



系统方案指南-预览

# 先进车辆前后 LED 照明系统方案



onsemi.cn



## 概览

应用领域

03

## 系统实现

光源及其发展历史

04

照明系统分类

05

自适应前照灯系统 (AFS)

06

市场趋势

06

## 解决方案概览

LED 前照灯顶层拓扑结构

07

LED 尾灯顶层拓扑结构

08

前大灯架构

09

LED 平台评估套件

11

无 MCU 方案的 LED 驱动器

12

像素控制器

13

尾灯解决方案

15

自适应尾灯系统

16

尾灯评估套件

16

低压差稳压器 (LDOs)

17

车内网络

18

水平与旋转控制

19

## 推荐产品

20

## 配套产品

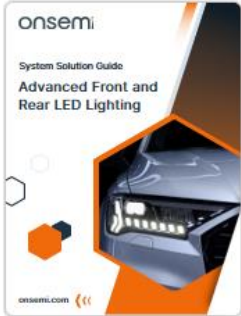
22

onsemi™

onsemi

System Solution Guide  
Advanced Front and  
Rear LED Lighting

立即注册，解锁全部系统方案指南



1



2



3



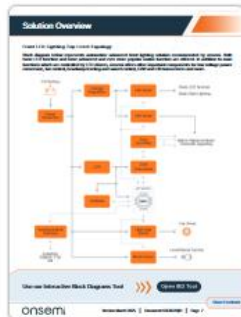
4



5



6



7



8



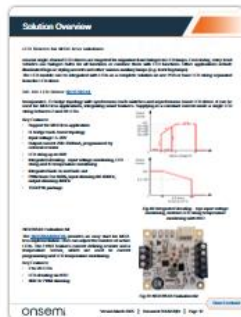
9



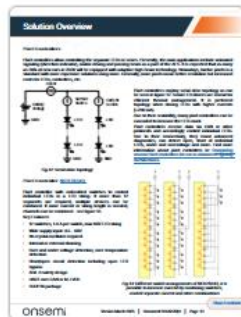
10



