

## Notice for TAIYO YUDEN products

Please read this notice before using the TAIYO YUDEN products.

### ⚠ REMINDERS

#### ■ Product Information in this Catalog

Product information in this catalog is as of January 2021. All of the contents specified herein and production status of the products listed in this catalog are subject to change without notice due to technical improvement of our products, 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 product specification sheets.

#### ■ Approval of Product Specifications

Please contact TAIYO YUDEN for further details of product specifications as the individual product specification sheets are available. When using our products, please be sure to approve our product specifications or make a written agreement on the product specification with TAIYO YUDEN in advance.

#### ■ Pre-Evaluation in the Actual Equipment and Conditions

Please conduct validation and verification of our products in actual conditions of mounting and operating environment before using our products.

#### ■ Limited Application

##### 1. Equipment Intended for Use

The products listed in this catalog are intended for general-purpose and standard 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) and other equipment specified in this catalog or the individual product specification sheets.

TAIYO YUDEN has the line-up of the products intended for use in automotive electronic equipment, telecommunications infrastructure and industrial equipment, or medical devices classified as GHTF Classes A to C (Japan Classes I to III). Therefore, when using our products for these equipment, please check available applications specified in this catalog or the individual product specification sheets and use the corresponding products.

##### 2. Equipment Requiring Inquiry

Please be sure to contact TAIYO YUDEN for further information before using the products listed in this catalog for the following equipment (excluding intended equipment as specified in this catalog or the individual product specification sheets) which may cause loss of human life, bodily injury, serious property damage and/or serious public impact due to a failure or defect of the products and/or malfunction attributed thereto.

- (1) Transportation equipment (automotive powertrain control system, train control system, and ship control system, etc.)
- (2) Traffic signal equipment
- (3) Disaster prevention equipment, crime prevention equipment
- (4) Medical devices classified as GHTF Class C (Japan Class III)
- (5) Highly public information network equipment, data-processing equipment (telephone exchange, and base station, etc.)
- (6) Any other equipment requiring high levels of quality and/or reliability equal to the equipment listed above

##### 3. Equipment Prohibited for Use

Please do not incorporate our products into the following equipment requiring extremely high levels of safety and/or reliability.

- (1) Aerospace equipment (artificial satellite, rocket, etc.)
- (2) Aviation equipment \*<sup>1</sup>
- (3) Medical devices classified as GHTF Class D (Japan Class IV), implantable medical devices \*<sup>2</sup>

- (4) Power generation control equipment (nuclear power, hydroelectric power, thermal power plant control system, etc.)
- (5) Undersea equipment (submarine repeating equipment, underwater work equipment, etc.)
- (6) Military equipment
- (7) Any other equipment requiring extremely high levels of safety and/or reliability equal to the equipment listed above

\*Notes:

1. There is a possibility that our products can be used only for aviation equipment that does not directly affect the safe operation of aircraft (e.g., in-flight entertainment, cabin light, electric seat, cooking equipment) if such use meets requirements specified separately by TAIYO YUDEN. Please be sure to contact TAIYO YUDEN for further information before using our products for such aviation equipment.
2. Implantable medical devices contain not only internal unit which is implanted in a body, but also external unit which is connected to the internal unit.

#### 4. Limitation of Liability

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 that is not intended for use by TAIYO YUDEN, or any equipment requiring inquiry to TAIYO YUDEN or prohibited for use by TAIYO YUDEN as described above.

#### ■ Safety Design

When using our products for high safety and/or reliability-required equipment or circuits, please fully perform safety and/or reliability evaluation. In addition, please install (i) systems equipped with a protection circuit and a protection device and/or (ii) systems equipped with a redundant circuit or other system to prevent an unsafe status in the event of a single fault for a failsafe design to ensure safety.

#### ■ Intellectual Property Rights

Information contained in this catalog is intended to convey examples of typical performances and/or applications of our products and is not intended to make any warranty with respect to the intellectual property rights or any other related rights of TAIYO YUDEN or any third parties nor grant any license under such rights.

