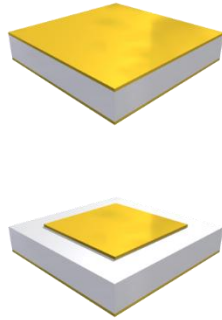


# SINGLE LAYER CAPACITORS



## APPLICATIONS

- DC Block
- Decoupling
- Filtering
- RF Bypass
- Tuning
- Hybrid assembly

## FEATURES

- Bond Strength exceeds MIL STD-883, Method 2011
- Shear Strength exceeds MIL STD-883, Method 2019
- Meets or exceeds MIL-PRF-38534 Element Evaluation

## DIELECTRIC MATERIAL

### TYPE 1

- Low dissipation factor
- Low temperature coefficients
- High voltage insulation and dielectric breakdown
- Negligible voltage and frequency coefficients
- Negligible aging effects

### TYPE 2

- High dk allows for smaller size
- High dk achieves lower series inductance
- Higher dissipation factor
- High temperature coefficients

DIELECTRIC MATERIAL	TYPE	DIELECTRIC CONSTANT (K)	DISSIPATION FACTOR @ 10GHz	TEMPERATURE COEFFICIENT (%) -55 to 125°C	INSULATION RESISTANCE (MEG-OHMS 100VDC @ 25°C)
D20	1	3.8	.0001	NIL	10 <sup>6</sup>
D30	1	9.6	.0006	180 ± 50	10 <sup>6</sup>
D50	1	36	.002	0 ± 30	10 <sup>6</sup>
D55	1	55	.005	0 ± 30	10 <sup>6</sup>
D58	1	90	.005	0 ± 30	10 <sup>6</sup>
D60	1	90	.002	-750 ± 100	10 <sup>6</sup>
D70	1	150	.0025	-1500 ± 400	10 <sup>6</sup>
D75	1	280	.003	-2200 ± 400	10 <sup>6</sup>

DIELECTRIC MATERIAL	TYPE	DIELECTRIC CONSTANT (K)	DISSIPATION FACTOR @ 1MHz	TEMPERATURE COEFFICIENT (%) -55 to 125°C	TEMPERATURE COEFFICIENT (%) -30 to 85°C	VOLTAGE COEFFICIENT OF C AT 10V/MIL	AGING (%) HR/DECADE	FREQUENCY COEFFICIENT OF C% (1kHz to 10MHz)	INSULATION RESISTANCE (MEG-OHMS 100VDC @ 25°C)
D80	2	280	.010	5 to 10		± 1	2.0	-12	10 <sup>5</sup>
D90	2	900	.015	10 to -10		± 2	3.0	-6	10 <sup>5</sup>
D100	2	2000	.015	3 to -10		± 2	3.5	-12	10 <sup>5</sup>
D120	2	4000	.020	5 to -25		± 2	3.0	-12	10 <sup>5</sup>
D130	2	5000	.025		5 to -50	-10	3.0	-9	10 <sup>5</sup>
D135	2	5000	.035	15 to -15		-10	3.0	-9	10 <sup>5</sup>
D140	2	9000	.025		5 to -70	-50	3.0	-10	10 <sup>5</sup>
D160	2	16000	.030		5 to -80	-50	3.0	-10	10 <sup>5</sup>
D200	2	25000	.025	15 to -15		-10	3.0	-9	10 <sup>5</sup>

# SINGLE LAYER CAPACITORS



SINGLE LAYER CAPACITORS

REV 1.0.2

## SELECTION CHART

Chart is for guidance only. See ordering info for rectangular size. Custom sizes are also available.

