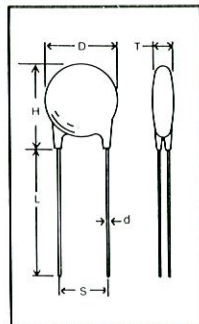


## CLASS II - Semi Stable Ceramic Disk Capacitors

### General

NOTE: Revisions of EIA RS-198 prior to Revision C combined semi-stable and higher-K general purpose ceramic capacitors under the Class II designation. Class II now refers specifically and only to semi-stable ceramic capacitors as defined below. Class III now refers to high-K general purpose capacitors and Class IV has been created for reduced titanate or barrier layer type capacitors which were formerly identified as Class III.



Maida offers standard Class II semi-stable capacitors consistent with the designations of EIA RS-198-C. These ceramic disk capacitors utilize high dielectric constant ( $K > 500$ ) ferroelectric formulations based upon barium titanate. They exhibit markedly non-linear temperature characteristics, significant dependence on voltage and frequency, and predictable logarithmic decay of capacitance with time. This group is characterized by dielectric constants in the range of 500 to 3000, and by capacitance values which vary by  $\pm 15\%$  or less with changes in temperature over the rated temperature range. Maida offers capacitors having temperature characteristic codes of X5F, Z5P, X5P, X5R, and X7R as explained later. These capacitors are suited for by-pass, coupling, and filtering applications where Q and stability of capacitance characteristics are not of major importance. They exhibit predictable changes with time, voltage, and frequency.

### Specifications

#### Capacitance and Dissipation Factor:

Capacitance and dissipation factor shall be measured at a frequency of 1 KHz at 25C with less than 2.0 volts A.C. applied. The maximum dissipation factor shall be 2.5%.

#### Capacitance Tolerances Available:

Tolerance	Code Letter
$\pm 10\%$	K
$\pm 20\%$	M
+80%, -20%	Z
+100%, -0% (GMV)	P

#### Voltage Ratings:

500 VDC - 30 KVDC (see tables)

#### Insulation Resistance:

The insulation resistance shall not be less than 10,000 megohms at 25C when measured between terminals after a 2-minute charge at 100 volts D.C. with the charging current limited to 50 milliamperes.

#### Dielectric Withstand Voltage:

After applying twice rated D.C. voltage for  $5 \pm 1$  seconds, capacitors shall meet the original requirements.

#### Temperature Characteristics Available:

A 3-digit code per EIA RS-198-C is used. The first letter denotes the lower temperature limit. A number then designates the upper temperature limit. A last letter defines the maximum variation of capacitance over this range using the +25C value as the reference.

1st Letter	Number	Last Letter
X = -55 C	5 = +85C	F = $\pm 7.5\%$
Y = -30C	7 = +125C	P = $\pm 10\%$
Z = +10C		R = $\pm 15\%$

#### Temperature Ratings:

Class II capacitors are designed to operate within the temperature limits indicated by the EIA code. Storage temperatures may vary from -55C to +125C without affecting ratings.

#### Life Test:

Capacitors shall withstand a potential of 1.5 times the rated D.C. voltage for a period of 1000 hours at 85C. When tested 24 hours after the completion of the test, the capacitance change shall be no more than 10%; the maximum D.F. shall be 5.0%; and the minimum I.R. shall be 1000 megohms.

#### Humidity Resistance:

After exposure to a relative humidity of 95% for 100 hours at 40C, capacitors shall have a minimum I.R. of 1000 megohms and a D.F. of 5.0% maximum.

### Construction

#### Coating Materials:

Maida's standard disk capacitors are conformally coated either with a dry-process fluid-bed epoxy or with a baked-on phenolic coating applied by a wet-dip method. Diameter and thickness dimensions shown in the tables are for the epoxy-coated units. These sizes are typically 1/32 inch (.031) in diameter larger than for phenolic-coated capacitors of identical values. Each coating is flame retardant.

#### Coating Control on Leads:

Straight leads - the coating will not extend more than 1/8" onto the leads as measured from a tangent line drawn to the bottom of the disk.

Formed leads - the coating will not extend below that kink which defines the "seating plane" of the capacitor.

#### Lead Wires:

Material - Standard leads are tin-plated copper, either 22 AWG or 20 AWG. All capacitors which are both smaller than 1/2" maximum diameter and rated below 8 KVDC use 22 AWG. All others have 20 AWG.

