

## Description

The DIODES™ AL5887 is comprised of 36 programmable LED current channels each with internal 12-bit PWM for color and brightness control through SPI or I2C digital interface. AL5887 is ideal for up to 12 RGB LED modules lighting applications with 3 programmable banks (A, B, C) for software control of each color. An external resistor can set up the global output current of all 36 channels. Each channel current can be configured up to 70mA under the thermal limitation of the package.

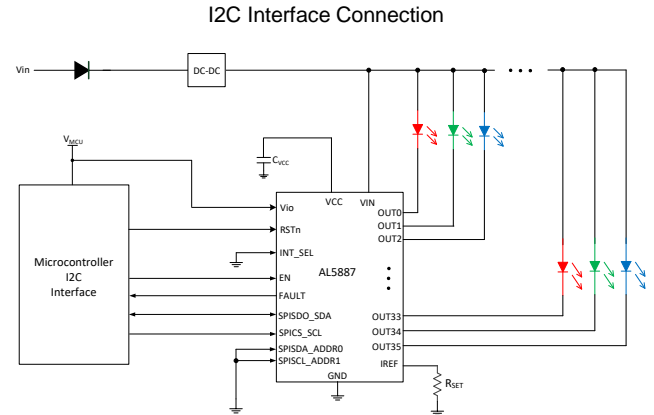
Features of the AL5887 are controlled via SPI/I2C digital interface. Using a dedicated pin INT\_SEL to select either SPI or I2C protocols. The AL5887 has a 30kHz, 12-bit PWM generator for each channel, as well as channel/module independent color mixing and brightness control registers to enable vivid LED effects with zero audible noise. Users can benefit from the device's ultra-low shutdown I<sub>Q</sub> Power Saving Mode and easy software programming.

The device operates over -40°C to +85°C ambient temperature range. The AL5887 is available in W-QFN6060-52/SWP (Type A1) package.

## Features

- Input Voltage: 2.7V to 5.5V
  - 36 Precision LED Current Sinks
  - OUT Pins Voltage Max. 5.5V
  - A Maximum of up to 70mA per Channel Current
  - Device to Device and Channel to Channel Current Accuracy: < 2% at 7mA to 70mA, and < 3.5% at 1mA to 7mA
  - 12-Bit (4096 Steps), 30kHz PWM Generator Integrated for Each Channel
  - PWM Phase Shifting
  - 6-Bit Global Current Dimming
  - Independent Color-Mixing Register per Channel
  - Independent Brightness Control Register per RGB Module
  - Optional Logarithmic- or Linear-Scale Brightness Control
  - Three Programmable Banks (A, B, C)
- Serial Digital Interface (I2C/SPI)
  - Support 400kHz I2C Interface (Default)
  - Two External Hardware Address Pins Allow Connecting up to Four Devices (I2C Only)
  - 4MHz SPI Compatible Digital Interface (INT\_SEL Pin = HIGH)
  - Broadcast Slave Address Allows Configuring Multiple Devices Simultaneously
  - Auto-Increment Allows Writing or Reading Consecutive Registers Within One Transmission
- Diagnosis and Protections
  - Open Drain Fault Pin for Fault Indication
  - Individual LED Channel Open/Short Detection
  - Pre-UVLO Warning & Undervoltage Lockout (UVLO)
  - Overtemperature Protection (OTP) with Pre-OTP Warning
  - Digital POR Indicator
  - Individual Channel Fault Masking
- Ultra-Low Quiescent Current:
  - Shutdown Mode: 1µA (Max.) When EN Low > 25ms
  - Power-Saving Mode: 15µA (Max.) When EN High and All LEDs Off for > 30ms
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

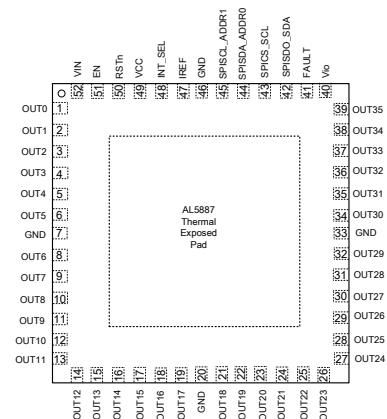
## Typical Application Diagram



## Pin Assignments

Wettable W-QFN6060-52/SWP (Type A1)

(Top View)



## Applications

- Smart home appliances
- Electric vehicle charging stations
- Infotainment displays
- IoT information indicators
- Computing hardware

## Ordering Information

Orderable Part Number	Package	Body Size
AL5887JAZW52-13	W-QFN6060-52/SWP (Type A1)	6mm x 6mm

Notes: 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.  
 2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.  
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.