APPLICATION NOTES

Assembling ITEN Powency batteries on PCB

ITEN Powency batteries are the first solid state batteries which fits into an Surface Mount Device (SMD) Quad Flat No-lead (QFN) package. As electronic systems such as IOT devices become increasingly complex and compact, having SMD components is crucial in today's electronics, as they enable high-density PCB designs and streamline the manufacturing process. This application note outlines the essential soldering practices and introduces silver paste adhesive as an alternative for assembling ITEN Powency batteries

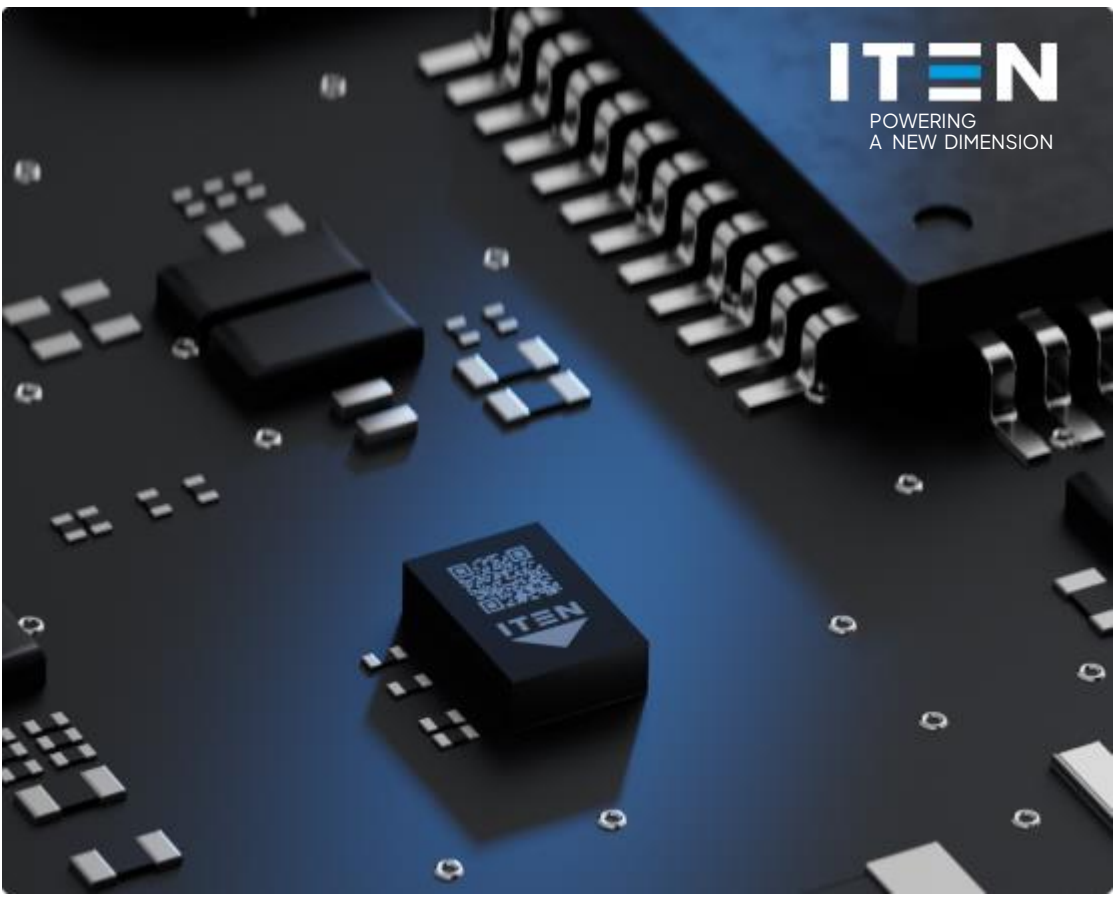

Table of content

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Soldering considerations for ITEN Powency batteries

The unique design of ITEN batteries in a QFN package requires careful handling during the soldering process. Its QFN package and internal materials are sensitive to high temperatures, making effective thermal management crucial to avoid potential damage during assembly. Failure to adhere to recommended practices may result in degraded performance or complete non-functionality of the component.

