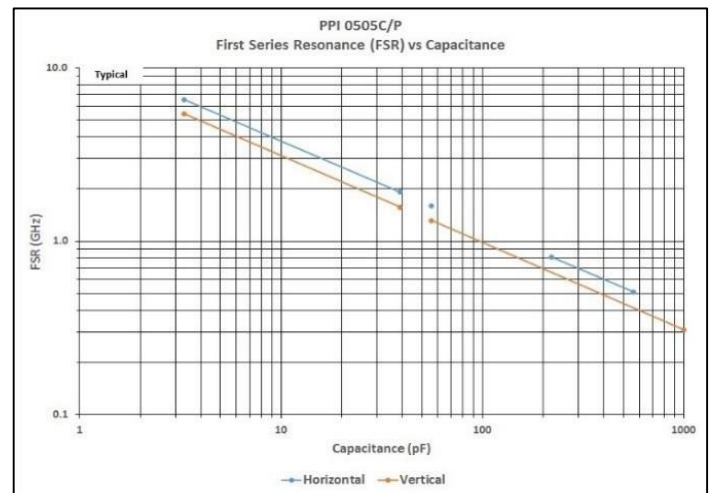
It is generally independent of substrate thickness or dielectric constant, but does depend on capacitor orientation. A horizontal orientation means the capacitor electrode planes are parallel to the plane of the substrate; a vertical orientation means the electrode planes are perpendicular to the substrate.



## ≠ FSR -- First Series Resonance (FSRs)

### ≠ Definitions and Measurement Conditions

The **First Series Resonance, FSR**, is defined as the lowest frequency at which the imaginary part of the input impedance,  $\text{Im}[Z_{in}]$ , equals zero. Should  $\text{Im}[Z_{in}]$  or the real part of the input impedance,  $\text{Re}[Z_{in}]$ , not be monotonic with frequency at frequencies lower than those at which  $\text{Im}[Z_{in}] = 0$ , the FSR shall be considered as undefined (represented as a gap in the plot). 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.

