Electrical & temperature performance

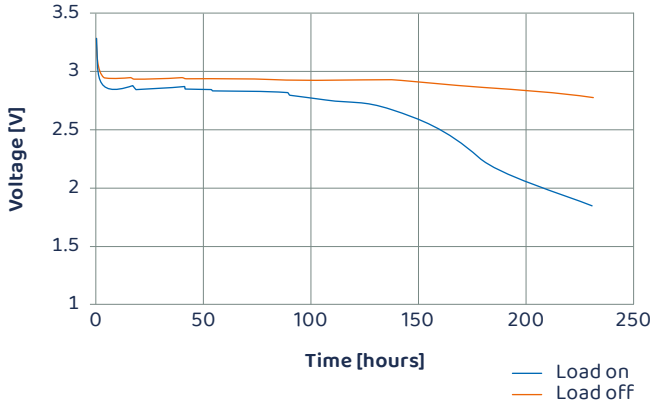
Pulse discharge characteristics

RENATA Lithium batteries have excellent pulse load characteristics, for example for the transmission of radio signals by remote controls.

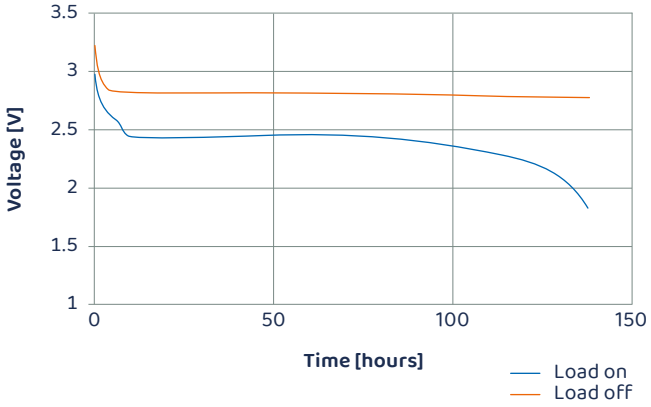
The following diagrams show the voltage characteristics of an electronic key pulse test, with a load of 10 mA (5 seconds On, 55 seconds Off, 24 h a day with a cut-off voltage of 1.8 V) at three different temperatures (–20 °C, 0 °C and room temperature 23 °C) on a CR2032.MFR RENATA battery.

Please contact RENATA for further details.

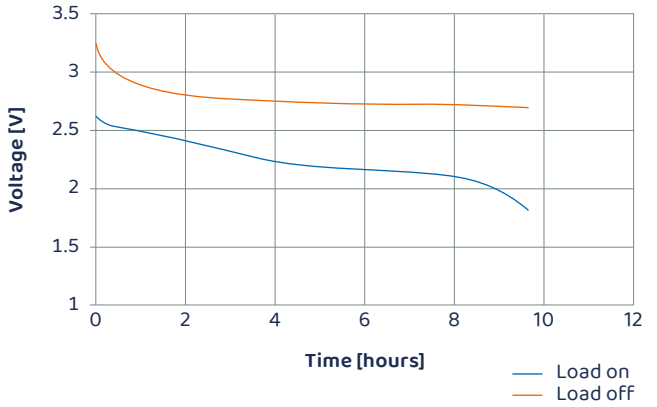
IEC Key Fob, CR2032.MFR
10 mA, 5 s On/55 s Off, at 23 °C



IEC Key Fob, CR2032.MFR
10 mA, 5 s On/55 s Off, at 0 °C



IEC Key Fob, CR2032.MFR
10 mA, 5 s On/55 s Off, at –20 °C



Electrical & temperature performance

Inverse current
Lithium primary batteries are not rechargeable. Therefore, if there is a possibility of electric current flowing from the main power source to the battery, the circuit must include two suitable blocking diodes in series or one blocking diode and one protective resistor in series (refer to drawing in chapter SAFETY GUIDELINES). Use a silicon diode of small inverse current to prevent charging. **The total amount of recharge energy due to leakage by the blocking diodes should not exceed 1% of the battery's nominal capacity during its total service life. A higher input of recharge energy may harm the battery or reduce its performance.**

Example: A CR2450N battery with a nominal capacity of 540 mAh is expected to supply power for 5 years. The amount of tolerable re-charge capacity is 5.4 mAh, corresponding to current of 0.123 µA for the total service life[1]. Consequently, a blocking diode with an inverse current not greater than 0.1 µA should be selected. Please note that the inverse current of blocking diodes varies with temperature.

[1] 540 mAh* 1% = 5.4 mAh
5.4 mAh / (5 years *365 days*24 h) = 0.123 µA

Short circuits
When lithium batteries are short-circuited, it takes time for the battery voltage to recover, even in case of slight short-circuits. If electrical characteristics are measured while the battery is recovering, the battery may appear to be defective, but is not. Short-circuiting leads to deterioration of the cell capacity. Short-circuiting of batteries must therefore be avoided, except for wave or dip soldering. Use an instrument with a high input impedance (minimum 10 MΩ) for measuring open circuit voltage.

Superior environmental resistance
The combination of RENATA's sealing system and the use of organic electrolytes with low creeping tendency ensure the excellent leakage resistance of our batteries. Each production lot is subjected to a quality assurance program under difficult environmental conditions (high temperature storage, high temperature / high humidity storage, temperature cycling, etc.). RENATA batteries can be operated in any physical position.