LED INTERIOR LIGHTING

AUTOMOTIVE

DOME LIGHTS

MAP READING AND VANITY LIGHTS

ACCESSORY LIGHTING

CUPHOLDERS, DOOR HANDLES, POWER PORTS

PUDDLE LIGHTS

SILL PLATE ILLUMINATION

INSTRUMENT CLUSTER BACKLIGHTING

EV CHARGE INDICATOR

FOOTWELL/AMBIENT LIGHTING

diodes.com
AUTOMOTIVE LED INTERIOR LIGHTING

AS AUTOMOBILES STRIVE TO BECOME EVER MORE EFFICIENT INCANDESCENT BULBS ARE RAPIDLY BEING REPLACED BY LIGHTS FOR BOTH EXTERIOR AND INTERIOR LIGHTING.

SIMPLICITY
In many cases an interior light was a simple bulb on a switch, fed by the battery or alternator voltage. As these simple lighting solutions are replaced with LEDs, products like the AL5809Q constant current regulator are required to maintain the simplicity of installation and wiring which designers are familiar.

CONTROL
Of course, there are more demands for lighting in vehicles now than in the past, with ambient mood lighting, illuminated sill plates and puddle lighting as relatively recent additions. Where effects like dimming and fade-in/fade-out are required then a dimmable device like the BCR4xxUQ series gives designers a simple way to achieve elegant lighting design.

EFFICIENCY
LEDs immediately offer efficiency improvements over incandescent bulbs, but this will not be fully realized with a linear driver. Switching regulators offer the maximum overall efficiency with the highest degree of control and accuracy.

CONSTANT CURRENT VERSUS RESISTOR
Whilst LEDs can be implemented with a series resistor this has numerous disadvantages in an automotive environment. LED output will vary with voltage during stop/start events. VF matched LEDs may be required for visual matching and LED lifetimes may be reduced due to uncontrolled current spikes. Diodes LED drivers overcome these issues cost-effectively and simply with a small footprint.

THE DIODES ADVANTAGE
- High power dissipation in a small footprint
- +/-5% accuracy over temperature range
- Wide operating voltage range for variety of LED chain lengths
- Low temperature drive and high power supply rejection ratio maintain accuracy over wide range of conditions

AL5809Q SIMPLE TWO-TERMINAL CONSTANT CURRENT LINEAR LED DRIVER
The AL5809Q is ideal for simple fixed-output current lighting applications. It requires no external resistors for current setting, available in 11 current options from 15–150mA.

- High-side drive
- Low-side drive

The AL5809Q can be used either high-side or low-side and with 60V rating and power dissipation up to 1.5W is extremely flexible. Ideal for sill plates, accessory lighting, reading and vanity lights as well as button backlighting.

BCR4xxUQ ADJUSTABLE AND DIMMABLE LINEAR LED DRIVERS
The BCR4xxUQ series are constant current regulators, adjustable from 10 to 350mA with PWM capability for fade-in, fade-out and dimming effects where required.

- Preset 10, 20 and 50mA options with no need for external components
- Output can be adjusted up to 350mA (BCR421UQ) using external resistor
- BCR421UQ can be directly PWM dimmed from 3.3V MCU

DFN2020 package option < 0.6mm height for side emitting LED strips

SWITCHING LED DRIVERS
For maximum power efficiency, control and accuracy select a switching LED driver. They are ideal where higher power outputs are needed, such as dome or puddle lighting. In addition, they are the optimum choice for applications which require higher efficiency and control such as ambient lighting.

THE DIODES ADVANTAGE
- Highest Efficiency
- High Accuracy
- Choice of PWM and DC Dimming
- Different Topologies: Buck, Boost, Buck/Boost/Buck-Boost

![Diagram of AL5809Q and BCR4XXUQ circuits]
## AUTOMOTIVE LED DRIVER PRODUCTS

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*Undergoing AEC-Q100 qualification - expected Q3 2018. PowerDI is a registered trademark of Diodes Incorporated.