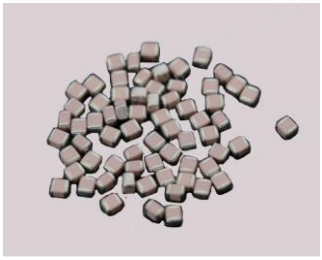
Specification

Part No.: DLC70A

DLC70A (.050" x .050")



◆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.

◆ DLC70A Capacitance Table

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 of 300V Code 301	2.4	2R4	A,B,C,D	150V Code 151 or 300V Code 301	20	200	F,G,J	150V Code 151 或 300V Code 301	160	161	F,G,J	150V Code 151 or 300V Code 301
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	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		50V Code 500 or 200V Code 201
1.2	1R2			6.8	6R8	B,C,D		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		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	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 DALICAP.

◆ Part Numbering

DLC70A 150 J W 151 N T

DLC70:series
A:0505

Capacitor Code
150=15x10⁰=15pF; 1R0=1.0pF

Capacitance Tolerance: See below list

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

Packaging Type
T: Tape & Reel , 4000 pcs/reel

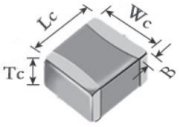
Laser Marking:
N, No Marking

Rated Voltage

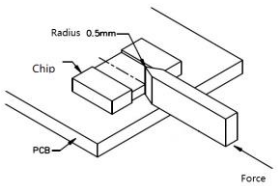
Termination Type

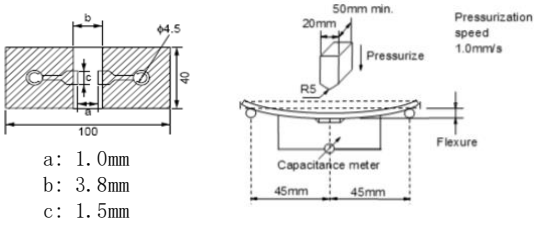
◆ DLC70A Termination Type and Dimensions

unit: inch（millimeter）

Series	Term. Code	Type/ Outlines	Capacitor Dimensions				Plated Material
			Length Lc	Width Wc	Thickness Tc	Overlap B	
70A	W		.055 +.015 ~ -.010 (1.40 +0.38 ~- 0.25)	.055±.010 (1.40±0.25)	.057 (1.45) MAX	.009～.024 (0.25～0.60)	100%Sn over Nickel Plating , RoHS Compliant
	L						10%Pb90%Sn over Nickel Plating ,
	P (Non-Mag)						100%Sn over Copper Plating , RoHS Compliant

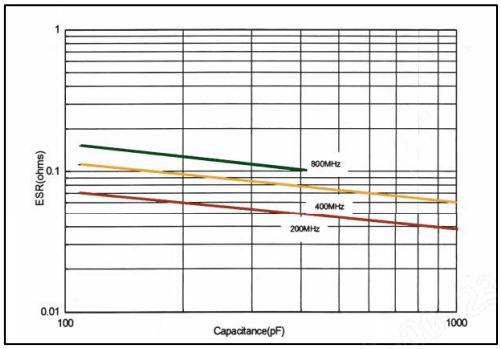
◆ Reliability Test Conditions.

No.	Item	Specification	Test method
1	Operating temperature	-55℃～125℃	-
2	Appearance	No defects or abnormality	Visual inspection: ×10 microscope.
3	Dimensions	See the previous page	Caliper inspection
4	Capacitance	Shall be within the applicable tolerance specified.	Test frequency: C≤1000pF: 1MHz±10% C＞1000pF: 1KHz±10% Test voltage: 1.0±0.2Vrms
5	D.F	C≤1.5pF: DF≤0.10% 1.5 pF＜C＜100pF: DF≤0.05% C≥100pF: DF≤0.10%	
6	Insulation resistance	10^5 Megohms min. @ +25 ℃ 10^4 Megohms min. @ +125 ℃	Voltage: DC Rated Voltage
7	Dielectric withstanding voltage (DWV)	Shall be no evidence of breakdown or visible evidence of arcing or damage.	1. Test Voltage: 250% of the rated voltage 2. Applied Time: 5 s 3.Charge/discharge current: 50mA max.
8	Temperature coefficient	(0±30)ppm/℃	The capacitance change should be measured after 5 min. at each specified temp. stage. Capacitance value as a reference is the value in step 3. step / temperature (℃): 1: 25±2; 2: -55±3; 3: 25±2; 4: 125±3; 5: 25±2 $TC=\frac{C_X-C_3}{C_3 \times \Delta T}X10^6$ ppm/℃
9	Adhesive Strength of Termination	No removal of the terminations or other defect should occur.	Pressurizing force: $8.0^{+1.0}_{0}$N Test time: 10±1 sec. 

