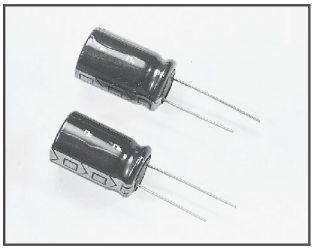
Miniature Aluminum Electrolytic Capacitors

NRWS Series

RADIAL LEADS, POLARIZED, NEW FURTHER REDUCED CASE SIZING,
FROM NRWA WIDE TEMPERATURE RANGE

EXTENDED TEMPERATURE
NRWA (today's standard) → NRWS (reduced sizes)

RoHS Compliant
includes all homogeneous materials
*See Part Number System for Details



CHARACTERISTICS

Rated Voltage Range		6.3 ~ 100VDC							
Capacitance Range		0.1 ~ 15,000µF							
Operating Temperature Range		-55°C ~ +105°C							
Capacitance Tolerance		±20% (M)							
Maximum Leakage Current @ +20°c	After 1 min.	0.03CV or 4µA whichever is greater							
	After 2 min.	0.01CV or 3µA whichever is greater							
Max. Tan δ at 120Hz/20°C	W.V. (Vdc)	6.3	10	16	25	35	50	63	100
	S.V. (Vdc)	8	13	20	32	44	63	79	125
	C ≤ 1,000µF	0.28	0.24	0.20	0.16	0.14	0.12	0.10	0.08
	C = 2,200µF	0.30	0.26	0.22	0.18	0.16	0.14	-	-
	C = 3,300µF	0.32	0.28	0.24	0.20	0.18	0.16	-	-
	C = 4,700µF	0.34	0.30	0.26	0.22	0.20	-	-	-
	C = 6,800µF	0.36	0.32	0.28	0.24	-	-	-	-
	C = 10,000µF	0.38	0.34	0.30	-	-	-	-	-
	C = 15,000µF	0.56	0.52	-	-	-	-	-	-
Low Temperature Stability Impedance Ratio @ 120Hz	Z-25°C/Z+20°C	5	4	3	2	2	2	2	2
	Z-40°C/Z+20°C	12	10	8	5	4	4	4	4
Load Life Test at +105°C & Rated W.V 2,000 Hours: 16V ~ 100V D≥ 10ϕ 1,000 Hours: All others	Δ Capacitance	Within ±20% of initial measured value							
	Δ Tan δ	Less than 200% of specified value							
	Δ LC	Less than specified value							
Shelf Life Test +105°C 1,000 Hours No Load	Δ Capacitance	Within ±20% of initial measured value							
	Δ Tan δ	Less than 200% of specified value							
	Δ LC	Less than specified value							

Note: Capacitors shall conform to JIS-C-5141, unless otherwise specified here.
*1. Add 0.5 every 1000µF for more than 1000µF *2. Add 1.0 every 1000µF for more than 1000µF

MAXIMUM PERMISSIBLE RIPPLE CURRENT (mA rms AT 100KHz AND 105°C)

Cap. (µF)	Working Voltage (Vdc)							
	6.3	10	16	25	35	50	63	100
0.1	-	-	-	-	-	10	-	-
0.22	-	-	-	-	-	10	-	-
0.33	-	-	-	-	-	10	-	-
0.47	-	-	-	-	-	20	15	-
1.0	-	-	-	-	-	30	30	-
2.2	-	-	-	-	-	40	42	-
3.3	-	-	-	-	-	50	58	-
4.7	-	-	-	-	-	80	64	-
10	-	-	-	-	-	90	90	-
22	-	-	-	-	-	110	140	235
33	-	-	-	-	120	120	200	300
47	-	-	-	150	140	180	240	330
100	-	150	150	240	180	310	300	450
220	160	240	240	3780	360	500	520	700
330	240	250	370	400	580	650	765	950
470	250	370	450	560	650	800	960	1100
1,000	450	560	760	900	900	1100	1100	-
2,200	760	900	1100	1320	1400	1650	-	-
3,300	900	1100	1320	1600	1800	2000	-	-
4,700	1100	1420	1600	1900	2000	-	-	-
6,800	1420	1700	1900	2200	-	-	-	-
10,000	1700	1950	2300	-	-	-	-	-
15,000	2100	2400	-	-	-	-	-	-

MAXIMUM IMPENDANCE (Ω AT 100KHz AND 20°C)

