

NRE-FL Series

Radial Leaded Aluminum Electrolytic Capacitors



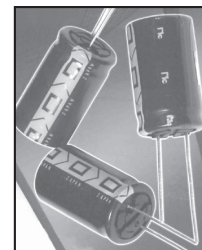
HIGH TEMPERATURE, EXTENDED LOAD LIFE, RADIAL LEADS, POLARIZED

FEATURES

- VOLTAGE RANGE 6.3 ~ 100V
- LOW IMPEDANCE AT 100KHz
- LONG LIFE AT HIGH TEMPERATURE (UP TO 10,000 HOURS)

CHARACTERISTICS

Rated Voltage Range		6.3 ~ 100VDC							
Capacitance Range		1.0 ~ 15,000 μ F							
Operating Temperature Range		-40°C ~ +105°C							
Capacitance Tolerance		$\pm 20\%$ (M)							
Maximum Leakage Current		0.01CV or 3 μ A whichever is greater after 2 minutes							
Max. Tan δ at 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 $\leq$ 1,000 μ F	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08
	C = 2,200 μ F	0.24	0.21	0.18	0.16	0.14	0.12	-	-
	C = 3,300 μ F	0.26	0.23	0.20	0.18	0.16	-	-	-
	C = 4,700 μ F	0.28	0.25	0.22	0.20	-	-	-	-
	C = 6,800 μ F	0.32	0.29	0.26	-	-	-	-	-
	C = 10,000 μ F	0.40	0.37	-	-	-	-	-	-
Low Temperature Stability Impedance Ratio @ 120Hz	Z-20°C/Z+20°C	4	3	2	2	2	2	2	2
	Z-40°C/Z+20°C	8	6	4	3	3	3	3	3
Case Size & Voltage	Hours	Load Life Test @ 105°C and Rated Voltage							
D ϕ $\leq$ 6.3mm, 6.3~10V	4000	Change in Characteristics	Δ Capacitance	Within $\pm 25\%$ of initial measured value					
D ϕ $\leq$ 6.3mm, 16~100V	5000								
D ϕ 8mm, 6.3~10V	6000		Δ Tan δ	Less than 200% of specified value					
D ϕ 8mm, 16~100V	7000								
D ϕ 10mm, 6.3~10V	6000								
D ϕ 10mm, 16~100V	7000								
D ϕ $\geq$ 12.5mm, 6.3~10V	8000		Δ LC	Less than specified value					
D ϕ $\geq$ 12.5mm, 16~100V	10000								



PART NUMBER SYSTEM

NRE-FL 101 M 100V 12.5X20 TB E

Series

Capacitance Code: First 2 characters significant, third character is multiplier

Tolerance Code (M=20%)

Working Voltage (Vdc)

Case Size (D ϕ x L)

TB = Tape & Box*

RoHS Compliant

*see tape specification for details

PRECAUTIONS

Please review the notes on correct use, safety and precautions found at <https://www.niccomp.com/resource/files/aluminum/AlumApplInfoCautions.pdf>
If in doubt or uncertainty, please review your specific application - process details with NIC's technical support personnel: tpmg@niccomp.com

NRE-FL Series

Radial Leaded Aluminum Electrolytic Capacitors



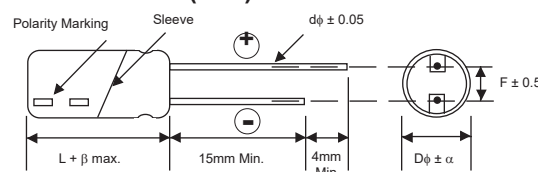
STANDARD PRODUCT AND CASE SIZE TABLE D ϕ x L (mm)

