

Tomorrow's Energy Solutions

SELECTION CRITERIA FOR THE ENERGY SUPPLY OF SMART CAR KEYS



CoinPower® - The small rechargeable Lithium-Ion button cell with superior energy density

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1. More functionality in the next generation car key

What your CUSTOMER is demanding



The next generation of smart car keys is communicating with the vehicle and shares information like: status of fuel level, corresponding driving records, status of doors and windows, tire pressure and control functions like remote-controlled parking. Traditional functions like open/ close doors and windows remain.

All these new functions demands more capacity and primary cells provide no **sufficient capacity**. Or in case they achieve the required capacity, primary cells assume **too large dimensions**. All this can be solved by Lithium-Pouch type batteries. However their weaknesses are the rectangular shape, the risk of leakage, the required battery replacement and robustness.

VARTAs' rechargeable Lithium-Ion CoinPower® cell offers the better solution.

Sufficient capacity. Four CoinPower® cell sizes are available with capacity from 43 to 120 mAh. Considering a lifetime of at least 500 charging cycles, the CoinPower® ends up, charged 500 times with respective capacity and voltage level, with an energy between 77 to 216 Wh with remaining at least 80% of initial capacity. Due to best in class product life even more is possible.

Too large dimensions. Patented iLock system, circular form factor and stainless steel housing provide highest energy density in the range from 310 to over 400 Wh/l. CoinPower® provides more power at less space with a cell height from 4.0 mm to 5.4 mm and a diameter from 12 mm to 16 mm. Smaller cells are available on request.

Risk of leakage. Fully automatized production lines and patented innovations provide outstanding performance, reliability and excellent quality along with very safe operations. Steel case design also means practically zero swelling over lifetime compared to pouch cell equivalents.

Battery replacement and robustness. Without the need for replacement, many new things are possible for you. By using wireless charging you may even offer a next generation car key that is waterproof. Furthermore, the CoinPower® cell housing consists of two stainless steel parts and meets the demands of the automotive industry for high robustness and reliability. Due to the robust cell you can optimize the design, save space and getting rid of not needed housing components.



2. Your customer requires more comfort in key-fobs

Project Manager perspective



As a project manager for smart car keys you are under pressure to meet your customer needs for **smaller designs, lighter products** and **increased user comfort**. For improvement, radical transformations are required like getting rid of the battery holder for a primary cell. You can optimize the design and get more space while at the same time have even more energy available. This is possible due to easy charging the CoinPower® instead of complicated exchangeability needed for a primary button cell.

CoinPower® – The better solution for your (car key) project.

34 times more capacity. The standard CR2032 offers a capacity of < 300 mAh. Your new rechargeable Lithium-Ion battery CP1240 starts with a capacity of 43 mAh but considering at least 500 recharge cycles you will end up with a capacity of more than 77 Wh. More than 70 times the energy of a conventional CR2032 is available and thanks to long cycle life of CoinPower® even more.

Save up to 80% of space.

When comparing the occupied space, your CR2032 requires > 1000 mm³, while the smallest rechargeable CoinPower® cell comes up with < 200 mm³. This gives you a significant downsizing of more than 80 %.

Safe more than 80% in weight.

An weight reduction is easily achievable by switching from primary to rechargeable cells. Comparing the primary CR2450 with ~6 gram and the rechargeable CP1240 with ~1,2 gram – the weight reduction is 80%.

User comfort.

CoinPower® is currently available in four standard cell sizes. They offer you high reliability through low self-discharge and reliable message transmission at HIGH PULSE LOAD due to low impedance. Customized connections are being available to meet your mechanical concept, capacity and power requirements. No wires to hand-solder each battery and defined mechanical contour means easy automation in your assembly line. Furthermore the use of standard battery holder simplifies the design process. By using wireless charging you may even offer a next generation key-fob that is waterproof.

Experience best in class product life and excellent charge and discharge characteristics with continuous charge and very high discharge currents. Outstanding performance data and product support worldwide is available for the design-engineer, with global design-in teams and high-tech application labs. Let your project benefit from the adherence to delivery dates and the reliability of VARTA Microbattery. By selecting VARTA Microbattery, a leading international manufacturer of microbatteries with more than 130 years of experience is supporting you. Support for success, test our services and cells!

3. Your battery commodity needs an upgrade

Purchasing view



You need to improve your supplier base in your battery portfolio? Struggling with difficult communication and unstable product quality causes daily frustration and additional work. Claim management is a huge cost driver. This in turn means that deadlines are not met and quantities are not delivered. Especially on daily issues, good communication and a partner on the same wavelength is priceless.

VARTA Microbattery with its CoinPower® guarantees ...

... **communication on the same wavelength.** Global representatives in over 75 countries worldwide offer in depth experience in batteries and their application and are able to support you at its best. Detailed know-how in automotive environment allows communication on daily issues from APQP to IMDS with an IATF 16949 approved supplier location to communicate in your native language. VARTA will deliver the AUTOMOTIVE battery you need.

