

Radial Leaded Aluminum Hybrid Electrolytic Capacitors

RHA Series



FEATURES

- Low ESR
- Endurance: 105°C, 5000-10,000 hours
- RoHS Compliance

APPLICATIONS

- High Reliability applications
- Base station equipment



LEAD-FREE
LEAD-FREE COMPATIBLE
COMPONENT



RoHS
COMPLIANT

HOW TO ORDER

Product Type Aluminum

Series Type R HA

Case Size See table below

Capacitance Code 1009 471
µF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)

Tolerance M = ±20%

Special No Code = std

Packaging K = Ammo Pack
B = Bulk Pack

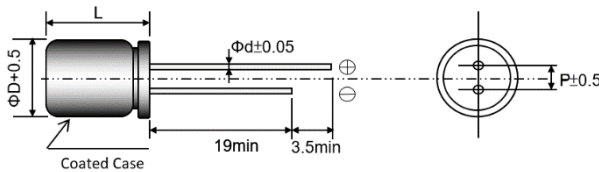
Rated DC Voltage

016 = 16Vdc	063 = 63Vdc
025 = 25Vdc	080 = 80Vdc
035 = 35Vdc	100 = 100Vdc
040 = 40Vdc	125 = 125Vdc
050 = 50Vdc	

Example: R HA 1009 471 M 016 K -

CASE DIMENSIONS millimeters (inches)

Code	D±0.50 (0.020)	L±1.50 (0.060)	d±0.05 (0.002)	P±0.50 (0.020)	Typical Weight (g)
0607	6.30 (0.248)	7.20 (0.283)	0.50 (0.020)	2.50 (0.098)	0.45
0809	8.00 (0.315)	9.50 (0.374)	0.60 (0.024)	3.50 (0.138)	0.87
1009	10.00 (0.394)	9.50 (0.374)	0.60 (0.024)	5.00 (0.197)	1.34
1011	10.00 (0.394)	11.50 (0.453)	0.60 (0.024)	5.00 (0.197)	1.47

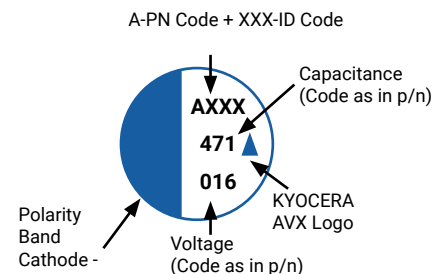


TECHNICAL SPECIFICATIONS

Category Temperature Range:	-55°C to +105°C	
Capacitance Range	At 25°C, 120Hz	10µF to 560µF
Capacitance Tolerance:	At 25°C, 120Hz	±20%
Surge Voltage:	at 15 - 35°C	Rated voltage x 1.15
Dissipation Factor (%)	Measurement Frequency: 120Hz at 25°C	Please see the ratings and part number reference table below
Leakage Current:	After 2 minutes at rated working voltage at 25°C*	I ≤ 0.01 CV or 3µA, whichever is greater

* Note: In the case of an anomalous reading, re-measure the leakage current after following voltage treatment: Voltage treatment: DC rated voltage to be applied to the capacitors for 120 minutes at 105°C.

MARKING



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CAPACITANCE AND RATED VOLTAGE RANGE (FIGURES DENOTES CASE SIZE)

Capacitance		Rated Voltage DC (V _R)								
μF	Code	16V	25V	35V	40V	50V	63V	80V	100V	125V
10	100						0607		1009	1009
12	120							1009	1009	
15	150					0607		1009	1011	
18	180							1011		
22	220						0809			
27	270				0607					
33	330					0809	0809, 1009			
47	470			0607			1009			
56	560				0809	1009	1011			
68	680		0607							
82	820					1011				
100	101			0809	1009					
120	121	0607			1011					
150	151		0809	1009						
220	221			1011						
270	271	0809	1009							
330	331		1011							
470	471	1009								
560	561	1011								

Released ratings

RATINGS & PART NUMBER REFERENCE

Part No.	Case Size	Capacitance (μF)	Rated Voltage (V)	DCL Max. (μA)	DF Max. (%)	ESR Max. @100kHz (mΩ)	100kHz RMS Current (mA)
16 Volt							
RHA0607121M016*	0607	120	16	19	16	40	1500
RHA0809271M016*	0809	270	16	43	16	26	2000
RHA1009471M016*	1009	470	16	75	16	21	2600
RHA1011561M016*	1011	560	16	90	16	15	3000
25 Volt							
RHA0607680M025*	0607	68	25	17	16	45	1400
RHA0809151M025*	0809	150	25	38	16	27	1900
RHA1009271M025*	1009	270	25	68	16	22	2500
RHA1011331M025*	1011	330	25	83	16	16	2900
35 Volt							
RHA0607470M035*	0607	47	35	16	16	60	1300
RHA0809101M035*	0809	100	35	35	16	30	1800
RHA1009151M035*	1009	150	35	53	16	23	2400
RHA1011221M035*	1011	220	35	77	16	17	2800
40 Volt							
RHA0607270M040*	0607	27	40	11	16	70	1200
RHA0809560M040*	0809	56	40	22	16	32	1700
RHA1009101M040*	1009	100	40	40	16	24	2400
RHA1011121M040*	1011	120	40	48	16	18	2700
50 Volt							
RHA0607150M050*	0607	15	50	8	16	80	1200
RHA0809330M050*	0809	33	50	17	16	35	1600
RHA1009560M050*	1009	56	50	28	16	25	2300
RHA1011820M050*	1011	82	50	41	16	19	2600