Best practices for soldering ITEN Powency batteries

Solder Paste Selection

Selecting a solder paste that is compatible with the QFN package and the specific requirements of ITEN microbattery is essential. We recommend using **Sn42Bi57.6Ag0.4 from ChipQuick** which performs well within the necessary temperature range. Full datasheet of the solder Paste is available using the following link:

https://www.chipquik.com/datasheets/SMDLTLFP.pdf

Meticulous application is critical to avoid common issues such as solder bridges and cold solder joints, ensuring reliable connections. Please contact ITEN technical support team if you want to use a different Solder Paste reference

Reflow Profile Optimization

Managing the reflow profile to achieve optimal results is key, given the need for low-temperature reflow soldering. Gradual increases in temperature and precise monitoring help manage thermal stress effectively. Appropriate soak times and controlled cooling rates ensure even heating and minimize thermal damage. Before soldering, be sure to preheat the components to limit thermal stress. Use air for natural cooling; using forced cooled air may lead to thermal shock cracks. Please use the following recommended reflow profile to get optimized assembly

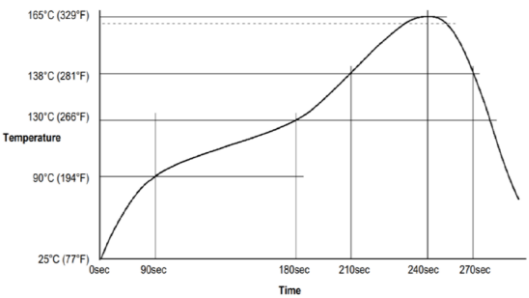

Figure 1: Recommended reflow profile

Deviations from the recommended reflow profile may cause thermal stress that might degrade the performance or render the component non-functional

Handling and Placement

Accurate placement of ITEN Powency battery on the PCB is essential for achieving high-quality solder joints and ensuring the component's performance. Ensure that the footprints used align with the specifications provided in the datasheet. Thoroughly cleaning the PCB to remove any contaminants that could affect the soldering process is also crucial for maintaining the performance of the battery.

Alternative Assembly Method: Silver Paste Adhesive

In addition to traditional soldering, silver paste adhesive offers a viable alternative for assembling ITEN Powency batteries. This method can be particularly beneficial in certain scenarios. Silver paste can be used to bond ITEN Powency battery to the PCB, providing a conductive adhesive layer that can be advantageous in managing thermal stress. It helps mitigate thermal stress, protecting sensitive components during assembly, and provides an alternative approach for cases where reflow soldering might be challenging or less effective.

Silver Paste Selection

Choosing high-quality silver paste that is compatible with ITEN Powency battery and the PCB materials is essential. We recommend using **IC343 from Delo** which has been tested and proven effective for this application. Batteries delivered on evaluation kit are assembled using this silver past. Careful application of the silver paste ensures proper bonding and electrical conductivity.

Please contact ITEN technical support team if you want to use a different Solder Paste reference.

Curing Profile

Choosing high-quality silver paste that is compatible with ITEN Powency battery and the PCB materials is essential. We recommend using IC343 from Delo which has been tested and proven effective for this application. Batteries delivered on evaluation kit are assembled using this silver past. Careful application of the silver paste ensures proper bonding and electrical conductivity.

Please contact ITEN technical support team if you want to use a different Solder Paste reference.

Addressing Potential Challenges

Material Compatibility

Ensuring that the selected solder paste or silver paste adhesive is compatible with ITEN Powency battery and the PCB materials is critical. Assessing the mechanical properties will ensure they meet performance standards. Incompatibilities can result in mechanical failure or electrical issues.

Equipment and Process Requirements

For soldering, using a reflow oven with precise temperature control is necessary. For silver paste, accurate curing processes must be followed. Implementing thorough monitoring and testing procedures will verify the quality of solder joints and adhesive bonds. Inadequate equipment or process control can lead to unreliable assembly and component damage

Revision History

Date	Version	Changes
2025/04/18	V1.1	Update file template
2024/07/31	V1.0	Initial Version

Notice

Contact

For any technical questions, please send us an email to:

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About Us

ITEN is a French industrial gem, leader in the development and production of solid-state batteries with unrivalled power density. It is one of the few global players with the capacity for industrial production of this technology, mastering the entire design and production chain. These revolutionary batteries meet the power and miniaturization needs of electronic systems used in connected objects, autonomous sensors and wearables.

At the heart of the French DeepTech ecosystem, ITEN holds over 200 patents. ITEN is the two-time winner of the global innovation competition in 2015 and 2017, the French Tech 120 winner in 2023 and 2024 and won the CES 2024 Best of Innovation Awards in Las Vegas for its Powency 250µAh battery (the second French company to be honoured since CES was founded in 1967).

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