Dwg. No. :H16-4291
承認字號
Issued Date: 2016/12/9

Customer :_____
(客　戶)

Part No. :_____
(貴公司料號)

SPECIFICATION FOR APPROVAL
承　認　書

Description : Organic Conductive Polymer Aluminum Electrolytic Capacitor
(零 件 名 稱)

Lelon Series : OVK Series
(立 隆 系 列)

Lelon Part No.: OVK101M1ETR-0608
(立 隆 料 號)

Environment.: RoHS Compliance & Halogen-free

LELON ELECTRONICS CORP.
立 隆 電 子 工 業 股 份 有 限 公 司

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Approval 核 准	Check 確 認	Design 作 成
R & D DEC. 9. 2016 Jack Huang	R & D DEC. 9. 2016 H.Y.Huang	R & D DEC. 9. 2016 Z.X.Sun

Approval Signatures
貴公司承認印

Please Return One Copy with Your Approval
承 認 後 請 寄 回 本 圖 一 份

Part Numbering System

Product Code Guide – SMD Type

OCV series	220μF	±20%	6.3V	Carrier Tape		6.3φ×7L	Pb-free and PET coating case	
OCV	**221**	**M**	**0J**	**TR**	**-**	**0607**		
□□□	□□□	□	□□	□□	□	□□□□	□	
①	②	③	④	⑤	⑥	⑦	⑧	⑨
Series	Capacitance	Capacitance Tolerance	Rated Voltage	Package Type	Terminal Type	Case size	Lead Wire and Coating Type	Supplement Code

① Series:

Series is represented by a three-letter code. When the series name only has two letters, use a hyphen, "-", to fill the third blank. When the series name has 4 letters, use the following series codes.
OCVZ→ OVZ; OCVU→ OVU

② Capacitance:

Capacitance in μF is represented by a three-digit code. The first two digits are significant and the third digit indicates the number of zeros following the significant figure. "R" represents the decimal point for capacitance under 10μF.
Example:

Capacitance	22	47	100	220	470	1,000	2,200	4,700
Part number	220	470	101	221	471	102	222	472

③ Tolerance:

K = -10% ~ +10%	M = -20% ~ +20%	V = -10% ~ +20%

④ Rated voltage:

Rated voltage in volts (V) is represented by a two-digit code

Voltage (WV)	2.5	4	6.3	10	16	20	25	35	40	50	63
Code	0E	0G	0J	1A	1C	1D	1E	1V	1G	1H	1J

⑤ Package:

TR = Reel package

⑥ Terminal:

- = No dummy terminal

⑦ Case size:

The first two digits indicate case diameter and the last two digits indicate case length in mm.

φD×L	5×5.7	6.3×4.4	6.3×5.9	6.3×7.0	6.3×7.7	8×6.7	8×12	10×7.7	10×9.9	10×12.6
Code	**0506**	**0604**	**0606**	**0607**	**0608**	**0807**	**0812**	**1008**	**1010**	**1013**

Note : When a case size is required and not shown in the table, please contact with us for further discussion.

⑧ Lead Wire and Coating Type:

None = Pb free wire + PET coating case (Standard design)
B = Sn-Bi Wire + Coating case

* When a supplement code following a blank digit code of lead wire and case coating type (standard design), use a hyphen, "-", to fill the blank digit.
* When the automotive control code is required, please contact with us for further discussion.

⑨ Supplement code (Optional):

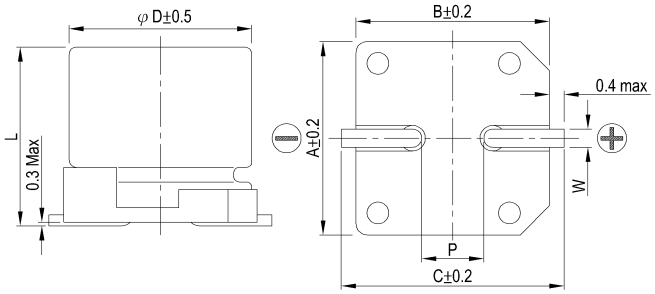
For special control purpose

Lelon P/N: OVK101M1ETR-0608	LELON ELECTRONICS CORP. OVK 100 µF / 25 V – 6.3φ ×7.7L	Page: 1 / 1

CUSTOMER : 坤興

CUSTOMER P/N:

PRODUCT DIMENSIONS



Unit: mm

φD	6.3
L	7.7 ± 0.3
A	6.6
B	6.6
C	7.2
W	0.5~0.8
P	2.0 ± 0.2

Items	Performance	
Rated Voltage V_R	25 V	
Capacitance C_R	100 µF	(120 Hz, 20℃)
Category Temperature Range	-55℃ ~ +105℃	
Capacitance Tolerance	-20 % ~ +20 %	(120 Hz, 20℃)
Surge Voltage V_S	29.0 V_{DC}	
Leakage Current (20℃)	I_{LEAK} ≦ 320 µA	After 2 minutes
Tan δ	≦ 0.12	(120 Hz, 20℃)
ESR $_{max.}$	< 50 mΩ	(100k ~300k Hz, 20℃)
Ripple Current ($I_{AC,R}$ / rms)	1500 mA	(100k Hz, 105℃)
Ripple Current (mA) and Frequency Multipliers		