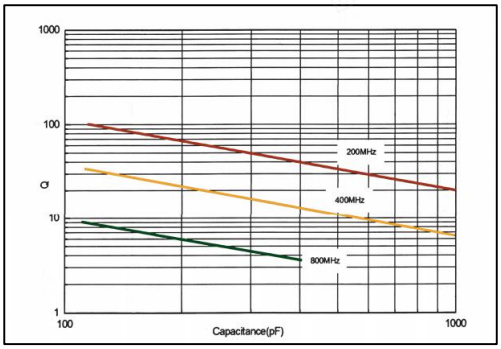
No.	Item	Specification	Test method
10	Substrate Bending test	Appearance: No defects or abnormalities. Capacitance Change: With in ±5% or ±0.3pF whichever is larger.	Mounting method: Reflow solder the capacitor on the test substrate. Pressurization Method: Shown as below. Flexure 1mm. Holding Time 5±1s  a：1.0mm b：3.8mm c：1.5mm
11	Solderability of termination	Shall be at least 95 percent covered with a smooth solder coating.	Immerse the capacitor in a eutectic solution requirement temperature 245±2 ℃ for 2±0.5 seconds. Capacitor shall be immersed to a depth of 10mm.
12	Resistance to soldering Heat	Appearance: No evidence of mechanical damage or delamination or exposed. Cap change: within -1.0%～+2.0% or ±0.5pF whichever is larger. Q: To meet initial requirement. IR(25℃): To meet initial requirement.	Immerse the capacitor in a eutectic solution at 260±5℃ for 10±1 seconds. Capacitor shall be immersed to a depth of 10mm. And following a 24±2 hours cooling period.
13	Temperature Cycle	Appearance: No evidence of mechanical damage . Cap change: within ±0.5% or ±0.5pF whichever is larger. Q: To meet initial requirement. IR(25℃): No less than 30% initial requirement. DWV: To meet initial requirement.	Perform the 5 cycles according to the four heat treatments listed in the following table. Set it for 24±2 hours at room temperature. step / Temperature(℃) / Time(min) 1 / -55(-3~0) / ≥30 2 / 25+10 / ≤5 3 / 125(0～+3) / ≥30 4 / 25+10 / ≤5
14	Humidity, steady state	Appearance: No evidence of mechanical damage . Cap change: within ±0.3% or ±0.3pF whichever is larger. IR(25℃): No less than 10% initial requirement.	With (1.3±0.25) Volts D.C. applied while subjected to an environment of 85℃ with 85% relative humidity for 240 hours minimum. Removed and sit 3.5±0.5 hours at room temperature.
15	High Temperature Load (Life)	Appearance: No evidence of mechanical damage . Cap change: within ±2% or± 0.5pF whichever is larger. IR(25℃): No less than 30% initial requirement. Q:＞1000.	Test Voltage: 200% of the rated voltage. The charge/discharge current is less than 50mA. Temperature: 125℃. Time: 2000h. Measurement： Set it for 48 hours at room temperature, then measure.

◆ DLC70A Performance Curve

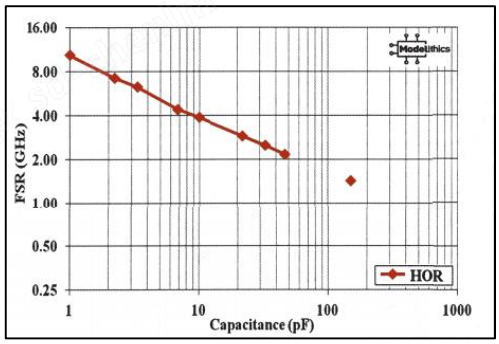
ESR vs Capacitance



Q vs Capacitance



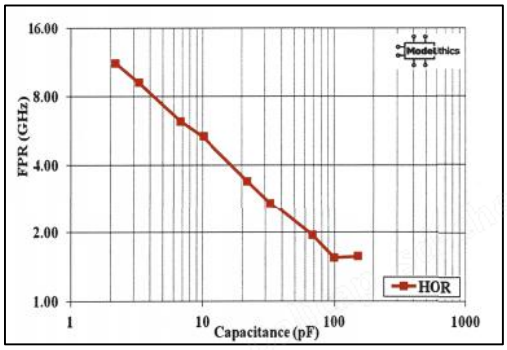
Horizontal First Series Resonance (FSR)



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). FSR is dependent on internal capacitor structure; substrate thickness and dielectric constant; capacitor orientation, as defined above; and mounting pad dimensions.
The measurement conditions are: substrate -- Rogers RO4350; substrate dielectric constant = 3.66; horizontal mount substrate thickness (mils) = 15; gap in microstrip trace (mils) = 25; 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 DLC. The models are derived from measurements on a large number of parts disposed on several different substrates.