Cap. (μ F)	Code	Working Voltage (Vdc)							
		6.3	10	16	25	35	50	63	100
1.0	1R0	-	-	-	-	-	5x11	-	5x11
2.2	2R2	-	-	-	-	-	5x11	-	5x11
3.3	3R3	-	-	-	-	-	5x11	-	5x11
4.7	4R7	-	-	-	-	-	5x11	-	5x11
10	100	-	-	-	-	-	5x11	5x11	6.3x11
22	220	-	-	-	-	-	5x11	6.3x11	8x11.5
33	330	-	-	-	5x11	5x11	6.3x11	6.3x11	10x12.5
47	470	-	-	5x11	5x11	6.3x11	6.3x11	8x11.5	10x16
68	680	-	-	-	-	-	-	-	-
100	101	5x11	5x11	6.3x11	6.3x11	8x11.5	8x11.5	10x12.5	12.5x20
150	151	-	-	-	-	-	-	-	-
220	221	6.3x11	6.3x11	8x11.5	8x11.5	10x12.5	10x16	10x20	16x25
330	331	6.3x11	8x11.5	8x11.5	10x12.5	10x16	10x20	12.5x20	16x25
470	471	8x11.5	8x11.5	10x12.5	10x16	10x20	12.5x20	12.5x25	-
1000	102	10x12.5	10x16	10x20	12.5x20	12.5x25	16x25	16x31.5	-
2200	222	12.5x20	12.5x20	12.5x25	16x25	16x31.5	18x35.5	-	-
3300	332	12.5x20	12.5x25	16x25	16x31.5	18x35.5	-	-	-
4700	472	16x25	16x25	16x31.5	18x35.5	-	-	-	-
6800	682	16x25	16x31.5	18x35.5	-	-	-	-	-
10000	103	16x31.5	18x35.5	-	-	-	-	-	-
15000	153	18x35.5	-	-	-	-	-	-	-

LEAD SPACING AND DIAMETER (mm)

Case Dia. (D ϕ)	5	6.3	8	10	12.5	16	18
Lead Dia. (D ϕ)	0.5	0.5	0.6	0.6	0.6	0.8	0.8
Lead Spacing (F)	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Dim. α	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Dim. β	L $\leq$ 16mm: 1.5mm, L $\geq$ 20mm: 2.0mm						

DIMENSIONS (mm)



Drawing is representative of parts as supplied in bulk or straight lead format, please see taping specification for details on taped format packaging.

STANDARD PRODUCT, SPECIFICATIONS AND CASE SIZES D ϕ x L (mm)

Part Number	Cap. (μ F)	W.V. (Vdc)	Max. Tan δ	Max. LC 2 minutes (μ A)	Max. Impedance	Max. Ripple Current at 100KHz/105°C (mA rms)	Load Life Hours @ +105°C
					100KHz/20°C		
NRE-FL101M6.3V5x11F	100	6.3	0.22	6.3	0.90	150	4,000
NRE-FL221M6.3V6.3x11F	220		0.22	13.2	0.40	250	4,000
NRE-FL331M6.3V6.3x11F	330		0.22	18.9	0.40	250	4,000
NRE-FL471M6.3V8x11.5F	470		0.22	29.61	0.25	400	6000
NRE-FL102M6.3V10x12.5F	1000		0.22	63	0.16	580	6000
NRE-FL222M6.3V12.5x20F	2200		0.24	138.6	0.062	1300	8000
NRE-FL332M6.3V12.5x20F	3300		0.26	207.9	0.062	1300	8000
NRE-FL472M6.3V16x25F	4700		0.28	296.1	0.034	1850	8000
NRE-FL682M6.3V16x25F	6800		0.32	428.4	0.034	1850	8000
NRE-FL103M6.3V16x31.5F	10000		0.40	630	0.029	2000	8000
NRE-FL153M6.3V18x35.5F	15000		0.50	945	0.025	2200	8000
NRE-FL101M10V5x11F	100	10	0.19	10	0.90	150	4,000
NRE-FL221M10V6.3x11F	220		0.19	22	0.40	250	4,000
NRE-FL331M10V8x11.5F	330		0.19	33	0.25	400	6000
NRE-FL471M10V8x11.5F	470		0.19	47	0.25	400	6000
NRE-FL102M10V10x16F	1000		0.19	100	0.12	770	6000
NRE-FL222M10V12.5x20F	2200		0.21	220	0.062	1300	8000
NRE-FL332M10V12.5x25F	3300		0.23	330	0.048	1650	8000
NRE-FL472M10V16x25F	4700		0.25	470	0.034	1850	8000
NRE-FL682M10V16x31.5F	6800		0.29	680	0.029	2000	8000
NRE-FL103M10V18x35.5F	10000		0.37	1000	0.025	2200	8000