... **stable product quality.** VARTA Microbattery secures maximum production accuracy on every single cell made in Germany by highly automated production lines. Furthermore 14 days storage and 100 % OCV- and impedance-check before shipping provide highest product quality. Patented innovations like the revolutionary sealing system offers highest energy density. For your next generation car key you need next generation energy source from a flexible supplier. Based on ongoing technological advancement with > 130 employees in research and development and yearly investments in future production line optimization – you are working with a key technology leader.

... **precise adherence to deadlines.** The production of the innovative CoinPower® is designed for further growth and therefore you can secure the right quantities even for large contracts. German engineering expertise and intelligent logistics enable fast transport, precise adherence to deadlines and resulting low storage costs.

A broad range of innovative energy source with energy density > 400 Wh/l in a small form factor, with a cell height from only 4.0 to 5.4 mm and a diameter from 12.0 to 16.0 mm gives you more power at less space. By selecting VARTA Microbattery, a leading international manufacturer of microbatteries. We appreciate to supply the world's most important companies and name them as our customers. Ensure your quality and quantity and experience adherence to delivery dates and reliability. Test our services and cells!

4. Your next generation car key requires more energy

What are the R/D tasks



As an engineer in the field of intelligent car keys you have to deal with the issue that more and more functions are assumed by the car key and thus energy demands increase. Primary cells no longer provide sufficient capacity or would assume too large dimensions while not providing enough peak current. Make your design-in process easier and increase user comfort by switching to the rechargeable Lithium-Ion button cell CoinPower®.

CoinPower®, the leading edge in your development department.

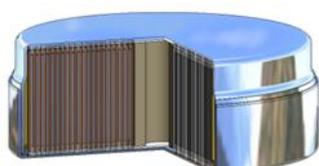
Customized connections are being available to meet your space, capacity and power requirements. Moreover cost savings are possible on the assembly stage of your production because hard steel cases are highly resistant to damage. Global design-in teams and high-tech application labs pave the way to outstanding performance and product support for you.

CoinPower® cells are UN38.3, UL1642 and IEC62133 certified and show long life expectancy. Stable product quality made in Germany is secured by highly automated production lines. The high quality, light and powerful energy source with outstanding performance data is available in several sizes with capacity from 43 to 120 mAh. Excellent charge and discharge characteristics with continuous charge and discharge currents up to 5C are possible due to patented innovations. Choose now best in class product life to benefit your customers and gain from us as your development partner for successful projects. Get in touch with us!

5. CoinPower® – The next generation energy source

Technology description

The housing of CoinPower® cells consists of two stainless steel parts; they are robust against scratches, dents and drop tests are not an issue. Steel case design also means practically zero swelling over lifetime. Furthermore stainless steel housings are more stable in respect of internal pressure (stability tested up to 20 bar). CoinPower® is suitable for compact and very reliable application design. The innovative design of the housing, combined with its foil gasket and the fact that anode, cathode and separator are wound to a coil, provides the most efficient use of space inside the cell for energy storing material. This is why the volumetric energy density of CoinPower® is in the range from 346 to more than 400 Wh/l. The rechargeable CoinPower® cells are the ultimate power source for your smart car keys and make them smaller, lighter and more attractive.



Batteries and configuration

The rechargeable Lithium-Ion button cells are available in four standard configurations with capacity from 43 to 120 mAh and a cycle life of >> 500 FULL cycles at >> 80 % of initial capacity. Further types with increased energy density to be launched 2020. Highest quality is secured by fully automatized production lines as well as 14 days storage and 100 % OCV and impedance check. CoinPower® provides very safe operation. Safety features in the components used in the cell, as well as in its mechanical design, ensure that the CoinPower® cell will be safe even when subject to severe abuse conditions. CoinPower® provides enough energy at temperatures from -20 to +60 °C for daily usage over many years. Patented innovations provide excellent charge and discharge characteristics, for very discharge currents. CoinPower® can be basically charged with all standard single-cell Lithium charging-IC's which fulfill the CCCV-procedure. CoinPower® cells can be charged with different charging rates and procedures with a maximum C-rate up to 2C. Thus the cells can be charged for moments and used for hours. Various assemblies or direct contacting is possible, to meet your space, capacity and power requirements.

Type Designation	Voltage (V)	Capacity (mAh)	Diameter (mm)	Height (mm)	Weight (g)
CP 1654 A3	3,7	120	16,1	5,4	3,2
CP 1454 A3	3,7	85	14,1	5,4	2,4
CP 1254 A3	3,7	60	12,1	5,4	1,6
CP 1240 A3	3,7	43	12,1	4,0	1,2

6. For your questions – Contact

For your questions regarding batteries, cells and configurations, visit our detailed company website, www.varta-microbattery.com or contact us personally via the following contacts:

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