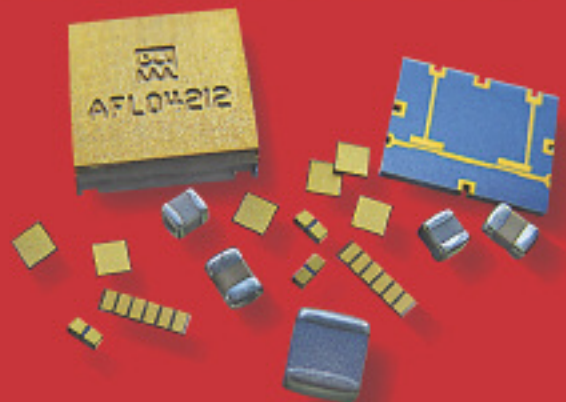


Single-Layer and Broadband Blocking Capacitors



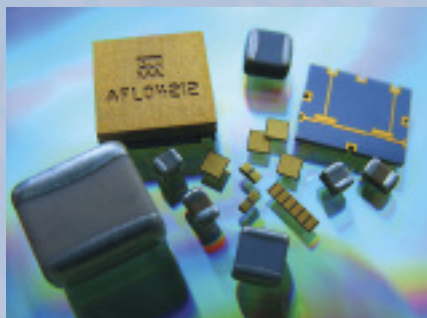
DLI – the Global Leader for High Frequency Solutions



Company Overview

Dielectric Laboratories, Inc. (DLI) is your global partner for application specific microwave and millimeter wave components serving customers in fiber optic, wireless, medical, transportation, semiconductor, space, avionics and military markets. With over 35 years of experience, you can turn to DLI with confidence for your high frequency Single-Layer Capacitors, difficult tight tolerance Multi-Layer Capacitors, Heat Sinks, Resonators, Filters, and Build-To-Print or Custom Thin Film Components.

DLI is the preeminent global supplier of Single-Layer Capacitors which are summarized in this catalog. Our products include Di-Cap®, Border Cap®, Gap Cap, Bar Cap®, Bi-Cap®, T-Cap®, Opti-Cap®, and Milli-Cap®. DLI has the world's broadest range of materials starting with Class 1 dielectrics with ϵ_r from 5.7 to 900 and Class 2 dielectrics with ϵ_r from 445 to 30,000+. DLI specializes in high reliability and space applications. We have the expertise in customizing, tight tolerances and meeting specific design targets. DLI continues to introduce exciting new innovations in custom ceramic resonator and filter technologies. These patent-protected products leverage decades of ceramic and Thin Film experience, creative and clever design expertise, and advanced prototyping and testing capabilities. Please discuss your needs with our sales and applications engineering Team.



DLI offers a broad range of Multi-Layer Capacitor products. Our products include C04, C06, C07, C08, C11, C17, C18, C22 and C40 High-Q Multi-Layer Capacitors. DLI has the world's most comprehensive array of Broadband Blocking Capacitors. We have the expertise in customizing, tight tolerances and meeting specific design targets.

DLI is constantly creating and evolving new state of the art products. Please contact our applications engineering team for the very latest.

We are committed to serving you and thank you for your business.

RoHS Compliance Statement

DLI is a leading supplier to the electronic components market and is fully committed to offering products supporting Restriction of Hazardous Substances (RoHS) directive 2002/95/E. All of our Dielectric formulations are RoHS compliant and we offer a broad range of capacitors with RoHS compliant terminations. DLI complies with the requirements of the individual customer and will maintain product offerings that meet the demands of our industry.

Quality and Environmental Policy

DLI's reputation for quality and environmental responsibility is based on a commitment not only to meet our customers' requirements, but to exceed their expectations. The entire organization, beginning with top management, strives to achieve excellence in designing, manufacturing and delivering high Q capacitors and proprietary thin film components for niche high frequency applications, while maintaining safe and healthy working conditions. Furthermore, DLI commits to achieve these goals in an environmentally responsible manner through our commitment to comply with environmental regulations and implement pollution prevention initiatives. DLI strives to continually improve the effectiveness of our Quality and Environmental Management System through the establishment and monitoring of objectives and targets.

Our goal deployment process (GDP) further assures that we are working on those initiatives that will increase our value to our most valued asset our "customers."



AS 9100 and ISO 9001 certified
ISO 14001 certified

Table of Contents

Table of Contents and Introduction	1
What's New at DLI	2
Capacitor Spectrum Chart	3
CapCad™	4
Dielectric General Information	5 – 7
Di-Cap®	8 – 11
Border Cap®	12 – 15
Gap Cap	16 – 19
Bar Cap®	20 – 21
Bi-Cap®	22
T-Cap®	23
Miniature RF Blocking Network	24 – 25
Opti-Cap®	26
Milli-Cap®	27
High-K Ceramic Substrates and Plates	28 – 29
C04/C06/C08 Broadband Blocks	30
Other DLI Products	31
SLC Packaging	32

Introduction

What Makes DLI Unique?

DLI has built its global reputation as a manufacturer of high frequency, high Q capacitors. In recent years, DLI has emerged as a comprehensive manufacturer of specialty ceramic components for high frequency applications. With over three decades of material science formulation and development, more than one hundred proprietary and/or patented ceramic formulations, and multiple recent patent filings, DLI is the pre-eminent ceramic component manufacturer in the industry. The marriage of ceramic

expertise, manufacturing know-how, product quality, customer service, product customization, and clever microwave and RF design engineering sets us apart from all others in the industry.

DLI invented the Di-Cap® in 1974 and it has become the world standard for reliable high performance ceramic Single-Layer Capacitors. DLI literally defined the industry and currently serves the overwhelming majority of the world markets as the leader of high Q, high frequency Single Layer Capacitors.



- Di-Cap®** Highest Performance SLC 100 KHz to > 80 GHz
- Border Cap®** One- or two-sided recessed metallization, ideal for epoxy attachment
- Gap Cap** Series configured SLC that eliminates wire bonds
- Bar Cap®** Multiple SLC array configuration for a single insertion in a multi-chip environment
- Bi-Cap®** The Binary Capacitor with multiple values for design and tuning
- T-Cap®** The Transmission Cap for repeatable resonance behavior
- Milli-Cap®** The ideal surface mount capacitor

What's New at DLI

Certified AS9100

In an effort to be at the forefront of the aerospace market, Dielectric Laboratories, Inc. (DLI) has been certified to the AS9100B standard. DLI was informed in March 2009 that the Quality Management System in place was found to be in compliance with the standard and was officially certified to ISO 9001-2000 & AS9100B.

Custom Microstrip Filters

DLI has expanded its filter capability beyond microstrip bandpass designs. Notch filters, lowpass and highpass filters, ceramic cavity filters, and various other filter types are now available. All filters employ DLI's high-K ceramics which allow for great size reduction, and unbelievable temperature stability compared to alumina and PWB materials. Solder surface mount and chip and wire filters are all possible.

Typical Notch Filter

- Greater than 20dB attenuation typical Notch frequency
- Low loss in passband regions [better than 1.5dB]
- Typical size: .25 x .196 x .02 inches
- Chip and Wire or SMT mounting schemes possible

Typical Lowpass Filter

- Low loss in passband [better than 1.0dB]
- Greater than 40dB attenuation in stopband
- Typical size: .4 x .25 x .015 inches
- Chip and Wire or SMT mounting schemes possible

Typical Highpass Filter

- Low loss in passband region [better than 2.0dB]
- Greater than 35dB attenuation in stopband
- Typical size: .3 x .2 x .015 inches
- Chip and Wire or SMT mounting schemes possible

L1/L2 GPS Notch Filters

- Greater than 20dB attenuation typical
- Low loss in passband regions [better than 1.5dB]
- Typical size: .25 x .25 x .075 inches
- Includes integral cover
- Chip and Wire or SMT mounting schemes possible

SLC on tape and reel

DLI is pleased to offer tape and reel packaging solutions for a variety of our Single-layer capacitor case sizes. Utilizing the latest technology and equipment to provide our customers the highest quality products, our standard SMD tape and reel packaging meets or exceeds EIA standards.

"NA" material temperature compensating capacitors

DLI is now offering our proprietary NA dielectric formulation in a variety of MLC case sizes. With its negative temperature coefficient of capacitance (N30+/-15ppm/°C), this high-Q porcelain dielectric is ideal for temperature compensating situations. NA is offered as a drop-in replacement for most AH/CF part numbers.

Extreme leach resistant terminations

When design engineers told us they'd like a termination that would allow them the freedom to use harsh solder profiles and multiple reworks, we listened! DLI has qualified enhanced versions of its RoHS compliant terminations designed to handle both the rigors of the test bench and the production floor with ease. The enhanced terminations are available in both standard (term code: E) and non-magnetic (term code: H) finishes. Please contact Sales for more details.

High Voltage 1111 case size

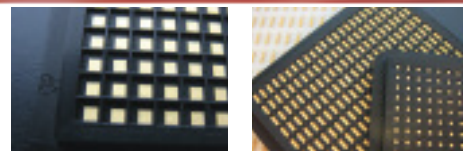
DLI is pleased to introduce the new C18 series of enhanced voltage high-Q porcelain capacitors. With voltage ratings up to 2000V, the C18 is designed to be the most robust "1111" high-Q capacitor available today. The C18 is available in both our ultra stable (0±15ppm/°C) CF and temperature compensating (+90ppm/°C) AH dielectrics, and is form-factor compatible with our existing line of C17 "1111" capacitors.

Tuning Rod Kits

DLI designed tuning rods to utilize our C11 or C17 capacitors of a specified value attached to High-Q insulating holder to find the optimum capacitor for a particular circuit or application without soldering capacitors.

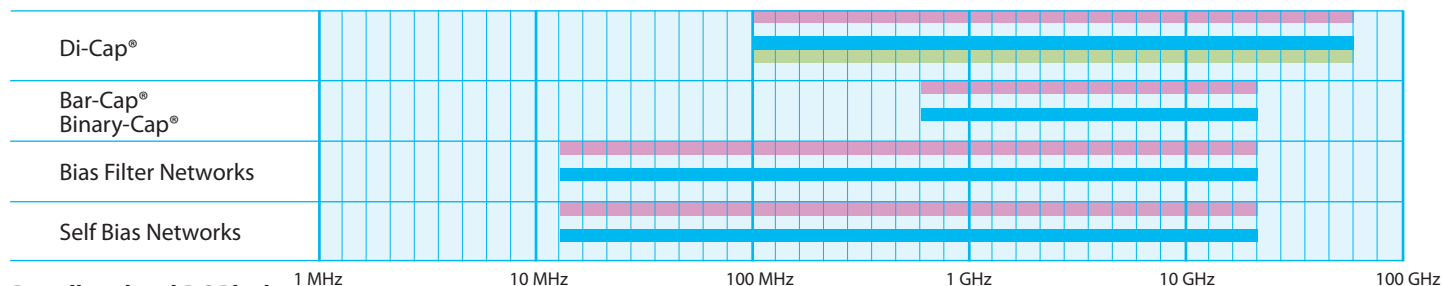
More new products are being introduced.

Please call DLI Applications Engineering for the latest breakthroughs in custom ceramic technologies.

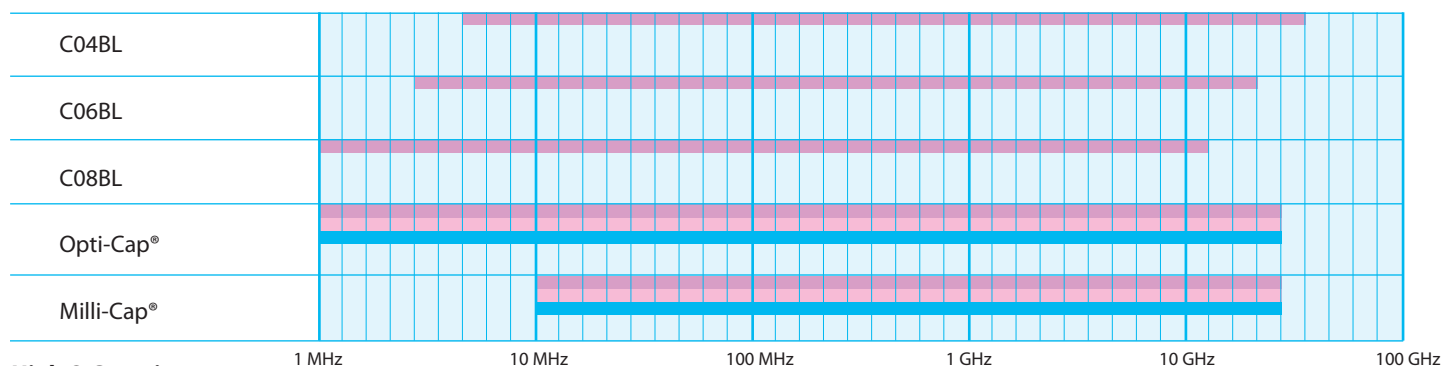


Capacitor Spectrum Chart

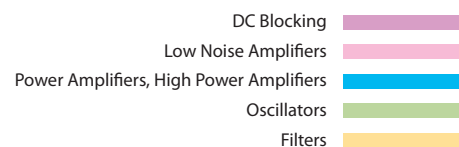
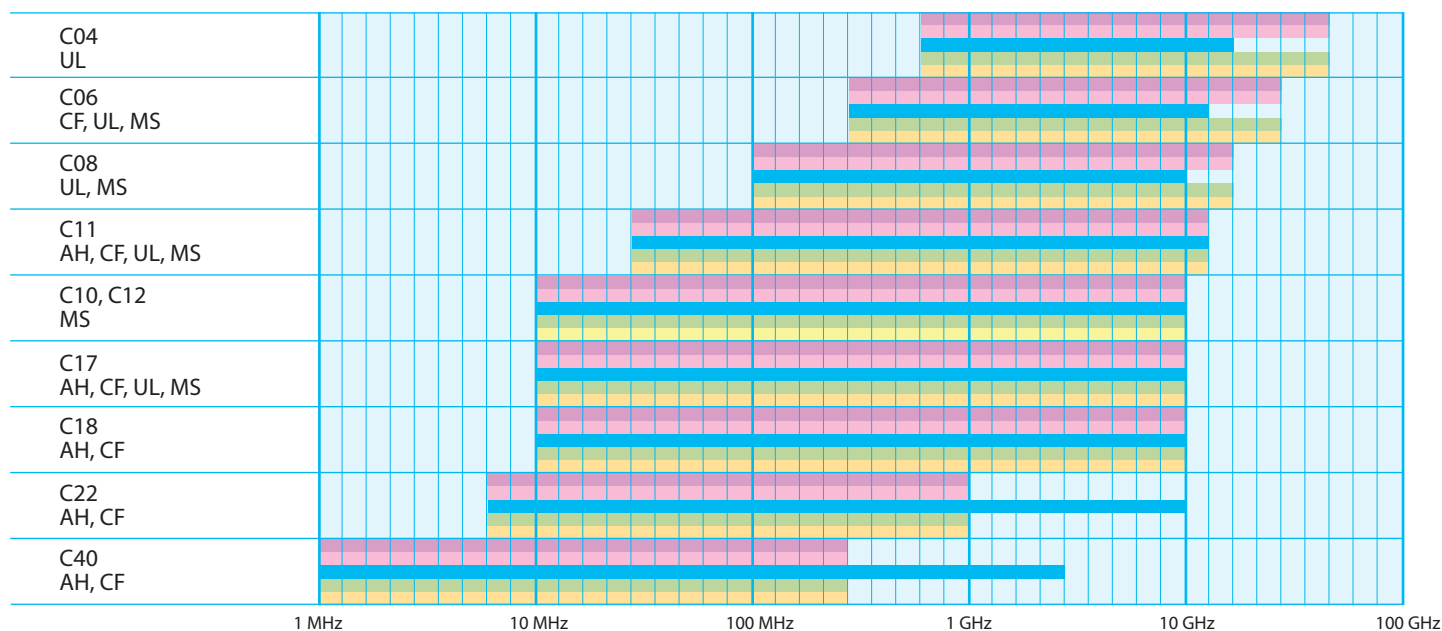
SLC and Thin Film



Broadband and DC Blocks



High Q Capacitors





CapCad™

CapCad™ Selection

DLI's web based CapCad™ capacitor modeling software was developed to provide customers with an easy to use and readily accessible comparison tool for choosing the best Single-Layer, Multi Layer or Broadband Blocking capacitor to suit the customer's needs. CapCad™ includes SPICE models with values that reflect typical performance at the chosen frequencies and temperatures that are of importance to an application. The user

also has the ability to plot 2-port Scattering Parameters, Impedance, Q Factor or Equivalent Capacitance over any frequency span from 1 MHz to 40 GHz while maintaining the ability to adjust the temperature and note how it may affect the performance. CapCad™ also includes a Smith Chart utility and the ability to copy the S-Parameter data in touchtone format(s2p).