Frequency (Hz)	120 ≦ f < 1k	1k ≦ f <10k	10k ≦ f <100k	100k≦ f <500k
Multiplier	0.05	0.3	0.7	1.0

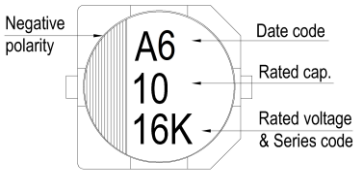
Endurance and Moisture Resistance

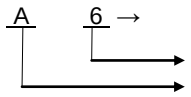
Items	Endurance	Moisture Resistance
Test Time	5,000 Hrs at 105℃; V_R	1,000 Hrs at 60℃; 90 ~ 95% R. H.
Cap. Change	Within ±20 % of initial value	Within ±20 % of initial value
Tan δ	Less than 150% of specified value	Less than 150% of specified value
ESR	Less than 150% of specified value	Less than 150% of specified value
Leakage Current*	Within specified value	Within specified value

Standards	JIS C 5101-25, IEC 60384-4
Remarks	RoHS Compliance, Halogen-free

* For any doubt about measured values, measure the leakage current again after the following voltage treatment.
Voltage treatment: Applying DC rated voltage to the capacitors for 2 hours at 105℃.

Marking: Each capacitor shall be marked with the following information.





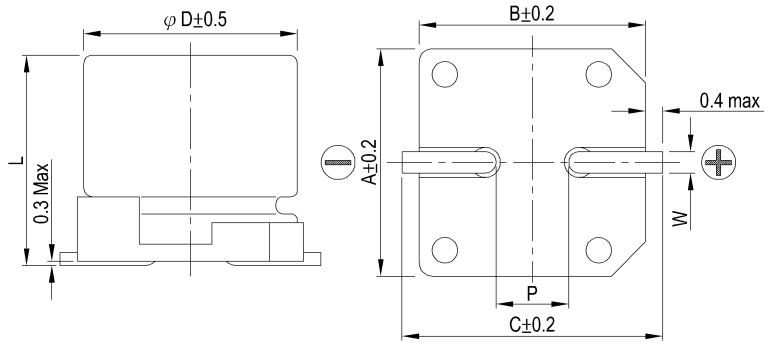
Month	1	2	3	4	5	6
Code	A	B	C	D	E	F
Month	7	8	9	10	11	12
Code	G	H	I	J	K	L

Marking color: Blue

* Please refer to “Precautions and Guidelines for Aluminum Electrolytic Capacitors” section in Lelon's catalog for further details.

Publication Date	December 9, 2016	Approval Signatures:	Approved	Checked	Designed
Revision Date			R & D DEC. 9. 2016 Jack Huang	R & D DEC. 9. 2016 H.Y.Huang	R & D DEC. 9. 2016 Z.X.Sun
Version No.	1	Please return one copy with your approval			

Diagram of Dimensions: Unit: mm

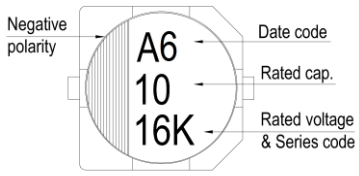


φD	L	A	B	C	W	P ± 0.2
6.3	5.9+0.1/-0.3	6.6	6.6	7.2	0.5 to 0.8	2.0
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 to 0.8	2.0
8	6.7 ± 0.3	8.4	8.4	9.0	0.7 to 1.1	3.1
8	10.0 ± 0.5	8.4	8.4	9.0	0.7 to 1.1	3.1
8	12.0 ± 0.5	8.4	8.4	9.0	0.7 to 1.1	3.1
10	7.7 ± 0.3	10.4	10.4	11.0	0.7 to 1.3	4.7
10	12.6+0.1/-0.4	10.4	10.4	11.0	0.7 to 1.3	4.7

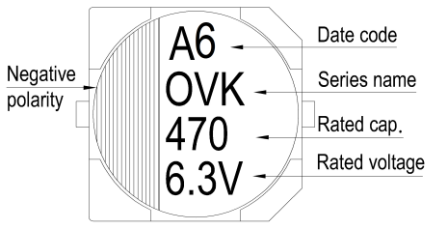
Marking:

Each capacitor shall be marked with the following information.

φD = 6.3 mm



φD = 8 ~ 10 mm



Description of Date Code:

A 6 → January, 2016

The last digit of A. D.

