

Specification

Part No.:DLC70A0R1BP301NTA20

DLC70A (.050" x .050")

◆ Product Features

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



◆ Product Application

Typical Functions: Tuning, Bypassing, Coupling, Feedback, Impedance Matching and D.C. Blocking

Typical Applications: Civil Satellite Communications, Mobile Communication Base Stations, RF Repaters, Trunking Communications

◆ Part Numbering

DLC70A	0R1	B	P	301	N	T	A	2	0
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩

① **DLC70A: 70:series 0505size**

② Capacitor Code: 0R1=0.1pF

③ Capacitance Tolerance: B -0.1pF~0.1pF

④ Termination Type: P 100%Snover Copper Plating, RoHS Compliant

⑤ Rated Voltage: 301=300V

⑥ Laser Marking: N No Marking

⑦ Packaging Type: Tape & Reel

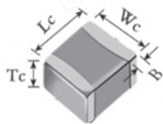
⑧ Internal Code: A

⑨ Temperature Range: 2 -55℃~125℃

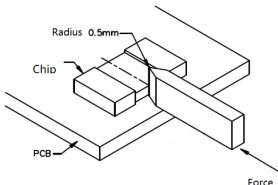
⑩ Internal Code: 0

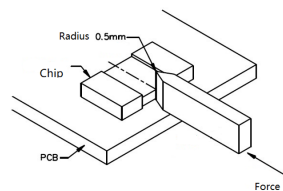
◆ DLC70A Dimension

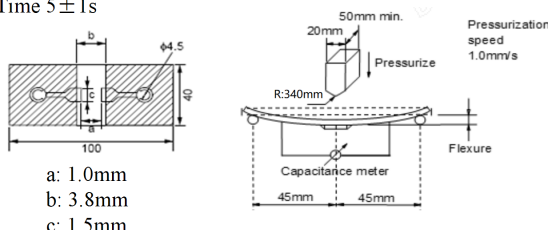
unit: inch (millimeter)

Series	Type/ Outlines	Capacitor Dimensions			
		Length Lc	Width Wc	Thickness Tc	Overlap B
70A		.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)

◆ Reliability Test Condition

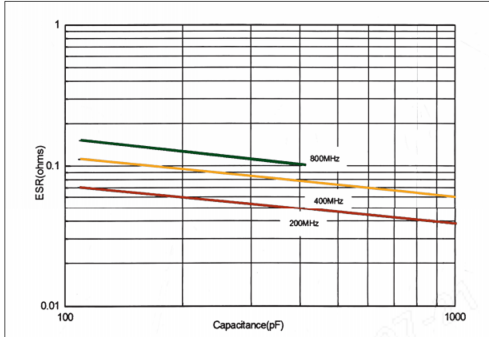
No.	Item	Specification	Test method												
1	Operating temperature	-55°C~125°C	-												
2	Appearance	No defects or abnormality	Visual inspection: ×10 microscope												
3	Dimensions	See the previous page	Caliper inspection												
4	Capacitance	0.1pF	Test frequency: C≤1000pF: 1MHz±10% C>1000pF: 1KHz±10% Test voltage: 1.0±0.2Vrms												
5	D.F	D.F≤0.01%													
6	Insulation resistance	≤100GΩ@25°C ≤10GΩ@125°C	Voltage: DC Rated Voltage												
7	Dielectric withstanding voltage (DWV)	Shall be no evidence of breakdown or visible evidence of arcing or damage	Test Voltage:250% of the rated voltage Applied Time: 5 s Charge/discharge current: 50mA max												
8	Temperature coefficient	(0±30)ppm/°C	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 <table><tr><th>step</th><th>temperature (°C)</th></tr><tr><td>1</td><td>25±2</td></tr><tr><td>2</td><td>-55±3</td></tr><tr><td>3</td><td>25±2</td></tr><tr><td>4</td><td>125±3</td></tr><tr><td>5</td><td>25±2</td></tr></table> $TC = \frac{C_5 - C_1}{C_3 \times \Delta T} \times 10^6 \text{ ppm/}^\circ\text{C}$	step	temperature (°C)	1	25±2	2	-55±3	3	25±2	4	125±3	5	25±2
step	temperature (°C)														
1	25±2														
2	-55±3														
3	25±2														
4	125±3														
5	25±2														
9	Capacitance Drift	±0.2% or ±0.05pF, whichever is larger													
10	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 												



