NRL SERIES

ALUMINUM ELECTROLYTIC CAPACITORS

LOW VOLTAGE TYPE

FEATURES

* Low impedance characteristics.
* Capacitance can be ±20% or ±10% Tolerance.
* Can size Larger than 8mm diameter has safety vents.

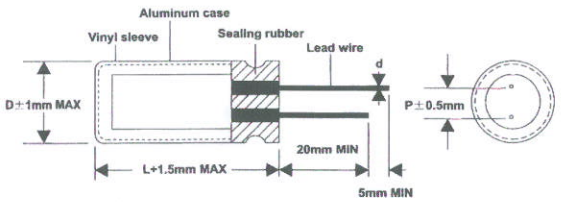
SPECIFICATION

Item	Characteristic
Operating Temperature Range	-40℃ ~ +85℃
Capacitance Tolerance	±20% or -10 ~ +50% (at 20℃, 120Hz)
Leakage Current	I =0.02CV or 3 (uA) which is greater (After 5 minutes applying the rated DC working voltage at 20℃)
Dissipation Factor (Tan δ) (At 20℃, 120Hz)	Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 80 / 100 Tan δ: 0.23 / 0.20 / 0.17 / 0.15 / 0.12 / 0.10 / 0.09 / 0.09 / 0.08 For capacitors whose capacitance exceeds 1,000uF, the specification of tan δ is increased by 0.02 for every addition of 1,000uF.(Test at 20℃, 120Hz)
Surge Voltage	Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 80 / 100 Surge voltage (V): 8 / 13 / 20 / 32 / 44 / 63 / 79 / 100 / 125
Life Test	1000 hours at 85℃ (Returned to 20℃)
	Capacitance change: ±20% / ±15% of initial measured value for 6.3~16WV / 25~100WV
	DF (tan δ): Less than 150% of the initial specified value.
	DC leakage current: Initial specified value.
Shelf Life Test	1000 hours at 85℃ no voltage applied (Returned to 20℃)
	Capacitance change: ±20% / ±15% of initial measured value for 6.3~16WV / 25~100WV
	DF (tan δ): Less than 200% of the initial specified value.
	DC leakage current: Less than 200% of the initial specified value.

DIMENSIONS

INTERNAL STRUCTURE

Unit : mm



LEAD SPACING AND DIAMETER

D	5	6	8	10	13	16	18	22	25
P	2.0	2.5	3.5	5.0		7.5		10	12.5
d	0.5			0.6		0.8			1.0

Rated Capacity, Rated Voltage & Case Size Corresponding Sheet

uF \ W. V.	10	16	25	35	50	63
0.1					5 x 11	
0.22					5 x 11	
0.33					5 x 11	
0.47					5 x 11	
1					5 x 11	5 x 11
2.2					5 x 11	5 x 11
3.3					5 x 11	5 x 11
4.7					5 x 11	5 x 11
6.8					5 x 11	5 x 11
10			5 x 11	5 x 11	5 x 11	5 x 11
22		5 x 11	5 x 11	5 x 11	5 x 11	6 x 12
33		5 x 11	5 x 11	6 x 12	6 x 12	
47	5 x 11	5 x 11	5 x 11	6 x 12	6 x 12	8 x 12
68	5 x 11	5 x 11	6 x 12			
100	5 x 11	5 x 12	6 x 12	8 x 12	8 x 12	10 x 17
220	6 x 12	6 x 12	8 x 12	8 x 16	10 x 14	10 x 20
330	6 x 12	8 x 12	8 x 12	10 x 15	10 x 16	13 x 21
470	6.3 x 12	8 x 12	8 x 14	10 x 18	13 x 21	13 x 27
680						13 x 27
1000	8 x 16	10 x 16	10 x 18	13 x 21	13 x 26	16 x 31
2200	10 x 20	10 x 20	13 x 22	16 x 25	16 x 36	18 x 36
3300		13 x 25	16 x 25	16 x 36	18 x 36	
4700	13 x 25	13 x 25	16 x 32	18 x 36	22 x 40	22 x 40
6800						30 x 45

The specifications and drawings are subjected to change without prior notice.

