3	8ERYL 绿宝石	

规格书

SPECIFICATION SHEET

Customer name :

BERYL SERIES : RC

TYPE : RADIAL

DESCRIPTION : 220uF/63V Φ10*16

Apply date : 2022-11-12

020019

BERYL			CUSTOMER	
P/N:RC063M221LO10*16TH-2A	A1Et	P/N:		
PREPARED	APPROVAL	PREPARED	CHECKED	APPROVAL
胡晓敏	张业维			

After approved, please sign back 1 Approval Sheet before order. If not, we will treat it as tacitly acknowledged and accepted our relative standard and technical index.

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Revise record

NO.	Date	Revise reason	Revise content	Prepared
01	2022.11.12	First issue	First issue	胡晓敏
	NO . 202211	10	Dago : 2	/ 10



1、 Application

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

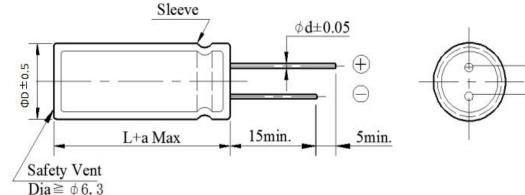
2. Table of specification and characteristics

Series	eries Cap(uF) 120Hz/20°C WV(V) Size (mm) Temperature (°C)		Capacitance Tolerance	Life(hours) @105(°C)				
	120112/20 0		D	L	(0)		Toteranee	(100(0)
RC	220	63	10	16	-40~+105		$\pm 20\%$	3000
DF (%)(MAX) 120Hz/20°C		LC(µA)(2min/2		ESR(Ω) 100KH	(MAX) Iz/25°C		(mA rms) 105°C/100KHz	Surge voltage(V)
	≤9 ≤139		39	≤0	0.20		830	72

Other: /

3、 Product Dimensions

Туре

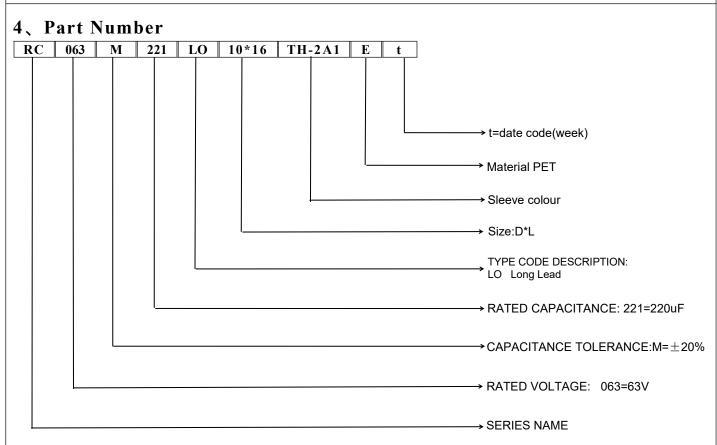


ΦD	5	6.3	8	10	13	16	18	22
Р	2	2.5	3.5	5	5	7.5	7.5	10
Φd	0.5	0.5	0.5/0.6	0.6	0.6	0.8	0.8	0.8
а			(L< 20)	± 1.5	(L≥2	$0) \pm 2.0$		

