



## Handling Precautions of Cylinder Type Lithium Ion Capacitors

1. This product has been charged to a certain voltage before shipment.

- Do not short-circuit the positive (+) and negative (-) electrode terminals.
- Do not bring the terminals of products into direct contact with each other.
- ⊘ • Do not apply force to the positive (+) and negative (-) electrode terminals
- Do not hold the terminals when carrying the product.
- Do not drop or subject the product to excessive shock or vibration.

\* It may cause an electric shock, burns, or personal injury, resulting in a fault causing it to leak, heat up, smoke, explode, or burst into flames.

| <b>Examples of Short Circuit Caused by Operation Errors</b>   |   |
|---|---|
| <p>⊘ ×Contacts of Terminals Caused by Bundling Products Together in a Package</p>     | <p>⊘ ×Short-Circuit Occurred in the Product Processing and Measurement Procedures</p>  |
|   |   |

2. Please refer to the following website for the comprehensive user guide of these products.

U R L [http://www.yuden.co.jp/productdata/manual/en/lithosion\\_ug01\\_en.pdf](http://www.yuden.co.jp/productdata/manual/en/lithosion_ug01_en.pdf)

## Notice for TAIYO YUDEN products

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Please read this notice before using the TAIYO YUDEN products.

### REMINDERS

- Product information in this catalog is as of October 2015. All of the contents specified herein are subject to change without notice due to technical improvements, etc. Therefore, please check for the latest information carefully before practical application or usage of the Products.

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- Please contact TAIYO YUDEN CO., LTD. for further details of product specifications as the individual specification is available.

- Please conduct validation and verification of products in actual condition of mounting and operating environment before commercial shipment of the equipment.

- All electronic components or functional modules listed in this catalog are developed, designed and intended for use in general electronics equipment.(for AV, office automation, household, office supply, information service, telecommunications, (such as mobile phone or PC) etc.). Before incorporating the components or devices into any equipment in the field such as transportation,( automotive control, train control, ship control), transportation signal, disaster prevention, medical, public information network (telephone exchange, base station) etc. which may have direct influence to harm or injure a human body, please contact TAIYO YUDEN CO., LTD. for more detail in advance.

Do not incorporate the products into any equipment in fields such as aerospace, aviation, nuclear control, submarine system, military, etc. where higher safety and reliability are especially required.

In addition, even electronic components or functional modules that are used for the general electronic equipment, if the equipment or the electric circuit require high safety or reliability function or performances, a sufficient reliability evaluation check for safety shall be performed before commercial shipment and moreover, due consideration to install a protective circuit is strongly recommended at customer's design stage.

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# CYLINDER TYPE LITHIUM ION CAPACITORS



Manual Soldering

## PARTS NUMBER

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | I | C | 2 | 5 | 4 | 0 | R | △ | 3 | R | 8 | 2 | 0 | 7 |
| ① |   |   | ② |   | ③ |   | ④ |   | ⑤ |   |   | ⑥ |   |   |

△ = Blank space

### ① Series name

| Code | Series name           |
|------|-----------------------|
| LIC  | Lithium ion capacitor |

### ② Dimensions (φ D)

| Code | Dimensions (φ D) [mm] |
|------|-----------------------|
| 12   | 12.5                  |
| 18   | 18                    |
| 25   | 25                    |

### ③ Dimensions (L)

| Code | Dimensions (L) [mm] |
|------|---------------------|
| 35   | 35                  |
| 40   | 40                  |

### ④ Shape

| Code | Shape         |
|------|---------------|
| R△   | Cylinder type |

### ⑤ Maximum usable voltage

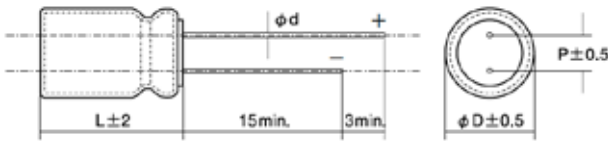
| Code | Maximum usable voltage [V] |
|------|----------------------------|
| 3R8  | 3.8                        |