Di Cap®
T-Cap®
Border Cap®
Gap Cap
Multi Cap
DC Block
RF Block
Bias Filter

T-Caps

W= 0.010
L= 0.010
T= 0.0030
☐ in ☐ mm

Material: **CF**
Class | K | TC | DF | IR (Ω)
1 | 24 | 0±15ppm | .6% | >10E6
Tolerance: **P: ± 0.01pF**
Termination: **P: TiW/NiV/Au (Sputter plated)**
Test Code: **X: Commercial**

Series Model

Rs(Ω)	0.198
Rp(KΩ)	122.4
Ls(nH)	0.028
C(pF)	0.20
Fs (GHz)	66.812

Series/Parallel Model

Rs(Ω)	0.198
Rp(KΩ)	122.4
Ls(nH)	0.039
Cs(pF)	0.15
Cp(pF)	0.06
Fs (GHz)	66.812
Fp (GHz)	129.798

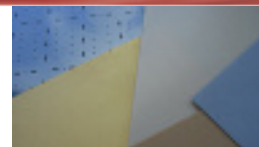
Add Lead Inductance

Inductance (nH): 0.0
Fs (GHz) 67.255
Graphing Links: ☐ Series ☐ Shunt ☐ T-Line

Acceptable Temp Range -55 to 125 (°C)

Temp (°C) 25
Frequency 1.000 (GHz)

The data presented by CapCad™ is based off of calculated models and is a representation of typical performance. It should not be construed as a specification or guarantee of performance. Actual performance may vary slightly from application to application. For more info or support please feel free to contact us by phone at (315) 655-8710, or by email at sales@dilabs.com.



Dielectric General Information

DLI Class I Dielectric Materials

Dielectric Code	Relative ϵ_r @ 1 MHz	Temperature Coefficient -55°C to 125°C (ppm/°C Maximum)	1 MHz Dissipation Factor (% Maximum)	25°C Insulation Resistance (M Ω)	125°C Insulation Resistance (M Ω)
LA	6.0	P115 $\pm$ 20	0.20	>10 ⁶	>10 ⁵
PI	9.9	P105 $\pm$ 20	0.15	>10 ⁶	>10 ⁵
PG	13	P22 $\pm$ 30	0.15	>10 ⁶	>10 ⁵
AH	20	P90 $\pm$ 20	0.15	>10 ⁶	>10 ⁵
CF	24	0 $\pm$ 15	0.60	>10 ⁶	>10 ⁵
NA	22	N30 $\pm$ 15	0.15	>10 ⁶	>10 ⁵
CD	37	N20 $\pm$ 15	0.15	>10 ⁶	>10 ⁵
NG	43	N220 $\pm$ 60	0.25	>10 ⁶	>10 ⁵
CG	70	0 $\pm$ 30	0.70	>10 ⁶	>10 ⁵
DB	72	N50 $\pm$ 30	0.15	>10 ⁶	>10 ⁵
NP	85	N750 $\pm$ 200	0.50	>10 ⁴	>10 ³
NR	160	N1500 $\pm$ 500	0.25	>10 ⁶	>10 ⁵
NS	300	N2400 $\pm$ 500	0.70	>10 ⁶	>10 ⁵
NU	600	N3700 $\pm$ 1000	1.50	>10 ⁶	>10 ⁵
NV	900	N4700 $\pm$ 1000	1.20	>10 ⁶	>10 ⁵

DLI Class II Dielectric Materials

Dielectric Code	Relative ϵ_r @ 1 MHz	Temperature Coefficient -55°C to 125°C (% Maximum)		1 MHz Dissipation Factor (% Maximum)	25°C Insulation Resistance (M Ω)	125°C Insulation Resistance (M Ω)
		No Bias, Pre Voltage Conditioning	No Bias, Post Voltage Conditioning			
BF*	445	$\pm$ 7.5	$\pm$ 10	2.5	>10 ⁴	>10 ²
BD	700	$\pm$ 10	$\pm$ 15	2.5	>10 ⁴	>10 ³
BG*	900	$\pm$ 10	$\pm$ 15	2.5	>10 ⁴	>10 ³
BC	1300	$\pm$ 10	$\pm$ 15	2.5	>10 ⁴	>10 ³
BE	1250	$\pm$ 10	$\pm$ 15	2.5	>10 ⁴	>10 ³
BL	2000	$\pm$ 15	$\pm$ 25	2.5	>10 ⁵	>10 ⁴
BJ	3300	$\pm$ 10	$\pm$ 15	3.0	>10 ⁵	>10 ⁴
BN	4500	$\pm$ 15	$\pm$ 25	3.0	>10 ⁵	>10 ⁴

DLI Class III Dielectric Materials

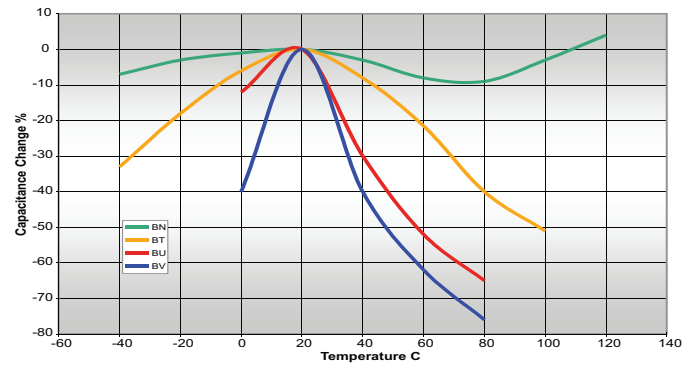
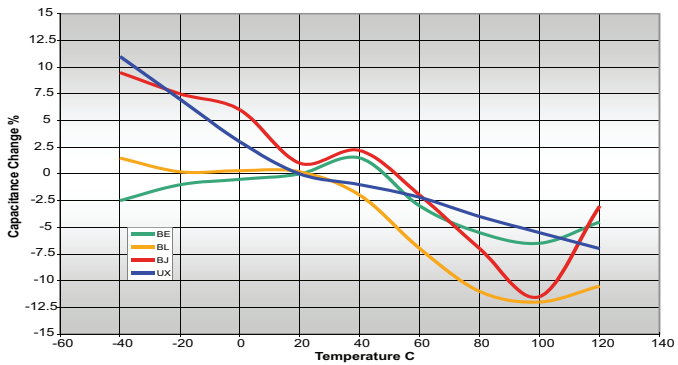
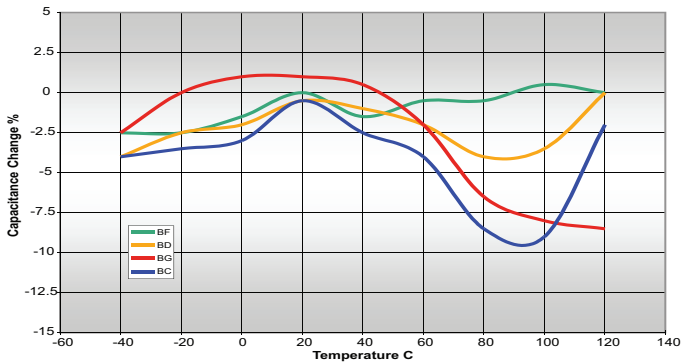
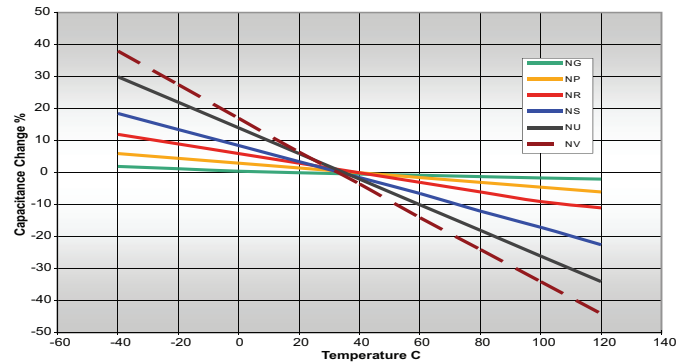
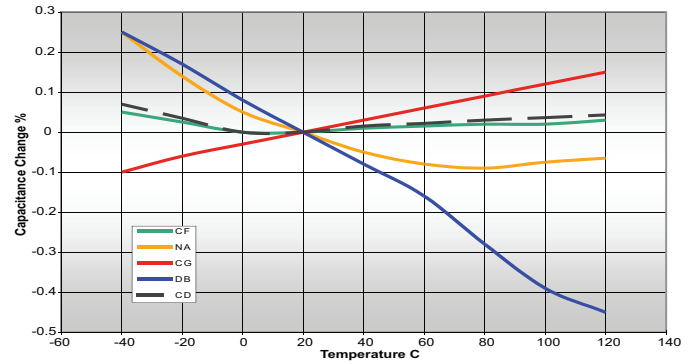
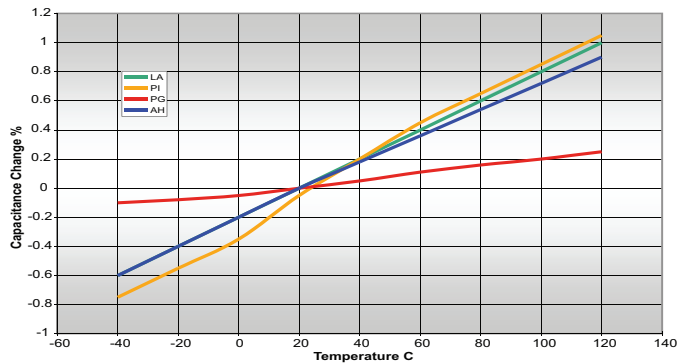
BT*	4200	+22, -56% (-55 to 105°C)	+22, -56% (-55 to 105°C)	3.0	>10 ⁵	>10 ²
BU	8500	+22, -82% (10°C to 85°C)	+22, -82% (10°C to 85°C)	3.0	>10 ⁵	>10 ⁴
BV	13,500	+22, -82% (10°C to 85°C)	+22, -82% (10°C to 85°C)	3.0	>10 ⁵	>10 ⁴
UX*	25,000	$\pm$ 15%	$\pm$ 25%	2.5	>10 ³	>10 ²

* Recommended for commercial use only.

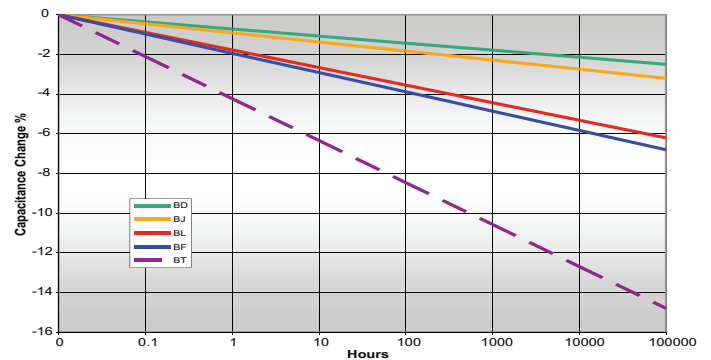
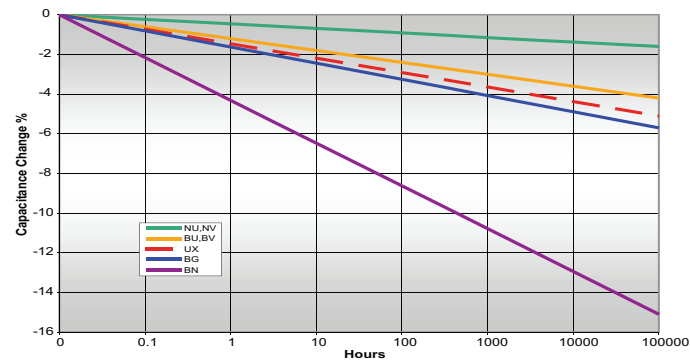
Please contact an inside sales representative for additional information.

Dielectric General Information

Dielectric Temperature Characteristics



Dielectric Aging Characteristics



Dielectric General Information

Termination Codes

	Code	Description (Layers in order from dielectric material to outermost)	Capacitor Types
	P	S1 (Sputter Plated) 1. 300 Angstroms Titanium-Tungsten 2. 50μ Inches min. Nickel-Vanadium 3. 100μ Inches min. Gold	AU-100 (Wet Plated) 1. 50μ Inches min. Nickel 2. 100μ Inches min. Gold
	T	S2 1. 300 Angstroms Titanium-Tungsten 2. 50μ Inches min. Nickel-Vanadium 3. 300μ Inches min. Gold-Tin	Di-Cap®, T-Cap®
	M	S5 1. 300 Angstroms Titanium-Tungsten 2. 100μ Inches min. Gold	Di-Cap®, T-Cap®, Bar Cap®, Binary Cap®, and Gap Cap
	B	S1	AU-100 Single Border Cap
	E	S1	AU-100 Double Border Cap
	L	Single beam lead. (Standard lead material is silver (Ag) .002" thick. Optional Gold (Au))	Di-Cap®
	A	Axial beam lead. (Standard lead material is silver (Ag) .002" thick. Optional Gold (Au))	Di-Cap®
	S	Standing axial beam lead. (Standard lead material is silver (Ag) .002" thick. Optional Gold (Au))	Di-Cap®



Environmental & Physical Testing Procedures

MIL-STD-202		
Parameter	Method	Condition
Thermal Shock	107	A, (modified), -55°C to +125°C.
Immersion	104	B
Moisture Resistance	106	-
Resistance to Solder Heat	210	C, 260°C for 20 seconds.
Life	108	A, 96 Hours @ +125°C.
Barometric Pressure	105	B
Shock, (Specified Pulse)	213	I, 100g's, 6ms.
Vibration, High Frequency	204	G, 30g's peak, 10Hz to 2kHz.

MIL-STD-883		
Parameter	Method	Condition
Bond Strength	2011	D, 3 grams minimum with .001" dia wire
Die Shear Strength	2019	Limit per MIL-STD-883, Figure 2019-4.
Temperature Cycling	1010	C
Mechanical Shock	2002	B,Y1,
Constant Acceleration	2001	3,000g's, Y1 direction

Test Level Codes

Code	Description
	Industrial / Commercial Options
Y	• 1% AQL 2 Side Visual Screening.
X	• 100% 4 Side Visual Screening. • 1% AQL for the electrical parameters Capacitance, Dissipation Factor, Insulation Resistance, and Dielectric Withstanding Voltage.
	High Reliability Options
A	MIL-PRF-49464 Group A • 100% Thermal Shock. • 100%, 100 +0/-4 Hours Voltage Conditioning. • 100% Electrical Screening. • 100% 6 Side Visual Screening. • Bond Strength. • Die Shear Strength. • Temperature Coefficient Limits.
B	MIL-PRF-49464 Group B • MIL-PRF-49464, Group A • Immersion • Low Voltage Humidity. • Life.
D	Special agreed upon testing to customers' formal specification. Customer Drawing Required! (May include, but is not limited to, one or more of the following common requests.) • MIL-PRF-38534 Class H Element Evaluation. • MIL-PRF-38534 Class K Element Evaluation. • 10(0) Destructive Bond Pull per MIL-STD-883, Method 2011. • 10(0) Die Shear per MIL-STD-883, Method 2019. Consult Factory for other alternatives or assistance in specifying custom testing.
E	6 Side Visual Screening per MIL-STD-883, Method 2032.

All Single Layer Capacitors are Lead Free and RoHS compliant.

Capacitance Tolerance Table

Tolerance Code	Tolerance
A	±.05pF
B	±.10pF
C	±.25pF
D	±.50pF
E	±.5%
F	±1%
G	±2%
H	±3%
I	±4%
J	±5%
K	±10%
L	±15%
M	±20%
X	GMV
V	+100%, -0%
Z	+80%, -20%
S	Special

High Performance Single Layer Capacitors for RF, Microwave, and Millimeter-Wave Applications



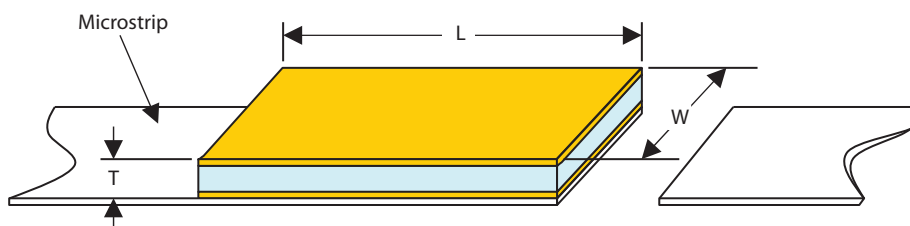
Di-Cap®

Functional Applications:

DC Blocking, RF Bypass, Filtering, and Tuning.

