

RAA239101

Photoelectric Smoke Detector AFE IC

The [RAA239101](#) is a low-power Analog Front-End (AFE) IC; combined with a microcontroller, photoelectric emitter/detector(s), horn, and minimal external components, it forms a complete smoke detector.

The IC operates from a 3V to 5V or 9V battery and has an LDO to provide power to a microcontroller. The battery-check feature can be used to signal an alarm when the battery is low.

The IC provides an SPI bus for a microcontroller interface and a general-purpose IO.

The RAA239101 provides a driver that can switch between two LEDs to pulse the smoke detection LED emitters with a DAC adjustable current. Two photodiode receiver channels with programmable gain amplification using an ADC allow the detection of smoke by sensing the LED light scattered off of smoke in a detection chamber.

A piezoelectric horn driver is also included to provide an audible alarm.

Features

- Ultra-low current consumption
- 9V or 3V to 5V battery operation
- LDO for microcontroller supply
- 10-bit ADC for measuring voltage on 7 analog pins
- Drives two LED emitters with 8-bit current DAC control from 45mA to 600mA
- Two photodiode receivers with programmable gain amplifiers
- General purpose IO
- Horn driver with clamp diodes
- SPI interface

Applications

- Photoelectric smoke detectors

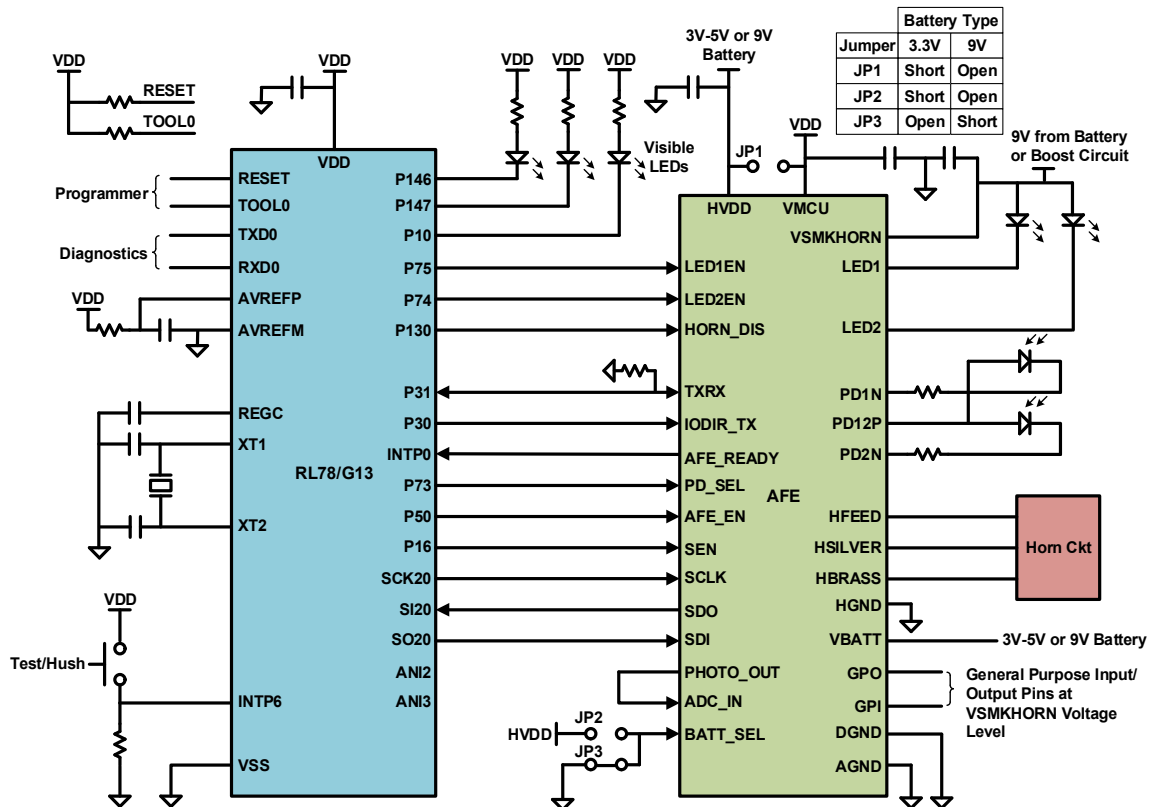


Figure 1. Typical System Diagram

