



NXP provides a new level of flexibility & scalability

# NXP System Solutions for Intelligent Automotive Exterior Lighting

NXP offers a broad portfolio to address the increasing demands of advanced automotive lighting applications. This solution provides a cost-effective, flexible and scalable architecture allowing platform designs to be quickly developed.

## OVERVIEW

LED technology has evolved to enable advanced automotive lighting applications by providing small form factors, higher power levels, longer lifetime and lower power consumption. Intelligent LED applications such as Glare Free High Beam, Adaptive Driving Beam, Dynamic Signaling and Rear lighting, make our roads safer to drive.

These systems require efficient, robust, flexible & scalable cost effective electronics to enable the full benefits of LEDs in automotive applications.

NXP's highly integrated LED Drivers and Controllers are specifically designed to maximize the performance and efficiency of lighting electronics. The ICs combine our deep understanding of LED performance with our world-class automotive A-BCD mixed-signal high voltage technology.

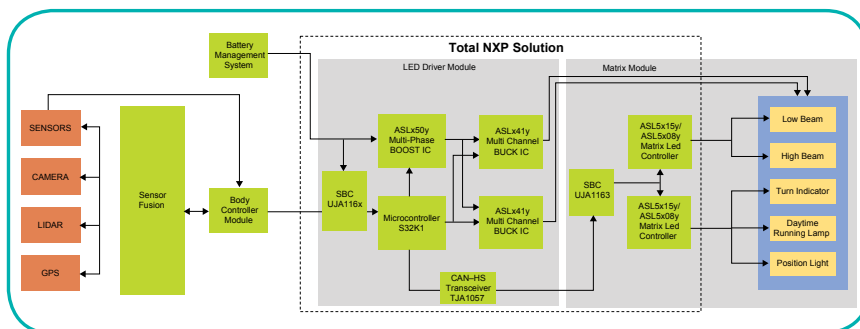
## NXP FEATURED PRODUCTS

- ▶ ASLx500/7 Boost converters
- ▶ ASLx416/7 Buck drivers
- ▶ ASL5xxx Matrix LED controller
- ▶ UJA116x System Basis Chip
- ▶ TJA1057 CAN Transceiver
- ▶ S32K Microcontroller

## TARGET APPLICATIONS:

- ▶ Advanced front lighting systems
- ▶ Matrix/pixel high/low beam (ADB/GFHB)
- ▶ Dynamic signaling (Front/Rear)
- ▶ Dynamic Daytime Running Lights

## LIGHTING APPLICATIONS DIAGRAM



## ASLx50y MULTI-PHASE BOOST CONVERTERS

### Lower system cost

- ▶ Programmable internal gate driver voltage regulator
- ▶ Integrated oscillator
- ▶ Space-saving, pin-compatible HVQFN32 package

### Easy configurability

- ▶ Wide operating input voltage range from +5.5 V to +40 V
- ▶ Two programmable regulated output voltages from 10 – 80 V (3 % accuracy)

### Improved robustness & improved performance

- ▶ SPI interface for control & diagnostics
- ▶ Low quiescent current <5  $\mu$ A
- ▶ Low electro magnetic emission (EME) and high electro magnetic immunity

## ASLX41y MULTI-CHANNEL BUCK DRIVER

### Lower system cost

- ▶ A highly integrated multi-channel programmable hysteretic constant current buck converter
- ▶ Integrated PWM dimming

### Easy configurability

- ▶ Diagnostics with external MCU
- ▶ PWM dimming to 100% with 0.1% resolution
- ▶ Programmable output current to 1.5A, using the SPI interface
- ▶ Wide output voltage range to 70V

### Improved robustness & improved performance

- ▶ SPI interface for control & diagnostics
- ▶ External MOSFETs for better thermal management
- ▶ Constant current to LEDs independent of input voltage
- ▶ LED open and short-to-ground fault detection

## ASL5xxx MATRIX LED CONTROLLER

### Lower system cost

- ▶ Built in non-volatile memory
- ▶ Limp Home Mode capability
- ▶ Single smart charge pump
- ▶ Integrated oscillator

### Easy configurability

- ▶ Max current up to 0.8 A or 1.5 A per switch
- ▶ 12-bit resolution PWM & SMART PWM
- ▶ Support on-board / off-board architectures
- ▶ 12 integrated switches in 4 floating blocks of 3 switches each
- ▶ Possible serial and parallel configuration of the switches

### Improved robustness & improved performance

- ▶ Internal switches with only 100 m $\Omega$  Rdson
- ▶ Only 2.1 K/W Rth between junction and base
- ▶ CAN or CAN-FD communication protocol
- ▶ Direct NTC & ID resistor input
- ▶ Single LED open/short detection & diagnostics with bypass feature
- ▶ Full IC and external components diagnostic
- ▶ QM(B) - Safety documentation to support up to ASIL B system level

| Part number | Description  | Package            |
|-------------|--|--------------------|
| ASL1500     | 1-phase boost converter                              | HVQFN32            |
| ASL1507     | 1-phase boost converter with limp home mode          |                    |
| ASL2500     | 2-phase boost converter                              |                    |
| ASL2507     | 2-phase boost converter with limp home mode          |                    |
| ASL4500     | 4-phase boost converter                              |                    |
| ASL4501     | 4-phase boost converter with enhanced phase mismatch |                    |
| ASL2416     | 2-channel LED buck driver                            |                    |
| ASL2417     | 2-channel LED buck driver with limp home mode        |                    |
| ASL3416     | 3-channel LED buck driver                            |                    |
| ASL3417     | 3 channel LED buck driver with limp home mode        |                    |
| ASL5008     | 0.8 A Max Current Smart PWM Matrix Led Controller    | HVQFN36<br>HLQFP48 |
| ASL5015     | 1.5 A Max Current Smart PWM Matrix Led Controller    |                    |
| ASL5108     | 0.8 A Max Current Direct PWM Matrix Led Controller   |                    |
| ASL5115     | 1.5 A Max Current Direct PWM Matrix Led Controller   |                    |

| Board           | Description                              |
|-----------------|--|
| ASL45XASLX41    | Evaluation board for LED drivers         |
| ASL5115EVBMS    | Master evaluation board Matrix IC direct |
| ASL5115EVBSLAV  | Slave evaluation board Matrix IC direct  |
| ASL5015EVBMS    | Master evaluation board Matrix IC smart  |
| ASL5015EVBSLAV  | Slave evaluation board Matrix IC smart   |
| S32K144EVB-Q100 | S32K144 microcontroller evaluation board |