

## 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 2016. 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 use of our products.

Please note that TAIYO YUDEN shall not be in any way responsible for any damages and defects in products or equipment incorporating our products, which are caused under the conditions other than those specified in this catalog or individual specification.

- Please contact TAIYO YUDEN for further details of product specifications as the individual specification is available.
- Please conduct validation and verification of our products in actual condition of mounting and operating environment before using our products.

- The products listed in this catalog are intended for use in general electronic equipment (e.g., AV equipment, OA equipment, home electric appliances, office equipment, information and communication equipment including, without limitation, mobile phone, and PC). Please be sure to contact TAIYO YUDEN for further information before using the products for any equipment which may directly cause loss of human life or bodily injury (e.g., transportation equipment including, without limitation, automotive powertrain control system, train control system, and ship control system, traffic signal equipment, disaster prevention equipment, medical equipment, highly public information network equipment including, without limitation, telephone exchange, and base station).

Please do not incorporate our products into any equipment requiring high levels of safety and/or reliability (e.g., aerospace equipment, aviation equipment, nuclear control equipment, undersea equipment, military equipment).

When our products are used even for high safety and/or reliability-required devices or circuits of general electronic equipment, it is strongly recommended to perform a thorough safety evaluation prior to use of our products and to install a protection circuit as necessary.

Please note that unless you obtain prior written consent of TAIYO YUDEN, TAIYO YUDEN shall not be in any way responsible for any damages incurred by you or third parties arising from use of the products listed in this catalog for any equipment requiring inquiry to TAIYO YUDEN or prohibited for use by TAIYO YUDEN as described above.

- Please note that TAIYO YUDEN shall have no responsibility for any controversies or disputes that may occur in connection with a third party's intellectual property rights and other related rights arising from use of our products. TAIYO YUDEN grants no license for such rights.
- Please note that unless otherwise agreed in writing, the scope of warranty for our products is limited to the delivered our products themselves and TAIYO YUDEN shall not be in any way responsible for any damages resulting from a fault or defect in our products.
- The contents of this catalog are applicable to our products which are purchased from our sales offices or authorized distributors (hereinafter "TAIYO YUDEN's official sales channel"). Please note that the contents of this catalog are not applicable to our products purchased from any seller other than TAIYO YUDEN's official sales channel.

#### ■ Caution for Export

Some of our products listed in this catalog may require specific procedures for export according to "U.S. Export Administration Regulations", "Foreign Exchange and Foreign Trade Control Law" of Japan, and other applicable regulations. Should you have any questions on this matter, please contact our sales staff.

# 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 (φD)

Code	Dimensions (φD) [mm]
12	12.5
18	18
25	25

### ③ Dimensions (L)

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

### ④ Characteristics spec

Code	Characteristic spec
RS	Low Resistance Type
R△	Standard type
	High Capacitance Type

### ⑤ Maximum usable voltage

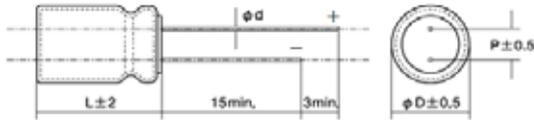
Code	Maximum usable voltage [V]
3R8	3.8

※R=Decimal point

### ⑥ Nominal capacitance

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

## ■ EXTERNAL DIMENSIONS



Characteristic spec.	Part number	φD	L	φd	P
Low Resistance Type (RS Series)	LIC1235RS3R8406	12.5	35	0.8	5.0
Standard Type (R Series)	LIC1840R 3R8107	18	40	0.8	7.5
	LIC2540R 3R8207	25	40	1.0	12.5
High Capacitance Type (R Series)	LIC2540R 3R8277	25	40	1.0	12.5

Unit : mm

## ■ PARTS NUMBER

Characteristic spec.	Part number	Maximum usable voltage [V]	Minimum usable voltage [V]	Nominal capacitance [F]	ESR@1KHz [mΩ]
Low Resistance Type (RS Series)	LIC1235RS3R8406	3.8	2.2	40F	70
Standard Type (R Series)	LIC1840R 3R8107	3.8	2.2	100	100
	LIC2540R 3R8207	3.8	2.2	200	50
High Capacitance Type (R Series)	LIC2540R 3R8277	3.8	2.2	270	50

