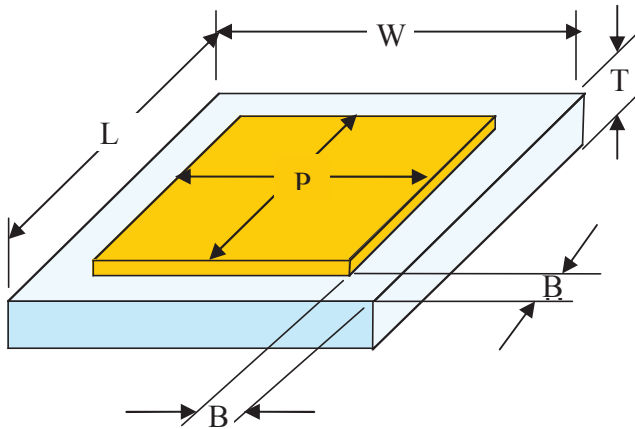


Functional Applications:

- DC Blocking
- RF Bypass
- Filtering
- Tuning
- Submounts

Benefits:

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



Please see the Border Cap® Dimension chart below



email sales@dilabs.com
or europesales@dilabs.com
or asiasesales@dilabs.com

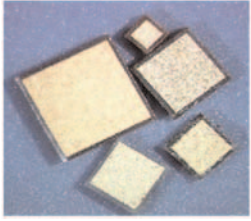
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Border Cap® Dimensions

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 (+.001, -.0005)	0.025 (+.025, -.013)	0.0035 – 0.008	0.089 – 0.203
D12	.03 – 100	0.012	0.305	0.010	0.254				
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				
D30	.15 – 1000	0.030	0.762	0.026	0.660				
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	0.002 (+.002, -.0015)	0.051 (+.005, -.038)		

UX contain special dimensional tolerances - consult factory.
UX thickness only available in .005", .010" and .015"

either single- or double-width border on one or both sides



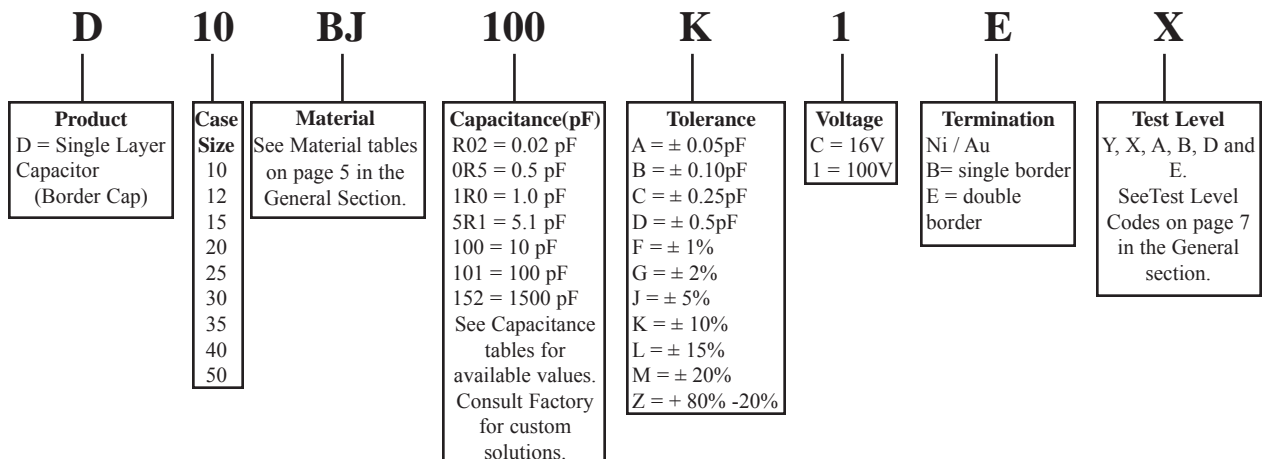
Border Cap® Designer Kits										
160 Capacitors, 10 Each of 16 Values										
Part Number	Capacitor Width	10 Capacitors of each value								
		Dielectric	pF	Tol.	pF	Tol.	pF	Tol.	pF	Tol.
D10XXKITA1EX	.010"	Class I, see codes on pg. 5	.1	B	.6	C	1.5	C	2.7	D
		Class II, see codes on pg. 5	.4	B	1.0	C	2.2	D	3.3	D
D15XXKITA1EX D20XXKITA1EX	.015"	Class I, see codes on pg. 5	3.9	D	5.6	M	8.2	M	20	M
	.020"	Class II, see codes on pg. 5	4.6	D	6.2	M	10	M	33	M
D25XXKITA1EX D30XXKITA1EX	.025"	Class I, see codes on pg. 5	.15	B	.7	C	1.6	C	3.3	D
	.030"	Class II, see codes on pg. 5	.35	B	1.0	C	2.2	C	6.4	D
D25XXKITA1EX D30XXKITA1EX	.025"	Class I, see codes on pg. 5	6.8	K	10	K	20	M	50	M
	.030"	Class II, see codes on pg. 5	8.2	K	15	K	33	M	100	M
D25XXKITA1EX D30XXKITA1EX	.025"	Class I, see codes on pg. 5	.4	B	1.7	C	4.0	D	8.2	K
	.030"	Class II, see codes on pg. 5	.6	C	1.9	C	5.0	D	10	K
D25XXKITA1EX D30XXKITA1EX	.025"	Class I, see codes on pg. 5	0.9	C	2.7	C	5.6	D	20	K
	.030"	Class II, see codes on pg. 5	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	110	1200	1300	1500	1600	1800
2000	220	2400	2700	3000	3300	3600	3900	4300
5300	6500	10,000						