Configuration - Standard leads are straight and long (1" minimum). Cut and/or formed leads are available. See page 25 for some of the many lead forms available.

Lead Spacing - On standard capacitors, nominal lead spacing is determined primarily by disk diameter. See capacitance tables. Other lead spacings are available on request.

### Marking

Laser marking and ink-stamp marking methods are used. All units shall be marked with "MDC", rated capacitance, capacitance tolerance, temperature characteristic code, and rated voltage. 500-volt capacitors shall have no voltage marking. On smaller units where space is limited the "MDC" may be omitted. Date coding is available.

### How To Order

Standard disk capacitors from the following tables should be ordered by Maida Style Number according to the following format:

D64X5R Style	102 Capacitance Code	M Tolerance Code	10KV DC Voltage
from first column of table	3 digits-2 are significant figures, last is a multiplier.	K= $\pm 10\%$ M= $\pm 20\%$ P= $\pm 100\%$ , -0% (GMV)	from table  (omit for 500V ratings.)
Phenolic coating available for voltages 2KV and less.	multipliers 0 = $\times 1$ 1 = $\times 10$ 2 = $\times 100$ 3 = $\times 1000$ 9 = $\times 0.1$		
Omit leading "D" in style number.			

## CLASS II – Semi Stable Ceramic Disk Capacitors

### Maximum Capacitance Available (pF) - X5F Temperature Coefficient

STYLE	D MAX	L.S.	500V	1KV	2KV	3KV	4KV	5KV	6KV	8KV	9KV	10KV	12KV	15KV	18KV	20KV	22KV	25KV	30KV
MAX. THICKNESS			.160	.170	.200	.220	.240	.260	.280	.320	.340	.360	.400	.460	.520	.560	*	*	*
D59X5F	.282	.200	200	150	110	75	56	43	33										
D58X5F	.312	.200	300	200	150	110	82	62	51										
D60X5F	.344	.250	430	270	220	150	110	91	75										
D73X5F	.375	.250	560	360	300	200	150	120	100										
D68X5F	.407	.250	680	470	360	270	200	150	130	110	100	91	75	56	47	43			
D61X5F	.469	.300	1000	750	560	390	300	240	200	150	150	120	100	82	68	62	56	47	30
D71X5F	.532	.375	1500	1000	750	510	430	330	270	220	180	180	150	110	91	82	75	68	51
D62X5F	.594	.375	2000	1300	1000	680	560	430	360	270	240	220	180	150	120	110	100	91	75
D69X5F	.656	.500	2700	1800	1300	910	680	560	470	360	300	270	240	180	150	150	130	110	91
D64X5F	.720	.500	3300	2200	1600	1100	910	680	560	430	390	330	300	220	200	180	150	150	110
D63X5F	.782	.500	3900	2700	2000	1500	1000	820	680	510	470	430	360	270	240	200	200	160	150
D67X5F	.844	.500	4700	3300	2400	1600	1200	1000	820	620	560	510	430	330	270	240	220	200	160
D65X5F	.906	.500	5100	3600	3000	2000	1500	1200	1000	750	620	560	470	390	330	300	270	240	200
D76X5F	.969	.500	5600	4300	3300	2200	1800	1300	1100	820	750	680	560	430	360	330	300	270	220
D66X5F	1.100	.500	→	5600	4300	3000	2200	1800	1500	1100	1000	910	750	620	470	430	390	360	300
D70X5F	1.350	.500	→	9100	6800	4700	3300	2700	2200	1800	1500	1500	1100	910	750	680	620	560	470

\*Various encapsulation available, contact our Engineering Department.

