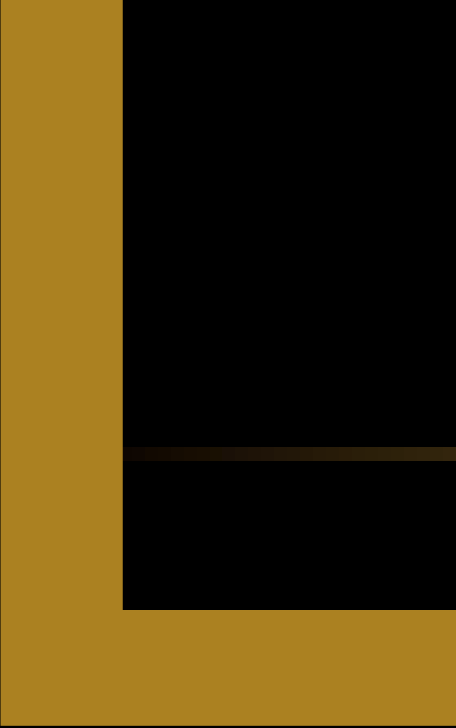




Primary Lithium Batteries





Primary Lithium Batteries

GP Primary Lithium Manganese Dioxide (LiMnO_2) batteries offer numerous advantages over other conventional primary battery systems. The unique features include high energy density, high voltage, excellent performance at extreme ambient temperature, wide operating temperature, superior safety design, specific crimp design for leakage proof, and low self discharge rate of less than 1% per year. Our wide product range (cylindrical and coin types) are the ideal options for user-replaceable electronic devices.

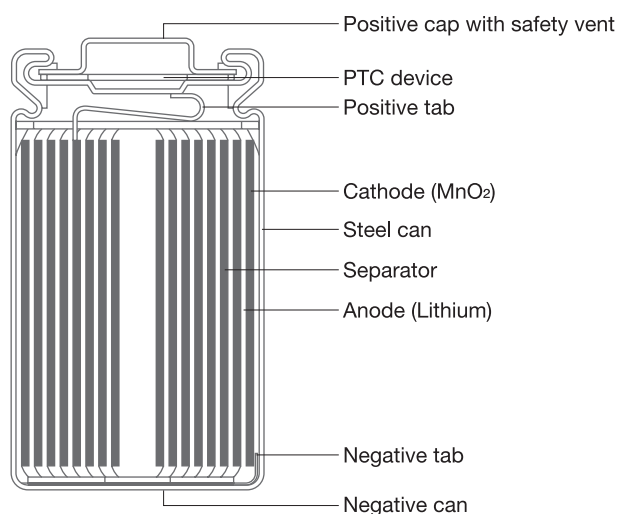
The security devices such as smoke detectors, do require highly reliable performance over an extended operation period under extreme ambient conditions. The maintenance-free GP Lithium 9V battery can last 5 times longer than the alkaline batteries, and it can provide 10-year service life in Ionisation-type Smoke Detector application! The high-power spiral cell construction of GP Lithium Cylindrical battery meets the needs of applications demanding high pulse current, or even continuous high drain discharge. GP Lithium 9V battery is the unanimous solution for smoke detectors and security professionals.

By adopting the advanced Japanese technology and fully automatic production processes, GP Primary Lithium Batteries are produced under strict and consistent quality control. As an expert in battery technology and the world's leading battery manufacturer, GP ensures our high standard of performance and quality are committed to meet the demands of the large and diversified market.