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RATINGS & PART NUMBER REFERENCE

Part No.	Case Size	Capacitance (μF)	Rated Voltage (V)	DCL Max. (μA)	DF Max. (%)	ESR Max. @100kHz (mΩ)	100kHz RMS Current (mA)
63 Volt							
RHA0607100M063*	0607	10	63	6	16	100	1000
RHA0809220M063*	0809	22	63	14	16	40	1500
RHA0809330M063*	0809	33	63	21	16	40	1500
RHA1009330M063*	1009	33	63	21	16	30	2100
RHA1009470M063*	1009	47	63	30	16	30	2100
RHA1011560M063*	1011	56	63	35	16	22	2400
80 Volt							
RHA1009120M080*	1009	12	80	10	16	70	1600
RHA1009150M080*	1009	15	80	12	16	70	1600
RHA1011180M080*	1011	18	80	14	16	50	1800
100 Volt							
RHA1009100M100*	1009	10	100	10	16	80	1400
RHA1009120M100*	1009	12	100	12	16	80	1400
RHA1011150M100*	1011	15	100	15	16	60	1600
125 Volt							
RHA1009100M125*	1009	10	125	13	16	90	1200

* Used to denote packing type: "K" for Ammo Pack or "B" for Bulk.

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2 volts. DCL is measured at rated voltage after 2 minutes

FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

Capacitance Range	100 ≤ F(Hz) <1K	1K ≤ F(Hz) <10K	10K ≤ F(Hz) <100K	100K ≤ F
4.7 < C ≤ 33	0.05	0.32	0.67	1.00
33 < C	0.10	0.35	0.70	1.00

Internal heating produced by ripple current will reduce the lifetime of capacitors, at a rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use the rms ripple current should be minimized.

QUALIFICATION TABLE

Test	RHA Series (Temperature Range -55°C to +105°C)		
	Condition	Characteristics	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 5000 to 10,000 hours at 105°C. Φ6.3=5000hrs, D≥Φ8=10,000hrs.	Visual examination	no visible damage
		ΔC/C	≤ ±30% of the initial limit
		DF:	≤ 200% of the initial specified limit
		ESR:	≤ 200% of the initial specified limit
		DCL:	≤ Initial specified limit
Damp Heat (Steady State)	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to store at 60°C, 90 to 95% RH for 1000 hours, without DC applied	Visual examination	no visible damage
		ΔC/C	≤ ±30% of the initial limit
		DF:	≤ 200% of the initial specified limit
		ESR:	≤ 200% of the initial specified limit
		DCL:	≤ Initial specified limit
Surge Voltage	The capacitors shall be subjected to 1000 cycles each consisting of charge with the surge voltages specified at 15-35°C for 30 seconds through a protective resistor (R = 1 kΩ) and discharge for 5 minutes 30 seconds.	Visual examination	no visible damage
		ΔC/C	≤ ±30% of the initial limit
		DF:	≤ 200% of the initial specified limit
		ESR:	≤ 200% of the initial specified limit
		DCL:	≤ Initial specified limit

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STORAGE

1. It is recommended to keep capacitors between the ambient temperatures of 5°C to 35°C and a relative humidity of 75% or below.
2. Confirm that the environment does not have any of the following conditions:
 - Damp conditions such as water, saltwater spray, or oil spray or fumes. High humidity or humidity condensation situations.
 - In an atmosphere filled with toxic gasses (such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonia, etc.).
 - Being exposed to direct sunlight, ozone, ultraviolet ray, or radiation.
 - Being exposed to acidic or alkaline solutions.
 - Under severe conditions where vibration and / or mechanical shock exceed the applicable ranges of the specification.
- 3.

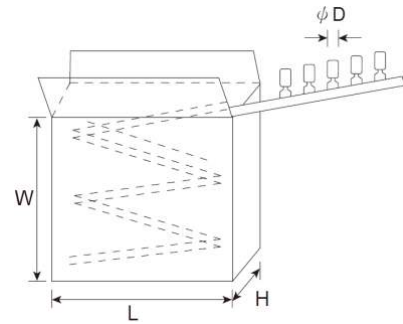
Category	Description	Storage Life
Mid-High Voltage	160V and above	2yrs, after 1yr, needs to check characteristics, if NG, needs to do aging
Low Voltage	120V and below	2yrs

Remark: Re-aging condition depends on its own spec.

PACKAGE TAPE DIMENSIONS units (mm)

AMMO PACKING

Ammo Pack						
Size Code	W±5	L±5	H±5	Qty. (pcs)	G.W. kg/box	Box /Carton
0607	235	327	54	1,500	1.12	10
0809	265	327	51	1,000	1.48	10
1009-1011	235	330	57	600	1.29	10



BULK PACKING

Package Box				
Size Code	Bags Inner box	Layer Quantity	Quantity (pcs/bag)	Total quantity (pcs/carton)
0607	9	2	1000	18,000
0809	10	2	500	10,000
1009-1011	11	2	200	4400