

Notice for TAIYO YUDEN products

Please read this notice before using the TAIYO YUDEN products.

REMINDERS

- Product information in this catalog is as of October 2014. 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.

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 POLYACENE CAPACITORS



FEATURES

- Polyacene Capacitors can store a large number of ions into its amorphous structure (doping), therefore Polyacene Capacitors has much larger capacitance than conventional electric double layer capacitors.
- Quick-charge with ampere measure is possible with its Low internal resistance.
- Possible to charge/discharge more than 100,000 times with less deterioration caused by charging/discharging compared to secondary battery which involves chemical reaction, and that enables to more than 100,000 times charge/discharge and large excellence of durability for over charge/discharge.
- Polyacene Capacitors is environmentally friendly power source, which does not contain any heavy metals such as Cd, Hg and Pb. (RoHS compliant)

APPLICATIONS

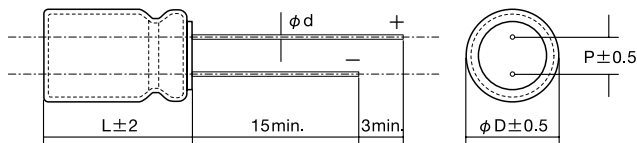
- Back-up power source for CPU, microcomputer, and flash memory writing when shutting off the power.
- Load change leveling (life lengthening of main power source such as dry battery, Lithium primary battery)
- Power source storage combined with solar cell, fuel cell, generator, and so on.
- Main power source for small devices (Measuring equipments, toys and so on).

ORDERING CODE

P A S 0 8 1 5 L S 2 R 5 1 0 5

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------|--|--------------------------------|------------------------------|--|----------------------------------|----|------|----|----|---|----|----|----|----|----|----|----|----|----|----|--|----|--------------|----|-----------------------|--|-----|-----|-----|-----|-----|-----|--|---------|--|-----|--------------------------|---|---|-----|---------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 Type | 2 Dimensions/ φD [mm] | 3 Dimensions/ L [mm] | 4 Characteristic Spec | 5 Maximum Usable Voltage [V] | 6 Nominal Capacitance [F] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PAS Polyacene Capacitors | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>08</td><td>8.0</td></tr> <tr><td>10</td><td>10.0</td></tr> <tr><td>12</td><td>12.5</td></tr> <tr><td>18</td><td>18</td></tr> </table> | 08 | 8.0 | 10 | 10.0 | 12 | 12.5 | 18 | 18 | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>15</td><td>15</td></tr> <tr><td>16</td><td>16</td></tr> <tr><td>20</td><td>20</td></tr> <tr><td>35</td><td>35</td></tr> <tr><td>40</td><td>40</td></tr> </table> | 15 | 15 | 16 | 16 | 20 | 20 | 35 | 35 | 40 | 40 | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>LS</td><td>Low ESR type</td></tr> <tr><td>LA</td><td>High Capacitance type</td></tr> </table> | LS | Low ESR type | LA | High Capacitance type | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>2R3</td><td>2.3</td></tr> <tr><td>2R5</td><td>2.5</td></tr> <tr><td>3R0</td><td>3.0</td></tr> </table> <p style="text-align: right; font-size: 0.8em;">※R=decimal point</p> | 2R3 | 2.3 | 2R5 | 2.5 | 3R0 | 3.0 | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2">example</td></tr> <tr><td>105</td><td>10×10⁵μF=1F</td></tr> <tr><td>∫</td><td>∫</td></tr> <tr><td>506</td><td>50×10⁶μF=50F</td></tr> </table> | example | | 105 | 10×10 ⁵ μF=1F | ∫ | ∫ | 506 | 50×10 ⁶ μF=50F |
| 08 | 8.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | 10.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | 12.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 | 40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LS | Low ESR type | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LA | High Capacitance type | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2R3 | 2.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2R5 | 2.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3R0 | 3.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| example | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 105 | 10×10 ⁵ μF=1F | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ∫ | ∫ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 506 | 50×10 ⁶ μF=50F | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

