Air quality control: Overview

- The ZMOD4410 gas sensor and HS300x humidity sensor family along with the RL78/G14 microcontroller enable users to sense the environment for gases, measure and improve air quality, and provide observations of goods during transport. The solution meets strict air quality regulations, saves energy, and helps maintain the user's health and wellness.
-
- Key Features:
- Easy and fast integration into existing systems
- Fast productization
- Gas sensor with highest sensitivity to gases in the market
- Firmware upgradeable solution to meet specific customer needs and requirements

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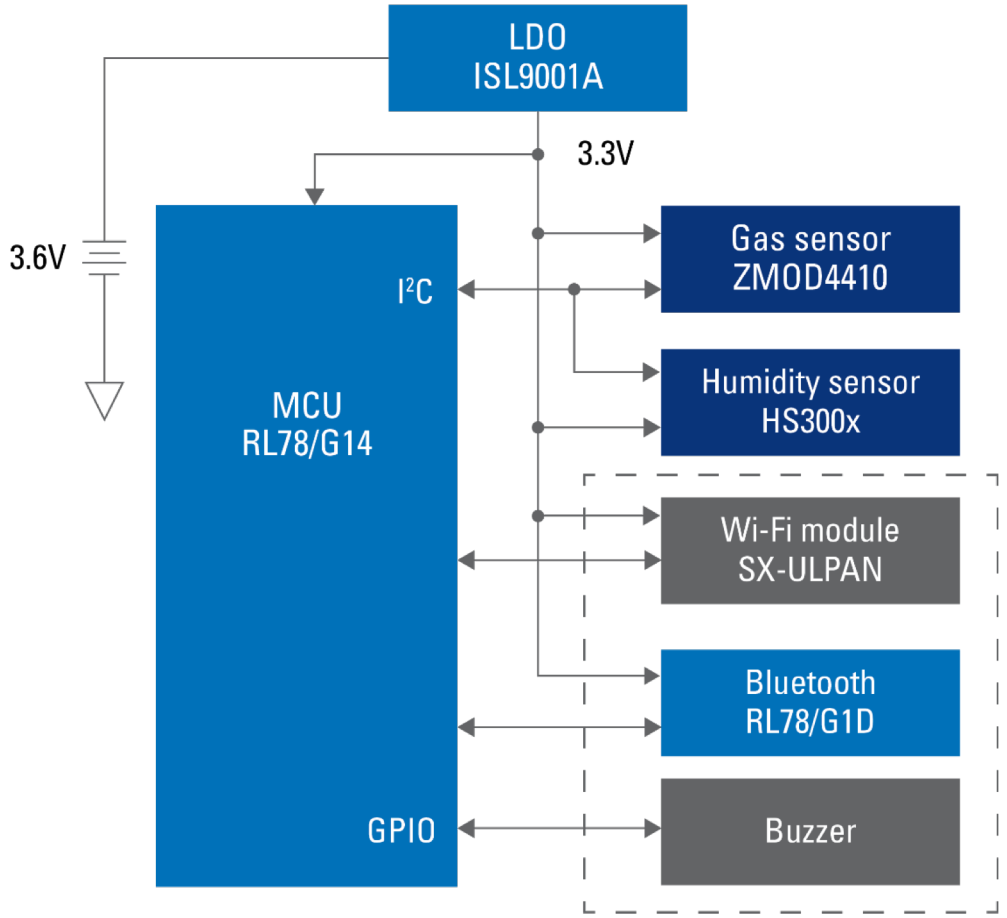
Air quality control: block diagram



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ZMOD4410: GAS sensor module TVoC

Indoor Air Quality Sensor Platform

Features

- Proven MOx Material
- Electrical and Gas calibrated
- Flexible architecture with available GUI and firmware for different operation modes
- Correlates German Committee on Indoor Guidelines (UBA study)
- Miniature 3 x 3 x 0.7mm
- Power consumption of <1 mW in Low Power operation
- Digital (I^2C) output
- Siloxane resistant

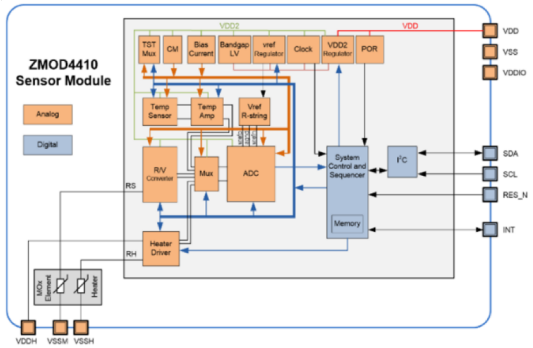
Benefits

- Leading high sensitivity and long term stability
- Calibrated sensor allows easy and fast system integration
- Enables Customer to release product families via SW changes
- International accepted definition of Indoor Air Quality (IAQ)
- Calculation of estimated Carbon Dioxide (eCO2)
- Reduced end product size

Applications

- HVAC Systems
- Air Purifiers
- Smart Thermostats
- Smart Speakers
- Bathroom fans
- Kitchen exhaust hoods
- Smart outlets & receptacles

