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 5Vbattery 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

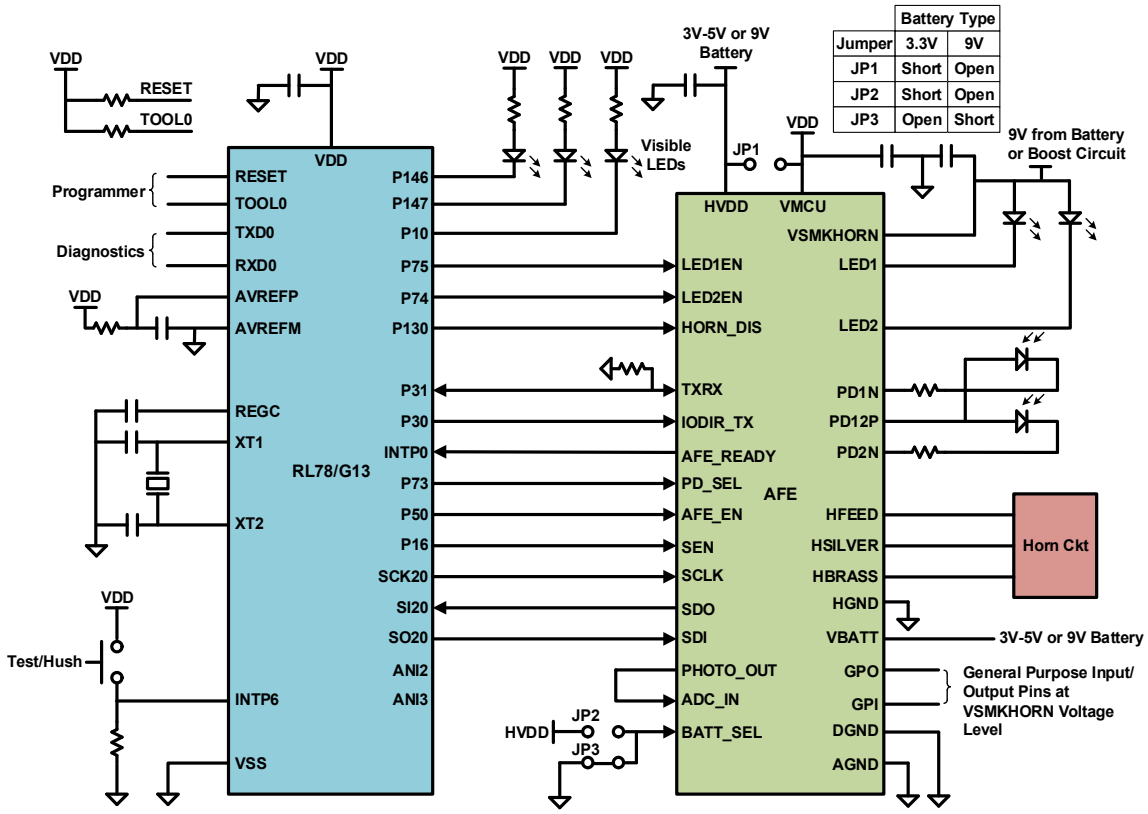

Figure 1. Typical System Diagram

1. Overview

1.1 Block Diagram

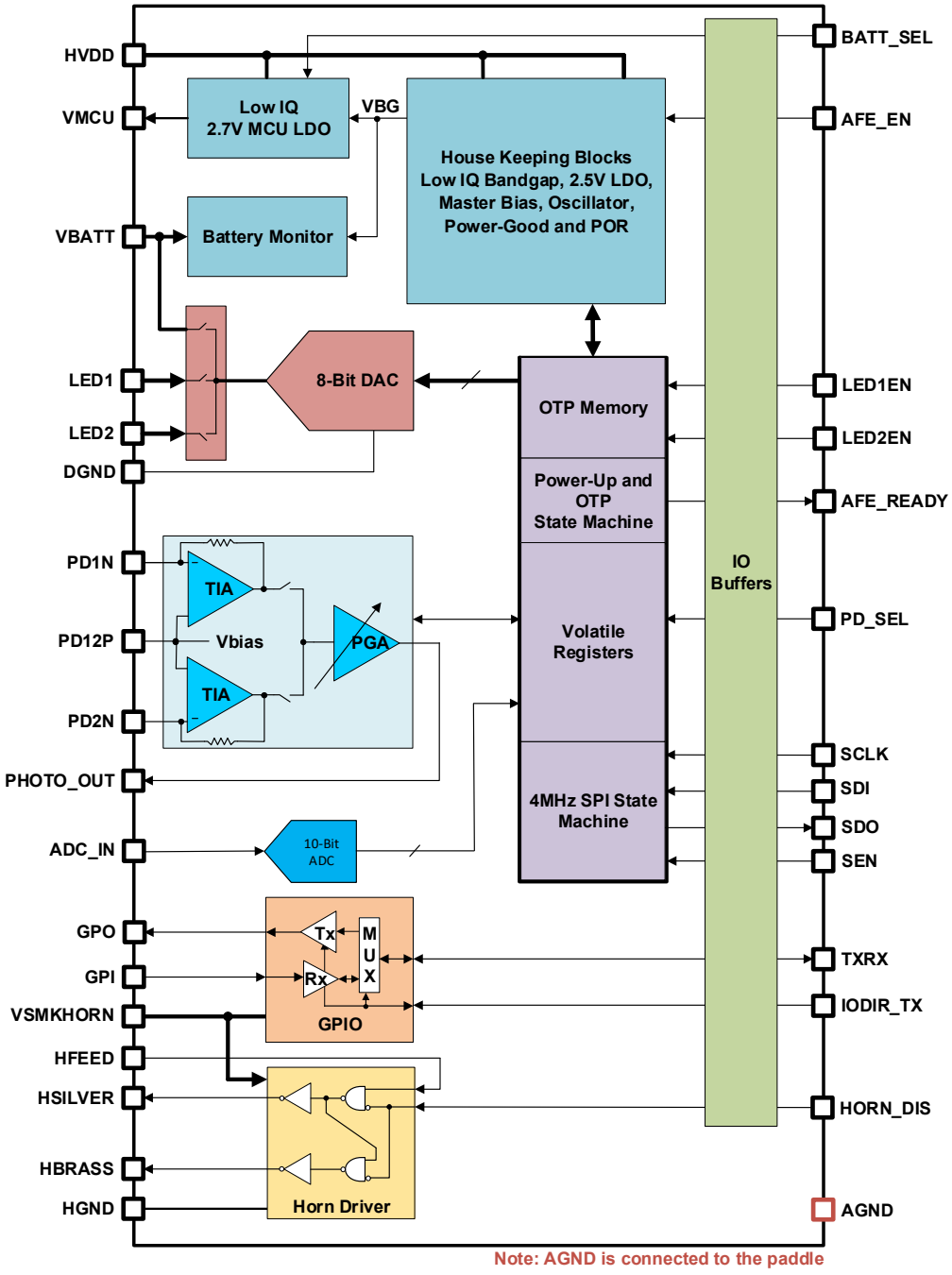

Figure 2. Block Diagram

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.