NRT SERIES

ALUMINUM ELECTROLYTIC CAPACITORS

HIGH TEMPERATURE TYPE

FEATURES

* Wide operating temperature range, from -40℃ to +105℃.
* Excellent temperature performance.
* Suitable to use for power supply, automative electronics and other industrial equipment.

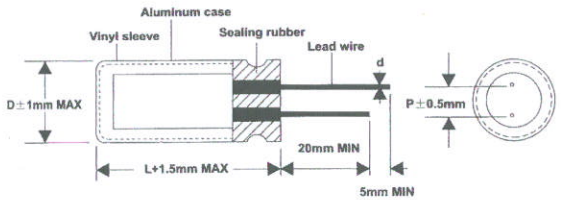
SPECIFICATION

Item	Characteristic
Operating Temperature Range	-40℃ ~ +105℃
Capacitance Tolerance	±20% (at 20℃, 120Hz)
Leakage Current	I =0.02CV or 4 (uA) which is greater (After 5 minutes applying the rated DC working voltage at 20℃)
Dissipation Factor (Tan δ) (At 20℃, 120Hz)	Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 80 / 100 Tan δ: 0.22 / 0.19 / 0.16 / 0.14 / 0.12 / 0.10 / 0.09 / 0.09 / 0.08 For capacitors whose capacitance exceeds 1,000uF, the specification of tan δ is increased by 0.02 for every addition of 1,000uF.
Surge Voltage	Rated voltage (V): 6.3 / 10 / 16 / 25 / 35 / 50 / 63 / 80 / 100 Surge voltage (V): 8 / 13 / 20 / 32 / 44 / 63 / 79 / 100 / 125
Life Test	1000 hours at 85℃ (Returned to 20℃)
	Capacitance change: ±20% / ±15% of initial measured value for 6.3~16WV / 25~100WV
	DF (tan δ): Less than 150% of the initial specified value.
	DC leakage current: Less than initial specified value.
Shelf Life Test	1000 hours at 85℃ no voltage applied (Returned to 20℃)
	Capacitance change: ±20% / ±15% of initial measured value for 6.3~16WV / 25~100WV
	DF (tan δ): Less than 200% of the initial specified value.
	DC leakage current: Less than 200% of the initial specified value.

DIMENSIONS

INTERNAL STRUCTURE

Unit : mm



LEAD SPACING AND DIAMETER

D	5	6	8	10	13	16	18	22	25
P	2.0	2.5	3.5	5.0		7.5		10	12.5
d	0.5			0.6		0.8			1.0

Rated Capacity, Rated Voltage & Case Size Corresponding Sheet

uF \ W. V.	10	16	25	35	50	63
0.1					5 x 11	
0.22					5 x 11	
0.33					5 x 11	
0.47					5 x 11	
1					5 x 11	
2.2					5 x 11	
3.3					5 x 11	
4.7					5 x 11	
6.8					5 x 11	
10			5 x 11	5 x 11	5 x 11	5 x 11
22			5 x 11	5 x 11	6 x 11	6 x 11
33	5 x 11	5 x 11	5 x 11	6 x 11	6 x 11	8 x 11
47	5 x 11	5 x 11	6 x 11	6 x 11	8 x 11	8 x 11
68	5 x 11	5 x 11	6 x 11	8 x 11	8 x 16	8 x 16
100	5 x 11	6 x 11	8 x 11	8 x 11	8 x 16	10 x 16
220	8 x 11	8 x 11	8 x 16	10 x 16	10 x 20	13 x 20
330	8 x 11	8 x 16	10 x 16	10 x 20	13 x 20	13 x 20
470	8 x 16	8 x 16	10 x 20	13 x 20	13 x 20	13 x 25
680	8 x 16	10 x 16	13 x 20	13 x 20	16 x 25	16 x 25
1000	10 x 16	10 x 20	13 x 20	13 x 25	16 x 30	16 x 35
2200	13 x 20	13 x 25	16 x 25	16 x 35	19 x 40	22 x 40
3300	13 x 25	16 x 25	16 x 35	18 x 40	22 x 40	
4700	16 x 25	16 x 35	18 x 40	22 x 40		
6800	16 x 35	18 x 35				

The specifications and drawings are subjected to change without prior notice.

