1111C/P (.110" x .110")

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◆ Product Features

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

◆ Product Application

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

◆ 1111C/P Capacitance Table NP0=C; P90=P **1111P: 1000pF max., 1111C: 10000pF max.**

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	500V Code 501 or 1000V Code 102 or 1500V Code 152	3.6	3R6	A,B, C,D	500V Code 501 or 1000V Code 102 or 1500V Code 152	43	430	F,G, J,K	500V Code 501 or 1000V Code 102 or 1500V Code 152	510	511	F,G, J,K	100V Code 101 or 200V Code 201
0.2	0R2			3.9	3R9			47	470			560	561		
0.3	0R3			4.3	4R3			51	510			620	621		
0.4	0R4			4.7	4R7			56	560			680	681		
0.5	0R5	A,B, C,D		5.1	5R1			62	620			750	751		
0.6	0R6			5.6	5R6			68	680			820	821		
0.7	0R7			6.2	6R2			75	750			910	911		
0.8	0R8			6.8	6R8			82	820			1000	102		
0.9	0R9			7.5	7R5			91	910			1100	112*	F,G, J,K	200V Code 201
1.0	1R0			8.2	8R2			100	101			1200	122*		
1.1	1R1			9.1	9R1			110	111		300V Code 301 or 1000V Code 102	1500	152*		
1.2	1R2			10	100	F,G, J,K		120	121			1800	182*		
1.3	1R3			11	110			130	131			2200	222*		100V Code 101
1.4	1R4			12	120			150	151			2700	272*		
1.5	1R5			13	130			160	161			3000	302*		
1.6	1R6			15	150			180	181			3300	332*		
1.7	1R7			16	160			200	201			3900	392*		
1.8	1R8			18	180			220	221		200V Code 201 or 600V Code 601	4700	472*		
1.9	1R9			20	200			240	241			5100	512*		50V Code 500
2.0	2R0			22	220			270	271			5600	562*		
2.1	2R1			24	240			300	301			10000	103*		
2.2	2R2			27	270			330	331						
2.4	2R4			30	300			360	361						
2.7	2R7			33	330			390	391						
3.0	3R0			36	360			430	431						
3.3	3R3			39	390			470	471						

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

◆ Part Numbering

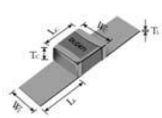
1111C 101 J W 501 X TV

- 1111C — C=NP0; P=P90
- 101 — Capacitor Code 101=10x10[1]=100pF; 1R0=1.0pF
- J — Capacitance Tolerance: See below list
- W — Termination Type
- 501 — Rated Voltage
- X — Laser Marking
- TV — Add TV for Vertical Orientation

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

◆ 1111C/P Lead Type and Dimensions

unit:inch(millimeter)

Series	Term. Code	Type/ Outlines	Capacitor Dimensions				Lead Dimensions			Plated Material
			Length L_C	Width W_C	Thick. T_C	Overlap B	Length L_L	Width W_L	Thickness T_L	
1111C 1111P	W L	 Chip	.110 +.020 to -.010 (2.79 +0.51 to -0.25)	.110 ±.010 (2.79± 0.25)	.10 (2.54) max	.024 (0.60) Max	-	-	-	W: 100%Sn Solder over Nickel Plating RoHS Compliant L: 90%Sn10%Pb Tin/Lead Solder over Nickel Plating
1111C 1111P	MS	 Microstrip	.135 ± .015 (3.43± 0.38)	.110 ±.010 (2.79± 0.25)	.10 (2.54) max	-	.250 (6.35) min	.093 ± .005 (2.36 ±0.13)	.004±.001 (0.1±0.025)	100%Silver

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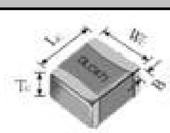
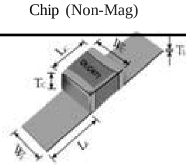
1111C 1111P	P	 Chip (Non-Mag)	.110 +.020 to -.010 (2.79 +0.51to -0.25)	.110 ±.010 (2.79± 0.25)	.10 (2.54) max	.024 (0.60) Max	-	-	-	100%Sn Solder over Copper Plating RoHS Compliant
1111C 1111P	MN	 Microstrip (Non-Mag)	.135 ± .015 (3.43± 0.38)	.110 ±.010 (2.79± 0.25)	.10 (2.54) max	-	.250 (6.35) min	.093 ± .005 (2.36± 0.13)	.004±.001 (0.1±0.025)	100%Silver

Note: “Non-Mag” means no magnetic materials. All leads are attached with high temperature solder and parts are RoHS Compliant.

