

# 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 $\mu$ 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 $\mu$ F = 0.03CV+ 15 $\mu$ A					
	After 2 min.	CV > 1000 $\mu$ F = 0.02CV+ 25 $\mu$ A					
Max. Tan $\delta$ @ 120Hz/20°C	W.V. (Vdc)	160	200	250	350	400	450
	Tan $\delta$	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 $\delta$	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 $\delta$	Less than 200% of specified maximum value					
	Leakage Current	Less than specified maximum value					

**RoHS Compliant**  
includes all homogeneous materials

\*See Part Number System for Details



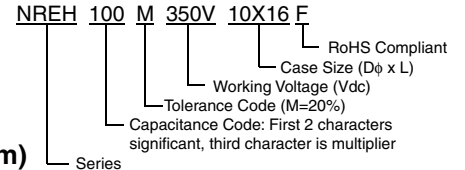
## MAXIMUM RIPPLE CURRENT (mA rms AT 120Hz AND 85°C)

Cap ( $\mu$ 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	-	-	-	-	-

## Ripple Current Frequency Correction Factor

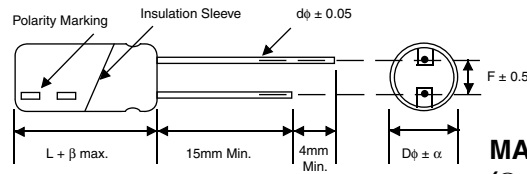
Frequency (Hz)	120	1K	10K	100K
Correction Factor $\leq$ 33 $\mu$ F	1.0	1.3	1.45	1.45
Correction Factor > 33 $\mu$ F	1.0	1.2	1.30	1.30

## PART NUMBER SYSTEM



## LEAD SPACING & DIAMETER (mm)

Case Dia. (D $\phi$ )	5	6.3	8	10	12.5	16	18
Leads Dia. (d $\phi$ )	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. $\alpha$	0.5	0.5	0.5	0.5	0.5	0.5	0.5



## STANDARD PRODUCT AND CASE SIZE TABLE D $\phi$ x L (mm)

Cap $\mu$ 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	-	-	-	-	-

## MAXIMUM ESR ( $\Omega$ AT 120HZ AND 20°C)

Cap ( $\mu$ 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	-

## 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](http://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](mailto:tpmg@niccomp.com)

