Kanebo
The Lifestyle Company

PAS

POLYACENE CAPACITORS

2004

PAS

What is PAS ...?

PAS (Polyacenic Semiconductor) which has been originally developed by KANEBO is a kind of conductive polymers synthesized through pyrolytic treatment of phenolic resin. PAS capacitors, in which PAS is employed for both positive and negative electodes, show extremely high performance.

Features of PAS capacitor

● High capacity/High reliability

PAS can store a lot of ions into it's amorphous structure (doping), therefore PAS capacitor has much lager capacity than conventional electrical double layer capacitor. PAS is also extremely stable material and PAS capacitor shows excellent performance of cycle life and durability to overcharge and overdischarge.

● Environmentally friendly

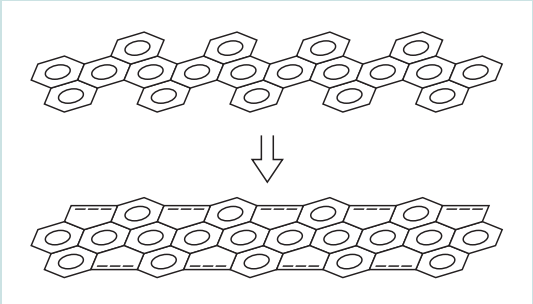
PAS capacitor contains neither heavy metal such as Cd and Hg in its body nor Pb for lead plating, which may cause environmental pollution. PAS capacitor is an environmentally friendly power source.

●Reflow soldering

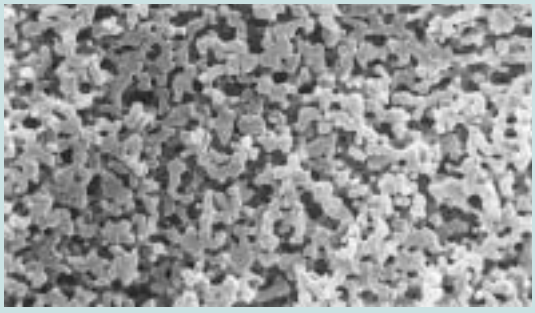
Kanebo is the first company in the world that introduced a reflow soldering type capacitor. As a pioneer of reflowable capacitor, we have a variety in line-up including reflowable capacitors with lead-free condition.

●High power

A newly developed cylindrical PAS capacitor has achieved low-ESR with keeping large capacity. It is suitable for high power use requiring high output of ampere (A) order.

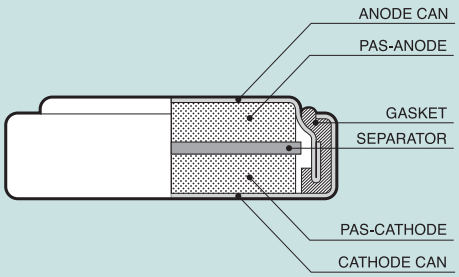


Molecular structure of PAS

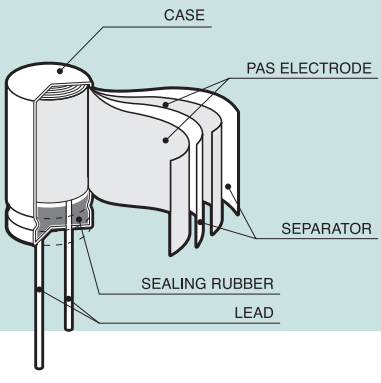


SEM image of PAS

Coin type



Cylindrical type



Line-up

Coin-type PAS capacitor

Our PAS capacitor has been used all over the world as back-up power source for real time clock (RTC) in mobile device such as cellular phone, digital camera and so on.

Reflow soldering type

R type	Max. usable voltage (V)	Capacity (F)	Cell diameter (mm)	Cell height (mm)	
PAS414R	2.5	0.06	4.8	1.4	→ 03
PAS614R		0.2	6.8	1.4	
PAS621R		0.3	6.8	2.1	

NR type	Max. usable voltage (V)	Capacity (F)	Cell diameter (mm)	Cell height (mm)	
PAS414NR	3.3	0.05	4.8	1.4	→ 04
PAS614NR		0.15	6.8	1.4	
PAS621NR		0.25	6.8	2.1	

Reflow soldering with lead-free condition type

SR/HR type	Max. usable voltage (V)	Capacity (F)	Cell diameter (mm)	Cell height (mm)	
PAS414SR	2.5	0.06	4.8	1.4	→ 05
PAS414HR	3.3	0.05	4.8	1.4	

Manual soldering type

L type	Max. usable voltage (V)	Capacity ※ (mAh)	Cell diameter (mm)	Cell height (mm)	
PAS614L	3.3	0.065	6.8	1.4	→ 08

※Capacity is measured between 3.3V and 2.0V (approximately doubled between 3.3V and 1.0V).

Application ●Power source for back-up of memory and RTC used for cellular phone, pager, PDA, digital camera, portable radio and so on.

Cylindrical-type PAS Capacitor

These are new type capacitors with high power, large capacity and also excellent durability. It can be used as power sources for momentary-term back up requiring large current for small electric device.