NRH SERIES

ALUMINUM ELECTROLYTIC CAPACITORS

HIGH VOLTAGE TYPE

FEATURES

* Low impedance characteristics.
* Case sizes are smaller than conventional general-purpose capacitors, with very high performance.
* Capacitor can be ±20% or ±10% tolerance.

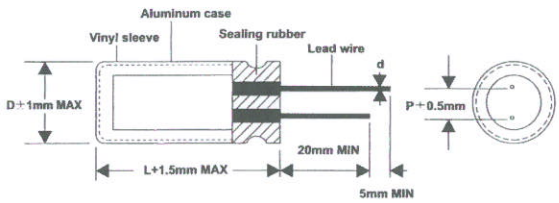
SPECIFICATION

Item	Characteristic		
Operating Temperature Range	-25℃ ~ +85℃		
Capacitance Tolerance	±20% (at 20℃, 120Hz)		
Leakage Current	I = 0.03CV + 15 (uA) (CV ≦ 1000), I= 0.02CV + 30 (uA) (CV>1000) (After 5 minutes applying the DC rated DC working voltage at 20℃)		
Dissipation Factor (Tan δ) (At 20℃, 120Hz)	Rated voltage (V): 100, 160, 200, 250, 350, 450 Tan δ: 0.08, 0.15, 0.15, 0.20, 0.20, 0.24 For capacitors whose capacitance exceeds 1,000uF, the specification of tan δ is increased by 0.02 for every addition of 1,000uF.		
Surge Voltage	Rated voltage (V): 100, 160, 200, 250, 350, 450 Surge voltage (V): 125, 200, 250, 300, 400, 500		
Life Test	1000 hours at 85℃ (Returned to 20℃)	Capacitance change	±25% of initial measured value.
		DF (tan δ)	Less than 200% of the initial specified value.
		DC leakage current	Less than the initial specified value.
Shelf Life Test	1000 hours at 85℃ no voltage applied (Returned to 20℃)	Capacitance change	±25% of initial measured value.
		DF (tan δ)	Less than 200% of the initial specified value.
		DC leakage current	Less than 200% of the initial specified value.

