

# Miniature Aluminum Electrolytic Capacitors

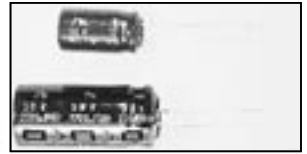
NRSX Series

VERY LOW IMPEDANCE AT HIGH FREQUENCY, RADIAL LEADS,  
POLARIZED ALUMINUM ELECTROLYTIC CAPACITORS

**RoHS  
Compliant**

includes all homogeneous materials

\*See Part Number System for Details



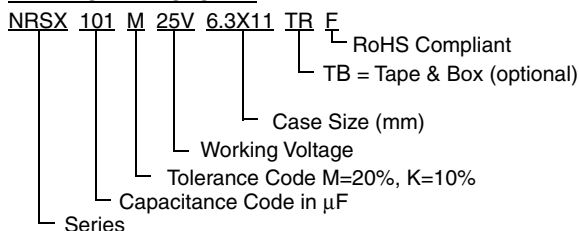
## FEATURES

- VERY LOW IMPEDANCE
- LONG LIFE AT 105°C (1000 ~ 7000 hrs.)
- HIGH STABILITY AT LOW TEMPERATURE
- IDEALLY SUITED FOR USE IN SWITCHING POWER SUPPLIES & CONVERTORS

## CHARACTERISTICS

Rated Voltage Range		6.3 ~ 50 VDC					
Capacitance Range		1.0 ~ 15,000 $\mu$ F					
Operating Temperature Range		-55 ~ +105°C					
Capacitance Tolerance		$\pm$ 20% (M)					
Max. Leakage Current @ (20°C)	After 1 min.	0.03CV or 4 $\mu$ A, whichever if greater					
	After 2 min.	0.01CV or 3 $\mu$ A, whichever if greater					
Max. Tan $\delta$ @ 120Hz/20°C	W.V. (Vdc)	6.3	10	16	25	35	50
	S.V. (Vdc)	8	13	20	32	44	63
	C < 1,200 $\mu$ F	0.22	0.19	0.16	0.14	0.12	0.10
	C = 1,500 $\mu$ F	0.23	0.20	0.17	0.15	0.13	0.11
	C = 1,800 $\mu$ F	0.23	0.20	0.17	0.15	0.13	0.11
	C = 2,200 $\mu$ F	0.24	0.21	0.18	0.16	0.14	0.12
	C = 2,700 $\mu$ F	0.25	0.22	0.19	0.17	0.15	
	C = 3,300 $\mu$ F	0.26	0.23	0.20	0.18	0.16	
	C = 3,900 $\mu$ F	0.27	0.24	0.21	0.19		
	C = 4,700 $\mu$ F	0.28	0.25	0.22	0.20		
	C = 5,600 $\mu$ F	0.30	0.27	0.24			
	C = 6,800 $\mu$ F	0.32	0.29	0.26			
	C = 8,200 $\mu$ F	0.35	0.32	0.29			
	C = 10,000 $\mu$ F	0.38	0.35				
	C = 12,000 $\mu$ F	0.42					
C = 15,000 $\mu$ F	0.48						
Low Temperature Stability Impedance Ratio @ 120Hz	Z-25°C/Z+20°C	3	2	2	2	2	2
	Z-40°C/Z+20°C	4	4	3	3	3	2
Load Life Test at Rated W.V. & 105°C 7,000 Hours: 16 ~ 18 $\emptyset$ 5,000 Hours: 12.5 $\emptyset$ 4,000 Hours: 10 $\emptyset$ 3,000 Hours: 6.3 ~ 8 $\emptyset$ 2,500 Hours: 5 $\emptyset$ 1,000 Hours: 4 $\emptyset$	Capacitance Change	Within $\pm$ 20% of initial measured value					
	Tan $\delta$	Less than 200% of specified maximum value					
	Leakage Current	Less than specified maximum value					
Shelf Life Test 105°C 1,000 Hours No Load	Capacitance Change	Within $\pm$ 20% of initial measured value					
	Tan $\delta$	Less than 200% of specified maximum value					
	Leakage Current	Less than specified maximum value					
Max. Impedance at 100Khz & -20°C	Less than 2 times the impedance at 100Khz & +20°C						
Applicable Standards	JIS C5141, C5102 and IEC 384-4						