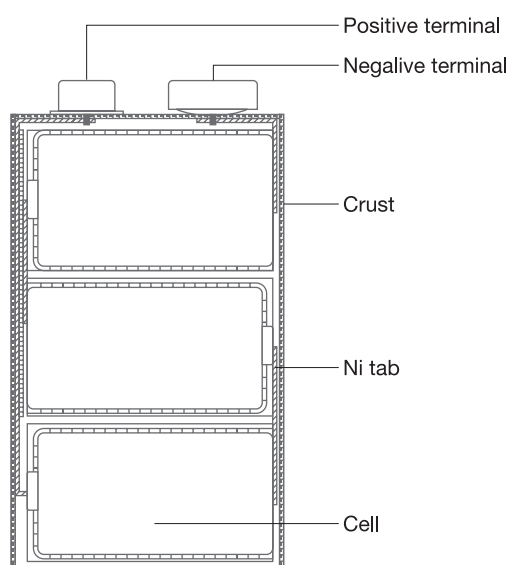


Cell Construction

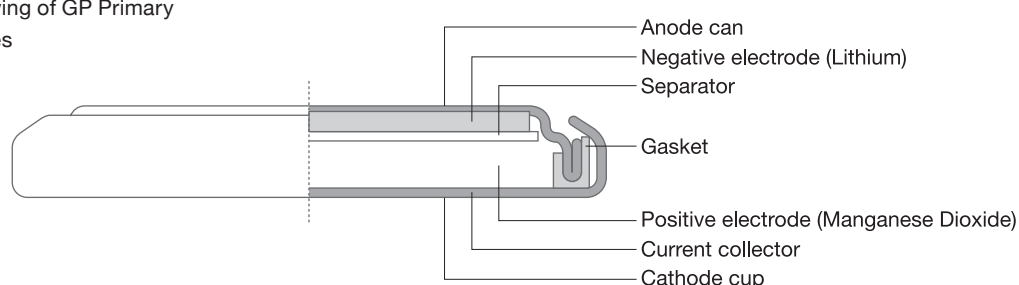
- ⊕ The spiral cell construction of GP Primary Lithium Cylindrical Batteries (e.g. GPCR-V9, GPCR123A, GPCR-V3 etc.) enlarges the facing area of the positive and negative electrodes, providing high power for high discharge current applications.
- ⊕ PTC device: A PTC (Positive Temperature Coefficient) device is installed to protect the battery from external short circuit.
- ⊕ Positive cap with safety vent : The burst-proof safety vent prevents excessive internal pressure build-up under abusive conditions.



GP Primary Lithium 9V battery (GPCR-V9) is consisted of 3 pieces of GP Primary Lithium Cylindrical Batteries (GPCR14250)



Cross sectional drawing of GP Primary Lithium Coin Batteries



Lithium 9V



Major Features

- A 10 years service life in smoke detectors
- B Up to 5 times longer lasting than ordinary alkaline batteries
- C Spiral construction results in
 - Low internal impedance
 - High discharge current
- D Design for safety
 - Built-in PTC (Positive Temperature Coefficient) to protect batteries from external short circuit
 - Burst-proof venting holes which allows safe release of the battery internal pressure
- E Leakage proof crimping technique
- F Wide operational temperature range of -40°C to +60°C with excellent discharge performance at extremely low temperatures
- G Excellent storability with low self discharge rate at less than 1% per year
- H Environmentally friendlier
 - Electrolyte contains no lithium perchlorate
- I Comply with UL and UN38.3 safety standards

Major Applications

General Applications:

Smoke detectors, security devices, medical equipment, carbon monoxide alarms, explosion gas alarms, meters (gas/electric/water), metal detectors, wireless transmitters, electronic toll collection system, etc.

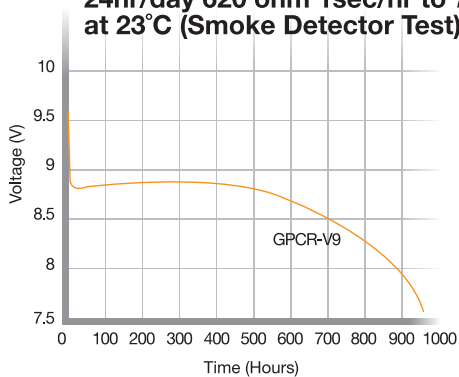
High Drain Applications:

Stun guns, military applications



Performance Characteristics

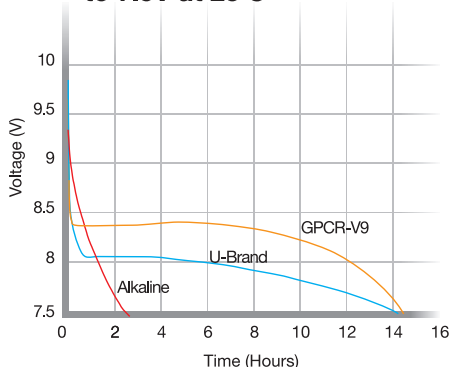
**ANSI 10K ohm background
24hr/day 620 ohm 1sec/hr to 7.5V
at 23°C (Smoke Detector Test)**



10-year Service Life in Smoke Detectors

Voltage characteristics remain stable even for a long period of discharge, greatly improving the reliability of the ionisation-type smoke detector that uses GP Lithium 9V battery (GPCR-V9). Such smoke detector is also maintenance free (battery replacement is seldom required).

