

Radial Leaded Aluminum Hybrid  
Electrolytic Capacitors  
RHD Series



FEATURES

- Low ESR, high ripple current resistant
- Endurance: 4000 hours at 125°C
- RoHS Compliance

APPLICATIONS

- Industrial electronics
- Base station equipment and power supplies



HOW TO ORDER

**Product Type** Aluminum

**Series Type**

**Case Size** See table below

**Capacitance Code**  $\mu\text{F}$  code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)

**Tolerance** M =  $\pm 20\%$

**Special** No Code = std

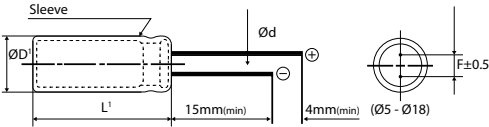
**Packaging** K = Ammo Pack  
B = Bulk Pack

**Rated DC Voltage**  
025 = 25Vdc  
035 = 35Vdc  
050 = 50Vdc  
063 = 63Vdc  
080 = 80Vdc

**Ordering Code:** R HD 1012 471 M 025 K -

CASE DIMENSIONS millimeters (inches)

Code	D'-0.10(0.004)+0.50(0.020)	L'-0.50(0.020)+1.00(0.039)	d±0.05 (0.002)	F±0.50 (0.020)	Typical Weight (g)
0605	6.30 (0.248)	5.00 (0.197)	0.50 (0.020)	2.50 (0.098)	0.28
0607	6.30 (0.248)	7.00 (0.276)	0.50 (0.020)	2.50 (0.098)	0.38
0608	6.30 (0.248)	8.00 (0.315)	0.50 (0.020)	2.50 (0.098)	0.42
0810	8.00 (0.315)	10.00 (0.394)	0.60 (0.024)	3.50 (0.138)	0.72
0812	8.00 (0.315)	12.00 (0.472)	0.60 (0.024)	3.50 (0.138)	0.92
0814	8.00 (0.315)	14.00 (0.551)	0.60 (0.024)	3.50 (0.138)	0.92
1010	10.00 (0.394)	10.00 (0.394)	0.60 (0.024)	5.00 (0.197)	0.98
1012	10.00 (0.394)	12.00 (0.472)	0.60 (0.024)	5.00 (0.197)	1.06

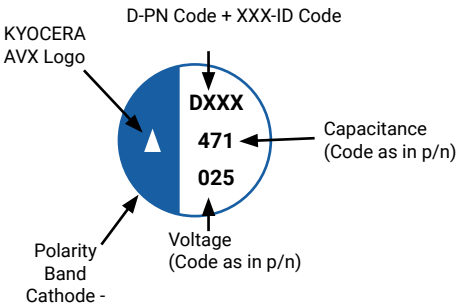


TECHNICAL SPECIFICATIONS

<b>Category Temperature Range:</b>	-55°C to +125°C	
<b>Capacitance Range</b>	At 25°C, 120Hz	15 $\mu\text{F}$ to 470 $\mu\text{F}$
<b>Capacitance Tolerance:</b>	At 25°C, 120Hz	$\pm 20\%$
<b>Dissipation Factor (%)</b>	Measurement Frequency: 120Hz at 25°C	Please see the ratings and part number reference table below
<b>Leakage Current:</b>	After 2 minutes at rated working voltage at 25°C*	I = 0.01CV or 3 $\mu\text{A}$ , 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 125°C.

