System Solution Guide - Preview

Advanced Front and Rear LED Lighting

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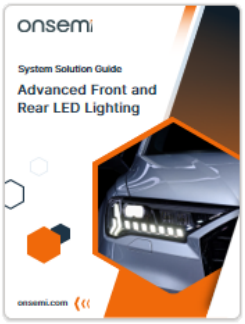

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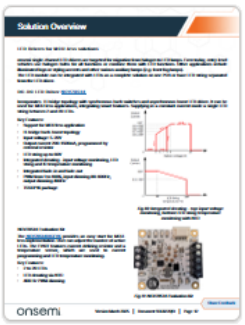

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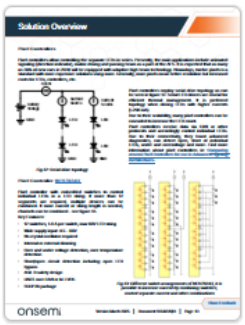

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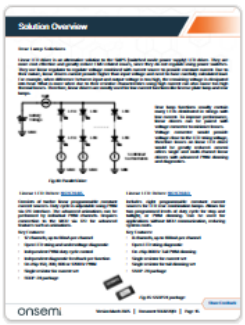

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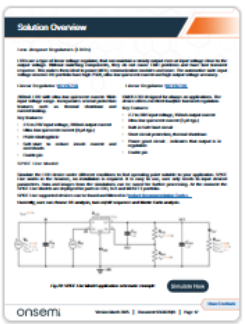

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Block Diagram

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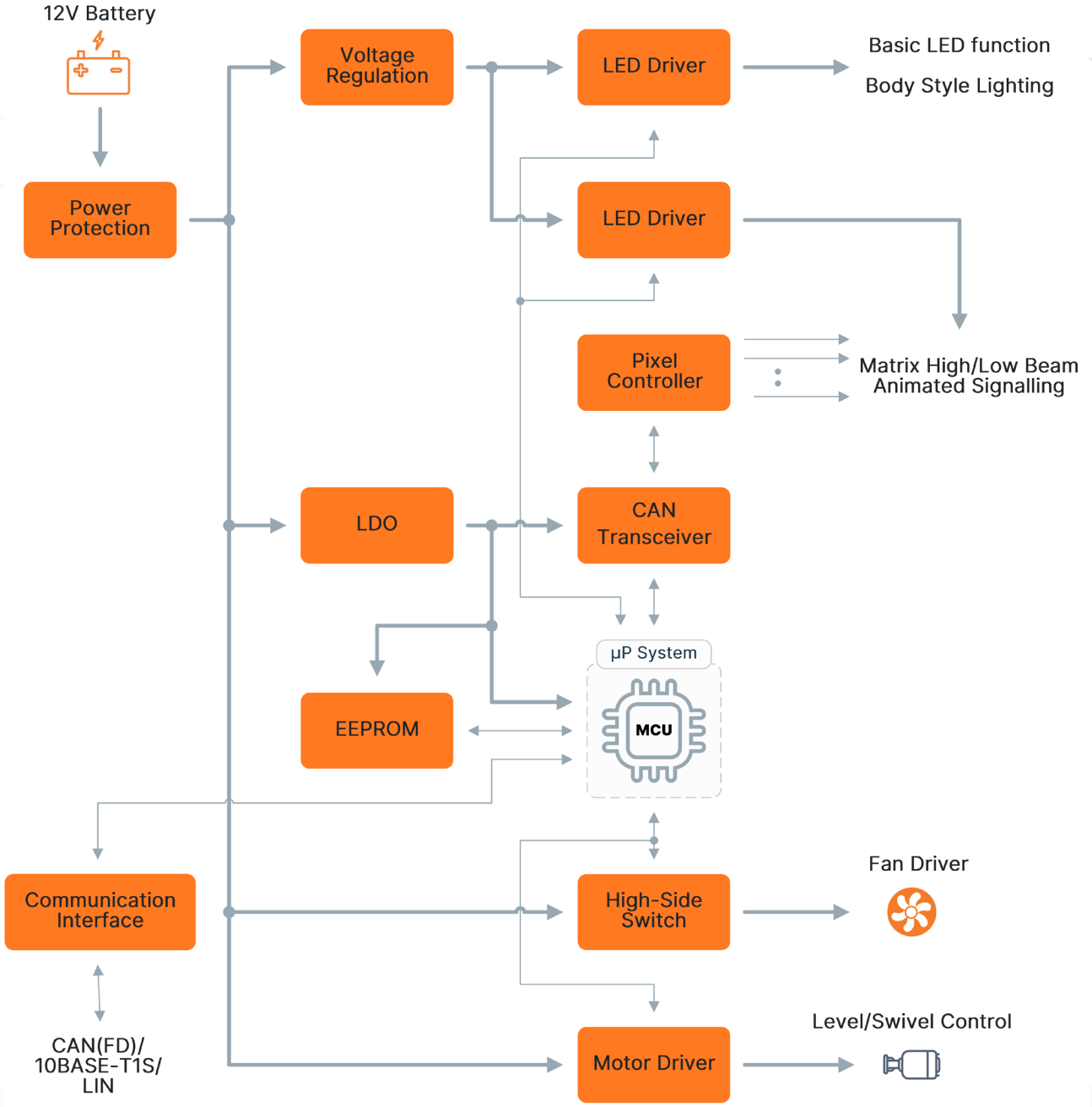
Front LED Lighting Top Level Topology

Block diagram below represents automotive advanced front lighting solution recommended by onsemi. Both basic LED function and more advanced and ever more popular matrix function are offered. In addition to main functions which are controlled by LED drivers, onsemi offers other important components for low voltage power conversion, fan control, headlamp leveling and swivel control, CAN and LIN transceivers and more.



