

# Revise record

NO.	Date	Revise reason	Revise content	Prepared
01	2019.6.27	First issue	First issue	廖玉娴

Sheet NO.: 20190627 Page : 2 / 12



# 1. Application

This specification applies to Aluminum electrolytic capacitor (foil type) used in electronic equipment. Designed capacitor's quality meets IEC 60384.

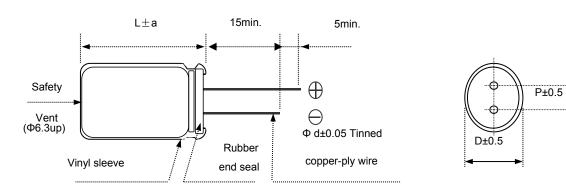
## 2. Table of specification and characteristics

Series	Cap(uF) 120Hz/20℃	WV(V)	Size (mm)				_		(mm) Temperatu		Capacitance Tolerance	Life(hours)
	120112/20 0		D	L			1 ofer unce					
RC	1000	10	8	12	-40~105		$\pm 20\%$	2000				
DF (%)(MAX) 120Hz/20°C		Lc(μA)(! 2min/2		ESR(Ω)( 100KH	•	ı	RC (mArms) (MAX)105℃ /100KHz	Surge voltage(V)				
≤19		≤10	00	≤0.	18		≤782	11.5				

Other:

## 3. Product Dimensions

Type

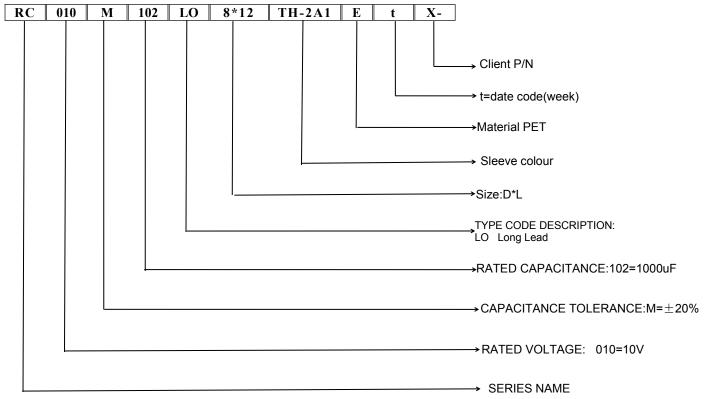


ФД	5	6. 3	8	10	13	16	18	22
P	2. 0	2. 5	3. 5	5. 0	5. 0	7. 5	7. 5	10
Φd	0. 5	0. 5	0.5/0.6	0.6	0.6	0.8	0.8	0.8
α	(L< 20) ± 1.5				(L≥20)	± 2.0		
β	$(D<20) \pm 0.5$				(D≥20)	± 1.0		

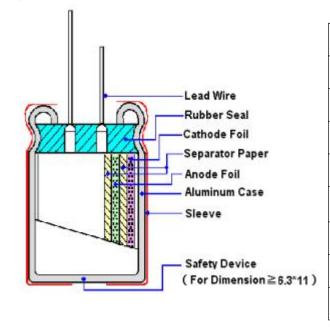
Sheet NO.: 20190627 Page : 3 / 12



## 4. Part Number



## 5. Construction



Material name	Composition	Supplier name		
Lead	Al and (Fe+Cu+Sn)	NM、JX		
Rubber	EPT / IIR	LHX、LA、TH、LM2		
Case	Aluminum	OX、YJ、HL、LY2		
Paper	Wood / Fibrous plant materials	KE、DF		
Anode foil	$Al + Al_2O_3$	HY1、HY2、HF、HY3、 LD、FQ		
Cathode foil	Aluminum	GY、LY1		
Electrolyte	Glycol + Water +Ammonium salt	XZB、LM1、JZ2、FS		
Sleeve	PET	YL、CY		

Sheet NO.: 20190627 Page : 4 / 12



# 6. Product Marking

## 

## **Marking Details:**

Capacitor shall be marked the following items:

- 1) Trademark (BERYL)
- 2) working voltage(10V)
- 3) Nominal capacitance(1000uF)
- 4) Cathode marked
- 5) Series symbol & Nominal capacitance tolerance (M:  $-20\% \sim +20\%$ )
- 6) Sleeve material(E: PET)