Benefits:

- Gold metallization for wire bonding
- Rugged construction
- Custom sizes at commercial prices
- Thin film Technology
- ESD proof



DiCap Dimensions

Style	W Width		L Length (Maximum)		T Thickness (50 Volts)		T Thickness (100 Volts)		Standard Capacitance Range pF
	Inches	mm	Inches	mm	Inches	mm	Inches	mm	
D10	.010 ^{+0.000} / _{-0.003}	.254 ^{+0.000} / _{-0.076}	.010	.254	.004 ±.001	.102 ±.025	-	-	.02 - 100
D12	.012 ^{+0.002} / _{-0.003}	.305 ^{+0.051} / _{-0.076}	.015	.381	.004 ±.001	.102 ±.025	-	-	.03 - 200
D15	.015 ^{+0.000} / _{-0.003}	.381 ^{+0.000} / _{-0.076}	.020	.508	.004 ±.001	.102 ±.025	.006 ±.001	.152 ±.025	.04 - 300
D20	.020 ^{+0.000} / _{-0.003}	.508 ^{+0.000} / _{-0.076}	.020	.508	.004 ±.001	.102 ±.025	.006 ±.001	.152 ±.025	.06 - 400
D25	.025 ^{+0.000} / _{-0.003}	.635 ^{+0.000} / _{-0.076}	.030	.762	.004 ±.001	.102 ±.025	.006 ±.001	.152 ±.025	.10 - 780
D30	.030 ^{+0.000} / _{-0.003}	.762 ^{+0.000} / _{-0.076}	.030	.762	.004 ±.001	.102 ±.025	.006 ±.001	.152 ±.025	.15 - 950
D35	.035 ±.005	.889 ±.127	.040	1.016	.004 ±.001	.102 ±.025	.007 ±.002	.178 ±.051	.20 - 1600
D50	.050 ±.010	1.270 ±.254	.060	1.524	-	-	.007 ±.002	.178 ±.051	.30 - 3700
D70	.070 ±.010	1.778 ±.254	.080	1.778	-	-	.008 ±.002	.203 ±.051	.55 - 6800
D90	.090 ±.010	2.286 ±.254	.100	2.540	-	-	.010 ±.004	.254 ±.102	.65 - 10,000

Maximum thickness does not apply for capacitance values below 0.5pF.

Table of Standard Values (pF)

0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.1
0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55
0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1
1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9
2	2.2	2.4	2.7	3	3.3	3.6	3.9	4.3
4.7	5.1	5.6	6.2	6.8	7.5	8.2	9.1	10
11	12	13	15	16	18	20	22	24
27	30	33	36	39	43	47	51	56
62	68	75	82	91	100	110	120	130
150	160	180	200	220	240	270	300	330
360	390	430	470	510	560	620	680	750
820	910	1000	1100	1200	1300	1500	1600	1800
2000	220	2400	2700	3000	3300	3600	3900	4300
5300	6500	10,000						



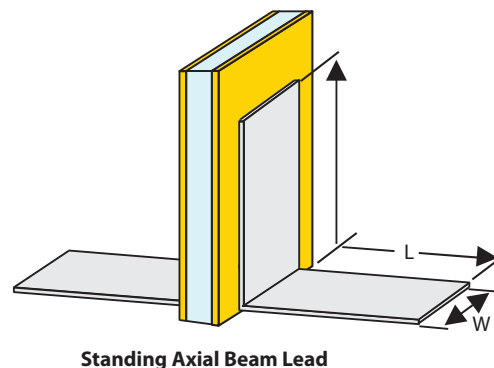
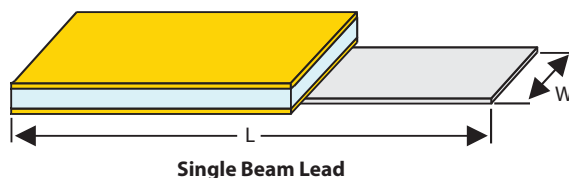
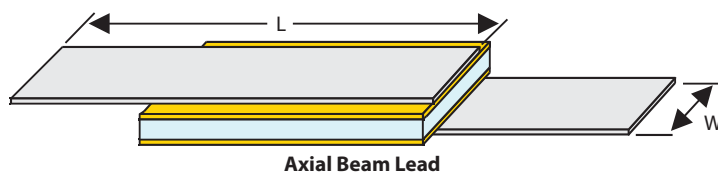
Di-Cap®

Leaded Di-Cap® Dimensions

Style	W		W		L	
	Lead Width (Minimum)		Lead Width (Maximum)		Lead Length (Minimum)	
	Inches	mm	Inches	mm	Inches	mm
D10	.0035	.0889	.007	.1778	.250	6.350
D12	.0045	.1143	.009	.2286	.250	6.350
D15	.0065	.1651	.013	.3302	.250	6.350
D20	.0085	.2159	.017	.2159	.250	6.350
D25	.011	.2794	.022	.5588	.250	6.350
D30	.0135	.3429	.027	.6858	.250	6.350
D35	.015	.381	.030	.762	.250	6.350
D50	.020	.508	.040	1.016	.250	6.350
D70	.030	.762	.060	1.524	.250	6.350
D90	.040	1.016	.080	2.032	.250	6.350

Notes:

- See Di-Cap® Termination Code Table for available lead configurations.
- Lead material is 0.002" pure silver, (Ag), 0.002" ± 0.0005" thick.
- Leads are attached with AuSn, 80%/20% eutectic alloy. Re-flow temperature is 280°C minimum.
- Pure Gold, (Au) leads are available. Consult factory for details.
- Chip dimensions per Di-Cap® dimensions table.
- Custom lead dimensions are available. Consult factory for details.



Di-Cap® Designer Kits 160 Capacitors, 10 Each of 16 Values

Part Number	Capacitor Width	10 Capacitors of each value								
		Dielectric	pF	Tol.	pF	Tol.	pF	Tol.	pF	Tol.
D10XXKITA5PX	.010"	Class I, see codes on pg. 5	.1	B	.6	C	1.5	C	2.7	D
			.4	B	1.0	C	2.2	D	3.3	D
		Class II, see codes on pg. 5	3.9	D	5.6	M	8.2	M	20	M
			4.7	D	6.2	M	10	M	33	M
D15XXKITA5PX D20XXKITA5PX	.015" .020"	Class I, see codes on pg. 5	.1	B	.6	C	1.5	C	3.3	D
			.4	B	1.0	C	2.2	C	5.6	D
		Class II, see codes on pg. 5	6.8	K	10	K	20	M	50	M
			8.2	K	15	K	33	M	100	M
D25XXKITA5PX D30XXKITA5PX	.025" .030"	Class I, see codes on pg. 5	.4	B	1.5	C	3.3	D	8.2	K
			.6	C	2.2	C	4.76	D	10	K
		Class II, see codes on pg. 5	1.0	C	2.7	C	5.6	D	20	K
			33	M	50	M	100	M	180	M

DLI reserves the right to substitute values as required.
Customer may request particular cap value and material for sample kits.

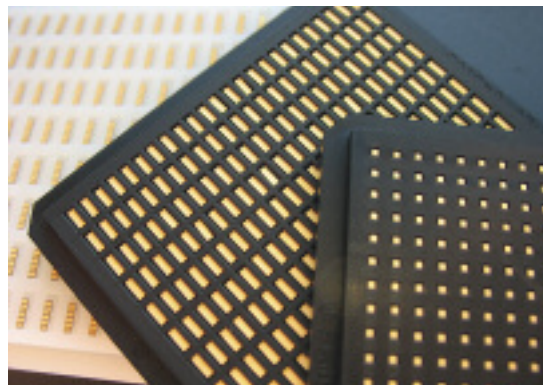
DLI - The Global Leader for High Frequency Solutions

High Performance Single Layer Capacitors for RF, Microwave, and Millimeter-Wave Applications

Di-Cap®

25 Volt, Ultra High K, UX* Dielectric Di-Cap® Capacitance Ranges (pF)

Case Size		Available Thickness	
		0.005"	0.010"
D10	Min	60	—
	Max	100	—
D12	Min	90	—
	Max	200	—
D15	Min	130	—
	Max	300	—
D20	Min	180	90
	Max	400	200
D25	Min	330	170
	Max	780	390
D30	Min	470	230
	Max	950	470
D35	Min	730	360
	Max	1600	850
D50	Min	1900	940
	Max	3700	1900
D70	Min	4300	2000
	Max	6800	3500
D90	Min	7500	3700
	Max	10000	5500



*Recommended for commercial use only. UX material restricted to "M" termination only.

50 Volt Di-Cap® Capacitance Ranges (pF)

Case Size		DLI Class I Dielectrics														
		LA	PI	PG	AH	CF	NA	CD	NG	CG	DB	NP	NR	NS	NU	NV
D10	Min	0.02	0.03	0.04	0.06	0.07	0.06	0.10	0.15	0.20	0.20	0.25	0.45	0.80	1.6	2.4
	Max	0.02	0.05	0.06	0.10	0.10	0.10	0.15	0.20	0.35	0.35	0.40	0.80	1.5	3.0	4.3
D12	Min	0.03	0.04	0.06	0.08	0.10	0.09	0.15	0.20	0.30	0.30	0.35	0.65	1.2	2.4	3.6
	Max	0.06	0.10	0.10	0.20	0.25	0.20	0.35	0.45	0.75	0.75	0.90	1.7	3.0	6.2	9.1
D15	Min	0.04	0.06	0.08	0.15	0.15	0.15	0.25	0.25	0.45	0.45	0.50	1.0	1.8	3.6	5.6
	Max	0.08	0.15	0.20	0.30	0.35	0.30	0.55	0.65	1.1	1.1	1.3	2.4	4.7	9.1	13
D20	Min	0.06	0.09	0.15	0.20	0.20	0.20	0.35	0.40	0.65	0.65	0.75	1.5	2.7	5.6	8.2
	Max	0.10	0.20	0.25	0.40	0.50	0.45	0.75	0.90	1.4	1.5	1.8	3.3	6.2	12	18
D25	Min	0.10	0.20	0.25	0.35	0.45	0.40	0.65	0.75	1.2	1.3	1.5	2.7	5.1	11	16
	Max	0.20	0.40	0.50	0.80	0.95	0.90	1.5	1.7	2.7	2.7	3.3	6.2	12	24	36
D30	Min	0.15	0.25	0.30	0.45	0.55	0.50	0.85	0.95	1.6	1.6	1.9	3.6	6.8	15	20
	Max	0.25	0.45	0.60	0.95	1.1	1.0	1.8	2.0	3.3	3.3	3.9	7.5	13	27	43
D35	Min	0.20	0.35	0.50	0.70	0.85	0.80	1.3	1.5	2.7	2.7	3.0	5.6	11	22	33
	Max	0.50	0.85	1.1	1.8	2.0	1.9	3.3	3.6	6.2	6.2	7.5	13	27	51	75

Case Size		DLI Class II Dielectrics								DLI Class III Dielectrics		
		BF*	BD	BG*	BC	BE	BL	BJ	BN	BT*	BU	BV
D10	Min	1.2	1.8	2.4	3.6	3.3	5.6	9.1	12	12	22	36
	Max	2.2	3.6	4.3	6.2	6.2	10	16	22	22	43	68
D12	Min	1.8	3.0	3.6	5.1	5.1	8.2	13	18	18	36	56
	Max	4.7	7.5	9.1	13	13	20	33	47	47	91	130
D15	Min	2.7	4.3	5.6	7.5	7.5	12	20	27	27	51	82
	Max	6.8	11	13	20	18	30	51	68	68	130	200
D20	Min	4.3	6.2	8.2	12	12	18	30	43	43	75	120
	Max	9.1	13	18	27	24	39	68	91	91	180	270
D25	Min	8	12	16	22	22	36	56	82	82	150	240
	Max	18	27	36	51	51	82	130	180	180	330	510
D30	Min	10	16	20	30	30	47	75	100	100	200	300
	Max	22	33	43	62	62	91	160	220	220	390	620
D35	Min	16	27	33	47	47	75	120	160	160	300	510
	Max	39	62	75	110	110	180	270	390	390	750	1200

*Recommended for commercial use only. Please contact an inside sales representative for additional information.

Di-Cap®

100 Volt Di-Cap® Capacitance Ranges (pF)

Case Size		DLI Class I Dielectrics														
		LA	PI	PG	AH	CF	NA	CD	NG	CG	DB	NP	NR	NS	NU	NV
D15	Min	0.03	0.04	0.06	0.08	0.1	0.09	0.15	0.20	0.30	0.30	0.35	0.65	1.2	2.4	3.6
	Max	0.05	0.10	0.10	0.20	0.25	0.20	0.35	0.45	0.70	0.75	0.85	1.6	3.0	6.2	9.1
D20	Min	0.04	0.06	0.08	0.15	0.15	0.15	0.25	0.30	0.45	0.45	0.55	1.0	1.9	3.9	5.6
	Max	0.08	0.10	0.15	0.25	0.30	0.30	0.50	0.60	0.95	1.0	1.2	2.2	3.9	8.2	12
D25	Min	0.07	0.15	0.20	0.25	0.30	0.30	0.45	0.50	0.85	0.85	1.0	1.9	3.6	7.5	11
	Max	0.15	0.25	0.35	0.50	0.65	0.60	1.0	1.1	1.9	1.9	2.2	4.3	8.2	16	24
D30	Min	0.09	0.15	0.20	0.35	0.40	0.35	0.60	0.65	1.1	1.1	1.3	2.7	4.7	9.1	15
	Max	0.15	0.30	0.40	0.65	0.75	0.70	1.2	1.4	2.2	2.2	2.7	5.1	9.1	18	27
D35	Min	0.15	0.20	0.25	0.40	0.45	0.45	0.70	0.80	1.3	1.4	1.6	3.0	5.6	12	18
	Max	0.30	0.55	0.75	1.2	1.4	1.3	2.2	2.4	3.9	4.3	5.1	9.1	18	36	51
D50	Min	0.30	0.50	0.60	0.95	1.1	1.1	1.7	2.0	3.3	3.3	3.9	7.5	15	30	43
	Max	0.75	1.3	1.7	2.7	3.0	3.0	4.7	5.6	9.1	9.1	11	20	39	82	120
D70	Min	0.55	0.95	1.2	1.9	2.4	2.2	3.6	4.3	6.8	6.8	8	15	30	56	91
	Max	1.10	2.0	2.7	3.9	4.7	4.3	7.5	8.2	13	15	16	33	62	120	180
D90	Min	0.65	1.2	1.5	2.4	3.0	2.7	4.3	5.1	8.2	8.2	10	20	36	68	110
	Max	1.80	3.0	3.9	6.2	7.5	6.8	12	13	22	22	27	51	91	180	270

Case Size		DLI Class II Dielectrics								DLI Class III Dielectrics		
		BF*	BD	BG*	BC	BE	BL	BJ	BN	BT*	BU	BV
D15	Min	1.8	3.0	3.6	5.6	5.1	8.2	13	18	18	36	56
	Max	4.3	6.8	9.1	13	13	20	33	47	47	82	130
D20	Min	2.7	4.3	5.6	8	8	13	20	30	30	56	82
	Max	6.2	9	12	18	16	27	47	62	62	120	180
D25	Min	5.6	8	11	16	15	24	39	56	56	100	160
	Max	12	18	24	33	33	51	82	120	120	220	360
D30	Min	6.8	11	15	20	20	33	51	68	68	130	220
	Max	13	22	27	43	39	62	100	130	130	270	430
D35	Min	9.1	13	18	24	24	39	62	91	91	160	270
	Max	24	39	51	75	75	120	180	270	270	510	750
D50	Min	22	33	43	62	62	100	160	220	220	390	620
	Max	56	91	120	160	160	270	430	560	560	1100	1800
D70	Min	43	68	91	120	120	200	330	430	430	820	1300
	Max	91	130	180	270	240	390	680	910	910	1600	2700
D90	Min	51	82	110	150	150	240	390	510	510	1000	1600
	Max	130	220	270	390	390	620	1000	1300	1300	2700	4300

*Recommended for commercial use only. Please contact an inside sales representative for additional information.

Part Number Identification

D	10	CF	OR1	B	5	P	X	
Product D = Di-Cap®	Case Size 10 12 15 20 25 30 35 50 70 90	Material See material tables on page 5.	Capacitance (pF) R02 = 0.02 pF OR5 = 0.5 pF 1R0 = 1.0 pF 5R1 = 5.1 pF 100 = 10 pF 101 = 100 pF 432 = 4300 pF Refer to Capacitance range tables for available values. Consult an inside sales rep. for custom solutions.	Tolerance A = ± 0.05pF B = ± 0.10pF C = ± 0.25pF D = ± 0.5pF F = ± 1% G = ± 2% J = ± 5% K = ± 10% L = ± 15% M = ± 20% Z = + 80% -20%	Voltage 2 = 25V 5 = 50V 1 = 100V	Termination P = Ni / Au T = Ni / AuSn M = Au L = Single Beam Lead A = Axial Beam Lead S = Standing Axial Beam Lead	Test Level Y, X, A, B, D and E. See test level definitions on page 7.	Packaging D = Black Dotted E = Repopulated T = Tape and Reel Leave blank for generic waffle pack. See packaging definitions on page 32.