Sheet NO.: 20221112

±0.5



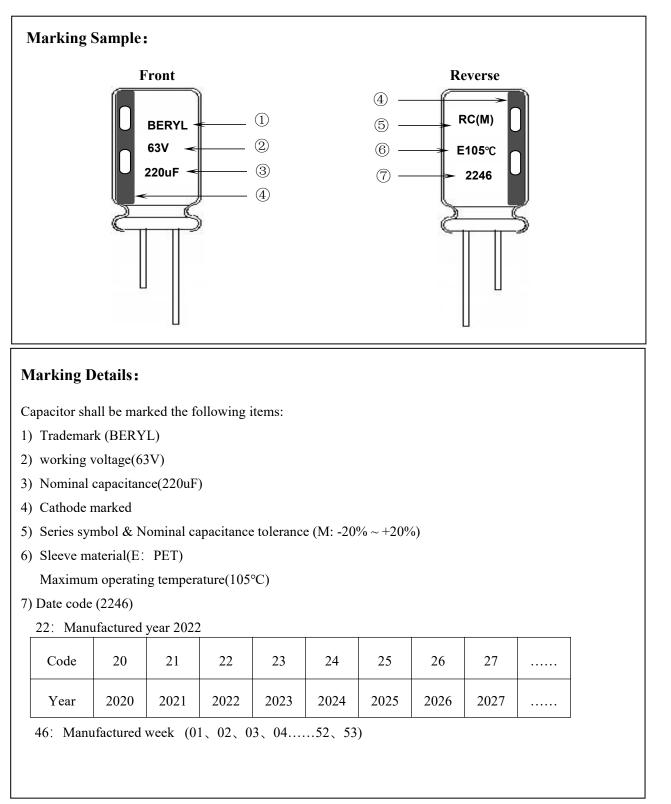


5、 Construction

	Material name	Composition	Supplier name
	Lead	Al and (Fe+Cu+Sn)	NM、RH、ZY
Lead Wire	Rubber	IIR	LHX、TH
—Rubber Seal —Cathode Foil	Case	Aluminum	OX、YJ、LY2、SH
Separator Paper	Paper	Wood / Fibrous plant materials	KE、CY
Aluminum Case	Anode foil	$Al + Al_2O_3$	HY1、HX2、HF、 HX1、GD、FC
SIEEVE	Cathode foil	Aluminum	GY、LY1
— Safety Device (For Dimension≧6.3*11)	Electrolyte	Glycol + Water +Ammonium salt	XZB、JZ2
(For Dimension = 0.5 11)	Sleeve	PET	YL、CY
	Adhesive tape	propylene , butyl acrylate	RK、RB、CW



6、Product Marking





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°CRelative 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 : $20^{\circ}C \pm 2^{\circ}C$ 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 $(6.3 \sim 450 \text{WV}) - 40^{\circ}\text{C}$ to $+105^{\circ}\text{C}$

Table

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



	ITEM		P	ERFORMA	NCE		
4	Impedance	<condition> Measuring frequency:10 Measuring point: 2mm r <criteria> (20°C) Must be within the second secon</criteria></condition>	nax. from the	surface of a	sealing rubb		wire.
5	Load life test	<condition> According to IEC60384- Maximum operating tem current for Rated life +4 exceed the rated workin recovering time at atmo <criteria> The characteristic shall n Leakage current Capacitance Change Dissipation Factor Appearance</criteria></condition>	perature $\pm 2^{\circ}6$ 8/0hours. (Tl g voltage) Th spheric condi neet the follo Not more Within ± 2 Not more	C with DC b he sum of DO ten the produ- tions. The re- wing require than the spe 0% of initial than 200%of	ias voltage pl C and ripple p act should be sult should n ements. cified value.	lus the rated rip peak voltage sl tested after 16 neet the follow d value.	ople all not hours
6 Shelf 6 life test		Condition> The capacitors are then st temperature±2°C for1 from the test chamber leakage current <criteria> The characteristic shall me Leakage current Capacitance Change Dissipation Factor Appearance</criteria>	000+48/0 hou and be allow eet the follow Not more th Within ±20 Not more th	ing requirem an 200%of t 6 of initial v an 200%of t	eg this period and at room to ments. he specified	, the capacitors emperature for value.	shall be ren
7	Maximum permissible (ripple current, temperature coefficient)	<condition> The maximum permissibl applied at maximum oper Table-3 The combined value of D voltage and shall not reve Frequency Multipliers: Freq (Hz) Cap. (μF) 220 Temperature Coefficient: Temperature (°C) Factor</condition>	ating tempera .C voltage an rse voltage.	iture			



