Miniature Aluminum Electrolytic Capacitors

NRSZ Series

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

RoHS Compliant

*See Part Number System for Details

FEATURES

- VERY LOW IMPEDANCE
- LONG LIFE AT 105°C (2000 ~ 5000 hrs.)
- HIGH STABILITY AT LOW TEMPERATURE
- IDEALLY SUITED FOR USE IN SWITCHING POWER SUPPLIES AND CONVERTORS

LOW IMPEDANCE

NRX ➡ NRSZ ➡ NRSY

(old sizes) (today's standard) (reduced sizes)

CHARACTERISTICS

Rated Voltage Range		6.3 ~ 100 VDC							
Capacitance Range		0.47 ~ 12,000µF							
Operating Temperature Range		-55 ~ +105°C							
Capacitance Tolerance		± 20% (M)							
Max. Leakage Current @ (20°C)	After 1 min.	0.03CV or 4µA , whichever if greater							
	After 2 min.	0.01CV or 3µA , whichever if greater							
Max. Tan δ @ 120Hz/20°C		W.V. (Vdc)	6.3	10	16	25	35	50	63	100
		S.V. (Vdc)	8	13	20	32	44	63	79	125
		C < 1,200µF	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.07
		C = 1,500µF	0.23	0.20	0.17	0.15	0.13	0.11		
		C = 1,800µF	0.23	0.20	0.17	0.15	0.13	0.11		
		C = 2,200µF	0.24	0.21	0.18	0.16	0.14			
		C = 2,700µF	0.25	0.22	0.19	0.17	0.15			
		C = 3,300µF	0.26	0.23	0.20	0.18	0.16			
		C = 3,900µF	0.28	0.25	0.22	0.20				
		C = 4,700µF	0.29	0.26	0.23	0.21				
		C = 5,600µF	0.31	0.28	0.25					
		C = 6,800µF	0.33	0.30	0.27					
		C = 8,200µF	0.36	0.33						
		C = 10,000µF	0.40							
		C = 12,000µF	0.44							
Low Temperature Stability Impedance Ratio @ 120Hz		Z-25°C/Z+20°C	3	2	2	2	2	2	2	2
		Z-40°C/Z+20°C	4	3	3	3	3	3	3	3
Load Life Test at Rated W.V. & 105°C 5,000 Hours: 12.5∅ ~ 3,000 Hours: 8 ~ 10 ∅* 2,000 Hours: 5 ~ 6.3 ∅		Capacitance Change	Within ±20% of initial measured value							
		Tan δ	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 ±20% of initial measured value							
		Tan δ	Less than 200% of specified maximum value							
		Leakage Current	Less than specified maximum value							

*NRSZ102M6.3V8X20 is 4,500 Hours @ 105°C

Unless otherwise specified here, capacitor shall meet JIS C-5141 Characteristics W.

RIPPLE CURRENT CORRECTION FACTORS

1. Temperature Factors

Ambient Temperature	≤+70°C	+85°C	+105°C
Correction Factor	1.96	1.68	1.0

2. Frequency Factors

Cap. (µF)	Frequency (Hz)			
	120	1K	10K	100K
0.47 ~ 4.7	0.40	0.68	0.78	1.0
5.6 ~ 47	0.50	0.76	0.87	1.0
56 ~ 270	0.70	0.85	0.90	1.0
330 ~ 1000	0.80	0.93	0.98	1.0
1200 ~ 12,000	0.90	0.95	1.0	1.0

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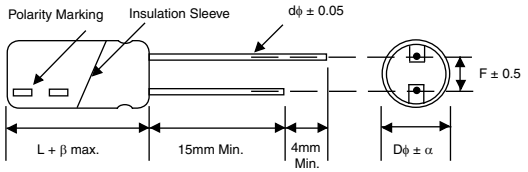
LEAD SPACING AND DIAMETER (mm)

Case Dia. (D∅)	5	6.3	8	10	12.5	16	18
Lead Space (F)	2.0	2.5	3.5	5.0		7.5	
Lead Dia. (d∅)	0.5		0.6			0.8	
Dim. *a*	0.5						
Dim. *b*	1.0			2.0			



