

Specification

Part No.: DLC70E

DLC70E (.380" x .380")

◆ Product Features

High Q, High Power, Low ESR/ESL, Low Noise,

High Self-Resonance, Ultra- Stable Performance.



◆ Product Application

Typical functions: bypass, coupling, tuning, impedance matching, and DC blocking.

Typical applications: semiconductor RF power supplies, MRI medical equipment, high-speed railway signal transponders, and radio and television equipment.

◆ DLC70E 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			
0.5	0R5	A,B,C,D	3600V Code 362 or 7200V Code 722	4.3	4R3	A,B,C,D	3600V Code 362 or 7200V Code 722	43	430	F,G,J	3600V Code 362 or 7200V Code 722	430	431	F,G,J	2500V Code 252 or 3600V Code 362
0.6	0R6			4.7	4R7			47	470			470	471		
0.7	0R7			5.1	5R1			51	510			510	511		
0.8	0R8			5.6	5R6			56	560			560	561		
0.9	0R9			6.2	6R2			62	620			620	621		
1.0	1R0			6.8	6R8			68	680			680	681		
1.1	1R1			7.5	7R5			75	750			750	751		
1.2	1R2			8.2	8R2			82	820			820	821		
1.3	1R3			9.1	9R1	91		910	910			911			
1.4	1R4			10	100	100		101	1000			102			
1.5	1R5			11	110	110		111	1100			112			
1.6	1R6			12	120	120		121	1200			122			
1.7	1R7			13	130	130		131	1500			152			
1.8	1R8			15	150	150		151	1800			182			
1.9	1R9			16	160	160		161	2200			222			
2.0	2R0			18	180	180		181	2400			242			
2.1	2R1			20	200	200		201	2700		272				
2.2	2R2			22	220	220		221	3000		302				
2.4	2R4			24	240	240		241	3300		332				
2.7	2R7			27	270	270		271	3600		362				
3.0	3R0			30	300	300		301	3900		392				
3.3	3R3			33	330	330		331	4300		432				
3.6	3R6			36	360	360		361	4700		472				
3.9	3R9			39	390	390		391	5100		512				

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

◆ Part Numbering

DLC70E 101 J W 722 X T X 7 X

DLC70:series

E:3838

Capacitor Code:

Cap < 10pF, e.g.: 1R0=1.0pF, R denotes decimal point.;

Cap $\geq 10\text{pF}$, e.g.: 101=100pF, the third number is the power of 10.

Capacitance Tolerance: See below list

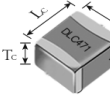
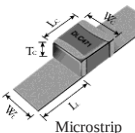
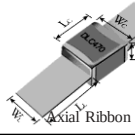
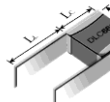
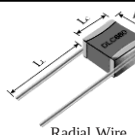
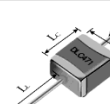
Capacitance Tolerance								
Code	A	B	C	D	F	G	J	K
Tol.	±0.05pF	±0.1pF	±0.25pF	±0.5pF	±1%	±2%	±5%	±10%

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

Internal code(can be left blank)
 Operating temperature
 Internal code(can be left blank)
 Packaging Type
 T: Tape & Reel
 TV- Chip capacitor Vertical Orientation
 Tape & Reel
 C- Lead capacitor
 Laser Marking:
 N: No Marking
 X: Marking
 Rated Voltage
 e.g.:722=7200v
 Termination Type

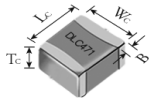
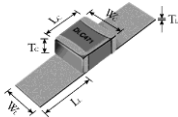
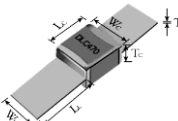
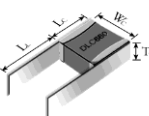
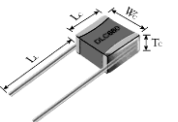
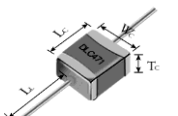
◆ DLC70E Termination Type and Dimensions

unit: inch (millimeter)