$10 \begin{array}{ c c c c c c } & & series for 30 \pm 5 \ seconds in \ every \ 5 \pm 0.5 \ minutes \ at \ 15 \sim 35^\circ C. Procedure \ shall \ be \ repeated \ 1000 \ times. Then the \ capacitors \ shall \ be \ left \ under \ normal \ humidity \ for \ 1-2 \ hours \ before \ measurement \ CR \ : \ Nominal \ Capacitance \ (\mu F) \\ \hline \hline & \ Criteria > \\ \hline & \ Leakage \ current \ Not \ more \ than \ the \ specified \ value. \ \hline & \ Capacitance \ Change \ Within \ \pm 15\% \ of \ initial \ value. \ \hline & \ Dissipation \ Factor \ Not \ more \ than \ the \ specified \ value. \ \hline & \ Dissipation \ Factor \ Not \ more \ than \ the \ specified \ value. \ \hline & \ Dissipation \ Factor \ Not \ more \ than \ the \ specified \ value. \ \hline & \ Dissipation \ Factor \ Not \ more \ than \ the \ specified \ value. \ \hline & \ Dissipation \ Factor \ Not \ more \ than \ the \ specified \ value. \ \hline & \ Dissipation \ Factor \ Not \ more \ than \ the \ specified \ value. \ \hline & \ Dissipation \ Factor \ Not \ more \ than \ the \ specified \ value. \ \hline & \ Dissipation \ Factor \ Not \ more \ than \ the \ specified \ value. \ \hline & \ Dissipation \ Factor \ Not \ more \ than \ the \ specified \ value. \ \hline & \ Dissipation \ Factor \ Not \ more \ than \ the \ specified \ value. \ \hline & \ Dissipation \ Factor \ Not \ more \ than \ the \ specified \ value. \ \hline & \ Dissipation \ Factor \ Not \ more \ than \ the \ specified \ value. \ \hline & \ Dissipation \ Factor \ Not \ more \ than \ the \ specified \ value. \ \hline & \ Dissipation \ Specified \ value. \ \hline & \ Specified \ Specif$		ITEM					PE	RFO	ORMA	NCE					
$\begin{array}{ c c c c c c } \hline & & & & & & & & & & & & & & & & & & $	8		Tensile strength of terminalsFixed the capacitor, applied force to the terminal in lead out direction for $30+5-0$ seconds. Bending strength of terminals.Fixed the capacitor, applied force to bent the terminal (1~4 mm from the rubber) is2~3 seconds, and then bent it for 90° to its original position within 2~3 seconds.Diameter of lead wireTensile force N (kgf)Bending force N (kgf)0.5mm and less5 (0.51)2.5 (0.25)0.6~0.8 mm10 (1.02)5 (0.51)							er) for 9 3.	90° wit				
9 Temperature characteristics 9 Temperature characteristics 10 Tem							ound, I		сакад						
9 Temperature characteristics $\frac{100}{100} \frac{100}{100} \frac{100}{10$				Test	ing tem	peratur	$\sim (^{\circ}C)$				Tim	e		1	
9 Temperature $\frac{2}{4}$ $\frac{-40 - 25 \pm 3}{2}$ Time to reach thermal equilibrium $\frac{3}{3}$ $\frac{20 \pm 2}{2}$ Time to reach thermal equilibrium $\frac{4}{4}$ $\frac{105 \pm 2}{105 \pm 2}$ Time to reach thermal equilibrium $\frac{4}{5}$ $\frac{20 \pm 2}{2}$ Time to reach thermal equilibrium $\frac{4}{5}$ $\frac{20 \pm 2}{2}$ Time to reach thermal equilibrium $\frac{4}{5}$ $\frac{20 \pm 2}{2}$ Time to reach thermal equilibrium $\frac{4}{5}$ $\frac{20 \pm 2}{2}$ Time to reach thermal equilibrium $\frac{4}{5}$ $\frac{20 \pm 2}{2}$ Time to reach thermal equilibrium $\frac{4}{5}$ $\frac{20 \pm 2}{2}$ Time to reach thermal equilibrium $\frac{4}{5}$ $\frac{20 \pm 2}{2}$ Time to reach thermal equilibrium $\frac{4}{5}$ $\frac{20 \pm 2}{2}$ Time to reach thermal equilibrium $\frac{4}{5}$ $\frac{20 \pm 2}{2}$ Time to reach thermal equilibrium $\frac{4}{5}$ $\frac{20 \pm 2}{2}$ Time to reach thermal equilibrium $\frac{4}{5}$ $\frac{20 \pm 2}{2}$ Time to reach thermal equilibrium $\frac{4}{5}$ $\frac{20 \pm 2}{2}$ Time to reach thermal equilibrium $\frac{1}{5}$ $\frac{20 \pm 2}{2}$ Time to reach thermal equilibrium $\frac{1}{5}$ $\frac{20 \pm 2}{2}$ Time to reach thermal equilibrium $\frac{1}{5}$ $\frac{20 \pm 2}{2}$ $\frac{1}{2}$				1051				Ti	ime to	reach			ulibrium	-	
9 Temperature characteristics $\frac{3}{20\pm2} \qquad \text{Time to reach thermal equilibrium} \\ \frac{4}{105\pm2} \qquad \text{Time to reach thermal equilibrium} \\ 5 \qquad 20\pm2 \qquad \text{Time to reach thermal equilibrium} \\ 5 \qquad 20\pm2 \qquad \text{Time to reach thermal equilibrium} \\ \text{Capacitance, DF, and impedance shall be measured at 120Hz.} \\ < \frac{\text{Criteria}}{\text{Criteria}} \\ \text{a. At +105^{\circ}C, capacitance measured at +20^{\circ}C shall be within ±25\% of its original value. Dissipation factor shall be within the limit of Item 7.3 \\ \text{The leakage current measured at +20^{\circ}C shall be within ±10\% of its original value. Dissipation factor shall be within the limit of Item 7.3 \\ \text{The leakage current measured at +20^{\circ}C shall be within ±10\% of its original value. Dissipation factor shall be within the limit of Item 7.3 \\ \text{The leakage current measured at +20^{\circ}C shall be within ±10\% of its original value. Dissipation factor shall be within the limit of Item 7.3 \\ \text{The leakage current shall not more than the specified value.} \\ \text{c. At- 40^{\circ}C, Impedance (Z) ratio shall not exceed the value of the following table.} \\ \hline \hline \sqrt{\text{Voltage (V)} 6.3 10 16 25 35 50 63 100 160 200-400 450 \\ \hline Z-40^{\circ}C/Z+20^{\circ}C 8 6 4 4 4 4 4 4 4 4 4$												-		-	