STANDARD PRODUCTS, CASE SIZES AND SPECIFICATIONS

W.V (Vdc)	Cap. (µF)	Code	Case Size DxL(mm)	Lead Space (mm)	Max. Tanδ	Max. L.C. (µA)	Max. Impedance (Ω)		Max. Ripple Current at 100kHz/105°C (mArms)
							100kHz/20°C	100kHz/-10°C	
6.3	100	101	5 x 11	2.0	0.22	6.3	0.90	1.8	100
	220	221	6.3 x 11	2.5	0.22	13.9	0.30	0.60	280
	330	331	6.3 x 11	2.5	0.22	20.8	0.22	0.44	300
			8 x 11.5	3.5	0.22	20.8	0.19	0.38	410
	470	471	8 x 11.5	3.5	0.22	29.6	0.11	0.22	560
	680	681	8 x 15	3.5	0.22	42.8	0.085	0.17	730
	820	821	10 x 12.5	5.0	0.22	51.7	0.085	0.17	800
	1000	102	8 x 20	3.5	0.22	63.0	0.069	0.14	800
	1200	122	10 x 16	5.0	0.22	75.6	0.062	0.13	1050
	1500	152	10 x 20	5.0	0.23	94.5	0.044	0.088	1250
	2200	222	12.5 x 20	5.0	0.24	138	0.048	0.096	1400
	2700	272	12.5 x 20	5.0	0.25	170	0.038	0.076	1600
	3900	392	12.5 x 25	5.0	0.28	245	0.029	0.058	1800
	4700	472	12.5 x 25	5.0	0.29	296	0.029	0.058	1800
	5600	562	16 x 25	7.5	0.31	353	0.022	0.044	2100
	12000	123	18 x 35.5	7.5	0.44	756	0.018	0.036	2800
10	68	680	5 x 11	2.0	0.19	6.8	0.90	1.8	160
	82	820	5 x 11	2.0	0.19	8.2	0.65	1.3	175
	100	101	5 x 11	2.0	0.19	10.0	0.42	0.84	190
	150	151	6.3 x 11	2.5	0.19	15.0	0.31	0.62	280
	180	181	6.3 x 11	2.5	0.19	18.0	0.31	0.62	280
	220	221	6.3 x 11	2.5	0.19	22.0	0.22	0.44	300
	330	331	8 x 11.5	3.5	0.19	33.0	0.11	0.28	560
	470	471	8 x 15	3.5	0.19	47.0	0.085	0.17	610
			10 x 12.5	5.0	0.19	47.0	0.12	0.24	730
	560	561	10 x 16	5.0	0.19	56.0	0.095	0.19	735
	680	681	8 x 20	3.5	0.19	68.0	0.069	0.14	800
			10 x 12.5	5.0	0.19	68.0	0.085	0.17	800
	1000	102	12.5x16	5.0	0.19	100	0.063	0.126	1150
			1 0x 20	5.0	0.19	100	0.050	0.10	1200
	1200	122	10 x 20	5.0	0.19	120	0.044	0.088	1250
	1500	152	10 x 22	5.0	0.20	150	0.039	0.078	1450
	2200	222	12.5 x 20	5.0	0.22	220	0.038	0.076	1400
			12.5 x 25	5.0	0.22	220	0.037	0.074	1700
	2700	272	12.5 x 25	5.0	0.22	270	0.029	0.058	1800

PART NUMBERING SYSTEM

NRSZ 102 M 35V 12.5x25 TR F

- F — Pb Free/RoHS Compliant
- TR — Tape and Reel
- 12.5x25 — Size (D∅ x L)
- 35V — Rated Voltage
- M — Tolerance Code
- 102 — Capacitance Code
- NRSZ — Series