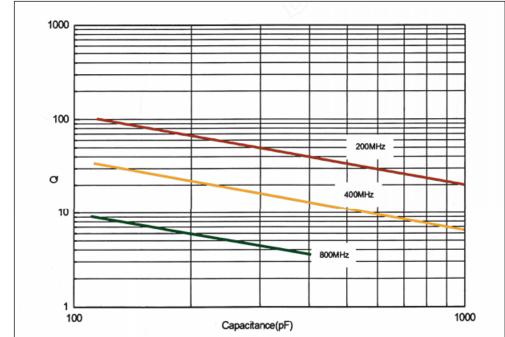
No.	Item	Specification	Test method															
11	Substrate Bending test	Appearance: No defects or abnormalities. Capacitance Change: With in $\pm 5\%$ or $\pm 0.3\text{pF}$ whichever is larger	Mounting method: Reflow solder the capacitor on the test substrate. Pressurization Method: Shown as below. Flexure 1mm. Holding Time $5 \pm 1\text{s}$  a: 1.0mm b: 3.8mm c: 1.5mm															
12	Solderability of termination	Shall be at least 95 percent covered with a smooth solder coating	Immerse the capacitor in a eutectic solution requirement temperature $245 \pm 2^\circ\text{C}$ for 2 ± 0.5 seconds. Capacitor shall be immersed to a depth of 10mm															
13	Resistance to soldering Heat	Appearance: No evidence of mechanical damage or delamination or exposed Cap change: within $-1.0\% \sim +2.0\%$ or $\pm 0.5\text{pF}$ whichever is larger Q: No less than initial requirement IR(25°C): No less than initial requirement	Preheat for 1 minute at 150°C to 180°C before immerse the capacitor in a eutectic solution at $260 \pm 5^\circ\text{C}$ for 10 ± 1 seconds. Capacitor shall be immersed to a depth of 10mm And following a 24 ± 2 hours cooling period															
14	Temperature Cycle	Appearance: No evidence of mechanical damage Cap change: within $\pm 0.5\%$ or $\pm 0.5\text{pF}$ whichever is larger Q: No less than initial requirement IR(25°C): 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 <table><tr><th>step</th><th>Temperature($^\circ\text{C}$)</th><th>Time(min)</th></tr><tr><td>1</td><td>$-55(-3 \sim 0)$</td><td>≥ 30</td></tr><tr><td>2</td><td>$25+10$</td><td>≤ 5</td></tr><tr><td>3</td><td>$125(0 \sim +3)$</td><td>≥ 30</td></tr><tr><td>4</td><td>$25+10$</td><td>≤ 5</td></tr></table>	step	Temperature($^\circ\text{C}$)	Time(min)	1	$-55(-3 \sim 0)$	≥ 30	2	$25+10$	≤ 5	3	$125(0 \sim +3)$	≥ 30	4	$25+10$	≤ 5
step	Temperature($^\circ\text{C}$)	Time(min)																
1	$-55(-3 \sim 0)$	≥ 30																
2	$25+10$	≤ 5																
3	$125(0 \sim +3)$	≥ 30																
4	$25+10$	≤ 5																
15	Humidity, steady state	Appearance: No evidence of mechanical damage Cap change: within $\pm 0.3\%$ or $\pm 0.3\text{pF}$ whichever is larger IR(25°C): No less than initial requirement	With 1.5 Volts D.C. applied while subjected to an environment of 85°C with 85% relative humidity for 240 hours minimum Removed and sit 3.5 ± 0.5 hours at room temperature															
16	High Temperature Load (Life)	Appearance: No evidence of mechanical damage Cap change: within $\pm 2\%$ or $\pm 0.5\text{pF}$ whichever is larger Q: No less than 50% initial requirement IR(25°C): No less than 30% initial requirement	Test Voltage: 200% of the rated voltage The charge/discharge current is less than 50mA Temperature: T_{max} Time: 2000h Measurement: Set it for 48 hours at room temperature, then measure															

◆ DLC70A Performance Curve

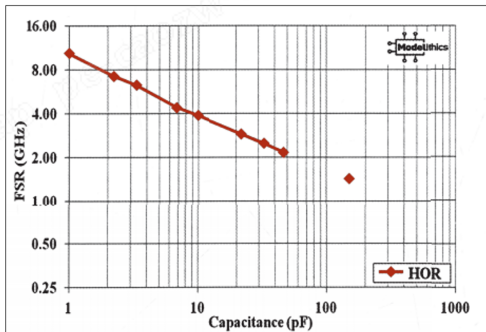
ESR vs Capacitance



Q vs Capacitance



Horizontal First Series Resonance (FSR)

