NRLAW Series
Large Can Aluminum Electrolytic Capacitors

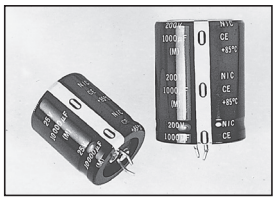
AEC-Q200 QUALIFIED

ROHS/REACH COMPLIANT HALOGEN FREE

NIC COMPONENTS
Performance Passives By Design

FEATURES
- LONG LIFE AT +105°C (3,000 HOURS)
- EXPANDED CV VALUE RANGE
- HIGH RIPPLE CURRENT ENDURANCE IN SMALLER SIZE
- NEW SIZES FOR LOW PROFILE AND HIGH DENSITY DESIGN OPTIONS
- CAN-TOP SAFETY VENT
- DESIGNED AS INPUT FILTER OF SWITCHED MODE POWER SUPPLY
- MEETS REQUIREMENTS OF AEC-Q200*

*Contact NIC for supporting details



SPECIFICATIONS

Operating Temperature Range		-40 ~ +105°C							-25 ~ +105°C	
Rated Voltage Range		200 ~ 450Vdc							500 ~ 550Vdc	
Rated Capacitance Range		68 ~ 2,200µF								
Capacitance Tolerance		±20% (M)								
Max. Leakage Current (µA) After 5 minutes (20°C)		See Standard Product Tables								
Max. Tan δ at 120Hz/20°C	W.V. (Vdc)	200	250	315	350	400	420	450	500	550
	Tan δ max.	0.15	0.15	0.15	0.15	0.15	0.15	0.20	0.20	0.20
Surge Voltage	W.V. (Vdc)	200	250	315	350	400	420	450	500	550
	S.V. (Vdc)	230	288	363	385	440	462	495	550	605
Impedance Ration (Low Temperature Stability)	Z (-25°C)/Z (+20°C)	4		5					6	
	Z (-40°C)/Z (+20°C)	7		10					-	
Load Life Test 3,000 hours at +105°C	Capacitance Change	Within ±15% of initial measured value								
	Tan δ	Less than 175% of specified maximum value								
	Leakage Current	Less than specified maximum value								
Shelf Life Test 1,000 hours at +105°C (no load)	Capacitance Change	Within ±15% of initial measured value								
	Tan δ	Less than 175% of specified maximum value								
	Leakage Current	Less than specified maximum value								

Ripple Current Correction Factors	Frequency (Hz)		60 (50)	120 (100)	300	1K	10K	50K ~ 100K
	Multiplier at 105°C	200 ~ 250Vdc	0.81	1.00	1.17	1.32	1.45	1.50
		315 ~ 550Vdc	0.77	1.00	1.16	1.30	1.41	1.43

MECHANICAL CHARACTERISTICS:

Safety Vent:

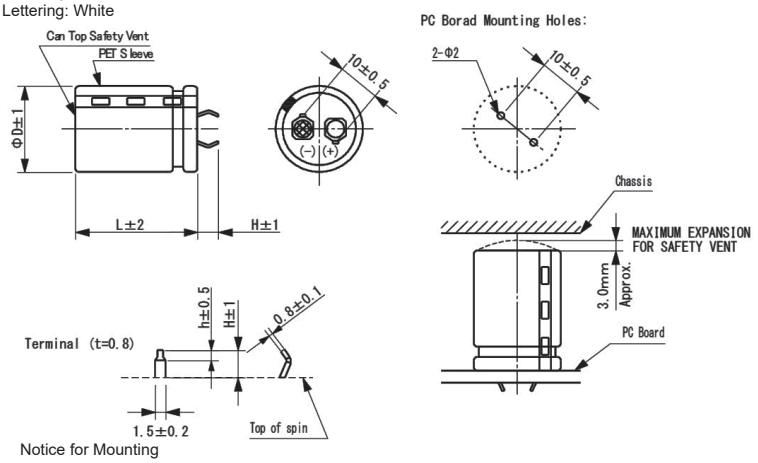
The capacitors are provided with a pressure vent on the top of can. The vent is designed to rupture in the event that high internal gas pressure is developed by circuit malfunction or mis-use like reverse voltage.