SLC with recessed metallization available with border on one or both sides

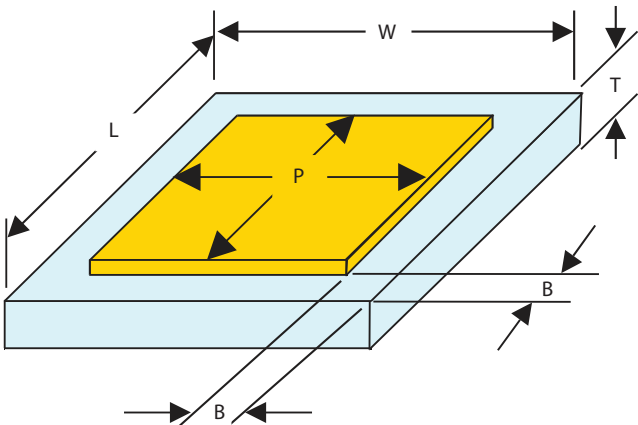
Border Cap®

Functional Applications:

DC Blocking, RF Bypass, Filtering, Tuning and Submounts.

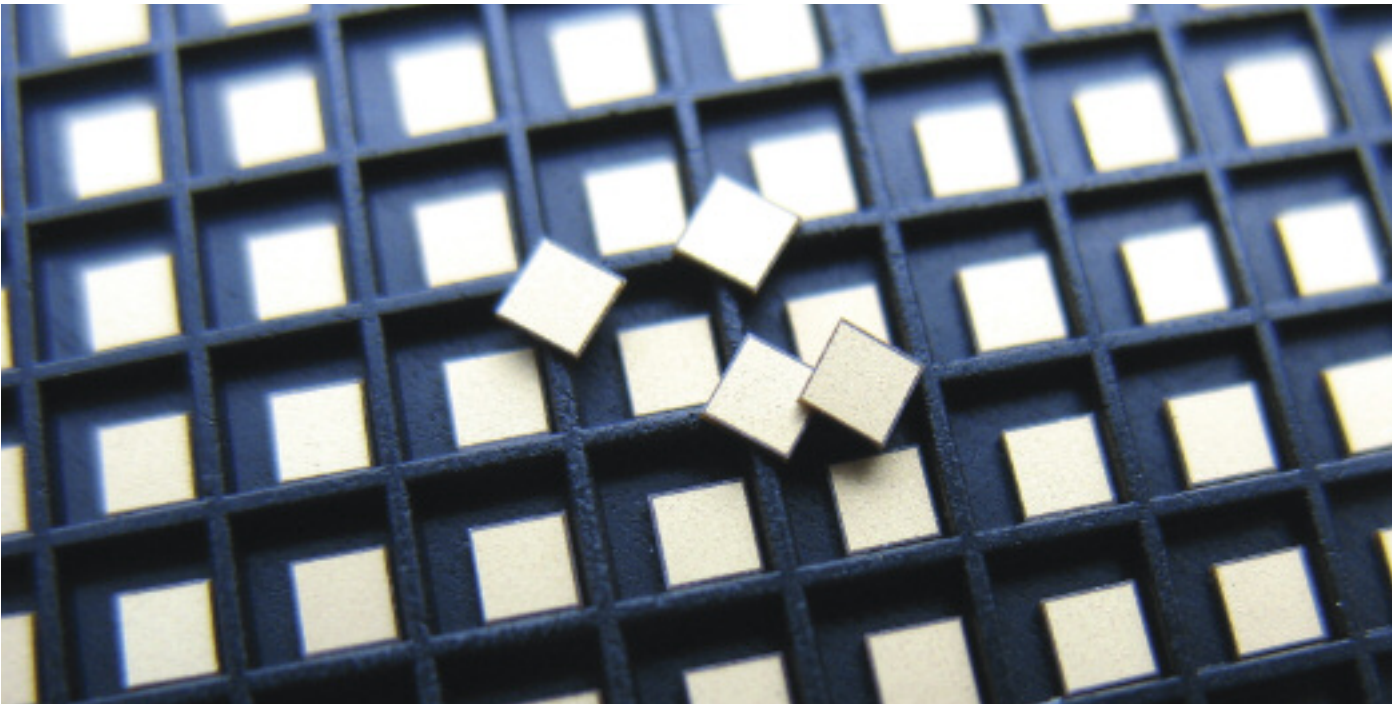
Benefits:

- Recessed metallization minimizes the potential for shorting during die attach.
- Bordered area provides contrast for vision recognition during automated placement and wire bonding.



Border Cap Dimensions

Style	Standard Capacitance Range	L&W Length & Width		P Pad Size		B Border		T Thickness	
	pF	Inches (±.001)	mm (±.025)	Inches (Nom.)	mm (Nom.)	Inches	mm	Inches	mm
D10	.02 - 100	0.010	0.254	0.008	0.203	0.001	0.025	0.0035 -0.008	0.089 -0.203
D12	.03 - 100	0.012	0.305	0.010	0.254	(+.001,-.0005)	(+.025,-.013)		
D15	.03 - 200	0.015	0.381	0.011	0.279				
D20	.06 - 430	0.020	0.508	0.016	0.406				
D25	.10 - 700	0.025	0.635	0.021	0.533	0.002	0.051		
D30	.15 - 1000	0.030	0.762	0.026	0.660	(+.002,-.0015)	(+.005,-.038)		
D35	.20 - 1300	0.035	0.889	0.031	0.787				
D40	.25 - 1800	0.040	1.016	0.036	0.914				
D50	.40 - 3000	0.050	1.270	0.046	1.168				



Double Border Cap®

Double Border Cap® Designer Kits 160 Capacitors, 10 Each of 16

Part Number	Capacitor Width	10 Capacitors of each value								
		Dielectric	pF	Tol.	pF	Tol.	pF	Tol.	pF	Tol.
D10XXKITA1EX	.010"	Class I, see codes on pg. 5	.1	B	.6	C	1.5	C	2.7	D
			.4	B	1.0	C	2.2	D	3.3	D
		Class II, see codes on pg. 5	3.9	D	5.6	M	8.2	M	20	M
			4.7	D	6.2	M	10	M	33	M
D15XXKITA1EX D20XXKITA1EX	.015" .020"	Class I, see codes on pg. 5	.1	B	.7	C	1.5	C	3.3	D
			.4	B	1.0	C	2.2	C	6.4	D
		Class II, see codes on pg. 5	6.8	K	10	K	20	M	50	M
			8.2	K	15	K	33	M	100	M
D25XXKITA1EX D30XXKITA1EX	.025" .030"	Class I, see codes on pg. 5	.4	B	1.7	C	4.0	D	8.2	K
			.6	C	1.9	C	5.0	D	10	K
		Class II, see codes on pg. 5	0.9	C	2.7	C	5.6	D	20	K
			33	M	50	M	100	M	180	M

DLI reserves the right to substitute values as required.

Customer may request particular cap value and material for sample kit to prove out designs.

Table of Standard Values (pF)

0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.1
0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55
0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1
1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9
2	2.2	2.4	2.7	3	3.3	3.6	3.9	4.3
4.7	5.1	5.6	6.2	6.8	7.5	8.2	9.1	10
11	12	13	15	16	18	20	22	24
27	30	33	36	39	43	47	51	56
62	68	75	82	91	100	110	120	130
150	160	180	200	220	240	270	300	330
360	390	430	470	510	560	620	680	750
820	910	1000	1100	1200	1300	1500	1600	1800
2000	220	2400	2700	3000	3300	3600	3900	4300
5300	6500	10,000						

Part Number Identification

D	10	BN	100	K	1	E	X	
Product D = Border Cap®	Case Size 10 12 15 20 25 30 35 40 50	Material See material tables on page 5.	Capacitance (pF) R02 = 0.02 pF OR5 = 0.5 pF 1R0 = 1.0 pF 5R1 = 5.1 pF 100 = 10 pF 101 = 100 pF 152 = 1500 pF Refer to Capacitance range tables for available values. Consult an inside sales rep. for custom solutions.	Tolerance A = ± 0.05pF B = ± 0.10pF C = ± 0.25pF D = ± 0.5pF F = ± 1% G = ± 2% J = ± 5% K = ± 10% L = ± 15% M = ± 20% Z = + 80% -20%	Voltage 2 = 25V* 1 = 100V *For Capacitors with UX material only	Termination Ni / Au B = Single Border E = Double Border M = Au* *For Capacitors with UX material only	Test Level Y, X, A, B, C, D and E. See test level definitions on page 7.	Packaging D = Black Dotted E = Repopulated T = Tape and Reel Leave blank for generic waffle pack. See packaging definitions on page 32.

SLC with recessed metallization available
with border on one or both sides

Border Cap®

Single Border Cap® Capacitance Ranges (pF)

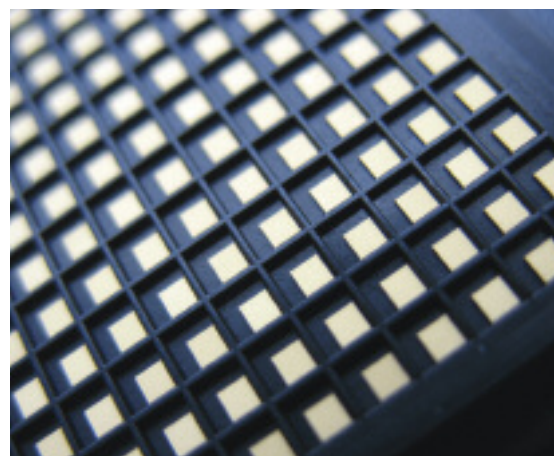
Case Size		DLI Class I Dielectrics												
		LA	PI	PG	AH	CF	NA	CD	NG	CG	NR	NS	NU	NV
D10	Min	0.02	0.03	0.04	0.06	0.07	0.07	0.15	0.15	0.25	0.50	0.90	1.8	2.7
	Max	0.02	0.05	0.06	0.10	0.10	0.10	0.15	0.20	0.35	0.80	1.5	3.0	4.3
D12	Min	0.03	0.05	0.06	0.09	0.10	0.15	0.20	0.20	0.30	0.70	1.3	2.7	3.9
	Max	0.04	0.07	0.09	0.10	0.15	0.15	0.25	0.30	0.50	1.1	2.2	4.3	6.2
D15	Min	0.04	0.06	0.08	0.15	0.15	0.15	0.25	0.30	0.45	1.00	1.9	3.9	5.6
	Max	0.05	0.09	0.10	0.20	0.20	0.20	0.35	0.40	0.70	1.6	3.0	5.6	8.2
D20	Min	0.07	0.15	0.15	0.25	0.25	0.25	0.45	0.50	0.80	1.8	3.6	6.8	10
	Max	0.10	0.15	0.20	0.35	0.40	0.45	0.70	0.80	1.3	3.0	5.6	11	16
D25	Min	0.15	0.20	0.25	0.40	0.40	0.45	0.70	0.80	1.3	3.0	5.6	11	16
	Max	0.15	0.30	0.40	0.60	0.65	0.70	1.1	1.3	2.0	4.7	9.1	18	27
D30	Min	0.15	0.30	0.35	0.55	0.60	0.65	0.95	1.2	1.8	4.3	8.2	16	24
	Max	0.25	0.45	0.55	0.90	1.0	1.0	1.6	1.9	3.0	6.8	13	27	39
D35	Min	0.25	0.35	0.50	0.75	0.80	0.85	1.4	1.6	2.7	6.2	11	22	33
	Max	0.35	0.60	0.80	1.2	1.3	1.5	2.2	2.7	4.3	10	18	36	56
D40	Min	0.30	0.50	0.65	1.0	1.1	1.2	1.8	2.0	3.3	7.5	15	30	43
	Max	0.40	0.70	0.95	1.4	1.6	1.7	2.7	3.0	5.1	11	22	43	62
D50	Min	0.45	0.8	1.0	1.5	1.7	1.8	2.7	3.3	5.1	12	22	47	68
	Max	0.65	1.1	1.5	2.2	2.4	2.7	4.3	4.7	8.2	18	33	68	100

Case Size		DLI Class II Dielectrics								DLI Class III Dielectrics		
		BF*	BD	BG*	BC	BE	BL	BJ	BN	BT*	BU	BV
D10	Min	1.3	2.2	2.7	3.9	3.6	6.2	10	13	13	27	39
	Max	2.2	3.3	4.3	6.2	6.2	10	16	22	22	43	68
D12	Min	1.9	3.0	3.9	5.6	5.6	9.1	15	20	20	36	62
	Max	3.3	5.1	6.2	9.1	9.1	13	24	33	33	62	100
D15	Min	2.7	4.3	5.6	8.2	8.2	13	20	30	30	56	82
	Max	4.3	6.8	8.2	13	12	20	33	43	43	82	130
D20	Min	5.1	8.2	10	15	15	24	39	51	51	100	150
	Max	8.2	13	16	24	22	36	62	82	82	160	240
D25	Min	8.2	13	16	24	24	36	62	82	82	150	240
	Max	13	20	27	39	36	56	100	130	130	240	390
D30	Min	12	18	24	36	33	56	91	120	120	220	360
	Max	20	30	39	56	56	91	150	200	200	360	560
D35	Min	16	27	33	47	47	75	120	160	160	300	510
	Max	27	43	56	75	75	120	200	270	270	510	820
D40	Min	22	33	43	62	62	100	160	220	220	430	680
	Max	33	51	62	91	91	130	240	330	330	620	1000
D50	Min	33	51	68	100	91	150	270	330	330	620	1000
	Max	51	82	100	150	130	220	390	510	510	1000	1500

*Recommended for commercial use only. Please contact an inside sales representative for additional information.

25 Volt, Ultra High K, UX* Dielectric Single Border Cap® Cap. Ranges (pF)

Case Size		Available Thickness		
		0.005"	0.010"	0.015"
D10	Min	90	—	—
	Max	110	—	—
D12	Min	140	—	—
	Max	160	—	—
D15	Min	200	—	—
	Max	230	—	—
D20	Min	370	200	—
	Max	410	225	—
D25	Min	600	320	—
	Max	660	350	—
D30	Min	900	470	—
	Max	960	500	—
D35	Min	1200	650	440
	Max	1300	690	470
D40	Min	1600	850	570
	Max	1700	900	600
D50	Min	2600	1350	900
	Max	2700	1400	950



*Recommended for commercial use only. UX material restricted to "M" termination only.
Consult a DLI Application Engineer for additional values.

Border Cap®

Double Border Cap® Capacitance Ranges (pF)

Case Size		DLI Class I Dielectrics														
		LA	PI	PG	AH	CF	NA	CD	NG	CG	DB	NP	NR	NS	NU	NV
D10	Min	0.02	0.03	0.04	0.06	0.07	0.07	0.15	0.15	0.20	0.23	0.27	0.45	0.85	1.7	2.7
	Max	0.02	0.04	0.06	0.09	0.10	0.10	0.15	0.15	0.30	0.34	0.41	0.70	1.3	2.7	3.9
D12	Min	0.03	0.04	0.06	0.09	0.10	0.09	0.15	0.20	0.30	0.33	0.39	0.65	1.3	2.7	3.9
	Max	0.03	0.06	0.08	0.10	0.15	0.15	0.25	0.25	0.45	0.51	0.60	1.1	2.0	3.9	6.2
D15	Min	0.03	0.06	0.07	0.15	0.15	0.15	0.20	0.25	0.40	0.48	0.56	0.85	1.6	3.3	5.1
	Max	0.04	0.08	0.10	0.15	0.15	0.15	0.30	0.35	0.55	0.68	0.80	1.3	2.4	4.7	6.8
D20	Min	0.06	0.10	0.15	0.20	0.25	0.25	0.40	0.45	0.70	0.87	1.03	1.6	3.0	6.2	9.1
	Max	0.09	0.15	0.20	0.30	0.35	0.35	0.60	0.70	1.1	1.3	1.5	2.4	4.7	9.1	13
D25	Min	0.10	0.20	0.25	0.35	0.40	0.40	0.60	0.70	1.2	1.4	1.7	2.7	5.1	10	15
	Max	0.15	0.25	0.35	0.50	0.65	0.60	1.0	1.1	1.9	2.1	2.5	4.3	8.2	16	24
D30	Min	0.15	0.25	0.35	0.50	0.60	0.55	0.90	1.1	1.7	2.0	2.4	3.9	7.5	15	22
	Max	0.20	0.40	0.50	0.80	0.95	0.90	1.5	1.7	2.7	3.1	3.7	6.2	12	24	36
D35	Min	0.20	0.35	0.45	0.70	0.80	0.75	1.3	1.5	2.4	2.8	3.3	5.6	10	20	30
	Max	0.30	0.55	0.70	1.1	1.3	1.2	2.0	2.4	3.9	4.3	5.1	9.1	16	33	51
D40	Min	0.25	0.45	0.60	0.90	1.1	1.0	1.7	1.9	3.3	3.6	4.3	7.5	15	27	43
	Max	0.35	0.65	0.90	1.3	1.6	1.5	2.4	2.7	4.7	5.7	6.8	11	20	39	62
D50	Min	0.40	0.70	0.95	1.4	1.7	1.6	2.7	3.0	5.1	5.7	6.8	12	22	43	68
	Max	0.60	1.1	1.4	2.2	2.4	2.4	3.9	4.7	7.5	9.1	10	16	33	62	100

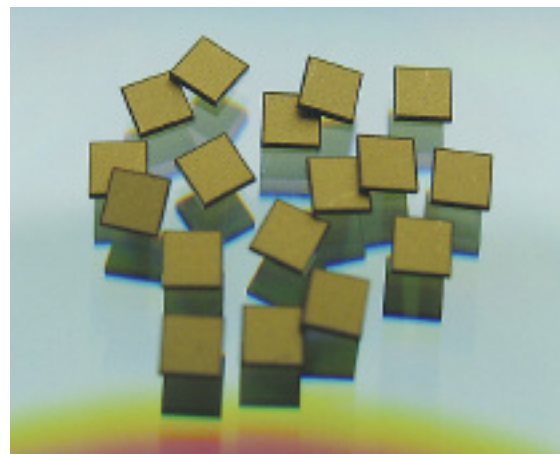
Case Size		DLI Class II Dielectrics							DLI Class III Dielectrics			
		BF*	BD	BG*	BC	BE	BL	BJ	BN	BT*	BU	BV
D10	Min	1.3	2.0	2.7	3.6	3.6	5.6	9.1	13	13	24	39
	Max	2.0	3.0	3.9	5.6	5.6	9.1	15	20	20	39	62
D12	Min	1.8	3.0	3.9	5.6	5.1	8.2	15	20	20	36	56
	Max	3.0	4.7	6.2	8.2	8.2	13	22	30	30	56	91
D15	Min	2.4	3.9	5.1	6.8	6.8	11	18	24	24	47	75
	Max	3.6	5.6	6.8	10	10	16	27	36	36	68	110
D20	Min	4.7	7.5	9.1	13	13	20	33	47	47	91	150
	Max	6.8	11	13	20	20	30	51	68	68	130	220
D25	Min	7.5	12	15	22	22	33	56	75	75	150	220
	Max	12	18	24	33	33	51	82	120	120	220	360
D30	Min	11	18	22	33	30	51	82	110	110	220	330
	Max	18	27	36	51	51	82	130	180	180	330	510
D35	Min	15	24	30	43	43	68	110	150	150	300	470
	Max	24	39	51	68	68	110	180	240	240	470	750
D40	Min	20	33	43	62	56	91	150	200	200	390	620
	Max	30	47	62	82	82	130	220	300	300	560	910
D50	Min	33	51	68	91	91	150	240	330	330	620	1000
	Max	47	75	100	130	130	220	360	470	470	910	1500

*Recommended for commercial use only. Please contact an inside sales representative for additional information.

