

# Miniature Aluminum Electrolytic Capacitors

NRE-HS Series

HIGH CV, HIGH TEMPERATURE, RADIAL LEADS, POLARIZED

**FEATURES**

- EXTENDED VALUE AND HIGH VOLTAGE
- NEW REDUCED SIZES

**RoHS  
Compliant**

includes all homogeneous materials

\*See Part Number System for Details



**CHARACTERISTICS**

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	0.20	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	0.20	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	-	-	-	-	-	-	-	-	-	-
C=10,000µF	0.44	0.40	-	-	-	-	-	-	-	-	-	-	-		
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								

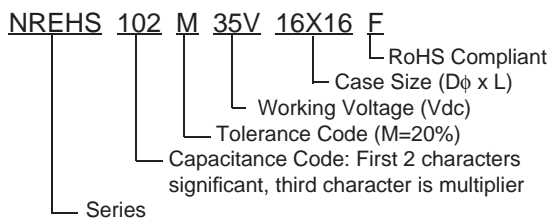
**STANDARD PRODUCT AND CASE SIZE TABLE D φ x L (mm)**

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)

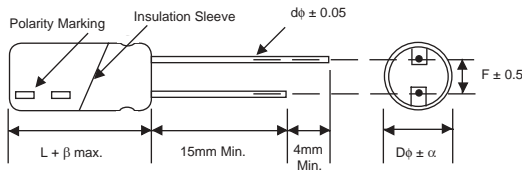
Cap. (μF)	Working Voltage (Vdc)					
	160	200	250	350	400	450
1.5	-	-	-	-	-	19
2.2	-	-	-	-	35	29
3.3	-	-	-	37	40	-
4.7	54	54	54	49	49	-
6.8	60	60	69	94	94	77
10	85	85	-	100	100	109
22	-	156	156	183	187	170
33	175	175	238	238	238	238
47	245	250	309	309	309	275
68	305	355	397	397	-	-
100	381	381	451	-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



$\beta$  max.  $L \leq 16\text{mm} = 1.5\text{mm}$ ,  $L > 20\text{mm} = 2.0\text{mm}$