EXTERNAL DIMENSIONS



| Part Number | | φD | L | φd | P |
|------------------------------------|-----------------|------|------|-----|-----|
| Low ESR type (LS series) | PAS0815LS2R5105 | 8.0 | 15.0 | 0.6 | 3.5 |
| | PAS1016LS2R5205 | 10.0 | 16.0 | 0.6 | 5.0 |
| Large Capacitance type (LA series) | PAS0815LA2R3185 | 8.0 | 15.0 | 0.6 | 3.5 |
| | PAS1020LA2R3475 | 10.0 | 20.0 | 0.6 | 5.0 |
| | PAS1020LA3R0405 | 10.0 | 20.0 | 0.6 | 5.0 |
| | PAS1220LA3R0905 | 12.5 | 20.0 | 0.6 | 5.0 |
| | PAS1235LA3R0206 | 12.5 | 35.0 | 0.6 | 5.0 |
| | PAS1840LA3R0506 | 18.0 | 40.0 | 0.8 | 7.5 |

Unit : mm

PART NUMBERS

| Part Number | | Maximum Usable Voltage (V) | Nominal Capacitance (F) | Internal Resistance (mΩ) |
|------------------------------------|-----------------|----------------------------|-------------------------|--------------------------|
| Low ESR type (LS series) | PAS0815LS2R5105 | 2.5 | 1 | 70 |
| | PAS1016LS2R5205 | | 2 | 50 |
| | PAS0815LA2R3185 | | 1.8 | 1000 |
| Large Capacitance type (LA series) | PAS1020LA2R3475 | 2.3 | 4.7 | 300 |
| | PAS1020LA3R0405 | | 4 | 300 |
| | PAS1220LA3R0905 | | 9 | 200 |
| | PAS1235LA3R0206 | 3.0 | 20 | 100 |
| | PAS1840LA3R0506 | | 50 | 70 |

► 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/>).

LS Series

SPECIFICATIONS

| Part Number | Operating Temp. Range (°C) | Max. Usable Voltage (V) | Initial Capacitance (F) | Initial Internal Resistance (mΩ) | Temperature Characteristics |
|-----------------|----------------------------|-------------------------|-------------------------|----------------------------------|---|
| PAS0815LS2R5105 | -25~+70 | 2.5 | 1.0±20% | Under 70 | Lowest temperature (-25°C) Capacitance : Over 70% of initial spec. Internal Resistance : Within 4 times of initial spec. Highest temperature (70°C) Capacitance, Internal Resistance : Within initial spec. |
| PAS1016LS2R5205 | | | 2.0±20% | Under 50 | |

LA Series

SPECIFICATIONS

| Part Number | Operating Temp. Range (°C) | Max. Usable Voltage (V) | Initial Capacitance (F) | Initial Internal Resistance (mΩ) | Temperature Characteristics |
|-----------------|----------------------------|-------------------------|-------------------------|----------------------------------|---|
| PAS0815LA2R3185 | -25~+60 | 2.3 | 1.8±20% | Under 1000 | Lowest temperature (-25°C) Capacitance : Over 70% of initial spec. Internal Resistance : Within 4 times of initial spec. Highest temperature (60°C) Capacitance, Internal Resistance : Within initial spec. |
| PAS1020LA2R3475 | | | 4.7±20% | Under 300 | |
| PAS1020LA3R0405 | -25~+60 | 3.0 | 4.0±20% | Under 300 | Lowest temperature (-25°C) Capacitance : Over 70% of initial spec. Internal Resistance : Within 4 times of initial spec. Highest temperature (60°C) Capacitance, Internal Resistance : Within initial spec. |
| PAS1220LA3R0905 | | | 9.0±20% | Under 200 | |
| PAS1235LA3R0206 | | | 20±20% | Under 100 | |
| PAS1840LA3R0506 | | | 50±20% | Under 70 | |

RELIABILITY DATA

| Items | Specifications | | | Test Conditions, Remark |
|---|--|-----------|------|---|
| | LS Series | LA Series | | |
| 1. Operating Temperature range | -25~+70°C | -25~+60°C | | |
| 2. Max. Usable Voltage | 2.5V | 2.3V | 3.0V | |
| 3. Floating Charge Characteristics | Capacitance : Over 70% of initial spec. Internal Resistance : Within 4 times of initial spec. Appearance : No noticeable abnormality | | | Apply a max. usable voltage to capacitor for 1000 hours at max. operating temp. and measure the floating charge characteristics after returning to normal temperature and humidity. |
| 4. Charge/Discharge Cycle Characteristics | Capacitance : Over 70% of initial spec. Internal Resistance : Within 4 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. |
| 5. Thermal Durability | Capacitance : Within initial spec. Internal Resistance : Within initial spec. Appearance : No noticeable abnormality | | | Leave the capacitor in an atmosphere of Max Operating Temperature±2°C and -25±2°C consecutively for 96 hours each, and return to normal temperature and humidity. |
| 6. Humidity Durability | Capacitance : Within initial spec. Internal Resistance : Within 4 times 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. |
| 7. Impact Durability | No exterior abnormality observed : initial spec. values retained | | | According to JIS C 60068-2-27 Sine half wave A=294 |
| 8. 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. |
| 9. Soldering | 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. Dipping depth : 1.5~2mm from cell body |