Capacitance (pF)	10 x 10		15 x 15		20 x 20		25 x 25		30 x 30		35 x 35		40 x 40		50 x 50	
	Substrate	Thickness (mil)	Substrate	Thickness (mil)	Substrate	Thickness (mil)	Substrate	Thickness (mil)	Substrate	Thickness (mil)	Substrate	Thickness (mil)	Substrate	Thickness (mil)	Substrate	Thickness (mil)
0.06	D50	10	D30	7	D20	5	D20	7	D20	10						
0.08	D50	9	D30	5	D30	10	D20	6	D20	8						
0.1	D50	6	D30	4	D30	7	D20	5	D20	7	D20	10				
0.2	D50	4	D50	7	D50	10	D30	6	D30	10	D20	5	D20	7	D20	10
0.3	D60	6	D50	5	D50	9	D30	4	D30	5	D30	9	D20	5	D20	7
0.4	D60	4	D50	4	D50	5	D50	10	D30	4	D30	6	D30	9	D20	5
0.5	D70	6	D60	8	D50	5	D50	9	D50	10	D30	5	D30	7	D30	10
0.6	D70	5	D60	7	D50	4	D50	7	D50	10	D30	4	D30	6	D30	9
0.8	D80	7	D60	5	D60	8	D50	5	D50	6	D50	10	D30	4	D30	7
1	D80	5	D60	4	D60	6	D50	4	D50	6	D50	9	D30	4	D30	5
1.2	D80	5	D70	5	D60	5	D60	9	D50	4	D50	8	D50	10	D30	4
1.5	D80	4	D70	4	D60	4	D60	7	D50	4	D50	6	D50	8	D30	5
1.8	D90	10	D80	7	D70	6	D60	6	D50	4	D50	5	D50	7	D50	10
2	D90	9	D80	6	D70	5	D60	5	D60	8	D50	5	D50	6	D50	9
2.2	D90	8	D80	5	D70	5	D60	5	D60	7	D50	4	D50	6	D50	8
2.7	D90	7	D80	4	D75	7	D60	4	D60	6	D60	8	D50	5	D50	7
3.3	D90	6	D80	4	D80	6	D70	5	D60	4	D60	7	D50	4	D50	6
3.9	D90	5	D90	10	D80	5	D70	4	D70	7	D60	6	D60	8	D50	5
4.7	D90	4	D90	8	D80	5	D80	8	D70	5	D60	5	D60	7	D60	10
5.6	D100	7	D90	7	D90	10	D80	6	D70	5	D60	4	D60	6	D60	8
6.8	D100	6	D90	6	D90	9	D80	5	D80	7	D70	6	D60	5	D60	7
8.2	D100	5	D90	5	D90	8	D80	4	D80	6	D70	5	D70	6	D60	6
10	D100	4	D90	4	D90	6	D80	4	D80	5	D70	4	D70	5	D60	5
12	D120	6	D100	6	D90	5	D90	9	D80	4	D80	7	D70	4	D70	7
15	D120	5	D100	5	D90	4	D90	7	D90	10	D80	5	D80	7	D70	5