※R=Decimal point

### ⑥ Nominal capacitance

| Code | Nominal capacitance [F] |
|------|-------------------------|
| 406  | 40                      |
| 107  | 100                     |
| 207  | 200                     |
| 277  | 270                     |

## EXTERNAL DIMENSIONS



| Part number     | φ D  | L    | φ d | P    |
|-----------------|------|------|-----|------|
| LIC1235R 3R8406 | 12.5 | 35.0 | 0.8 | 5.0  |
| LIC1840R 3R8107 | 18.0 | 40.0 | 0.8 | 7.5  |
| LIC2540R 3R8207 | 25.0 | 40.0 | 1.0 | 12.5 |
| LIC2540R 3R8277 | 25.0 | 40.0 | 1.0 | 12.5 |

Unit: mm

## PARTS NUMBER

| Part number     | Maximum usable voltage [V] | Minimum operating voltage [V] | Nominal capacitance [F] | Internal resistance [mΩ] |
|-----------------|----------------------------|-------------------------------|-------------------------|--------------------------|
| LIC1235R 3R8406 | 3.8                        | 2.2                           | 40                      | 150                      |
| LIC1840R 3R8107 | 3.8                        | 2.2                           | 100                     | 100                      |
| LIC2540R 3R8207 | 3.8                        | 2.2                           | 200                     | 50                       |
| LIC2540R 3R8277 | 3.8                        | 2.2                           | 270                     | 50                       |

## SPECIFICATIONS

| Part number     | Operating temp. range [°C] | Maximum usable voltage [V] | Minimum operating voltage [V] | Initial capacitance [F] | Initial internal resistance [mΩ] | Temperature characteristics  |
|-----------------|----------------------------|----------------------------|-------------------------------|-------------------------|----------------------------------|--|
| LIC1235R 3R8406 | -25~+70(85)                | 3.8(3.5)                   | 2.2                           | 40±20%                  | Under 150                        | Lowest temperature (-25°C)<br>Capacitance: Over 60% of initial spec.<br>Internal resistance: Within 10 times of initial spec.<br>Highest temperature 70°C (85°C)<br>Capacitance: Within initial spec.<br>Internal resistance: Within initial spec. |
| LIC1840R 3R8107 | -25~+70(85)                | 3.8(3.5)                   | 2.2                           | 100±20%                 | Under 100                        |  |
| LIC2540R 3R8207 | -25~+70(85)                | 3.8(3.5)                   | 2.2                           | 200±20%                 | Under 50                         |  |
| LIC2540R 3R8277 | -25~+60                    | 3.8(3.5)                   | 2.2                           | 270±20%                 | Under 50                         |  |

► This catalog contains the typical specification only due to the limitation of space. When you consider the purchase of our products, please check our specification. For details of each product (characteristics graph, reliability information, precautions for use, and so on), see our Web site (<http://www.ty-top.com/>).