Month of manufacure

Month	1	2	3	4	5	6
Code	**A**	**B**	**C**	**D**	**E**	**F**
Month	7	8	9	10	11	12
Code	**G**	**H**	**I**	**J**	**K**	**L**

Origin Code:

Huizhou: A6 , B6 , … , K6 , L6

Suzhou: 6A , 6B , … , 6K , 6L

Marking Color: Blue

Taping Specification for SMD Type

1. Carrier Tape

Fig. 1-1

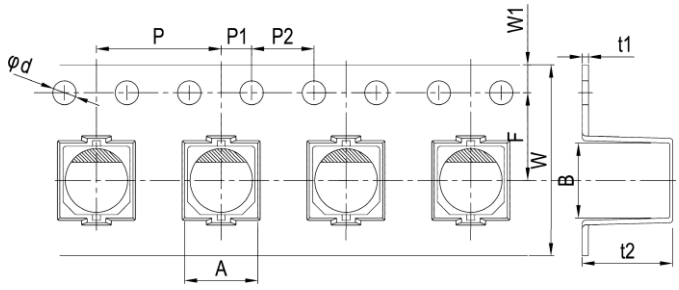


Fig. 1-2

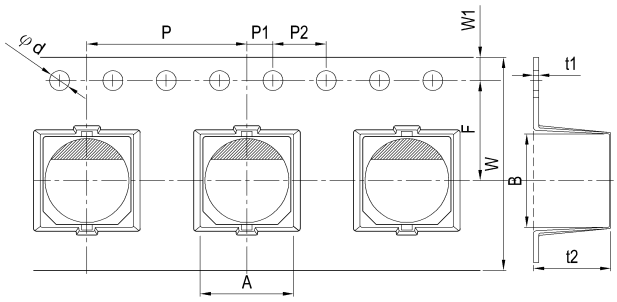
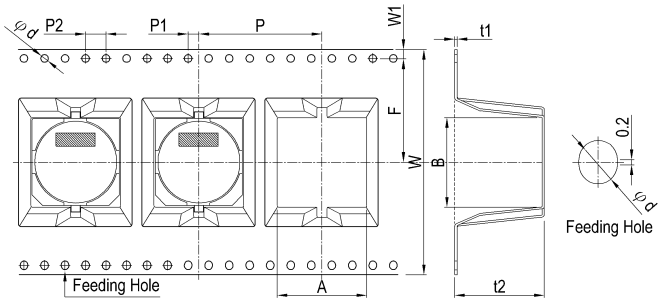


Fig. 1-3



Unit: mm

φD ×L	A	B	φd	F	P	P1	P2	t1	t2	W	W1	Fig. No.
3~4 ×4.5~5.3	4.7	4.7		5.5	8				5.8			
4 ×5.7	4.7	4.7		5.5	8				6.2	12.0		
5 ×4.5~5.3	5.7	5.7		5.5	12				5.8			1-1
5 ×5.7 (5.9*)	5.7	5.7		5.5	12				6.2			
6.3 ×4.5~5.3	7.0	7.0							5.8			
6.3 ×5.7 / 5.8	7.0	7.0							6.2			
6.3 ×5.9*	7.0	7.0							6.2			
6.3 ×7.0*	7.0	7.0		7.5	12				6.8	16.0		
6.3 ×7.7	7.0	7.0						0.4	8.3			
8 ×6.5	8.7	8.7							6.8			1-2
8 ×6.7*	8.7	8.7							6.8			
8 ×10	8.7	8.7							11.0			
8 ×11.2 / 12*	8.7	8.7	1.5			2.0	4.0		13.0		1.75	
10 ×7.7*	10.7	10.7		11.5	16				10.0	24.0		
10 ×10 (9.9*)	10.7	10.7							11.0			
10 ×12.6*	10.7	10.7							13.0			
12.5 ×13.5	13.4	13.4							15.0			
12.5 ×13.5(G)	13.7	13.7		14.2	24				15.0	32.0		
12.5 ×16	13.4	13.4							17.5			
12.5 ×16(G)	13.7	13.7							17.5			
16 ×16.5	17.5	17.5						0.5	17.5			1-3
16 ×16.5(G)	17.5	17.5			28				17.5	44.0		
16 ×21.5	17.5	17.5		20.2					22.5			
18 ×16.5	19.5	19.5			32				17.5			
18 ×21.5	19.5	19.5							22.5			
Tol.	±0.2	±0.2	+0.1/-0	±0.1	±0.1	±0.1	±0.1	±0.1	±0.2	±0.3	±0.15	

Note: Case size in mark of "*" are for OP-CAP ; case size in mark of "G" are for "Anti-vibration"

2. Reel Package

Fig. 2-1

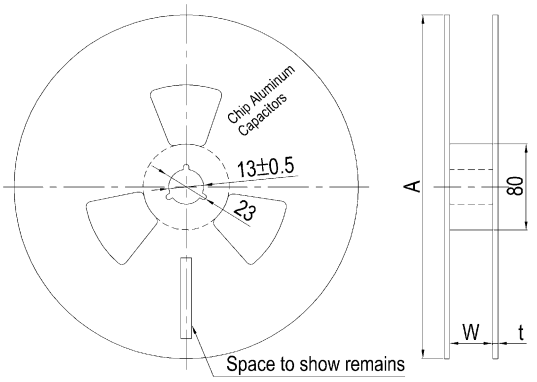
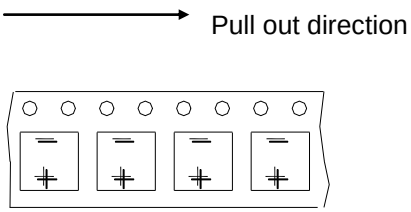


