80V Low I_Q Ideal Diode Controllers from Diodes Incorporated Simplify Reverse Battery Polarity and Overvoltage Protection in Modern Automotive Architectures

Plano, Texas – July 23, 2025 – Diodes Incorporated (Nasdaq: DIOD) today introduces the AP74502Q and AP74502HQ automotive-compliant* 80V ideal diode controllers, providing robust and reliable protection against reverse connections and voltage transients. Typical applications include advanced driver assistance systems (ADAS), body control modules, infotainment systems, exterior lighting, and USB charging ports.

The ideal diode controllers have all the features necessary to implement an efficient and fast reverse polarity protection circuit. They also include a load disconnect function in case of overvoltage and undervoltage events. With an 80V capability, they are suitable for all 12V and 24V batteries. This includes batteries in hybrid and battery electric vehicles (EVs), as well as the emerging 48V systems.

The shift to 48V is paving the way for EV innovations, enabling features like electric turbocharging and improved regenerative braking. The higher voltage also facilitates advanced infotainment systems and electrified auxiliary components. It could also lead to a zonal architecture, allowing more efficient power distribution and reduced wiring needs. The ±80V rating is particularly relevant for the stricter overvoltage stress conditions associated with these 48V systems.

Unlike ideal diodes with reverse current blocking features, these devices are suitable for applications where energy may return to the input supply. However, they can also be configured as surge stoppers to protect overvoltage supply and downstream loads against unsuppressed load dump transients.

The AP74502Q and AP74502HQ controllers also support input voltages as low as 3.2V, ensuring correct and reliable operation even during severe cold crank conditions, which can cause the battery voltage to drop significantly. Both devices share a peak gate turn-off sink current of 2.3A, enabling rapid turn-off of the external N-channel MOSFETs when required, for example, during overvoltage or undervoltage events.

When the charge pump is enabled, the operating quiescent current (I_Q) is 62µA, and 1µA in disabled mode. This minimizes the overall power consumption of the system and reduces battery drain to an absolute minimum.

The AP74502Q features a peak gate source current, typically 60µA, which provides a smooth start-up with inherent inrush current control. This is advantageous in applications where limiting the initial current surge is important. In contrast, the AP74502HQ boasts a higher 11mA peak gate source current, similar to earlier members of Diodes' ideal diode controller portfolio. This stronger gate drive allows for a faster turn-on of the external MOSFET, within 1µs (typ.).

The AP74502Q and AP74502HQ are available in the industry-standard SOT28 package with an operating temperature range from -40°C to +125°C. Both devices are available at $0.27 each for 1,000-piece quantities.

About Diodes Incorporated
Diodes Incorporated (Nasdaq: DIOD), a Standard and Poor's SmallCap 600 and Russell 3000 Index company, delivers high-quality semiconductor products to the world's leading companies in the automotive, industrial, computing, consumer electronics, and communications markets. We leverage our expanded product portfolio of analog and discrete power solutions combined with leading-edge packaging technology to meet customers' needs. Our broad range of application-specific products and solutions-focused sales, coupled with global operations including engineering, testing, manufacturing, and customer service, enable us to be a premier provider for high-volume, high-growth markets. For more information, visit www.diodes.com.

**Automotive-compliant—qualified to AEC-Q100 Grade 1, manufactured in facilities certified to IATF 16949, supporting PPAP documents.*

Company Contact:
Gurmeet Dhaliwal
Director, Investor Relations & Corporate Marketing
Diodes Incorporated
+1 408-232-9003
Contact Us