25 Volt, Ultra High K, UX* Dielectric Double Border Cap® Cap. Ranges (pF)

Case Size		Available Thickness		
		0.005"	0.010"	0.015"
D10	Min	90	—	—
	Max	110	—	—
D12	Min	130	—	—
	Max	160	—	—
D15	Min	160	—	—
	Max	190	—	—
D20	Min	320	180	—
	Max	360	200	—
D25	Min	540	300	—
	Max	600	320	—
D30	Min	820	440	300
	Max	880	470	320
D35	Min	1150	610	420
	Max	1200	650	450
D40	Min	1500	810	550
	Max	1600	860	580
D50	Min	2500	1300	880
	Max	2600	1350	920

*Recommended for commercial use only. UX material restricted to "M" termination only. Consult a DLI Application Engineer for additional values.



Series Configured Capacitors for Microwave Applications



Gap Cap

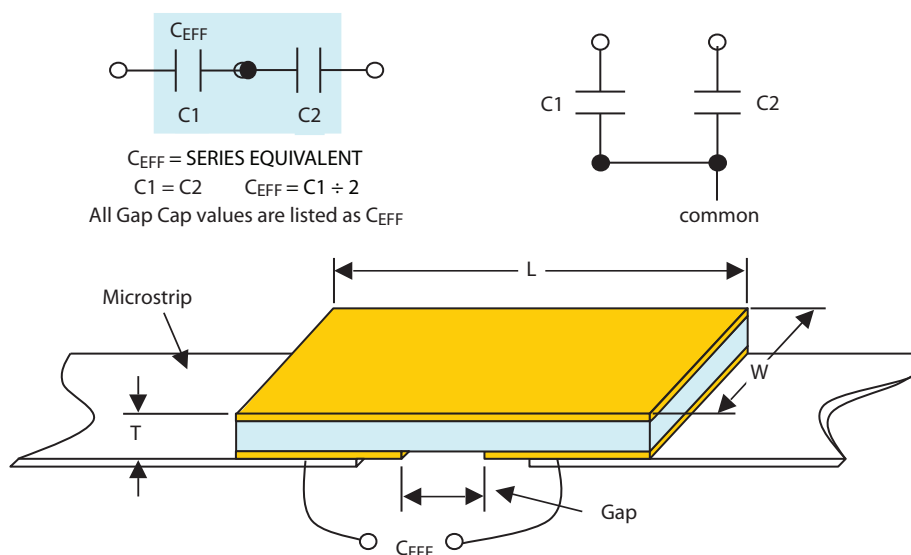
Gap Caps are designed for DC Blocking and RF Bypassing. The low insertion loss and high resonant frequencies make it an ideal device for this type of application. This product's unique configuration eliminates the need for wirebonding, therefore reducing performance variations.

Functional Applications:

DC Blocking, RF Bypassing, and Elimination of wirebond.

Benefits:

- Consistent performance
- Coplanar waveguide
- Gap Cap configuration eliminates wirebonding



25 Volt Gap Cap Dimensions

Style	G Gap (Nom.)		W Width		L Length (Maximum)		T Thickness Range		Standard Capacitance pF
	Inches	mm	Inches	mm	Inches	mm	Inches (± .001)	mm (± .025)	
G10	.005	.127	.010 ^{+0.000} _{-.003}	.254 ^{+0.000} _{-.076}	.030	.762	.004	.102	.01 - 70
G15	.008	.203	.015 ^{+0.000} _{-.003}	.381 ^{+0.000} _{-.076}	.040	1.016	.004	.102	.02 - 130
G20	.010	.254	.020 ^{+0.000} _{-.003}	.508 ^{+0.000} _{-.076}	.050	1.270	.004	.102	.03 - 200
G25	.020	.508	.025 ^{+0.000} _{-.003}	.635 ^{+0.000} _{-.076}	.060	1.524	.004	.102	.03 - 300
G30	.020	.508	.030 ^{+0.000} _{-.003}	.762 ^{+0.000} _{-.076}	.060	1.524	.004	.102	.04 - 360
G35	.020	.508	.035 ±.005	.889 ±.127	.060	1.524	.004	.102	.04 - 400

UX thickness only available in .005", .010" and .015".

Gap Cap

50 Volt Gap Cap Dimensions

Style	G Gap (Nom.)		W Width		L Length (Maximum)		T Thickness Range		Standard Capacitance
	Inches	mm	Inches	mm	Inches	mm	Inches (± .001)	mm (± .025)	
G10	.005	.127	.010 ^{+0.000} _{-.003}	.254 ^{+0.000} _{-.076}	.030	.762	.006	.152	.01 - 36
G15	.008	.203	.015 ^{+0.000} _{-.003}	.381 ^{+0.000} _{-.076}	.040	1.016	.006	.152	.02 - 68
G20	.010	.254	.020 ^{+0.000} _{-.003}	.508 ^{+0.000} _{-.076}	.050	1.270	.006	.152	.02 - 110
G25	.020	.508	.025 ^{+0.000} _{-.003}	.635 ^{+0.000} _{-.076}	.080	2.032	.006	.152	.03 - 200
G30	.020	.508	.030 ^{+0.000} _{-.003}	.762 ^{+0.000} _{-.076}	.080	2.032	.006	.152	.03 - 240
G35	.020	.508	.035 ± .005	.889 ± .127	.080	2.032	.006	.152	.04 - 300
G50	.020	.508	.050 ± .010	1.270 ± .254	.080	2.032	.006	.152	.04 - 510

Gap Cap Designer Kits 160 Capacitors, 10 Each of 16 Values

Part Number	Capacitor Width	10 Capacitors of each value							
		Dielectric	pF	Tol.	pF	Tol.	pF	Tol.	pF
G10XXKITAPX05	.010"	Class I, see codes on pg. 5	.05	A	.2	A	.4	A	.6
			.14	A	.3	A	.5	B	.8
		Class II, see codes on pg. 5	1.0	C	2.2	D	5.6	M	10
			1.5	C	4.7	M	8.2	M	15
G15XXKITAPX08 G20XXKITAPX10	.015" .020"	Class I, see codes on pg. 5	.08	A	.4	A	.6	B	1.5
			.2	A	.5	B	1.0	C	2.2
		Class II, see codes on pg. 5	3.3	D	5.6	M	8.2	M	15
			4.7	M	6.8	M	10	M	20
G25XXKITAPX10	.025"	Class I, see codes on pg. 5	.4	A	.77	B	1.5	C	3.3
			.5	B	1.0	C	2.2	D	4.7
		Class II, see codes on pg. 5	5.6	M	8.2	M	15	M	33
			6.8	M	10	M	20	M	51

DLI reserves the right to substitute values as required.
Customer may request particular cap value and material for sample kits.

Part Number Identification

G	10	BU	100	K	5	P	X	10	
Product G = GAP Capacitors	Case Size 10 15 20 25 30 35 50	Material See material tables on page 5.	Capacitance (pF) R01 = 0.01 pF 0R5 = 0.5 pF 1R0 = 1.0 pF 5R1 = 5.1 pF 100 = 10 pF 511 = 510 pF Refer to Capacitance range tables for available values. Consult an inside sales rep. for custom solutions.	Tolerance A = ± 0.05pF B = ± 0.10pF C = ± 0.25pF D = ± 0.5pF F = ± 1% G = ± 2% J = ± 5% K = ± 10% L = ± 15% M = ± 20% Z = + 80%-20%	Voltage 2 = 25V 5 = 50V	Termination P = Ni / Au M = Au	Test Level Y, X, A, B, D and E. See test level definitions on page 7.	Gap Width In mils 5 8 10 15	Packaging D = Black Dotted E = Repopulated T = Tape and Reel Leave blank for generic waffle pack. See packaging definitions on page 32.

Series Configured Capacitors for Microwave Applications

Gap Cap

25 Volt Gap Cap Capacitance Ranges (pF)

Case Size	Std. Gap		DLI Class I Dielectrics														
			LA	PI	PG	AH	CF	NA	CD	NG	CG	DB	NP	NR	NS	NU	NV
G10	.005"	Min	0.01	0.02	0.02	0.04	0.04	0.04	0.06	0.07	0.15	0.15	0.15	0.25	0.50	0.95	1.4
		Max	0.02	0.03	0.05	0.08	0.09	0.08	0.10	0.15	0.15	0.25	0.25	0.30	0.60	1.2	2.4
G15	.008"	Min	0.02	0.03	0.04	0.06	0.08	0.07	0.15	0.15	0.25	0.25	0.30	0.50	0.90	1.8	2.7
		Max	0.04	0.07	0.10	0.15	0.15	0.15	0.25	0.30	0.50	0.55	0.65	1.2	2.2	4.3	6.8
G20	.010"	Min	0.03	0.04	0.05	0.08	0.10	0.09	0.15	0.20	0.30	0.30	0.35	0.65	1.2	2.4	3.6
		Max	0.07	0.10	0.15	0.25	0.30	0.25	0.45	0.55	0.90	0.90	1.1	2.0	3.9	7.5	11
G25	.020"	Min	0.03	0.05	0.07	0.10	0.15	0.15	0.20	0.20	0.35	0.35	0.40	0.75	1.4	3.0	4.3
		Max	0.09	0.15	0.20	0.30	0.35	0.35	0.60	0.65	1.1	1.1	1.3	2.4	4.7	9.1	13
G30	.020"	Min	0.04	0.06	0.08	0.15	0.15	0.15	0.25	0.30	0.45	0.45	0.55	0.95	1.8	3.6	5.6
		Max	0.10	0.15	0.25	0.35	0.45	0.40	0.70	0.80	1.3	1.4	1.6	3.0	5.6	11	16
G35	.020"	Min	0.04	0.07	0.09	0.15	0.20	0.15	0.30	0.30	0.50	0.50	0.60	1.1	2.2	4.3	6.2
		Max	0.10	0.20	0.25	0.45	0.50	0.50	0.80	0.95	1.6	1.6	1.9	3.6	6.8	13	20

Case Size	Std. Gap		DLI Class II Dielectrics								DLI Class III Dielectrics		
			BF*	BD	BG*	BC	BE	BL	BJ	BN	BT*	BU	BV
G10	.005"	Min	0.70	1.1	1.4	2.0	2.0	3.3	5.1	7.5	7.5	15	22
		Max	1.7	2.7	3.6	5.1	4.7	7.5	13	18	18	33	51
G15	.008"	Min	1.4	2.2	2.7	3.9	3.9	6.2	10	15	15	27	43
		Max	3.3	5.1	6.8	10	9.1	15	24	33	33	62	100
G20	.010"	Min	1.7	2.7	3.6	5.1	5.1	8.2	13	18	18	33	51
		Max	5.6	9.1	11	16	16	24	43	56	56	110	160
G25	.020"	Min	2.2	3.3	4.3	6.2	6.2	10	16	22	22	43	68
		Max	6.8	11	13	20	20	30	51	68	68	130	200
G30	.020"	Min	2.7	4.3	5.6	8.2	7.5	12	20	27	27	51	82
		Max	8.2	13	16	24	24	39	62	82	82	160	240
G35	.020"	Min	3.3	5.1	6.2	9.1	9.1	15	24	33	33	62	100
		Max	10	16	20	27	27	43	75	100	100	180	300

*Recommended for commercial use only. Please contact an inside sales representative for additional information.

Table of Standard Values (pF)

0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.1
0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55
0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1
1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9
2	2.2	2.4	2.7	3	3.3	3.6	3.9	4.3
4.7	5.1	5.6	6.2	6.8	7.5	8.2	9.1	10
11	12	13	15	16	18	20	22	24
27	30	33	36	39	43	47	51	56
62	68	75	82	91	100	110	120	130
150	160	180	200	220	240	270	300	330
360	390	430						

Gap Cap

25 Volt, Ultra High K, UX* Dielectric Gap Cap Dimensions and Capacitance Ranges (pF)

Case Size	G Gap (Nom.)		W Width				L Length (Maximum)		Capacitance Range (Min/Max) Thickness		
	Inches	mm	Inches		mm		Inches	mm	0.0005"	0.010"	0.015"
G10	0.005	0.127	0.010	+0.000 -0.003	.254	+0.000 -.076	0.030	0.762	50/65	*	*
G15	0.008	0.203	0.015	+0.000 -0.003	.381	+0.000 -.076	0.040	1.016	110/130	60/70	*
G20	0.010	0.254	0.020	+0.000 -0.003	.508	+0.000 -.076	0.050	1.270	200/220	100/120	70/82
G25	0.020	0.508	0.025	+0.000 -0.003	.635	+0.000 -.076	0.060	1.524	250/280	140/160	100/110
G30	0.020	0.508	0.030	+0.000 -0.003	.762	+0.000 -.076	0.060	1.524	310/340	180/190	120/140
G35	0.020	0.508	0.035	±0.005	.889	±.127	0.060	1.524	350/450	200/250	140/180
G50	0.020	0.508	0.050	±0.010	1.270	±.254	0.080	2.032	700/1000	380/550	260/380

*Recommended for commercial use only. UX material restricted to "M" termination only.