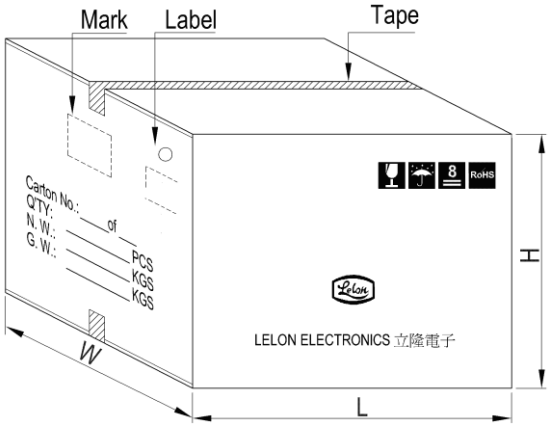
Fig. 2-2 Reel Polarity



Case size	3 ~ 4φ	5φ	6.3φ	8φ×6.5 ~ 7L	8φ×10 ~12L	10φ	12.5φ	16 ~ 18φ
W	14	14	18	18	26	26	34	46
A	380	380	380	380	380	380	380	380
t	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

3. Packing specification

Fig. 3-1 Carrier Tape



Unit: pcs

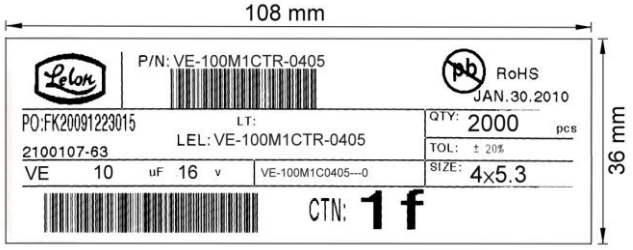
Case size	Q'ty / Reel	Q'ty / Box
3φ	2,000	20,000
4φ	2,000	20,000
5φ	1,000	10,000
6.3φ	1,000	10,000
8φ×6.5~7L	1,000	10,000
8φ×10L	500	5,000
8φ×12L*	400	4,000
10φ×8~10L	500	5,000
10φ×12.7L*	400	4,000
12.5φ×13.5L	200	1,600
12.5φ×16L	200	1,600
16φ×16.5L	200	1,600
16φ×21.5L	100	800
18φ×16.5L	150	1,200
18φ×21.5L	100	800

* Case size with "*" mark are for OP-CAP only.

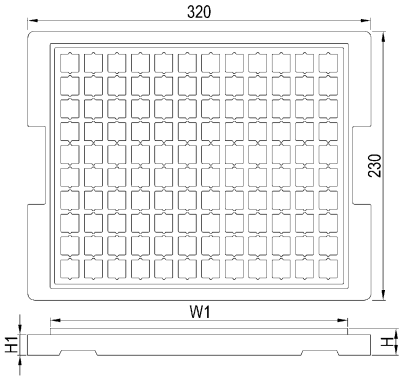
Unit: mm

Case size	3 ~ 4φ	5φ	6.3φ	8φ× 6.5 ~ 7L	8φ× 10 ~ 12L	10φ	12.5φ	16 ~ 18φ
H	180	220	220	220	310	310	315	390
W, L	390	390	390	390	390	390	390	390

Fig. 3-2 Label



4. Chip Tray

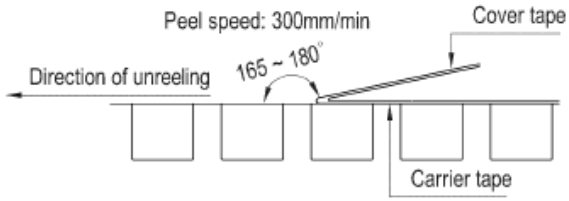


Dimension and package quantity Unit: mm

Case size	W1	H	H1	Q'ty / Tray	Q'ty / Box
12.5φ×13.5L	284	21	18.5	120	600
12.5φ×16L	284	21	18.5	120	600
16φ×16.5L	284	28	24.0	80	400
16φ×21.5L	284	28	24.0	80	400
18φ×16.5L	284	28	24.0	60	300
18φ×21.5L	284	28	24.0	60	300

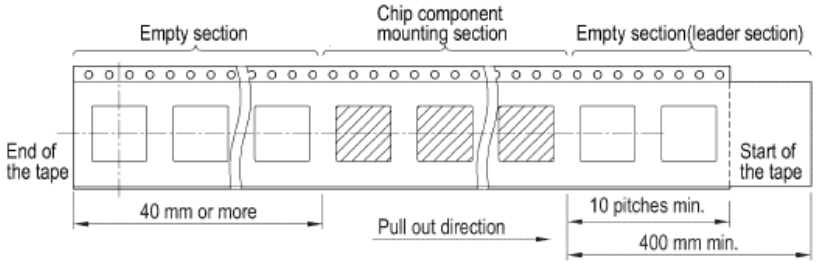
5. Sealing Tape Reel Strength

5.1 Peel angle: 165 to 180℃ refered to the surface on which the tape is glued.
5.2 Peel speed: 300mm per minutes
5.3 The peel strength must be 0.1 ~ 0.7N under these conditions.