	Max. usable voltage (V)	Capacity (F)	Cell diameter (mm)	Cell height (mm)	
PAS08110OP	2.3	0.7	8.0	11.0	→ 09
PAS08150OP		1.0	8.0	15.0	
PAS10200OH		4.7	10.0	20.0	

Application ●Power source for back up on black out●Load leveling (Help a lifetime for dry battery, primary lithium battery) ●Energy storage device for solar cell system, fuel cell system, electric generator (Flashing road sign, Regenerating brake equipment, Self-flashing tale lamp for bicycle and so on) ●Main power source for potable electric device (Toy, Guage and so on)

Coin type PAS capacitor - R type【Reflow soldering type】

Features

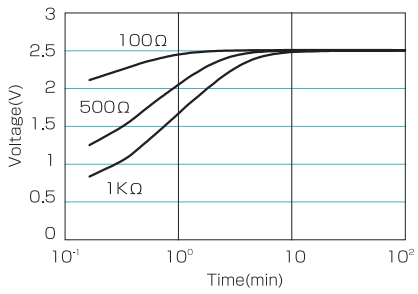
- Reflowable (Pls. refer to Page 5 for reflow temperature profile).
- Voltage can be set freely below 2.5V.
- Durable to more than 100,000 cycles.

Specification

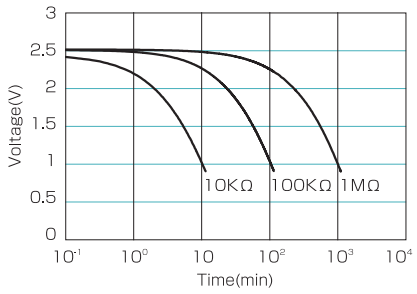
Part Number	PAS414R	PAS614R	PAS621R
Max. operating voltage (V)	2.5		
Capacity (F)	0.06	0.2	0.3
Capacity Tolerance (%)	−25～+50		
Internal resistance (Ω)	100	30	30
Operating temperature range (℃)	−25～+70		
Temperature characteristics	Highest temperature (70℃) Capacity : To meet initial spec. Internal resistance : To meet initial spec. Lowest temperature (-25℃) Capacity : 70% of initial spec. or more. Internal resistance : 4 times of initial spec. or less		
High temperature load characteristics	Cell is to maintain 70% of initial spec. or more in capacity, after kept with 2.5V of applied voltage at 70℃ for 500hours.		
Cycle characteristics	Cell is to maintain 50% of initial spec. or more in capacity, after 10,000 cycles (Charging:2.5V for 0.4hr with constant resistance/Discharging:For 0.1hr with constant resistance)		
Dimension(diamter ϕ ×cell height mm)	4.8×1.4	6.8×1.4	6.8×2.1
Weight (g)	0.07	0.16	0.20

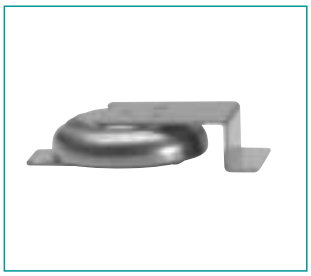
Characteristics (Typical of PAS414R)

Charging characteristics (Constant R)

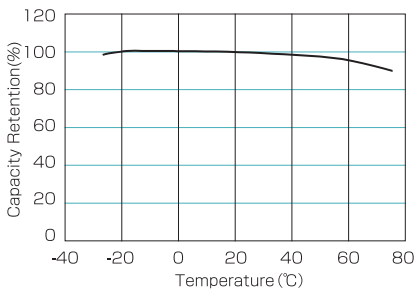


Discharging characteristics (Constant R)

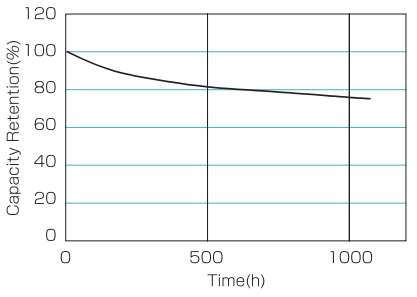




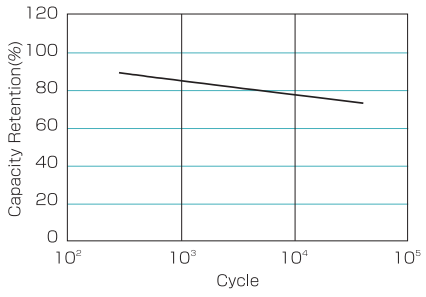
Temperature characteristics



High temperature load characteristics



Cycle characteristics



Coin type PAS capacitor - NR type【Reflow soldering type】

Features

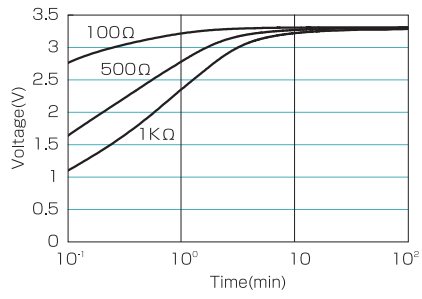
- Reflowable (Pls. refer to Page 5 for reflow temperature profile).
- Voltage can be set freely below 3.3V.
- Durable to more than 10,000 cycles.