9 Temperature characteristics 4 105±2 Time to reach thermal equilibrium 5 20±2 Time to reach thermal equilibrium Capacitance, DF, and impedance shall be measured at 120Hz. 9 Temperature characteristics a. At +105°C, capacitance measured at +20°C shall be within ±25% of its original value. Dissipation factor shall be within the limit of Item 7.3 The leakage current measured shall not more than 10 times of its specified value. Dissipation factor shall be within the limit of Item 7.3 The leakage current shall not more than 10 times of its original value. Dissipation factor shall be within the limit of Item 7.3 The leakage current shall not more than 10 times of its original value. Dissipation factor shall be within the limit of Item 7.3 The leakage current shall not more than the specified value. c. At-40°C, Impedance (Z) ratio shall not exceed the value of the following table. 10 Voltage (V) 6.3 10 16 200 ⁻² / ₂ 8 6 4 4 4												-		-	
9 Temperature characteristics 5 20±2 Time to reach thermal equilibrium 9 Temperature characteristics 5 20±2 Time to reach thermal equilibrium 9 Temperature characteristics 5 20±2 Time to reach thermal equilibrium 9 Temperature characteristics 5 20±2 Time to reach thermal equilibrium 9 Temperature characteristics 5 20±2 Time to reach thermal equilibrium 9 Temperature characteristics 5 20±2 Time to reach thermal equilibrium 9 Criteria> a. At +105°C, capacitance measured at +20°C shall be within ±120Hz. Criteria> a. At +105°C, capacitance measured at +20°C shall be within ±10% of its original value. Dissipation factor shall be within the limit of Item 7.3 The leakage current shall not more than the specified value. c. At- 40°C, Impedance (Z) ratio shall not exceed the value of the following table. 10 160 200-400 450 2.40°C/Z+20°C 8 6 4 4 4 4 7 8 10 16 25 35 50 63 100 160 200-400 450 <								-				-		ibrium ibrium ibrium ibrium ibrium ibrium ibrium ibrium f its original value. ecified value. ts original value. owing table. 200-400 450 7 8 0)/CR (k Ω) resistor in all be repeated	
 9 Temperature characteristics Capacitance, DF, and impedance shall be measured at 120Hz. Criteria> a. At +105°C, capacitance measured at +20°C shall be within ±25% of its original value. Dissipation factor shall be within the limit of Item 7.3 The leakage current measured at +20°C shall be within ±10% of its original value. Dissipation factor shall be within the limit of Item 7.3 The leakage current measured at +20°C shall be within ±10% of its original value. Dissipation factor shall be within the limit of Item 7.3 The leakage current shall not more than the specified value. c. At- 40°C, Impedance (Z) ratio shall not exceed the value of the following table. Voltage (V) 6.3 10 16 25 35 50 63 100 160 240°C/Z+20°C 8 6 4 4	9		5					-				-			
$10 Surge test Voltage (V) 6.3 10 16 25 35 50 63 100 160 200-400 450 \\ \hline Z-40^\circ C/Z+20^\circ C 8 6 4 4 4 4 4 4 4 4 4$			 a. At +105°C, capacitance measured at +20°C shall be within ±25% of its orig Dissipation factor shall be within the limit of Item 7.3 The leakage current measured shall not more than 10 times of its specified v b. In step 5, capacitance measured at +20°C shall be within ±10% of its origin Dissipation factor shall be within the limit of Item 7.3 The leakage current shall not more than the specified value. 							specified v f its origina	r) for 90° within hal value. hal value. lue. value. ble. 450 8 2) resistor in cated				
$\frac{\mathbb{Z} \cdot 40^{\circ} \mathbb{C}/\mathbb{Z} + 20^{\circ} \mathbb{C} 8 6 4 4 4 4 4 4 4 4 4$					`	- <u>í</u>	I I					r			1
10 Surge test Condition> Applied a surge voltage to the capacitor connected with a (100 ±50)/CR (kΩ) resistor 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) Leakage current Not more than the specified value. Dissipation Factor Not more than the specified value.						16	25	35	50	63	100	160	200~400	450	
$10 Surge test \qquad \begin{array}{c} Applied a surge voltage to the capacitor connected with a (100 \pm 50)/CR (k\Omega) resistor series for 30\pm5 seconds in every 5\pm0.5 minutes at 15~35^{\circ}C.Procedure shall be repeated 1000 times. Then the capacitors shall be left under normal humidity for 1-2 hours before measurement CR : Nominal Capacitance (µF) \begin{array}{c} \\ \hline Leakage current & Not more than the specified value. \\ \hline Dissipation Factor & Not more than the specified value. \\ \hline \end{array}$			Z-40°C/Z+2	0°C	8 6	4	4	4	4	4	4	4	7	8	
Attention: This test simulates over voltage at abnormal situation only. It is not applicable to such o	10	-	$\label{eq:series} \begin{array}{l} \mbox{Applied a surge voltage to the capacitor connected with a (100 \pm 50)/CR (k\Omega) resistor is series for 30\pm5 seconds in every 5\pm0.5 minutes at 15~35^{\circ}C. Procedure shall be repeated 1000 times. Then the capacitors shall be left under normal humidity for 1-2 hours before measurement CR : Nominal Capacitance (\muF) \\ \hline \hline Criteria> \\ \hline \hline Leakage current & Not more than the specified value. \\ \hline Capacitance Change & Within \pm 15\% of initial value. \\ \hline Dissipation Factor & Not more than the specified value. \\ \hline Appearance & There shall be no leakage of electrolyte. \\ \hline \end{array}$												