■ RELIABILITY DATA

| Items                                     | Specified value   | Test methods and remark   |
|---|---|---|
| 1. Operating temperature range            | -25~+70°C<br>(LIC2540R 3R8277: -25~+60°C)   |   |
| 2. Maximum usable voltage                 | 3.8V  |   |
| 3. Minimum operating voltage              | 2.2V  |   |
| 4. Floating charge characteristics        | Capacitance: Over 70% of initial spec.<br>Internal resistance: Within 2 times of initial spec.<br>Appearance: No noticeable abnormality | Apply a max. usable voltage to capacitor for 1000 hours at max. operating temperature and measure the floating charge characteristics after returning to normal temperature and humidity. |
| 5. Charge/Discharge cycle characteristics | Capacitance: Over 70% of initial spec.<br>Internal resistance: Within 2 times of initial spec.<br>Appearance: No noticeable abnormality | Measure the charge/discharge cycle characteristics after 10000 charge/discharge cycle at 25 ± 5 °C with under mentioned charge/discharge cycle test condition for each parts.             |
| 6. Thermal durability                     | Capacitance: Over 70% of initial spec.<br>Internal resistance: Within 2 times of initial spec.<br>Appearance: No noticeable abnormality | Leave the capacitor in an atmosphere of 70°C ± 2°C (LIC2540R 3R8277: -25~+60°C) and -25 ± 2°C consecutively for 96 hours each, and return to normal temperature and humidity.             |
| 7. Impact durability                      | No exterior abnormality observed:<br>initial spec. values retained  | According to JIS C 60068-2-27<br>Half-sine wave A=294   |
| 8. Vibration durability                   | No exterior abnormality observed:<br>initial spec. values retained  | Apply a sine wave vibration of 1.5mm amplitude and frequency 10~55Hz, for 2 hours per each direction (X,Y and Z), total 6 hours.  |
| 9. Soldering                              | Capacitance: Within initial spec.<br>Internal resistance: Within initial spec.<br>Appearance: No noticeable abnormality                 | Material: Sn-3Ag-0.5Cu<br>Solder bath temperature: 235 ± 5°C<br>Dipping time: 2 ± 0.5 sec.<br>Dipping depth: 1.5~2mm from cell body   |

● Charge/Discharge cycle test condition

| Part number     | Charging voltage [V] | Charging time [s] | Max. charging current [A] | Discharging current [A] | Cut off voltage [V] |
|-----------------|----------------------|-------------------|---------------------------|-------------------------|---------------------|
| LIC1235R 3R8406 | 3.8                  | 1                 | 2                         | 2                       | 2.2                 |
| LIC1840R 3R8107 | 3.8                  | 1                 | 5                         | 5                       | 2.2                 |
| LIC2540R 3R8207 | 3.8                  | 1                 | 5                         | 5                       | 2.2                 |
| LIC2540R 3R8277 | 3.8                  | 1                 | 5                         | 5                       | 2.2                 |

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# CYLINDER TYPE LITHIUM ION CAPACITOR

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## ■ PRECAUTIONS

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### 1. Use within the usable voltage range

If over maximum usable voltage is applied, it might cause abnormal current flow, which cause shorter lifetime and leakage, and sometimes damage Lithium ion capacitor.

Moreover, in case of discharging to the voltage lower than the minimum usable voltage, it becomes a cause which accelerate degradation of a capacity fall, an internal resistance rise, etc.

### 2. Use under maximum operating temperature

Not only shorter lifetime but also leakage and damage will happen by increasing internal pressure if Lithium ion capacitor is used in over maximum operating temperature.

### 3. Limited life time

Lifetime of Lithium ion capacitor is greatly affected by surrounding temperature. 10°C rise in temperature shorten its expected lifetime approximately half as much. Design a circuit under consideration of deterioration of electrical characteristics after long time usage, decreasing in capacity and increasing in internal resistance.

### 4. The electrical characteristics of capacitor vary with respect to temperature

The electrical characteristics of Lithium ion capacitor temporarily vary with respect to temperature separately from secular change mentioned above. Design a circuit under consideration of temperature characteristics.

### 5. Lithium ion capacitor has polarity

Lithium ion capacitor has polarity. Please check the polarity before use. It will be damage if it is reversely charged.

### 6. Don't short-circuit positive (+) and negative (-) lead terminals

If a positive lead terminal (+) and a negative lead terminal (-) are contacted each other or connected by induction tools, Lithium ion capacitor will be short-circuited and excessive current will be drained.

As a result, internal temperature will rise, internal pressure will rise and in some case leak will occur and gas may be released by opening a pressure valve.

Following actions will cause external short circuit

- To trim two terminals by a nipper at once.
- To measure a distance of two terminals by a metal slide gauge .
- To mount on a circuit board by flow soldering.