50 Volt Gap Cap Capacitance Ranges (pF)

Case Size	Std. Gap	DLI Class I Dielectrics															
		LA	PI	PG	AH	CF	NA	CD	NG	CG	DB	NP	NR	NS	NU	NV	
G10	.005"	Min	0.01	0.02	0.02	0.03	0.03	0.03	0.04	0.05	0.08	0.08	0.09	0.20	0.35	0.65	0.95
		Max	0.01	0.02	0.03	0.05	0.06	0.05	0.09	0.10	0.15	0.15	0.20	0.40	0.80	1.6	2.4
G15	.008"	Min	0.02	0.03	0.03	0.05	0.06	0.05	0.08	0.10	0.15	0.20	0.20	0.35	0.65	1.3	2.0
		Max	0.02	0.05	0.06	0.10	0.10	0.10	0.15	0.20	0.35	0.35	0.40	0.80	1.5	3.0	4.7
G20	.010"	Min	0.02	0.03	0.04	0.06	0.07	0.07	0.15	0.15	0.20	0.25	0.25	0.45	0.85	1.7	2.7
		Max	0.04	0.08	0.10	0.15	0.20	0.15	0.30	0.35	0.60	0.60	0.70	1.3	2.4	5.1	7.5
G25	.020"	Min	0.03	0.04	0.05	0.08	0.09	0.08	0.15	0.20	0.30	0.30	0.35	0.60	1.1	2.2	3.3
		Max	0.09	0.15	0.20	0.30	0.35	0.35	0.55	0.65	1.1	1.1	1.3	2.4	4.7	9.1	13
G30	.020"	Min	0.03	0.05	0.07	0.10	0.15	0.15	0.20	0.20	0.35	0.35	0.40	0.75	1.4	3.0	4.3
		Max	0.10	0.15	0.25	0.35	0.45	0.40	0.70	0.80	1.3	1.3	1.6	3.0	5.6	11	16
D35	.020"	Min	0.04	0.06	0.07	0.15	0.15	0.15	0.20	0.25	0.40	0.40	0.50	0.90	1.6	3.3	5.1
		Max	0.10	0.20	0.25	0.45	0.5	0.45	0.80	0.95	1.5	1.6	1.9	3.6	6.2	13	20
G50	.020"	Min	0.04	0.07	0.09	0.15	0.20	0.20	0.30	0.30	0.50	0.50	0.60	1.2	2.2	4.3	6.2
		Max	0.20	0.35	0.50	0.75	0.90	0.85	1.4	1.6	2.7	2.7	3.3	6.2	11	22	33

Case Size	Std. Gap	DLI Class II Dielectrics								DLI Class III Dielectrics		
		BF*	BD	BG*	BC	BE	BL	BJ	BN	BT*	BU	BV
G10	.005"	Min	0.50	0.75	0.95	1.4	1.4	2.2	3.6	5.1	5.1	9.1
		Max	1.1	1.8	2.4	3.3	3.3	5.1	8.2	12	12	22
G15	.008"	Min	0.95	1.5	2.0	3.0	2.7	4.3	7.5	10	10	20
		Max	2.2	3.6	4.7	6.8	6.2	10	16	22	22	43
G20	.010"	Min	1.3	2.0	2.7	3.9	3.6	6.2	10	13	13	24
		Max	3.6	5.6	7.5	11	10	16	27	39	39	68
G25	.020"	Min	1.7	2.7	3.3	4.7	4.7	7.5	12	18	18	33
		Max	6.8	11	13	20	20	30	51	68	68	130
G30	.020"	Min	2.2	3.3	4.3	6.2	6.2	10	16	22	22	43
		Max	8.2	13	16	24	24	36	62	82	82	160
G35	.020"	Min	2.4	3.9	5.1	7.5	6.8	11	18	24	24	47
		Max	10	15	20	27	27	43	68	100	100	180
G50	.020"	Min	3.3	5.1	6.2	9.1	9.1	15	24	33	33	62
		Max	16	27	33	51	47	75	120	160	160	330

*Recommended for commercial use only. Please contact an inside sales representative for additional information.

Multiple Decoupling/Blocking Capacitors in a Single Array

Bar Cap®

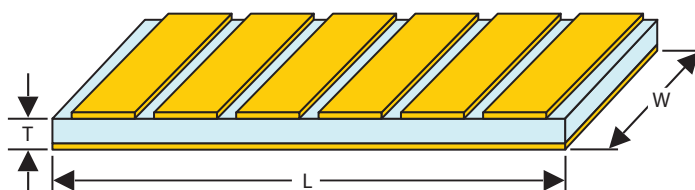
Bar Caps are specifically designed for MMIC circuits requiring multiple capacitor applications, such as Multiple Decoupling or RF Bypassing Networks. Multiple capacitor array devices have become an integral circuit component due to their High Q and low inductance.

Functional Applications:

Decoupling, DC Blocking for GaAs IC's, RF Bypassing.

Benefits:

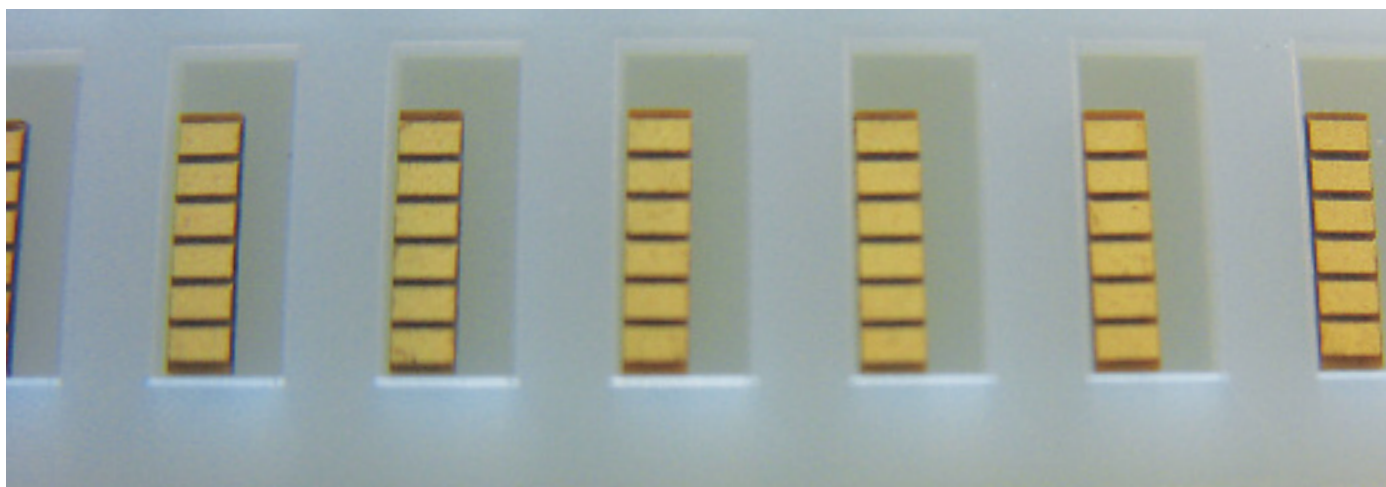
- Can be integrated into IC package to reduce bond wire lengths and improve performance
- Single insertion reduces complexity and costs
- Simplified assembly



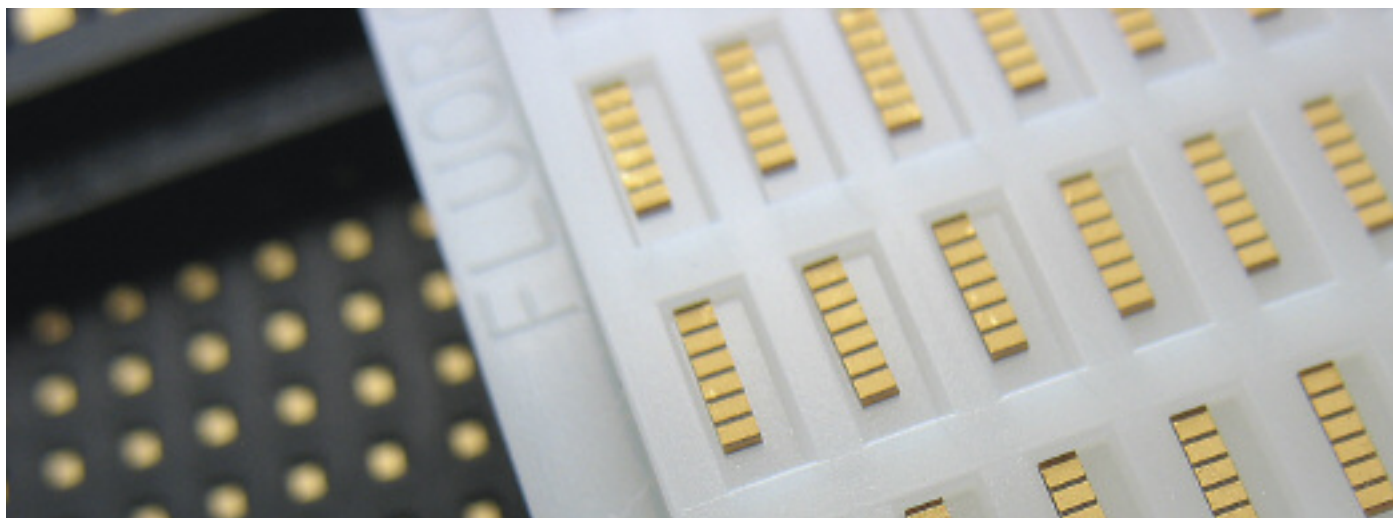
Bar Cap® Dimensions and Part Numbers

Part Number	Number Of Caps	Value Of Each Cap (pF)	W Width		L Length		Pad Size		T Thickness	
			Inches (± 0.003)	mm (± 0.076)	Inches (± 0.005)	mm (± 0.127)	Inches (Nom)	mm (Nom)	Inches (± 0.001)	mm (± 0.025)
E20BU800Z1PX3	3	80	0.02	0.508	0.065	1.651	0.02	0.508	0.007	0.178
E20BU800Z1PX4	4	80	0.02	0.508	0.085	2.159	0.02	0.508	0.007	0.178
E20BU800Z1PX6	6	80	0.02	0.508	0.125	3.175	0.02	0.508	0.007	0.178
E25BU101Z1PX3	3	100	0.025	0.635	0.065	1.651	0.025	0.635	0.007	0.178
E25BU101Z1PX4	4	100	0.025	0.635	0.085	2.159	0.025	0.635	0.007	0.178
E25BU101Z1PX6	6	100	0.025	0.635	0.125	3.175	0.025	0.635	0.007	0.178
E30BU121Z1PX3	3	120	0.03	0.762	0.065	1.651	0.03	0.762	0.007	0.178
E30BU121Z1PX4	4	120	0.03	0.762	0.085	2.159	0.03	0.762	0.007	0.178
E30BU121Z1PX6	6	120	0.03	0.762	0.125	3.175	0.03	0.762	0.007	0.178
E40BU151Z1PX3	3	150	0.04	1.016	0.065	1.651	0.04	1.016	0.007	0.178
E40BU151Z1PX4	4	150	0.04	1.016	0.085	2.159	0.04	1.016	0.007	0.178
E40BU151Z1PX6	6	150	0.04	1.016	0.125	3.175	0.04	1.016	0.007	0.178

*Custom Solutions are available; however additional tooling costs may apply. Please contact an inside sales representative for more information.



Bar Cap®



25 Volt, Ultra High K, UX Dielectric Bar Cap® Options

Part Number	Number Of Caps	W Width		L Length		Capacitance Range (Min/Max) Thickness		
		Inches (±0.003")	mm (±0.076")	Inches (±0.005")	mm (±0.127")	0.005"	0.010"	0.015"
E20UX ___ Z2MX	3	0.020"	0.508	0.065"	1.651	400	210	150
	4	0.020"	0.508	0.085"	2.159			
	6	0.020"	0.508	0.125"	3.175			
E25UX ___ Z2MX	3	0.025"	0.635	0.065"	1.651	500	270	180
	4	0.025"	0.635	0.085"	2.159			
	6	0.025"	0.635	0.125"	3.175			
E30UX ___ Z2MX	3	0.030"	0.762	0.065"	1.651	600	320	220
	4	0.030"	0.762	0.085"	2.159			
	6	0.030"	0.762	0.125"	3.175			
E40UX ___ Z2MX	3	0.040"	1.016	0.065"	1.651	810	430	300
	4	0.040"	1.016	0.085"	2.159			
	6	0.040"	1.016	0.125"	3.175			

Part Number Identification

E	40	BU	151	Z	1	P	X	4	
Product E = Bar Capacitors	Width 20 25 30 40	Material See material tables on page 5.	Capacitance (pF) Per Pad 800 = 80 pF 101 = 100 pF 121 = 120 pF 151 = 150 pF Consult an inside sales rep. for custom solutions.	Tolerance Z = +80% -20%	Voltage 2 = 25V 1 = 100V	Termination P = Ni / Au M = Au	Test Level Y or X See test level definitions on page 7.	Capacitor Quantity In mils 3 4 6 Etc.	Packaging D = Black Dotted E = Repopulated T = Tape and Reel Leave blank for generic waffle pack. See packaging definitions on page 32.

Binary Tunable Caps for SLC Hybrids



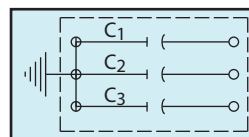
Bi-Cap®

Functional Applications:

Matching Networks, Tank Circuits,
Dielectric resonator tuning/coupling.

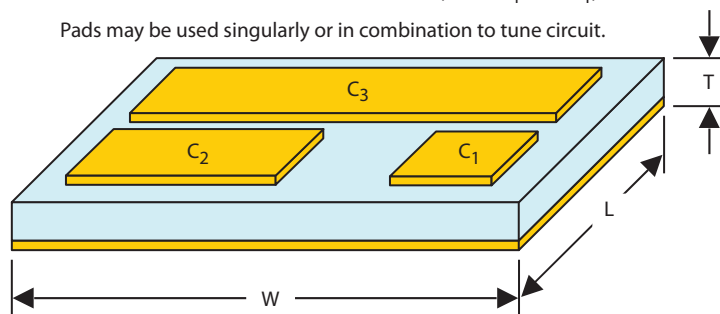
Benefits:

- Small size is compatible with microwave geometries.
- Ideal for prototype circuits.



$C_1 = 1$
 $C_2 = 2 \times C_1$
 $C_3 = 4 \times C_1$
 (4 Pad $C_4 = 8 \times C_1$)

Pads may be used singularly or in combination to tune circuit.



Bi-Cap® Dimensions and Part Numbers

Part Number	Number Of Caps	Value Of Each Cap (pF)	L & W Length & Width		T Thickness		B Border		Voltage Rating (Volts)
			Inches (±.001)	mm (±.025)	Inches (±.001)	mm (±.025)	Inches (±.002)	mm (±.051)	
F15CGR08M5PX3	3	.080, .15, .3	0.015	0.381	0.004	0.102	0.002	0.0051	50
F15NR0R1M1PX3	3	.1, .2, .4	0.015	0.381	0.006	0.152	0.002	0.0051	100
F20CG0R1M1PX3	3	.1, .2, .4	0.020	0.508	0.006	0.152	0.002	0.0051	100
F20NR0R2M1PX3	3	.2, .4, .8	0.020	0.508	0.006	0.152	0.002	0.0051	100
F25CFR08M5PX3	3	.080, .15, .3	0.025	0.635	0.004	0.102	0.002	0.0051	50
F25CG0R2M1PX3	3	.2, .4, .8	0.025	0.635	0.006	0.152	0.002	0.0051	100
F25NR0R4M1PX3	3	.4, .8, 1.6	0.025	0.635	0.006	0.152	0.002	0.0051	100
F35CF0R1M1PX3	3	.1, .2, .4	0.035	0.889	0.006	0.152	0.002	0.0051	100
F35CG0R4M1PX3	3	.1, .2, .4	0.035	0.889	0.006	0.152	0.002	0.0051	100
F40NR0R5M1PX4	4	.5, 1, 2, 4	0.040	1.016	0.0075	0.191	0.002	0.0051	100

*Custom Solutions are available; however additional tooling costs may apply. Please contact an inside sales representative for more information.

Part Number Identification

F	15	NR	OR1	M	1	P	X	3	
Product F = Binary Capacitors	Size 15 20 25 35 40	Material See material tables on page 5.	Capacitance (pF) Lowest Value in Series is Part Number R08 = .080 pF OR1 = .1 pF OR2 = .2 pF OR4 = .4 pF OR5 = .5 pF Consult an inside sales rep. for custom solutions.	Tolerance M = ±20%	Voltage 2 = 25V 5 = 50V 1 = 100V	Termination P = Ni / Au M = Au	Test Level Y or X See test level definitions on page 7.	Pad Quantity 3 4	Packaging D = Black Dotted E = Repopulated T = Tape and Reel Leave blank for generic waffle pack. See packaging definitions on page 32.

Transmission Line Single-Layer Capacitors

T-Cap®

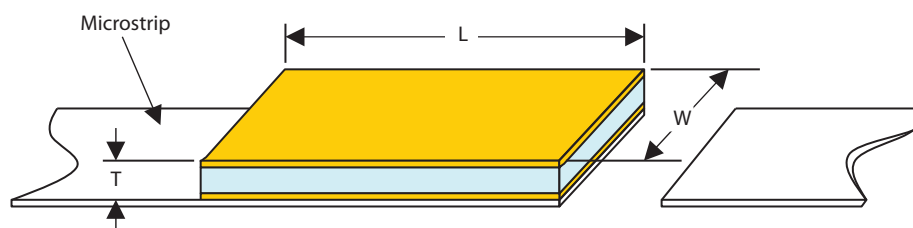
T-Cap® “Transmission Line” capacitors are designed as a reliable solution in DC Blocking and RF Bypassing applications. The T-Cap® products utilize the same Single-Layer processing technology of the Di-Cap® product line, with one difference, this device offers a more constant physical size, and resonance behavior where dimensional consistency is more desirable than a specified capacitance value.

