

SiC/IGBT Power Supply Use Case: Energy Storage Systems (ESS)

This use case examines the application of the [MPQ18913](#) for biasing a silicon carbide (SiC) or insulated gate bipolar transistor (IGBT) MOSFET, in [energy storage systems](#) (ESS).



The [MPQ18913](#) isolated gate driver power supply's LLC soft switching topology and low leakage current can optimize isolation in energy storage systems, improving efficiency and reducing the total solution size.

In view of ambitious emissions targets and sustainability initiatives, the transition to renewable energy is ramping up. Developing infrastructure for renewable energy is important to effectively integrate and manage intermittent energy sources, such as wind, solar, geothermal, and hydropower. Energy storage systems are an integral part of the renewable energy infrastructure that stores surplus energy during low demand and then distributes it during high demand. Traditionally, transformers and optocouplers are used to achieve isolation between components; however, the high voltage and high energy density of ESS often pose challenges to generating sufficient isolation.

The [MPQ18913](#) isolated gate driver power supply's LLC soft switching topology and low leakage current can optimize isolation in energy storage systems, improving efficiency and reducing the total solution size. The MPQ18913 can generate a +15/-4V or +15/-8V isolated power supply for biasing SiC or IGBTs, respectively. Other output voltage (V_{OUT}) options can be achieved based on the design of the transformer and turns ratio. This isolated gate driver power supply combines a controller and two integrated switching FETs into a compact device.

In addition, the MPQ18913 provides a fault indicator and full protection features, including input over-voltage protection (OVP), over-temperature protection (OTP), and over-current protection (OCP). It is available in an ultra-small QFN-10 (2mmx2.5mm) package with wettable flanks.

Additional features include:

- High Performance:
 - Configurable Switching Frequency (f_{sw}), Up to 5MHz
 - Frequency Spread Spectrum (FSS) for Reduced EMI
 - Supports Up to 6W of Output Power (P_{OUT})
 - 5V to 30V Input Voltage (V_{IN}) Range
- Robust Design for Automotive Environments:
 - -40°C to +150°C Junction Temperature (T_J) Range
 - Available in AEC-Q100 Grade 1

Discover MPS's family of innovative [isolated solutions](#) that are designed for electrification in the powertrain of various applications.