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TECHNICAL DATA SHEET

# Internal Short Circuit (ISC)

July 2022

## ABOUT KULR TECHNOLOGY

KULR'S disruptive thermal management technologies strive to fulfill an addressable \$24 billion thermal management systems market. KULR's integrated design approach offers comprehensive solutions in thermal interface materials, lightweight heat exchangers, and protection against lithium-ion battery thermal propagation. Our high-performance solutions can be designed to fit almost any power or electronic configuration, including extremely demanding spaces or for applications where size and weight restrictions are a concern.

## PRODUCT DESCRIPTION

KULR Technology's patented Internal Short Circuit Device (ISC) is an industry-tested thermal runaway (TR) triggering method for lithium-ion cells originally developed by NASA and NREL. By using a cell with ISC implanted, thermal runaway events can be triggered that are much closer to a field failure than is allowed by nail- or heater-driven TR events.

The ISC device technology was exclusively licensed to KULR by NASA and NREL and can be included in a variety of different cells (18650, 21700, or pouch). These cells, and battery packs, can be tested for failure modes and safety issues, once the ISC device has been intentionally triggered on demand. This is a valuable tool for research institutes, battery manufacturers, and OEMs looking to improve the performance and safety of their Li-ion batteries.

## FEATURES AND BENEFITS

- Provides a field representative thermal runaway trigger method
- Triggers an internal short circuit in a controlled, reliable, and simplified way
- Short circuit is triggered at low a temperature of 40°C and 60°C
- Cell structure is preserved prior to triggering
- Includes all the combined benefits of alternative trigger methods in a single solution

## TYPICAL APPLICATIONS

Archaic methods of battery testing include crush and penetration tests, which damage the Li-ion battery cell structure prior to thermal runaway initiation. With the implementation of the ISC device, there is no damage to the cell prior to heating it to between 40°C and 60°C. At this temperature barrier, the ISC trigger device will generate an internal short circuit within the cell. Through the use of the ISC, a consistent, reliable, and verified Li-ion battery short circuit can be achieved. Both timing of the test, as well as the location of the ISC device within your Li-ion battery can be controlled.



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## AVAILABILITY

Pre-manufactured in 18650 and 21700. Custom cell implementation upon request.

## DISCLAIMER

Data on this Technical Data Sheet (TDS) are typical values and for reference only. The information provided in this TDS, including but not limited to the recommendations for use and application of the product, are based on our knowledge and experience of the product. The product can have a variety of different applications, as well as differing working conditions and environments that are beyond our control. Factors or events that could cause actual results to differ may emerge from time to time, and it is not possible for us to predict all of them. We cannot guarantee future results, performance or achievements. Furthermore, no representations or warranties are made as to the accuracy or reasonableness of any assumptions on which the data or information is based.

This product is not intended for use with any products containing lithium metal. KULR Technology Group, Inc. is, therefore, not responsible or liable for the suitability of our products for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you conduct your own prior trials to confirm such suitability of our product for your use and application and within your working conditions and environments.