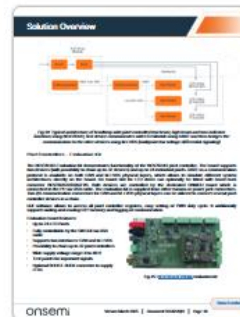
11



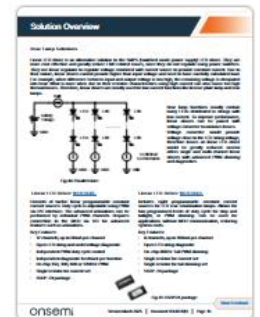
12



13



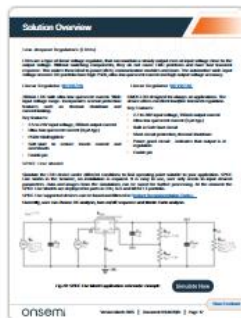
14



15



16



17



18



19

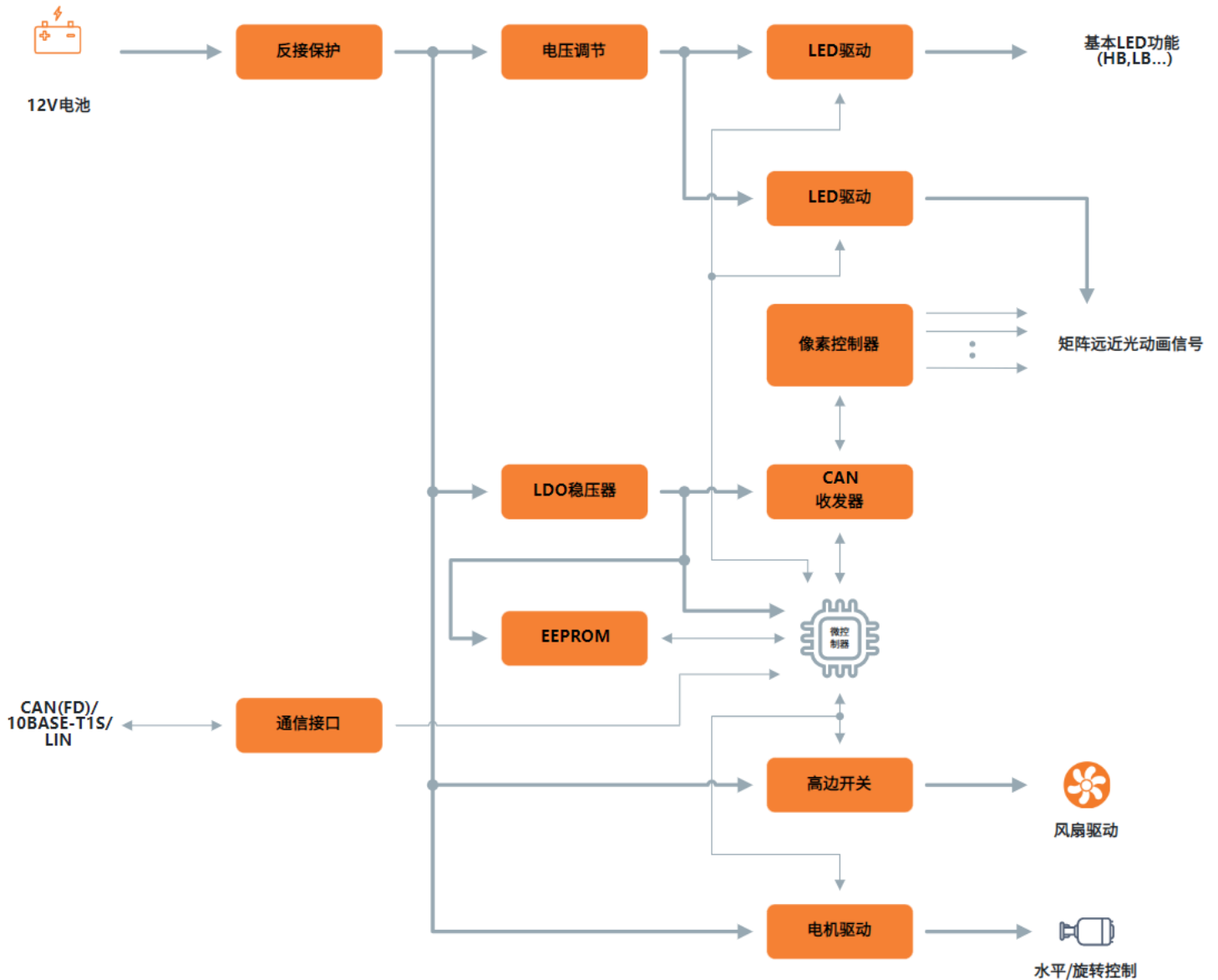


20



## LED 前照灯顶层拓扑结构

以下框图展示了安森美 (onsemi) 推荐的汽车先进前照灯解决方案。该方案不仅提供基本的 LED 照明功能, 也有更先进、更受欢迎的矩阵灯功能。除了由 LED 驱动器控制的主要功能外, 安森美还提供用于低压电源转换、风扇控制、大灯水平调节与旋转控制、CAN 和 LIN 收发器等多种关键元件。



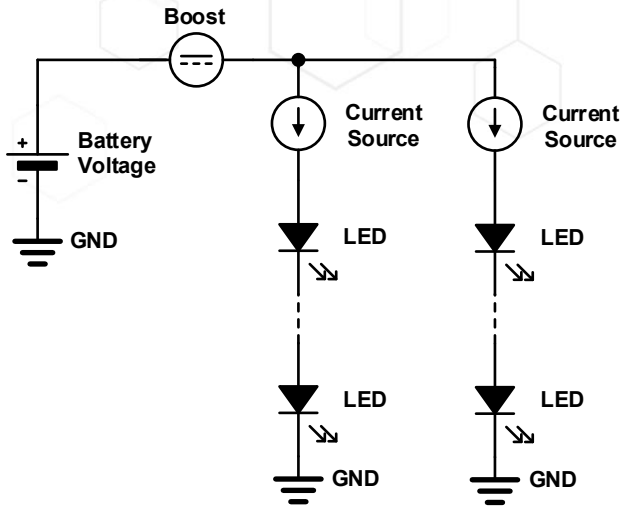
使用我们的交互式框图工具



打开交互式框图工具

## 像素控制器

像素控制器 (Pixel Controller) 可用于控制串联中的各个独立 LED。目前, 其主要应用包括动态信号指示 (如转向灯)、矩阵灯以及作为自适应前照灯系统 (AFS) 一部分的远光灯控制。预计到 2030 年, 多达 38% 的新车将配备自适应远光灯技术。如今, 12 像素配置已成为标准, 更高端方案则使用更多像素。通常情况下, 像素数量越多, 分辨率越高, 但 LED、控制器等成本也相应增加。



