

# Notice for TAIYO YUDEN products

Please read this notice before using the TAIYO YUDEN products.

## REMINDERS

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Please note that Taiyo Yuden Co., Ltd. shall not be responsible for any defects in products or equipment incorporating such products, which are caused under the conditions other than those specified in this catalog or individual specification.

- 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.

- The contents of this catalog are applicable to the products which are purchased from our sales offices or distributors (so called "TAIYO YUDEN' s official sales channel").  
It is only applicable to the products purchased from any of TAIYO YUDEN' s official sales channel.
- Please note that Taiyo Yuden Co., Ltd. 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 your usage of products in this catalog. Taiyo Yuden Co., Ltd. grants no license for such rights.
- Caution for export  
Certain items in this catalog may require specific procedures for export according to "Foreign Exchange and Foreign Trade Control Law" of Japan, "U.S. Export Administration Regulations", and other applicable regulations. Should you have any question or inquiry on this matter, please contact our sales staff.

# CYLINDER TYPE LITHIUM ION CAPACITOR



Manual Soldering

## FEATURES

- Lithium Ion Capacitor (LIC) is one of the Hybrid Capacitors to which the reaction of EDLC and that of lithium-ion battery are adopted.
- LIC applies the reaction of lithium-ion battery with anode, therefore it has extremely large capacitance. (about twice as large as conventional EDLC)
- The technique of doping lithium-ions to the anode previously (pre-doping) makes a cell voltage of 3.8V attainable.

- In spite of a high output voltage, damages to the electrodes can be repressed because of low electrode's potential due to pre-doping technique. Therefore LIC shows excellent performance of cycle life.
- LIC is environmentally friendly power source, which does not contain any heavy metals such as Cd, Hg and Pb. (RoHS compliant)

## APPLICATIONS

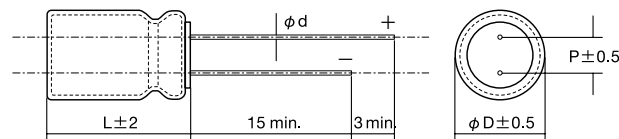
- Storage power source combined with solar cell, fuel cell, generator, and so on.
- Main power source for small devices (toys, measuring equipments, machine tools, and so on).
- Load charge leveling (life lengthening of main power source such as dry battery, Lithium primary battery)

## ORDERING CODE

L I C 2 5 4 0 R △ 3 R 8 2 0 7

<b>1</b> Type	<b>2</b> Dimensions/ φD [mm]	<b>3</b> Dimensions/ L [mm]	<b>4</b> Shape	<b>5</b> Maximum Usable Voltage (VDC)	<b>6</b> Nominal Capacitance [F]
LIC Lithium Ion Capacitors	12 12.5 18 18 25 25	35 35 40 40	R△ Cylinder type △=Blank space	3R8 3.8 ※R=decimal point	406 40 107 100 207 200

## EXTERNAL DIMENSIONS



Part Number	φD	L	φd	P
LIC1235R 3R8406	12.5	35.0	0.8	5.0
LIC1840R 3R8107	18.0	40.0	0.8	8.0
LIC2540R 3R8207	25.0	40.0	1.0	13.0

Unit : mm

## PART NUMBERS

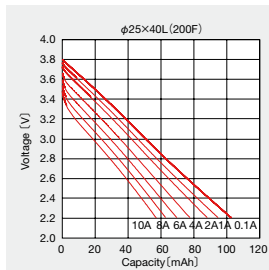
Part Number	Voltage Range (V.DC)	Min. Voltage (V.DC)	Nominal Capacitance (F)	Internal Resistance (mΩ)
LIC1235R 3R8406	3.8	2.2	40	150
LIC1840R 3R8107			100	100
LIC2540R 3R8207			200	50

## SPECIFICATIONS

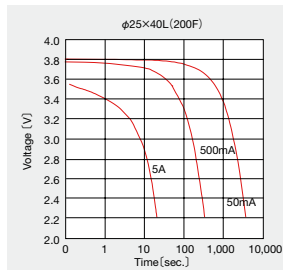
Part Number	Operating Temp. Range (°C)	Max. Usable Voltage (V)	Min. Operating voltage (V)	Initial Capacitance (F)	Initial Internal Resistance (mΩ)	High Temp. Load Test
LIC1235R 3R8406	-25~+60	3.8	2.2	40±20%	Below 150	Lowest temperature (-25°C) Capacitance : Over 60% of initial spec. Internal Resistance : Within 10times of initial spec. Highest temperature (60°C) Capacitance, Internal Resistance : Within initial spec.
LIC1840R 3R8107				100±20%	Below 100	
LIC2540R 3R8207				200±20%	Below 50	

## ELECTRICAL CHARACTERISTICS

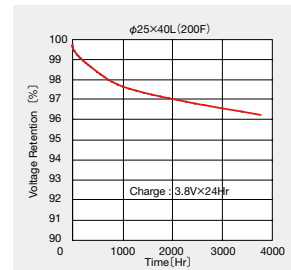
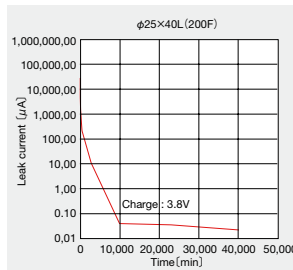
### Discharge characteristics at various currents



### Leak current characteristics



### Self-discharge characteristics



\* 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/>) or CD catalogs.