	ITEM		PERFORMAN	CE	
		<condition> Temperature cycle: According to IEC60384-4 Nc according as below:</condition>	o.4.7 methods, capacitor	shall be placed in an over	n, the condition
		Ten	nperature	Time	
		(1) +20°C		3 Minutes	
	Change of	(2) Rated low temperatu	are $(-40^{\circ}C)(-25^{\circ}C)$	30±2 Minutes	
11	temperature test	(3) Rated high temperat	ure (+105°C)	30±2 Minutes	
		(1) to (3) =1 cycle, total	5 cycle		
		<criteria> The characteristic shall meet</criteria>	the following reauireme	nt.	
		Leakage current	Not more than the sp		
		Dissipation Factor	Not more than the sp	pecified value.	
		Appearance	There shall be no lea	akage of electrolyte.	
	Damp	<condition> Humidity test: According to IEC60384-4 No be exposed for 500±8 hours in 40±2°C, the characteristic cha <criteria></criteria></condition>	n an atmosphere of 90~9	95%R H .at	
12	heat test	Leakage current	Not more than the spec	cified value.	
		Capacitance Change	Within $\pm 10\%$ of initial	value.	
		Dissipation Factor	Not more than 120% c	of the specified value.	
		Appearance	There shall be no leaka	age of electrolyte.	
13	Solderability test	<condition> The capacitor shall be tested of Soldering temperature : 243 Dipping depth : 2m Dipping speed : 25 Dipping time : 3±0 <criteria></criteria></condition>	5 ±5°C mm ±2.5mm/s	ditions:	
		Soldering wetting time	Less than 3s		