Functional Applications:

- Filtering
- DC Blocking
- RF Bypassing
- Tuning
- Insulation
- Submounts
- Stand-Offs

Benefits:

- Consistant electrical resonance performance at microwave frequencies.
- Repeatable performance from lot to lot
- Thin Film technology



Part Number Identification

T	30	BV	30	X	45	P	X	
Product T = T-Cap®	Width Two digit number representing the Width in .001" For Widths >.099", Consult an inside sales rep.	Material See material tables on page 5.	Length Two digit number representing the Length in .001" For Lengths >.099", Consult an inside sales rep.	Tolerance X= Length and Width: $\pm .001"$, Thickness: $-.0005"$ S= Special	Thickness "35" – "99" Represents thickness in .0001" K0 = .010" M0 = .020" Examples: 55 = .0055" K2 = .012" M5 = .025"	Termination P = Ni / Au T = Ni / AuSn M = Au	Test Level Y or X See test level definitions on page 7.	Packaging D = Black Dotted E = Repopulated T = Tape and Reel Leave blank for generic waffle pack. See packaging definitions on page 32.

For RF Noise Suppression in high speed mixed signal semiconductor devices



Miniature RF Blocking Network

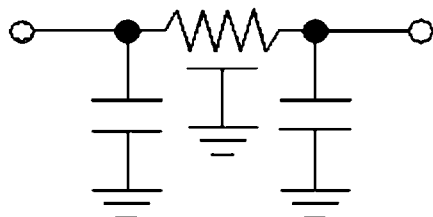
Functional Applications:

- High Speed Digital
- Mixed Signal IC's
- Suppression of Noise on DC Supply Lines
- MCM and Hybrid Modules

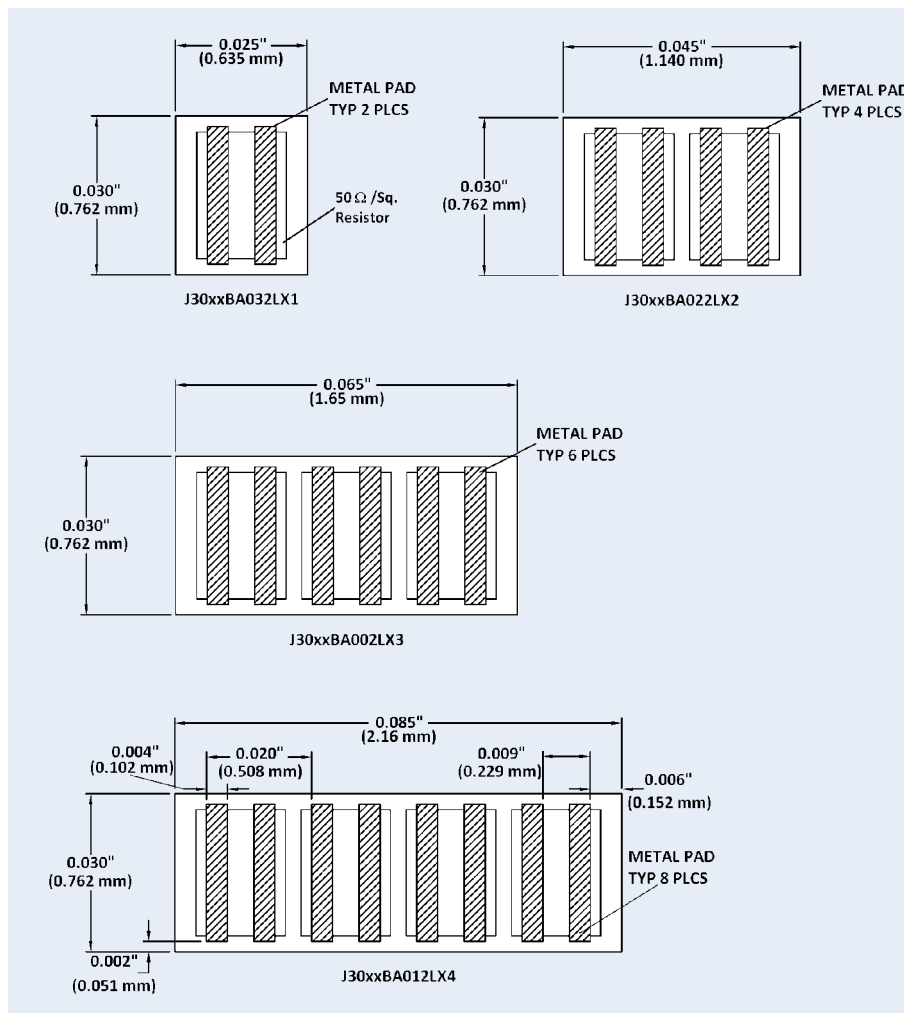
Benefits:

- Eliminates Noise at I/O Pins
- Replaces Large Decoupling Capacitor with Superior Performance
- Clean DC Lines Beyond 18 GHz

Segment Equivalent Schematic Representation



Layout and Dimensions



Part Number Identification

J	30	XX	BA01	2	L	X	4
Product J = Blocking Network	Width (Mils)	Material BL or BJ	Internal Drawing Reference	Voltage 2 = 25 Vdc	Metallization 100 μ " Gold Finish	Test Level Commercial	Number of RC Segments

Material and Electrical Characteristics

Material Code	Capacitance (typical)	Resistance (pad to pad)	DF	TCC	Rated Voltage
BL	30 pF	10 Ω Nom.	3.0% Max.	X7R	25 Vdc
BJ	45 pF	10 Ω Nom.	3.0% Max.	X7R	25 Vdc

Miniature RF Blocking Network

Metallization:

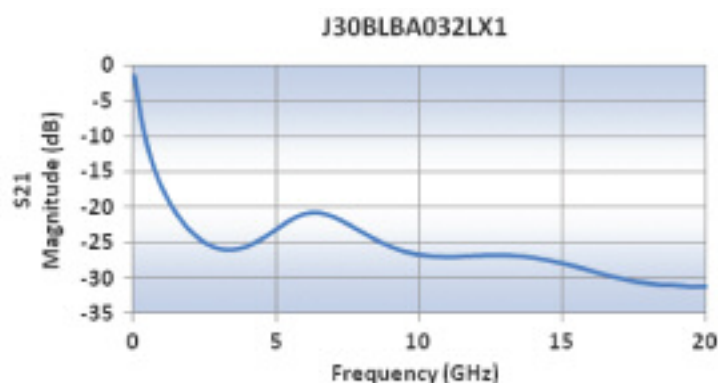
Top: 50•/Square TaN, 300Å TiW, 100 • Inch minimum Au.

Bottom: 300Å TiW, 100 • Inch minimum Au.

Screening Options

Test Code	Test/Inspection	Sample Size	Description
X	Bond Strength	2 Pcs/Plate	2 bonding pads on each sample
	IR	1% AQL	2 1/2 times rated voltage of 25 volts
	Visual Inspection	100%	4 Side visual screening
	Pad to pad resistance check	1% AQL	Ensure isolation between segments and boarder

Performance

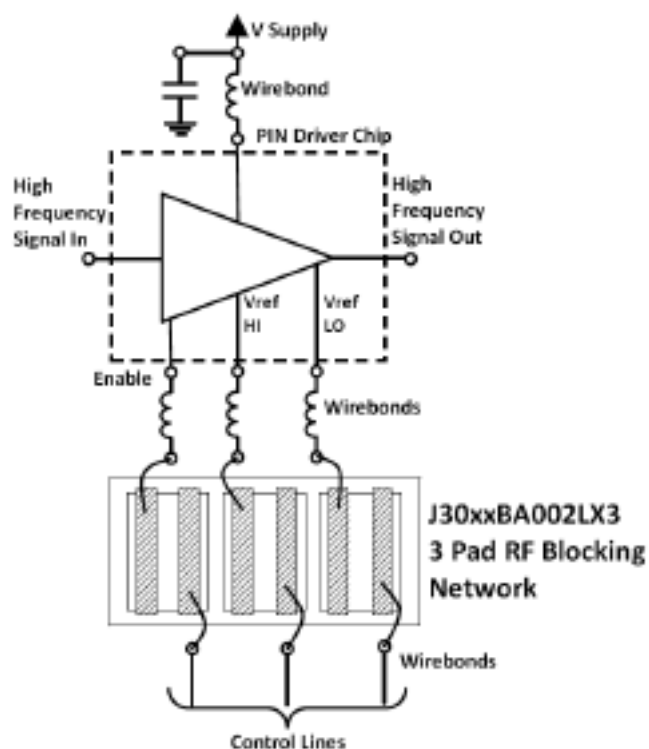


Segment Bonding for Measurement



For additional data of multi-segment devices please contact an inside sales representative.

Typical Application



Ultra Broadband DC Blocking

Opti-Cap®



Functional Applications:

- Improved Low Frequency Stability over Temperature
- Very Low Series Inductance
- X7R Temperature and Voltage Stability

Benefits:

- Resonance Free DC Blocking to >40GHz
- Surface Mountable by Solder or Epoxy Bonding
- Available in Tape & Reel or Waffle Pack Format
- Improved Low Frequency Stability over Temperature

Opti-Cap™ Electrical Characteristics

Part Number (Includes T&R)	Capacitance/ MLC Case Size	Voltage Rating	Temperature Coefficient	IR (@+20°C, Rated Voltage)	Max DF 1kHz	Aging Rate (% per Decade Hour Max)	Term	Frequency Range 3dB pts. Typical	Max Process Temperature/ Recommended Attachment Method
P62BN820MA2636	100 nF / 0603	25 Vdc	X7R ΔC max: $\pm 15\%$ (-55°C to 125°C)	10^2 M Ω	3.0%	1.0%	Au (Flash)	16 KHz. >>40 GHz	250°C/ Conductive Epoxy or Solder
P42BN820MA3152	220 nF / 0402	10 Vdc	X5R ΔC max: $\pm 15\%$ (-55°C to 85°C)	10^2 M Ω	3.5%	1.0%	Au (Flash)	16 KHz. >>40 GHz	160°C/ Conductive Epoxy
P21BN300MA3976	10 nF / 0201	10 Vdc	X5R ΔC max: $\pm 15\%$ (-55°C to 85°C)	10^2 M Ω	3.5%	1.0%	Au (Flash)	16 KHz. >>40 GHz	160°C/ Conductive Epoxy

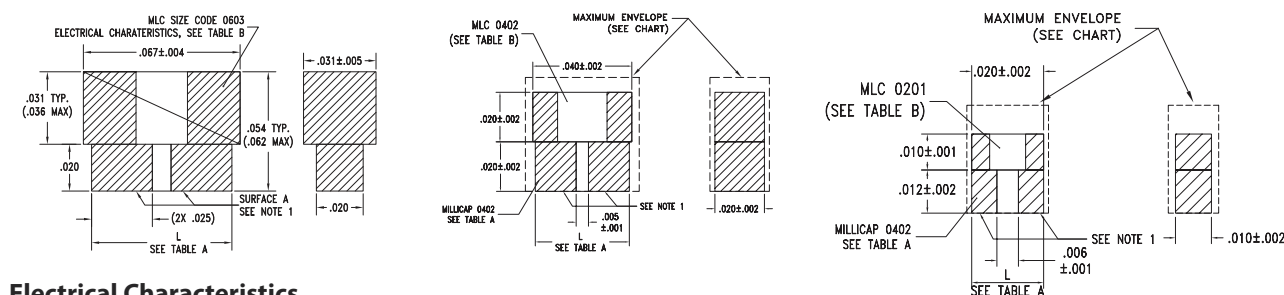
Notes:

1. Termination Metalization: 7.5 ± 4.5 micro inches Au over 50 microinches Ni min.
2. Maximum assembly process temperature: 250°C
3. For best high frequency performance, attach surface A to transmission line.
For 50 ohm system, transmission line should be near or slightly greater than 20 mils. Recommended microstrip gap length is 0.015 inch.
4. Rated working voltage (WVDC) is the lesser of 25 volts (Milli.) or multilayer WVDC.
5. Recommended attachment is solder or conductive epoxy.

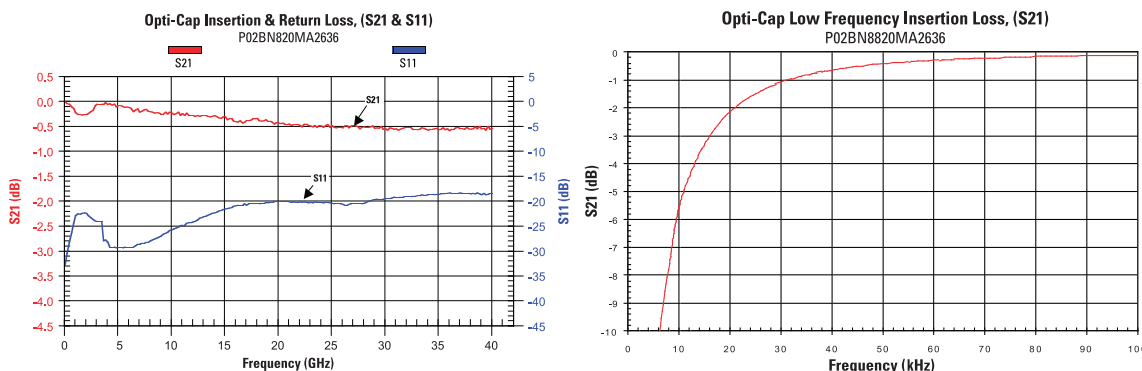
Broadband Kit

Part Number	Freq Range
P02BN820MA2636	
P02BN820Z5S	20MHz - 40GHz
P02CG1R5C5S	8GHz - 32GHz
P02CG1R0C5S	18GHz - 40GHz
P02CF0R5B5S	28GHz - 40GHz
P02CF0R3B5S	35GHz - 50GHz
C06BL851X-5UN-X0B	2MHz - 30GHz
C08BL242X-5UN-X0B	1MHz - 20GHz

Physical Characteristics



Electrical Characteristics



Ideal SMT Capacitor

Milli-Cap®



Functional Applications:

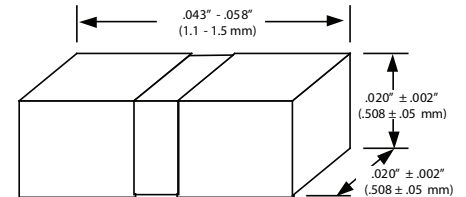
0402, 0502 and 0602 Footprints, Very Low Series Inductance, Ultra High Series Resonance, Low Loss High Q part.

Benefits:

Matches typical 50Ω Line Widths, Preserves Board Space, Behaves Like An Ideal Capacitor, More Usable Bandwidth

Mechanical Specification:

- Terminations: Gold
- Assembly temperatures not to exceed 260°C
- Ideal for Test Equipment, Photonics, SONET, Digital radios, and Matching Filter applications
- < .25db loss over the full spectrum

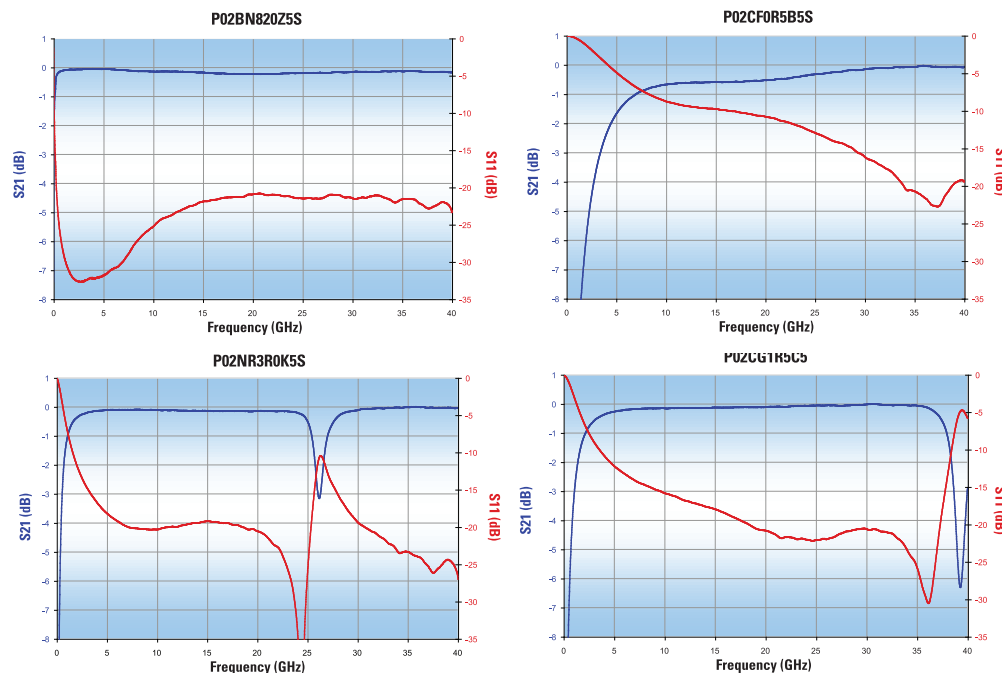


Part Characteristics

Part Number	Cap.	Voltage Rating	Temperature Coefficient -55°C to 125°C	Maximum Dissipation Factor	Insulation Resistance (MΩ Minimum)	Aging Rate	Frequency Range
P_2BN820Z5ST	82 pF	50 Vdc	± 10% 1MHz, 25°C	3.0% at rated voltage	10 ⁵ MΩ @ 25°C Decade Hours	<=1.5%/ 20MHz- 40GHz	20MHz-40GHz
P_2NR3R0K5ST	3.0 pF	50 Vdc	N1500 ±500PPM / °C	0.25% 1MHz, 25°C	10 ⁶ MΩ @ 25°C at rated voltage	N / A*	4-20GHz
P_2CG1R5C5ST	1.5 pF	50 Vdc	0 ± 30PPM	0.7% 1KHz, 25°C	10 ⁶ MΩ @ 25°C at rated voltage	N / A*	4-20GHz
P_2CG1R0C5ST	1.0 pF	50 Vdc	0 ± 30PPM	0.15% 1KHz, 25°C	10 ⁶ MΩ @ 25°C at rated voltage	N / A*	18-40GHz
P_2CD0R7B5ST	0.7 pF	50 Vdc	N20 ±15PPM / °C	0.15% 1KHz, 25°C	10 ⁶ MΩ @ 25°C at rated voltage	N / A*	20-46GHz
P_2CF0R5B5ST	0.5 pF	50 Vdc	0 ±15PPM / °C	0.6% 1KHz, 25°C	10 ⁶ MΩ @ 25°C at rated voltage	N / A*	28-40GHz
P_2CF0R3B5ST	0.3 pF	50 Vdc	0 ±15PPM / °C	0.6% 1KHz, 25°C	10 ⁶ MΩ @ 25°C at rated voltage	N / A*	35-50GHz

Dimensions Key: P21 = 0201; P42 = 0402; P02 = 0502; P62 = 0602

Electrical Performance



High K substrates are used for circuit miniaturization.
DLI offers complete fabrication services!