1. Overview

1.1 Block Diagram

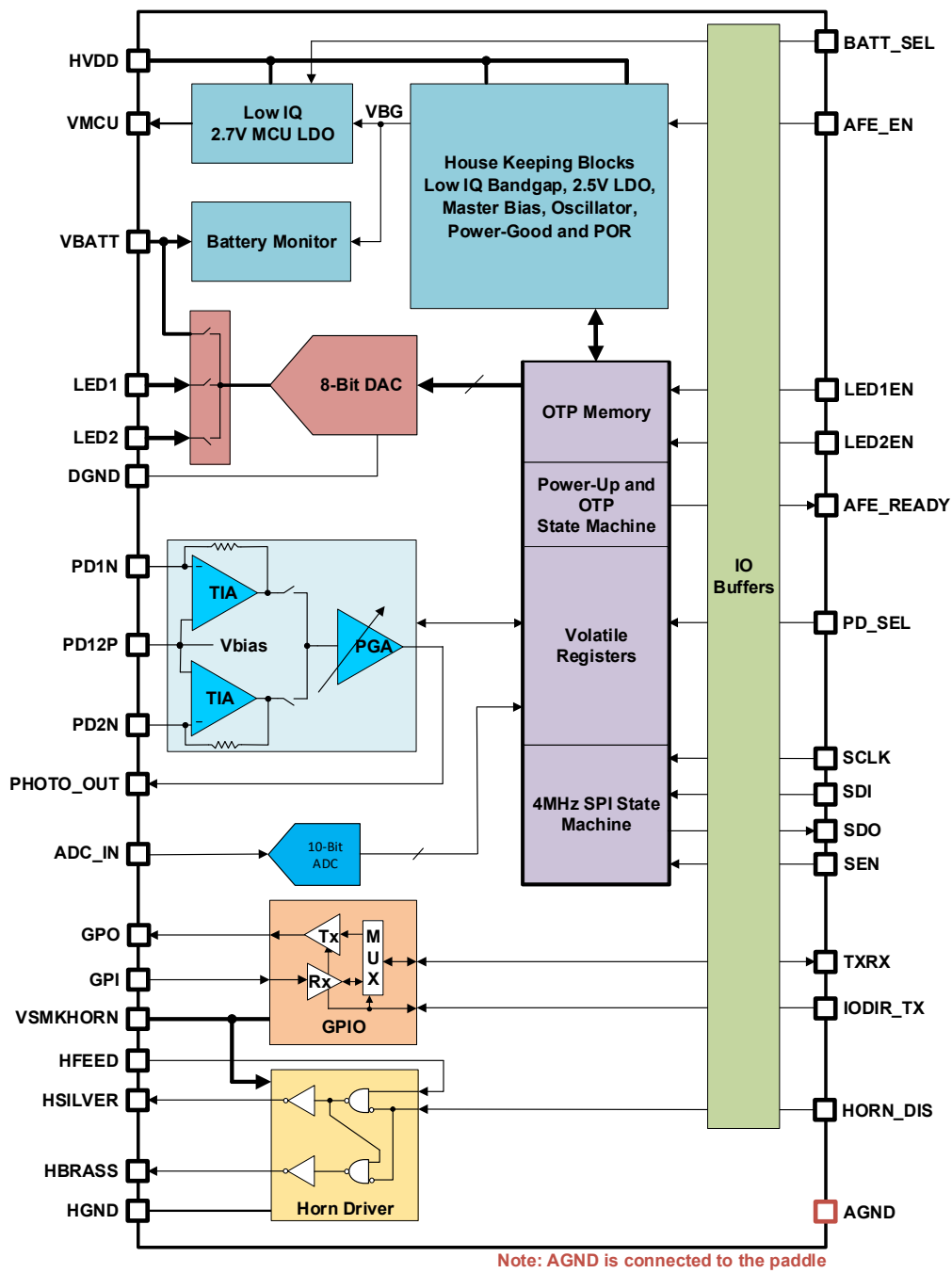


Figure 2. Block Diagram

1.2 Ordering Information

| Part Number (Notes 2, 3) | Part Marking | Package Description (RoHS Compliant) | Pkg. Dwg. # | Carrier Type (Note 1) | Temp Range |
|-----------------------------|--------------|---|-------------|--------------------------|--------------|
| RAA239101A2GNP#HA0 | 239101 | 32 Ld QFN | L32.4X4F | Reel, 6k | -40 to +85°C |

Notes:

1. See [TB347](#) for details about reel specifications.
2. These Pb-free plastic packaged products employ special Pb-free material sets, molding compounds/die attach materials, and 100% matte tin plate plus anneal (e3 termination finish, which is RoHS compliant and compatible with both SnPb and Pb-free soldering operations). Pb-free products are MSL classified at Pb-free peak reflow temperatures that meet or exceed the Pb-free requirements of IPC/JEDEC J-STD-020.
3. For Moisture Sensitivity Level (MSL), see the [RAA239101](#) device page. For more information about MSL, see [TB363](#).

2. Revision History

| Rev. | Date | Description |
|------|--------------|--|
| 2.01 | Jun 27, 2022 | Changed 3.3V to 3V-5V throughout. |
| 2.00 | May 20, 2021 | Updated Voltage from 3V-5V to 3.3V throughout. |
| 1.01 | May 4, 2021 | Updated File number to Renesas formatting. Updated Figure 1. Added Revision History. |

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