*"F" suffix denotes RoHS compliant parts

STANDARD PRODUCTS, CASE SIZES AND SPECIFICATIONS

W.V. (Vdc)	Cap. (µF)	Code	Case Size DØ XL(mm)	Lead Space (mm)	Max. Tanδ	Max. L.C. (µA)	Max. Impedance (Ω)		Max. Ripple Current at 100kHz/105°C (mArms)
							100kHz/20°C	100kHz/-10°C	
10	3300	332	12.5 x 25	5.0	0.23	330	0.035	0.070	1700
	3900	392	16 x 25	7.5	0.25	390	0.028	0.056	2070
	4700	472	16 x 31.5	7.5	0.26	470	0.024	0.048	2350
	5600	562	16 x 31.5	7.5	0.28	560	0.024	0.048	2350
	6800	682	16 x 35.5	7.5	0.30	680	0.022	0.044	2550
	8200	822	18 x 35.5	7.5	0.33	820	0.020	0.040	2800
16	47	470	5 x 11	2.0	0.16	7.5	0.90	1.8	180
	56	560	5 x 11	2.0	0.16	9.0	0.90	1.8	180
	100	101	6.3 x 11	2.5	0.16	16.0	0.32	0.64	280
	120	121	6.3 x 11	2.5	0.16	19.2	0.31	0.62	290
	150	151	6.3 x 11	2.5	0.16	24.0	0.22	0.44	300
	180	181	6.3 x 11	2.5	0.16	28.8	0.24	0.48	280
	220	221	8 x 11.5	3.5	0.16	35.2	0.11	0.32	560
	270	271	8 x 12.5	3.5	0.16	43.2	0.11	0.28	570
	330	331	8 x 15	3.5	0.16	52.8	0.085	0.17	730
			10 x 12.5	5.0	0.16	52.8	0.10	0.20	650
	470	471	8 x 20	3.5	0.16	75.2	0.069	0.14	800
			10 x 16	5.0	0.16	75.2	0.090	0.18	950
	680	681	10 x 20	5.0	0.16	108	0.054	0.11	1250
	820	821	10 x 20	5.0	0.16	131	0.044	0.09	1250
	1000	102	10 x 22	5.0	0.16	160	0.039	0.078	1450
	1200	122	12.5 x 20	5.0	0.16	192	0.038	0.076	1600
	1500	152	12.5 x 25	5.0	0.16	240	0.037	0.074	1800
	1800	182	12.5 x 25	5.0	0.17	288	0.029	0.058	1800
	2200	222	12.5 x 25	5.0	0.18	352	0.037	0.074	1700
			16 x 21	7.5	0.18	352	0.040	0.08	1700
	2700	272	16 x 25	7.5	0.19	432	0.022	0.044	2100
	3900	392	16 x 31.5	7.5	0.22	624	0.018	0.036	2350
	4700	472	16 x 35.5	7.5	0.23	752	0.018	0.036	2550
25	5600	562	18 x 35.5	7.5	0.25	896	0.018	0.036	2800
	33	330	5 x 11	2.0	0.14	8.3	0.90	1.8	160
	47	470	5 x 11	2.0	0.14	11.7	0.42	0.84	190
	68	680	6.3 x 11	2.5	0.14	17.0	0.32	0.64	280
	100	101	6.3 x 11	2.5	0.14	25.0	0.22	0.48	300
	150	151	8 x 11.5	3.5	0.14	37.5	0.11	0.22	560