### PART NUMBER SYSTEM



### RIPPLE CURRENT CORRECTION FACTOR

Cap. ( $\mu$ F)	Frequency (Hz)			
	120	1K	10K	100K
1.0 ~ 330	0.40	0.68	0.78	1.00
390 ~ 1000	0.50	0.76	0.87	1.00
1200 ~ 2200	0.70	0.85	0.90	1.00
2700 ~ 15000	0.90	0.95	1.00	1.00

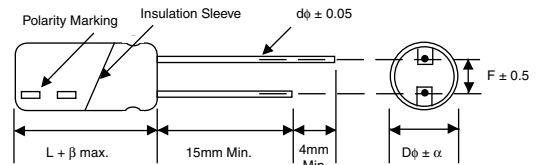


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NRSX Series

## LEADSPACING AND DIAMETER (mm)

Case Dia.	4x7	5x7	6.3x7	5x11	6.3x11	8φ	10 ~ 12.5φ	16 ~ 18φ
Lead Space(F)	1.5	2.0	2.5	2.0	2.5	3.5	5.0	7.5
Lead Dia. (dφ)	0.45		0.5		0.6		0.8	



$$\beta = 1.5 L < 20 \text{ or } 2.0 L \geq 20$$

SLEEVE COLOR: DARK BROWN

## STANDARD PRODUCTS, CASE SIZES AND SPECIFICATIONS

W.V. (Vdc)	Cap.		Case Size Dφ x L(mm)	Lead Space (mm)	Max. Tan δ at 120Hz	Max. LC (μA) 2 minutes	Max. Z(Ω) 100Khz/20°C	Max. Ripple Current 100Khz/105°C (mA rms)
	(μF)	Code						
6.3	27	270	4 x 7	1.5	0.22	3.0	2.0	65
	56	560	5 x 7	2.0	0.22	3.5	0.95	120
	100	101	5 x 11	2.0	0.22	6.3	0.42	190
	120	121	6.3 x 7	2.5	0.22	7.5	0.45	200
	220	221	6.3 x 11	2.5	0.22	13.9	0.22	300
	270	271	6.3 x 11	2.5	0.22	17.0	0.22	300
	330	331	6.3 x 11	2.5	0.22	20.8	0.30	280
	390	391	8 x 11.5	3.5	0.22	24.6	0.11	560
	470	471	8 x 11.5	3.5	0.22	29.6	0.11	560
	560	561	8 x 12.5	3.5	0.22	35.3	0.11	570
	820	821	8 x 15	3.5	0.22	51.7	.085	730
			10 x 12.5	5.0				800
	1200	122	8 x 20	3.5	0.22	75.6	.069	800
			10 x 16	5.0				1050
	1500	152	10 x 20	5.0	0.23	94.5	.044	1250
			12.5 x 16					.062
	1800	182	10 x 22	5.0	0.23	113	.039	
	2200	222	10 x 22	5.0	0.24	139	.039	1450
	2700	272	12.5 x 20	5.0	0.25	170	.038	1600
	3300	332	12.5 x 20	5.0	0.26	208	.038	1600
3900	392	12.5 x 25	5.0	0.27	246	.029	1800	
5600	562	12.5 x 25	5.0	0.30	353	.031	1780	
6800	682	16 x 25	7.5	0.32	428	.022	2100	
8200	822	16 x 31.5	7.5	0.35	517	.018	2350	
10000	103	16 x 35	7.5	0.38	630	.018	2550	
12000	123	18 x 35.5	7.5	0.42	756	.015	3200	
15000	153	18 x 35.5	7.5	0.48	945	.015	3200	
10	22	220	4 x 7	1.5	0.19	3.0	1.15	90
	39	390	5 x 7	2.0	0.19	3.9	.49	160
	82	820	5 x 11	2.0	0.19	8.2	.42	190
			6.3 x 7	2.5				280
	100	101	5 x 11	2.0	0.19	10	.42	190
	150	151	6.3 x 11	2.5	0.19	15	.22	300
	180	181	6.3 x 11	2.5	0.19	18	.22	300
	220	221	6.3 x 11	2.5	0.19	22	.22	300
330	331	8 x 11.5	3.5	0.19	33	.11	560	