PART NUMBER SYSTEM

NRLAW 221 M 450V 25X35 S F

- F — RoHS compliant
- S — Lead Length: S = 4mm, L = 6mm
- 25X35 — Case Size (mm)
- 450V — Voltage Rating
- M — Tolerance Code
- 221 — Capacitance Code
- NRLAW — Series

Sleeve Color: Black
Lettering: White



Notice for Mounting

The space from the top of the can shall be more than (3mm) from chassis or other construction materials so that safety vent has room to expand in case of emergency.

PRECAUTIONS

Please review the notes on correct use, safety and precautions found at
https://www.niccomp.com/wp-content/uploads/files/aluminum/AlumApplInfoCautions.pdf
If in doubt or uncertainty, please review your specific application - process details with NIC's technical support personnel: tpmg@niccomp.com

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Performance Passives By Design

Part Number	Voltage (VDC)	Cap (µF)	Case Size D x L (mm)	Dissipation Factor	Max. Leakage Current (µA)	MAX. ESR (mΩ@20°C) 120Hz	Max. Ripple Current (Arms @ 105°C) 10KHz ~ up
NRLAW391M200V22X30SF	200	390	22X30	0.15	838	510	1560
NRLAW471M200V22X30SF		470	22X30	0.15	920	420	1680
NRLAW471M200V22X35SF		470	22X35	0.15	920	420	1790
NRLAW471M200V25X25SF		470	25X25	0.15	920	420	1680
NRLAW561M200V22X40SF		560	22X40	0.15	1004	360	1880
NRLAW561M200V25X30SF		560	25X30	0.15	1004	360	1780
NRLAW561M200V35X20SF		560	35X20	0.15	1004	360	1400
NRLAW681M200V22X40SF		680	22X40	0.15	1107	290	2150
NRLAW821M200V30X25SF		820	30X25	0.15	1215	240	2340
NRLAW821M200V30X30SF		820	30X30	0.15	1215	240	2510
NRLAW821M200V35X25SF		820	35X25	0.15	1215	240	2560
NRLAW102M200V22X50SF		1000	22X50	0.15	1342	200	2660
NRLAW102M200V25X40SF		1000	25X40	0.15	1342	200	2580
NRLAW102M200V25X45SF		1000	25X45	0.15	1342	200	2720
NRLAW122M200V30X35SF		1200	30X35	0.15	1470	170	3420
NRLAW182M200V35X40SF		1800	35X40	0.15	1800	110	4460
NRLAW222M200V35X45SF		2200	35X45	0.15	1990	90	5110
NRLAW221M250V22X25SF	250	220	22X25	0.15	704	900	1150
NRLAW271M250V22X30SF		270	22X30	0.15	780	740	1300
NRLAW331M250V22X30SF		330	22X30	0.15	862	600	1520
NRLAW471M250V22X35SF		470	22X35	0.15	1029	420	1850
NRLAW471M250V22X40SF		470	22X40	0.15	1029	420	1960
NRLAW471M250V25X30SF		470	25X30	0.15	1029	420	1720
NRLAW471M250V30X25SF		470	30X25	0.15	1029	420	1880
NRLAW471M250V35X25SF		470	35X25	0.15	1029	420	2070
NRLAW681M250V22X45SF		680	22X45	0.15	1237	290	2990
NRLAW681M250V22X50SF		680	22X50	0.15	1237	290	2410
NRLAW102M250V30X40SF		1000	30X40	0.15	1500	200	3300
NRLAW102M250V35X30SF		1000	35X30	0.15	1500	200	3160
NRLAW102M250V35X40SF		1000	35X40	0.15	1500	200	3540
NRLAW152M250V35X45SF		1500	35X45	0.15	1838	130	4340
NRLAW681M315V25X50SF	315	680	25X50	0.15	1389	290	2580
NRLAW221M350V22X30SF	350	220	22X30	0.15	833	900	1230
NRLAW221M350V22X35SF		220	22X35	0.15	833	900	1320
NRLAW471M350V30X30SF		470	30X30	0.15	1217	420	1860
NRLAW471M350V30X40SF		470	30X40	0.15	1217	420	2090
NRLAW471M350V35X25SF		470	35X25	0.15	1217	420	1940
NRLAW102M350V35X45SF		1000	35X45	0.15	1775	200	3290
NRLAW122M350V35X50SF		1200	35X50	0.15	1945	170	3790
NRLAW101M400V22X25SF	400	100	22X25	0.15	600	1990	670
NRLAW121M400V22X25SF		120	22X25	0.15	658	1660	770
NRLAW151M400V25X25SF		150	25X25	0.15	735	1330	890
NRLAW151M400V25X30SF		150	25X30	0.15	735	1330	960