Border Cap® Part Number Identification



Single Border Capacitors

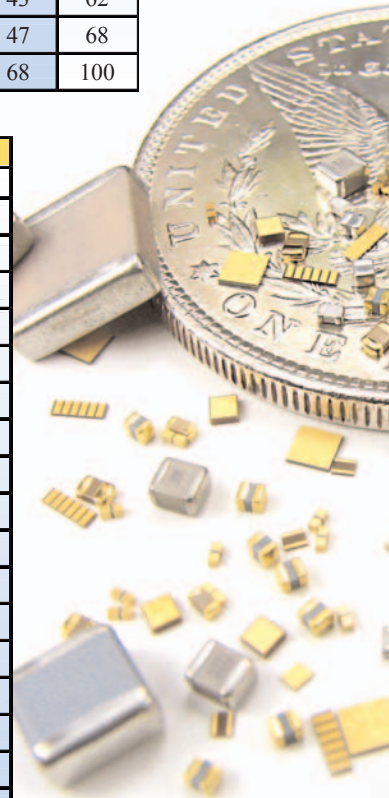
Capacitance Range vs. Case Size by Dielectric Material

Style		Class I Dielectric Materials												
		LA	PF	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

Style		Class II Materials											
		BF	BD	BG	BC	BE	BL	BJ	BN	BT	BU	BV	UX*
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	100
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	130
	Max	4.3	6.8	8.2	13	12	20	33	43	43	82	130	200
D20	Min	5.1	8.2	10	15	15	24	39	51	51	100	150	150
	Max	8.2	13	16	24	22	36	62	82	82	160	240	430
D25	Min	8.2	13	16	24	24	36	62	82	82	150	240	250
	Max	13	20	27	39	36	56	100	130	130	240	390	700
D30	Min	12	18	24	36	33	56	91	120	120	220	360	370
	Max	20	30	39	56	56	91	150	200	200	360	560	1000
D35	Min	16	27	33	47	47	75	120	160	160	300	510	500
	Max	27	43	56	75	75	120	200	270	270	510	820	1300
D40	Min	22	33	43	62	62	100	160	220	220	430	680	700
	Max	33	51	62	91	91	130	240	330	330	620	1000	1800
D50	Min	33	51	68	100	91	150	270	330	330	620	1000	1000
	Max	51	82	100	150	130	220	390	510	510	1000	1500	3000

Consult factory for additional information or special requirements

*UX Capacitors are 16 volt rated



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Cazenovia, New York, USA
13035-9433

either single- or double-width border on one or both sides

Double Border Capacitors

<i>Capacitance Range vs. Case Size by Dielectric Material</i>														
Style		Class II Materials												
		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	0.20	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	0.70	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	0.65	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	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	0.85	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	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	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	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	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	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	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	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	5.6	10	20	30
	Max	0.30	0.55	0.70	1.1	1.3	1.2	2.0	2.4	3.9	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	7.5	15	27	43
	Max	0.35	0.65	0.90	1.3	1.6	1.5	2.4	2.7	4.7	11	20	39	62
D50	Min	0.40	0.70	0.95	1.4	1.7	1.6	2.7	3.0	5.1	12	22	43	68
	Max	0.60	1.1	1.4	2.2	2.4	2.4	3.9	4.7	7.5	16	33	62	100