### STANDARD PRODUCTS, CASE SIZES AND SPECIFICATIONS

W.V. (Vdc)	Cap.		Case Size D $\phi$ x L(mm)	Lead Space (mm)	Max. Tan $\delta$ at 120Hz	Max. LC ( $\mu$ A) 2 minutes	Max. Z ( $\Omega$ ) 100KHz/20°C	Max. Ripple Current 100KHz/105°C (mA rms)
	( $\mu$ F)	Code						
10	390	391	8 x 12.5	3.5	0.19	39	.11	570
	470	471	8 x 12.5	3.5	0.19	47	.16	410
	560	561	10 x 12.5	5.0	0.19	56	.085	800
	680	681	8 x 15	3.5	0.19	68	.085	730
			10 x 12.5	5.0			.09	800
	820	821	10 x 16	5.0	0.19	82	.062	1050
	1000	102	8 x 20	3.5	0.19	100	.069	800
			10 x 16	5.0			.062	1050
	1200	122	10 x 20	5.0	0.19	120	.044	1250
			12.5 x 16				.063	1150
	1500	152	10 x 22	5.0	0.20	150	.039	1450
	1800	182	12.5 x 20	5.0	0.20	180	.038	1600
	2200	222	12.5 x 20	5.0	0.21	220	.038	1600
	2700	272	12.5 x 25	5.0	0.22	270	.029	1800
	3300	332	12.5 x 25	5.0	0.23	330	.029	1880
	3900	392	16 x 25	7.5	0.24	390	.022	2100
	4700	472	16 x 25	7.5	0.25	470	.022	2100
5600	562	16 x 25	7.5	0.27	560	.022	2100	
6800	682	16 x 31.5	7.5	0.29	680	.018	2350	
8200	822	16 x 35	7.5	0.35	820	.018	2550	
10000	103	18 x 35.5	7.5	0.35	1000	.018	2800	
16	15	150	4 x 7	1.5	0.16	3	1.15	90
	27	270	5 x 7	2.0	0.16	4.3	.49	160
	47	470	5 x 11	2.0	0.16	7.5	.42	190
	56	560	5 x 11	2.0	0.16	9.0	.42	190
			6.3 x 7			2.5	.49	280
	68	680	5 x 11	2.0	0.16	10.9	.42	190
	100	101	6.3 x 11	2.5	0.16	16	.22	300
	120	121	6.3 x 11	2.5	0.16	19	.22	300
	220	221	8 x 11.5	3.5	0.16	35	.11	560
	270	271	8 x 12.5	3.5	0.16	43	.11	570
	330	331	8 x 12.5	3.5	0.16	53	.16	410
	390	391	10 x 12.5	5.0	0.16	62	.085	800
	470	471	8 x 15	3.5	0.16	75	.085	730
			10 x 12.5	5.0				800
560	561	10 x 16	5.0	0.16	90	.062	1050	

