Selecting Coin Cell Holders

Key Criteria Needed to Make Smart Holder Selections

While breakthrough technologies continue to grab headlines, components like the coin cell holders often get overlooked, despite their critical role in a device's operation. Holders can fail due to issues like vibrations, shocks, heat, humidity, and corrosion, and design engineers face growing challenges in developing power management solutions to handle these real world conditions. With the following criteria and advice, engineers can achieve the product reliability they need at the costs they want.

A well-designed coin cell holder must resist shocks and vibrations while remaining flexible enough to allow easy battery replacements. Unfortunately, these two criteria are in conflict, as better battery retention almost always leads to tougher battery removal. The best coin cell holders have features designed to ease battery removal, which allows for the use of stronger plastics while keeping battery replacements simple.

Durability is especially important for applications where frequent battery replacements may be needed over the product's expected lifespan. If a coin cell holder's contacts have an especially strong grip, the increased wear and tear on the contacts during battery insertions and removals can cause significant harm to the metal. If an application will require relatively frequent cell changes, find out the cycle count that the holder has been tested for. It is also worth noting that a large number of replacements will lead to more instances of end users inserting batteries with the polarities reversed, so holders with built-in reverse polarity protection features would be beneficial as well.

Products exposed to excessive heat and humidity, caustic chemicals, or airborne pollutants can often have problems associated with corrosion build-up, which can negatively impact electrical and retention performance. To minimize these effects, some holders are constructed from corrosion-resistant materials, such as LCP and gold. The presence of electrochemically dissimilar metals can further increase corrosion problems due to galvanic corrosion. For coin cell holders, this can be minimized through the use of either nickel- or gold-plated contacts. Gold and similar metals are especially useful as they are not only highly conductive, but also provide a smoother surface with a smaller frictional insertion force, resulting in easier battery replacements for the elderly and disabled. All other things held constant, a holder with gold-flashed contacts will have a smaller battery insertion force than one with tin- or nickel-plating.

Another little known fact is that competing brands of batteries can differ substantially in terms of dimensional specifications. For example, according to ANSI and IEC standards a CR2032 coin cell can vary in height by ±0.3 mm, or almost 10% of its total height. Therefore, it is critical that a coin cell holder be adaptable to normal height variances while not accepting incompatible batteries, but it is of course completely unacceptable to have a connection that is too loose, as it compromises electrical performance and battery retention. This is less of an issue if the cells are factory installed and designers have control over the battery brand that is used, but if the end user can purchase a replacement cell, the full range of battery sizes should be supported.

Soldering processes also influence the choice of a coin cell holder. For example, a coin cell holder for use in lead-free reflow soldering should be made of a high quality plastic, like LCP, that offers exceptional dielectric strength at temperatures of at least 280°C. By contrast, wave soldering processes require less rugged materials, which allows for the use of PBT or nylon. These materials offer strong dielectric strengths, as well as resistances to chemicals and solvents, a broad service temperature range with excellent thermal cycling performance, and excellent insulating properties.

Although making a smart coin cell holder selection based on available information is a start, testing is always the most crucial step. Comprehensive product test data should be requested to ensure that the coin cell holder meets or exceeds the EIA-540J0AB standard, and that superior quality raw materials were used. Furthermore, samples should be requested so that in situ testing can be done with prototypes to ensure that a coin cell holder is right for a given application.