TYPE 1 DIELECTRIC

-- CONTINUED ON NEXT PAGE --

# SINGLE LAYER CAPACITORS

SINGLE LAYER CAPACITORS

REV 1.0.2

18	D130	6	D100	4	D100	7	D90	6	D90	9	D80	4	D80	6	D80	8	TYPE 2 DIELECTRIC
20	D130	5	D100	4	D100	7	D90	5	D90	7	D80	4	D80	5	D80	8	
22	D130	4	D100	4	D100	6	D90	5	D90	7	D90	10	D80	5	D80	7	
27	D140	5	D120	6	D100	5	D90	4	D90	6	D90	9	D80	4	D80	6	
33	D140	5	D120	5	D100	4	D100	7	D90	5	D90	7	D90	9	D80	5	
39	D140	4	D120	4	D120	7	D100	6	D100	8	D90	6	D90	8	D80	4	
47	D140	4	D130	5	D120	5	D100	5	D100	7	D90	5	D90	7	D90	10	
56	D200	8	D140	7	D120	5	D100	4	D100	6	D90	4	D90	5	D90	8	
68	D200	8	D140	6	D120	4	D120	7	D100	5	D100	7	D90	4	D90	7	
82	D200	5	D140	5	D130	5	D120	6	D120	8	D100	6	D100	7	D90	6	
100	D200	5	D140	4	D140	7	D120	5	D120	7	D100	5	D100	6	D90	5	
120			D200	8	D140	6	D120	4	D120	6	D100	4	D100	5	D100	8	
150			D200	8	D140	5	D130	4	D120	5	D120	7	D100	4	D100	7	
180			D200	5	D140	5	D140	6	D120	4	D120	6	D120	7	D100	6	
200			D200	5	D140	4	D140	6	D140	8	D120	5	D120	7	D100	5	
220			D200	5	D200	8	D140	6	D140	8	D120	5	D120	6	D100	5	
270					D200	8	D140	4	D140	6	D120	4	D120	5	D120	8	
330					D200	5	D200	8	D140	5	D140	8	D130	5	D120	6	
390					D200	5	D200	8	D140	4	D140	7	D140	8	D120	5	
470							D200	5	D200	8	D140	5	D140	7	D120	5	
560							D200	5	D200	8	D140	4	D140	6	D130	5	
680							D200	5	D200	5	D140	4	D140	5	D140	7	
820									D200	5	D200	8	D140	4	D140	6	
1000									D200	5	D200	8	D200	8	D140	5	
1200											D200	5	D200	8	D140	4	
1500													D200	5	D200	8	
1800															D200	8	
2200															D200	5	
2700															D200	5	

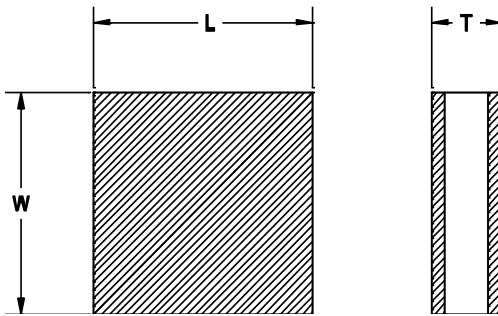
# SINGLE LAYER CAPACITORS

## GENERAL ELECTRICAL CHARACTERISTICS

	CHARACTERISTICS
OPERATING FREQUENCY	<ul style="list-style-type: none"> <li>&gt; 60 GHz</li> </ul>
VOLTAGE RATING	<ul style="list-style-type: none"> <li>THICKNESSES <math>\leq</math> 5 MIL: 50 WVDC (25 WVDC FOR D200 DIELECTRIC)</li> <li>THICKNESSES &gt; 5 MIL: 100 WVDC (50 WVDC FOR D200 DIELECTRIC)</li> </ul>
INSULATION RESISTANCE	<ul style="list-style-type: none"> <li>TESTED @ 50 V ALL DIELECTRIC (D200 TESTED AT 16-25 V FOR <math>\leq</math> 6 MIL THICK AND 25-50 V FOR &gt; 6 MIL THICK.</li> </ul>
DIELECTRIC TEST VOLTAGE	<ul style="list-style-type: none"> <li>250% VOLTAGE RATING</li> </ul>
TEST FREQUENCY	<ul style="list-style-type: none"> <li>1 MHz @ 1 V (BELOW 1000 pF)</li> <li>1 kHz @ 1 V (ABOVE 1000 pF)</li> </ul>
SERIES RESONANT FREQUENCY	<ul style="list-style-type: none"> <li>DEPENDENT ON APPLICATION; AFFECTED BY WIRE BOND, RIBBON BOND, PLACEMENT OF BOND, AND SIZE OF CAPACITOR. MUST BE TESTED <i>IN SITU</i>.</li> </ul>