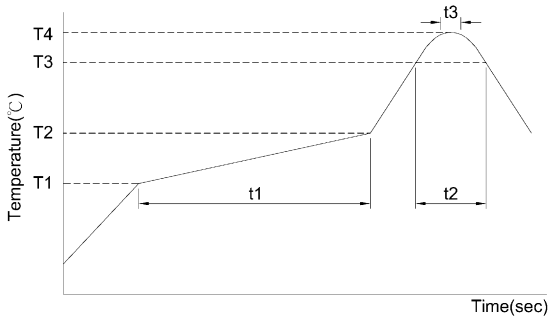


6. Packing Method

6.1 Polarity: Anode on the opposite side of the feed hole
6.2 The leader length of the tape shall not be less than 400mm including 10 or more embossed sections in which no parts are contained.
6.3 The winding core is provided with an over 40mm long empty section.



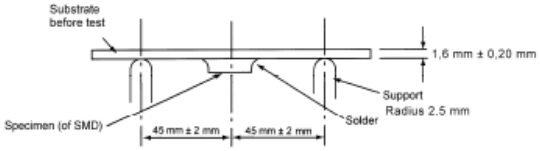
Endurance Characteristic:

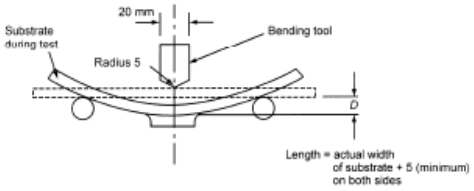
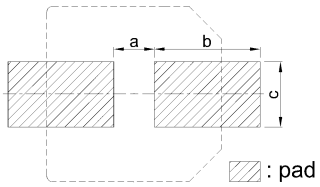
<table>
<tr><th>No.</th><th>Item</th><th>Conditions</th><th colspan="2">Specification</th></tr>
<tr><td rowspan="4">1</td><td rowspan="4">Rotational Temperature Test</td><td rowspan="4">Capacitor is placed in an oven whose temperature follow specific regulation to change. The specific regulation is "+25℃(3 min.) →- 55℃(30 min.) → +25℃(3min.) → +105℃(30 min.) → +25℃(3min.)", and it is called a cycle. The test totals 10 cycles. And then the capacitor shall be subjected to standard atmospheric conditions for 4 hours, after which measurements shall be made.</td><td>Capacitance change</td><td>Within ±10% of initial value.</td></tr>
<tr><td>Tanδ</td><td>Within specified value</td></tr>
<tr><td>Leakage Current</td><td>Within specified value</td></tr>
<tr><td>Physical</td><td>No broken and undamaged</td></tr>
<tr><td rowspan="5">2</td><td rowspan="5">High Temperature Endurance Life</td><td rowspan="5">1. Capacitors shall be placed in oven with application of rated voltage for 5000 +72/-0 hrs at 105℃.
2. Then the capacitor shall be subjected to standard atmospheric conditions for 4 hours, after which measurements shall be made.</td><td>Capacitance change</td><td>Within ±20% of initial value</td></tr>
<tr><td>Tanδ</td><td>Less than 150% of specified value</td></tr>
<tr><td>ESR</td><td>Less than 150% of specified value</td></tr>
<tr><td>Leakage Current</td><td>Within specified value</td></tr>
<tr><td>Physical</td><td>No broken and undamaged</td></tr>
<tr><td rowspan="5">3</td><td rowspan="5">Moisture Resistance</td><td rowspan="5">Capacitors shall be exposed for 1000 +48/-0 hrs in an atmosphere of 90 ~ 95% R.H. at 60±3℃. And then the capacitor shall be subjected to standard atmospheric conditions for 4 hours, after which measurements shall be made.</td><td>Capacitance change</td><td>Within ±20% of initial value.</td></tr>
<tr><td>Tanδ</td><td>Less than 150% of specified value</td></tr>
<tr><td>ESR</td><td>Less than 150% of specified value</td></tr>
<tr><td>Leakage Current</td><td>Within specified value</td></tr>
<tr><td>Physical</td><td>No broken and undamaged</td></tr>
<tr><td rowspan="5">4</td><td rowspan="5">Vibration Test</td><td rowspan="5">1. Fix it at the point 4mm or less form body. For ones of 12.5mm or more in diameter or 25mm or more length, use separate fixture.
2. Direction and during of vibration: 3 orthogonal directions mutually each for 2 hrs (total of 6 hrs).
3. Frequency: 10 to 55 Hz reciprocation for 1min.
4. Total amplitude : 1.5mm</td><td>Capacitance change</td><td>Within ±10% of initial value</td></tr>
<tr><td>Tanδ</td><td>Within specified value</td></tr>
<tr><td>ESR</td><td>Within specified value</td></tr>
<tr><td>Leakage Current</td><td>Within specified value</td></tr>
<tr><td>Physical</td><td>No broken and undamaged</td></tr>
<tr><td rowspan="5">5</td><td rowspan="5">Resistance to Soldering Heat Test</td><td>IR Reflow
 