**50mA continuous discharge
to 7.5V at 23°C**



Lithium Cylindrical



Major Features

- A** Spiral construction results in
 - Low internal impedance
 - High discharge current
- B** Design for safety
 - Built-in PTC (Positive Temperature Coefficient) to protect batteries from external short circuit
 - Burst-proof venting holes which allows safe release of the battery internal pressure
- C** Leakage proof crimping technique
- D** Wide operational temperature range of -40°C to $+60^{\circ}\text{C}$ with excellent discharge performance at extremely low temperatures
- E** Excellent storability with low self discharge rate at less than 1% per year
- F** Environmentally friendlier
 - Electrolyte contains no lithium perchlorate
- G** Comply with UL and UN38.3 safety standards

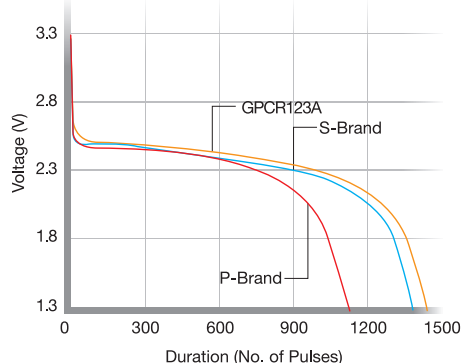
Major Applications

Cameras, flashlights, memory back-up, medical equipment, meters (gas/electric/water), photo flash, electronic guns, etc.

Performance Characteristics

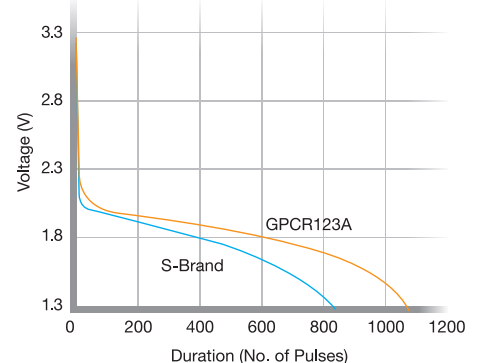


1200mA pulse discharge to 1.3V at 23°C



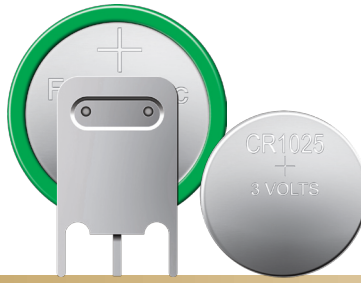
Excellent Pulse Discharge Performance at Room Temperature
GPCR123A shows superior high pulse discharge performance and longer duration than competitors.

1200mA pulse discharge to 1.3V at -20°C



Outstanding Pulse Discharge Capability at -20°C
The outstanding high pulse discharge capability of GPCR123A remains strong at extremely low temperature.

Lithium Coin



Major Features

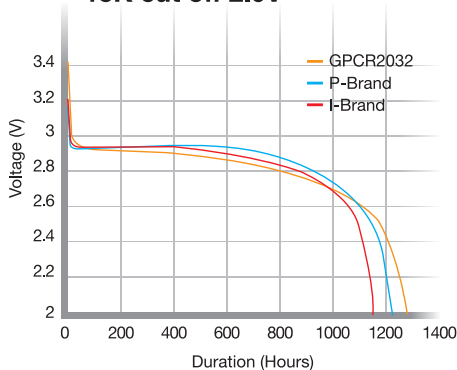
- A High volumetric energy density
- B Flat discharge voltage
- C Leakage proof crimping technique
- D Wide range of operating temperature from -10°C to $+60^{\circ}\text{C}$
- E Excellent storability with low self discharge rate at less than 1% per year
- F Comply with UL and UN38.3 safety standards

Major Applications

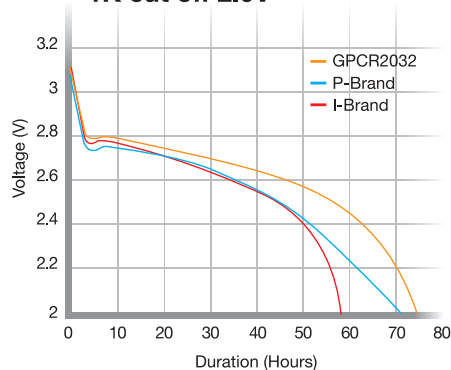
Calculators, car equipment (keyless entry), FA instruments (measuring instruments, onboard microcomputers, sensors), electronic thermometer, IC cards, IC tags, memory back-up, greeting cards, time pieces, remote control, portable games, etc.