### STANDARD PRODUCTS, CASE SIZES AND SPECIFICATIONS

W.V. (Vdc)	Cap.		Case Size D $\phi$ x L(mm)	Lead Space (mm)	Max. Tan $\delta$ at 120Hz	Max. LC ( $\mu$ A) 2 minutes	Max. Z ( $\Omega$ ) 100Khz/20°C	Max. Ripple Current 100Khz/105°C (mA rms)
	( $\mu$ F)	Code						
16	680	681	8 x 20	3.5	0.16	109	.069	800
			10 x 16	5.0				1050
	820	821	10 x 20	5.0	0.16	131	.044	1250
			12.5 x 16					.063
	1000	102	10 x 22	5.0	0.16	160	.039	1450
	1200	122	10 x 22	5.0	0.16	192	.039	1450
	1500	152	12.5 x 20	5.0	0.17	240	.038	1600
	1800	182	12.5 x 25	5.0	0.17	288	.029	1800
	2200	222	12.5 x 25	5.0	0.18	352	.022	1800
			16 x 25	7.5				2100
	2700	272	12.5 x 30	5.0	0.17	432	.025	2310
			16 x 25	7.5	0.19	432	.022	2100
	3900	392	16 x 25	7.5	0.21	624	.022	2100
	4700	472	16 x 31.5	7.5	0.22	752	.018	2350
	5600	562	16 x 35	7.5	0.24	896	.018	2550
6800	682	16 x 35	7.5	0.26	1088	.018	2550	
8200	822	18 x 35.5	7.5	0.29	1310	.018	2800	
25	10	100	4 x 7	1.5	0.14	3.0	1.15	90
	22	220	5 x 7	2.0	0.14	5.5	.49	160
	39	390	5 x 11	2.0	0.14	9.8	.42	190
			6.3 x 7	2.5				.24
	47	470	5 x 11	2.0	0.14	12	.42	190
	82	820	6.3 x 11	2.5	0.14	21	.22	300
	100	101	6.3 x 11	2.5	0.14	25	.22	300
	180	181	8 x 12.5	3.5	0.14	45	.11	570
	220	221	8 x 12.5	3.5	0.14	55	.11	570
	270	271	10 x 12.5	5.0	0.14	68	.085	850
	330	331	8 x 15	3.5	0.14	83	.085	730
			10 x 12.5	5.0				800
	390	391	10 x 16	5.0	0.14	98	.062	1050
	470	471	8 x 20	3.5	0.14	118	.069	800
			10 x 16	5.0				.062
560	561	10 x 20	5.0	0.14	140	.044	1250	
		12.5 x 16					.063	1150
680	681	10 x 22	5.0	0.14	170	.039	1450	