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Part Number	Voltage (VDC)	Cap (µF)	Case Size D x L (mm)	Dissipation Factor	Max. Leakage Current (µA)	MAX. ESR (mΩ@20°C) 120Hz	Max. Ripple Current (Arms @ 105°C) 10KHz ~ up
NRLAW221M400V22X45SF	400	220	22X45	0.15	890	900	1200
NRLAW221M400V25X35SF		220	25X35	0.15	890	900	1200
NRLAW221M400V25X40SF		220	25X40	0.15	890	900	1170
NRLAW221M400V30X25SF		220	30X25	0.15	890	900	1150
NRLAW221M400V30X30SF		220	30X30	0.15	890	900	1240
NRLAW221M400V35X25SF		220	35X25	0.15	890	900	1240
NRLAW271M400V25X45SF		270	25X45	0.15	986	740	1350
NRLAW271M400V35X25SF		270	35X25	0.15	986	740	1300
NRLAW331M400V22X50SF		330	22X50	0.15	1090	600	1470
NRLAW331M400V25X40SF		330	25X40	0.15	1090	600	1420
NRLAW331M400V30X40SF		330	30X40	0.15	1090	600	1580
NRLAW391M400V22X55SF		390	22X55	0.15	1185	510	1650
NRLAW391M400V30X35SF		390	30X35	0.15	1185	510	1630
NRLAW391M400V35X35SF		390	35X35	0.15	1185	510	1780
NRLAW471M400V30X35SF		470	30X35	0.15	1301	420	1680
NRLAW471M400V30X50SF		470	30X50	0.15	1301	420	2070
NRLAW471M400V35X35SF		470	35X35	0.15	1301	420	1980
NRLAW471M400V35X40SF		470	35X40	0.15	1301	420	2070
NRLAW561M400V25X60SF		560	25X60	0.15	1420	360	2210
NRLAW561M400V30X40SF		560	30X40	0.15	1420	360	2050
NRLAW561M400V30X45SF		560	30X45	0.15	1420	360	2190
NRLAW561M400V35X35SF		560	35X35	0.15	1420	360	2130
NRLAW561M400V35X45SF		560	35X45	0.15	1420	360	2360
NRLAW681M400V30X50SF		680	30X50	0.15	1565	290	2490
NRLAW681M400V35X35SF		680	35X35	0.15	1565	290	2350
NRLAW681M400V35X45SF		680	35X45	0.15	1565	290	2600
NRLAW681M400V35X50SF		680	35X50	0.15	1565	290	2720
NRLAW821M400V35X55SF		820	35X55	0.15	1719	240	3110
NRLAW102M400V35X50SF		1000	35X50	0.15	1898	200	3300
NRLAW102M400V35X55SF		1000	35X55	0.15	1898	200	3440
NRLAW102M400V35X60SF		1000	35X60	0.15	1898	200	3570
NRLAW122M400V35X60SF		1200	35X60	0.15	2079	170	3910
NRLAW122M400V35X70SF		1200	35X70	0.15	2079	170	4180
NRLAW152M400V35X80SF		1500	35X80	0.15	2324	130	4600
NRLAW121M420V22X30SF	420	120	22X30	0.15	674	1870	1060
NRLAW681M420V30X55SF		680	30X55	0.15	1604	390	2760
NRLAW820M450V25X20SF	450	82	25X20	0.20	577	3230	530
NRLAW101M450V22X30SF		100	22X30	0.20	637	2650	720
NRLAW101M450V25X25SF		100	25X25	0.20	637	2650	720
NRLAW121M450V25X25SF		120	25X25	0.20	698	2210	780
NRLAW121M450V30X25SF		120	30X25	0.20	698	2210	850
NRLAW151M450V22X35SF		150	22X35	0.20	780	1770	940
NRLAW151M450V25X25SF		150	25X25	0.20	780	1770	870

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Performance Passives By Design