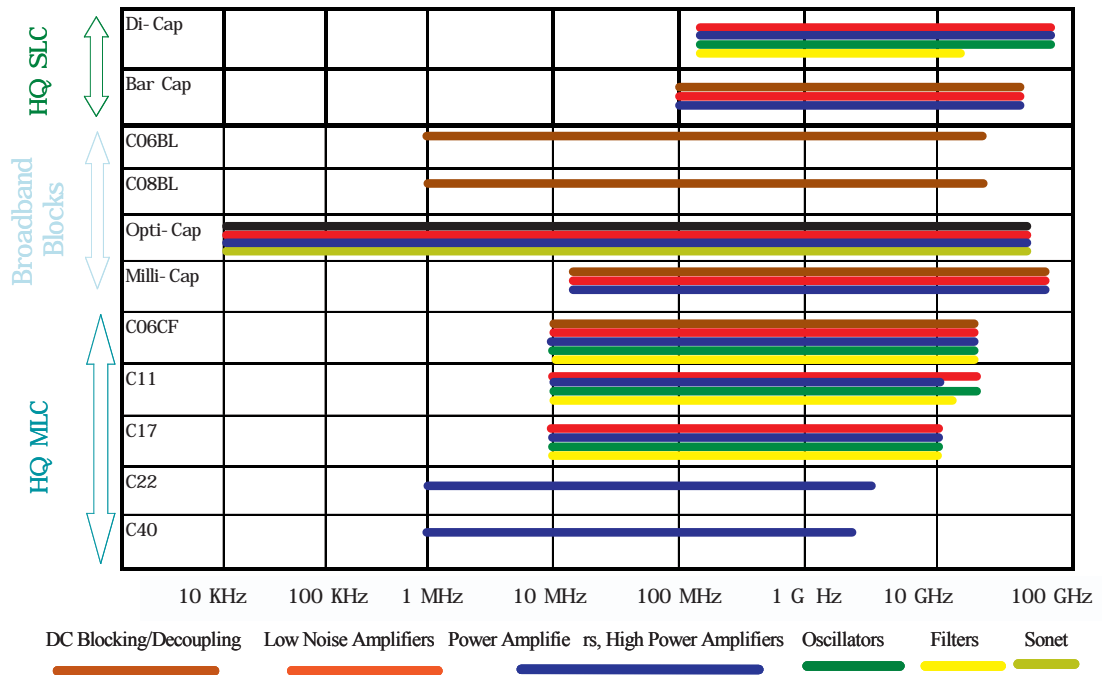


Style		Class II Materials												
		BF	BD	BG	BC	BE	BL	BJ	BN	BT	BU	BV	UX*	
D10	Min	1.3	2.0	2.7	3.6	3.6	5.6	9.1	13	13	24	39		
	Max	2.0	3.0	3.9	5.6	5.6	9.1	15	20	20	39	62	100	
D12	Min	1.8	3.0	3.9	5.6	5.1	8.2	15	20	20	36	56		
	Max	3.0	4.7	6.2	8.2	8.2	13	22	30	30	56	91		
D15	Min	2.4	3.9	5.1	6.8	6.8	11	18	24	24	47	75	100	
	Max	3.6	5.6	6.8	10	10	16	27	36	36	68	110	200	
D20	Min	4.7	7.5	9.1	13	13	20	33	47	47	91	150	150	
	Max	6.8	11	13	20	20	30	51	68	68	130	220	370	
D25	Min	7.5	12	15	22	22	33	56	75	75	150	220	220	
	Max	12	18	24	33	33	51	82	120	120	220	360	600	
D30	Min	11	18	22	33	30	51	82	110	110	220	330	340	
	Max	18	27	36	51	51	82	130	180	180	330	510	900	
D35	Min	15	24	30	43	43	68	110	150	150	300	470	470	
	Max	24	39	51	68	68	110	180	240	240	470	750	1300	
D40	Min	20	33	43	62	56	91	150	200	200	390	620	600	
	Max	30	47	62	82	82	130	220	300	300	560	910	1800	
D50	Min	33	51	68	91	91	150	240	330	330	620	1000	1000	
	Max	47	75	100	130	130	220	360	470	470	910	1500	2800	