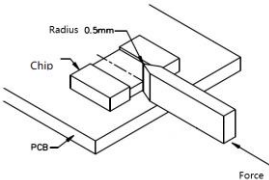
Series	Term. Code	Type/ Outlines	Capacitor Dimensions				Lead Dimensions			Terminals Material
			Length Lc	Width Wc	Thickness Tc	Overlap B	Length Ll	Width Wl	Thickness Tl	
70E	W					.024~.059 (0.60~1.50)	—	—	—	100%Sn over Nickel Plating , RoHS Compliant
	L	Chip								90%Sn 10%Pb over Nickel Plating ,
70E	MS						.728 (18.50) min	.350 ± .020 (8.89 ± 0.50)	.008 ± .001 (0.20 ± .025)	Silver-plated Copper
70E	AR							.315 ± .010 (8.00 ± 0.25)		
70E	RR					—		.354 (9.00) min	.118 ± .010 (3.00 ± 0.25)	.012 ± .001 (0.30 ± .025)
	RW							.709 (18.00) min	.031 ± .004 (0.80 ± 0.10)	Silver wire
70E	AW							.906 (23.00) min		

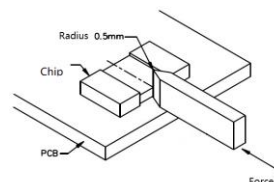
◆ **DLC70E Termination Type and Dimensions**

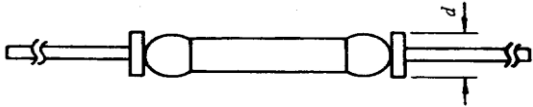
unit: inch (millimeter)

Series	Term. Code	Type/ Outlines	Capacitor Dimensions				Lead Dimensions			Termina Material
			Length Lc	Width Wc	Thickness Tc	Overlap B	Length LL	Width WL	Thickness TL	
70E	P	 Chip(Non-Mag)	.380 -.010~+.015 (9.65 -0.25~+0.38)	.380±.010 (9.65±0.25)	.170 (4.32)max	.024~.059 (0.60~1.50)	—	—	—	100%Sn over Copper Plating , RoHS Compliant
70E	MN	 Microstrip(Non-Mag)				—	.728 (18.50) min	.350±.020 (8.89±0.50)	.008±.001 (0.20±.025)	Silver- plated Copper
70E	AN	 Axial Ribbon (Non-Mag)						.315±.010 (8.00±0.25)		
70E	FN	 RadialRibbon (Non-Mag)					.354 (9.00) min	.118±.010 (3.00±0.25)	.012±.001 (0.30±.025)	
70E	RN	 Radial Wire(Non-Mag)				—	.709 (18.00) min	.031±.004 (0.80 ± 0.10)		Silver wire
70E	BN	 Axial Wire (Non-Mag)					.906 (23.00) min			

◆ **Reliability Test Conditions.**

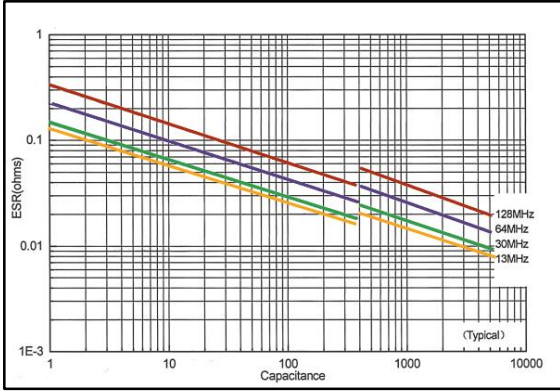
No.	Item	Specification	Test method												
1	Operating temperature	-55℃~125℃ -55℃~175℃	-												
2	Appearance	No defects or abnormality	Visual inspection: ×10 microscope.												
3	Dimensions	See the previous page	Caliper inspection												
4	Capacitance	Shall be within the applicable tolerance specified.	Test frequency: C≤1000pF: 1MHz±10% C>1000pF: 1KHz±10% Test voltage: 1.0±0.2Vrms												
5	D.F	D.F≤0.01%													
6	Insulation resistance	10 ⁵ Megohms min. @ +25 °C 10 ⁴ Megohms min. @ +125 °C	Voltage: DC Rated Voltage (500V max)												
7	Dielectric withstanding voltage (DWV)	Shall be no evidence of breakdown or visible evidence of arcing or damage.	Test Voltage: Rated voltage≤500V: 250% of the rated voltage 500V<Rated voltage≤1250V: 150% of the rated voltage Rated voltage>1250V: 120% 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 (°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>Tmax ±3</td></tr><tr><td>5</td><td>25±2</td></tr></table> $TC = \frac{C_5 - C_3}{C_3 \times \Delta T} \times 10^6 \text{ ppm/}^\circ\text{C}$	step	temperature (°C)	1	25±2	2	-55±3	3	25±2	4	Tmax ±3	5	25±2
step	temperature (°C)														
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: 50.0 ^{+2.0} ₀ N Test time: 10±1 sec. 												