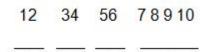
	ITEM	PERFORMANCE
14	Vibration test	<condition> The following conditions shall be applied for 2 hours in each 3 mutually perpendicular directions. Vibration frequency range : 10Hz ~ 55Hz each to peak amplitude : 1.5mm Sweep rate : 10Hz ~ 55Hz ~ 10Hz in about 1 minute Mounting method: The capacitor with diameter greater than 12.5mm or longer than 25mm must be fixed in place with a bracket. 4mm or less 4mm or less Vithin 30° 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.</condition>
		AppearanceNo 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°Cfor10±1seconds or400±10°Cfor3 ⁻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></criteria></condition>
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 test	<condition> The following test only apply to those products with vent products at diameter ≥Ø6.3 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. <table 2=""> Diameter (mm) DC Current (A) 22.4 or less 1 <criteria> The vent shall operate with no dangerous conditions such as flames or dispersion of pieces of the capacitor and/or case.</criteria></table></condition>



8、 Packing Information

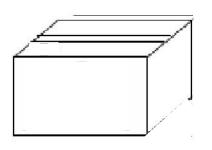
Packing Label Marked (the following items shall be marked on the label)
(Inside box or bag)
(1)Clint order number (2)Client part number (3)Beryl part number (4)Capacitance (5)Voltage (6)Dimension
(7)Packaging quantity (8)Capacitance tolerance (9) QC Marking (0) Lot number (1) Series

LOT Number :

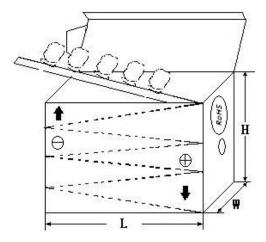


year month date number

1) Bulk Packing:



2) Taped Packing:



3) Outer box



外箱

4) Outer box label:

BERYL	Zhao Qin	g Beryl Ele Ltd.	ctronic	c Technology Co.,
C.S.R:				
C.S.R P/C):			ROHS HE
C.S.R P/N	1:0			
S.P.R P/N	l:			QC
SPEC:				
QTY:	PCS	TOL:	%	
L/N:		S.P.R:		3 ⁻



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>

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

X-ON Electronics

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