◆ Performance

Item	Specifications
Quality Factor (Q)	greater than 10,000 at 1MHz.
Insulation Resistance (IR)	0.1 pF to 470 pF: 10^6Megohms min. @ +25 ℃ at rated WVDC. 10^5 Megohms min. @ +125 ℃ at rated WVDC. 510 pF to 10000 pF: 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 Voltage for 5seconds, Rated Voltage≦500VDC 150% of Voltage for 5 seconds, 500VDC< Rated Voltage ≦1250VDC 120% of Voltage for 5 seconds, Rated Voltage>1250VDC
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.

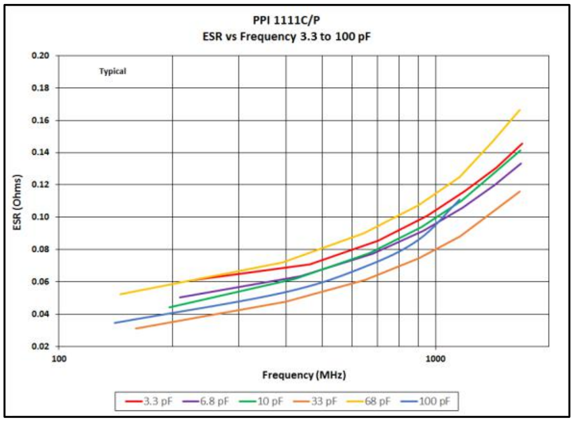
Capacitors are designed and manufactured to meet the requirements of MIL-PRF-55681 and MIL-PRF-123.

◆ Environmental Tests

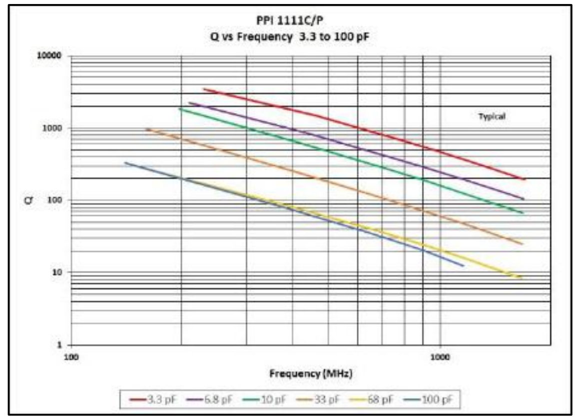
Item	Specifications	Method
Thermal shock	DWV: the initial value IR: Shall not be less than 30% of the initial value Capacitance change: no more than 0.5% or 0.5pF, whichever is greater.	MIL-STD-202, Method 107, Condition A. At the maximum rated temperature (-55℃ and 200℃) stay 30 min,the time of removing 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, for2000hours, at 200℃. 200% of Voltage for Capacitors, RatedVoltage≦500VDC; 120% of Voltage for Capacitors, 500VDC< Rated Voltage ≦1250VDC; 100% of Voltage forCapacitors, RatedVoltage>1250VDC.
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.