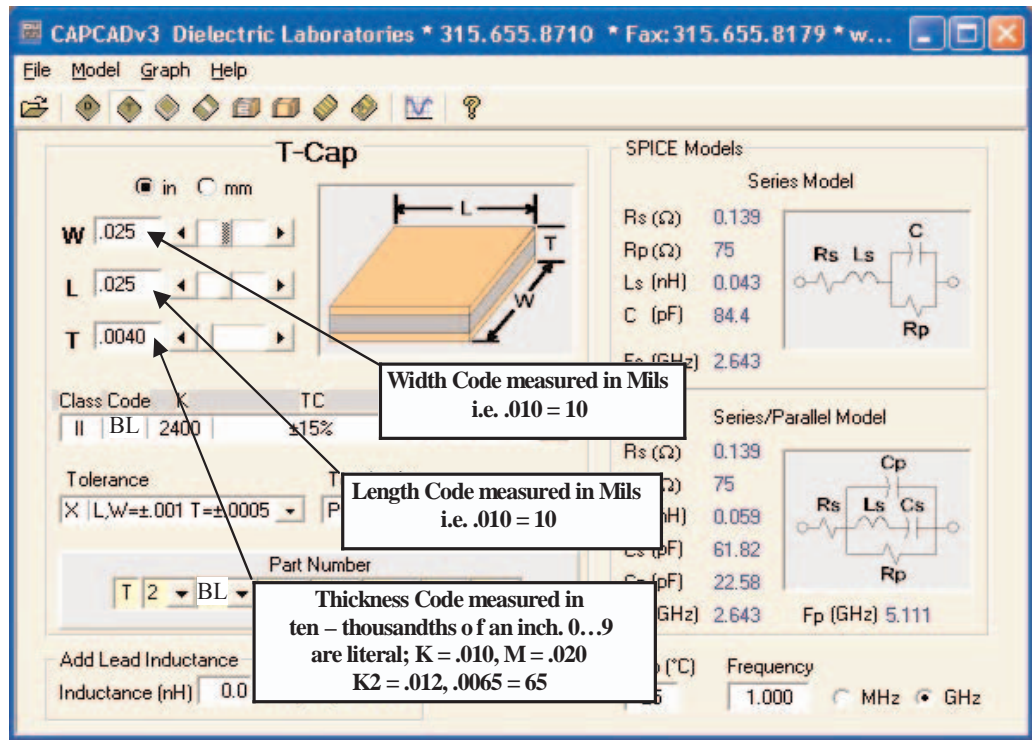
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*UX Capacitors are 16 volt rated

Capacitor Spectrum Chart



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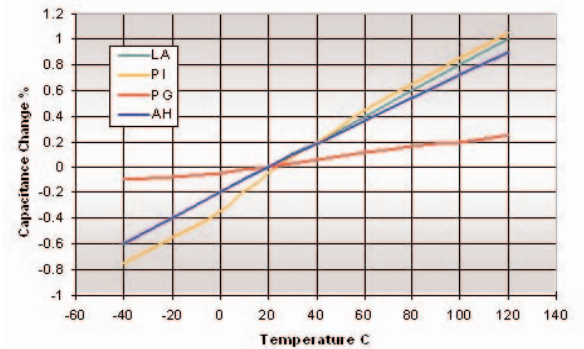
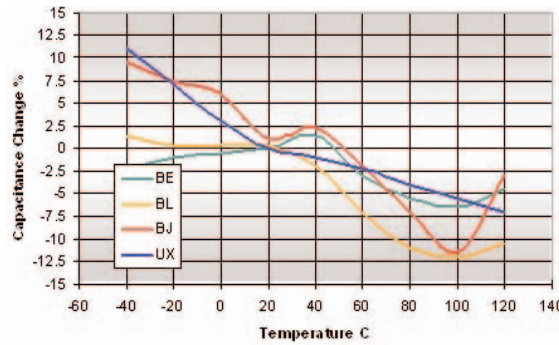
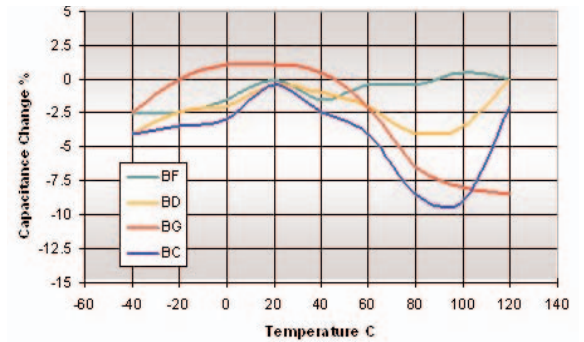
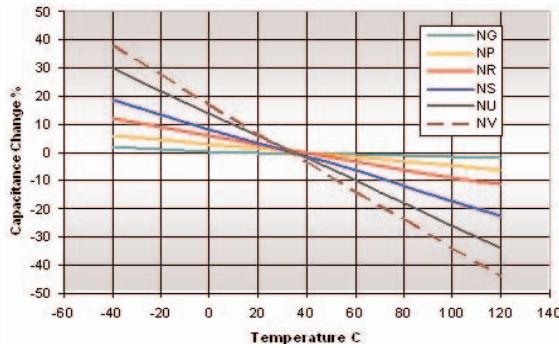
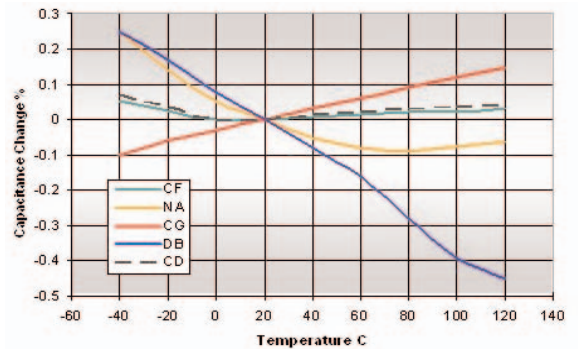
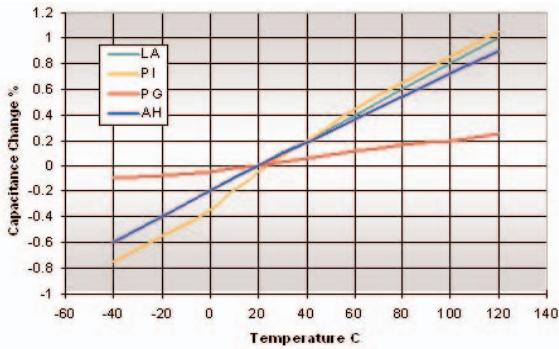
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Cazenovia, New York, USA
13035-9433

