



# Aluminum Electrolytic Capacitors

HR Series

## Features

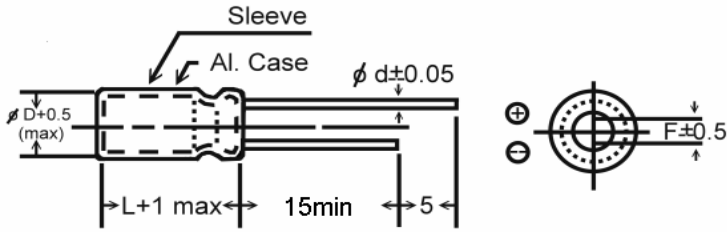
- 105°C, Standard series for general purpose

## Specification

Items	Performance																																												
Capacitance Tolerance	±20 % (at 120Hz, 25°C)																																												
Rated Voltage Range	6.3 to 100 VDC							160 to 450 VDC																																					
Capacitance Range	0.1 to 15000 uF							0.47 to 220 uF																																					
Operating Temperature Range	-40 to +105°C							-25 to 105°C																																					
Leakage Current (at 25°C)	I ≤ 0.02 CV or 3 (uA), whichever is greater.							I ≤ 0.03 CV + 10(uA), whichever is greater																																					
	After 3 minutes application of working voltage. I= Leakage current (uA), C= Rated capacitance (uF), V= Raeted voltage (V)																																												
Dissipation Factor (Tan δ at 120Hz, 25°C)	Rated Voltage	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450																														
	Tan δ (max)	0.24	0.20	0.17	0.15	0.12	0.10	0.10	0.10	0.10	0.20	0.20	0.20	0.20	0.25	0.25																													
For capacitance > 1000uF, add 0.02 per 1000uF increase.																																													
Low Temperature characteristics (at 120Hz)	Impedance ration max.																																												
	Rate Voltage	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450																														
	-25°C/25°C	4	3	2	2	2	2	2	2	2	8	8	8	12	12	12																													
-40°C/25°C	10	8	6	4	3	3	3	3	3																																				
Load Life	After 1000 hours application of W.V. at +105°C, the capacitor shall meet the following limits.																																												
	Capacitance change	: ≤ ±25% of initial value																																											
Dissipation factor	: ≤ 200% of initial specified value																																												
Leakage Current	: ≤ Initial specified value																																												
Shelf Life	After storage for 500 hours at 105°C, with no voltage applied and being stabilixed at + 25°C, Capacitor shall meet the limit specified in load life.																																												
Ripple Current & Frequency Multipliers	<table border="1"> <thead> <tr> <th>Freq.(Hz)</th> <th>60</th><th>120</th><th>500</th><th>1K</th><th>10Kup</th> </tr> </thead> <tbody> <tr> <td>Cap.(uF)</td> <td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Under 100</td> <td>0.70</td><td>1.00</td><td>1.20</td><td>1.30</td><td>1.50</td> </tr> <tr> <td>100 to 1000</td> <td>0.75</td><td>1.00</td><td>1.10</td><td>1.15</td><td>1.30</td> </tr> <tr> <td>1000 up above</td> <td>0.80</td><td>1.00</td><td>1.05</td><td>1.10</td><td>1.15</td> </tr> </tbody> </table>															Freq.(Hz)	60	120	500	1K	10Kup	Cap.(uF)						Under 100	0.70	1.00	1.20	1.30	1.50	100 to 1000	0.75	1.00	1.10	1.15	1.30	1000 up above	0.80	1.00	1.05	1.10	1.15
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Ripple Current & Temperature Multipliers	Temperature (°C)	85							105																																				
	Multiplier	1.40							1.00																																				

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D	5	6.3	8	10	13	16	18	22	25
F	2.0	2.5	3.5	5.0		7.5		10.0	12.5
d	0.5			0.6		0.8		1.0	

Dimension :  $\phi D \times L$  (mm)