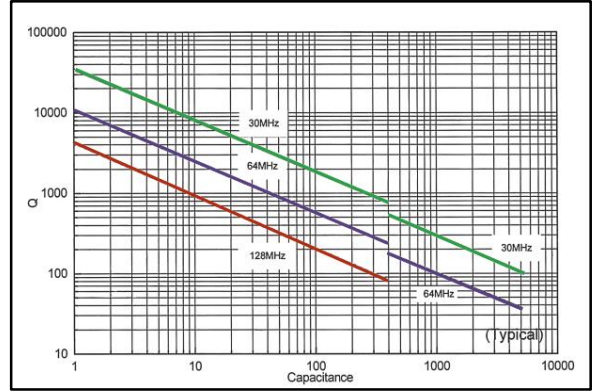
No.	Item	Specification	Test method															
11	Substrate Bending test	Visual examination for loosening, rupturing, and permanent damage to the terminals.	Solder the capacitor on test jig as below . Then apply a horizontal force. Holding time: 5~10 s Force: 10 N minimum. d= (1.02±0.15) mm; 															
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±2 °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%~+2.0% or ±0.5pF 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±5°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 ±0.5% or ±0.5pF 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(°C)</th><th>Time(min)</th></tr><tr><td>1</td><td>-55(-3~0)</td><td>≥30</td></tr><tr><td>2</td><td>25+10</td><td>≤5</td></tr><tr><td>3</td><td>125(0~+3)</td><td>≥30</td></tr><tr><td>4</td><td>25+10</td><td>≤5</td></tr></table>	step	Temperature(°C)	Time(min)	1	-55(-3~0)	≥30	2	25+10	≤5	3	125(0~+3)	≥30	4	25+10	≤5
step	Temperature(°C)	Time(min)																
1	-55(-3~0)	≥30																
2	25+10	≤5																
3	125(0~+3)	≥30																
4	25+10	≤5																
15	Humidity, steady state	Appearance: No evidence of mechanical damage . Cap change: within ±0.3% or ±0.3pF 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 ±2% or ±0.5pF whichever is larger. Q: No less than 50% initial requirement. IR(25°C): No less than 30% initial requirement.	Test Voltage: Rated voltage≤500V: 200% of the rated voltage 500V<Rated voltage≤1250V: 120% of the rated voltage Rated voltage>1250V: 100% of the rated voltage The charge/discharge current is less than 50mA. Temperature: Tmax°C; Time: 2000h. Measurement: Set it for 48 hours at room temperature, then measure.															