### Maximum Capacitance Available (pF) - Z5P Temperature Coefficient

STYLE	D MAX	L.S.	500V	1KV	2KV	3KV	4KV	5KV	6KV	8KV	9KV	10KV	12KV	15KV	18KV	20KV	22KV	25KV	30KV
MAX. THICKNESS			.170	.190	.220	.250	.260	.310	.340	.400	.430	.460	.520	.610	.710	.770	*	*	*
D59Z5P	.282	.200	390	270	150	91	68	47	36										
D58Z5P	.312	.200	620	430	220	150	100	82	62										
D60Z5P	.344	.250	820	560	300	200	150	120	91										
D73Z5P	.375	.250	1100	750	390	270	200	160	130										
D68Z5P	.407	.250	1500	910	510	330	270	200	180	150	130	110	91	68	39	27			
D61Z5P	.469	.300	2000	1500	750	510	390	330	270	200	180	160	150	110	75	62	43	24	
D71Z5P	.532	.375	3000	2000	1100	750	560	430	360	270	240	220	180	150	120	100	82	56	24
D62Z5P	.594	.375	3900	2700	1500	1000	750	560	470	360	330	300	240	200	160	150	120	91	56
D69Z5P	.656	.500	5100	3300	1800	1200	910	750	620	470	430	360	300	240	200	180	160	150	91
D64Z5P	.720	.500	6200	4300	2200	1500	1100	910	750	560	510	470	390	300	270	220	200	180	130
D63Z5P	.782	.500	7500	5100	2700	1800	1500	1100	910	680	620	560	470	360	300	270	240	220	180
D67Z5P	.844	.500	9100	6200	3300	2200	1600	1300	1100	820	750	680	560	430	360	330	300	270	220
D65Z5P	.906	.500	10000	7500	3900	2700	2000	1500	1300	1000	820	750	620	510	430	390	360	300	270
D76Z5P	.969	.500	12000	9100	4300	3000	1220	1800	1500	1100	1000	910	750	620	510	430	390	360	300
D66Z5P	1.100	.500	→	11000	5600	3900	2300	2400	2000	1500	1300	1200	1000	750	620	560	510	470	390
D70Z5P	1.350	.500	→	18000	9100	6200	4700	3600	3000	2200	2000	1800	1500	1200	1000	910	820	750	620

\*Various encapsulation available, contact our Engineering Department

## CLASS II - Semi Stable Ceramic Disk Capacitors

### Maximum Capacitance Available (pF) - X5P Temperature Coefficient

STYLE	D MAX	L.S.	500V	1KV	2KV	3KV	4KV	5KV	6KV	8KV	9KV	10KV	12KV	15KV	18KV	20KV	22KV	25KV	30KV
MAX. THICKNESS			.160	.170	.200	.220	.240	.260	.280	.320	.340	.360	.400	.460	.520	.560	*	*	*
D59X5P	.282	.200	330	240	180	120	91	68	56										
D58X5P	.312	.200	510	360	270	180	150	110	91										
D60X5P	.344	.250	680	470	360	270	200	150	130										
D73X5P	.375	.250	910	620	470	330	270	200	180										
D68X5P	.407	.250	1200	820	620	430	330	270	220	180	160	150	120	100	82	75			
D61X5P	.469	.300	1800	1200	910	620	510	390	330	270	240	220	180	150	120	110	100	82	51
D71X5P	.532	.375	2400	1800	1300	910	680	560	470	360	330	300	240	200	160	150	130	110	91
D62X5P	.594	.375	3300	2200	1800	1200	910	750	620	470	430	360	300	240	200	180	180	150	120
D69X5P	.656	.500	4300	3000	2200	1500	1200	910	820	620	510	470	390	330	270	240	220	200	160
D64X5P	.720	.500	5600	3600	2700	2000	1500	1200	1000	750	680	560	470	390	330	300	270	240	200
D63X5P	.782	.500	6800	4300	3300	2400	1800	1500	1200	910	820	680	620	470	390	360	330	300	240
D67X5P	.844	.500	7500	5600	3900	2700	2200	1800	1500	1100	910	820	680	560	470	430	390	330	270
D65X5P	.906	.500	8200	6200	4700	3300	2400	2000	1600	1200	1100	1000	820	680	560	510	430	390	330
D76X5P	.969	.500	10000	7500	5600	3900	3000	2200	2000	1500	1300	1100	1000	750	620	560	510	470	390
D66X5P	1.100	.500	→	10000	7500	5100	3600	3000	2400	1800	1600	1500	1200	1000	820	750	680	620	510
D70X5P	1.350	.500	→	15000	12000	7500	5600	4700	3900	3000	2700	2400	2000	1500	1300	1200	1100	910	750

\*Various encapsulation available, contact our Engineering Department.