Specification

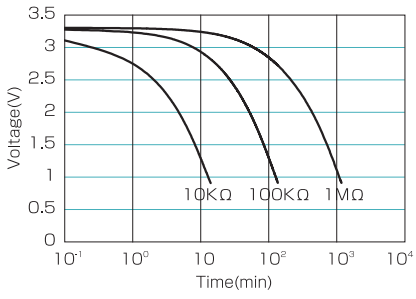
Part Number	PAS414NR	PAS614NR	PAS621NR
Max. operating voltage (V)	3.3		
Capacity (F)	0.05	0.15	0.25
Capacity Tolerance (%)	−25～+50		
Internal resistance (Ω)	1000	200	200
Operating temperature range (℃)	−25～+60		
Temperature characteristics	Highest temperature (60℃) Capacity : To meet initial spec. Internal resistance : To meet initial spec. Lowest temperature (-20℃) Capacity : 70% of initial spec. or more. Internal resistance : 4 times of initial spec. or less		
High temperature load characteristics	Cell is to maintain 60% of initial spec. or more in capacity, after kept with 3.3V of applied voltage at 60℃ for 500hours.		
Cycle characteristics	Cell is to maintain 50% of initial spec. or more in capacity, after 10,000 cycles (Charging:3.3V for 0.4hr with constant resistance/Discharging:For 0.1hr with constant resistance)		
Dimension (diamter ϕ ×cell height mm)	4.8×1.4	6.8×1.4	6.8×2.1
Weight (g)	0.07	0.16	0.20

Characteristics (Typical of PAS414NR)

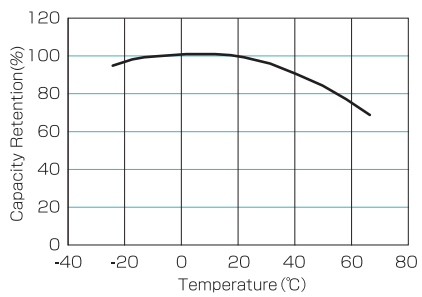
Charging characteristics (Constant R)



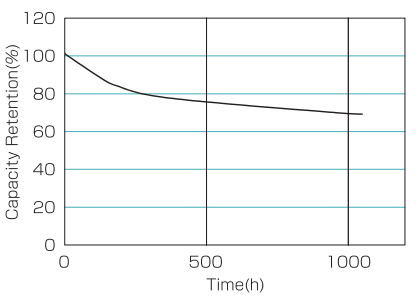
Discharging characteristics (Constant R)



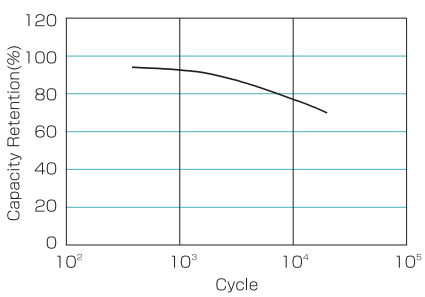
Temperature characteristics



High temperature load characteristics



Cycle characteristics



Coin type PAS capacitor - SR/HR type【Reflow soldering type】

Features

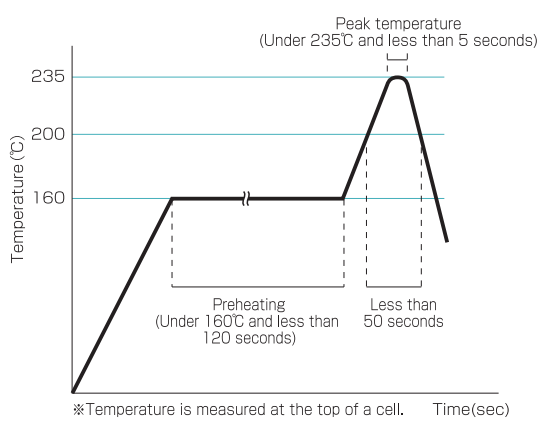
- Reflowable with lead–free condition
  (Pls. refer to the profile below for recommendable reflow pattern).
- Voltage can be set freely below max. operating voltage.

Specification

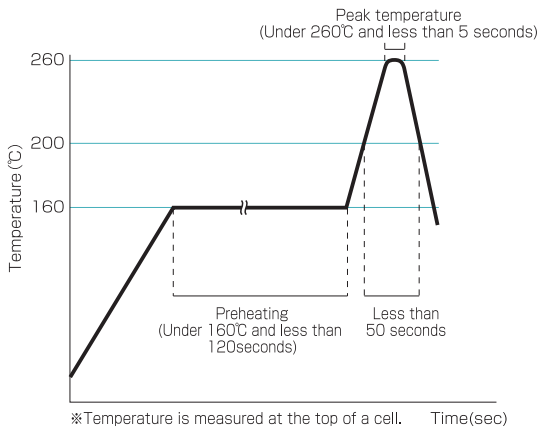
Part Number	PAS414SR	PAS414HR
Max. operating voltage (V)	2.5	3.3
Capacity (F)	0.06	0.05
Capacity Tolerance (%)	−25～+50	
Internal resistance (Ω)	250	1000
Operating temperature range (℃)	−25～+70	−20～+60
Temperature characteristics	Highest temperature: Capacity : To meet initial spec.; Internal resistance : To meet initial spec. Lowest temperature: Capacity : 50% of initial spec. or more.; Internal resistance : 4 times of initial spec. or less	
High temperature load characteristics	Cell is to maintain 70% of initial spec. or more in capacity, after kept with applying max. operating voltage at highest operating temperature for 500hours.	
Cycle characteristics	Cell is to maintain 50% of initial spec. or more in capacity, after 10,000 cycles (Charging:Maximum operating voltage for 0.4hr with constant resistance /Discharging:For 0.1hr with constant resistance)	
Dimension (diamter ϕ ×cell height mm)	4.8×1.4	
Weight (g)	0.07	