<table>
<tr><td rowspan="2">Preheat</td><td>Temp.(T1~T2,℃)</td><td colspan="2">150~200</td></tr>
<tr><td>Time(t1)(Max,secs)</td><td colspan="2">180</td></tr>
<tr><td rowspan="2">Duration</td><td>Temp. (T3,℃)</td><td colspan="2">230</td></tr>
<tr><td>Time(t2)(Max,secs)</td><td colspan="2">60</td></tr>
<tr><td rowspan="2">Peak</td><td>Temp. (T4,℃)</td><td>250</td><td>260</td></tr>
<tr><td>Time (t3,secs)</td><td colspan="2">5</td></tr>
<tr><td colspan="2">Reflow cycles</td><td>2</td><td>1</td></tr>
</table>
* Please contact our representative if your condition is higher.
* Please ensure that the capacitor became coldenough to the room temperature (5℃~ 35℃) before the second reflow.
* Consult with us when performing reflow profile in IPC / JEDEC (J-STD-020)</td><td>Capacitance change</td><td>Within ±10% of initial value.</td></tr>
<tr><td>Tanδ</td><td>Within specified value</td></tr>
<tr><td>ESR</td><td>Within specified value</td></tr>
<tr><td>Leakage Current</td><td>Within specified value</td></tr>
<tr><td>Physical</td><td>No broken and undamaged</td></tr>
</table>

<table>
<tr><th>No.</th><th>Item</th><th>Conditions</th><th colspan="2">Specification</th></tr>
<tr><td>6</td><td>Surge Voltage Test</td><td>The capacitor shall be subjected to 1000 cycles at 15~35℃. Protective series resistor a 1KΩ each consisting of a charge period of 30±5 seconds, followed by discharge period of approximately 5.5 minutes.

Applying voltage:
<table>
<tr><td>Rated Voltage(V)</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>20</td><td>25</td><td>35</td></tr>
<tr><td>Surge Voltage(V)</td><td>4.6</td><td>7.2</td><td>12.0</td><td>18.0</td><td>23.0</td><td>29.0</td><td>40.0</td></tr>
</table></td><td colspan="2"><table>
<tr><td>Capacitance change</td><td>Within ±20% of initial value.</td></tr>
<tr><td>Tanδ</td><td>Less than 150% of specified value</td></tr>
<tr><td>ESR</td><td>Less than 150% of specified value</td></tr>
<tr><td>Leakage Current</td><td>Within specified value</td></tr>
<tr><td>Physical</td><td>No broken and undamaged</td></tr>
</table></td></tr>
<tr><td>7</td><td>Thermal Shock Test</td><td>Capacitor is placed in an oven whose temperature follow specific regulation to change.
The specific regulation is - 55 ± 3℃ (30 min.) → +105 ± 3℃ (30 min.), and it is called a cycle.
The test totals 10 cycles.</td><td colspan="2"><table>
<tr><td>Capacitance change</td><td>Within ± 10% of initial value</td></tr>
<tr><td>Tanδ</td><td>Within specified value</td></tr>
<tr><td>ESR</td><td>Within specified value</td></tr>
<tr><td>Leakage Current</td><td>Within specified value</td></tr>
<tr><td>Physical</td><td>No broken and undamaged</td></tr>
</table></td></tr>
<tr><td>8</td><td>Mechanical Characteristics Test</td><td>Bending Test:
Apply pressure in the direction of the arrow at a rate of about 0.5 mm / s until bent width reaches 2 mm and hold for 60s. The board shall be the test board “B” as specified in JIS C 0051: 2002. If the land area differs, it shall be specified clearly in the next item.


</td><td colspan="2">Without mechanical damage such as breaks. Electrical characteristics shall be satisfied. If there are electrodes on both surfaces, above requirements shall be satisfied on whicheversurface it may be fixated on.</td></tr>
<tr><td>9</td><td>Solderability Test</td><td colspan="3">After the lead wire fully immersed in the solder for 2±0.5 secs at a temperature of 245±5℃, the solder coating must be more than 95%.</td></tr>
<tr><td>10</td><td>Failure Rate Level</td><td colspan="3">Examination of resistance to solder heat.
Test temperature : 105±3℃
Applied voltage: Apply D.C. voltage equal to rated voltage.
Confidence level: 60 %</td></tr>
<tr><td>11</td><td>Coating Case</td><td colspan="3">The color of coating case will turn light khaki from colorless with long duration in high temperature. Should there is any concern with the color changing of coating case, please consult with us.</td></tr>
<tr><td>12</td><td>Land Pattern</td><td colspan="3">Recommended pad pattern and size
 

<table>
<tr><th rowspan="2">Case size</th><th colspan="3">Land size</th></tr>
<tr><th>a</th><th>b</th><th>c</th></tr>
<tr><td>6.3φ</td><td>1.9</td><td>3.5</td><td>1.6</td></tr>
<tr><td>8φ</td><td>3.0</td><td>3.5</td><td>2.5</td></tr>
<tr><td>10φ</td><td>4.0</td><td>4.0</td><td>2.5</td></tr>
</table></td></tr>
<tr><td>13</td><td>Standards</td><td colspan="3">Satisfies Characteristic JIS C 5101-25</td></tr>
<tr><td>14</td><td>Remarks</td><td colspan="3">OP-CAP is appropriate for the products of non-concussive environment, if it needs to be applied on concussive environment, we suggest that the capacitors should be fixed by glue and it cannot exceed the condition of concussive spec.</td></tr>
</table>

Precautions and Guidelines for Organic Conductive Polymer Aluminum Capacitors

Organic conductive polymer capacitor (OP-CAP) is specially structured solid aluminum electrolytic capacitor that uses highly conductive polymer electrolytic material. Please read the following contents in order to get most performance and stable quality by using OP-CAP series products.