Typical application and key performances



IDT IAQ Rating	Reference Level	Air Information	TVOC (mg/m³)	Air Quality
≤ 1.99	Level 1	Clean Hygienic Air (Target value)	< 0.3	Very Good
2.00 – 2.99	Level 2	Good Air Quality (if no threshold value is exceeded)	0.3 – 1.0	Good
3.00 – 3.99	Level 3	Noticeable Comfort Concerns (Not recommended for exposure > 12 months)	1.0 – 3.0	Medium
4.00 – 4.99	Level 4	Significant Comfort Issues (Not recommended for exposure > 1 month)	3.0 – 10.0	Poor
≥ 5.00	Level 5	Unacceptable Conditions (Not recommended)	> 10.0	Bad

HS300x: Relative humidity and temperature sensor

Humidity Sensor with Industry Leading Accuracy, Response Time, and Excellent Stability

Features

- ±1.5% Relative Humidity Accuracy (HS3001)
- Fast RH response time (Typical 6 seconds)
- 14-bit resolution, 0.01%RH (Typical)
- Low power consumption, 1.0µA average (one RH + T measurement per second)
- Temperature sensor accuracy of ±0.2° C (HS3001, HS3002)
- Extended supply voltage, 1.8V to 5.5V

Benefits

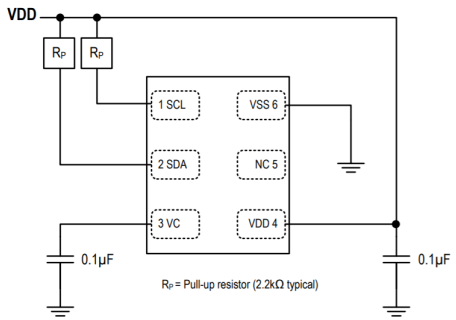
- Silicon-carbide capacitive sensing element
- Excellent stability against aging
- Highly robust protection from harsh environmental conditions and mechanical shock
- Very low power consumption
- Digital I2C Output

Applications

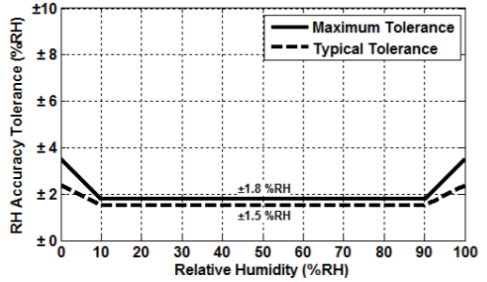
- Climate control systems
- Home appliance
- Weather stations
- Industrial automation
- Process controls and monitoring
- Automotive climate control
- Medical equipment

Typical application and key performances

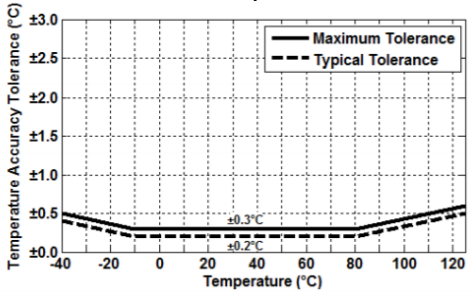
Typical application circuit



HS3001 RH Accuracy Tolerance at 25°C



HS3001 Temperature Sensor Accuracy Tolerance



RL78 / G14: High function general purpose MCU

Low power MCU series within the RL78 Family

Features

- True Low Power 16bit 32MHz uC
- Broad Scalability w/ pin/FLASH/RAM options
- High Performance w/ 1.6V to 5.5V operation
- High Integration including oscillators, power-on-reset, low voltage detection, watchdog, real time clocks and analog functions
- Comprehensive Tools and Support
  - Advanced Tools, 3rd Party, Online resources and training

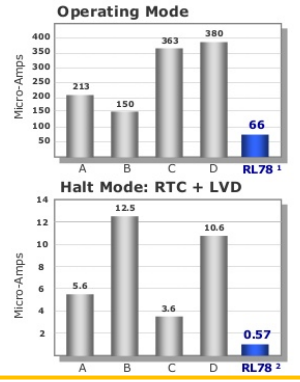
Benefits

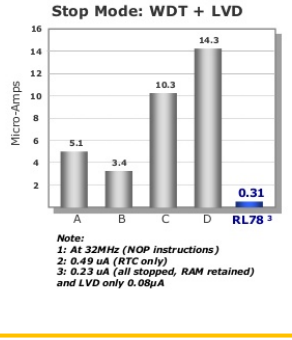
- RL78 provide many options in-order to scale power based on application requirements by using combination of the clock selection and advanced power modes.
- RL78 offer scalability via > 600 devices with wide pin count, packages, I/O peripheral mapping and large memory options
- Integration options allow for many of the functions necessary to make the solution smaller, more reliable and lower cost