◆ **DLC70E Performance Curve**

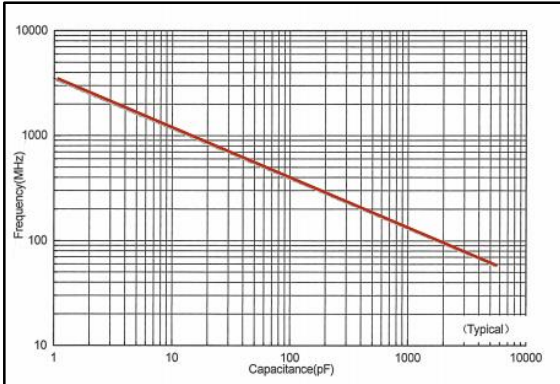
ESR vs Capacitance



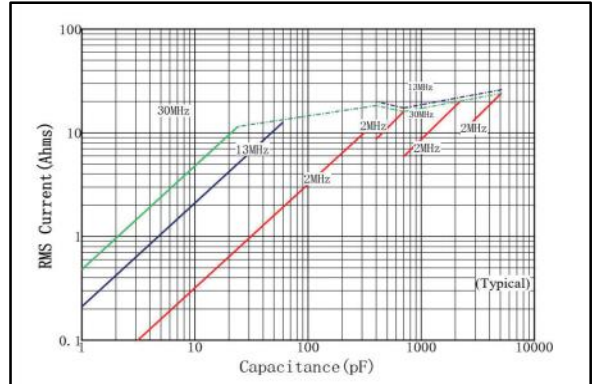
Q vs Capacitance



Series Resonance vs Capacitance



RMSCurrent vs Capacitance



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

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

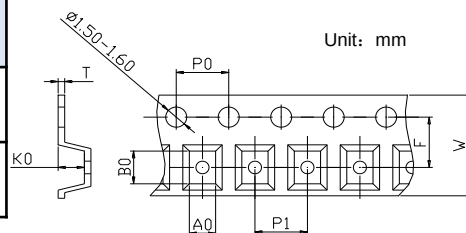
The current determined by dissipated power. (Dashed line)

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

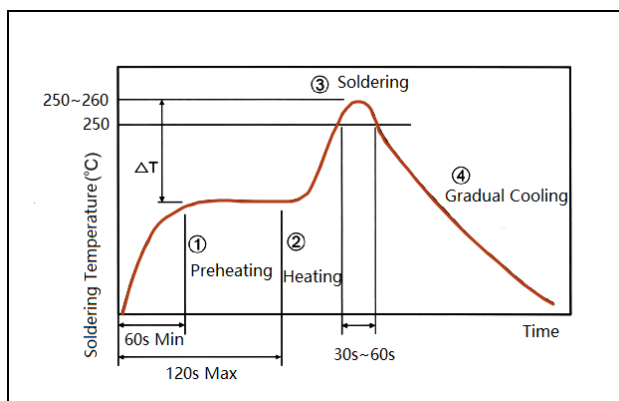
If the rated current is based on a temperature rise (ΔT) of 60°C (Ambient Temperature at 65°C), with a thermal resistance (θ) of 12°C/W, the maximum power dissipation of the capacitor is 5W.

◆ Tape & Reel Specifications

Orientation	EIA	A0	B0	K0	W	P0	P1	T	F	Qty/reel	Tape Material
Horizontal	3838	10.1	10.1	4.3	16	4	16	0.4	7.5	200	Plastic
Vertical	3838	4.3	10.1	10.1	24	4	12	0.5	11.5	500	Plastic



◆ Recommended soldering conditions



$\Delta T \leq 150^{\circ}\text{C}$;

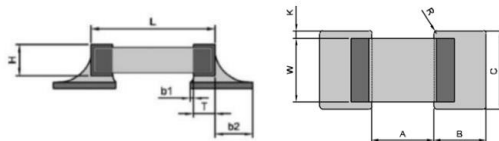
Maximum temperature: $255^{\circ}\text{C} \pm 5^{\circ}\text{C}$;

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

◆ Recommended Land Dimensions

Horizontal Mounting

Orientation	EIA	A(mm)	B(mm)	C(mm)
Horizontal	3838	7.1	3.0	10.0



Vertical Mounting

Orientation	EIA	A(mm)	B(mm)	C(mm)
Vertical	3838	7.1	3.0	5.0

