

CYLINDER TYPE PAS CAPACITOR



WAVE

FEATURES

- PAS can store a large number of ions into its amorphous structure (doping), therefore PAS capacitor 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.
- PAS capacitor is environmentally friendly power source, which does not contain any heavy metals such as Cd, Hg and Pb. (RoHS compliant)

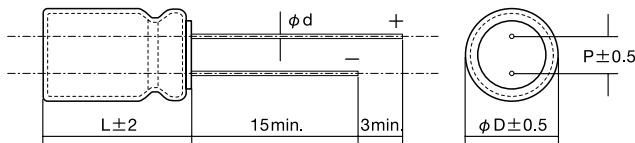
APPLICATIONS

- 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	R	2	R	3	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		08 8.0 10 10.0 12 12.5 18 18		15 15 16 16 20 20 35 35 40 40		LR Low ESR type LA High Capacitance type		2R3 2.3 3R0 3.0 ※R=decimal point		example 105 10×10 ⁵ μF=1F 566 56×10 ⁶ μF=56F				

EXTERNAL DIMENSIONS



Part Number		φD	L	φd	P
Low ESR type (LR series)	PAS0815LR2R3105	8.0	15.0	0.6	3.5
	PAS1016LR2R3205	10.0	16.0	0.6	5.0
	PAS0815LA2R3185	8.0	15.0	0.6	3.5
Large Capacitance type (LA series)	PAS1020LA2R3475	10.0	20.0	0.6	5.0
	PAS1220LA2R3106	12.5	20.0	0.6	5.0
	PAS1235LA2R3226	12.5	35.0	0.6	5.0
	PAS1840LA2R3566	18.0	40.0	0.8	8.0
	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	8.0

Unit : mm

PART NUMBERS

Part Number		Maximum Usable Voltage (V)	Nominal Capacitance (F)	Internal Resistance (mΩ)
Low ESR type (LR series)	PAS0815LR2R3105	2.3	1	70
	PAS1016LR2R3205		2	50
	PAS0815LA2R3185		1.8	1000
Large Capacitance type (LA series)	PAS1020LA2R3475	2.3	4.7	300
	PAS1220LA2R3106		10	200
	PAS1235LA2R3226		22	150
	PAS1840LA2R3566		56	50
	PAS1020LA3R0405	3.0	4	300
	PAS1220LA3R0905		9	200
	PAS1235LA3R0206		20	100
	PAS1840LA3R0506		50	70

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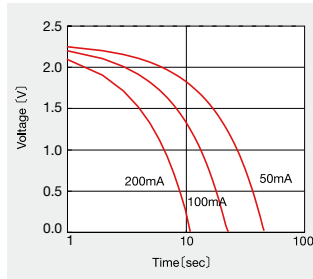
LR Series

SPECIFICATIONS

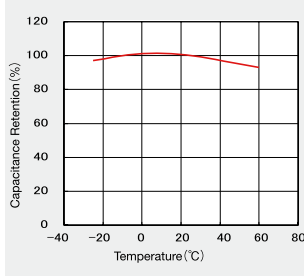
Part Number	Operating Temp. Range (°C)	Max. Usable Voltage (V)	Initial Capacitance (F)	Initial Internal Resistance (mΩ)	Temperature Characteristics
PAS0815LR2R3105	-25~+60	2.3	1.0±20%	Under 70	Lowest temperature (-25°C) Capacitance : Over 70% of initial spec. Internal Resistance : Within 4 times of initial spec.
PAS1016LR2R3205			2.0±20%	Under 50	Highest temperature (60°C) Capacitance, Internal Resistance : Within initial spec.

ELECTRICAL CHARACTERISTICS

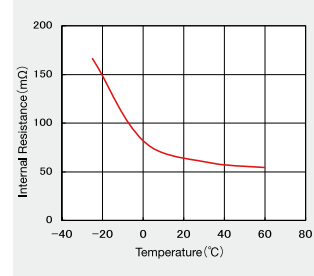
PAS0815LR2R3105 ● Discharging Characteristics



● Temperature Characteristics (Capacitance)



● Temperature Characteristics (Internal Resistance)



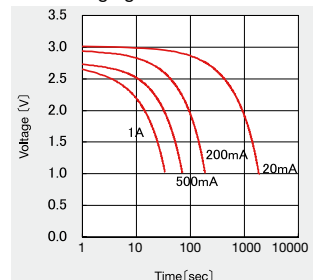
LA Series

SPECIFICATIONS

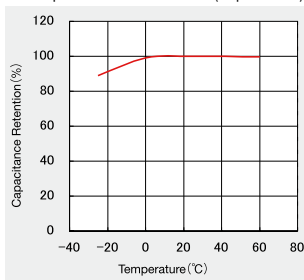
Part Number	Operating Temp. Range (°C)	Max. Usable Voltage (V)	Initial Capacitance (F)	Initial Internal Resistance (mΩ)	Temperature Characteristics
PAS0815LA2R3185	-25~+60	2.3	1.8±20%	Under 1000	Lowest temperature (-25°C) Capacitance : Over 70% of initial spec. Internal Resistance : Within 4 times of initial spec. Highest temperature (60°C) Capacitance, Internal Resistance : Within initial spec.
PAS1020LA2R3475			4.7±20%	Under 300	
PAS1220LA2R3106			10±20%	Under 200	
PAS1235LA2R3226			22±20%	Under 150	
PAS1840LA2R3566		3.0	56±20%	Under 50	
PAS1020LA3R0405			4.0±20%	Under 300	
PAS1220LA3R0905			9.0±20%	Under 200	
PAS1235LA3R0206			20±20%	Under 100	
PAS1840LA3R0506			50±20%	Under 70	