MARKING



# Radial Leaded Aluminum Hybrid Electrolytic Capacitors

## RHD Series



### CAPACITANCE AND RATED VOLTAGE RANGE (FIGURES DENOTES CASE SIZE)

Capacitance		Rated Voltage DC (V <sub>R</sub> )				
μF	Code	25V	35V	50V	63V	80V
15	150				0608	
22	220			0608		
33	330				0810	
47	470		0605	0810		0814
56	560				1010	
68	680		0608			
100	101	0607		0812, 1010		
120	121		0810			
220	221	0810	1010			
330	331	1010				
470	471	1012				

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)
25 Volt							
RHD0607101M025*	0607	100	25	25	12	35	1200
RHD0810221M025*	0810	220	25	55	12	27	1400
RHD1010331M025*	1010	330	25	82.5	12	25	1800
RHD1012471M025*	1012	470	25	117.5	12	20	2000
35 Volt							
RHD0605470M035*	0605	47	35	16.5	12	40	1100
RHD0608680M035*	0608	68	35	23.8	12	40	1200
RHD0810121M035*	0810	120	35	42	12	35	1400
RHD1010221M035*	1010	220	35	77	12	30	1800
50 Volt							
RHD0608220M050*	0608	22	50	11	12	90	900
RHD0810470M050*	0810	47	50	23.5	12	35	1100
RHD0812101M050*	0812	100	50	50	12	35	1400
RHD1010101M050*	1010	100	50	50	12	35	1400
63 Volt							
RHD0608150M063*	0608	15	63	9.5	12	100	800
RHD0810330M063*	0810	33	63	20.8	12	50	1000
RHD1010560M063*	1010	56	63	35.3	12	40	1200
80 Volt							
RHD0814470M080*	0814	47	80	37.6	12	40	1000

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

All technical data relates to an ambient temperature of +25C. 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

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## RHD Series



### QUALIFICATION TABLE

Test	RHD Series (Temperature Range -55°C to +125°C)		
	Condition	Characteristics	
Temperature Characteristics (Impedance Ratio at 100kHz)	Z(+125°C)/Z(+20°C)≤1.5 Z(-55°C)/Z(+20°C)≤2.0		
Endurance	After applying rated voltage with rated ripple current for 4000 hours at 125°C±2°C, the capacitors shall meet the following requirements at normal temperature.	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
High Temperature (No-Load)	The requirements for the Endurance characteristics listed above shall be satisfied when the capacitors are restored to normal temperature after storing them for 2000 hours under no-load at 125°C±2°C.		
Humidity Resistance (On-Load)	After applying rated voltage for 2000 hours at 85°C±2°C and 85-90%RH, the capacitors shall meet the following requirements.	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

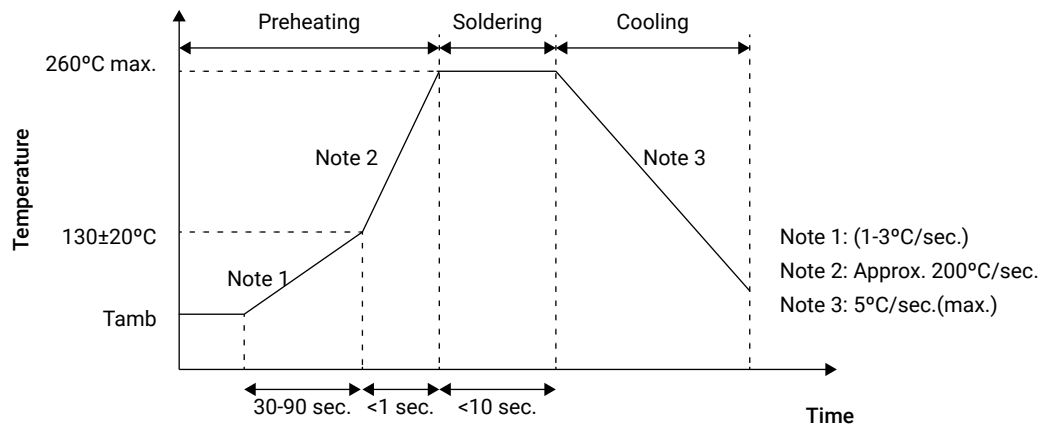
### SOLDERING

#### 1. When soldering with a soldering iron:

- Soldering conditions (temperature and time) should be within the limits prescribed in the catalogs or the product specifications.
- If the terminal spacing of a capacitor does not fit the terminal hole spacing of the PC board, reform the terminals in a manner to minimize a mechanical stress into the body of the capacitor.
- Remove the capacitors from the PC board, after the solder is completely melted, reworking by using a soldering iron minimizes the mechanical stress to the capacitors.
- Do not touch the capacitor body with the hot tip of the soldering iron.