1. Guidelines for Circuit design

(1) Polarity

OP-CAP is a solid aluminum electrolytic capacitor with positive and negative electrodes. Make sure of the polarity. If it is used in reverse polarity, leakage current will increase and life span may decrease.

(2) Operating Voltage

Do not apply DC voltage, which exceeds the rated voltage of the capacitor and shall not be reverse voltage. If a voltage exceeding the capacitor's voltage rating is applied, the capacitor may be damaged as leakage current increase. Using capacitors at recommended working voltage prolongs capacitor life. The surge volgage rating is the maximum DC over-voltage to which the capacitors may be subjected of short periods.

(3) Ripple Current

The combined value of DC voltage and the peak AC voltage shall not exceed the rated voltage. The superimposition of a large ripple current increases the rate of heating within the capacitor. This may reduce the service life of the capacitor or damage the capacitor.

(4) Operating Temperature

Use the electrolytic capacitors according to the specified operating temperature range. Usage at room ambient will ensure longer life.

(5) Leakage Current

The initial leakage current shall be within specified levels. Note that the leakage current may increase due to thermal stresses that occur during soldering, etc. Note that increased currents gradually decrease when voltage is applied.

(6) Charge and Discharge

Do not use OP-CAP in circuits where the capacitor is repetitively charged and discharged rapidly. Repetitively charging and discharging rapidly may reduce the capacitance or cause damage due to internal heating. Therefore, protection circuits are recommended to design when rush currents exceed 10A.

(7) Condition of Use

OP-CAP shall not be used / exposed to the following conditions.

(a) Water, saltwater spray, oil or fumes, high humidity or humidity condensation.

(b) Ambient conditions that include hazardous gases such as hydrogen sulfide, sulfurous acid, nitrous acid, nitrous acid, chlorine or bromine gas, ammonia, etc.

(c) Ozone, ultraviolet rays and radiation.

(d) Severe vibration or physical shock that exceeds the condition in specification sheets.

(8) Consideration to Circuit Design

(a) Please make sure the application and mounting conditions that the capacitor will be used are within the conditions specified in the catalog. If the conditions are beyond the conditions specified in the catalog, please contact Lelon.

(b) Do not design a circuit board so that heat-generating components are places near OP-CAP or reverse side of PCB. A cooling system is recommended.

(c) Operating temperature, applied voltage and ripple current shall be within specification. The ambient temperature shall not exceed the operating temperature and applied ripple current shall not exceed the allowable ripple current specified in the specification.

(d) Performances of electrical characteristics of OP-CAP are affected by variation of operating temperature and frequency. Consider this variation designing the circuit.

(e) When two or more capacitors are connected in parallel, consider the current balance that flow through the capacitors.

(f) If more than two capacitors are connected in series, make sure the applied voltage will be lower than the rated voltage and that voltage will be applied to each equally using a balancing resistor in parallel with each capacitor.

(g) For appropriate choice of capacitors for circuit that repeat rapid charge and discharge, please consult Lelon.

(h) Outer sleeve of the capacitor is not guaranteed as an electrical insulator. Do not use a standard sleeve on a capacitor that requires the electrical insulation. When the application requires special electrical insulation, please contact Lelon.

(i) Do not lie down or twist the capacitor's body after the capacitor is soldered to the PCB.

2. Caution for Assembling Capacitors

(1) Mounting

(a) OP-CAP cannot be re-used once the capacitor has assembled in the set and power applied.

(b) OP-CAP may have electrical potential between positive and negative terminal, please discharge through a 1KΩ resistor before use.

Leakage current of OP-CAP may be increased after storage a long period of time. In this case, we recommend that the OP-CAP shall be applied with DC rated voltage through a resistor of 1KΩ in series for 1 hour at 60℃~70℃, and then discharge through a resistor of 1KΩ. When the capacitors have been assembled in the board, use a volt regulator to input voltage gradually to the rated volt of the board.

(c) Please confirm the rated voltage before mounting.

(d) Please confirm the polarity before mounting.

(e) Do not use the OP-CAP that once dropped on the hard floor.

(f) Do not damage the OP-CAP while mounting.

(g) OP-CAP shall be mounted that hold spacing on PCB matches the lead pitch of the capacitors.

(h) During the auto-insertion process and parts inspection, capacitors shall avoid the excessive force and shock.

(i) Do not apply excessive external force to the lead terminal and the OP-CAP itself.

(2) Soldering

(a) Be careful of temperature and time when soldering. Dip of flow soldering of the capacitors should be limited at less than 260℃ and 10 seconds. Do not dip OP-CAP capacitor's body into melted solder.

(b) High humidity will affect the solder ability of lead wire and terminals. High temperature will reduce long-term operating life.

(c) Except SMD type, reflow soldering can not be used for any types of organic conductive polymer aluminum electrolytic capacitors. When using the SMD type of OP-CAP, please check the reflow profile. The temperature and duration shall not exceed the specified temperature and duration in the specification. If the temperature or duration is higher than the value specified, please consult Lelon before usage.

