ENERGY STORAGE

Success Story

PSR fuses enabled larger Battery Energy Storage System (BESS) capacity to lower utility operating costs

PRODUCT:

PSR | High-Speed Square-Body Semiconductor Fuses

Introduction

An integrator, who supplies solar power systems and BESSs, needed to increase the capacity of their BESS to help their utility customers meet peak power demands for a longer time period. To accomplish this, the integrator's engineers planned to add more battery banks to their BESS. The designers also switched from using flow batteries to higher-capacity, lithium-ion battery cells.

Situation

The challenge facing the design engineers was that the higher power density in the new BESS could lead to a much larger fault current. At high levels of power, a fault could create catastrophic damage and even injure personnel. The BESS would need a much higher level of circuit protection.

The design engineers realized that they could add additional battery banks into the BESS if they could source a fuse with a higher short-circuit current interruption rating than what their BESSs currently used. In addition, the fuse had to be of a type that operates very quickly, in order to protect the sensitive electronics used in the BESS power converter. The design engineers tested fuses from several manufacturers.

Outcome

The design engineers selected the Littelfuse PSR series high-speed square-body semiconductor fuse. Of the fuses tested, the PSR series provided the highest short-circuit current ratings: 150 kA dc interrupting rating and 200 kA ac current interruption. The higher rating also allowed for fewer combiner boxes, reducing cost and design complexity.

In addition, the PSR fuse family enabled the integrator's designers to use a fuse that had a block-style form factor similar to the fuse used in their existing design. Using the PSR fuse avoided the cost of making significant design changes. To adapt the flush-mount PSR fuse to a parallel busbar mount configuration, Littelfuse shared their design of L-brackets. With that information, the integrator was able to adapt its busbars to mount the L-brackets and fuses (Figure 1).

By using Littelfuse PSR series fuses, the integrator reduced the combiner count by one per container and added two more battery units. This increased the capacity of their existing BESS container by 7%, which will enable the utility to rely on the BESS for a longer period of time during high peak-power demands and lower its operating costs.

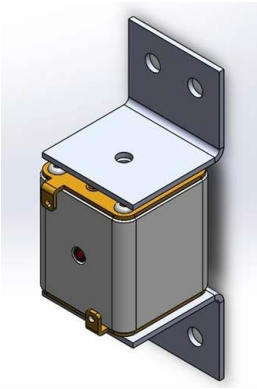

Figure 1

Quick Facts:

Industry:
Energy Storage

Application:
Lithium-ion energy storage systems

Customer:
Integrator

End-User:
Utility

Benefits:
Fuses that act quicker and have higher short-circuit current interruption ratings. Other benefits include form factor and mounting flexibility.

Distributor:
Mouser

Target Audience:
Manufacturers/integrators of battery energy storage systems

Littelfuse®
Expertise Applied | Answers Delivered