

LP586x-Q1 Automotive N × 18 High-Current Matrix LED Driver with 8-Bit Analog and 8-Bit or 16-Bit PWM Dimming

1 Features

- LED matrix topology:
 - 18 constant current sinks with N scan switches
 - LP5866-Q1: N=6, 108 LED Dots
 - LP5868-Q1: N=8, 144 LED Dots
 - LP5860-Q1: N=11, 198 LED Dots
 - Configurable for 1 to N scan switches
- Operating voltage range:
 - V_{CC}/V_{LED} range: 2.7V to 5.5V
 - Logic pins compatible with 1.8V, 3.3V, and 5V
- 18 constant current sinks with high precision:
 - 100mA per current sink when $V_{CC} \geq 3.3V$
 - Device-to-device error: $\pm 3\%$
 - Channel-to-channel error: $\pm 3\%$
 - Phase-shift for balanced transient power
- Ultra-low power consumption:
 - Shutdown mode: $I_{CC} \leq 1\mu A$ when EN = Low
 - Standby mode: $I_{CC} \leq 10\mu A$ (typ.) when EN = High and CHIP_EN = 0
 - Active mode: $I_{CC} = 5mA$ (typ.) when channel current = 12.5mA
- Flexible dimming options:
 - Individual ON/OFF control for each LED dot
 - Analog dimming (current gain control)
 - Global 7-step Maximum Current (MC) setting for all LED dots
 - 3 groups of 7-bit Color Current (CC) RGB setting
 - Individual 8-bit Dot Current (DC) setting for each LED dot
 - PWM dimming with audible-noise-free frequency
 - Global 8-bit PWM dimming for all LED dots
 - 3 programmable groups of 8-bit PWM dimming for LED dot arbitrary mapping
 - Individual 8-bit or 16-bit PWM dimming for each LED dot
- Full addressable SRAM to minimize data traffic
- Individual LED dot open/short detection
- De-ghosting and low brightness compensation
- Interface options:
 - 1MHz (max.) I²C interface when IFS = Low
 - 12MHz (max.) SPI interface when IFS = High

2 Applications

- LED animation and indication for:
 - Automotive interior and exterior FSTD
 - Automotive ambient lighting and HMI

3 Description

The LP586x-Q1 family is a high-current and high-performance LED matrix driver. The device integrates 18 constant current sinks with N switching MOSFETs to control N × 18 LED dots or N × 6 RGB LEDs.

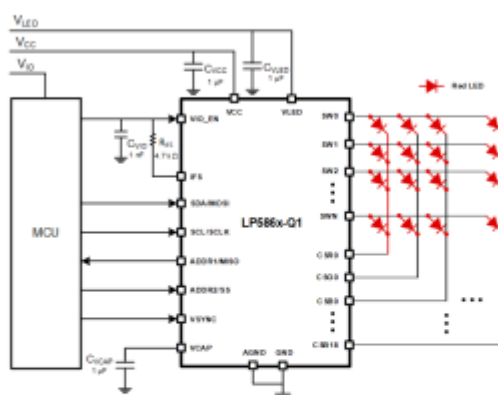
The LP586x-Q1 family supports both analog dimming and PWM dimming methods. For analog dimming, each LED dot can be adjusted with 256 steps. For PWM dimming, the integrated 8-bit or 16-bit configurable PWM generators enable smooth and audible-noise-free dimming control. Each LED dot can also be arbitrarily mapped into 8-bit Group PWM to achieve dimming control together.

The LP586x-Q1 family device implements full addressable SRAM to minimize the data traffic. The ghost-cancellation circuitry is integrated to eliminate both upside and downside ghosting. The LP586x-Q1 family also supports LED open and short detection functions. Both 1MHz (maximum) I²C and 12MHz (maximum) SPI are available in LP586x-Q1 family.

Package Information

PART NUMBER	PACKAGE ⁽¹⁾	BODY SIZE (NOM)
LP586x-Q1 family	RKP (VQFN, 40)	5.00mm × 5.00mm

- (1) For all available packages, see the orderable addendum at the end of the data sheet.



Simplified Schematic



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