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)	Dissipation Factor @ 1 MHz (% Maximum)	Insulation Resistance (M Ω)	
				@ +25°C	@ +125°C
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)		Dissipation Factor @ 1MHz (% Maximum)	Insulation Resistance (M Ω)	
		No Bias, Pre Voltage Conditioning	No Bias, Post Voltage Conditioning			
					@ +25°C	@ +125°C
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
BT	4200	+22/-56 (-55°C to +105°C)	+22/-56 (-55°C 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	30,000	\pm 15%	\pm 25%	2.5	>10 ³	>10 ²

Dielectric Temperature Characteristics



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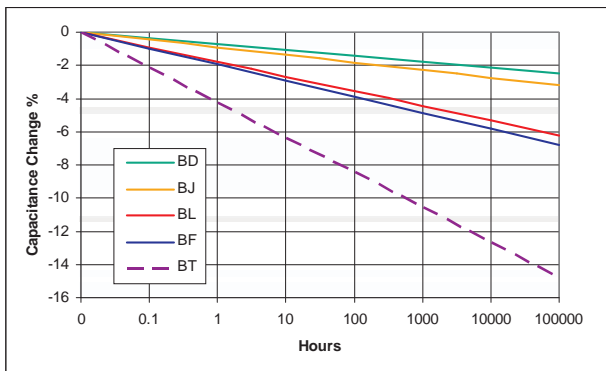
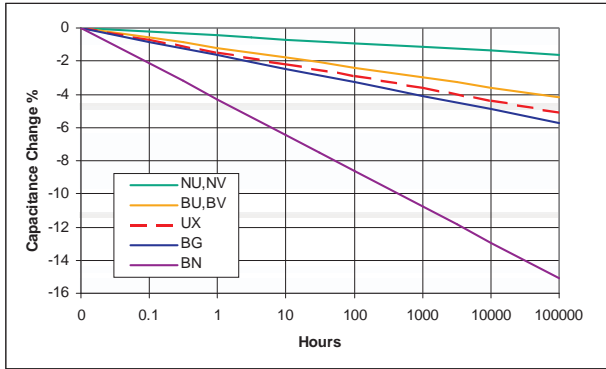
Termination Codes

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

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Test Level Codes

Dielectric Aging Characteristics



Code	Description
Industrial / Commercial Options	
Y	<ul style="list-style-type: none"> 1% AQL 2 Side Visual Screening.
X	<ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 100%, 100 +0/-4 Hours Voltage Conditioning. 100% Electrical Screening 100% 6 Side Visual Screening.
B	<ul style="list-style-type: none"> Bond Strength. Die Shear Strength. Temperature Coefficient Limits. MIL-PRF-49464 Group B <ul style="list-style-type: none"> MIL-PRF-49464, Group A above Thermal Shock and Immersion. Resistance to Soldering Heat. Moisture Resistance. 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.) <ul style="list-style-type: none"> 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.

Environmental & Physical Testing Procedures

Parameter	MIL-STD-202	
	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.
Parameter	MIL-STD-883	
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

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