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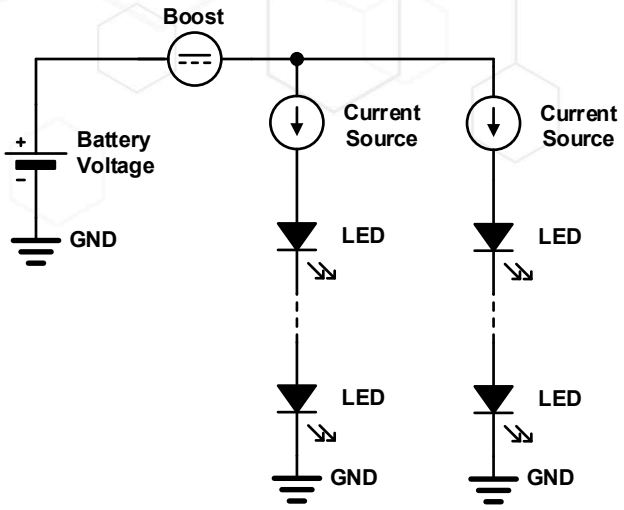
Pixel Controllers

Pixel controllers allow controlling the separate LEDs in series. Presently, the main applications include animated signaling (direction indicator), matrix driving and passing beam as a part of the AFS. It is expected that as many as 38% of new cars in 2030 will be equipped with adaptive high beam technology. Nowadays, twelve pixels is a standard with more expensive solutions using more. Generally, more pixels mean better resolution but increased costs for LEDs, controllers, etc.



Serial drive topology

Pixel controllers employ serial drive topology as can be seen in figure 12. Serial LED drivers are crucial for efficient thermal management. It is preferred topology when driving LEDs with higher currents (>200 mA).

Due to their scalability, many pixel controllers can be cascaded to increase the LED count.

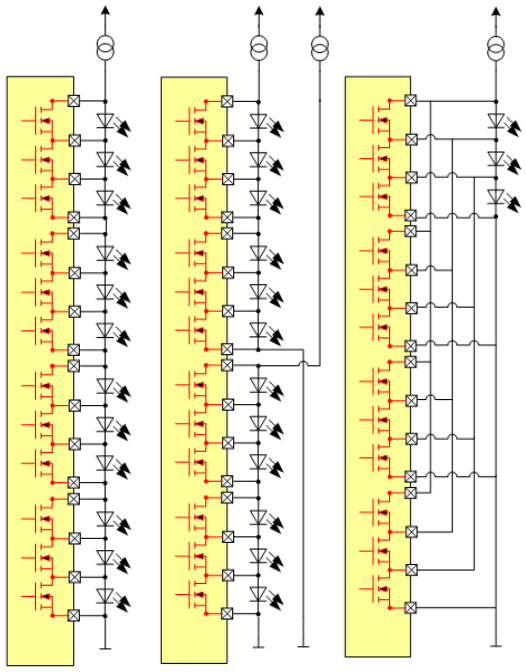
Pixel controllers receive data via CAN or other protocols and accordingly control individual LEDs. Due to their connectivity, they boast advanced diagnostics, can detect open, short of individual LEDs, under and overvoltage and more.

Pixel Controller NCV78343

Pixel controller with embedded switches to control individual LEDs in a LED string. If more than 12 segments are required, multiple devices can be combined. If more current or string length is needed, channels can be combined – see figure 13.

Key Features:

- 12 switches, 1.4 A per switch, max 60V LED string
- Wide supply input: 4.5 – 60V
- No crystal oscillator required
- Internal or external dimming
- Over and under voltage detection, over temperature detection
- Short/open circuit detection including open LED bypass
- ASIL B safety design
- UART over CAN or M-LVDS
- SSOP36 package



Different switch arrangements of NCV78343, it is possible to increase current by combining switches, control separate current and other combinations

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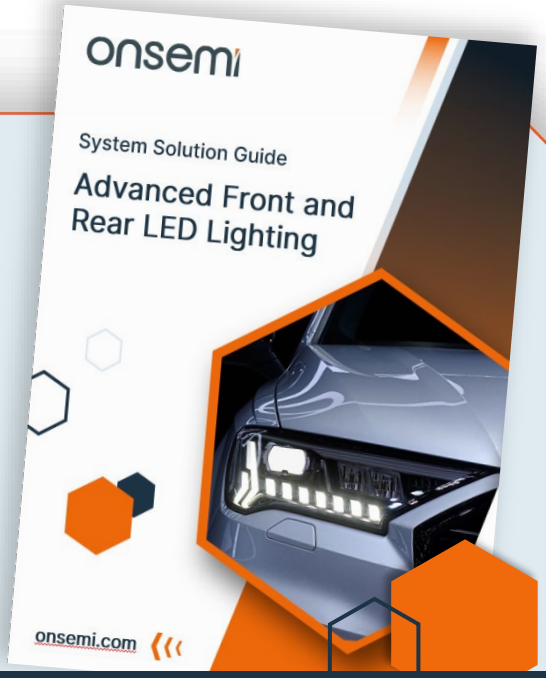

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