Recommendable reflow pattern

Reflow profile with standard condition



Reflow profile with lead free condition



Note

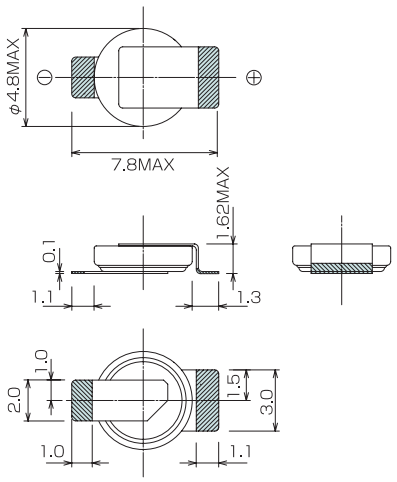
- Do not charge a cell prior to reflow.
- Pls. set reflow condition within the range provided in 'Specification', which will be published separately.
- Pls. consult with us about the details.

Example of terminal type

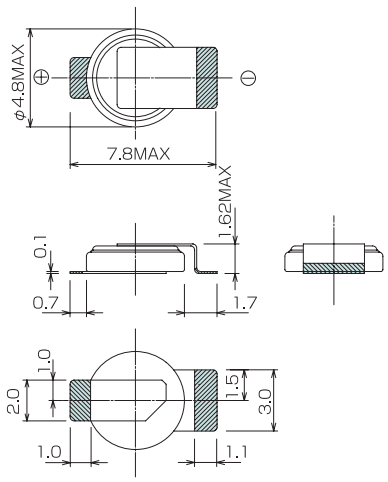
Consult with us about other terminals

solder plating area
Unit of size : mm

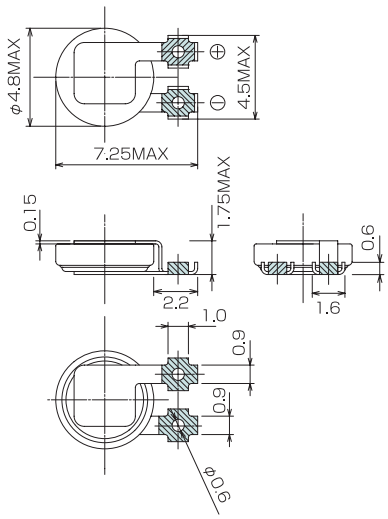
414-VA5 type



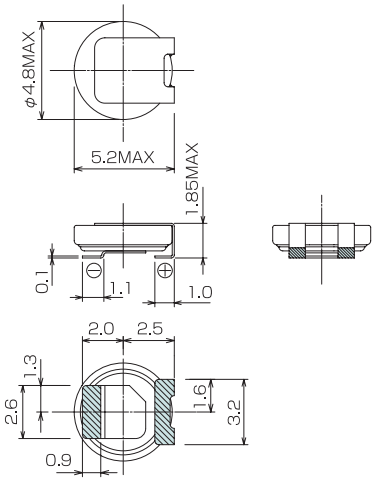
414-VA5R type



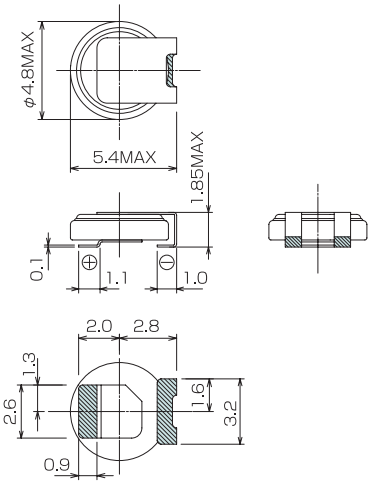
414-VD3 type