Ripple Current : mA/rms at 120Hz, 105°C

## DIMENSION & PERMISSIBLE RIPPLE CURRENT

VDC uF	6.3V		10V		16V		25V		35V		50V		63V	
	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA	$\phi D \times L$	mA
0.47											5x11.5	8		
1											5x11.5	10	5x11.5	10
2.2											5x11.5	18	5x11.5	18
3.3											5x11.5	20	5x11.5	20
4.7											5x11.5	28	5x11.5	30
10											5x11.5	40	5x11.5	43
22							5x11.5	48	5x11.5	55	5x11.5 6.3x11	58	6.3x11	65
33					5x11.5	55	5x11.5	60	6.3x11	68	6.3x11 8x11	68 70	6.3x11 8x11	70 85
47			5x11.5	55	5x11.5	60	5x11.5	65	6.3x11	75	6.3x11 8x11	80 85	8x11	100
100	5x11.5	85	5x11.5	90	6.3x12	95	6.3x12 8x11	95 110	8x11	125	8x14 10x15	125 135	8x16 10x17	135 145
220	6.3x11	130	8x11	135	6x12 8x11	130 145	8x11 8x14	150 170	8x14 10x12	190 230	10x17 10x20	340	13x21	345
330	6.3x11	180	8x11	185	8x11 8x14	195 210	8x14	250	10x12 10x17	300 350	13x21	400	13x26	450
470	8x11	300	8x11	300	8x14	300	10x17	320	10x21	400	13x21	480	13x26	530
1000	8x12	380	8x14 10x12	380 400	10x17 10x20	490	10x20 13x21	550 600	13x26	680	16x26	720	16x32	800
2200	10x17	600	10x20 13x26	620 650	13x21 13x26	700	13x26 16x26	700 850	16x26	960	18x36 22x28	1000 1100	22x36	1350
3300	13x21	710	13x26	720	13x26 16x26	800 850	16x32	950	18x36	1100	22x40	1300		
4700	13x26	940	13x26 16x26	940 950	16x26	1000	18x36	1100	22x36	1300	25x42	1500		
6800	16x26	1000	16x36	1100	16x36	1200	18x36	1400	22x40	1800	30x46	2000		
10000	16x32	1200	18x36	1300	22x36	1450	22x40	1650	25x42	2000				
15000			22x36	1900	22x40	2100	25x42	2400						

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**HR Series**

Dimension :  $\phi$  D x L (mm)

Ripple Current : mA/rms at 120Hz, 105°C

## DIMENSION & PERMISSIBLE RIPPLE CURRENT

VDC uF	100V		160V		200V		250V		350V		400V		450V	
	$\phi$ DxL	mA	$\phi$ DxL	mA	$\phi$ DxL	mA	$\phi$ DxL	mA	$\phi$ DxL	mA	$\phi$ DxL	mA	$\phi$ DxL	mA
<b>1</b>	5x11.5	14	5x11.5	12	6.3x11	12	6.3x11	12	8x11	13	8x11	13	8x11	14
<b>2.2</b>	5x11.5	22	6.3x12	20	8x11	20	8x11	22	10x12	20	10x12	20	10x12	22
<b>3.3</b>	5x11.5	25	6.3x11 8x11	25 27	8x11	30	8x11	35	10x12	30	10x15	30	10x15	35
<b>4.7</b>	5x11.5	30	8x11	32	8x11	36	10x12	40	10x15	35	10x12.5 10x15	35	10x20	40
<b>10</b>	6.3x11	55	10x12	50	10x12	55	10x16	60	10x20	55	10x17 10x20	60	13x21	60
<b>22</b>	8x11	80	10x16	85	10x20	100	10x20	110	13x21	100	13x26	100	16x26	110
<b>33</b>	10x12.5	110	10x21	115	13x21	125	13x21	135	16x26	130	16x26	140	16x26	120
<b>47</b>	10x16	140	13x21	145	13x21	165	13x26	175	16x26	175	16x33	200	18x27	220
<b>100</b>	10x20	240	16x26	245	16x26	250	16x32	275	18x37	275	18x41	300	22x38	320
<b>220</b>	13x26	450	16x36	450	18x37 22x27	480 500	22x38	560						
<b>330</b>	16x26	550	22x38	570	22x38	600	22x42	660						
<b>470</b>	16x32	700	22x38	700	25x41	750								
<b>1000</b>	18x41	1100												