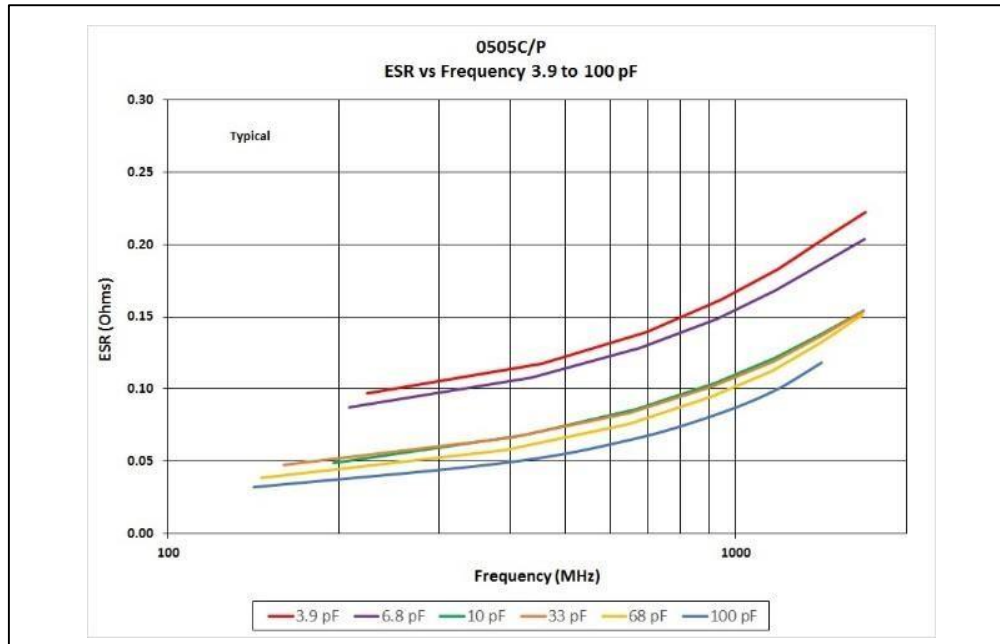


Traditional High Q (>10,000) Low ESR  
Multi-Layer Ceramic Capacitors

**0505C/P (0.055" x 0.055")**

## ≠ ESR vs. Frequency

0505C/P ESR vs Frequency



0505C ESR vs Frequency





Traditional High Q (>10,000) Low ESR  
Multi-Layer Ceramic Capacitors

**0505C/P (0.055" x 0.055")**

## ≠ Q vs. Frequency

0505C/P Q vs Frequency

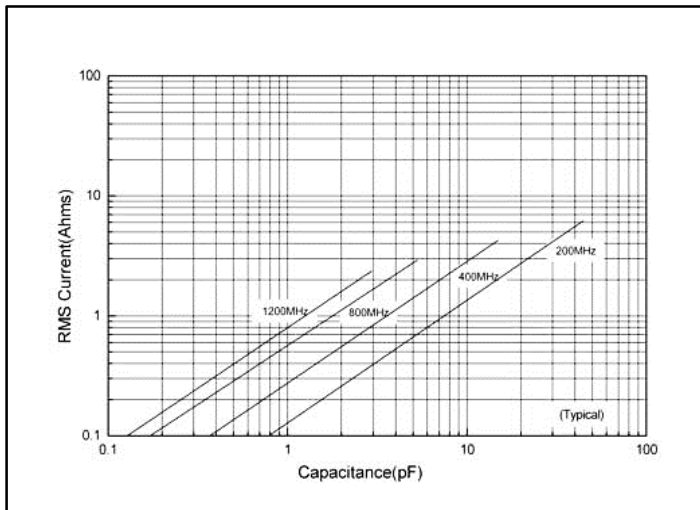


0505C Q vs Frequency



## ≠ Current Rating vs. Capacitance

0505C/P Current Rating vs Capacitance



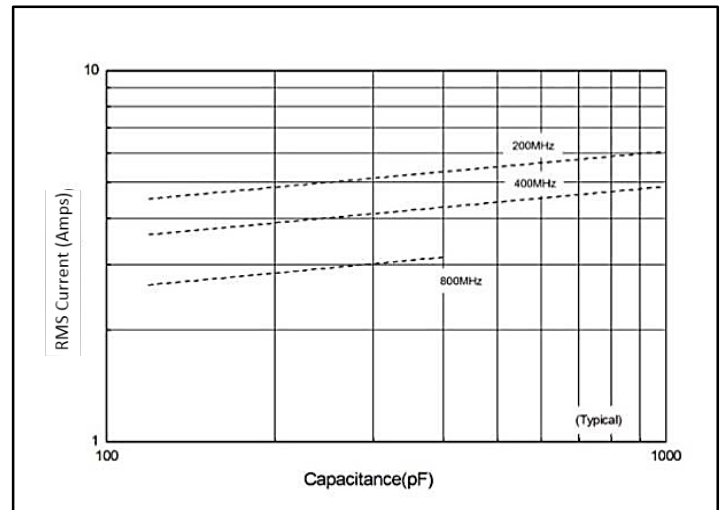
The current depends on voltage limited:

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

The current depends on power dissipation limited:

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

0505C Current Rating vs Capacitance

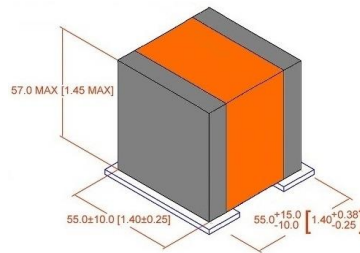


Note: If the thermal resistance of mounting surface is 40°C/W, then a power dissipation of 1.5 W will result in the current limited we can calculate the current limited:

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

## ≠ Capacitor Application Program

Passive Plus, Inc.'s brand new **online Capacitor Application Program (C.A.P.)** helps Engineers and Designers select capacitors according to parameters such as cap value and frequency. C.A.P. allows engineers to insert capacitor requirements (Cap value, Frequency), producing Scattering Matrices (S2P) Charts while providing options (Case Size, Terminations, Mounting), and parameters (ESR, Q, Impedance) along with Datasheets. Once engineers have determined their capacitor requirements, C.A.P. also includes online Requests For Quotes (RFQs) and/or sample requests.



## ≠ Modelithics Vendor Program

PPI offers design engineers a Free 90-Day Trial license for the Modelithics PPI Component Library. This program provides engineers access to extremely accurate scalable simulation models for Passive Plus capacitors with advanced features that enable a more precise and rapid design process.

Microwave Global Models include every part value in a series and permit users to input substrate thickness, dielectric constant, and loss tangent, as well as mounting pad layout dimensions. Selected models also include capacitor orientation – vertical or horizontal – as an input. Engineers can request FREE use of the models, by either visiting the [Passive Plus Resources page \(http://passiveplus.com/addldocs\\_resources.php\)](http://passiveplus.com/addldocs_resources.php).



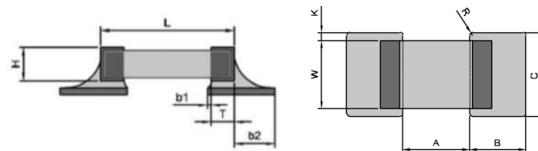
### ≠ Recommended Land Pattern Dimensions

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.

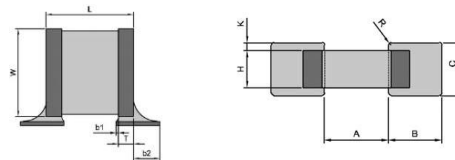
#### ≠ Horizontal Mounting (mm)