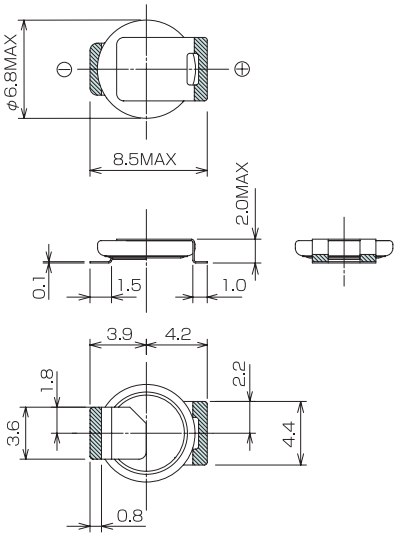
414-VE5 type



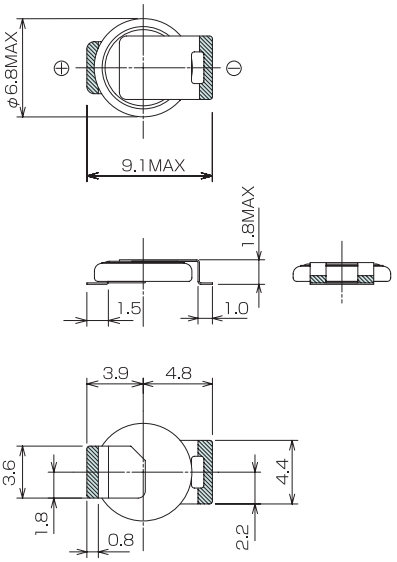
414-VE5R type



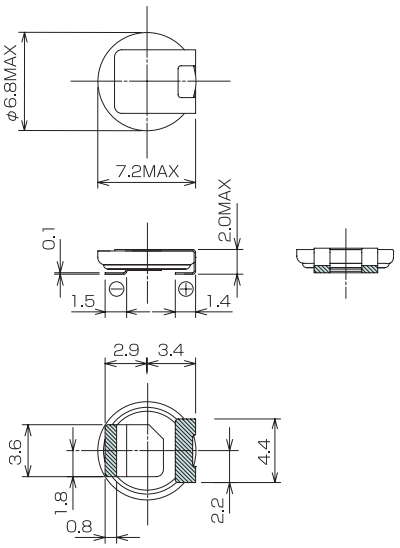
614-VA7 type



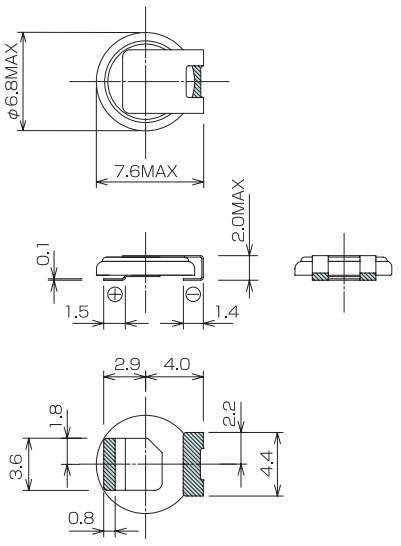
614-VA7R type



614-VE5 type



614-VE5R type



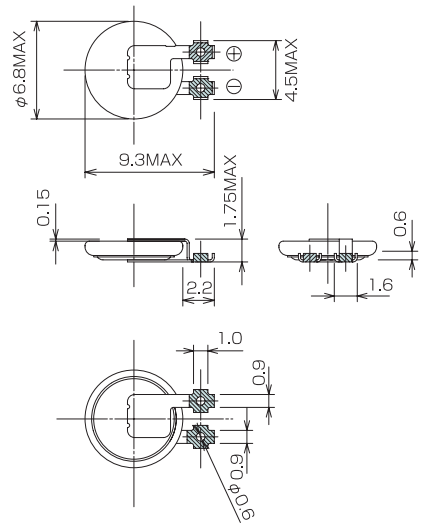
Example of terminal type

Consult with us about other terminals

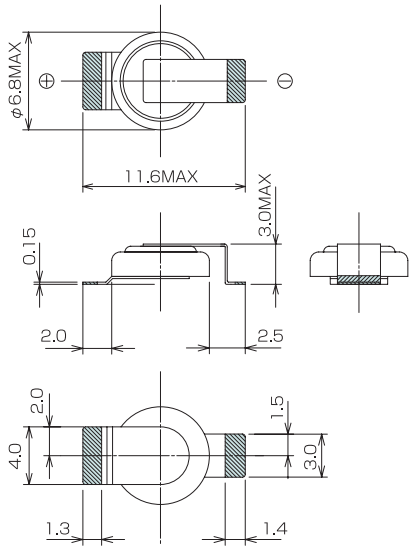
solder plating area

Unit of size : mm

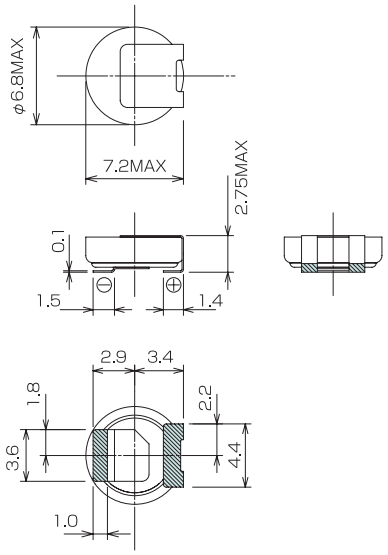
614-VD3 type



621-VA6R type

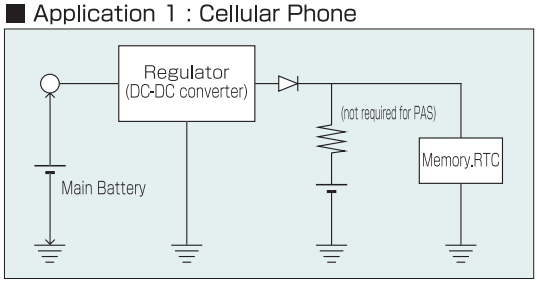


621-VE5 type

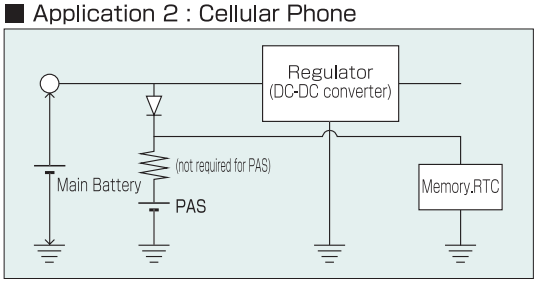


Circuit appli cation

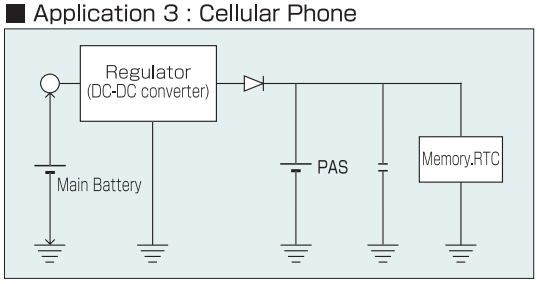
