# LED HEADLAMPS FOR MAINSTREAM VEHICLES

High/Low Beam LED Controller IC Solves Common Design Challenges

The A80803 LED controller for LED headlamps and DRL/position lamps is a unique solution that leverages multi-topology conversion and patented IP to enable smooth high/low/high beam transitions in a single integrated circuit (IC). Its innovative features make it easier for headlamp designers to bring advanced functionality to mainstream vehicles, enabling higher performance and more compact designs at an overall lower solution cost.

The A80803 is a switch-mode, constant-current controller for high-power LED automotive lighting applications that addresses many common pain points for headlight designers. The multi-topology single-ended controller design, combined with wide input/output voltage capability, provides a universal solution for a wide variety of use cases and/or number of LEDs.

EMC and thermal friendly, the A80803 includes both a FET driver for PWM control and a unique slew-control feature to minimize the LED current over/undershoot while transitioning between low beam and high beam. Both low-side and high-side gate drivers are included to control the external power MOSFETs, and two additional gate drivers are integrated to enable/disable part of the LED string to simplify high/low beam applications. Options for SPI-based control or EEPROM-based end-of-line programming for standalone operation further extend the range of possibilities.
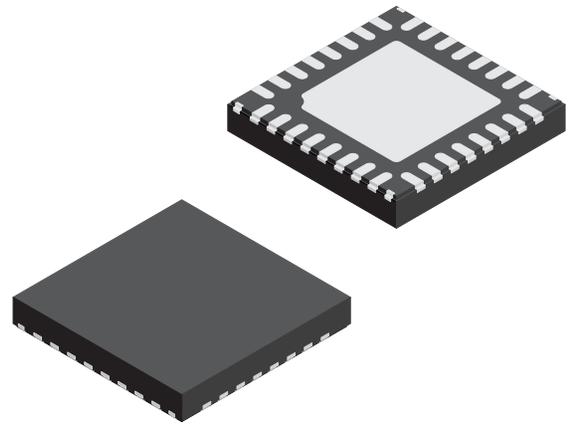
Features and Benefits

- High/low beam switchover in a single IC

- Lower external component and system costs compared to competitive solutions

- Patented IP enables significant improvement in LED current control during high/low and low/high transitions

- Able to change converter topology "on the fly."
  - Example: boost <--> buck-boost based on Vin/Vout ratios

- Process technology enables configuration via EEPROM and Vout to 70V
  - Can remove local uController
  - Output to 70V for higher number of LEDs in a string

- Significant fault handling/reporting allows ASIL-B safety design capability

Low Beam / High Beam Topology Transition Capability
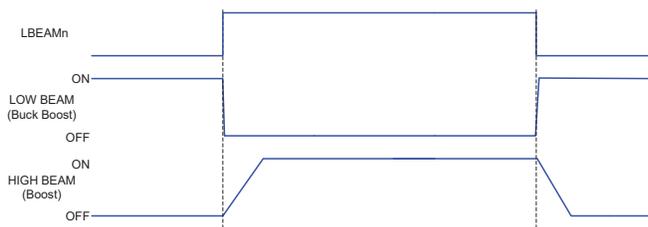### Single IC can run both beams, regardless of Vin / Vout ratios
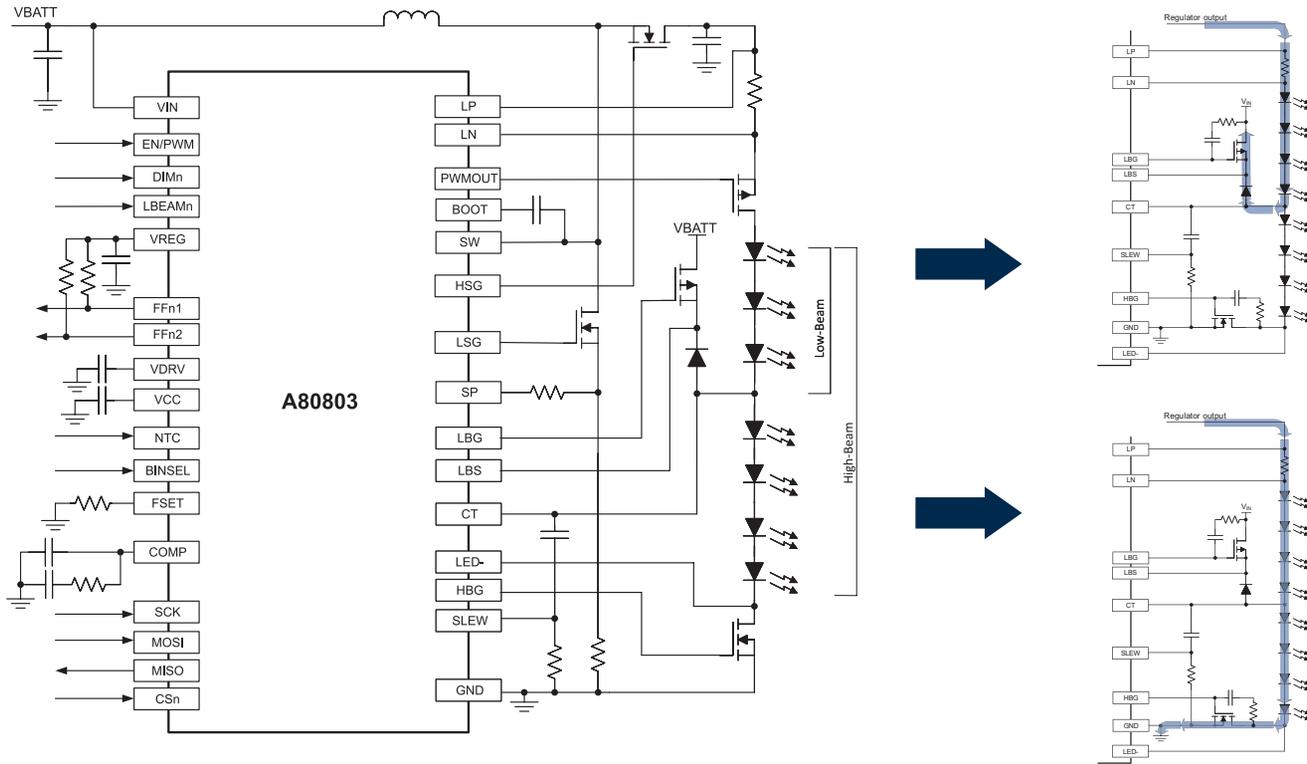
Smart Voltage Detection and LED Current Slew Rate Control
Dictates Topology and LED Current Ramping Up/Down for Smooth Transition

Low / High / Low-Beam Transitions when
Vin is greater than the voltage level between
the 2 LED segments (Vct)

Low / High / Low-Beam Transitions when
Vin is less than the voltage level between
the 2 LED segments (Vct)

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