Part Number	Voltage (VDC)	Cap (µF)	Case Size D x L (mm)	Dissipation Factor	Max. Leakage Current (µA)	MAX. ESR (mΩ@20°C) 120Hz	Max. Ripple Current (Arms @ 105°C) 10KHz ~ up
NRLAW151M450V25X30SF	450	150	25X30	0.20	780	1770	960
NRLAW151M450V35X25SF		150	35X25	0.20	780	1770	1090
NRLAW181M450V22X30SF		180	22X30	0.20	854	1470	970
NRLAW181M450V22X40SF		180	22X40	0.20	854	1470	1100
NRLAW181M450V25X25SF		180	25X25	0.20	854	1470	990
NRLAW181M450V25X30SF		180	25X30	0.20	854	1470	1020
NRLAW181M450V30X25SF		180	30X25	0.20	854	1470	1080
NRLAW181M450V30X30SF		180	30X30	0.20	854	1470	1210
NRLAW221M450V25X30SF		220	25X30	0.20	944	1210	1080
NRLAW221M450V25X35SF		220	25X35	0.20	944	1210	1150
NRLAW221M450V25X40SF		220	25X40	0.20	944	1210	1240
NRLAW221M450V30X25SF		220	30X25	0.20	944	1210	1120
NRLAW221M450V30X30SF		220	30X30	0.20	944	1210	1240
NRLAW221M450V35X25SF		220	35X25	0.20	944	1210	1240
NRLAW271M450V22X45SF		270	22X45	0.20	1046	980	1260
NRLAW271M450V22X50SF		270	22X50	0.20	1046	980	1300
NRLAW271M450V25X50SF		270	25X50	0.20	1046	980	1420
NRLAW271M450V30X25SF		270	30X25	0.20	1046	980	1190
NRLAW271M450V30X30SF		270	30X30	0.20	1046	980	1280
NRLAW271M450V30X35SF		270	30X35	0.20	1046	980	1350
NRLAW331M450V22X55SF		330	22X55	0.20	1157	800	1560
NRLAW331M450V25X45SF		330	25X45	0.20	1157	800	1500
NRLAW331M450V25X50SF		330	25X50	0.20	1157	800	1570
NRLAW331M450V30X30SF		330	30X30	0.20	1157	800	1400
NRLAW331M450V30X40SF		330	30X40	0.20	1157	800	1580
NRLAW331M450V35X25SF		330	35X25	0.20	1157	800	1400
NRLAW331M450V35X30SF		330	35X30	0.20	1157	800	1580
NRLAW331M450V35X35SF		330	35X35	0.20	1157	800	1660
NRLAW391M450V25X50SF		390	25X50	0.20	1257	680	1650
NRLAW391M450V30X30SF		390	30X30	0.20	1257	680	1500
NRLAW391M450V30X40SF		390	30X40	0.20	1257	680	1720
NRLAW391M450V30X45SF		390	30X45	0.20	1257	680	1800
NRLAW391M450V30X50SF		390	30X50	0.20	1257	680	1890
NRLAW391M450V35X35SF		390	35X35	0.20	1257	680	1790
NRLAW471M450V30X45SF		470	30X45	0.20	1380	560	1850
NRLAW471M450V30X50SF		470	30X50	0.20	1380	560	2080
NRLAW471M450V35X35SF		470	35X35	0.20	1380	560	1970
NRLAW471M450V35X40SF		470	35X40	0.20	1380	560	2080
NRLAW471M450V35X45SF		470	35X45	0.20	1380	560	2160
NRLAW561M450V25X60SF		560	25X60	0.20	1506	470	2210
NRLAW561M450V30X45SF		560	30X45	0.20	1506	470	2160
NRLAW561M450V30X50SF		560	30X50	0.20	1506	470	2260
NRLAW561M450V35X40SF		560	35X40	0.20	1506	470	2250