### 7. Mind high ripple current or rapid charge / discharge

In circuit with high ripple current or rapid charge / discharge, the lifetime of Lithium ion capacitor might be shortened by self-heating.

### 8. Mind voltage drop when back-up

When back-up (discharging) starts, voltage drop will occur because of active current and internal resistance.

### 9. Series connection

In case of using Lithium ion capacitor in series connection, the voltage of each capacitor is not always equal and it may be occurred excessive voltage in a part of capacitor, which may lead to shortening lifetime and breakdown. Take a margin against the usable voltage range or add a balancing resistor.

### 10. Lithium ion capacitor has the pressure release vent

In case of inside pressure of capacitor excessively rising, the pressure release vent will be opened in order to release inner gas. Following clearance (Diameter <math>\phi 18</math> : over 2mm, Diameter  $\geq \phi 18</math> : over 3mm) should be made above the pressure release vent.$

Don't set up wiring or a pattern in the upper part of the pressure release vent, so that the high temperature gas is gushed when the pressure release vent open.

The product which open the pressure release vent can not use.

### 11. The sleeve of Lithium ion capacitor is not guaranteed insulation

Short circuit might happen if circuit pattern is set underneath of Lithium ion capacitor or it fixed by a metal or it contact with other component.

### 12. Environmental of usage

In case Lithium ion capacitor is used in high humidity, alkaline or acid air, it may cause deteriorating of its performance and short circuit by corrosion of outer can or lead terminal. In addition, used in sudden temperature change or high humidity, it may cause deteriorating of its performance and electrolyte leak by dew condensation.

### 13. Don't apply shock and vibration or pressure

Lithium ion capacitor is sensitive to shock. Don't drop Lithium ion capacitor and not apply strong pressure to a body, terminals and leads. Soldering part or lead terminal might be damaged if applying vibration, shock and stress such as pinch, tip, push and twist after installed.

### 14. Soldering

If next each item is not minded, it may cause deteriorating of its performance, leak, shortening lifetime.

- Don't contact soldering iron to a cell body.
- Don't solder over solder conditions in the spec. sheet.

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#### 15. Mind cleaning condition when cleaning circuit-board after soldering

Cleaning may affect Lithium ion capacitor. Consult us about cleaning conditions beforehand.  
Some cleaning conditions cause detrimental influence.

#### 16. Storage

Keep following cautions for storage of Lithium ion capacitor.

- Don't store in the high temperature and the high humidity condition and a place where receiving direct sunlight. Storing Lithium ion capacitor in the room condition of 10 °C – 35 °C and less than 65% relative humidity is recommended. Sudden temperature change or high humidity may cause deteriorating of its characteristics and solderability.
- Don't store Lithium ion capacitor near water, salt water or oil, and in the dew condensation, gasified oil or salinity filled place.
- Don't store Lithium ion capacitor in the hazardous gas (hydrogen sulfide, sulfurous, chlorine, ammonia, bromine, methyl bromine and etc.) .
- Don't fumigate by halogen fumigant.
- Don't store Lithium ion capacitor near acid or alkaline solvent.
- Don't store Lithium ion capacitor in a place where exposed to ozone, ultraviolet or radioactive rays.
- Don't store Lithium ion capacitor in a place where vibration and shock might occur.

#### 17. Disposal

To insulate a positive lead terminal (+) and a negative lead terminal (-) by covering such as a tape to avoid short circuit and dispose in accordance with local and country rules and regulations.

#### 18. Usage

Lithium ion capacitor is developed on the assumption that this product will be used in the memory-backup & RTC for usage of information & communication equipment, home electronics, audio & visual equipment, office equipment, etc. Consult us about using high reliability and safety required products such as medical equipment, transportation equipment, industrial equipment, flight / space equipment and emergency equipment, etc.

#### 19. Other Notice

- Don't heat or throw Lithium ion capacitor into fire.
- Don't short-circuit.
- Don't solder directly to a cell body.
- Don't open a body.
- Don't deform.
- Don't apply pressure.

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