

Miniature Aluminum Electrolytic Capacitors

NRE-H Series

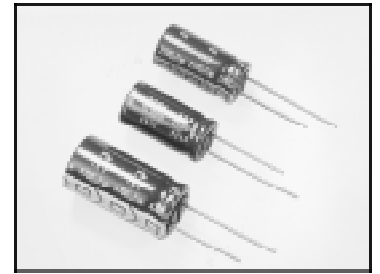
HIGH VOLTAGE, RADIAL LEADS, POLARIZED

FEATURES

- HIGH VOLTAGE (UP THROUGH 450VDC)
- NEW REDUCED SIZES

CHARACTERISTICS

Rated Voltage Range		160 ~ 450 VDC					
Capacitance Range		0.47 ~ 330 μ F					
Operating Temperature Range		-40 ~ +85°C:160~ 250V or -25 ~ +85°C:315 ~ 450V					
Capacitance Tolerance		$\pm 20\%$ (M)					
Max. Leakage Current @ (20°C)	After 1 min.	CV \leq 1000 μ F = 0.03CV + 15 μ A					
	After 2 min.	CV > 1000 μ F = 0.02CV + 25 μ A					
Max. Tan δ @ 120Hz/20°C	W.V. (Vdc)	160	200	250	350	400	450
	Tan δ	0.20	0.20	0.20	0.25	0.25	0.25
Low Temperature Stability Impedance Ratio @ 120Hz	Z-25°C/Z+20°C	3	3	3	10	12	12
	Z-40°C/Z+20°C	6	6	6	-	-	-
Load Life Test at Rated W.V. 85°C 2,000 Hours	Capacitance Change	Within $\pm 20\%$ of initial measured value					
	Tan δ	Less than 200% of specified maximum value					
	Leakage Current	Less than specified maximum value					
Shelf Life Test 85°C 1,000 Hours No Load	Capacitance Change	Within $\pm 20\%$ of initial measured value					
	Tan δ	Less than 200% of specified maximum value					
	Leakage Current	Less than specified maximum value					



LEADED

MAXIMUM PERMISSIBLE RIPPLE CURRENT (mA rms) AT 85°C & 120Hz

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

Cap μ F	Code	Working Voltage (Vdc)					
		160	200	250	350	400	450
0.47	R47	5 x 11	5 x 11	5 x 11	6.3 x 11	6.3 x 11	
1.0	1R0	5 x 11	5 x 11	5 x 11	6.3 x 11	8 x 11.5	8 x 12.5
2.2	2R2	6.3 x 11	6.3 x 11	6.3 x 11	8 x 11.5	8 x 11.5	10 x 16
3.3	3R3	6.3 x 11	6.3 x 11	8 x 11.5	8 x 12.5	10 x 12.5	10 x 20
4.7	4R7	6.3 x 11	8 x 11.5	8 x 11.5	10 x 12.5	10 x 16	12.5 x 20
10	100	8 x 11.5	8 x 12.5	10 x 12.5	10 x 16	10 x 20	12.5 x 25
22	220	10 x 12.5	10 x 16	10 x 20	12.5 x 20	12.5 x 25	16 x 25
33	330	10 x 20	10 x 20	12.5 x 20	12.5 x 25	16 x 25	16 x 31
47	470	12.5 x 20	12.5 x 20	12.5 x 25	16 x 25	16 x 31	18 x 36
68	680	12.5 x 20	12.5 x 25	16 x 25	16 x 36	16 x 36	18 x 41
100	101	12.5 x 25	16 x 25	16 x 31	18 x 36	18 x 41	
150	151	16 x 31	16 x 36	18 x 36			
220	221	16 x 36	18 x 36	18 x 41			
330	331	18 x 41					

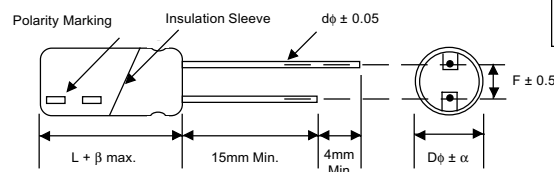
Cap (μ F)	Working Voltage (Vdc)					
	160	200	250	350	400	450
0.47	10	11	12	14	14	
1.0	21	23	25	29	29	26
2.2	31	34	35	40	40	40
3.3	40	45	48	52	52	52
4.7	55	57	59	67	67	67
10	90	92	94	100	100	100
22	153	160	170	175	180	180
33	195	210	220	225	230	220
47	245	250	260	260	270	245
68	310	325	335	340	345	270
100	410	430	432	440	450	
150	550	575	588			
220	745	760	760			
330	800					

MAXIMUM ESR (Ω) AT 20°C & 120Hz

Cap (μ F)	W.V. (Vdc)	
	160-250	350-450
0.47	706	882
1.0	332	415
2.2	151	188
3.3	101	126
4.7	70.6	86.2
10	33.2	41.5
22	15.1	18.8
33	10.1	12.6
47	7.06	8.82
68	4.88	6.10
100	3.32	4.15
150	2.21	
220	1.51	
330	1.01	

RIPPLE CURRENT FREQUENCY CORRECTION FACTORS

Frequency (Hz)	120	1K	10K	100K
Correction Factor $\leq 33\mu$ F	1.0	1.3	1.45	1.45
Correction Factor $> 33\mu$ F	1.0	1.2	1.30	1.30



LEAD SPACING AND DIAMETER (mm)

Case Dia. (D ϕ)	5	6.3	8	10	12.5	16	18
Leads 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

$\beta = L < 20\text{mm} = 1.5\text{mm}, L > 20\text{mm} = 2.0\text{mm}$