Performance Characteristics

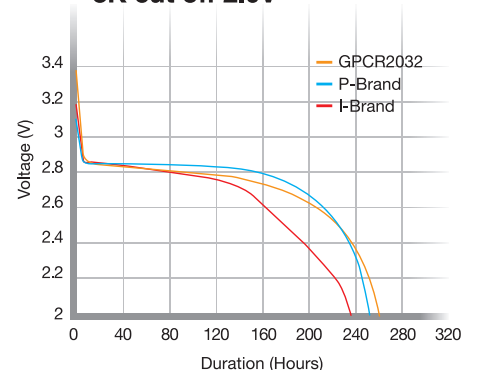
Discharge curve by loading 15K cut off 2.0V



Discharge curve by loading 1K cut off 2.0V



Discharge curve by loading 3K cut off 2.0V



GPCR2032 provides longer operating hours at different loading discharges.



Primary Lithium

Specifications

Lithium 9V

Model No.	Dimension (mm)	Voltage (V)	Weight (g)	Cross Reference			
				IEC	JIS	ANSI	Ultralife
CR-V9	26.5(L) x 17.5(W) x 48.5(H)	9.0	34	—	—	1604LC	U9VL

Operating temperature: -40°C to +60°C

Lithium Cylindrical

Model No.	Dimension (mm)		Voltage (V)	Weight (g)	Cross Reference			
	Diameter	Height			IEC	JIS	Eveready	Duracell
CR14250	14.5	25.0	3.0	9	—	—	—	—
CR14500	14.0	50.0	3.0	18	—	—	—	—
CR2	15.6	27.0	3.0	12	—	—	—	DLCR2
CR123A	16.8	34.5	3.0	17	CR17345	—	EL123AP	DL123A
CR-V3	29.0(L) x 14.5(W) x 52.0(H)		3.0	38	—	—	ELCRV3	CR-V3
CR-P2	34.8(L) x 19.5(W) x 35.8(H)		6.0	37	CR-P2	—	EL223AP	DL223A
2CR5	34.0(L) x 17.0(W) x 45.0(H)		6.0	40	2CR5	—	EL2CR5BP	DL245

Operating temperature: -40°C to +60°C

Lithium Coin

Model No.	Dimension (mm)		Voltage (V)	Weight (g)	Cross Reference			
	Diameter	Height			IEC / JIS	Eveready	Varta	Duracell
CR1/3N	11.6	10.8	3.0	2.3	CR1/3N	—	—	DL1/3N
CR1025	10.0	2.5	3.0	0.6	CR1025	ECR1025	CR1025	—
CR1216	12.5	1.6	3.0	0.6	CR1216	ECR1216	CR1216	—
CR1220	12.5	2.0	3.0	0.8	CR1220	ECR1220	CR1220	—
CR1616	16.0	1.6	3.0	1.1	CR1616	ECR1616	CR1616	—
CR1620	16.0	2.0	3.0	1.2	CR1620	ECR1620	CR1620	—
CR2016	20.0	1.6	3.0	1.7	CR2016	ECR2016	CR2016	DL2016
CR2025	20.0	2.5	3.0	2.4	CR2025	ECR2025	CR2025	DL2025
CR2032	20.0	3.2	3.0	3.2	CR2032	ECR2032	CR2032	DL2032
CR2430	24.5	3.0	3.0	4.0	CR2430	ECR2430	CR2430	DL2430
CR2450	24.5	5.0	3.0	6.6	CR2450	ECR2450	CR2450	—