## RELIABILITY DATA

Items	Specifications	Test Conditions, Remark
1. Operating Temperature range	-25~+60°C	
2. Max. Usable Voltage	3.8V	
3. Min. Operating Voltage	2.2V	
4. Floating Charge Characteristics	Capacitance : Over 70% of initial spec. Internal Resistance : Within 2times of initial spec. Appearance : No noticeable abnormality	Apply a max.usable voltage to capacitor for 1000hours at max. operating temp. and measure the floating charge characteristics after returning to normal temperature and humidity.
5. Charge/Discharge Cycle Characteristics	Capacitance : Over 70% of initial spec. Internal Resistance : Within 2times 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.
6. Thermal Durability	Capacitance : Over 70% of initial spec. Internal Resistance : Within 2times of initial spec. Appearance : No noticeable abnormality	Leave the capacitor in an atmosphere of 60°C±2°C and -25±2°C consecutively for 96 hours each, and return to normal temperature and humidity.
7. Humidity Durability	Capacitance : Over 70% of initial spec. Internal Resistance : Within 2times of initial spec. Appearance : No noticeable abnormality	Temperature : 40±2°C, Humidity : 90~95%RH Leave the capacitor for 500 hours, and return to normal temperature and humidity.
8. Impact Durability	No exterior abnormality observed : initial spec. values retained	According to JIS C 0041, Half-sine wave A=294
9. Vibration Durability	No exterior abnormality observed : initial spec. values retained	Apply a sine wave vibration with 1.5mm of amplitude and 10~55Hz of frequency for 2 hours per each of 3 directions (X, Y, Z), (totally 6hours).
10. Resistance to Soldering Heat	Capacitance : Within initial spec. Internal Resistance : Within initial spec. Appearance : No noticeable abnormality	Material:Sn-3Ag-0.5Cu Solder bath temperature : 260±5°C Dipping time : 10±1 sec. Depth of Immersion : Up to 1.5~2.0mm from the lower end of cell body

### ● Charge/Discharge Cycle Test Condition

Part Number	LIC1235R3R8406	LIC1840R3R8107	LIC2540R3R8207
Charging Voltage (V)	3.8	3.8	3.8
Charging Time (s)	1	1	1
Max. Charging Current (A)	2	2	5
Discharging Current (A)	2	2	5
Cut off Voltage (V)	2.2	2.2	2.2

## PRECAUTIONS

- Lithium ion capacitor has polarity  
Please check the polarity before use. It will be damaged if it is reverse charged.
- Do not short-circuit positive (+) and negative(-) terminals.  
Direct contact with positive(+) and negative (-) terminals or connection with metal or other conductive materials may cause short-circuit and excessive current flow, which may cause heating and leakage.
- Use within the rated voltage (2.2~3.8V)  
Use beyond the rated voltage may cause not only reduced lifetime but also heating or leakage in some cases.
- Operating temperature  
Lithium ion capacitor is characterized by stability behavior in high temperature, but operating temperature is recommended to be lower than the maximum operating temperature, because use in low temperature extends its expected lifetime.
- Pay sufficient attention to use lithium ion capacitor in circuit with high ripple current or that requires rapid and very frequent charge / discharge  
In circuit with high ripple current or that requires rapid and very frequent charge / discharge, the lifetime of lithium ion capacitors might be shortened by self-heating. Please consult us in case of using lithium ion capacitor in such circuit.
- Mind voltage drop when discharging  
When the discharge starts, voltage drop occurs if discharge current is high. Consult us about the discharging current.
- Series connection  
In case of using lithium ion capacitors in a series connection, the voltage may be different in these capacitors, the difference of the voltages could shorten the life-time of the capacitors or break them down.  
Take a margin against a rated voltage or add a balancing resistor
- Environment of usage  
In case lithium ion capacitor is used in the 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, that may cause a deterioration of its performance or a leakage by dew condensation.
- Lithium ion capacitor has the pressure relief vent.  
In case of inside pressure of lithium ion capacitor excessively rising, the pressure relief vent will be opened in order to release inner gas.  
Following clearance should be made above the pressure relief vent.

Diameter of cell	less than 18mm	over 18mm
Clearance	2mm or more	3mm or more
- Do not apply shock or pressure  
Lithium ion capacitor is sensitive to shock. Do not drop lithium ion capacitor and not apply strong pressure to a body, terminals and lead.  
Soldering part or lead terminal will be damaged if applying vibration, shock and stress such as pinch, tip, push and twist after mounting.
- Do not apply excessive heat when soldering.  
If excessive heat stress applied, electronic degradation or leakage might occur.  
Do not solder over solder conditions in the spec. sheet.
- Consult us about cleaning condition when cleaning circuit-board after soldering.  
Cleaning may affect lithium ion capacitor. Consult us about cleaning conditions beforehand.
- Other Notice
  - Do not heat or throw into fire.
  - Do not solder directly to a cell body.
  - Do not dismantle.
  - Do not deform.

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