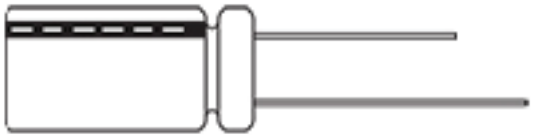
Aluminum Electrolytic Capacitors
RA Series: Radial, Very Low Leakage, 105°C



FEATURES

- •105°C, 1000 hours assured.
- •Very Low leakage current.
- •Use in high temperature industrial equipment.

SPECIFICATIONS

Item	Performance
Operating Temperature Range	-40°C ~ +105°C
Capacitance Tolerance	± 20% (120Hz, 20°C)
Leakage Current (at 20°C)	I = 0.002CV or 0.4 (μA) whichever is greater (after 2 minutes). Where, C = rated capacitance in F. V=rated DC working voltage in V.

Dissipaton Factor Tan at 120 Hz, 20°C

Rated Voltage	6.3	10	16	25	35	50	63	100
Tan (max)	0.24	0.21	0.16	0.14	0.12	0.10	0.09	0.08

When the capacitance exceed 1000 F 0.02 shall be added every 1000 F. Impedance ratio shall not exceed the values given in the table below.

Low Temperature Characteristics (at 120Hz)

Rated Voltage		6.3	10	16	25	35	50	63	100
Impedance Ratio	Z(-25°C)/Z(+20°C)	4	3	3	2	2	2	2	2
	Z(-40°C)/Z(+20°C)	8	6	6	4	4	3	3	3

Load Life Test (after application of the rated voltage applied for 1000 hours at 105°C)

Test Time	1000 Hrs
Capacitance Change	≤ ± 20%
Dissipation Factor	Less than 200% of specified value
Leakage Current	Within specified value

Shelf Life Test (at 20°C after rated voltage applied for 1000 hours at 105°C without voltage applied)

Test Time	1000 Hrs
Capacitance Change	≤ ± 20%
Dissipation Factor	Less than 200% of specified value
Leakage Current	Within specified value

Ripple Current & Frequency Multilpiers

Cap. (μF) \ Freq. (Hz)	60(50)	120	500	1K	10K up
Under 100	0.75	1.00	1.35	1.55	1.90
220 to 1000	0.83	1.00	1.23	1.32	1.45
2200 up above	0.90	1.00	1.12	1.10	1.12

Riple Current & Temperature Multipliers

Temperature (°C)	Under 50	70	85	105
Multipliers	2.20	1.75	1.58	1.00

Standards	Satisfies Characteristic W of JIS C 5141

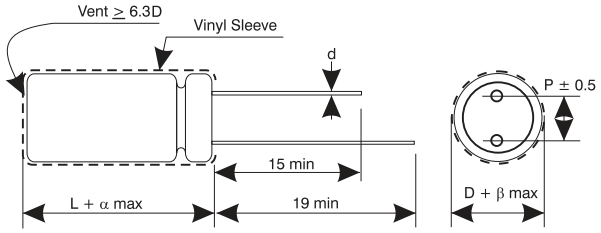
DIMENSIONS AND PERMISSIBLE RIPPLE CURRENT

