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 .47μF. If your requirement exceeds our single device ratings, Semtech can build a custom capacitor assembly to reach the values you need.

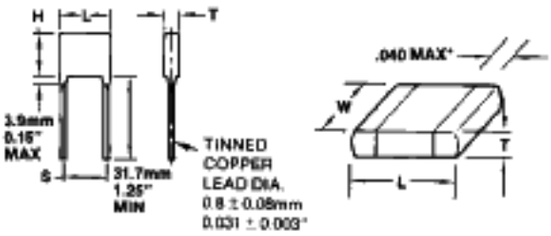
- **X7R AND NPO DIELECTRICS**
- **100 pF TO .47μF CAPACITANCE RANGE**
- **1 TO 10 KV VOLTAGE RANGE**
- **14 CHIP SIZES**

CAPABILITY MATRIX

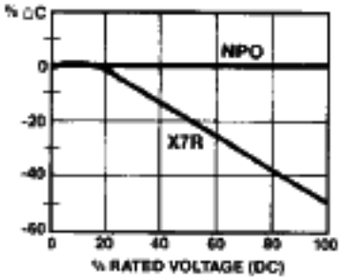
Size	Bias Voltage (Note 2)	Dielectric Type	Maximum Capacitance—EIA Code (Note 1)									
			1 KV	2 KV	3 KV	4 KV	5 KV	6 KV	7 KV	8 KV	9 KV	10 KV
1515	—	NPO	102	561	271	181	121					
	VDCW	X7R	562	222	102	471	271					
	0	X7R	123	472	222	821	561					
2020	—	NPO	182	122	561	331	221	181				
	VDCW	X7R	103	472	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: ±30 ppm/°C
  X7R: ±15% ΔC Max.
- **DISSIPATION FACTOR**
  NPO: 0.1% Max, 0.02% typical
  X7R: 2.5% Max, 1.5% typical
- **INSULATION RESISTANCE**
  @ 25°C, 1.0 KV: >100GΩ or 1000ΩF, whichever is less
  @ 125°C, 1.0 KV: >10GΩ or 100ΩF, whichever is less
- **DIELECTRIC WITHSTANDING VOLTAGE**
  1.2 × 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±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 2020 " " 7565	**CHIP** A=Silver Termination D=Palladium / Silver Termination **LEADED** E=Epoxy Encapsulated L=Leaded Only	X=X7R N=NPO	Last digit indicates number of zeroes following the first two digits. Ex. 103=10000 pF	J=5% K=10% M=20% Z=+80%-20%	1 KV 2 KV " " 10 KV

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