#### ■ Limited Warranty

Please note that 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 failure or defect in our products. Notwithstanding the foregoing, if there is a written agreement (e.g., supply and purchase agreement, quality assurance agreement) signed by TAIYO YUDEN and your company, TAIYO YUDEN will warrant our products in accordance with such agreement.

#### ■ TAIYO YUDEN's Official Sales Channel

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.

▶ This catalog contains the typical specification only due to the limitation of space. When you consider the purchase of our products, please check our product specification sheets. 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 ELECTRIC DOUBLE LAYER CAPACITORS

WAVE

PARTS NUMBER

L	P	08	15	2R7	245
①	②	③	④	⑤	

①Series name

Code	Series name
LP	Electric double layer capacitor

②Dimensions (φD)

Code	Dimensions (φD) [mm]
08	8
10	10
12	12.5

③Dimensions (L)

Code	Dimensions (L) [mm]
15	15
20	20
30	30
35	35

④Upper limit voltage

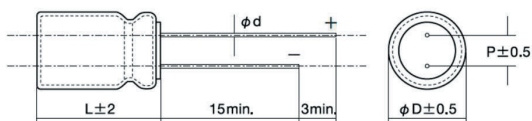
Code	Upper limit voltage [V]
2R7	2.7

※R=Decimal point

⑤Nominal capacitance

Code (example)	Nominal capacitance [F]
245	2.4
335	3.3
505	5
106	10
206	20

EXTERNAL DIMENSIONS



Part number	φD	L	φd	P
LP08152R7245	8	15	0.6	3.5
LP08202R7335	8	20	0.6	3.5
LP10202R7505	10	20	0.6	5.0
LP10302R7106	10	30	0.6	5.0
LP12202R7106	12.5	20	0.6	5.0
LP12352R7206	12.5	35	0.6	5.0

Unit: mm

SPECIFICATIONS

Part number	Operating temp. range [°C]	Upper limit voltage [V]	Initial capacitance [F]	Initial ESR@1KHz [mΩ]	Temperature characteristics
LP08152R7245	-40~+70 Over +70~+85	2.7 2.3	2.4±20%	Under 120	Lowest temperature (-40°C) Capacitance: Over 85% of initial spec. Internal resistance: Under 6 times of initial spec. High temperature (70°C) Capacitance: Within initial spec. Internal resistance: Within initial spec. Highest temperature (85°C) Capacitance: Over 90% of initial spec. Internal resistance: Within initial spec.
LP08202R7335			3.3±20%	Under 75	
LP10202R7505			5.0±20%	Under 60	
LP10302R7106			10.0±20%	Under 35	
LP12202R7106			10.0±20%	Under 45	
LP12352R7206			20.0±20%	Under 40	

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## RELIABILITY DATA

Items	Specified value	Test methods and remark
1. Operating temperature range	-40 to +70 / +85°C	
2. Upper limit voltage	2.7V / 2.3V	
3. Soldering heat resistance	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±1 sec. Dipping depth: 1.5~2.0mm from cell body
4. Floating charge characteristics	Capacitance: Over 70% of initial spec. Internal resistance: Under 4 times of initial spec. Appearance: No noticeable abnormality.	Temperature: 70±2°C Apply a voltage of 2.7V to the capacitor for 1,000hours, and measure the characteristics after returning to normal temperature and humidity.
5. Charge/Discharge cycle characteristics		Measure after charging and discharging 10,000 times. The charge/discharge cycle test conditions are as follows.
6. Humidity durability	Capacitance: Within initial spec. Internal resistance: Under 4 times of initial spec. Appearance: No noticeable abnormality.	Temperature: 40±2°C Humidity: 90-95%RH Leave the capacitor for 500hours and measure the characteristics after returning to normal temperature and humidity.
7. Shock resistance	No exterior abnormality observed. Initial spec. values retained.	According to JIS C 60068-2-27 Half-sine wave A=294
8. Vibration resistance		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

Part number	Charging voltage [V]	Charging time [sec]	Max. Charging current [A]	Discharge current [A]	End voltage [V]
LP08152R7245	2.7	30	0.24	0.24	1.5
LP08202R7335			0.33	0.33	
LP10202R7505			0.5	0.5	
LP10302R7106			1	1	
LP12202R7106			1	1	
LP12352R7206			2	2	

# CYLINDER TYPE ELECTRIC DOUBLE LAYER CAPACITORS

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## ■ PRECAUTIONS

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### 1. Use within the usable voltage range

Applying voltage exceeding the maximum working voltage may cause leakage or damage.