■ Application 1 : Cellular Phone



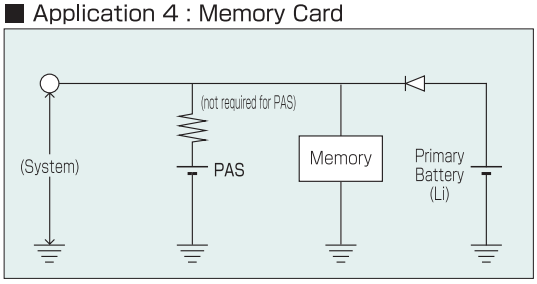
■ Application 2 : Cellular Phone



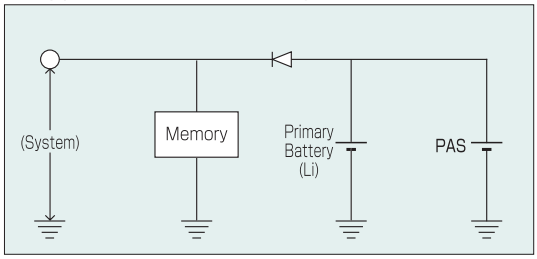
■ Application 3 : Cellular Phone



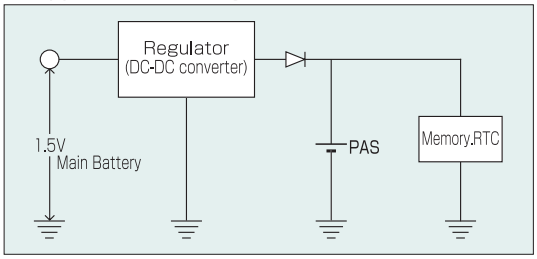
■ Application 4 : Memory Card



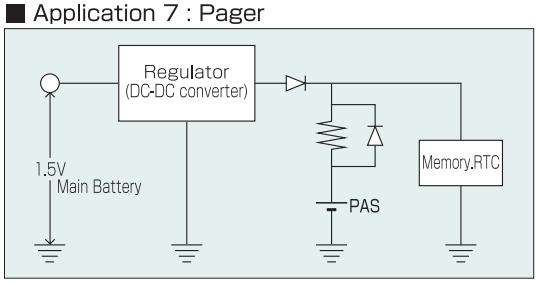
■ Application 5 : IC Memory Card



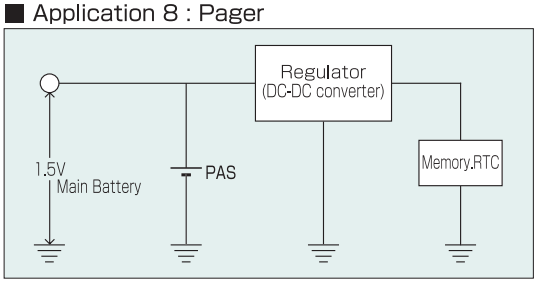
■ Application 6 : Pager



■ Application 7 : Pager



■ Application 8 : Pager



Coin type PAS capacitor - L type【Manual soldering type】

Features

- 3.3V type (Voltage can be set freely below 3.3V).
- Durable to more than 10,000 cycles.
- Excellent self-discharging characteristics.
- UL certification (File No MH19429).

