

Specification

Part No.: DLC70A

DLC70A (.050" x .050")

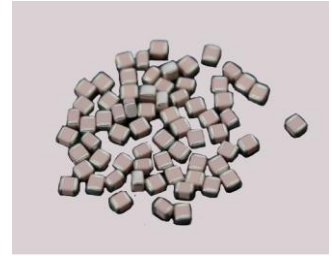
◆ Product Features

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

◆ Product Application

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

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

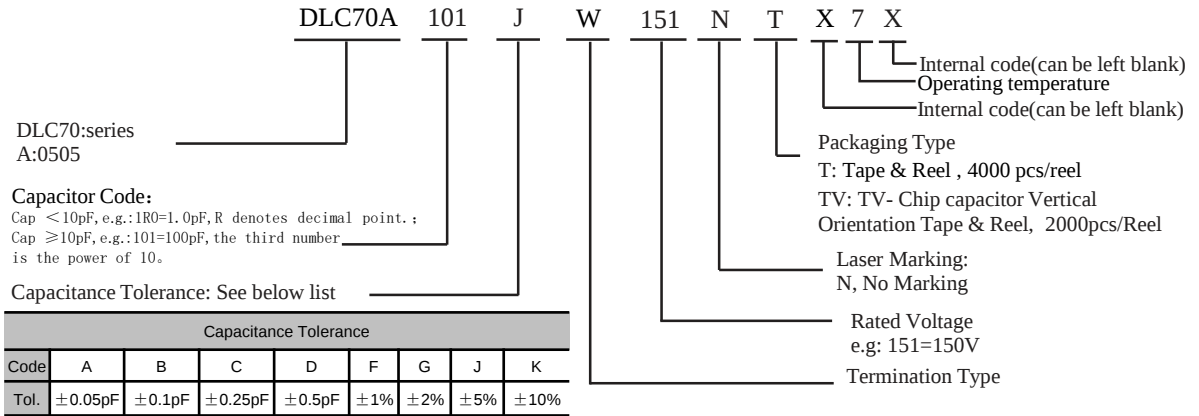


◆ DLC70A Capacitance Table

Cap.	Code	Tol.	Rated	Cap.	Code	Tol.	Rated	Cap.	Code	Tol.	Rated	Cap.	Code	Tol.	Rated
pF			WVDC	pF			WVDC	pF			WVDC	pF			WVDC
0.1	0R1	A,B,C,D	150V Code 151 or 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 or 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		
1.0	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							

Remark: special capacitance, tolerance and WVDC are available, consult with DALICAP.

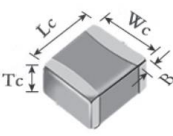
◆ Part Numbering



※Operating temperature: left blank : -55°C~125°C; 5: -55°C~150°C; 7: -55°C~175°C.

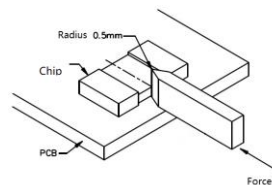
◆ DLC70A Termination Type and Dimensions

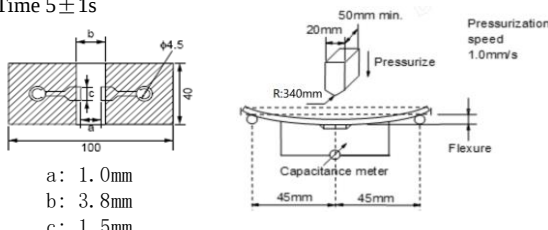
unit: inch (millimeter)

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

◆ **Reliability Test Conditions.**

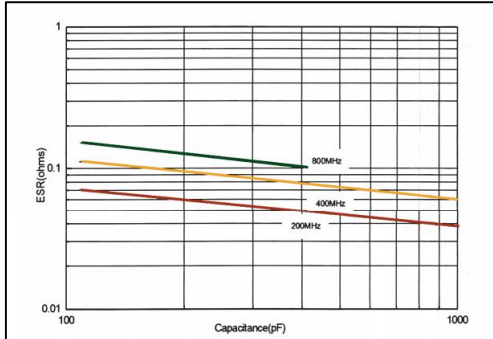
No.	Item	Specification	Test method												
1	Operating temperature	-55℃~125℃ -55℃~175℃	-												
2	Appearance	No defects or abnormality	Visual inspection: ×10 microscope.												
3	Dimensions	See the previous page	Caliper inspection												
4	Capacitance	Shall be within the applicable tolerance specified.	Test frequency: C≤1000pF: 1MHz±10% C>1000pF: 1KHz±10% Test voltage: 1.0±0.2Vrms												
5	D.F	C≤130pF: DF≤0.01% C>130pF: DF≤0.05%													
6	Insulation resistance	10 ⁵ Megohms min. @ +25 °C 10 ⁴ Megohms min. @ +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(-55℃~125℃) (0±60)ppm/°C(+125℃~175℃)	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 (℃)</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>Tmax ±3</td></tr><tr><td>5</td><td>25±2</td></tr></table> $TC = \frac{C_x - C_3}{C_3 \times \Delta T} \times 10^6 \text{ ppm/}^\circ\text{C}$	step	temperature (℃)	1	25±2	2	-55±3	3	25±2	4	Tmax ±3	5	25±2
step	temperature (℃)														
1	25±2														
2	-55±3														
3	25±2														
4	Tmax ±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.												