ELECTRICAL CHARACTERISTICS

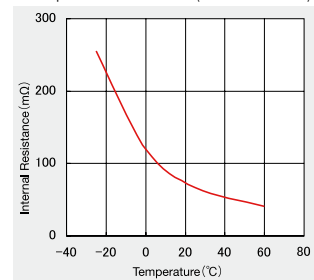
PAS1235LA3R0206 ● Discharging Characteristics



● Temperature Characteristics (Capacitance)



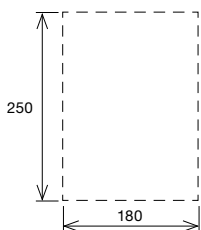
● Temperature Characteristics (Internal Resistance)



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PACKAGING

① Minimum Packing Unit (Plastic Bag)



Item	Minimum Packing Unit	Standard Inner Packing Box quantity	
PAS0815	200	10bags	2000
PAS1016	200	10bags	2000
PAS1020	100	15bags	1500
PAS1220	100	10bags	1000
PAS1235	50	10bags	500
PAS1840	10	20bags	200

Standard Inner Packing Box
200mm(W)×330mm(L)×140mm(H)

RELIABILITY DATA

Items	Specifications			Test Conditions, Remark
	LR Series	LA Series		
1. Operating Temperature range	-25~-+60℃			
2. Max. Usable Voltage	2.3V	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℃ 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 60℃±2℃ and -25±2℃ 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℃, 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 0041 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. Solder Heat Resistance	Capacitance : Within initial spec. Internal Resistance : Within initial spec. Appearance : No noticeable abnormality			Material : Sn-3Ag-0.5Cu Solder bath temperature : 260±5℃ Dipping time : 10±1 sec. Dipping depth : 1.5~2mm from cell body

● Charge/Discharge Cycle Test Condition

Part Number	PAS0815 LR2R3105	PAS1016 LR2R3205	PAS0815 LA2R3185	PAS1020 LA2R3475	PAS1220 LA2R3106	PAS1235 LA2R3226	PAS1840 LA2R3566	PAS1020 LA3R0405	PAS1220 LA3R0905	PAS1235 LA3R0206	PAS1840 LA3R0506
Charging Voltage (V)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	3.0	3.0	3.0	3.0
Charging Time (s)	10	10	10	10	10	10	30	30	30	30	30
Max. Charging Current (A)	1	1	1	1	1	1	5	2	3	5	10
Discharging Current (A)	1	1	1	1	1	1	5	0.5	1.0	1	2
Cut off Voltage (V)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5

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1. Use under the maximum usable voltage
If over maximum usable voltage is applied, it might cause abnormal current flow, which shorten lifetime and sometimes damage PAS capacitor.
2. Use under maximum operating temperature
Not only shorter life time but also leakage and damage will happen by increasing internal pressure if PAS capacitor use in over max operating temperature.
3. Limited life time
Lifetime of PAS capacitor is greatly affected by surrounding temperature. 10°C drop in temperature extend its expected lifetime approximately twice as much. Design a circuit under consideration of deterioration of electrical characteristics after long time usage, decreasing in capacitance and increasing in internal resistance.
4. The electrical characteristics of capacitors vary with respect to temperature
The electrical characteristics of PAS capacitors 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 damaged 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 capacitors might be shortened by self-heating.
7. Mind voltage drop when discharging
When back-up (discharging) starts, voltage drop 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 a rated 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 < ϕ 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 the high humidity, alkaline or acid air, it may cause deterioration of its performance, electrolyte leak 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, terminals and lead. 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, leakage, shortening lifetime.
 - Don't contact solder iron to a cell body.
 - Don't solder over solder conditions in the spec sheet.
14. 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, 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 Soldering.
 - Don't store PAS capacitor near water, salt water or oil, and it 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 x-ray.
 - Don't store PAS capacitor in a place where vibration and shock might occur in.
16. Disposal
Dispose PAS capacitor in accordance with local and country rules and regulations.
17. Usage
PAS capacitor is developed on the assumption of the memory-backup & RTC for usage of information & communication equipment, home electronics, audio & visual equipment, office equipment and 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.
18. Other Notice
 - Don't heat or throw PAS capacitor into fire.
 - Don't short.
 - Don't solder directly to a cell body.
 - Don't open a body
 - Don't deform.
 - Don't apply pressure.

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