### Maximum Capacitance Available (pF) - X7R Temperature Coefficient

STYLE	D MAX	L.S.	500V	1KV	2KV	3KV	4KV	5KV	6KV	8KV	9KV	10KV	12KV	15KV	18KV	20KV	22KV	25KV	30KV
MAX. THICKNESS			.160	.170	.200	.220	.240	.260	.280	.320	.340	.360	.400	.460	.520	.560	*	*	*
D59X7R	.282	.200	430	300	240	160	120	91	75										
D58X7R	.312	.200	680	430	330	240	180	150	120										
D60X7R	.344	.250	910	620	470	330	240	200	160										
D73X7R	.375	.250	1200	820	620	430	330	270	220										
D68X7R	.407	.250	1500	1000	820	560	430	330	300	240	220	200	160	130	110	91			
D61X7R	.469	.300	2200	1600	1200	820	620	510	430	330	300	270	220	180	150	150	120	100	68
D71X7R	.532	.375	3300	2200	1800	1200	910	750	620	470	430	360	300	240	200	180	180	150	110
D62X7R	.594	.375	4300	3000	2200	1500	1200	1000	820	620	560	470	390	330	270	240	220	200	160
D69X7R	.656	.500	5600	3900	3000	2000	1500	1200	1000	750	680	620	510	430	330	300	270	240	200
D64X7R	.720	.500	6800	4700	3600	2400	2000	1500	1300	910	820	750	620	510	430	390	330	300	270
D63X7R	.782	.500	8200	5600	4300	3000	2200	1800	1500	1100	1000	910	750	620	510	470	430	360	300
D67X7R	.844	.500	10000	6800	5100	3600	2700	2200	1800	1500	1200	1100	910	740	620	560	510	430	360
D65X7R	.906	.500	11000	8200	6200	4300	3300	2700	2200	1600	1500	1300	1100	820	680	620	560	510	430
D76X7R	.969	.500	13000	9100	7500	5100	3600	3000	2400	1800	1600	1500	1200	1000	820	750	680	620	510
D66X7R	1.100	.500	→	12000	10000	6200	4700	3900	3300	2400	2200	2000	1600	1300	1100	1000	910	750	620
D70X7R	1.350	.500	→	20000	15000	10000	7500	6200	5100	3900	3300	3000	2700	2000	1800	1500	1500	1200	1000

\*Various encapsulation available, contact our Engineering Department.

# CLASS II - Semi Stable Ceramic Disk Capacitors

## Maximum Capacitance Available (pF) - X5R Temperature Coefficient

STYLE	D MAX	L.S.	500V	1KV	2KV	3KV	4KV	5KV	6KV	8KV	9KV	10KV	12KV	15KV	18KV	20KV	22KV	25KV	30KV
MAX. THICKNESS			.160	.170	.200	.220	.240	.260	.280	.320	.340	.360	.400	.460	.520	.560	*	*	*
D59X5R	.282	.200	620	430	330	220	160	120	100										
D58X5R	.312	.200	910	620	570	330	240	200	160										
D60X5R	.344	.250	1200	820	680	430	330	270	220										
D73X5R	.375	.250	1600	1100	910	620	470	360	300										
D68X5R	.407	.250	2000	1500	1100	750	560	470	390	330	300	270	220	180	150	130			
D61X5R	.469	.300	3000	2200	1600	1100	910	750	620	470	430	360	300	240	200	180	180	150	91
D71X5R	.532	.375	4300	3000	2400	1600	1200	1000	820	620	560	510	430	330	270	270	220	200	150
D62X5R	.594	.375	5600	3900	3000	2200	1600	1300	1100	820	750	680	560	430	360	330	300	270	220
D69X5R	.656	.500	7500	5100	3900	2700	2000	1600	1500	1000	910	820	680	560	470	430	390	330	270
D64X5R	.720	.500	9100	6200	5100	3300	2700	2000	1800	1300	1100	1000	910	680	560	510	470	430	330
D63X5R	.782	.500	12000	8200	6200	4300	3000	2400	2000	1500	1500	1200	1000	820	680	620	560	510	430
D67X5R	.844	.500	15000	9100	7500	5100	3600	3000	2400	1800	1600	1500	1200	1000	820	750	680	620	510
D65X5R	.906	.500	15000	11000	8200	5600	4300	3600	3000	2200	2000	1800	1500	1200	1000	910	820	680	560
D76X5R	.969	.500	18000	13000	10000	6800	5100	3900	3300	2700	2200	2000	1800	1300	1100	1000	910	820	680
D66X5R	1.100	.500	→	18000	13000	9100	6800	5100	4300	3300	3000	2700	2200	1800	1500	1300	1200	1100	910
D70X5R	1.350	.500	→	27000	20000	15000	10000	8200	6800	5100	4700	4300	3300	2700	2200	2000	1800	1600	1500

\*Various encapsulation available, contact our Engineering Department.