◆ 1111C/P Performance Curves

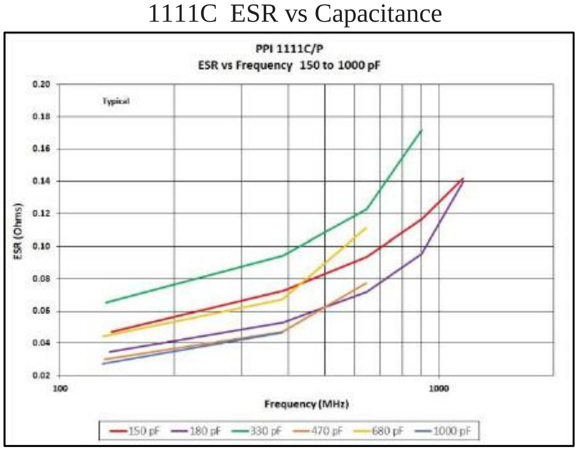
1111C/P ESR vs Capacitance



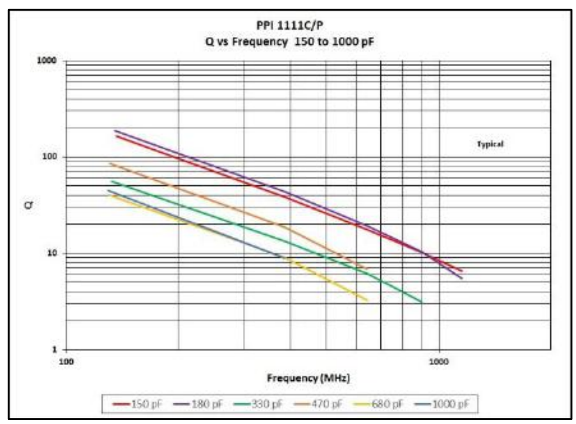
1111C/P Q vs Capacitance



1111C ESR vs Capacitance



1111C 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. 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 (gap in plot above). 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) = 50; gap in microstrip trace (mils) = 72; horizontal mount microstrip trace width (mils) = 110. 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.

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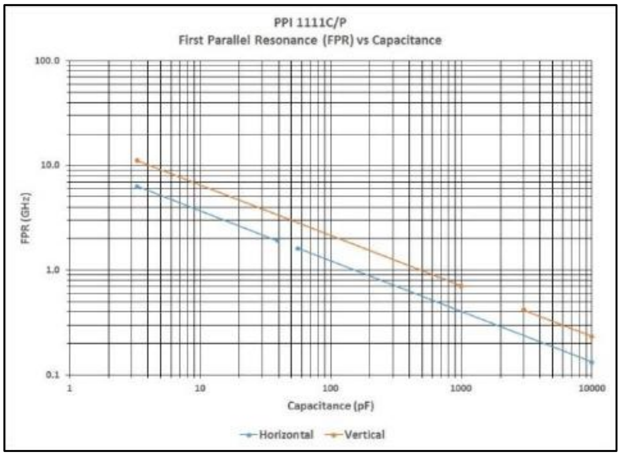
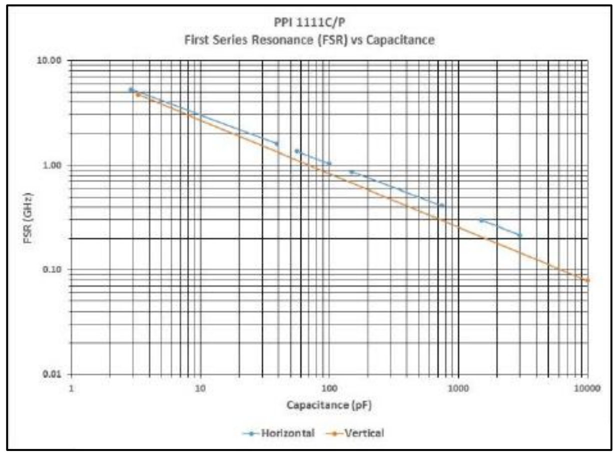
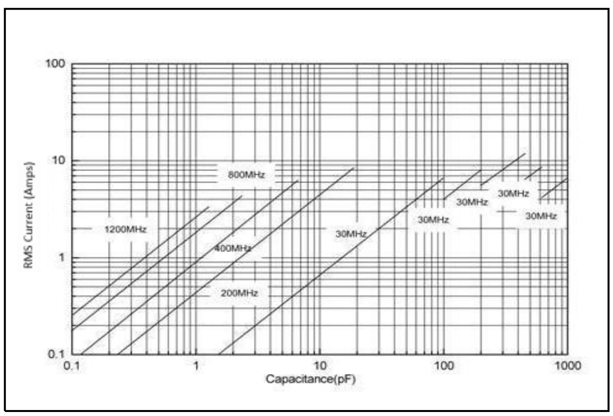
1111C/P First Parallel Resonance (FPRs)



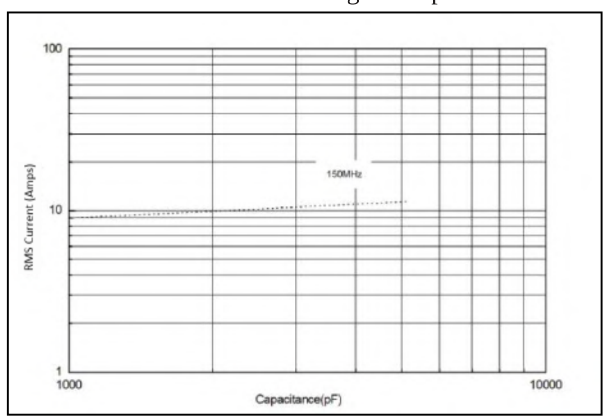
1111C/P First Series Resonance (FSRs)



1111C/P Current Rating vs Capacitance



1111C/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: $I = \sqrt{\frac{P_{dissipation}}{ESR}}$

Note: If the thermal resistance of mounting surface is 20 ℃/W. then a power dissipation of 3 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) = 50; gap in microstrip trace (mils) = 72; horizontal mount microstrip trace width (mils) = 110. 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.