Dimension: D×L(mm) Ripple Current: mA/RMS at 120Hz 105°C

VDC / μF	Code	6.3V(0J)		10V(1A)		16V(1C)		25V(1E)		35V(1H)		50V(1H)		63V(1J)		100V(2A)	
		DXL	mA	DXL	mA	DXL	mA	DXL	mA	DXL	mA	DXL	mA	DXL	mA	DXL	mA
0.1	0R1											5 x 11	1.3			5 x 11	2.6
0.22	R22											5 x 11	2.9			5 x 11	5.8
0.33	R33											5 x 11	4.4			5 x 11	8
0.47	R47											5 x 11	7			5 x 11	10
1	010											5 x 11	13			5 x 11	15
2.2	2R2											5 x 11	20			5 x 11	23
3.3	3R3											5 x 11	25			5 x 11	29
4.7	4R7							5 x 11	26	5 x 11	28	5 x 11	30	5 x 11	32	5 x 11	34
10	100					5 x 11	35	5 x 11	38	5 x 11	41	5 x 11	46	5 x 11	50	6.3 x 11	56
22	220			5 x 11	49	5 x 11	54	5 x 11	57	5 x 11	61	5 x 11	68	6.3 x 11	82	8 x 11.5	96
33	330	5 x 11	54	5 x 11	60	5 x 11	64	5 x 11	69	5 x 11	75	6.3 x 11	90	6.3 x 11	100	10 x 12.5	140
47	470	5 x 11	65	5 x 11	70	5 x 11	99	5 x 11	82	6.3 x 11	100	6.3 x 11	110	8 x 11.5	135	10 x 16	180
100	101	5 x 11	95	5 x 11	105	6.3 x 11	125	6.3 x 11	135	8 x 11.5	170	8 x 11.5	180	10 x 12.5	225	13 x 20	320
220	221	6.3 x 11	160	6.3 x 11	175	8 x 11.5	215	8 x 11.5	230	10 x 12.5	300	10 x 16	345	10 x 20	400	16 x 25	570
330	331	6.3 x 11	195	8 x 11.5	245	8 x 11.5	260	10 x 12.5	335	10 x 16	400	10 x 20	460	13 x 20	540	16 x 25	700
470	471	8 x 11.5	270	8 x 11.5	290	10 x 12.5	370	10 x 16	440	10 x 20	520	13 x 20	610	13 x 25	700	16 x 31.5	880
1000	102	10 x 12.5	460	10 x 16	550	10 x 20	640	13 x 20	770	13 x 25	920	16 x 25	1080	16 x 31.5	1210		
2200	222	13 x 20	810	13 x 20	860	13 x 25	1000	16 x 25	1170	16 x 31.5	1340	18 x 35.5	1530				
3300	332	13 x 20	960	13 x 25	1100	16 x 25	1300	16 x 31.5	1460	18 x 35.5	1650						
4700	472	16 x 25	1330	16 x 25	1400	16 x 31.5	1600	18 x 35.5	1780	18 x 40	1900						

■ LEAD SPACING AND DIAMETER SPECIFICATIONS

D	5	6.3	8	10	13	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
d	0.5		0.6			0.8	
α	1.0			1.5			
β	0.5						



■ HOW TO MAKE A PART NUMBER

RA 220 M 1C BK 050110

(1) RA Series
(2) 22 µF Capacitance
(3) ±20% Tolerance
(4) 16V Rated Voltage
(5) Packaging
(6) 5 x 11mm Case Size
(7) Sleeve Type

1. Series: RA

2. Capacitance: Rated capacitance in µF is represented by a three digit number. The first two digits are the significant figures of the nominal capacitance and the third digit indicates the number of zeros following these figures. The decimal point is represented by the capital letter R. Please refer to the following example.

µF	0.1	0.47	1	4.7	10	47	100	470	1000	4700	10000
Part Number	0R1	R47	010	4R7	100	470	101	471	102	472	103

3. Tolerance: (20% IS Typical)

Code	K	M	T	W
Tolerance	± 10%	± 20%	+ 50% / -10%	+ 100% / -10%

4. Rated Voltage: Voltage in volts (V) is represented by a two digit code showing the rated working voltage indicated as follows:

Voltage (WV)	6.3	10	16	25	35	40	50	63	80	100	160	200	250	350	400	450
Code	0J	1A	1C	1E	1V	1G	1H	1J	1K	2A	2C	2D	2E	2V	2G	2W

5. Lead Forming & Package

Code	Lead Description	Packaging
BC	Bending Cut	Bulk Packing
BK	Straight Lead	Bulk Packing
CC	Lead Cutting	Bulk Packing
FC	Lead Forming & Cutting	Bulk Packing
SD	Cathode Lead Beading	Bulk Packing
SA	Straight Lead	Tape & Ammo
TA	Lead Forming	Tape & Ammo
SR	Straight Lead	Tape & Reel
TR	Lead Forming	Tape & Reel

6. Can Size
Diameter (mm)x10 & Length (mm)x10. Can Size 063110, represents 6.3mm diameter by 11mm length.

7. Sleeve Type* = (Omit) PVC Sleeve
P = PET Sleeve

*Note: All standard RFE Aluminum Electrolytic Capacitors are Lead (Pb) free and RoHS compliant. PET sleeve is available for those companies that also require PVC free product.