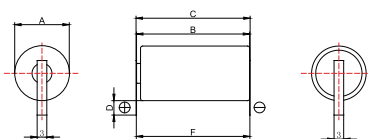
Operating temperature: -10°C to +60°C



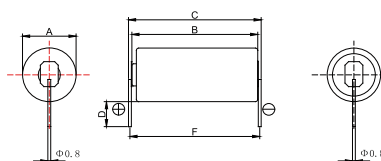
Batteries

Lithium Battery With Terminal

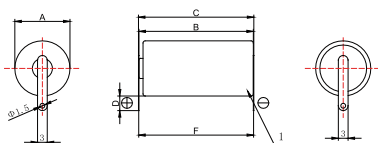
T1



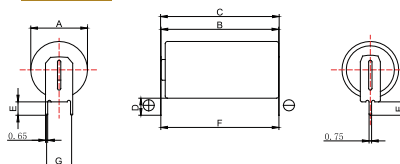
T2



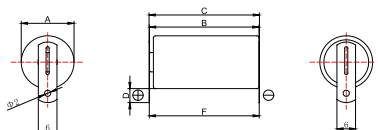
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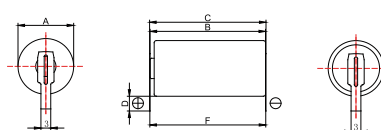
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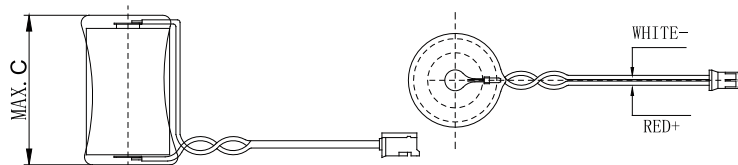
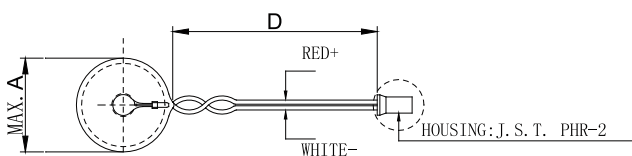
T5



T6



T7



No	Model	Capacity (mAh)	Size (mm)							Connector Description
			A	B	C	D	E	F	G	
T1	CR123A	1400	17	34	34.5	4.5		34		t:0.15 Nickel Belt
T2	CR2	800	15.6	27	29	7.2		28		φ 0.8 t:0.15 Stainless Steel
T3	CR123A	1400	17	34	34.5	3.5		34		t:0.15 Nickel Belt
T4	CR123A	1400	17	34	35	5.1	4	34	7.5	t:0.3 Stainless Steel
T5	CR123A	1400	17	34	35	3.5		34.5		t:0.3 Stainless Steel
T6	CR123A	1400	17	34	35	4.5		34.5		t:0.3 Stainless Steel
T7	CR123A	1400	18		38	40				Conector: J.S.T-PHR-2

Application Table for GP Primary Lithium Batteries

[illegible]

Batteries

Precautions for Battery Handling

1. Do not charge. When this battery is charged, gas is generated inside and raises internal pressure, resulting in fire, heat generation, leakage or bursting.
2. Do not dispose of in fire, disassemble or heat in any way. It will damage the insulation materials and the safety vent resulting in fire, heat generation, leakage or bursting.
3. Insert batteries properly. Keep polarities in the correct position aligning + and - correctly for ALL batteries to avoid leakage or bursting.
4. Do not short-circuit. If the + and - come into contact with metal objects, short circuiting occurs resulting in heat generation or bursting. When carrying or storing batteries, avoid direct contact with metal objects such as bracelets or key chains by putting them in a separate bag.
5. Keep away from children. Consult a doctor IMMEDIATELY if a battery or leaked liquid is swallowed.
6. If leakage or strange smell occurs, keep batteries well away from fire to prevent ignition of leaked electrolyte.
7. Do not solder. It will damage the insulation materials resulting in fire, heat generation, leakage or bursting.
8. Do not force-discharge. When a battery is force-discharged by an external power source, the voltage drops to 0 or less (reversal voltage) and gas is generated inside the battery. This may cause fire, heat generation, leakage or bursting.
9. If leaked liquid gets into the eyes, wash IMMEDIATELY with plenty of clean water and consult a doctor.
10. Do not use different types of batteries nor new and used batteries together. Doing so can cause heat generation, leakage or bursting.
11. Do not apply strong force or handle roughly to avoid heat generation, leakage or bursting.
12. Do not use nor keep batteries in direct sunlight nor high-temperature areas. Doing so may cause heat generation, leakage or bursting.
13. Do not wash nor place batteries in water as this may cause heat generation.
14. Read the instruction manual. Take note of all precautions carefully before use. Make sure these batteries are appropriate for your equipment.
15. Storage precautions. Keep batteries away from direct sunlight, excess humidity and high temperature areas as this can cause dangerous heat generation.
16. For proper disposal and transportation follow local authority guidelines and regulations.
17. Battery shall not be punctured, crushed, disassembled, or stored beyond the maximum temperature range specified on the data sheet.
18. Do not use if there is any sign of leakage or deformation. Read the Material Safety Data Sheet (MSDS) for precautions and leakage handling directions.
19. Switch off the device immediately once the battery becomes hot, and remove the battery from the device after its temperature is cooled down to normal.
20. Only use the battery for the applications which it is designed for.
21. The warning labels must be read and all the safety precautions must be followed.
22. In case of battery fire incident refer to MSDS for control instructions.
23. While installing the battery pack in the device, ensure the pack is installed in the right position and away from the heat sources in the device, in order to avoid any damage caused to the battery pack.
24. Adopt a battery pack mechanism to prevent battery pack from being ejected, if the device is suffered from a drop of any physical impact.





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