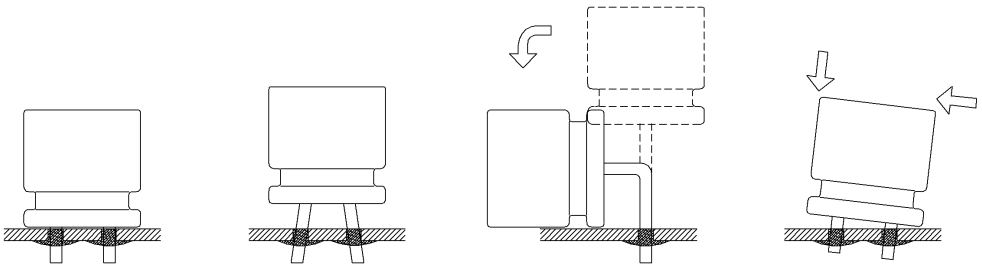
(d) Defective mounting on PCB and improper external strength applied on the lead wires or case body after soldering (see below drawings) may damage inside structure of the capacitor and may cause short circuit, high leakage current or leakage problems.

(i) Good soldering.

(ii) Hole-to-hole space on board differs from the lead space of lead wires.

(iii) Lead wires are bent after soldering.

(iv) Case body doesn't stand vertical on board after soldering. Do not bend or twist the capacitor's body after soldering.



○ (i) × (ii) × (iii) × (iv)

(3) Cleaning Circuit Boards After Soldering
Halogenated solvent cleaning is not available for OP-CAP. IPA (Isopropyl Alcohol) is one of the most acceptable cleaning agents; it is necessary to maintain a flux content in the cleaning liquid at a maximum limit of 2 Wt. %. If you use other cleaning agents, please consult Lelon.

3. Maintenance Inspection
Periodical inspection is necessary for using OP-CAP with industrial equipment. The following items should be checked:
(1) Appearance: bulge, damage, etc.
(2) Electrical characteristic: Capacitance, dissipation factor, leakage current, and other specified items listed in specification.
Lelon recommend replacing the capacitors if the parts are out of specifications.

4. Storage
(1) OP-CAP should not be stored in high temperature or high humidity condition. The suitable condition is 5℃ ~ 35℃ and less than 75% in relative humidity indoor.
(2) Do not store OP-CAP in damp conditions such as water, brine or oil.
(3) Do not store OP-CAP that exposed to hazardous gas such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, ammonium, etc.
(4) Do not store OP-CAP that exposed to ozone, ultraviolet rays or radiation.
(5) Do not expose OP-CAP to acidic or alkaline solutions.
(6) After taking the parts out from the storage bag, please put the un-used parts in the storage bag soon and make sure the bag is fully sealed. This measure can make sure the un-used parts can have a good soldering result in next usage.
(7) Open the bags just before mounting and use up all products once opened. Duration of storage of OP-CAP is as follows.

Series name	Before unseal	After unseal
OCV, OCVZ, OCVU, OVH, OVK	Within 1 year after delivery (Unopened condition)	Within 30 days from opening package
OCR, OCRZ, OCRK, OCRU, ORE	Within 1 year after delivery (Unopened condition)	Within 7 days from opening package

※ It is not applied to a regulation of JEDEC J-STD-020 (Rev. C).

5. Estimation of life time

$$L_r = L_0 \times 10^{\frac{T_0 - T_r}{20}}$$

Lr: Estimated lifetime (hrs)
L_0: Base lifetime specified at maximum operating temperature with applied the DC voltage (hrs)
T_0: Rated maximum operating temperature (℃)
Tr: Actual ambient temperature (℃)

OP-CAP	Aluminum Electrolytic Capacitors
105℃ ≧ 2,000 Hrs	105℃ ≧ 2,000 Hrs
95℃ ≧ 6,324 Hrs	95℃ ≧ 4,000 Hrs
85℃ ≧ 20,000 Hrs	85℃ ≧ 8,000 Hrs
75℃ ≧ 63,245 Hrs	75℃ ≧ 16,000 Hrs

Please note that
(1) Maximum life is 15 years
(2) Ripple current in application should be less than or equal to ripple current specified in catalogue

6. Disposal
Please consult with a local industrial waste disposal specialist when disposing of aluminum electrolytic capacitors.

7. Environmental Consideration
Lelon already have received ISO 14000 certificate. Cadmium (Cd), Lead (Pb), Mercury (Hg), Hexavalent Chromium (Cr^{+6}), PBB, PBDE, DEHP, BBP, DBP and DIBP have never been using in capacitor. If you need "Halogen-free" products, please consult with us.

For further details, please refer to the following industrial standards:

IEC 60384-4- Fixed capacitors for use in electronic equipment – Part 4: Sectional specification – Aluminum electrolytic capacitors with solid (MnO2) and non-solid electrolyte (Established in January 1995, Revised in March 2007)

EIAJ RCR-2367B- Guideline of notabilia for fixed aluminum electrolytic capacitors for use in electronic equipment [Technical Standardization Committee on Passive Components (Established in March 1995, Revised in March 2002)].