Maximum operating temperature (105°C)

7) Date code (1926)

19: Manufactured year 2019

Code	19	20	21	22	23	24	25	26	
Year	2019	2020	2021	2022	2023	2024	2025	2026	

26: Manufactured week (01, 02, 03, 04.....11, 12)

Sheet NO.: 20190627 Page : 5 / 12



### 7. Characteristics

### **Standard atmospheric conditions**

Unless other specified, the standard range of atmospheric conditions for making measurements and tests is as follows:

Ambient temperature : 15°C to 35°C
Relative humidity : 45% to 85%
Air pressure : 86kPa to 106kPa

If there is any doubt about the results, measurement shall be made within the following conditions:

Ambient temperature :  $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$ Relative humidity : 60% to 70%Air pressure : 86kPa to 106kPa

### **Operating temperature range**

The ambient temperature range at which the capacitor can be operated continuously at rated voltage is  $(6.3\sim400\text{WV})$  -40°C to +105°C.  $(450\sim500\text{WV})$  -25°C to +105°C

#### **Table**

	ITEM	PERFORMANCE
1	Nominal capacitance (Tolerance)	<b>Condition&gt;</b> Measuring Frequency: 120Hz±12Hz Measuring Voltage: Not more than 0.5Vrms +1.5~2.0V.DC Measuring Temperature: 20±2°C <b>Criteria&gt;</b> Shall be within the specified capacitance tolerance.
2	Leakage current	<ul> <li>Condition&gt; Connecting the capacitor with a protective resistor (1kΩ±10Ω) in series for 2 minutes, and then, measure leakage current.</li> <li>Criteria&gt; I: Leakage current (μA) I (μA) ≤0.01CVor 3 (μA) whichever is greater, measurement circuit refer to right drawing.</li> <li>C: Capacitance (μF)</li> <li>V: Rated DC working voltage (V)</li> </ul>
3	Dissipation factor	<b>Condition&gt;</b> Nominal capacitance, for measuring frequency, voltage and temperature. <b>Criteria&gt;</b> Must be within the parameters (See page 3)

Sheet NO.: 20190627 Page : 6 / 12



	ITEM	PERFORMANCE			
4	Impedance	<condition> Measuring frequency:100kHz; Measuring temperature:20±2°C Measuring point: 2mm max. from the surface of a sealing rubber on the lead wire.  <criteria> (20°C) Must be within the parameters (See page 3)</criteria></condition>			
5	Load life test	<b>Condition&gt;</b> According to IEC60384-4No. 4.13 methods, the capacitor is stored at a temperature of Maximum operating temperature ±2°C with DC bias voltage plus the rated ripple current for Rated life +48/0hours. (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) Then the product should be tested after 16 hours recovering time at atmospheric conditions. The result should meet the following table: <b>Criteria&gt;</b> The characteristic shall meet the following requirements. Leakage current Not more than the specified value. Capacitance Change Within ±20% of initial value. Dissipation Factor Not more than 200% of the specified value. Appearance There shall be no leakage of electrolyte.			
6	Shelf life test	Condition> The capacitors are then stored with no voltage applied at a temperature of Maximum operating temperature±2°C for1000+48/0 hours. Following this period, the capacitors shall be removed from the test chamber and be allowed to stabilized at room temperature for16 hours. measure leakage current  Criteria> The characteristic shall meet the following requirements. Leakage current The specified value Capacitance Change Within ±20% of initial value. Dissipation Factor Not more than 200% of the specified value. Appearance There shall be no leakage of electrolyte.			
7	Maximum permissible (ripple current, temperature coefficient)	Condition> The maximum permissible ripple current is the maximum A.C current at 100kHz and can be applied at maximum operating temperature Table-3 The combined value of D.C voltage and the peak A.C voltage shall not exceed the rated voltage and shall not reverse voltage. Frequency Multipliers: Freq (Hz) 120 1k 100 100 100 1000 0.60 0.80 0.96 1.00  Temperature Coefficient:  Temperature (°C) 60 85 95 105 Factor 2.23 1.73 1.41 1.00			