NRE-FL Series

Radial Leaded Aluminum Electrolytic Capacitors



STANDARD PRODUCT, SPECIFICATIONS AND CASE SIZES D ϕ x L (mm)

Part Number	Cap. (μ F)	W.V. (Vdc)	Max. Tan δ	Max. LC 2 minutes (μ A)	Max. Impedance	Max. Ripple Current at 100KHz/105°C (mA rms)	Load Life Hours @ +105°C
					100KHz/20°C		
NRE-FL470M16V5x11F	47	16	0.16	7.52	0.90	150	5000
NRE-FL101M16V6.3x11F	100		0.16	16	0.40	250	5000
NRE-FL221M16V8x11.5F	220		0.16	35.2	0.25	400	7000
NRE-FL331M16V8x11.5F	330		0.16	52.8	0.25	400	7000
NRE-FL471M16V10x12.5F	470		0.16	75.2	0.16	580	7000
NRE-FL102M16V10x20F	1000		0.16	160	0.078	1050	7000
NRE-FL222M16V12.5x25F	2200		0.18	352	0.048	1650	10000
NRE-FL332M16V16x25F	3300		0.20	528	0.034	1850	10000
NRE-FL472M16V16x31.5F	4700		0.22	752	0.029	2000	10000
NRE-FL682M16V18x35.5F	6800		0.26	1088	0.025	2200	10000
NRE-FL330M25V5x11F	33	25	0.14	8.25	0.90	150	5000
NRE-FL470M25V5x11F	47		0.14	11.75	0.90	150	5000
NRE-FL101M25V6.3x11F	100		0.14	25	0.40	250	5000
NRE-FL221M25V8x11.5F	220		0.14	55	0.25	400	7000
NRE-FL331M25V10x12.5F	330		0.14	82.5	0.16	580	7000
NRE-FL471M25V10x16F	470		0.14	117.5	0.12	770	7000
NRE-FL102M25V12.5x20F	1000		0.14	250	0.062	1300	10000
NRE-FL222M25V16x25F	2200		0.16	550	0.034	1850	10000
NRE-FL332M25V16x31.5F	3300		0.18	825	0.029	2000	10000
NRE-FL472M25V18x35.5F	4700		0.20	1175	0.025	2200	10000
NRE-FL330M35V5x11F	33	35	0.12	11.55	0.90	150	5000
NRE-FL470M35V6.3x11F	47		0.12	16.45	0.40	250	5000
NRE-FL101M35V8x11.5F	100		0.12	35	0.25	400	7000
NRE-FL221M35V10x12.5F	220		0.12	77	0.16	580	7000
NRE-FL331M35V10x16F	330		0.12	115.5	0.12	770	7000
NRE-FL471M35V10x20F	470		0.12	164.5	0.078	1050	7000
NRE-FL102M35V12.5x25F	1000		0.12	350	0.048	1650	10000
NRE-FL222M35V16x31.5F	2200		0.14	770	0.029	2000	10000
NRE-FL332M35V18x35.5F	3300		0.16	1155	0.025	2200	10000
NRE-FL1R0M50V5x11F	1.0	50	0.10	3	4.0	30	5000
NRE-FL2R2M50V5x11F	2.2		0.10	3	2.5	43	5000
NRE-FL3R3M50V5x11F	3.3		0.10	3	2.2	53	5000
NRE-FL4R7M50V5x11F	4.7		0.10	3	1.9	88	5000
NRE-FL100M50V5x11F	10		0.10	5	1.5	100	5000
NRE-FL220M50V5x11F	22		0.10	11	0.90	150	5000
NRE-FL330M50V6.3x11F	33		0.10	16.5	0.40	250	5000
NRE-FL470M50V6.3x11F	47		0.10	23.5	0.40	250	5000
NRE-FL101M50V8x11.5F	100		0.10	50	0.25	400	7000
NRE-FL221M50V10x16F	220		0.10	110	0.12	770	7000
NRE-FL331M50V10x20F	330		0.10	165	0.078	1050	7000
NRE-FL471M50V12.5x20F	470		0.10	235	0.062	1300	10000
NRE-FL102M50V16x25F	1000		0.10	500	0.034	1850	10000
NRE-FL222M50V18x35.5F	2200		0.12	1100	0.025	2200	10000
NRE-FL100M63V5x11F	10	63	0.09	6.3	2.3	87	5000
NRE-FL220M63V6.3x11F	22		0.09	13.86	1.3	140	5000
NRE-FL330M63V6.3x11F	33		0.09	20.79	1.2	140	5000
NRE-FL470M63V8x11.5F	47		0.09	29.61	0.63	210	7000
NRE-FL101M63V10x12.5F	100		0.09	63	0.43	300	7000
NRE-FL221M63V10x20F	220		0.09	138.6	0.21	520	7000
NRE-FL331M63V12.5x20F	330		0.09	207.9	0.16	660	10000
NRE-FL471M63V12.5x25F	470		0.09	296.1	0.12	750	10000
NRE-FL102M63V16x31.5F	1000		0.09	630	0.054	1390	10000