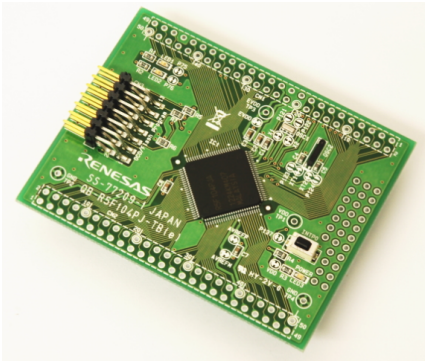
Applications

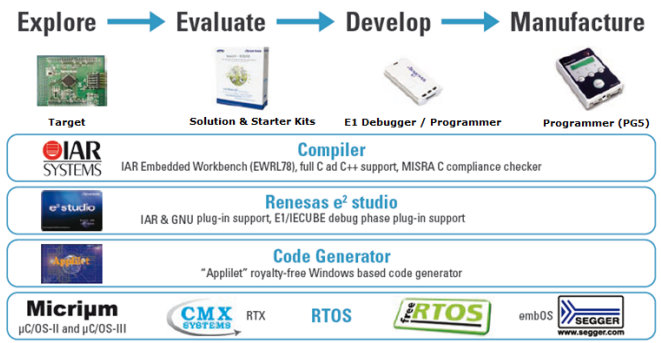
- HVAC Systems
- Climate control systems
- Smart Thermostats
- Bathroom fans
- Kitchen exhaust hoods
- Smart outlets & receptacles
- Home appliance
- Weather stations
- Industrial automation

Typical application and key performances









RL78 / G1D: Low power 16 bit 32MHz MCU

Bluetooth® low energy microcontrollers MCU series within the RL78 Family

Features

- True Low Power 16bit 32MHz uC
- Targeted for Bluetooth applications
- High Performance w/ 1.6V to 3.6V operation
- RL78/G1D Module offering
- Comprehensive Tools and Support
  - Advanced Tools, 3rd Party, Online resources and training

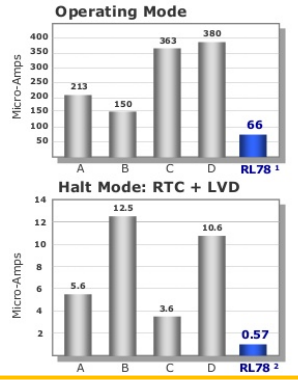
Benefits

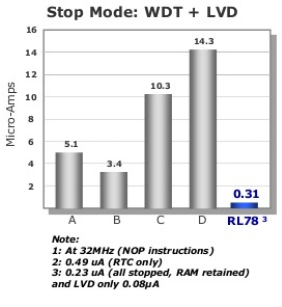
- Lowest level of current consumption in the industry at 43mA RF transmission(0 dBm output) and 3.5mA RF receiving current
- Built in circuit elements for antenna simplify circuit design and reduces system cost
- Compact module with built-in 32Mhz crystal oscillator for RF chip and antenna (already certified)

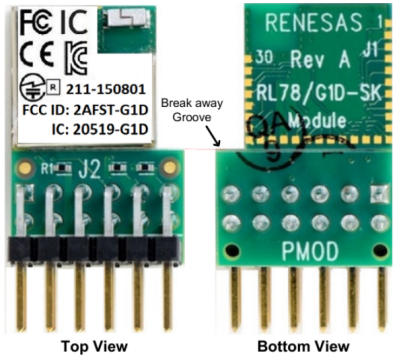
Applications

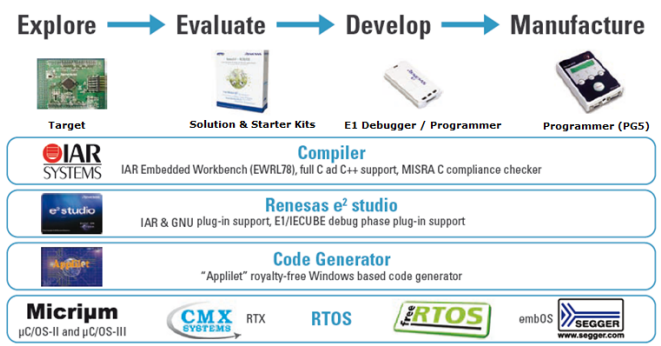
- Bluetooth Low Energy (BLE)
- Healthcare and Fitness
- M2M connectivity
- Industrial and home automation
- Fitness trackers
- Athletic garments
- Worker safety
- Mobile or tabletop pulse oximetry devices

Typical application and key performances









ISL9001A: High accuracy, high PSRR LDO in tiny package

Low dropout regulator with low Iq and high PSRR

Features

- Excellent transient response to large current steps
- Excellent load regulation: <0.1% voltage change across full range of load current
- High PSRR: 90dB @ 1kHz
- Extremely low quiescent current: 25µA
- Low dropout voltage: typically 200mV @ 300mA
- Low output noise: typically 30µVRMS @ 100µA (1.5V)

Benefits

- When coupled with a no load quiescent current of 25µA (typical), and 0.1µA shutdown current, the ISL9001A is an ideal choice for low power consumption application.

Applications

- PDAs, cell phones and smart phones
- Portable instruments, MP3 players
- Handheld devices, including medical handhelds

Typical application and key performances

Typical application circuit