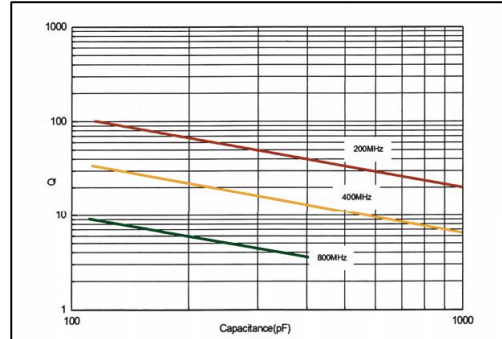
No.	Item	Specification	Test method															
11	Substrate Bending test	Appearance: No defects or abnormalities. Capacitance Change: With in $\pm 5\%$ or $\pm 0.3\text{pF}$ whichever is larger.	Mounting method: Reflow solder the capacitor on the test substrate. Pressurization Method: Shown as below. 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: Tmax; Time: 2000h. Measurement: Set it for 48 hours at room temperature, then measure.															

◆ DLC70A Performance Curve

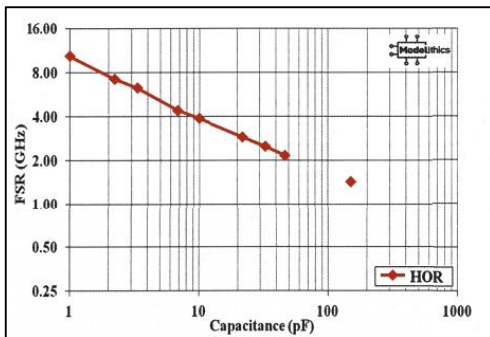
ESR vs Capacitance



Q vs Capacitance



Horizontal First Series Resonance (FSR)

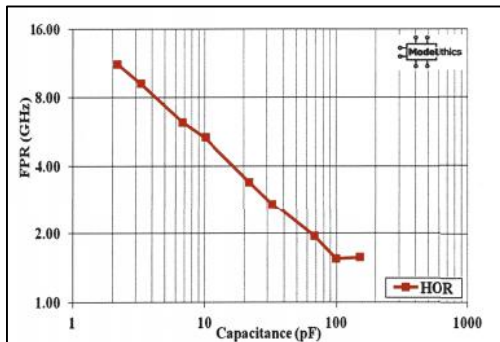


Definitions and Measurement Conditions

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)



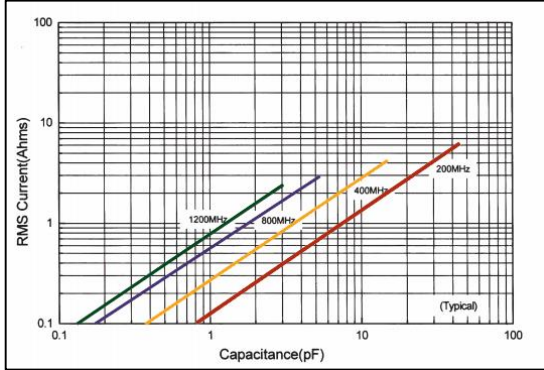
Definitions and Measurement conditions:

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



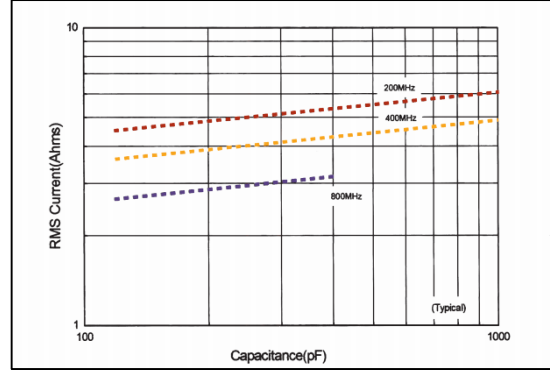
The current determined by rated voltage (max voltage products). (Solid line)

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

The current determined by dissipated power. (Dashed line)

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

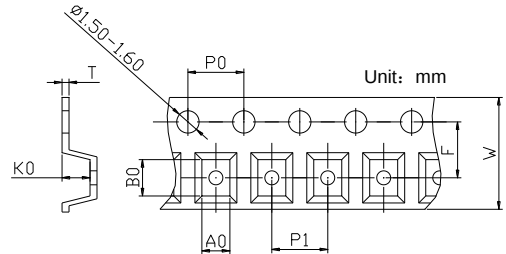
RMS Current vs Capacitance



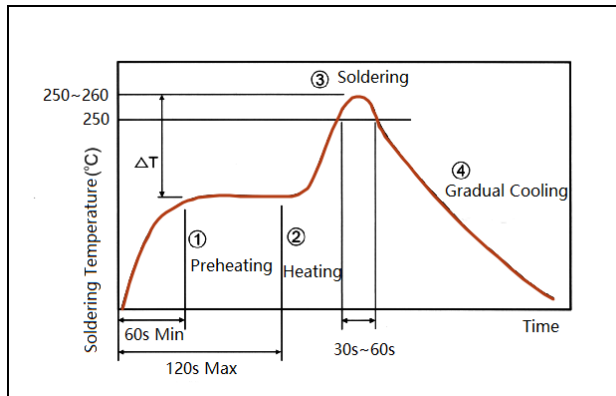
If the rated current is based on a temperature rise (ΔT) of 60°C (Ambient Temperature at 65°C), with a thermal resistance (θ) of 40°C/W, the maximum power dissipation of the capacitor is 1.5W.

◆ 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



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

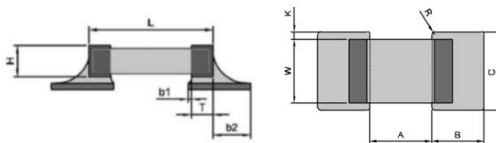
Maximum temperature: $255^\circ\text{C} \pm 5^\circ\text{C}$;

Heating rate: $\leq 4^\circ\text{C/s}$.

◆ 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