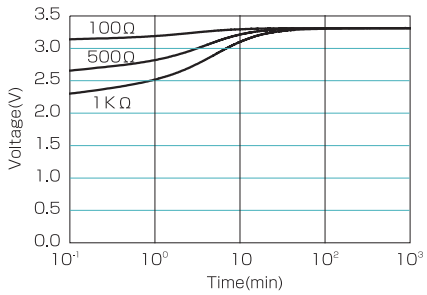
Specification

Part Number	PAS614L		
Max. operating voltage (V)	3.3	Temperature characteristics	Highest temperature (60℃) Capacity : To meet initial spec. Internal resistance : To meet initial spec. Lowest temperature (-20℃) Capacity : 70% of initial spec. or more. Internal resistance : 4 times of initial spec. or less
Capacity (mAh)※	0.065		
Capacity Tolerance (%)	−25～+50	High temperature load characteristics	Cell is to maintain 70% of initial spec. or more in capacity, after kept with 3.3V of applied voltage at 60℃ for 500hours.
Internal resistance (Ω)	160	Cycle characteristics	Cell is to maintain 50% of initial spec. or more in capacity, after 10,000 cycles (Charging:3.3V for 0.4hr with constant resistance/Discharging:For 0.1hr with constant resistance)
Operating temperature range (℃)	−20～+60	Dimension (diamter φ ×cell height mm)	6.8×1.4
		Weight (g)	0.16

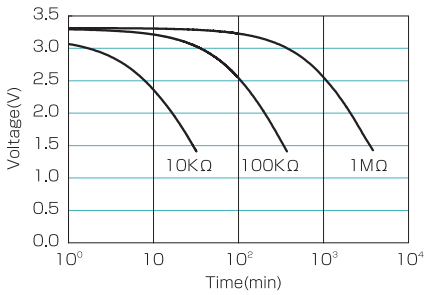
※Capacity is measured between 3.3V and 2.0V (approximately doubled between 3.3V and 1.0V).

Characteristics

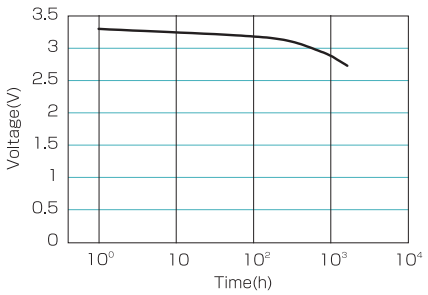
Charging characteristics (Constant R)



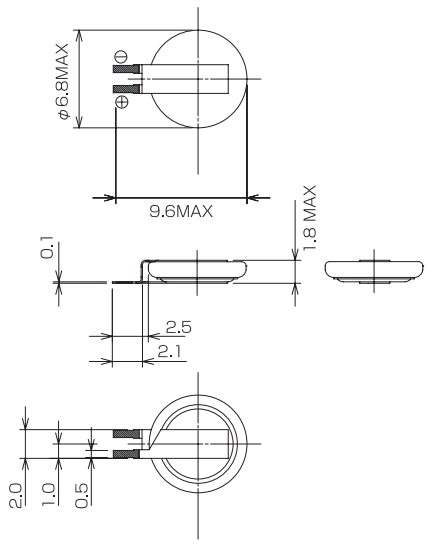
Discharging characteristics (Constant R)



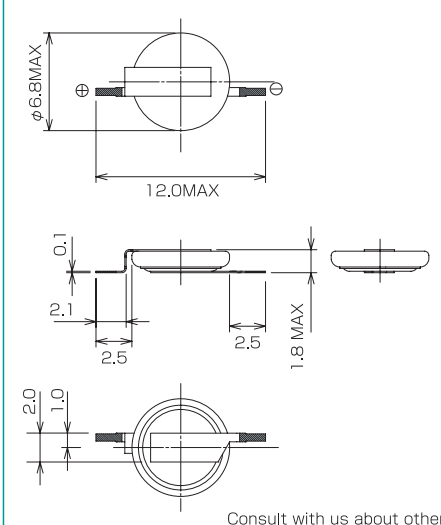
Self-discharging characteristics

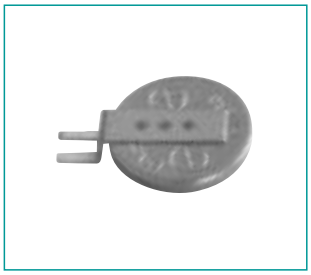


614L-VL3 type



614L-VL5 type





Consult with us about other terminals

solder plating area

Unit of size : mm

Cylindrical type PAS Capacitor

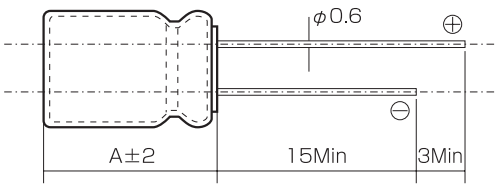
Features

- Low ESR, Rapid charging and discharging of A (ampere) order is possible.
- High capacity as double as conventional electric double layer capacitor in same size
- Durable to 100,000 cycles.
- Voltage can be set freely below maximum operating voltage.