DIMENSIONS

INTERNAL STRUCTURE

Unit : mm



LEAD SPACING AND DIAMETER

D	5	6	8	10	13	16	18	22	25
P	2.0	2.5	3.5	5.0		7.5		10	12.5
d	0.5			0.6		0.8			1.0

Rated Capacity, Rated Voltage & Case Size Corresponding Sheet

uF \ W. V.	100	160	200	250	300	350	400	450
0.1	5 x 11	5 x 11		6 x 11		8 x 11	8 x 11	8 x 11
0.15	5 x 11	5 x 11		6 x 11		8 x 11	8 x 11	8 x 11
0.22	5 x 11	5 x 11		6 x 11		8 x 11	8 x 11	8 x 11
0.33	5 x 11	5 x 11		6 x 11		8 x 11	8 x 11	8 x 11
0.47	5 x 11	5 x 11		6 x 11	6 x 11	8 x 11	8 x 11	8 x 11
0.68	5 x 11	5 x 11		6 x 11	6 x 11	8 x 11	8 x 11	8 x 11
1	5 x 11	5 x 11	6 x 11	6 x 11	6 x 11	8 x 11	8 x 11	8 x 11
1.5	5 x 11	5 x 11	6 x 11	6 x 11	6 x 11	8 x 11	8 x 11	8 x 11
2.2	5 x 11	6 x 11	6 x 11	6 x 11	8 x 11	8 x 11	8 x 16	8 x 16
3.3	5 x 11	6 x 11	8 x 11	8 x 11	8 x 11	8 x 16	8 x 16	8 x 16
4.7	5 x 11	8 x 11	8 x 11	8 x 16	8 x 16	8 x 16	10 x 16	10 x 16
6.8	5 x 11	8 x 11	8 x 16	8 x 16	10 x 16	10 x 16	10 x 20	10 x 20
10	6 x 11	8 x 16	8 x 16	10 x 16	10 x 16	10 x 20	13 x 20	13 x 20
15	8 x 11	10 x 16	10 x 16	10 x 20	13 x 20	13 x 20	13 x 20	13 x 20
22	8 x 11	10 x 16	10 x 20	13 x 20	13 x 20	13 x 25	13 x 25	16 x 25
33	8 x 16	13 x 20	13 x 20	13 x 20	13 x 25	16 x 25	16 x 25	16 x 30
47	10 x 16	13 x 20	13 x 25	16 x 25	16 x 25	16 x 30	16 x 35	18 x 35
68	10 x 16	13 x 25	16 x 25	16 x 30	16 x 35	18 x 35	18 x 40	18 x 40
100	13 x 20	16 x 25	16 x 30	18 x 35	18 x 35	22 x 40	22 x 40	22 x 40
150	13 x 20	16 x 35	18 x 35					
220	13 x 25	18 x 40	22 x 40					
330	16 x 25	22 x 40						
470	16 x 35							

The specifications and drawings are subjected to change without prior notice.

NRM SERIES ALUMINUM ELECTROLYTIC CAPACITORS

SUPER-MINATURE TYPE

FEATURES

* Utraminature and low profile size.
* Low leakage current.
* ±20% tolerance standard, ±10% toerance available.
* Can be replacement for tantalum capacitor.

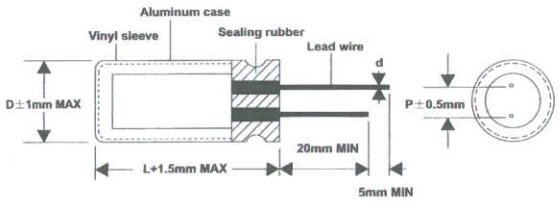
SPECIFICATION

Item	Characteristic		
Operating Temperature Range	-40℃ ~ +85℃		
Capacitance Tolerance	±20% (at 20℃, 120Hz)		
Leakage Current	I =0.02CV or 3 (uA) whichever is greater (After 5 minutes applying the rated DC working voltage at 20℃)		
Dissipation Factor (Tan δ) (At 20℃, 120Hz)	Rated voltage (V): 6.3, 10, 16, 25, 35, 50, 63 Tan δ: 0.23, 0.20, 0.17, 0.15, 0.12, 0.10, 0.10 For capacitors whose capacitance exceeds 1,000uF, the specification of tan δ is increased by 0.02 for every addition of 1,000uF.		
Surge Voltage	Rated voltage (V): 6.3, 10, 16, 25, 35, 50, 63 Surge voltage (V): 8, 13, 20, 32, 44, 63, 79		
Life Test	1000 hours at 85℃ (Returned to 20℃)	Capacitance change	±20% of initial measured value.
		DF (tan δ)	Less than 200% of the initial specified value.
		DC leakage current	Less than initial specified value.
Shelf Life Test	1000 hours at 85℃ no voltage applied (Returned to 20℃)	Capacitance change	±20% of initial measured value.
		DF (tan δ)	Less than 200% of the initial specified value.
		DC leakage current	Less than 200% of the initial specified value.

