



# HLC DOUBLES POWER FOR CURRENT PEAKS

Requirements for an electric energy source in the metering and Internet of Things (IoT) industry are demanding.

Despite a long lifetime of up to 20 years these decentralised systems have the need to cover the current peaks of various radio protocols existing in the market. In order to provide a reliable solution for this industry, Tadiran invented the PulsesPlus technology almost two decades ago. This product combines an ultra-low self-discharge lithium thionyl chloride battery with a hybrid layer capacitor (HLC). The battery stores the energy while the hybrid

from -40 up to +85 °C. The task was to gather more power capability into a given form factor. Back in 2008 by optimising the surface structure and composition of the inner components it was possible to double the power capability between the HLC A type and the HLC B type. In the meantime, Tadiran's R&D department invested more effort into pushing this system forward. The result is the HLC C type which again provides twice the power of the B type.



Figure 2: The same power, but smaller form factor: The new HLC-1020 P6 will be able to substitute the HLC-1530A – and more ...

factor with two main advantages: It needs less installation space which is especially important for IoT applications (small smart sensors). Secondly: Smaller cells with the power of considerably larger products are more cost efficient. So particularly the small sized HLC-1020C (1/2 AAA size) generates cost savings which makes it a perfect match for future applications: small size, high and reliable power capabilities and competitive pricing.

At the same time the other advantages of the HLC technology stay valid:

- Just one power providing component up to 3.9 V level
- No balancing needed
- Extra low self-discharge over entire lifetime
- High equivalent capacity to cover long pulses

By the way: On the horizon the 6<sup>th</sup> generation HLC P6 is already launching – with even more outstanding power capabilities. **SEI**

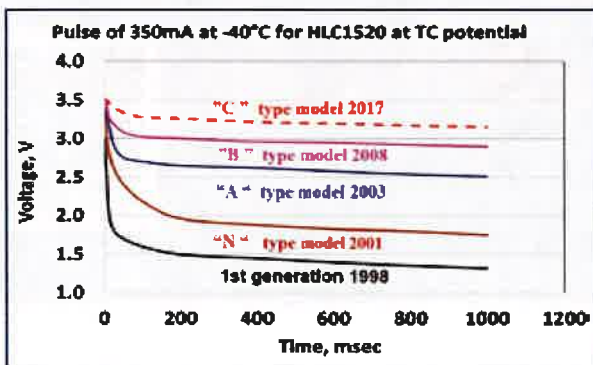


Figure 1: Improvement of Tadiran Hybrid Layer Capacitor HLC-1520

Figure 1 shows the development of the Tadiran HLC performance over the years, undergoing a pulse of 350 mA at -40 °C. The performance of the 1<sup>st</sup> HLC generation in 1998 generating a voltage of apprx. 1.3 V after 1.000 msec was improved generation by generation. While the B type model (launched in 2008) was designed to deliver approximately 2.9 V under

the defined conditions, the new C type is the first system that clearly exceeds the 3.0 V barrier.

This 5<sup>th</sup> generation product offers the opportunity to work with a compact form

layer capacitor is providing the power for pulses. Both components are made from high quality raw materials refined in a precisely engineered manufacturing process. The result is a perfect-match power supply for any long-term application in even harsh environments.

Nevertheless, there is always room for improvement in order to add value to the market through new innovative solutions. In the past the lithium thionyl chloride system was optimised in capacity, self-discharge and voltage losses.

Thus, the time was right to focus research capacity on the hybrid layer capacitor. This secondary battery element is responsible for providing power for radio and other pulses over the full temperature range



**ABOUT THE AUTHOR**

Marc Henn studied Mechatronics Engineering near Frankfurt/Main and holds a Master's degree in Business Administration. He has extensive experience in the testing and certification industry and joined Tadiran as manager of application engineering in 2016.

**ABOUT THE COMPANY:**

Tadiran Batteries is a leader in the development of lithium batteries for industrial use. Tadiran Batteries are suitable where utility meters require a single long-term standalone power source even if it has to supply high pulse currents for a GSM module.

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