

# AUTOMOTIVE

## LED INTERIOR LIGHTING

MAP READING AND  
VANITY LIGHTS

DOME LIGHTS

INSTRUMENT CLUSTER  
BACKLIGHTING

EV CHARGE  
INDICATOR

FOOTWELL/  
AMBIENT LIGHTING

PUDDLE LIGHTS

ACCESSORY LIGHTING

CUPHOLDERS,  
DOOR HANDLES,  
POWER PORTS

SILL PLATE  
ILLUMINATION

[diodes.com](http://diodes.com)

## AUTOMOTIVE LED INTERIOR LIGHTING

AS AUTOMOBILES STRIVE TO BECOME EVER MORE EFFICIENT INCANDESCENT BULBS ARE RAPIDLY BEING REPLACED BY LEDs 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 with which designers are familiar.

### CONTROL

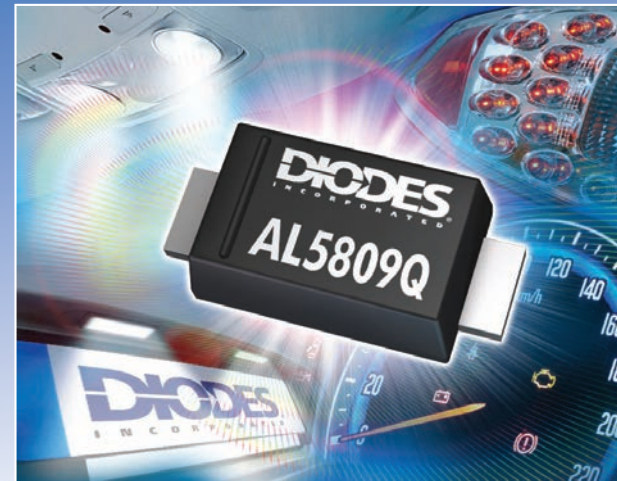
Of course, there are more demands for lighting in vehicles now than in the past, with ambient mood lighting, illuminated sill plates and puddle lighting as relatively recent additions. Where effects like dimming and fade-in/fade-out are required then a dimmable device like the BCR4xxUQ series gives designers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



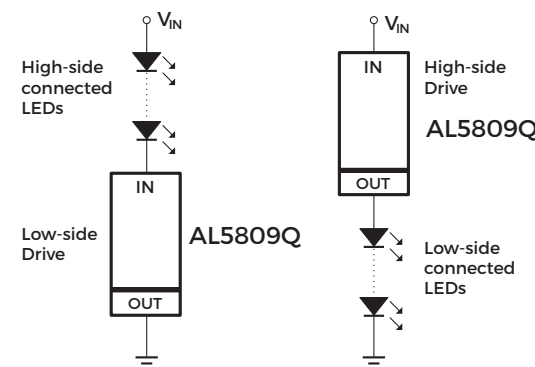
### AL5809Q SIMPLE TWO-TERMINAL CONSTANT CURRENT LINEAR LED DRIVER

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.

It 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.

#### 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



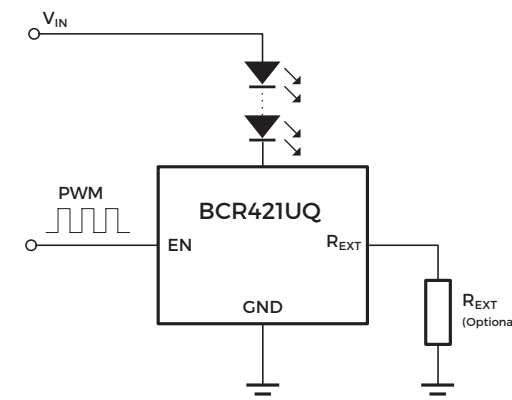
### BCR4xxUQ ADJUSTABLE AND DIMMABLE LINEAR LED DRIVERS

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.

With a minimum 1.4V output the number of LEDs in the string can be maximized to improve efficiency. Ideal for strip lighting and ambient mood lighting, as well as backlighting of instruments, infotainment displays and controls.