● Charge/Discharge Cycle Test Condition

| Part Number | PAS0815 LS2R5105 | PAS1016 LS2R5205 | PAS0815 LA2R3185 | PAS1020 LA2R3475 | PAS1020 LA3R0405 | PAS1220 LA3R0905 | PAS1235 LA3R0206 | PAS1840 LA3R0506 |
|---------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Charging Voltage (V) | 2.5 | 2.5 | 2.3 | 2.3 | 3.0 | 3.0 | 3.0 | 3.0 |
| Charging Time (s) | 10 | 10 | 10 | 10 | 30 | 30 | 30 | 30 |
| Max. Charging Current (A) | 1 | 1 | 1 | 1 | 2 | 3 | 5 | 10 |
| Discharging Current (A) | 1 | 1 | 1 | 1 | 0.5 | 1 | 1 | 2 |
| Cut off Voltage (V) | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |

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CYLINDER TYPE PAS CAPACITOR

■ PRECAUTIONS

- 1. Use under the maximum usable voltage**
If over maximum usable voltage is applied, it might cause abnormal current flow, which cause shorter lifetime and leakage, and sometimes damage PAS capacitor.
- 2. Use under maximum operating temperature**
Not only shorter lifetime but also leakage and damage will happen by increasing internal pressure if PAS capacitor is used in over maximum operating temperature.
- 3. Limited life time**
Lifetime of PAS 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 PAS capacitor temporarily vary with respect to temperature separately from secular change mentioned above. Design a circuit under consideration of temperature characteristics.
- 5. PAS capacitor has polarity**
PAS capacitor has polarity. Please check the polarity before use. It will be damage if it is reversely charged.
- 6. Mind high ripple current or rapid charge / discharge**
In circuit with high ripple current or rapid charge / discharge, the lifetime of PAS capacitor might be shortened by self-heating.
- 7. Mind voltage drop when back-up**
When back-up (discharging) starts, voltage drop will occur because of active current and internal resistance.
- 8. Series connection**
In case of using PAS 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 maximum usable voltage or add a balancing resistor.
- 9. PAS 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 $\phi 18$: over 2mm, Diameter $\geq \phi 18$: 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.
- 10. The sleeve of the PAS capacitor is not guaranteed insulation**
Short circuit might happen if circuit pattern is set underneath of PAS capacitor or it fixed by a metal or it contact with other component.
- 11. Environmental of usage**
In case PAS 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**
PAS capacitor is sensitive to shock. Don't drop PAS capacitor and not apply strong pressure to a body and lead terminals. Soldering part or lead terminal might be damaged if applying vibration, shock and stress such as pinch, tip, push and twist after installed.
- 13. 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.
- 14. Mind cleaning condition when cleaning circuit-board after soldering**
Cleaning may affect PAS capacitor. Consult us about cleaning conditions beforehand.
Some cleaning conditions cause detrimental influence.

15. Storage

Keep following cautions for storage of PAS capacitor.

- Don't store in the high temperature and the high humidity condition and a place where receiving direct sunlight. Storing PAS 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 PAS capacitor near water, salt water or oil, and in the dew condensation, gasified oil or salinity filled place.
- Don't store PAS capacitor in the hazardous gas (hydrogen sulfide, sulfurous, chlorine, ammonia, bromine, methyl bromine and etc.) .
- Don't fumigate by halogen fumigant.
- Don't store PAS capacitor near acid or alkaline solvent.
- Don't store PAS capacitor in a place where exposed to ozone, ultraviolet or radioactive rays.
- Don't store PAS capacitor in a place where vibration and shock might occur.

16. Disposal

Dispose PAS capacitor in accordance with local and country rules and regulations.

17. Usage

PAS 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 PAS 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.

※Please see JEITA RCR-2370C for details.

JEITA RCR-2370C

[Safety application guide of electric double layer capacitor (EDLC)(Directions guideline of electric double layer capacitor)]
[Corporation Electronic Industries Association of Japan. Enactment in March 1995 and revision in July 2008]