High-K Ceramic Substrates and Plates

Case Sizes and Tolerances - For custom sizes please contact an inside sales representative.

Case Size	Length (Inches)	Width (Inches)	Tolerance	
			Plates (H) ± (Inches)	Substrates (S) ± (Inches)
10	1.000	1.000	Substrates Only	
15	1.000	1.500	.050	.002
20	2.000	2.000	.050	.002
25	2.500	2.500	.050	.002
30	3.000	3.000	.050	.002
40	4.000	4.000	.050	.002

Material Specifications

Material Code	Relative ϵ_r * @ 5 GHz	TCC†Loss ppm/°C	Coefficient of Tangent* % Max	Thermal Thermal Expansion ppm/°K	Conductivity W/m-°K
QZ	3.82 (@ 1MHz)	Fused Quartz	0.0015 (@ 1MHz) 0.033 (@ 24 GHz)	0.55	1.28
LA	4.9 ± 0.2	—	0.25	4.6 - 5.1	—
AG	8.85 ± 0.35 (@ 1MHz)	Aluminum Nitride	0.10	4.6	140-180
PI	9.9 ± 0.15 (@ 1MHz)	Alumina 99.6%	0.01	6.5 - 7.5	27
PG	12.5 ± 0.5	P22 ± 30	0.02	7.6	—
AH	20 ± 0.5	P90 ± 20	0.02	9.6	1.56
NA	23 ± 1	N30 ± 15	0.03	10.1	1.56
CF**	25 ± 2	0 ± 15	0.15	9.0	1.56
CD	38 ± 1	N20 ± 15	0.04	5.8	1.59
CG**	67 ± 3	0 ± 30	0.10	9.0	1.59
NR	152 ± 5	N1500 ± 500	0.06	10.0	2.72

*Unless otherwise specified K dielectric measurement at approximately 5 GHz.

†For the temperature range -55 to 125°C.

**Material only provided metalized.



High-K Ceramic Substrates and Plates

Thickness, Surface Finish and Metallization Options

Thickness Code Definition

A three digit number representing the thickness in **xx.x** mils.

Examples: Code 100 = .010"
Code 155 = .0155"
Code 250 = .025"

Thickness Tolerance Codes

D = $\pm .0005$ – Machined or Polished
E = $\pm .001$ – Standard

Please consult with an applications engineer for thicknesses < .010"

Surface Finish

Code	Roughness R_a	Material Process
X	>50 μ in.	As-Fired
Y	20 μ in.	Machined
Z	<5 μ in.	Polished
S	Special	Drawing req'd

Metallization

Code	Description
X	No Metallization
M	300 Angstroms TiW, 100 μ in. min. Au
N	300 Angstroms TiW, 50 μ in. min. NiV, 100 μ in. min. Au
P	75 μ in. min. Nickel, 100 μ in. min. Au
L	Top 50 Ohms/sq. TaN, 300 Angstroms TiW, 100 μ in. min. Au. Bottom Side 300 Angstroms TiW, 100 μ in. min. Au
E	Metalized and etched per Customer drawing
T	300 Angstroms min. TiW, 50 μ in. min. NiV, 300 μ in. min. Au-Sn
D	SPECIAL, Customer Drawing Required!

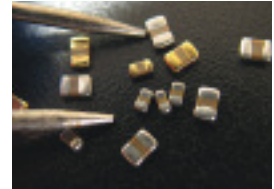
Screening Options

Test Code	Test/Inspection	Sample Size	Description
X	Visual Mechanical	100%	Verify that the required area is available and continuous (Broken corners allowable).
K	Visual Mechanical	100%	Verify that the required area is available and continuous (Broken corners allowable).
	Kent Test	10% of lot	K and Loss.
D	Customer Defined		Customer Drawing Required!

Part Number Identification

S	20	CG	250	D	Z	N	X
Product S = Substrate H = Plate	Case Size 10 15 20 25 30 40	Material See material tables on page 5.	Thickness 100 = .010" 155 = .0155" 250 = .025"	Thickness Tolerance D = $\pm .0005$ E = $\pm .001$	Surface Finish X Y Z S	Metallization See table on 29.	Test Level X K D

Low loss resonance free performance
in an MLC Structure



C04/C06/C08 Broadband Blocks

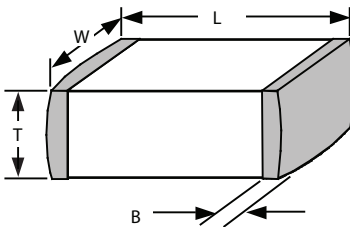
Functional Applications:

Fiber Optic Links, High Isolation Decoupling, LAN's,
VCO Frequency Stabilization, Diplexers, RF/Microwave
Modules, Instruments and Test Equipment.

Benefits:

Resonance free DC Blocking / Decoupling, up to 4 GHz
Standard surface mountable

Mechanical Specification:



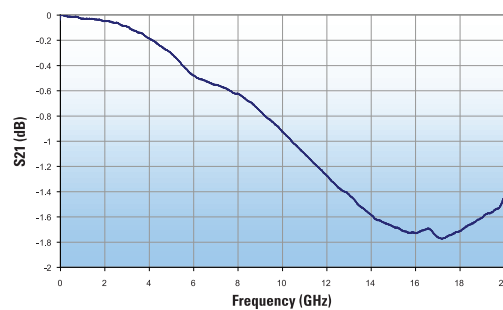
Product Code	Body Dimensions			Band Dimensions (B)	
	Length (L)	Width (W)	Thickness (T)	Min	Max
C04BL	0.040" ± 0.008"	0.020" ± 0.006"	0.028" Max	0.003"	0.019"
C06BL	0.060" ± 0.012"	0.031" ± 0.009"	0.036" Max	0.006"	0.03"
C08BL	0.081" ± 0.020"	0.051" ± 0.013"	0.061" Max	0.012"	0.0468"

Part Characteristics

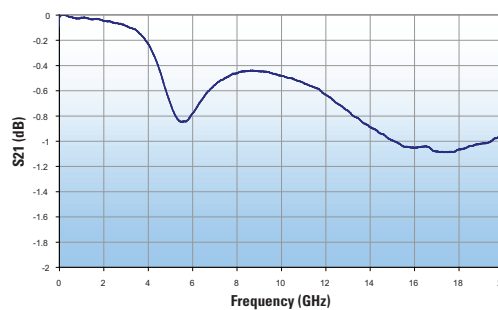
Part Number	Capacitance Guaranteed Min. Value	Voltage Rating	Temperature Coefficient -55°C to 125°C	Maximum Dissipation Factor	Insulation Resistance (MΩ Min.)	Aging Rate	Frequency Range	Termination
C04BL121X-5UN-X0T	120pF @ 1KHz, 2Vrms	50 Vdc	± 15%	3.0% @ 1KHz, 2Vrms	10 ⁴	<=1.5%/Decade Hrs	10MHz – 40GHz	"U" & "S"
C06BL851X-1UN-X0T	850pF @ 1KHz, 2Vrms	100 Vdc	± 15%	3.0% @ 1KHz, 2Vrms	10 ⁴	<=1.5%/Decade Hrs	2MHz – 30GHz	"U", "S" & "Z"
C08BL242X-5UN-X0T	2400pF @ 1KHz, 2Vrms	50 Vdc	± 15%	3.0% @ 1KHz, 2Vrms	10 ⁴	<=1.5%/Decade Hrs	1MHz – 20GHz	"U", "S" & "Z"
C08BL102X-1UN-X0T	1000pF @ 1KHz, 2Vrms	100 Vdc	± 15%	3.0% @ 1KHz, 2Vrms	10 ⁴	<=1.5%/Decade Hrs	1MHz – 20GHz	"U", "S" & "Z"

Electrical Performance

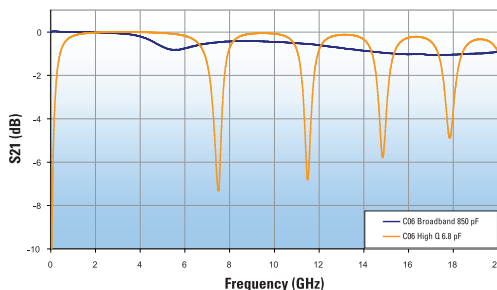
C08BL242X-5UN-X0T Insertion Loss (S21)



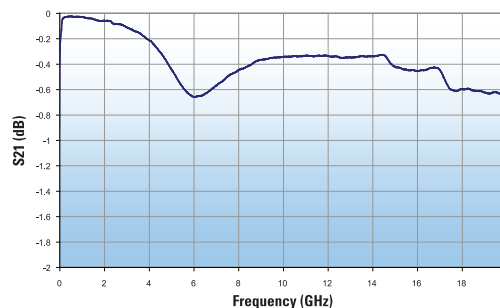
C06BL851X-1UN-X0T Insertion Loss (S21)



High Q & Broadband MLC Compared Insertion Loss (S21)



C04BL121X-5UN-X0T Insertion Loss (S21)



Other DLI Products

Multi-Layer Capacitors

DLI offers a broad range of Multi-Layer Capacitor products.

Please refer to DLI's catalog "High-Q Multi-Layer and Broadband Blocking Capacitors".

C04	C06	C07	C08	C11	C17	C18	C22	C40
0.04 X 0.02	0.06 X 0.03	0.110 x 0.07	0.08 x 0.05	0.055 X 0.055	0.11 X 0.11	0.11 X 0.11	0.22 x 0.25	0.38 X 0.38
0.1 - 10pF	0.3 - 100pF	0.1 - 100pF	0.3 - 470pF	0.3 - 220pF	0.1 - 1000pF	0.1 - 1000pF	1 - 2700pF	1 - 5100pF
UL	UL,CF,MS	UL	UL	UL,CF,AH,MS	UL,CF,AH,MS	CF,AH	CF and AH	CF and AH
100V WVDC	250V WVDC	1250 WVDC	250V WVDC	250V WVDC	1000V WVDC	2000V WVDC	2500V WVDC	7200 WVDC

Filters/Heat Sinks/Sub Mounts/Standoffs

Filter Family

Micro-strip, cavity filters, duplexers, diplexers, GPS filters. Frequency from 30 MHz to 67 GHz. No tuning required, extremely temperature stable, miniature and lightweight. Customized designs and prototypes.

Bias Filter Network

Designed to filter RF signals from bias and control line from 10MHz to 40GHz. Reduces RF feedback through bias supplies and simplifies assembly – one component replaces many.

Heatsinks, Sub Mounts and Standoffs

For laser diodes, VCSEL, and others for the fiber optics industry. DLI can customize a design for high volume and be very price competitive. The next generation of "smart" heatsinks are also available using proprietary technologies.

Build-to-Print

DLI maintains an inventory of industry standard ceramics and manufactures a large selection of proprietary and/or patented custom ceramics. Plus, DLI's custom ceramics can offer significantly better thermal performance than the majority of industry standard ceramics and have the added benefit of a sufficiently higher K allowing miniaturization opportunities.

Equalizers/Duplexers/Resonators

Gain Equalizer

Excellent, repeatable microwave performance is achieved by application of precision thin film fabrication and DLI HI-K ceramic materials. DLI's unique design solution provides near ideal R-C frequency response, far superior to "Stacked R-C chip" assemblies. RADAR application to 67 GHz.

Duplexers and Diplexers

Duplexers are three port devices used to separate and combine frequencies, having two filters with a common driving point covering two frequency bands. Diplexers are three port devices used to separate and combine frequencies, having one filter covering all frequency bands.

Cavity Resonator

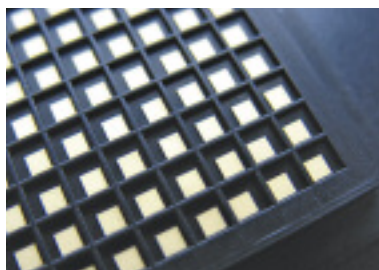
DLI's Cavity Resonators set a new standard for high Q resonator performance across a broad spectrum of frequencies. High Q resonators play a critical role in system noise performance, and employing the advantage is dramatically easier and less expensive than ever before. These products include extremely stable Single Frequency Cavity Resonators (SFCR), Narrow-Band and Wide-Band Tunable Ceramic Resonator, and Two-Port Resonators. Single Frequency Cavity Resonators-standard from 3GHz to >67GHz. Two Port Cavity Resonators-standard from 3GHz to >67Ghz.

Substrates

DLI manufactures substrates to allow our customers to manufacture their own custom ceramic products*. DLI's proprietary and/or patented ceramics offer high K values, to allow for miniaturization, extreme temperature stability, space reliability and radiation hardened properties. As a direct result of the above, DLI is able to offer our customers a complete array of fabrication services for all industry standards and/or custom ceramics.

*DLI does restrict certain proprietary materials in specific applications for internal use only.

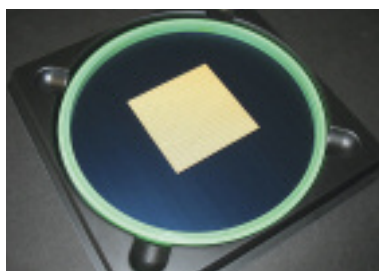
SLC Packaging



SLC Waffle Packaging



SLC Tape and Reel



SLC on Tape Ring



SLC "Black Dotted" on Tape Ring

SLC Waffle Packaging

DLI offers a wide variety of custom and standard design waffle packages in various materials depending on the application. Typical material offerings are antistatic and gel pack, which can contain up to 400 pieces depending on component dimension.

SLC Tape and Reel

DLI offers tape and reel packaging solutions for a variety of our single-layer capacitor case sizes. Utilizing the latest technology and equipment to provide our customers the highest quality products, our standard SMD tape and reel packaging meets or exceeds EIA standards. Custom tape and reel packaging available; consult the factory for options.

SLC on Tape Ring

DLI offers single-layer capacitors re-populated on blue membrane tape and photon ring assembly to maximize efficiency and minimize product cost. Used in high volume applications, the re-populated capacitors provide for more efficient component placement and fewer "pick and place" machine change outs. The re-populated capacitors meet GMV capacitance value, are 100% visual acceptable, and can be re-populated to a 4" square on a 6 inch photon tape ring.

SLC "Black Dotted" on Tape Ring

DLI offers "black dotted" capacitors on membrane tape and photon ring assembly. For high volume applications utilizing visual recognition, a less expensive alternative is the use of "black dotted" capacitors provided on saw dice membrane tape. The non-"black dotted" capacitors meet GMV capacitance value, and a minimum of 75% visually acceptable product are guaranteed.

Storage

Single-layer capacitors with applicable terminations will be solderable for a minimum of 1 year from date of shipment if properly stored in its original packaging. For extended periods, storage in a dry nitrogen environment is recommended. Product supplied on membrane tape and photon ring should be stored in the original container and in an environmentally controlled area where temperature and humidity are maintained. It is recommended not to store the product in direct light; this can negatively impact the adhesion properties of the tape.

Handling

Single-layer ceramic capacitors should be handled carefully during component transfer or placement, preventing damage to the gold and ceramic surfaces. The capacitors should be handled with precision stainless steel tweezers or vacuum wand. Contacting the capacitor with bare hand should be avoided; resulting contaminants will affect the performance of the component.

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Ceramic & Microwave Products (CMP) designs, manufactures and sells special electronic components and systems, including high-performance filters, switches, capacitors and EMI and cosite signal interference solutions. Our products are used in military, space, telecom infrastructure, medical and industrial applications where function and reliability are crucial.

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