

# Miniature Aluminum Electrolytic Capacitors

## NRE-HS Series

HIGH CV, HIGH TEMPERATURE, RADIAL LEADS, POLARIZED

### FEATURES

- EXTENDED VALUE AND HIGH VOLTAGE
- NEW REDUCED SIZES

### CHARACTERISTICS

**RoHS Compliant**  
includes all homogeneous materials

\*See Part Number System for Details



Rated Voltage Range	6.3 ~ 50Vdc				160 ~ 250Vdc				350 ~ 450Vdc				
Capacitance Range	100 ~ 10,000µF				4.7 ~ 220µF				1.5 ~ 68µF				
Operating Temperature Range	-55 ~ +105°C				-40 ~ +105°C				-25 ~ +105°C				
Capacitance Tolerance	±20%(M)												
Max. Leakage Current @ 20°C	6.3 ~ 50Vdc				160 ~ 450Vdc								
	0.01CV or 3µA whichever is greater after 2 minutes				CV≤1,000µF				CV>1,000µF				
					0.1CV + 40µA (1 min.)				0.04CV + 100µA (1 min.)				
Max. Tan δ @ 120Hz/20°C	W.V. (Vdc)	6.3	10	16	25	35	50	160	200	250	350	400	450
	S.V. (Vdc)	8.0	13	20	32	44	63	200	250	300	400	450	500
	C≤1,000µF	0.30	0.26	0.20	0.18	0.14	0.12	0.20	0.20	0.20	0.20	0.20	0.25
	W.V. (Vdc)	6.3	10	16	25	35	50	160	200	250	350	400	450
	C≤1,000µF	0.26	0.22	0.18	0.16	0.14	0.12	0.20	0.20	0.20	0.20	0.20	0.25
	C=2,000µF	0.28	0.24	0.20	0.18	0.16	0.14	-	-	-	-	-	-
	C=3,300µF	0.30	0.26	0.22	0.20	0.18	-	-	-	-	-	-	-
	C=4,700µF	0.32	0.28	0.24	0.22	-	-	-	-	-	-	-	-
	C=6,800µF	0.36	0.32	0.28	-	-	-	-	-	-	-	-	-
Low Temperature Stability Impedance Ratio @ 120Hz	W.V. (Vdc)	6.3	10	16	25	35	50	160	200	250	350	400	450
	Z-25°C/Z+20°C	4	3	2	2	2	2	3	3	3	6	6	6
	Z-40°C/Z+20°C	8	6	4	4	3	3	-	-	-	-	-	-
Load Life Test at Rated W.V. +105°C 2,000 Hours	Capacitance Change				Within ±25% of initial measured value								
	Tan δ				Less than 200% of specified maximum value								
	Leakage Current				Less than specified maximum value								

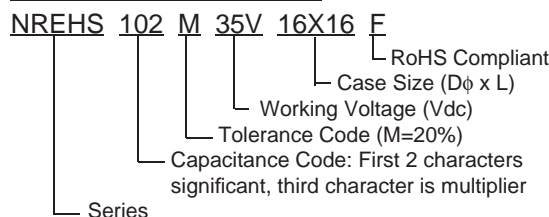
### STANDARD PRODUCT AND CASE SIZE TABLE D φ x L (mm)

Cap. (µF)	Code	Working Voltage (Vdc)					
		6.3	10	16	25	35	50
100	101	-	-	-	-	-	8x9
150	151	-	-	-	-	8x9	8x9
220	221	-	-	-	8x9	10x9	-
330	331	-	-	8x9	10x9	10x9	-
470	471	8x9	8x9	8x9	10x9	-	12.5x16
680	681	8x9	10x9	10x9	12.5x16	12.5x16	16x16
1000	102	10x9	10x9	-	12.5x16	16x16	16x20
2200	222	12.5x16	12.5x16	16x16	16x20	18x20	18x25
3300	332	16x16	16x16	16x20	18x20	18x25	-
4700	472	18x16	16x20	18x20	18x25	-	-
6800	682	16x20	18x20	18x25	-	-	-
10000	103	18x20	18x25	-	-	-	-

### PERMISSIBLE RIPPLE CURRENT (mA rms AT 120Hz AND 105°C)

Cap. (µF)	Working Voltage (Vdc)					
	6.3	10	16	25	35	50
100	-	-	-	-	-	200
150	-	-	-	-	250	300
220	-	-	-	240	300	-
330	-	-	270	310	360	-
470	270	295	310	370	-	570
680	300	350	370	640	640	710
1000	460	460	-	670	850	890
2200	770	770	930	1100	1200	1320
3300	930	930	1200	1200	1490	-
4700	1000	1200	1330	1490	-	-
6800	1200	1330	1680	-	-	-
10000	1430	1680	-	-	-	-

### PART NUMBER SYSTEM



### 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)



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

Cap. (μF)	Code	Working Voltage (Vdc)					
		160	200	250	350	400	450
1.5	1R5	-	-	-	-	-	8x9
2.2	2R2	-	-	-	-	8x9	10x9
3.3	3R3	-	-	-	8x9	10x9	-
4.7	4R7	8x9	8x9	8x9	10x9	10x9	-
6.8	6R8	8x9	8x9	10x9	12.5x16	12.5x16	12.6x16
10	100	10x9	10x9	-	12.5x16	12.5x16	16x16
22	220	-	12.5x16	12.5x16	18x16	16x20	16x20
33	330	12.5x16	12.5x16	16x16	16x20	16x20	18x25
47	470	16x16	16x16	18x16	18x20	18x20	18x25
68	680	18x16	16x20	16x20	18x25	-	-
100	101	16x20	16x20	18x25	-	-	-
150	151	18x20	18x25	-	-	-	-
220	221	18x25	-	-	-	-	-

PERMISSIBLE RIPPLE CURRENT (mA rms AT 120Hz AND 105°C)

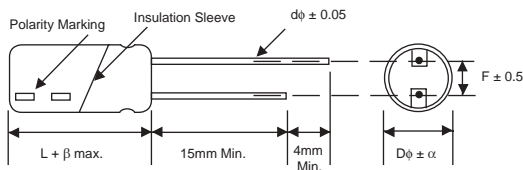
Cap. (μF)	Working Voltage (Vdc)					
	160	200	250	350	400	450
1.5	-	-	-	-	-	19
2.2	-	-	-	-	35	29
3.3	-	-	-	37	40	-
4.7	54	54	54	49	49	-
6.8	60	60	69	94	94	77
10	85	85	-	100	100	109
22	-	156	156	183	187	170
33	175	175	238	238	238	238
47	245	250	309	309	309	275
68	305	355	397	397	-	-
100	381	381	451	-	-	-
150	464	532	-	-	-	-
220	602	-	-	-	-	-

LEAD SPACING AND DIAMETER (mm)

Case Dia. (Dφ)	8	10	12.5	16	18
Lead Dia. (dφ)	0.6	0.6	0.6	0.8	0.8
Lead Spacing (F)	3.5	5.0	5.0	7.5	7.5
Dim. α	0.5	0.5	0.5	0.5	0.5

RIPPLE CURRENT FREQUENCY CORRECTION FACTORS

Frequency (Hz)	60	120	500	1K	10K ≥
1.5 ~ 6.8μF	0.65	1.00	1.20	1.30	1.50
10 ~ 68μF	0.80	1.00	1.20	1.30	1.50
100 ~ 1000μF	0.80	1.00	1.10	1.15	1.20
2200 ~ 10000μF	0.80	1.00	1.05	1.10	1.15



β max. L ≤ 16mm = 1.5mm, L ≥ 20mm = 2.0mm