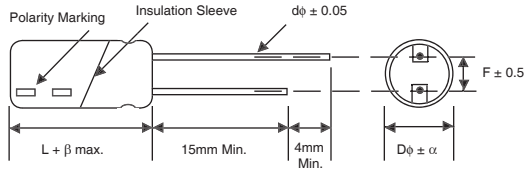
Cap. (µF)	Working Voltage (Vdc)							
	6.3	10	16	25	35	50	63	100
0.1	-	-	-	-	-	30	-	-
0.22	-	-	-	-	-	20	-	-
0.33	-	-	-	-	-	15	-	-
0.47	-	-	-	-	-	10	15	-
1.0	-	-	-	-	-	7.0	10.5	-
2.2	-	-	-	-	-	5.5	8.3	-
3.3	-	-	-	-	-	4.0	6.0	-
4.7	-	-	-	-	-	2.80	4.20	-
10	-	-	-	-	-	2.30	2.80	-
22	-	-	-	-	-	2.20	2.40	0.83
33	-	-	-	-	2.10	2.10	1.40	0.60
47	-	-	-	1.40	2.10	1.10	1.30	0.39
100	-	1.40	1.40	0.60	1.10	310	300	450
220	1.40	0.58	0.55	0.39	0.46	0.30	0.22	0.15
330	0.58	0.55	0.35	0.34	0.26	0.20	0.17	0.09
470	0.55	0.39	0.28	0.17	0.18	0.13	0.14	0.085
1,000	0.26	0.16	0.13	0.10	0.11	0.10	0.065	-
2,200	0.12	0.10	0.075	0.062	0.056	0.055	-	-
3,300	0.10	0.074	0.054	0.043	0.038	0.035	-	-
4,700	0.072	0.054	0.043	0.035	0.035	-	-	-
6,800	0.054	0.043	0.035	0.028	-	-	-	-
10,000	0.043	0.035	0.028	-	-	-	-	-
15,000	0.032	0.028	-	-	-	-	-	-

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

Cap. (µF)	Code	Working Voltage (Vdc)							
		6.3	10	16	25	35	50	63	100
0.1	R10	-	-	-	-	-	5x11	-	-
0.22	R22	-	-	-	-	-	5x11	-	-
0.33	R33	-	-	-	-	-	5x11	-	-
0.47	R47	-	-	-	-	-	5x11	5x11	-
1.0	1R0	-	-	-	-	-	5x11	5x11	-
2.2	2R2	-	-	-	-	-	5x11	5x11	-
3.3	3R3	-	-	-	-	-	5x11	5x11	-
4.7	4R7	-	-	-	-	-	5x11	5x11	-
10	100	-	-	-	-	-	5x11	5x11	-
22	220	-	-	-	-	-	5x11	5x11	8x11.5
33	330	-	-	-	-	5x11	5x11	6.3x11	8x12.5
47	470	-	-	-	5x11	5x11	6.3x11	6.3x11	10x12.5
100	101	-	5x11	5x11	6.3x11	6.3x11	8x11.5	8x12.5	10x20
220	221	5x11	6.3x11	6.3x11	8x11.5	8x11.5	10x12.5	10x16	12.5x25
330	331	6.3x11	6.3x11	8x11.5	8x11.5	10x12.5	10x16	10x20	16x25
470	471	6.3x11	6.3x11	8x11.5	10x12.5	10x16	10x20	12.5x20	16x31
1,000	102	8x11.5	10x12.5	10x16	10x20	12.5x20	12.5x25	16x25	-
2,200	222	10x16	10x20	12.5x20	12.5x25	16x25	16x31	-	-
3,300	332	10x20	12.5x20	12.5x25	16x25	16x35	18x36	-	-
4,700	472	12.5x20	12.5x25	16x25	16x31	18x36	-	-	-
6,800	682	12.5x25	16x25	16x31	18x36	-	-	-	-
10,000	103	16x25	16x31	18x36	-	-	-	-	-
15,000	153	16x36	18x36	-	-	-	-	-	-

LEAD SPACING AND DIAMETER (mm)

Case Dia. (Dϕ)	5	6.3	8	10	12.5	16	18
Lead Dia. (Dϕ)	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



β = L < 20mm = 1.5mm, L ≥ 20mm = 2.0mm

PART NUMBER SYSTEM

NRWS 101 M 35V 6.3X11 F

- F — RoHS Compliant
- 6.3X11 — Case Size (Dϕ x L)
- 35V — Working Voltage (Vdc)
- M — Tolerance Code (M=20%)
- 101 — Capacitance Code: First 2 characters significant, third character is multiplier
- NRWS — Series

RIPPLE CURRENT CORRECTION FACTORS

Cap. (µF)	Frequency (Hz)		
	100	1K	10K ~
~ 47	0.50	0.80	1.0
> 47 ~ 220	0.55	0.85	1.0
> 220 ~ 1,000	0.65	0.90	1.0
> 1,000	0.75	0.90	1.0

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**
If in doubt or uncertainty, please review your specific application - process details with NIC's technical support personnel: **tpmg@niccomp.com**