Specification

Part Number	PAS08110OP	PAS08150OP	PAS10200OH
Max. operating voltage(V)	2.3		
Capacity (F)	0.7	1.0	4.7
Internal resistance (mΩ)	100	70	300
Operating temperature range (℃)	−25～+60		
Dimension(diamter φ ×cell height mm)	8×11	8×15	10×20

Dimension

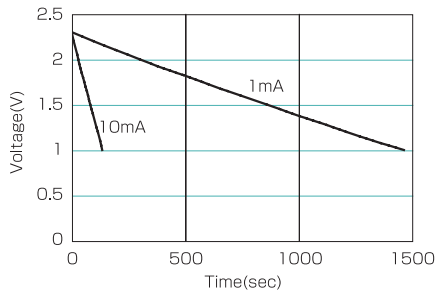


Unit : mm

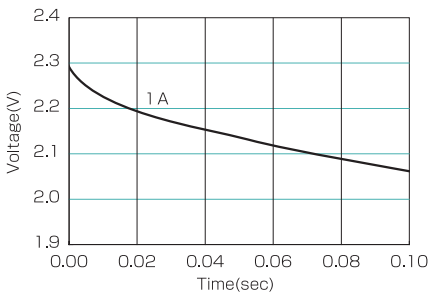
	A	B	C
PAS08110OP	11	8	3.5
PAS08150OP	15	8	3.5
PAS10200OH	20	10	5.0

Characteristics (Typical of PAS08150OP)

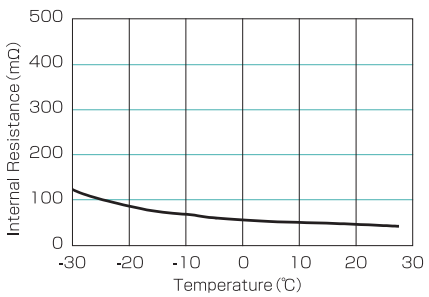
Discharging characteristics I



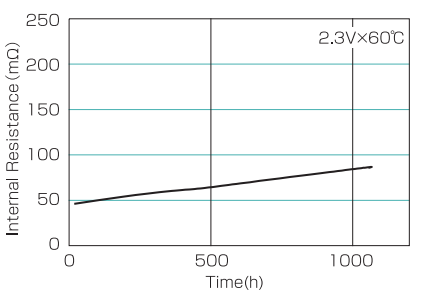
Discharging characteristics II



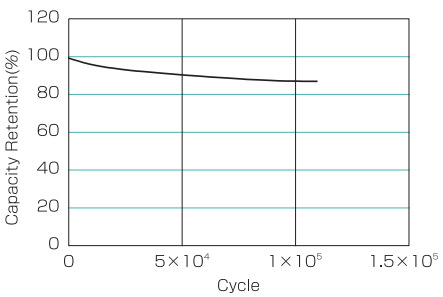
Temperature characteristics



High temperature load characteristics



Cycle characteristics



Caution

1. Use under the maximum usable voltage.

If voltage over maximum usable voltage is applied, it might cause abnormal current flow, shorten the lifetime and sometimes damage PAS capacitor.

2. Use under surrounding temperature kept as normal as possible.

Lifetime of PAS capacitor is greatly affected by surrounding temperature. Each 10℃ drop in temperature extends its expected lifetime approximately twice as much. Therefore, avoid high temperature and use PAS capacitor under lower temperature than the maximum of operating temperature range.

3. Consult us about using PAS capacitors in a series connection.

In case of using PAS capacitors in a series connection, the voltage of each capasitor is not always equal, so excessive voltage might be applied to a part of capasitor. It might cause shortening its lifetime and damaging.

4. Be careful of using PAS in the circuit with high ripple current.

Since PAS capacitor has higher internal resistance than electric capacitors, ripple current may heat a capacitor body. It might cause the increase of internal resistance and deterioration of capacity.

5. Do not expose PAS capacitor into high humidity, alkaline or acid air.

In case PAS capacitor is used in high humidity, alkaline or acid air, lead terminal and container may be damaged. Also, it may cause deteriorating of its performance.

6. When installing PAS capacitor on board, it should not touch the printed patterns.

A short-circuit will occur when a capacitor body touches wiring pattterns.

7. Caution the polarity of PAS capacitor when soldering on board.

At installing, verify the indication of polarity or the shape of terminals. If the reverse voltage is applied, it might deteriorate capacity and increase internal resistance, so damage may occur.

8. Caution on soldering

8-1. Reflow soldering type

- Follow the scope of conditions regulated in specifications.
- Do not charge prior to reflow.
- Consult us about the detail for reflow condition.

8-2 Manual soldering type.

- For use of a soldering iron, it should not touch the cell body. Temperature of the soldering iron should be less than 300℃. Soldering time for terminal should be less than 3 seconds.
- Do not carry out relow soldering.

9. Consult us about cleaning condition if circuit board is cleaned after soldering.

Cleaning may affect PAS capacitor. It is necessary to consult us about cleaning conditions.

10. Avoid excessive vibration.

Excessive vibration may break soldering part and damage lead terminal.

11. Storage

Keep the following cautions for storage.

- Use Kanebo's tray or reel. For moving on to another tray, do not bend lead terminal.
- Storage under normal atmosphere. A sudden change of temperature or high humidity deteriorates the performance.
- Avoid dust and direct sunlight.

12. Other cautions.

- Do not heat PAS capacitor or throw it into fire.
- Do not let short-circuit happen.
- Do not solder directly to a cell body.
- Do not take into pieces.
- Do not deform a cell.
- Watch out for the edge of terimal.

PAS

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