■ LEADED TAPING & PACKAGING SPECIFICATIONS Taping Specification for Radial Lead Type

Fig. 1

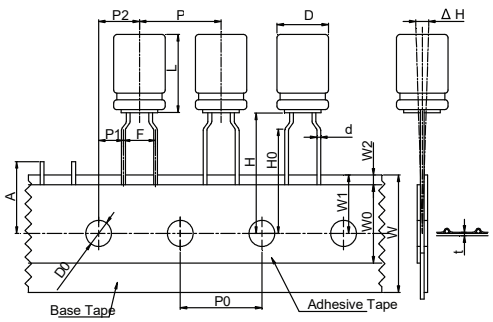


Fig. 2

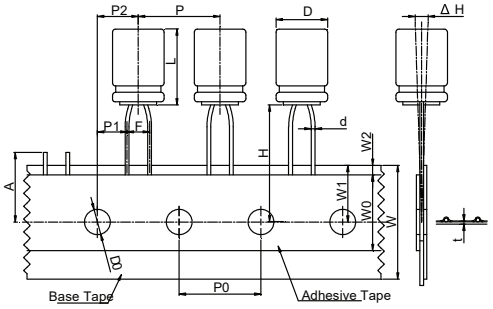


Fig. 3

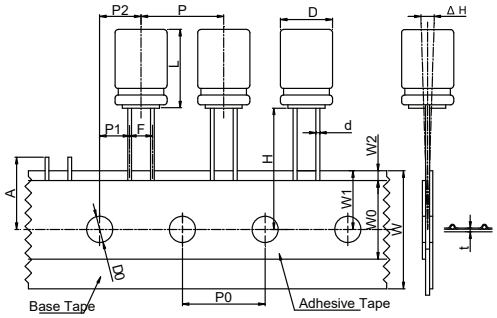
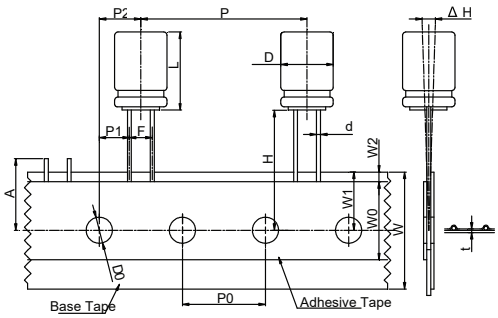


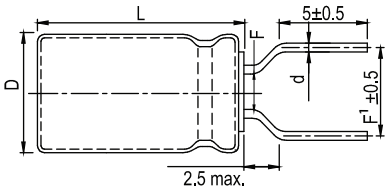
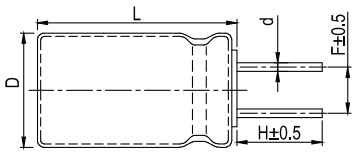
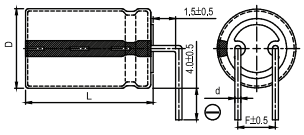
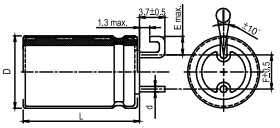
Fig. 4