Horizontal First Parallel Resonance (FPR)

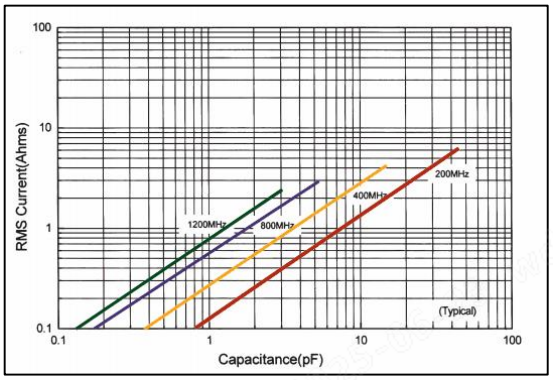


Definitions and Measurement conditions:

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 Parallel Resonance,FPR, is defined as the lowest frequencyat 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 DLC. The models are derived from measurements on a large number of parts disposed on several different substrates.

◆ DLC70A Performance Curve

RMSCurrent vs Capacitance



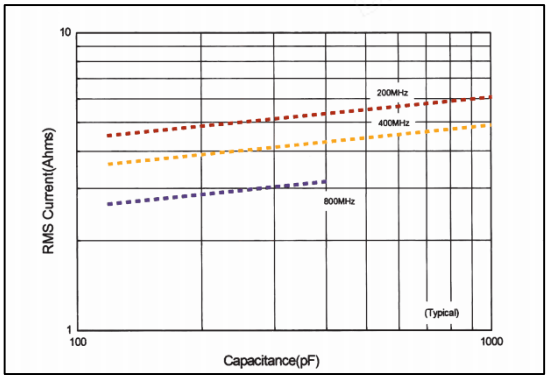
The current depends on voltage limited:

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

The current depends on power dissipation limited:

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

RMSCurrent vs Capacitance

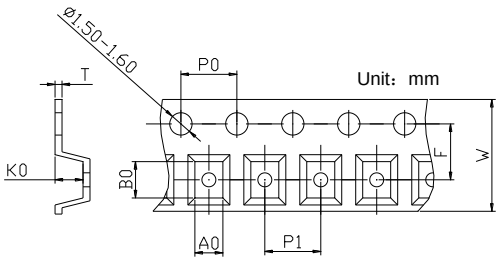


The current rating is based on a 65℃ mounting surface and a device thermal resistance of 40℃/W. A Power dissipation of 1.5W

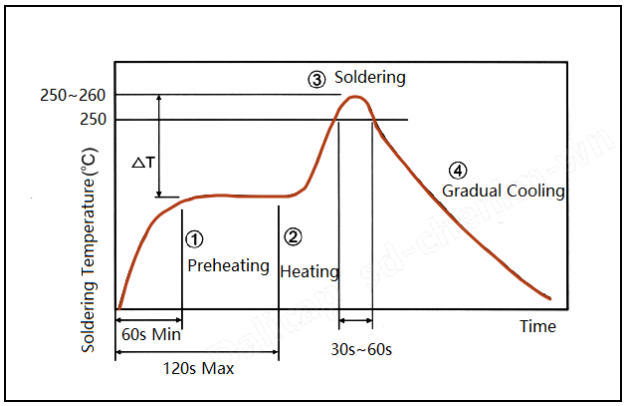
$$I = \sqrt{\frac{P_{耗散}}{ESR}}$$

◆ Tape & Reel Specifications

Orien-tation	EIA	A0	B0	K0	W	P0	P1	T	F	Qty/reel	Tape Material
Horiz-ontal	0505	1.50	1.75	1.15	8.00	4.00	4.00	0.22	3.50	3000	Plastic
Vertical	0505	1.10	1.60	1.40	8.00	4.00	4.00	0.30	3.50	2000	Plastic



◆ Recommended soldering conditions

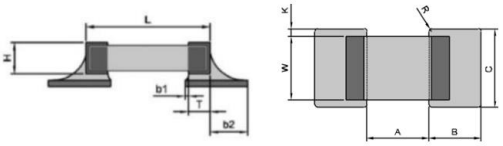


△T≤190℃；
Maximum temperature: 255℃±5℃；
Heating rate: ≤4℃/s。

◆ Recommended Land Dimensions

Horizontal Mounting

Orientation	EIA	A(mm)	B(mm)	C(mm)
Horizontal	0805	1.0	0.8	1.3



Vertical Mounting

Orientation	EIA	A(mm)	B(mm)	C(mm)
Vertical	0805	1.1	1.1	1.4