

# SEMTECH INDUSTRIAL HIGH VOLTAGE CAPACITORS MONOLITHIC CERAMIC TYPE

Semtech's Industrial Capacitors employ a new body design for cost efficient, volume manufacturing. This capacitor body design also expands our voltage capability to 10 KV and our capacitance range to .47 $\mu$ F. If your requirement exceeds our single device ratings, Semtech can build a custom capacitor assembly to reach the values you need.

- X7R AND NPO DIELECTRICS • 100 pF TO .47 $\mu$ F CAPACITANCE RANGE • 1 TO 10 KV VOLTAGE RANGE
- 14 CHIP SIZES

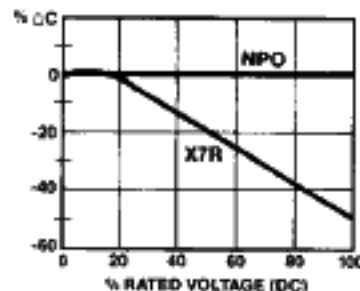
## CAPABILITY MATRIX

Size	Bias Voltage (Note 2)	Dielectric Type	Maximum Capacitance—EIA Code (Note 1)												
			1 KV	2 KV	3 KV	4 KV	5 KV	6 KV	7 KV	8 KV	9 KV	10 KV			
1515	—	NPO	102	561	271	181	121								
	VDCW	X7R	562	222	102	471	271								
	0	X7R	123	472	222	821	561								
2020	—	NPO	182	122	561	331	221	181							
	VDCW	X7R	103	472	182	681	471	271							
	0	X7R	223	103	392	152	102	561							
2520	—	NPO	222	152	681	391	271	221	101						
	VDCW	X7R	153	682	222	821	561	331	181						
	0	X7R	333	123	472	182	122	681	391						
3333	—	NPO	682	472	222	122	821	561	271						
	VDCW	X7R	473	153	562	272	182	102	561						
	0	X7R	104	333	123	562	392	222	122						
3530	—	NPO	562	392	182	102	681	471	221						
	VDCW	X7R	393	153	562	272	182	102	561						
	0	X7R	823	333	123	562	392	222	122						
4020	—	NPO	152	102	821	681	391	331	271	181	121	101			
	VDCW	X7R	123	562	272	122	821	681	471	391	391	331			
	0	X7R	223	123	562	272	182	152	102	821	681	561			
4040	—	NPO	103	682	332	222	122	102	391	331					
	VDCW	X7R	563	273	103	392	272	182	471	471					
	0	X7R	124	563	223	822	562	392	182	102					
4540	—	NPO	123	822	332	222	152	122	471	331					
	VDCW	X7R	683	333	123	472	332	222	102	561					
	0	X7R	154	683	273	103	682	472	222	122					
5040	—	NPO	182	122	102	681	471	391	271	221	151	121			
	VDCW	X7R	153	682	332	152	102	821	561	471	391	391			
	0	X7R	273	153	682	332	222	182	122	102	821	681			
5440	—	NPO	153	103	472	272	182	122	561	391					
	VDCW	X7R	104	333	153	562	392	272	122	681					
	0	X7R	224	683	333	123	822	562	272	152					
5550	—	NPO	183	123	562	332	222	152	681	561					
	VDCW	X7R	124	393	183	682	472	332	152	821					
	0	X7R	274	823	393	153	103	682	332	182					
6560	—	NPO	273	183	822	562	332	272	122	821					
	VDCW	X7R	184	563	273	103	682	472	272	122					
	0	X7R	394	124	563	223	153	103	562	272					
6666	—	NPO	123	682	562	472	272	222	152	122	102	681			
	VDCW	X7R	823	473	183	822	682	472	332	272	182	122			
	0	X7R	154	104	393	183	153	103	682	562	392	272			
7565	—	NPO	333	223	103	682	392	332	152	102					
	VDCW	X7R	224	683	333	123	822	562	332	152					
	0	X7R	474	154	683	273	183	123	682	332					

NOTES: 1. EIA Capacitance Code: Value in Picofarads; two significant figures followed by number of zeros: 562 = 5600 pf, 273 = 27000 pf (.027 mfd).  
 2. • Class I Dielectric (NPO) has zero voltage coefficient. Values shown are at 0 volt bias, or at working volts (VDCW).  
 • Class II Dielectric (X7R) has voltage coefficient, and values derate at VDCW by up to 50% of value at 0 volt bias. Capacitance @ VDCW is function of design of unit and may vary.