STANDARD PRODUCTS, CASE SIZES AND SPECIFICATIONS

W.V. (Vdc)	Cap. (µF)	Code	Case Size D x L(mm)	Lead Space (mm)	Max. Tanδ	Max. L.C. (µA)	Max. Impedance (Ω)		Max. Ripple Current at 100kHz/105°C (mArms)
							100kHz/20°C	100kHz/-10°C	
25	220	221	8 x 15	3.5	0.14	55.0	0.085	0.18	730
			10 x 12.5	5.0	0.14	55.0	0.12	0.24	630
	270	271	10 x 12.5	5.0	0.14	67.5	0.085	0.18	800
	330	331	8 x 20	3.5	0.14	82.5	0.069	0.16	800
			10 x 16	5.0	0.14	82.5	0.09	0.18	830
	470	471	12.5x16	5.0	0.14	117	0.063	0.126	1150
			10 x 16	5.0	0.14	117	0.065	0.13	1010
	560	561	10 x 20	5.0	0.14	140	0.044	0.088	1250
	680	681	10 x 22	5.0	0.14	170	0.039	0.078	1450
	1000	102	12.5 x 20	5.0	0.14	250	0.038	0.076	1600
	1200	122	12.5 x 25	5.0	0.14	300	0.029	0.058	1800
	1800	182	16 x 25	7.5	0.15	450	0.022	0.044	2100
	2200	222	16 x 25	7.5	0.16	550	0.029	0.058	2000
	2700	272	16 x 31.5	7.5	0.17	675	0.018	0.038	2350
	3300	332	16 x 35.5	7.5	0.18	825	0.018	0.038	2550
	3900	392	18 x 31.5	7.5	0.20	975	0.018	0.046	2800
	4700	472	18 x 35.5	7.5	0.12	1175	0.021	0.042	2700
35	22	220	5 x 11	2.0	0.12	7.7	0.42	0.84	190
	33	330	6.3 x 11	2.5	0.12	11.6	0.42	0.84	190
	47	470	6.3 x 11	2.5	0.12	16.5	0.32	0.64	280
	68	680	6.3 x 11	2.5	0.12	19.6	0.22	0.44	300
	82	820	6.3 x 11	2.5	0.14	28.7	0.24	0.48	280
	100	101	8 x 11.5	3.5	0.12	35.0	0.11	0.22	560
	120	121	8 x 12.5	3.5	0.12	42.0	0.11	0.22	570
			10 x 12.5	5.0	0.12	42.0	0.14	0.28	560
	150	151	8 x 15	3.5	0.12	52.5	0.085	0.17	730
			10 x 12.5	5.0	0.12	52.5	0.12	0.24	635
	220	221	8 x 20	3.5	0.12	77.0	0.069	0.14	800
			10 x 16	5.0	0.12	77.0	0.085	0.17	950
	330	331	10 x 20	5.0	0.12	115	0.044	0.088	1250
	390	391	10 x 20	5.0	0.12	136	0.054	0.11	1190
	470	471	10 x 20	5.0	0.12	164	0.054	0.11	1250
	560	561	12.5 x 20	5.0	0.12	196	0.042	0.084	1400
	680	681	12.5 x 20	5.0	0.12	238	0.038	0.076	1600
	1000	102	12.5 x 25	5.0	0.12	350	0.029	0.058	1800
			16 x 21	7.5	0.12	350	0.037	0.074	1700
	1200	122	16 x 25	7.5	0.12	420	0.029	0.058	2000
	1500	152	16 x 25	7.5	0.13	525	0.022	0.044	2100
	2200	222	16 x 31	7.5	0.14	770	0.018	0.036	2350
			16 x 35.5	7.5	0.14	770	0.018	0.036	2550
	2700	272	18 x 35.5	7.5	0.15	945	0.018	0.036	2800
	3300	332	18 x 35.5	7.5	0.16	1155	0.022	0.044	2700

STANDARD PRODUCTS, CASE SIZES AND SPECIFICATIONS

W.V. (Vdc)	Cap. (µF)	Code	Case Size D x L(mm)	Lead Space (mm)	Max. Tanδ	Max. L.C. (µA)	Max Impedance		Max. Ripple Current at 100kHz/105°C (mA rms)
							100kHz/20°C	100kHz/-10°C	
50	1.0	1R0	5 x 11	2.0	0.10	3.0	3.3	6.6	30
	2.2	2R2	5 x 11	2.0	0.10	3.0	3.0	6.0	45
	4.7	4R7	5 x 11	2.0	0.10	3.0	2.0	4.0	90
	10	100	5 x 11	2.0	0.10	5.0	1.7	3.4	110
	15	150	5 x 11	2.0	0.10	7.5	1.2	2.4	130
	18	180	5 x 11	2.0	0.10	9.0	1.0	2.0	150
	22	220	5 x 11	2.0	0.10	11.0	0.70	1.4	160
	33	330	6.3 x 11	2.5	0.10	16.5	0.55	1.1	200
	39	390	6.3 x 11	2.5	0.10	19.5	0.55	1.1	200
	47	470	6.3 x 11	2.5	0.10	23.5	0.43	0.86	220
	68	680	8 x 11.5	3.5	0.10	34.0	0.26	0.52	360
	82	820	8 x 12.5	3.5	0.10	41.0	0.24	0.48	400
	100	101	8 x 15	3.5	0.10	50.0	0.18	0.36	500
			10 x 12.5	5.0	0.10	50.0	0.25	0.50	520
	120	121	10 x 12.5	5.0	0.10	60.0	0.16	0.32	550
	150	151	8 x 20	3.5	0.10	75.0	0.16	0.32	650
	180	181	10 x 16	5.0	0.10	90.0	0.12	0.24	760
	220	221	10 x 20	5.0	0.10	110	0.10	0.20	850
	330	331	10 x 22	5.0	0.10	165	0.072	0.16	1000
	470	471	12.5 x 20	5.0	0.10	235	0.059	0.12	1200
	560	561	12.5 x 25	5.0	0.10	280	0.045	0.092	1400
	1000	102	16 x 25	7.5	0.10	500	0.039	0.078	1750
	1200	122	16 x 31.5	7.5	0.10	600	0.025	0.058	2100
	1500	152	16 x 35.5	7.5	0.11	750	0.025	0.058	2300
	1800	182	18 x 35.5	7.5	0.11	900	0.024	0.048	2400