A	B	C
0.5-0.7	0.7-0.9	1.2-1.4



#### ≠ Vertical Mounting\* (mm)

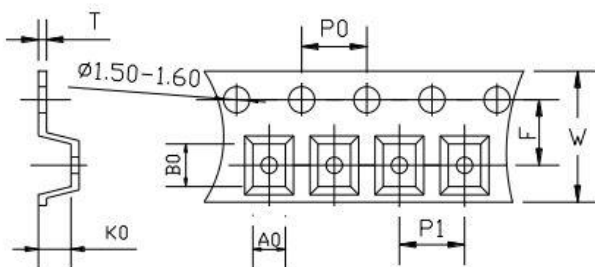
A	B	C
0.5-0.7	0.7-0.9	1.0-1.2



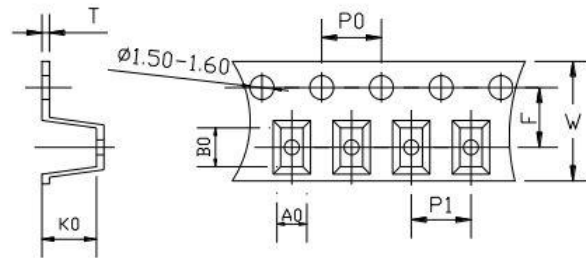
\*Only available below 430pF

### ≠ Tape & Reel Specifications (mm)

Horizontal Orientation



Vertical Orientation



Orientation	W	P0	P1	T	F	Qty Min	Qty/reel	Tape Material
Horizontal	8.00	4.00	4.00	0.22	3.50	500	3000	Plastic
Vertical	12.00	4.00	4.00	0.30	5.50	300	2000	Plastic

A<sub>0</sub> B<sub>0</sub> K<sub>0</sub>

- Determined by component size. Typical clearance between the cavity and the component is:  
.05 (.002) min to .50 (.020) max for 8mm tape and .50 (.002) min to .65 (.026) max for 12mm tape.
- The component cannot rotate more than 20° within the determined cavity.



Traditional High Q (>10,000) Low ESR  
Multi-Layer Ceramic Capacitors

**0505C/P (0.055" x 0.055")**

## ≠ Engineering Design Kits

PPI offers Design Kits for engineers who are building and testing prototypes. Each kit contains 16 values; 10 pieces per value.



Kits are offered in Magnetic or Non-Magnetic Terminations. Kits are 100% RoHS compliant.

Kit Number		Value Range	Values	
MAGNETIC	NON-MAGNETIC			
DKD0505C01	DKD0505C05	<b>0.1 - 2.0pF</b>	0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.2, 1.5, 1.6, 1.8, 2.0pF	✓ RoHS
DKD0505P01	DKD0505P05			
DKD0505C02	DKD0505C06	<b>1 - 10pF</b>	1.0, 1.2, 1.5, 1.8, 2.0, 2.2, 2.4, 2.7, 3.0, 3.3, 3.9, 4.7, 5.6, 6.8, 8.2, 10pF	✓ RoHS
DKD0505P02	DKD0505P06			
DKD0505C03	DKD0505C07	<b>10 - 100pF</b>	10, 12, 15, 18, 20, 22, 24, 27, 30, 33, 39, 47, 56, 68, 82, 100pF	✓ RoHS
DKD0505P03	DKD0505P07			
DKD0505C04	DKD0505C08	<b>100 - 1000pF</b>	100, 120, 150, 180, 200, 220, 240, 270, 300, 330, 390, 470, 560, 680, 820, 1000pF	✓ RoHS

**PPI**  
Passive Plus Inc.  
RF & Microwave Components

**DKD0505C01**

**0505C Series 0.1 — 2.0pF**  
Size: 0.055" x 0.055"  
TC = NP0 WVDC = 150V

Hi-Q Low ESR Capacitor Design Kit

www.passiveplus.com

**PPI**  
Passive Plus Inc.  
RF & Microwave Components

**DKD0505C02**

**0505C Series 1.0 — 10pF**  
Size: 0.055" x 0.055"  
TC = NP0 WVDC = 150V

Hi-Q Low ESR Capacitor Design Kit

www.passiveplus.com

**PPI**  
Passive Plus Inc.  
RF & Microwave Components

**DKD0505C03**

**0505C Series 10 — 100pF**  
Size: 0.055" x 0.055"  
TC = NP0 WVDC = 150V

Hi-Q Low ESR Capacitor Design Kit

www.passiveplus.com

**PPI**  
Passive Plus Inc.  
RF & Microwave Components

**DKD0505C04**

**0505C Series 100 — 1000pF**  
Size: 0.055" x 0.055"  
TC = NP0 WVDC = 150V

Hi-Q Low ESR Capacitor Design Kit

www.nassivenlus.com

**PPI**  
Passive Plus Inc.  
RF & Microwave Components

**DKD0505P01**

**0505P Series 0.1 — 2.0pF**  
Size: 0.055" x 0.055"  
TC = P90 WVDC = 150V

Hi-Q Low ESR Capacitor Design Kit

www.passiveplus.com

**PPI**  
Passive Plus Inc.  
RF & Microwave Components

**DKD0505P02**

**0505P Series 1.0 — 10pF**  
Size: 0.055" x 0.055"  
TC = P90 WVDC = 150V

Hi-Q Low ESR Capacitor Design Kit

www.passiveplus.com

**PPI**  
Passive Plus Inc.  
RF & Microwave Components

**DKD0505P03**

**0505P Series 10 — 100pF**  
Size: 0.055" x 0.055"  
TC = P90 WVDC = 150V

Hi-Q Low ESR Capacitor Design Kit

www.passiveplus.com