Sheet NO.: 20190627 Page: 7 / 12



Sheet NO.: 20190627

# **ALUMINUM ELECTROLYTIC CAPACITORS**

Page : 8 / 12

	ITEM	PERFORMANCE									
8	Terminal strength	Condition> Tensile strength of termin Fixed the capacitor, applications. Bending strengt Fixed the capacitor, applications are capacitor, applications are capacitor, applications.  Diameter of lead wir  0.5mm and less  0.6~0.8 mm			terminals orce to be for 90° to Tensi	nt the term	inal (1~4 r l position w Bendin	nm fro	m the 1 $\sim$ 3 sec e N (kg	ubber onds.	
			ible chang	es shall b	e found, r	o breakag	e or loosen	ess at t	he tern	ninal.	
9	Temperatur e characterist ics	a. At +105 Dissipat The leak b. In step 5 Dissipat The leak c. At- 40°C	ce, DF, an °C, capacitation factor (age current factor factor (age current factor factor factor factor factor factor factor (age current factor facto	tance measurnce measurnce measurshall be water shall not measure that the shall not measure the shall not measure that the shall not measure the shall not measure that the shall not measure the shall	asured at -2 within the cot more the cot (Z) ratio	Time to	em 7.3 an 10 times be within ± em 7.3 cified value exceed the	mal equal eq	uilibriu uilibriu uilibriu uilibriu of its o specifi f its ori	original ginal	ue. value.
10	Surge test	<b>Condition&gt;</b> Applied a surge voltage to the capacitor connected with a (100 ±50)/CR (kΩ) resistor in series for 30±5 seconds in every 5±0.5 minutes at 15~35°C. Procedure shall be repeated 1000 times. Then the capacitors shall be left under normal humidity for 1-2 hours before measurement CR: Nominal Capacitance (μF) <b>Criteria&gt;</b> Leakage current						ated			



ITEM		PERFORMANCE						
		<condition> Temperature cycle: According to IEC60384-4 No according as below:</condition>	o.4.7 methods, capacito	r shall be placed in an oven, the condition	ı			
		Ter	mperature	Time				
		(1) +20°C		3 Minutes				
	Change of	(2) Rated low temperate	ure (- 40°C) (-25°C)	30±2 Minutes				
11	temperature test	(3) Rated high temperar	ture (+105°C)	30±2 Minutes				
		(1) to (3) =1 cycle, tota	l 5 cycle					
		<a href="#">Criteria&gt;</a> The characteristic shall meet	the following requirem	ent				
		Leakage current	Not more than the s					
		Dissipation Factor	Not more than the s	specified value.				
		Appearance	There shall be no le	eakage of electrolyte.				
12	Damp heat test	Condition> Humidity test: According to IEC60384-4 Note to be exposed for 500±8 hours it 40±2°C, the characteristic characteria>  Leakage current  Capacitance Change  Dissipation Factor  Appearance	n an atmosphere of 90~ ange shall meet the following that the special within ±10% of initial	295%R H .at owing requirement. ecified value. al value. of the specified value.				
13	Solderabilit y test	Condition> The capacitor shall be tested under the following conditions: Soldering temperature : 245 ±5°C Dipping depth : 2mm Dipping speed : 25±2.5mm/s Dipping time : 3±0.5s  Criteria> Soldering wetting time   Less than 3s Coating quality   A minimum of 95% of the surface being immersed						

Sheet NO.: 20190627 Page : 9 / 12



Sheet NO.: 20190627

# **ALUMINUM ELECTROLYTIC CAPACITORS**

Page :

10 / 12

	ITEM	PERFORMANCE					
		Condition> The following conditions shall be applied for 2 hours in each 3 mutually perpendicular directions. Vibration frequency range: 10Hz ~ 55Hz each to peak amplitude: 1.5mm Sweep rate: 10Hz ~ 55Hz ~ 10Hz in about 1 minute Mounting method: The capacitor with diameter greater than 12.5mm or longer than 25mm must be fixed in place with a bracket.					
14	Vibration test	4mm or less					
		Criteria> To be soldered After the test, the following items shall be tested:					
		Inner construction No intermittent contacts, open or short circuiting.					
		No damage of tab terminals or electrodes.  No mechanical damage in terminal. No leakage of electrolyte or swelling of the case. The markings shall be legible.					
	Resistance	Condition> Terminals of the capacitor shall be immersed into solder bath at 260±5°C for10±1seconds or400±10°C for3 −0 seconds to 1.5~2.0 mm from the body of capacitor. Then the capacitor shall be left under the normal temperature and normal humidity for 1~2 hours before measurement. Criteria>					
15	to solder heat	Leakage current Not more than the specified value.					
	test	Capacitance Change Within ±5% of initial value.					
		Dissipation Factor Not more than the specified value.					
		Appearance There shall be no leakage of electrolyte.					
16	Vent	<b>Condition&gt;</b> The following test only apply to those products with vent products at diameter ≥∅6.3 with vent. D.C. test The capacitor is connected with its polarity reversed to a DC power source. Then a current selected from Table 2 is applied. <b>Table 2&gt;</b>					
	test	Diameter (mm) DC Current (A)					
		22.4 or less   1					