## INDUSTRIAL CAPACITOR DC VOLTAGE COEFFICIENTS



## GENERAL SPECIFICATIONS

- **OPERATING TEMPERATURE RANGE**  
-55° C to 125° C
- **TEMPERATURE COEFFICIENT**  
NPO:  $\pm 30$  ppm/°C  
X7R:  $\pm 15\%$   $\Delta$ C Max.
- **DISSIPATION FACTOR**  
NPO: 0.1% Max, 0.02% typical  
X7R: 2.5% Max, 1.5% typical
- **INSULATION RESISTANCE**  
@ 25° C, 1.0 KV: >100G $\Omega$  or 1000 $\Omega$ F, whichever is less  
@ 125° C, 1.0 KV: >10G $\Omega$  or 100 $\Omega$ F, whichever is less
- **DIELECTRIC WITHSTANDING VOLTAGE**  
1.2  $\times$  VDCW Min, 50 m-amp Max, 5 seconds
- **AGING RATE**  
NPO: 0% per decade hour  
X7R: <2.0% per decade hour
- **TEST PARAMETERS**  
1 KHz, 1.0 VRMS  $\pm$  0.2 VRMS, 25° C  
0 Volts

# SEMTECH INDUSTRIAL HIGH VOLTAGE CAPACITORS MONOLITHIC CERAMIC TYPE (cont.)

## CHIP DIMENSIONS

Size	(Nom.) Len. In. (mm)	(Nom.) Wid. In. (mm)	T (Max) In. (mm)
1515	.150±.015 (3.81±.38)	.150±.015 (3.81±.38)	.120 (3.05)
2020	.200±.020 (5.08±.51)	.200±.020 (5.08±.51)	.120 (3.05)
2520	.230±.023 (5.84±.58)	.190±.019 (4.82±.48)	.120 (3.05)
3333	.330±.033 (8.38±.84)	.330±.033 (8.38±.84)	.150 (3.81)
3530	.350±.035 (8.89±.89)	.300±.030 (7.62±.76)	.150 (3.81)
4020	.400±.040 (10.2±1.0)	.200±.020 (5.08±.51)	.150 (3.81)
4040	.400±.040 (10.2±1.0)	.400±.040 (10.2±1.0)	.150 (3.81)
4540	.450±.045 (11.4±1.1)	.400±.040 (10.2±1.0)	.150 (3.81)
5040	.460±.046 (11.7±1.2)	.380±.038 (9.65±.97)	.150 (3.81)
5440	.540±.054 (13.7±1.4)	.400±.040 (10.2±1.0)	.150 (3.81)
5550	.550±.055 (14.0±1.4)	.500±.050 (12.7±1.3)	.150 (3.81)
6560	.650±.065 (16.5±1.7)	.600±.060 (15.2±1.5)	.175 (4.45)
6666	.660±.066 (16.8±1.7)	.660±.066 (16.8±1.7)	.175 (4.45)
7565	.750±.075 (19.0±1.9)	.650±.065 (16.5±1.7)	.175 (4.45)

## ENCAPSULATED DIMENSIONS

Size	Len. (Max) In. (mm)	Wid. (Max) In. (mm)	T (Max) In. (mm)	S In. (mm)
1515	.300 (7.62)	.300 (7.62)	.220 (5.59)	.180±.03 (4.57±.46)
2020	.350 (8.89)	.350 (8.89)	.220 (5.59)	.230±.03 (5.84±.58)
2520	.380 (9.65)	.340 (8.64)	.220 (5.59)	.260±.03 (6.60±.66)
3333	.480 (12.2)	.480 (12.2)	.250 (6.35)	.360±.033 (9.14±.91)
3530	.500 (12.7)	.450 (11.4)	.250 (6.35)	.380±.035 (9.65±.97)
4020	.550 (13.97)	.350 (8.89)	.250 (6.35)	.430±.040 (10.9±1.1)
4040	.550 (13.97)	.550 (13.97)	.250 (6.35)	.430±.040 (10.9±1.1)
4540	.600 (15.24)	.550 (13.97)	.250 (6.35)	.480±.045 (12.2±1.2)
5040	.610 (15.49)	.530 (12.46)	.250 (6.35)	.490±.046 (12.4±1.2)
5440	.690 (17.53)	.550 (13.97)	.250 (6.35)	.570±.054 (14.5±1.4)
5550	.700 (17.78)	.650 (16.51)	.250 (6.35)	.580±.058 (14.7±1.5)
6560	.800 (20.32)	.750 (19.05)	.275 (6.99)	.680±.065 (17.3±1.7)
6666	.810 (20.57)	.810 (20.57)	.275 (6.99)	.690±.066 (17.5±1.8)
7565	.900 (22.86)	.800 (20.32)	.275 (6.99)	.780±.075 (19.8±2)

## ORDERING INSTRUCTIONS

2020	A	X	103	K	2
PART SIZE CODE	FORM	DIELECTRIC MATERIAL	CAPACITANCE (EIA CODE)	CAPACITANCE TOLERANCE	VOLTAGE RATING
1515	CHIP	X=X7R	Last digit	J=5%	1 KV
2020	A=Silver		indicates number	K=10%	2 KV
"	Termination	N=NPO	of zeroes	M=20%	"
"	D=Palladium /		following the first	Z=+80%-20%	"
7565	Silver		two digits.		10 KV
	Termination		Ex. 103=10000 pF		
	<b>LEADED</b>				
	E=Epoxy				
	Encapsulated				
	L=Leaded Only				