STANDARD PRODUCTS, CASE SIZES AND SPECIFICATIONS

W.V. (Vdc)	Cap. (µF)	Code	Case Size Dϕ x L(mm)	Lead Space (mm)	Max. Tanδ	Max. LC (µA)	Max. Impedance		Max. Ripple Current at 100KHz/105°C (mA rms)
							100KHz/20°C	100KHz/-10°C	
63	18	180	5 x 11	2.0	0.08	7.6	1.6	3.20	140
	33	330	6.3 x 11	2.5	0.08	17.0	0.90	1.80	200
	39	390	6.3 x 11	2.5	0.08	24.6	0.90	1.80	200
	47	470	8 x 11.5	3.5	0.08	29.6	0.52	1.04	275
	56	560	8 x 11.5	3.5	0.08	35.3	0.52	1.04	275
	68	680	8 x 11.5	3.5	0.08	42.8	0.52	1.04	275
	82	820	8 x 15	3.5	0.08	51.7	0.34	0.68	360
	120	121	8 x 20	3.5	0.08	75.6	0.21	0.42	510
			10 x 12.5	5.0	0.08	75.6	0.26	0.52	420
	150	151	10 x 16	5.0	0.08	91.5	0.20	0.40	525
	220	221	10 x 20	5.0	0.08	138	0.15	0.30	765
	270	271	10 x 22	5.0	0.08	170	0.12	0.24	840
	330	331	12.5 x 20	5.0	0.08	208	0.10	0.20	960
	390	391	12.5 x 25	5.0	0.08	245	0.064	0.13	1200
	470	471	12.5 x 25	5.0	0.08	296	0.064	0.13	1200
	680	681	16 x 25	7.5	0.08	428	0.052	0.11	1500
	1000	102	16 x 31.5	7.5	0.08	630	0.042	0.09	1750
100	5.6	5R6	5 x 11	2.0	0.07	5.6	2.7	5.40	120
	10	100	6.3 x 11	2.5	0.07	10	1.4	2.80	120
	12	120	6.3 x 11	2.5	0.07	12	1.4	2.80	170
	15	150	8 x 11.5	3.5	0.07	15	0.81	1.62	230
	22	220	8 x 11.5	3.5	0.07	22	0.81	1.62	230
	27	270	8 x 15	3.5	0.07	27	0.64	1.30	295
	39	390	8 x 20	3.5	0.07	39	0.36	0.72	400
	47	470	10 x 16	5.0	0.07	47	0.35	0.70	420
	68	680	10 x 20	5.0	0.07	68	0.24	0.48	630
	100	101	12.5 x 20	5.0	0.07	100	0.15	0.30	800
	150	151	12.5 x 25	5.0	0.07	150	0.11	0.22	920
	220	221	16 x 25	7.5	0.07	220	0.071	0.15	1100
	330	331	16 x 31.5	7.5	0.07	330	0.049	0.10	1490
	390	391	16 x 35.5	7.5	0.07	390	0.043	0.09	1630
	470	471	18 x 35.5	7.5	0.07	470	0.038	0.08	1700