#### THE DIODES ADVANTAGE

- 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



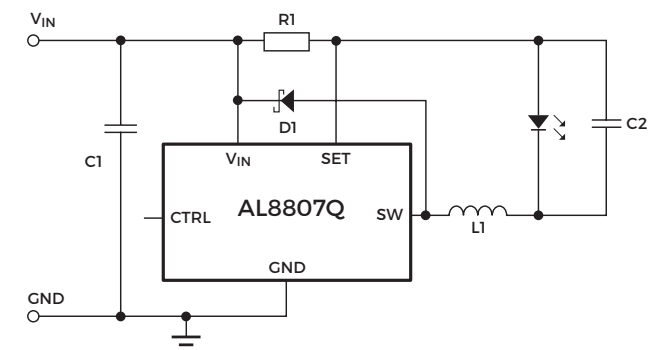
### SWITCHING LED DRIVERS

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





## AUTOMOTIVE LED DRIVER PRODUCTS

Part	Buck-boost Buck	Boost	Linear	Driver/Controller	Input Voltage		Drop-Out Voltage	Maximum Output Voltage	Maximum LED Current	LED Current Accuracy	Max Switching Frequency	Dimming		Efficiency	Operating Temp Range	Sense Voltage	Package	
					Min	Max						PWM	Analog					
							V	V	V	V	mA			%	kHz	Y		N
AL5801Q	-	-	-	Y	D	5	100	2	100	350	-	N/A	Y	N	-	-40 to +125	560	SOT26
AL5809Q	-	-	-	Y	D	2.5	60	2.5	60	15, 20, 25, 30, 40, 50, 60, 90, 120, 150	5	N/A	Ext	N	-	-40 to +125	N/A	PowerDI-123
AL8400Q	-	-	-	Y	C	2	18	0.5	-	Ext. /BJT	3	N/A	Ext	N	-	-40 to +125	200	SOT353
AL8806Q	Y	-	-	-	D	6	36	-	36	1500	5	1000	Y	Y	98	-40 to +125	100	MSOP-8EP
AL8807BQ	Y	-	-	-	D	6	36	-	36	1300	5	1000	Y	-	97	-40 to +125	100	MSOP-8EP
AL8807Q	Y	-	-	-	D	6	36	-	36	1300	5	1000	Y	Y	98	-40 to +125	100	MSOP-8EP
AL8860Q/61Q*	Y	-	-	-	D	4.5	40	-	40	1500	5	1000	Y	Y	97	-40 to +125	100	MSOP-8EP
BCR420UW6Q	-	-	-	Y	D	1.4	40	1.4	40	10 to 200	10	N/A	N	N	-	-55 to +150	700	SOT26
BCR421UW6Q	-	-	-	Y	D	1.4	40	1.4	40	10 to 350	10	N/A	Y	N	-	-55 to +150	700	SOT26
BCR420UFDQ	-	-	-	Y	D	1.4	40	1.4	40	10 to 200	10	N/A	N	N	-	-55 to +150	700	U-DFN2020-6
BCR421UFDQ	-	-	-	Y	D	1.4	40	1.4	40	10 to 350	10	N/A	Y	N	-	-55 to +150	700	U-DFN2020-6
BCR401UW6Q	-	-	-	Y	D	1.4	40	1.4	40	10 to 100	10	N/A	Y	N	-	-55 to +150	700	SOT26
BCR402UW6Q	-	-	-	Y	D	1.4	40	1.4	40	20 to 100	10	N/A	Y	N	-	-55 to +150	700	SOT26
BCR405UW6Q	-	-	-	Y	D	1.4	40	1.4	40	50 to 100	10	N/A	Y	N	-	-55 to +150	700	SOT26
ZXLD1350Q	Y	-	-	-	D	7	30	-	30	380	5	1000	Y	Y	95	-40 to +105	100	TSOT25
ZXLD1356Q	Y	-	-	-	D	6	60	-	60	550	3	1000	Y	Y	97	-40 to +125	200	TSOT25, V-DFN3030-6
ZXLD1360Q	Y	-	-	-	D	7	30	-	30	1000	5	1000	Y	Y	95	-40 to +125	100	TSOT25
ZXLD1362Q	Y	-	-	-	D	6	60	-	60	1000	5	1000	Y	Y	95	-40 to +125	100	TSOT25
ZXLD1366Q	Y	-	-	-	D	6	60	-	60	1000	2.5	500	Y	Y	95	-40 to +125	200	SO-8EP, TSOT25, V-DFN3030-6
ZXLD1370Q	Y	Y	Y	-	C	6.5	60	-	Ext. MOSFET		2	1000	Y	Y	95	-40 to +125	218	TSSOP-16EP
ZXLD1371Q	Y	Y	Y	-	C	5	60	-	Ext. MOSFET		2	1000	Y	Y	95	-40 to +125	218	TSSOP-16EP
ZXLD1374Q	Y	Y	Y	-	D	6.5	60	-	60	1500	2	1000	Y	Y	95	-40 to +125	218	TSSOP-20EP
ZXLD1615Q	-	-	Y	-	D	2.70	5.5	-	28	-	-	350	N	N	85	-40 to +85	1250	TSOT25

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

### CORPORATE HEADQUARTERS AND AMERICAS SALES OFFICE

4949 Hedgcoxe Road  
Suite 200  
Plano, Texas 75024, USA  
Tel: (+1) 972-987-3900  
Email: inquiries@diodes.com

### SILICON VALLEY OFFICE

1545 Barber Lane  
Milpitas, California 95035, USA  
Tel: (+1) 408-232-9100

### EUROPE SALES OFFICE

Kustermann-Park  
Balanstrasse 59, 8th Floor  
D-81541 Munchen, Germany  
Tel: (+49) 89-45-49-49-0  
Email: inquiries-europe@diodes.com

### ASIA SALES OFFICES

Email: inquiries-asia@diodes.com

### DIODES-CHINA

#### SHANGHAI OFFICE

Room 3001-3002,  
International Corporate City,  
No. 3000 Zhongshan North Road,  
Shanghai 200063, China  
Tel: (+86) 21-5241-4882

#### SHENZHEN OFFICE

16th Floor Skyworth Semiconductor  
Design Building East Wing,  
No.8 Gaoxin South 4th Road,  
Nanshan District,  
Shenzhen 518057, China  
Tel: (+86) 755-8828-4988

### DIODES-JAPAN

8F Humax Ebisu Bldg  
1-1-1 Ebisu-Minami, Shibuya-ku  
Tokyo 150-0022, Japan  
Tel: (+81) 3-6871-9388

### DIODES-KOREA

1601 ho, ParkView Tower  
Jeongja 1 dong,  
Bundang-gu, Seongnam-si,  
Gyeonggi-do 463-811, Korea  
Tel: (+82) 31-786-0434

### DIODES-TAIWAN

7F, No. 50, Min-Chuan Road  
Hsin-Tien District  
New Taipei City 23141,  
Taiwan, R.O.C.  
Tel: (+886) 2-8914-6000