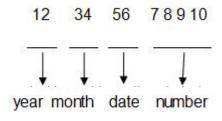


## 8. Packing Information

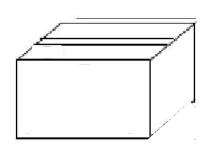
Packing Label Marked (the following items shall be marked on the label) (Inside box or bag)

(1)Clint order number (2)Client part number (3)Beryl part number (4)Capacitance (5)Voltage (6)Dimension (7)Packaging quantity (8)Capacitance tolerance (9) QC Marking (0) Lot number (1) Series

## LOT Number:



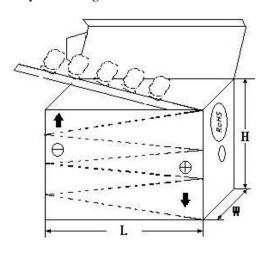
## 1) Bulk Packing:



#### 3) Outer box



### 2) Taped Packing:



#### 4) Outer box label:

BERYL	Zhao Qin	g Beryl Ele Ltd.	ctronic	Technology Co.,
C.S.R:				- 110 115
C.S.R P/C	D:			ROHS HE
C.S.R P/	<b>V</b> :			
S.P.R P/N	S.P.R P/N:			QC
SPEC:				
QTY:	PCS	TOL:	%	
L/N:		S.P.R:		

Sheet NO.: 20190627 Page : 11 / 12



## 9. Prohibition to Use Environment- related Substances

We are hereby to certify the followings:

Our company hereby warrants and guarantees that all or part of products, including, but not limited to, the peripherals, accessories or package, delivered to your company (including your subsidiaries and affiliated companies) directly or indirectly by our company are free from any of the substances listed below.

The latest version of <Substances Prohibited as per RoHS or <Sony-SS-00259>

	Cadmium and cadmium compounds			
Accord with	Lead and lead compounds			
heavy metal	Mercury and mercury compounds			
	Hexavalent chromium compounds			
	Polychlorinated biphenyls (PCB)			
Organia ablaria	Polychlorinated naphthalenes (PCN)			
Organic chlorin	Polychlorinated terphenyls (PCT)			
compounds	Chlorinated paraffins (CP)			
	Other chlorinated organic compounds			
Organic	Polybrominated biphenyls (PBB)			
bromine	Polybrominated diphenylethers (PBDE)			
compounds	Other brominated organic compounds			
Tributyltin compo	ounds			
Triphenyltin com	pounds			
Asbestos				
Specific azo comp	pounds			
Formaldehyde				
Polyvinyl chlorid	e (PVC) and PVC blends			
F、Cl、Br、I	F、Cl、Br、I			
REACH	REACH			

Sheet NO.: 20190627 Page : 12 / 12

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NEV220M25DD-BULK NEV.33M100AA NEV4700M50HB NEV.47M100AA NEVH1.0M250AB NEVH3.3M250BB NEVH3.3M450CC

KM4700/16 KME50VB100M-8X11.5 SG220M1CSA-0407 ES5107M016AE1DA ESMG160ETD102MJ16S ESX472M16B 227RZS050M

476CKH100MSA 477RZS050M UVX1V101KPA1FA UVX1V222MHA1CA KME25VB100M-6.3X11 VTL100S10 VTL470S10

VTL470S16A 511D336M250EK5D 052687X ECE-A1CF471 EKMA500ELL4R7ME07D NRE-S560M16V6.3X7TBSTF RGA221M1CTA
0611G ERZA630VHN182UP54N UPL1A331MPH SK035M0100AZS-0611 MAL214658821E3 NEV1000M6.3DE NEV100M16CB

NEV100M50DD-BULK NEV2200M16FF NEV220M50EE NEV2.2M50AA