#### 2. Flow Soldering:

- Do not dip the body of a capacitor into the solder bath, only dip the terminals in. The soldering must be done on the reverse side of PC board.
- Do not apply flux to any part of capacitors other than their terminals.
- Make sure the capacitors do not come into contact with any other components while soldering.
- Soldering conditions (preheat, solder temperature and dipping time) should be within the limits prescribed in the picture below.



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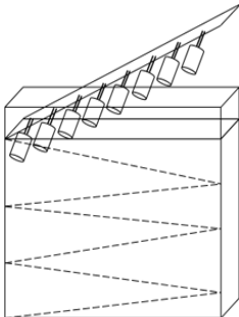
STORAGE

- Store with the temperature range between 5 to 35°C (If between 35 to 85°C, it should be less than three months), and the relative humidity of 75% without direct sunshine and store in the package states if possible.
- It is recommended that you open the bag just before use and use up as early as possible.
- Store the capacitors in places free from water, oil or salt water or in condensation status.
- Never store in any area filled with poisonous gases (including hydrogen sulfide, sulfurous acid, nitrous acid, chlorine and ammonia).
- Store the capacitors in places free from ozone, ultraviolet rays or radiation:  
(Radial Lead Type)  
Before unseal: within 1 year after delivery  
After opening: within 1 month

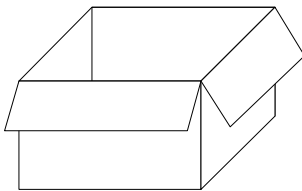
PACKING

Size Code	Bulk Pack					Ammo Pack				
	Bags	Inner Box		Carton		Inner Box		Carton		
		(LxWxH) 290*215*160		(LxWxH) 455*310*350		Quantity	Inner Box Size	Inner Box Quantity	Carton Size	Whole Pieces
		Bags Number	Quantity / pcs	Inner Box Number	Quantity / pcs		(LxWxH)		(LxWxH)	
0605	1000	8	8000	4	32,000	2000	340x290x48	10	600x354x265	20,000
0607	1000	8	8000	4	32,000	2000	340x290x48	10	600x354x265	20,000
0608	1000	8	8000	4	32,000	2000	340x290x48	10	600x354x265	20,000
0810	500	8	4000	4	16,000	950	320x230x50	10	485x345x275	9500
0812	500	8	4000	4	16,000	950	320x230x50	10	485x345x275	9500
0814	500	8	4000	4	16,000	950	320x230x50	10	485x345x275	9500
1010	500	6	3000	4	12,000	600	320x230x50	10	485x345x275	6000
1012	500	6	3000	4	12,000	600	320x230x50	10	485x345x275	6000

AMMO PACKING



BULK PACKING



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[EG22GM2R2E09OTMO](#) [ECG2WM4R7F13OTBO](#) [ECF2GM4R7F09OTPO](#) [EG22GM4R7F12OTMO](#) [ECE2GM100G14OTPVZC](#)  
[ECF1HM471G20OTPVZC](#) [ECF1KM220E12OTPO](#) [ECG2WM100G20OTBO](#) [ECG1HM221G12OTBO](#) [ECG2CM680K17CTBVZC-L=3.5](#)  
[ECG1JM821K25OTBO](#) [EPF1AM471E12CTPVZC-L=3.2](#) [ECF1KM101G14OTPO](#) [EPF1AM102F12OTPO](#) [EPF1HM681K21OTPO](#)  
[EKM2GM220G18OTBVZC](#) [ECF1EM680D11OTPO](#) [ECF1KM100E12OTPO](#)