

## Ideal Diode Controller with $V_{DS}$ Clamp Removes the Need for External TVS in Automotive RVP Circuits

The automotive-compliant\* AP74701Q provides a simple, cost effective, and fast response solution for automotive reverse-voltage protection (RVP) circuits without the need for an external TVS diode.

With its wide 3.2V to 65V operating voltage range, coupled with a -33V reverse voltage clamp, the device provides a small footprint solution to both 12V and 24V battery systems—including enhanced cold crank conditions.

The AP74701Q ideal diode controller actively drives an external N-channel MOSFET to achieve a 20mV voltage drop, thereby providing a highly efficient reverse-voltage-protection solution for automotive systems.

Its optimized regulation scheme ensures immediate reverse current blocking ( $<0.75\mu\text{s}$ ), meeting stringent output voltage holdup requirements during transient events like ISO 7637 pulse testing.

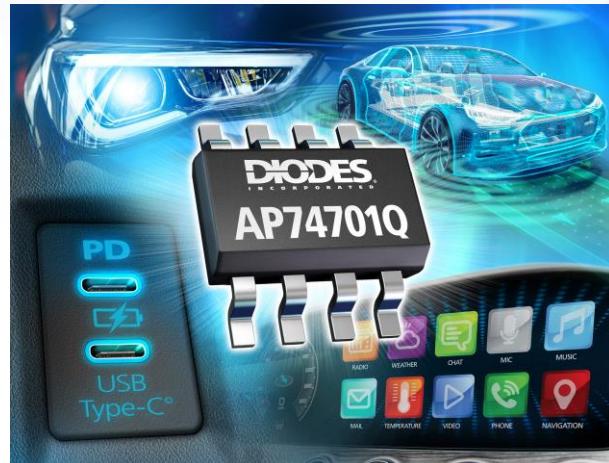
The AP74701Q has a low  $1\mu\text{A}$  shutdown current, operates across the  $-40^\circ\text{C}$  to  $+125^\circ\text{C}$  ambient temperature range, and is available in the SOT28 package.

\*Automotive-compliant - AEC qualified, manufactured in facilities certified to IATF 16949, supporting PPAP documents.

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### The DIODES Advantage

The AP74701Q's  $V_{DS}$  clamp reduces BOM cost in automotive RVP circuits by meeting ISO 7637 without additional TVS.

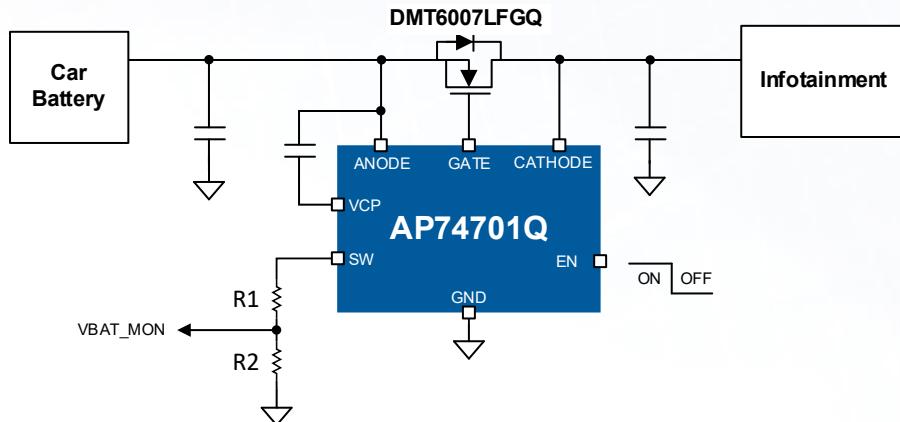
- **Wide 3.2V to 65V Input Voltage Range with a -33V Reverse Voltage Withstand**  
Operates across both the 12V and 24V battery range including load dumps and cold cranking
- **Drives External N-MOSFET**  
Provides cost-performance optimization based on load current/temperature range with improved reverse voltage protection performance
- **20mV ANODE to CATHODE Forward Voltage Drop Control**  
Reduces power loss and temperature rise in RVP circuits
- **Low Leakage SW Pin**  
Enables a simple battery voltage monitoring solution
- **AEC-Q100 Grade 1 Qualified with 150°C Maximum Junction Temperature**  
Supports  $-40^\circ\text{C}$  to  $+125^\circ\text{C}$  ambient temperature range

### Applications

Automotive reverse voltage protection in:

- Infotainment systems
- ADAS systems
- Exterior lighting
- USB charging
- Active ORing for redundant power supplies

### Typical Application



### Ideal Diode Controller Portfolio

Part Number	Input Voltage Range	Maximum Reverse Voltage	Typical Forward Voltage	Quiescent Current	Reverse Response Time	Operating Temperature Range	FET	Key Feature	Package
	V	V	mV	µA	µs	°C			
<a href="#">AP74701Q</a>	3.2 to 65	-33	20	80	0.75	-40 to +125	External N-MOSFET	VDS Clamp	SOT28
<a href="#">AP74700Q</a>	3.9 to 60	-60	20	80	0.45	-40 to +125	External N-MOSFET	±60V Operation	SO26
<a href="#">AP74700AQ</a>	3.9 to 65	-60	20	80	0.45	-40 to +125	External N-MOSFET	48V Specs	SOT26, SOT28, SO-8

### Ordering Information

Orderable Part Number	Compliance (Only Automotive Supports PPAP)	Package	Moisture Sensitivity	Packing	
				Quantity	Carrier
<a href="#">AP74701QTA8-7</a>	<a href="#">Automotive</a>	SOT28	MSL-1	3,000	7" Tape & Reel