

HIGH TEMPERATURE, EXTENDED LOAD LIFE, RADIAL LEADS, POLARIZED

FEATURES

- HIGH VOLTAGE (6.3 ~ 250V)
- LOW IMPEDANCE AT 100KHz
- LONG LIFE AT HIGH TEMPERATURE (UP TO 10,000 HOURS)

RoHS Compliant
includes all homogeneous materials

*See Part Number System for Details



CHARACTERISTICS

Rated Voltage Range		6.3 ~ 250VDC										
Capacitance Range		1.0 ~ 15,000μF										
Operating Temperature Range		-40°C ~ +105°C										
Capacitance Tolerance		±20% (M)										
Maximum Leakage Current		0.01CV or 3μA whichever is greater after 2 minutes									0.04CV+100μA (After 1 minute)	
											0.02CV+25μA (After 5 minutes)	
Max. Tan δ at 120Hz/20°C	W.V. (Vdc)	6.3	10	16	25	35	50	63	100	160	200	250
	S.V. (Vdc)	8	13	20	32	44	63	79	125	200	250	300
	C ≤ 1,000μF	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.12	0.12	0.12
	C = 2,200μF	0.24	0.21	0.18	0.16	0.14	0.12	-	-	-	-	-
	C = 3,300μF	0.26	0.23	0.20	0.18	0.16	-	-	-	-	-	-
	C = 4,700μF	0.28	0.25	0.22	0.20	-	-	-	-	-	-	-
	C = 6,800μF	0.32	0.29	0.26	-	-	-	-	-	-	-	-
	C = 10,000μF	0.40	0.37	-	-	-	-	-	-	-	-	-
Low Temperature Stability Impedance Ratio @ 120Hz	Z-20°C/Z+20°C	4	3	2	2	2	2	2	2	3	3	3
	Z-40°C/Z+20°C	8	6	4	3	3	3	3	3	4	4	4
Case Size & Voltage	Hours	Load Life Test @ 105°C and Rated Voltage										
Dφ ≤ 6.3mm, 6.3~10V	4000	Change in Characteristics	Δ Capacitance	Within ±25% of initial measured value (±20% for 160 ~ 250Vdc parts)								
Dφ ≤ 6.3mm, 16~100V	5000											
Dφ 8mm, 6.3~10V	6000		Δ Tan δ	Less than 200% of specified value								
Dφ 8mm, 16~100V	7000											
Dφ 10mm, 6.3~10V	6000											
Dφ 10mm, 16~100V	7000											
Dφ 10mm, 160~250V	2000											
Dφ ≥ 12.5mm, 6.3~10V	8000		Δ LC	Less than specified value								
Dφ ≥ 12.5mm, 16~100V	10000											
Dφ ≥ 12.5mm, 160~250V	2000											

PART NUMBER SYSTEM

NRE-FL 101 M 100V 12.5X20 TB F

Series

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

Tolerance Code (M=20%)

Working Voltage (Vdc)

Case Size (Dφ x L)

TB = Tape & Box*

F RoHS Compliant

*see tape specification for details

PRECAUTIONS

Please review the notes on correct use, safety and precautions found on pages T10 & T11 of NIC's Electrolytic Capacitor catalog.

Also found at www.niccomp.com/precautions

If in doubt or uncertainty, please review your specific application - process details with NIC's technical support personnel: tpmg@niccomp.com



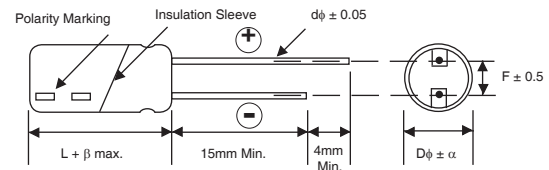
STANDARD PRODUCT AND CASE SIZE TABLE D ϕ x L (mm)

Cap. (μ F)	Code	Working Voltage (Vdc)										
		6.3	10	16	25	35	50	63	100	160	200	250
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	10x20	10x20	10x20
33	330	-	-	-	5x11	5x11	6.3x11	6.3x11	10x12.5	12.5x20	12.5x25	12.5x25
47	470	-	-	5x11	5x11	6.3x11	6.3x11	8x11.5	10x16	12.5x25	12.5x25	16x25
68	680	-	-	-	-	-	-	-	-	12.5x25	16x25	16x31.5
100	101	5x11	5x11	6.3x11	6.3x11	8x11.5	8x11.5	10x12.5	12.5x20	16x25	16x31.5	16x35.5
150	151	-	-	-	-	-	-	-	-	16x31.5	16x35.5	-
220	221	6.3x11	6.3x11	8x11.5	8x11.5	10x12.5	10x16	10x20	16x25	18x35.5	18x35.5	-
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

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

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
NRE-FL220M160V10x20F	22	160	0.12	70.4	1.0	350	2000
NRE-FL330M160V12.5x20F	33		0.12	105.6	0.70	450	2000
NRE-FL470M160V12.5x25F	47		0.12	150.4	0.45	600	2000
NRE-FL680M160V12.5x25F	68		0.12	217.6	0.45	600	2000
NRE-FL101M160V16x25F	100		0.12	320	0.24	950	2000
NRE-FL151M160V16x31.5F	150		0.12	480	0.17	1200	2000
NRE-FL221M160V18x35.5F	220		0.12	704	0.14	1400	2000
NRE-FL220M200V10x20F	22	200	0.12	88	1.0	350	2000
NRE-FL330M200V12.5x25F	33		0.12	132	0.55	550	2000
NRE-FL470M200V12.5x25F	47		0.12	188	0.44	600	2000
NRE-FL680M200V16x25F	68		0.12	272	0.24	950	2000
NRE-FL101M200V16x31.5F	100		0.12	400	0.17	1200	2000
NRE-FL151M200V16x35.5F	150		0.12	600	0.16	1280	2000
NRE-FL221M200V18x35.5F	220		0.12	880	0.14	1400	2000
NRE-FL220M250V10x20F	22	250	0.12	110	1.4	300	2000
NRE-FL330M250V12.5x25F	33		0.12	165	0.70	450	2000
NRE-FL470M250V16x25F	47		0.12	235	0.31	850	2000
NRE-FL680M250V16x31.5F	68		0.12	340	0.22	1050	2000
NRE-FL101M250V16x35.5F	100		0.12	500	0.18	1200	2000

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

All 160 ~ 250V Parts					
Frequency (Hz)	60(50)	120	1K	10K	$\leq$ 100K
Coefficient	0.40	0.50	0.75	0.90	1.00