◆ Design Kits

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

Design Kit	Description	Values (pF)	No. of values	Toler-ances
DKD1111C01 **DKD1111P01**	1.0pF - 10pF	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, 8.2pF	16	± 0.1pF
		10pF		± 5%
DKD1111C02 **DKD1111P02**	10pF -100pF	10, 12, 15, 18, 20, 22, 24, 27, 30, 33, 39, 47, 56, 68, 82, 100pF	16	± 5%
DKD1111C03 **DKD1111P03**	100pF-1000pF	100, 120, 150, 180, 200, 220, 240, 270, 300, 330, 390, 470, 560, 680, 820,1000pF	16	± 5%
DKD1111C04 **DKD1111P04**	1000pF-10000pF	1000, 1100, 1200, 1500, 1800, 2200, 2700, 3000, 3300, 3900, 4700, 5100, 5600, 10000pF	14	± 5%
DKD1111C05 **DKD1111P05**	1.0pF - 10pF Non-Magnetic	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, 8.2pF	16	± 0.1pF
		10pF		± 5%
DKD1111C06 **DKD1111P06**	10pF - 100pF Non-Magnetic	10, 12, 15, 18, 20, 22, 24, 27, 30, 33, 39, 47, 56, 68, 82, 100pF	16	± 5%
DKD1111C07 **DKD1111P07**	100pF- 1000pF Non-Magnetic	100, 120, 150, 180, 200, 220, 240, 270, 300, 330, 390, 470, 560, 680, 820,1000pF	16	± 5%
DKD1111C08 **DKD1111P08**	1000pF- 10000pF Non-Magnetic	1000, 1100, 1200, 1500, 1800, 2200, 2700, 3000, 3300, 3900, 4700, 5100, 5600,10000pF	14	± 5%

◆ Recommended Land Pattern Dimensions

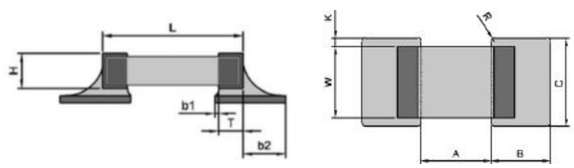
When mounting the capacitor to substrate, it's important to carefully consider that the amount of solder (size of fillet) used has a direct effect upon the capacitor once it's mounted.

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.

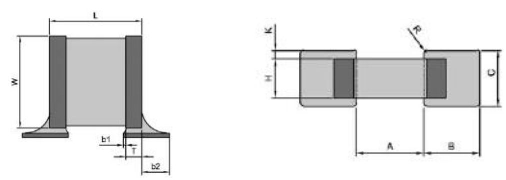
● Horizontal Mounting

Orientation	EIA	A	B	C
Horizontal	1111	1.9	1.7	2.9



● Vertical Mounting

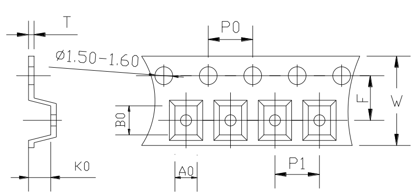
Orientation	EIA	A	B	C
Vertical	1111	1.9	1.7	2.5



◆ Tape & Reel Specifications

Orientation	EIA	A0	B0	K0	W	P0	P1	T	F	Qty Min	Qty /reel	Tape material
Horizontal	1111	2.85	3.90	1.95	8.00	4.00	4.00	0.22	3.50	500	2000	Plastic
Vertical	1111	2.00	3.50	2.70	12.00	4.00	4.00	0.40	5.50	500	1500	Plastic
Vertical	1111	2.96	3.60	2.40	8.00	4.00	4.00	0.22	3.50	500	1500	Plastic

Horizontal Orientation



Vertical Orientation