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NRSX Series

## STANDARD PRODUCTS, CASE SIZES AND SPECIFICATIONS

W.V. (Vdc)	Cap.		Case Size D $\phi$ x L(mm)	Lead Space (mm)	Max. Tan $\delta$ at 120Hz	Max. LC ( $\mu$ A) 2 minutes	Max. Z ( $\Omega$ ) 100Khz/20°C	Max. Ripple Current 100Khz/105°C (mA rms)
	( $\mu$ F)	Code						
25	820	821	10 x 22	5.0	0.14	205	.039	1450
			12.5 x 20	5.0			.038	1600
	1000	102	12.5 x 20	5.0	0.14	250	.038	1600
	1200	122	12.5 x 25	5.0	0.14	300	.029	1800
	1500	152	12.5 x 25	5.0	0.15	375	.029	1800
	1800	182	16 x 25	7.5	0.15	450	.022	2100
	2200	222	16 x 25	7.5	0.16	550	.022	2100
	2700	272	16 x 25	7.5	0.17	675	.022	2100
	3300	332	16 x 31.5	7.5	0.18	825	.018	2350
	3900	392	16 x 35	7.5	0.19	975	.018	2550
4700	472	18 x 35.5	7.5	0.20	1175	.018	2800	
35	6.8	6R8	4 x 7	1.5	0.12	3.0	1.15	90
	12	120	5 x 7	2.0	0.12	4.2	.49	160
	22	220	5 x 11	2.0	0.12	7.7	.42	190
			5 x 11	2.0			.42	190
	27	270	6.3 x 7	2.5	0.12	9.5	.29	280
			5 x 11	2.0			.42	190
	33	330	5 x 11	2.0	0.12	12	.42	190
	47	470	6.3 x 11	2.5	0.12	17	.22	300
	56	560	6.3 x 11	2.5	0.12	20	.22	300
	68	680	6.3 x 11	2.5	0.12	24	.22	300
	100	101	8 x 11.5	3.5	0.12	35	.11	560
	120	121	8 x 12.5	3.5	0.12	42	.11	570
	150	151	8 x 12.5	3.5	0.12	53	.11	570
	180	181	10 x 12.5	5.0	0.12	63	.085	800
	220	221	8 x 15	3.5	0.12	77	.085	730
			10 x 12.5	5.0			.085	800
	270	271	10 x 16	5.0	0.12	95	.062	1050
	330	331	8 x 20	3.5	0.12	116	.069	800
	390	391	10 x 20	5.0	0.12	137	.044	1250
	470	471	10 x 22	5.0	0.12	165	.039	1450
	560	561	10 x 22	5.0	0.12	196	.039	1450
			12.5 x 20				.038	1600
	680	681	12.5 x 20	5.0	0.12	238	.038	1600
	820	821	12.5 x 25	5.0	0.12	287	.029	1800
	1000	102	12.5 x 25	5.0	0.12	350	.029	1800
	1200	122	12.5 x 25	5.0	0.12	420	.029	1800
	1500	152	16 x 25	7.5	0.13	525	.022	2100
1800	182	16 x 25	7.5	0.13	630	.022	2100	
2200	222	16 x 31.5	7.5	0.14	770	.018	2350	
2700	272	16 x 35	7.5	0.15	945	.018	2550	
3300	332	18 x 35.5	7.5	0.16	1155	.018	2800	

### STANDARD PRODUCTS, CASE SIZES AND SPECIFICATIONS

W.V. (Vdc)	Cap.		Case Size D $\phi$ x L(mm)	Lead Space (mm)	Max. Tan $\delta$ at 120Hz	Max. LC ( $\mu$ A) 2 minutes	Max. Z ( $\Omega$ ) 100Khz/20°C	Max. Ripple Current 100Khz/105°C (mA rms)
	( $\mu$ F)	Code						
50	1.0	1R0	5 x 11	2.0	0.1	3.0	3.3	30
	2.2	2R2	5 x 11	2.0	0.1	3.0	3.0	45
	3.3	3R3	5 x 11	2.0	0.1	3.0	2.7	55
	4.7	4R7	5 x 11	2.0	0.1	3.0	2.0	90
	10	100	5 x 11	2.0	0.1	5.0	2.0	90
	15	150	5 x 11	2.0	0.1	7.5	1.2	130
	22	220	5 x 11	2.0	0.1	11	.70	160
	33	330	6.3 x 11	2.5	0.1	17	.43	220
	47	470	6.3 x 11	2.5	0.1	24	.43	220
	68	680	8 x 11.5	3.5	0.1	34	.26	360
	100	101	10 x 12.5	5.0	0.1	50	.16	550
	150	151	10 x 16	5.0	0.1	75	.12	760
	220	221	10 x 20	5.0	0.1	110	.088	950
			12.5 x 16				.11	810
	330	331	10 x 22	5.0	0.1	165	.072	1000
			12.5 x 20				.059	1200
	470	471	12.5 x 20	5.0	0.1	235	.059	1200
	680	681	12.5 x 25	5.0	0.1	340	.045	1400
1000	102	16 x 25	7.5	0.1	500	.039	1750	
1500	152	16 x 35	7.5	0.11	750	.025	2300	
2200	222	18 x 35.5	7.5	0.12	1100	.024	2400	