Packing	TA,TR (Fig. 1)								SA, SR (Fig. 2, 3, 4)											
L	L≤ 7mm					L ≥ 7mm			L ≤ 7mm					L ≥ 7mm					
D / Symbol	3	4	5	6.3	8	5	6.3	8	3	4	5	6.3	8	5	6.3	8	Tol.	10	13	Tol.
d	0.4	0.45	0.5	0.5	0.5	0.5	0.5	0.6	0.4	0.45	0.45	0.45	0.45	0.5	0.5	0.6	± 0.05	0.6	0.6	± 0.05
F	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	2.5	2.5	2.5	2.5	3.5	2.5	2.5	3.5	-0.2/+0.8	5.0	5.0	-0.2/+0.8
P	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	± 1.0	12.7	25.4	± 1.0
P0	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	± 0.2	12.7	12.7	± 0.30
P2	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	± 1.0	6.35	6.35	± 1.3
P1	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	5.1	5.1	5.1	5.1	4.6	5.1	5.1	4.6	± 0.5	3.85	3.85	± 0.7
H	17.5	17.5	17.5	17.5	17.5	18.5	18.5	20.0	17.5	17.5	17.5	17.5	17.5	18.5	18.5	18.5	± 0.75	18.5	18.5	± 0.75
H0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	--	--	--	--	--	--	--	--	± 0.5	--	--	± 0.5
W	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	± 0.5	18.0	18.0	± 0.5
W0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	Min	12.0	12.0	Min.
W1	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	± 0.5	9.0	9.0	± 0.5
W2	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	Max.	1.5	1.5	Max.
D0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	± 0.2	4.0	4.0	± 0.2
t	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	± 0.2	0.7	0.7	± 0.2
Δ H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	± 1.0	0	0	± 1.0
ℓ	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	Max.	1.0	1.0	Max.
A	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	Max.	11	11	Max.
Fig. No.	1	1	1	1	1	1	1	1	2	2	2	3	3	2	3	3		3	3,4	

■ RADIAL FORMING

Lead Forming & Cutting Specifications for Radial Type (Unit: mm)

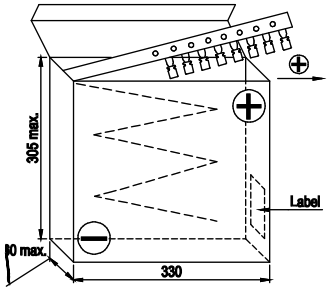
Forming Method	Code	Shape	Dimensions
Forming Cut (4 ~ 8)	FC		
Cut (3 ~ 25)	CC		
Bending Cut (5 ~ 25)	BC		
(10 ~ 25)	SD		

D x L	d	F	F¹	H
3 x 5	0.40	1.0	5.0	5.0
4 x 5	0.45	1.5	5.0	5.0
5 x 5	0.45	2.0	5.0	5.0
6.3 ~ 8 x 5	0.45	2.5	5.0	5.0
4 x 7	0.45	1.5	5.0	5.0
5 x 7 ~ 11	0.5	2.0	5.0	5.0
6 x 7 ~ 15	0.5	2.5	5.0	5.0
8 x 7 ~ 9	0.5	3.5	5.0	5.0
8 x 11.5 ~ 20	0.6	3.5	5.0	5.0
10	0.6	5.0	-	4.5
12.5	0.6	5.0	-	4.5
16	0.8	7.5	-	4.5
18	0.8	7.5	-	4.5
22	1.0	10.0	-	4.5
25	1.0	12.5	-	4.5

D x L	d	F±0.5
5 X 11	0.5	2.0
6.3 X 11 ~ 15	0.5	2.5
8 X 11.5 ~ 20	0.6	3.5
10	0.6	5.0
12.5	0.6	5.0
16	0.8	7.5
18	0.8	7.5
22	1.0	10.0
25	1.0	12.5

Ammo pack box.(SA,TA)
10 Boxes per carton

Reel pack box.(SR,TR)



Packaging Quantity

D	3	4	5	6.3	8	10	13
TA, SA	3000	2000	2000	2000	1000	500	250
TR, SR	3000	1500	1200	1000	800	500	500

NOTES:
1. The above quantities are typical. Quantities may vary.
2. The component will be oriented on the tape so that the positive lead is leading or the negative lead is leading, depending on the customer's request