DIMENSIONS

INTERNAL STRUCTURE

Unit : mm



LEAD SPACING AND DIAMETER

D	4	5	6	8
P	1.5	2.0	2.5	3.5
d	0.45			0.5

Rated Capacity, Rated Voltage & Case Size Corresponding Sheet

uF \ W. V.	10	16	25	35	50	63
0.1					4 x 7	
0.22					4 x 7	
0.33					4 x 7	
0.47					4 x 7	
1					4 x 7	
2.2					4 x 7	
3.3					4 x 7	
4.7					4 x 7	
10			4 x 7		5 x 7	
22		4 x 7				
33	4 x 7					
47	4 x 7	5 x 7				
100	5 x 7	6 x 7				
220	6 x 7					

The specifications and drawings are subjected to change without prior notice.

NRS SERIES

ALUMINUM ELECTROLYTIC CAPACITORS

SNAP-IN TERMINAL TYPE

FEATURES

* Has a snap-in terminal, which can solder to PCB directly and need not fixture to save processing time.
* Suitable for electronic equipment with middle-high voltage circuits.

SPECIFICATION

Item	Characteristic
Operating Temperature Range	-25℃ ~ +85℃ for 160V to 450V
Capacitance Tolerance	20% (T) for 160V to 450V (at 20J, 120Hz)
Leakage Current	I = 0.06CV + 200 (uA) or 5mA whichever is greater (160V and up) (After 5 minutes applying the rated DC working voltage at 20℃)

Dissipation Factor (Tan δ) (At 20℃, 120Hz)

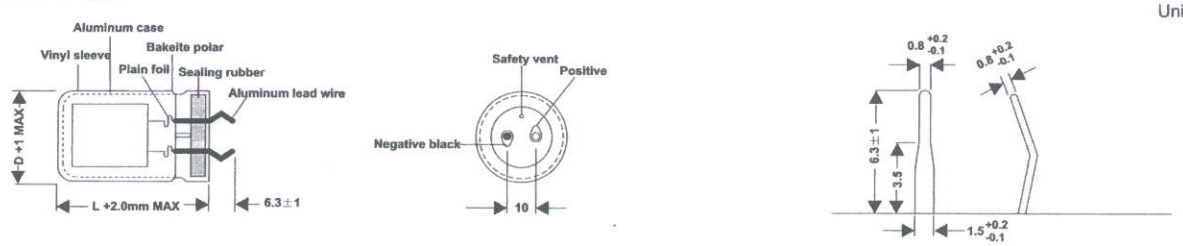
V \ CV	CV≦100,000	100,000CV≦330,000	330,000<CV
160 ~ 300	0.20	0.30	0.40
350 ~450	0.25	0.30	

Life Test	1000 hours at 85℃ (Returned to 20℃)	Capacitance change	±20% of initial measured value.
		DF (tan δ)	Less than 200% of the initial specified value.
		DC leakage current	Less than the initial specified value.
Shelf Life Test	1000 hours at 85℃ no voltage applied (Returned to 20℃)	Capacitance change	±20% max of initial measured value.
		DF (tan δ)	Less than 150% of the initial specified value.
		DC leakage current	Less than 200% of the initial specified value.

DIMENSIONS

INTERNAL STRUCTURE

Unit : mm



Rated Capacity, Rated Voltage & Case Size Corresponding Sheet

DxL(mm) / CR(uF) \ UR(V) / US(V)	160 / 200	200 / 250	250 / 300	300 / 365	350 / 400	400 / 450
33						22 x 30
47			16 x 25	22 x 30	22 x 30	22 x 30
68				22 x 40	22 x 40	22 x 40
100	22 x 30	22 x 30	22 x 40	25 x 40	25 x 40	25 x 40
150	22 x 30	22 x 30	25 x 40	25 x 50	25 x 50	25 x 50
220	25 x 40	25 x 40	25 x 50	30 x 40	30 x 50	30 x 50
		22 x 35				25 x 40
330	25 x 40	25 x 50	30 x 40			
470	25 x 40	30 x 50				30 x 50
	25 x 50					

The specifications and drawings are subjected to change without prior notice.