NRE-FL Series

Radial Leaded Aluminum Electrolytic Capacitors



STANDARD PRODUCT, SPECIFICATIONS AND CASE SIZES D ϕ x L (mm)

Part Number	Cap. (μ F)	W.V. (Vdc)	Max. Tan δ	Max. LC 5 minutes (μ A)	Max. Impedance	Max. Ripple Current at 100KHz/105°C (mA rms)	Load Life Hours @ +105°C
					100KHz/20°C		
NRE-FL1R0M100V5x11F	1.0	100	0.08	3.0	4.5	20	5000
NRE-FL2R2M100V5x11F	2.2		0.08	3.0	3.0	30	5000
NRE-FL3R3M100V5x11F	3.3		0.08	3.3	2.7	40	5000
NRE-FL4R7M100V5x11F	4.7		0.08	4.7	2.5	65	5000
NRE-FL100M100V6.3x11F	10		0.08	10	1.2	140	5000
NRE-FL220M100V8x11.5F	22		0.08	22	0.63	160	7000
NRE-FL330M100V10x12.5F	33		0.08	33	0.43	230	7000
NRE-FL470M100V10x16F	47		0.08	47	0.31	290	7000
NRE-FL101M100V12.5x20F	100		0.08	100	0.16	430	10000
NRE-FL221M100V16x25F	220		0.08	220	0.073	900	10000
NRE-FL331M100V16x25F	330		0.08	330	0.073	900	10000

RIPPLE CURRENT FREQUENCY CORRECTION FACTOR

Frequency (Hz)	120	1K	10K	$\leq$ 100K
1.0 ~ 10 μ F	0.42	0.60	0.80	1.00
22 ~ 33 μ F	0.55	0.75	0.90	1.00
47 ~ 330 μ F	0.70	0.85	0.95	1.00
470 ~ 1000 μ F	0.75	0.90	0.98	1.00
2200 ~ 15000 μ F	0.80	0.95	1.00	1.00