The PULSESPLUS BATTERY
BY TADIRAN
20 YEARS OF SERVICE LIFE AND MORE

By Dr. Thomas Dittrich

The PULSESPLUS battery series eliminates the voltage drop, increases pulse current capability and minimizes the impedance loss of the battery. With its very long service life, it is perfectly suited for smart metering applications.

The most expensive thing about a battery is having to replace it. The PULSESPLUS battery by Tadiran puts an end to that. 20 years of continuous power supply to a display and GSM module where currents range from microamps to 2 Amps – that is the challenge.

THE PULSESPLUS BATTERY

The PULSESPLUS series has been developed by Tadiran to expand the application range for lithium/thionyl-chloride (LTC) batteries. This is done by elimination of the voltage drop, increase of the pulse current capability and minimization of the battery’s impedance loss.

The hybrid layer capacitor

For this purpose, a dedicated hybrid layer capacitor (HLC) was developed. A PULSESPLUS battery is made up of one or several non-rechargeable LTC batteries connected in parallel to one or several HLCs. This HLC is rechargeable. Its electrodes contain lithium intercalation compounds and are spiral-coiled. The HLC has been optimized for self-discharge, temperature range and longevity. Additionally, the material properties of the electrodes have been chosen carefully and a glass-to-metal feed-through is used for sealing.

Performance

As a result, the PULSESPLUS battery exceeds conventional lithium batteries such as the 3 V batteries of the LiMnO₂ system and even coiled LTC batteries: PULSESPLUS batteries supply a higher voltage and capacity and offer an unparalleled operating duration.

Minimum self-discharge

The PULSESPLUS battery is suitable for a mains independent power supply of 20 years as required for applications in GSM or radio modules. The reason for this is the stability of the LTC battery and the HLC regarding the sealing system and the internal resistance, and particularly the extremely low self-discharge.

No impedance loss

Figure 1 shows a D-cell being discharged with a continuous load of ~50 mA and short pulses of 150 mA. Adding an HLC makes it a PULSESPLUS battery and the impedance loss causing severe voltage drop after only 5 years disappears.

Application in GSM modules

Figure 2 shows the behaviour of a PULSESPLUS under typical conditions of a GSM-communication module. For each temperature level, the upper curve shows the voltage under peak load and the lower one that under continuous load.

Predictable service life

Figure 3 shows the average current that a PULSESPLUS battery can deliver in order to reach a certain service life. The typical battery life is between 5 and 10 years; even 20 to 30 years are possible, longer than the life of the powered device itself.

APPLICATION IN SMART METERING SYSTEMS

The PULSESPLUS battery meets all requirements for a power supply for smart metering applications. This makes it perfect for use in this area. Early cooperation between the battery manufacturer and user, however, is recommended in any case to adjust the power supply to the specific circuit – if possible in the planning phase, while changes are still possible.

Overview: Benefits of PULSESPLUS batteries

- High and stable voltage of 3.6 V (optionally 3.9 V)
- Higher capacity (up to 19 Ah per D-cell)
- Wide operating temperature range (~40 °C to +85 °C)
- High reliability (hermetically tight laser welding, glass-to-metal feed-through)
- Outstanding storage capacity (up to 10 years)
- Recognized safety (UL)
- Very low self-discharge (less than 2% per year)

ABOUT THE AUTHOR

Dr. Thomas Dittrich studied physics and physical chemistry at Bonn University in Germany. He joined Sonnenbichler GmbH in 1980. As manager of Quality Assurance, he led Sonnenbichler Lithium GmbH to ISO 9001 certification in 1993. Since 2002, he has been Manager of Applications Engineering. In 2010, Sonnenbichler Lithium changed its name to Tadiran Batteries.

ABOUT THE COMPANY

Tadiran Batteries is a leader in the development of lithium batteries for industrial use. Its technology has been steadily established for more than 30 years. Tadiran Batteries are suitable where utility meters require a single long term standby power source, even if it has to supply high pulse currents for a GSM module.

www.tadiranbatteries.de

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