串行驱动拓扑

如图 12 所示, 像素控制器采用串行驱动拓扑结构。这种结构对高效的热管理至关重要, 尤其适用于大电流 ( $>200\text{ mA}$ ) 驱动 LED 的场景, 是此类应用的首选方案。

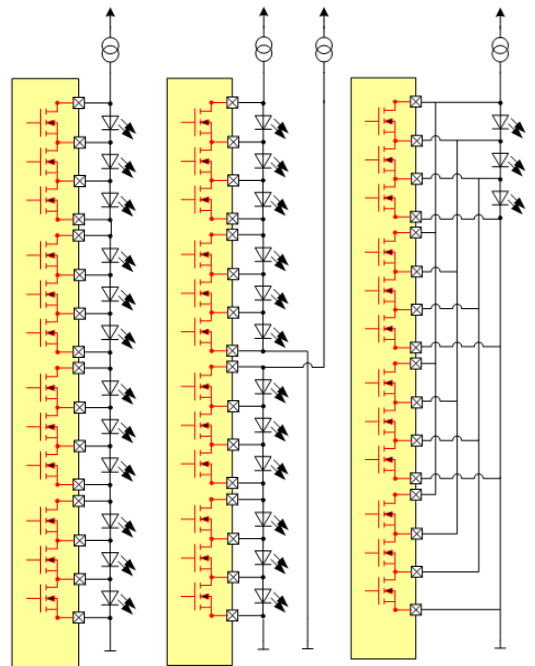
由于具备良好的可扩展性, 多个像素控制器可以级联使用, 以支持更多的 LED。像素控制器通过 CAN 或其他通信协议接收数据, 并据此控制单个 LED。凭借其强大的连接能力, 系统具备高级诊断功能, 可检测 LED 开路、短路、欠压、过压等问题。

## 像素控制器 [NCV78343](#)

像素控制器带有内置开关, 用于控制 LED 灯串中的各个 LED。如果需要超过 12 个分区, 可将多个器件组合在一起。若需要更大的电流或更长的 LED 串, 也可以合并通道使用——详见图 13。

### 主要功能:

- 12个开关, 每个开关 1.4 A, LED 灯串最大电压 60 V
- 宽输入电压范围: 4.5 V – 60 V
- 无需晶体振荡器
- 支持内部或外部调光
- 具备过压、欠压、过温检测功能
- 支持短路/开路检测, 包括 LED 旁路开路检测
- 支持 ASIL B 功能安全设计
- 支持通过 CAN 或 M-LVDS 实现 UART 通信
- 采用 SSOP36 封装



NCV78343 具有不同的开关配置方式, 可以通过合并开关来增加电流、控制单独电流以及实现其他组合方式。

# 先进车辆前后 LED 照明系统方案

获取最新版本

# onsemi™

## Intelligent Technology. Better Future.

立即注册，解锁所有系统方案指南并获得更多独家优惠！

- 加入社区论坛讨论。
- 使用Elite Power仿真工具和其他开发工具。
- 观看独家网络研讨会和讲座。

浏览完整的系统方案指南



onsemi, the onsemi logo, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "onsemi" or its affiliates and/or subsidiaries in the United States and/or other countries. onsemi owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of onsemi's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). onsemi reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and onsemi makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using onsemi products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by onsemi. "Typical" parameters which may be provided in onsemi data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. onsemi does not convey any license under any of its intellectual property rights nor the rights of others. onsemi products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use onsemi products for any such unintended or unauthorized application, Buyer shall indemnify and hold onsemi and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that onsemi was negligent regarding the design or manufacture of the part. onsemi is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.