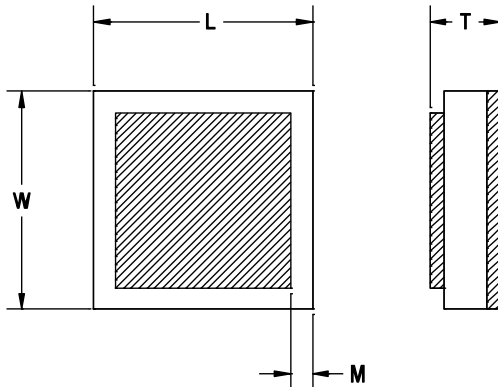
## MECHANICAL OUTLINE

### EDGE-TO-EDGE STYLE CAPACITOR



SQ. SIZE (MIL)	L & W TOLERANCE (%)	THICKNESS (MIL)
10	$\pm 15$	$\pm 1.5$
15	$\pm 15$	$\pm 1.5$
20	$\pm 15$	$\pm 1.5$
25	$\pm 10$	$\pm 1.5$
30	$\pm 10$	$\pm 1.5$
40	$\pm 10$	$\pm 1.5$
50	$\pm 10$	$\pm 1.5$

### MARGIN STYLE CAPACITOR



SQ. SIZE (MIL)	L & W TOLERANCE (MIL)	MARGIN (MIL)	THICKNESS (MIL)
10	$\pm 1.0$	1	$\pm 1.5$
15	+ 1 / -1.5	2	$\pm 1.5$
20	+ 1 / -2.0	2	$\pm 1.5$
25	+ 1 / -2.0	2	$\pm 1.5$
30	+ 1 / -3.0	2	$\pm 1.5$
40	+ 1 / -4.0	2	$\pm 1.5$
50	+ 1 / -5.0	2	$\pm 1.5$

# SINGLE LAYER CAPACITORS

## ORDERING INFO

<b>E P S L 1</b>	<b>-</b>	<b>1 0 x 1 0 x 5</b>	<b>-</b>	<b>2 0 0</b>	<b>-</b>	<b>1 0 1</b>	<b>-</b>	<b>M</b>	<b>-</b>	<b>G</b>
①		②		③		④		⑤		⑥
①		②		③		④		⑤		⑥
<b>CAPACITOR STYLE</b>		<b>SIZE*</b>		<b>MATERIAL</b>		<b>CAPACITANCE†</b>		<b>TOLERANCE</b>		<b>METALLIZATION‡</b>
EPSSL1 = EDGE-TO-EDGE EPSSL2 = MARGIN		LENGTH x WIDTH x THICKNESS (MIL)		(SEE CHART)		EXAMPLE 101 = 100 pF 102 = 1000 pF 0R1 = 0.1 pF		(SEE TOLERANCE TABLE BELOW)		G = GOLD T = TIN  (GOLD ONLY FOR MARGIN STYLE)

\* For rectangular size, first calculate the area of chip with the desired capacitance. Then calculate the needed dimension given that one dimension must not exceed 20 mil. Example: 50 mil sq. chip equates to 2500 mil<sup>2</sup> area. (2500 mil<sup>2</sup> / 20 mil) = 125 mil. The rectangular dimension becomes 20 mil x 125 mil.

† First two digits represent significant digits; the third digit determines the number of zeros to follow. "R" is used in place of a decimal point and the following digits are significant digits.

‡ Tin – 150 µin Tin over non-magnetic nickel; excellent for soldering. Gold – 70 µin Gold over non-magnetic nickel or platinum; excellent for wirebonding.

## TOLERANCE TABLE

TYPE 1 DIELECTRIC		TYPE 2 DIELECTRIC	
± 0.01 pF	P	-20 % thru +80 %	Z
± 0.05 pF	A	-10 % thru +40 %	Y
± 0.10 pF	B	± 20 %	M
± 0.25 pF	C	± 15 %	L
± 0.50 pF	D	± 10 %	K
± 20 %	M	± 5 %	J
± 15 %	L		
± 10 %	K		
± 5 %	J		
± 2 %	G		
± 1 %	F		