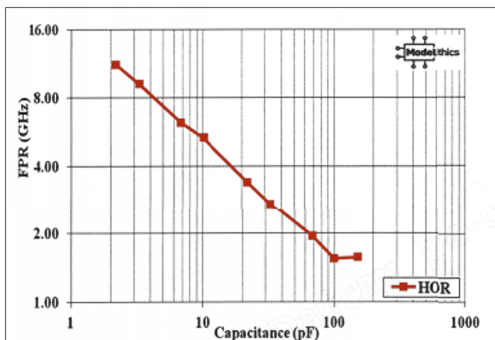


Definitions and Measurement Conditions

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, $\text{Im}[Z_{in}]$, 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 (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.**

Horizontal First Parallel Resonance (FPR)



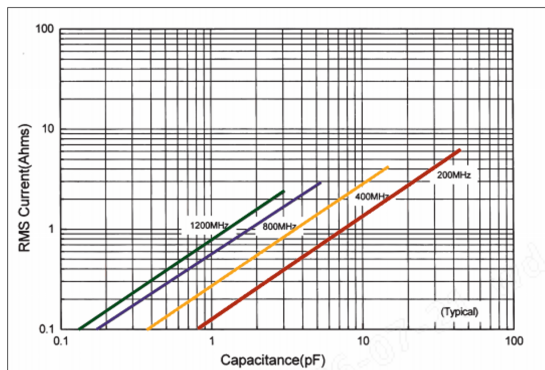
Definitions and Measurement Conditions

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 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.

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.**

◆ DLC70A Performance Curve

RMS Current vs Capacitance



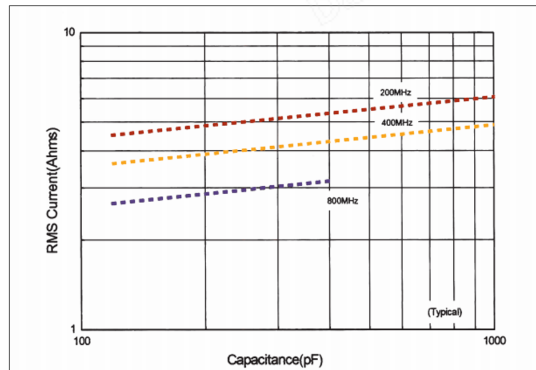
The current determined by rated voltage (max voltage products). (Solid line)

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

The current determined by dissipated power. (Dashed line)

$$I_{RMS} = \sqrt{\frac{P_{dmax}}{ESR}}$$

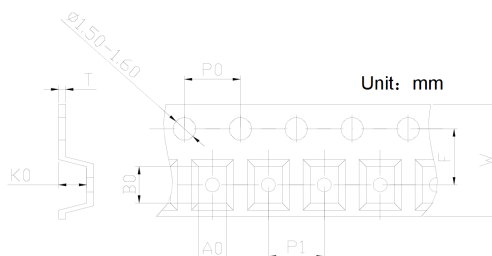
RMS Current vs Capacitance



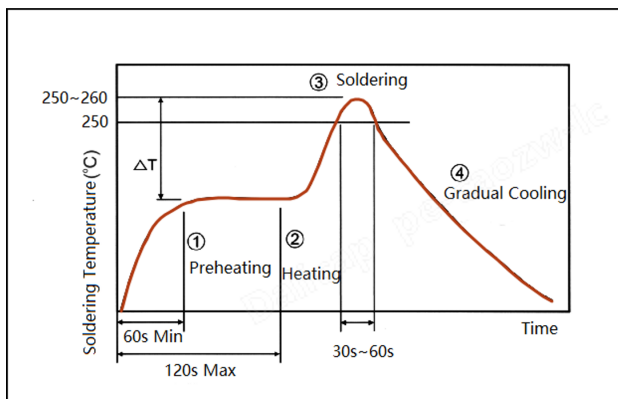
If the rated current is based on a temperature rise (ΔT) of 60°C (Ambient Temperature at 65°C), with a thermal resistance (θ) of 40°C/W, the maximum power dissipation of the capacitor is 1.5W.

◆ Tape & Reel Specifications

Orientation	EIA	A0	B0	K0	W	P0	P1	T	F	Qty/reel	Tape Material
Horizontal	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



$$\Delta T \leq 190^\circ\text{C}$$

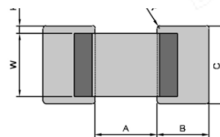
Maximum temperature: 255°C±5°C

Heating rate: ≤4°C/s

◆ Recommended Land Dimensions

Horizontal Mounting

Orientation	EIA	A(mm)	B(mm)	C(mm)
Horizontal	0505	0.7	0.6	1.5



Vertical Mounting

Orientation	EIA	A(mm)	B(mm)	C(mm)
Vertical	0505	0.7	0.9	1.5