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NRLAW561M450V35X45SF	450	560	35X45	0.20	1506	470	2360
NRLAW561M450V35X50SF		560	35X50	0.20	1506	470	2470
NRLAW681M450V30X50SF		680	30X50	0.20	1660	390	2410
NRLAW681M450V30X55SF		680	30X55	0.20	1660	390	2510
NRLAW681M450V35X50SF		680	35X50	0.20	1660	390	2720
NRLAW821M450V30X60SF		820	30X60	0.20	1823	320	2700
NRLAW821M450V35X45SF		820	35X45	0.20	1823	320	2700
NRLAW821M450V35X55SF		820	35X55	0.20	1823	320	3000
NRLAW821M450V35X60SF		820	35X60	0.20	1823	320	3230
NRLAW821M450V35X65SF		820	35X65	0.20	1823	320	3350
NRLAW102M450V35X65SF		1000	35X65	0.20	2013	270	3380
NRLAW102M450V35X70SF		1000	35X70	0.20	2013	270	3500
NRLAW122M450V35X80SF		1200	35X80	0.20	2205	220	3600
NRLAW680M500V22X35SF	500	68	22X35	0.20	554	3900	560
NRLAW820M500V22X40SF		82	22X40	0.20	608	3230	740
NRLAW101M500V30X30SF		100	30X30	0.20	671	2650	850
NRLAW121M500V25X30SF		120	25X30	0.20	735	2210	840
NRLAW151M500V25X30SF		150	25X30	0.20	822	1770	950
NRLAW151M500V30X40SF		150	30X40	0.20	822	1770	1190
NRLAW181M500V25X40SF		180	25X40	0.20	900	1470	1120
NRLAW181M500V30X30SF		180	30X30	0.20	900	1470	1110
NRLAW221M500V25X40SF		220	25X40	0.20	995	1210	1250
NRLAW221M500V30X45SF		220	30X45	0.20	995	1210	1470
NRLAW221M500V35X30SF		220	35X30	0.20	995	1210	1240
NRLAW271M500V25X50SF		270	25X50	0.20	1103	980	1470
NRLAW271M500V30X30SF		270	30X30	0.20	1103	980	1200
NRLAW271M500V30X35SF		270	30X35	0.20	1103	980	1300
NRLAW271M500V35X40SF		270	35X40	0.20	1103	980	1620
NRLAW331M500V25X60SF		330	25X60	0.20	1219	800	1770
NRLAW331M500V30X45SF		330	30X45	0.20	1219	800	1750
NRLAW391M500V35X50SF		390	35X50	0.20	1325	680	1930
NRLAW471M500V35X45SF		470	35X45	0.20	1455	560	2020
NRLAW471M500V35X60SF		470	35X60	0.20	1455	560	2280
NRLAW561M500V30X60SF		560	30X60	0.20	1588	470	2050
NRLAW561M500V35X55SF		560	35X55	0.20	1588	470	2150
NRLAW561M500V35X60SF		560	35X60	0.20	1588	470	2240
NRLAW681M500V35X60SF		680	35X60	0.20	1750	390	2270
NRLAW681M500V35X70SF		680	35X70	0.20	1750	390	2430
NRLAW821M500V35X80SF		820	35X80	0.20	1921	320	2850
NRLAW680M550V22X30SF	550	68	22X30	0.20	581	3900	600
NRLAW820M550V22X35SF		82	22X35	0.20	638	3500	650
NRLAW121M550V22X40SF		120	22X40	0.20	771	2210	890
NRLAW121M550V25X35SF		120	25X35	0.20	771	2210	900

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NRLAW121M550V30X30SF	550	120	30X30	0.20	771	2210	940
NRLAW151M550V30X35SF		150	30X35	0.20	862	1770	1100
NRLAW151M550V30X40SF		150	30X40	0.20	862	1770	1160
NRLAW181M550V30X40SF		180	30X40	0.20	944	1470	1200
NRLAW181M550V35X40SF		180	35X40	0.20	944	1470	1250
NRLAW221M550V25X55SF		220	25X55	0.20	1044	1210	1300
NRLAW221M550V35X35SF		220	35X35	0.20	1044	1210	1300
NRLAW271M550V30X50SF		270	30X50	0.20	1157	980	1500
NRLAW271M550V35X35SF		270	35X35	0.20	1157	980	1440
NRLAW271M550V35X45SF		270	35X45	0.20	1157	980	1600
NRLAW331M550V35X45SF		330	35X45	0.20	1279	800	1600
NRLAW471M550V35X60SF		470	35X60	0.20	1526	560	2030
NRLAW471M550V35X70SF		470	35X70	0.20	1526	560	2170