### 2. Use within the operating temperature range

### 3. Lifetime of Electric double layer capacitor is finite

The life of the product is affected by operating temperature and operating voltage. In addition, the internal resistance rises gradually with usage and the capacity drops.

### 4. There are temperature dependence and voltage dependence in the electrical characteristics

The electrical characteristics of the product vary depending on operating temperature and voltage. Please check the temperature characteristics before using the product.

### 5. Electric double layer capacitor has polarity

Check the polarity before use. It will be damage if it is reversely charged. Avoid using products with reverse voltage applied.

### 6. Be aware of the ripple current and use in circuits that repeat sudden charge and discharge

Electric double layer capacitor may be used in a circuit that repeats sudden charge / discharge or application of high ripple current may cause the life to be shortened due to heat generation. Please inquire when using it for such a circuit.

### 7. Mind the voltage drop during discharge (backup)

If the discharge current is large, a voltage drop occurs at the start of discharge. Be careful about discharge current.

### 8. Series connection

When Electric double layer capacitors are connected in series, the balance of the applied voltage may be lost, and some capacitors may be overcharged or may lead to shortening lifetime and breakdown. Take a margin against the maximum usable voltage or add a balancing resistor.

### 9. Electric double layer 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 cannot use.

### 10. Insulation of the aluminum case and sleeve of Electric double layer capacitor is not guaranteed

There is a possibility of short-circuiting when the circuit pattern is arranged under the Electric double layer capacitor or when it comes in contact with other parts.

### 11. Environmental of usage

In case Electric double layer 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.

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

Electric double layer capacitors are weak parts for mechanical shock. Be careful not to drop the product or apply strong force to the main body and lead terminal. Also, if you apply excessive vibration or shock after mounting, stress such as grasping, tilting, pushing, twisting, etc., the soldered part may come off or the lead terminal part may be damaged.

### 13. Be careful not to apply excessive heat when mounting

If excessive heat stress is added to the product, electric characteristics deterioration and electrolyte leakage may occur.

Soldering conditions should be within the range specified in the delivery specifications.

### 14. Please consult about substrate cleaning after soldering

There are cases where the product may be adversely affected depending on the type of solvent and washing conditions, so please consult in advance.

### 15. Storage

Keep following cautions for storage of Electric double layer capacitor.

- Don't store in the high temperature and the high humidity condition and a place where receiving direct sunlight. Storing Electric double layer 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 Electric double layer capacitor near water, salt water or oil, and in the dew condensation, gasified oil or salinity filled place.

- Don't store Electric double layer capacitor in the hazardous gas (hydrogen sulfide, sulfurous, chlorine, ammonia, bromine, methyl bromine, ozone and etc.) .

- Don't fumigate by halogen fumigant.

- Don't store Electric double layer capacitor near acid or alkaline solvent.

- Don't store Electric double layer capacitor in a place where exposed to ultraviolet or radioactive rays.

- Don't store Electric double layer capacitor in a place where vibration and shock might occur.

## 16. Disposal

Dispose Electric double layer capacitor properly with a decree or the regulation a local public organization designates.

## 17. Usage

Electric double layer 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.

## 18. Other Notice

- Don't heat or throw Electric double layer 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.

※All of the contents specified herein are subject to change without notice due to technical improvements, etc.

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※Please see JEITA RCR-2370C for details.

JEITA RCR-2370C

「Safety Application Guide for electric double layer capacitors (EDLC)(Guideline of notabilia for electric double layer capacitors)」

[Japan Electronics and Information Technology Industries Association. Established in March, 1995 and revised in July, 2008]

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