■ SPECIFICATIONS

【Low Resistance Type (RS Series)】

Part number	Operating temp. range [°C]	Maximum usable voltage [V]	Minimum usable voltage [V]	Initial capacitance [F]	Initial ESR@1KHz [mΩ]	Temperature characteristics
LIC1235RS3R8406	-30 ~ +70 -30 ~ +85	3.8 3.5	2.2	40±20%	Under70	Lowest temperature( -30°C) Capacitance: Over 60% of initial spec. Internal resistance: Within 10 times of initial spec. Highest temperature(+70°C / +85°C) Capacitance: Within initial spec. Internal resistance: Within initial spec.

【Standard Type (R Series)】

Part number	Operating temp. range [°C]	Maximum usable voltage [V]	Minimum usable voltage [V]	Initial capacitance [F]	Initial ESR@1KHz [mΩ]	Temperature characteristics
LIC1840R 3R8107	-25 ~ +70 -25 ~ +85	3.8 3.5	2.2	100±20%	Under 100	Lowest temperature( -25°C) Capacitance: Over 60% of initial spec. Internal resistance: Within 10 times of initial spec. Highest temperature(+60°C / +70°C / +85°C) Capacitance: Within initial spec. Internal resistance: Within initial spec.
LIC2540R 3R8207	-25 ~ +70 -25 ~ +85	3.8 3.5	2.2	200±20%	Under 50	

【High Capacitance Type (R Series)】

Part number	Operating temp. range [°C]	Maximum usable voltage [V]	Minimum usable voltage [V]	Initial capacitance [F]	Initial ESR@1KHz [mΩ]	Temperature characteristics
LIC2540R 3R8277	-25 ~ +60	3.8	2.2	270±20%	Under 50	Lowest temperature( -25°C) Capacitance: Over 60% of initial spec. Internal resistance: Within 10 times of initial spec. Highest temperature(+60°C / +70°C / +85°C) Capacitance: Within initial spec. Internal resistance: Within initial spec.

■ RELIABILITY DATA

Items	Specified value		Test methods and remark
	RS series	R series	
1. Operating temperature range	-30 ~ +70°C / +85°C	-25 ~ +70°C / +85°C (LIC2540R 3R8277: -25 ~ +60°C)	
2. Maximum usable voltage	3.8V / 3.5V		LIC2540R 3R8277 : 3.8V
3. Minimum operating voltage	2.2V		
4. Soldering	Capacitance: Within initial spec. Internal resistance: Within initial spec. Appearance: No noticeable abnormality		Material: Sn-3Ag-0.5Cu Solder temperature: 260±5°C Dipping time: 10±1sec. Dipping depth: 1.5~2mm from cell body
5. Floating charge characteristics	Capacitance: Over 70% of initial spec. Internal resistance: Within 2 times of initial spec. 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.
6. Charge/Discharge cycle characteristics	Capacitance: Over 70% of initial spec. Internal resistance: Within 2 times of initial spec. 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.
7. Thermal durability	Capacitance: Over 70% of initial spec. Internal resistance: Within 2 times of initial spec. Appearance: No noticeable abnormality		Leave the capacitor in environment of the max. usable temperature ±2°C and -25±2°C consecutively for 96 hours each, and return to normal temperature and humidity.
8. Impact durability	No exterior abnormality observed: initial spec. values retained		According to JIS C 60068-2-27 Half-sine wave A=294
9. Vibration durability	No exterior abnormality observed: 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.

● Charge/Discharge cycle test condition

Characteristic spec.	Part number	Charging voltage [V]	Charging time [sec.]	Max. charging current [A]	Discharging current [A]	Cut off voltage [V]
Low Resistance Type (RS Series)	LIC1235RS3R8406	3.8	60	2	2	2.2
Standard Type (R Series)	LIC1840R 3R8107	3.8	60	5	5	2.2
	LIC2540R 3R8207	3.8	60	5	5	2.2
High Capacitance Type (R Series)	LIC2540R 3R8277	3.8	60	5	5	2.2

▶ 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 website (<http://www.ty-top.com/>).

# 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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