

CN270 Body Temperature Measurement in Access Control Systems

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Body Temperature Measurement in Access Control Systems

■ Overview

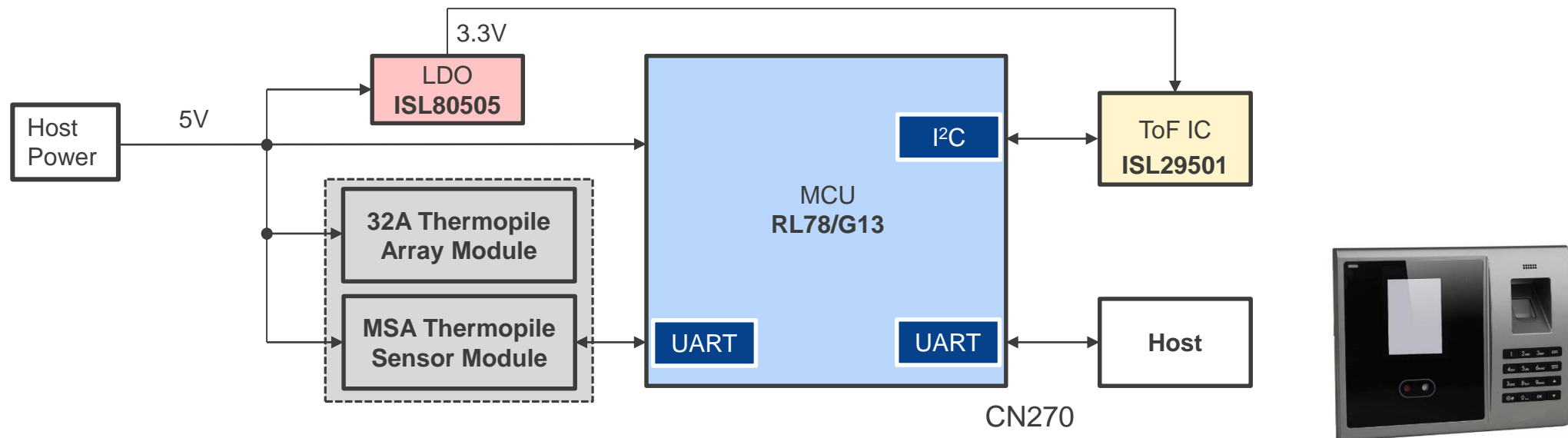
Body temperature measurement systems are a healthy and safe way to measure body heat. Compared with common IR contactless thermometers, they can measure with longer distance (> 50cm). Users of this solution can measure body temperatures accurately and quickly, and the solution can be integrated into access control systems easily. The RL78/G13 is a standard 16-bit microcontroller (MCU) with low power, low cost, and an abundant lineup of features. This system incorporates the ISL29501 Time of Flight (ToF) IC to provide an efficient solution that is easy to design and control, while also providing accurate wide range distance measurement. With a high performance LDO, this reference design provides a reliable power system.

■ System Benefits

- A low cost, low power, and high performance RL78/G13 MCU controls the system
- Features a high performance LDO as part of the integrated solution
- ToF IC with high accuracy distance measurement

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Note:

1. 32A Thermopile array module is 32*32 array, FOV: 90 x 90°, measure distance: 1m (max)
2. MSA module is single thermopile sensor, FOV: 8 x 8°, measure distance: 80cm (max)
3. 32A and MSA module are produced by China local vender. For low cost, MSA module is more suitable.

MCU / MPU Analog Power

Body Temperature Measurement in Access Control Systems

Device Category	P/N	Key Features
MCU	RL78/G13	Low consumption current (CPU: 63 μ A/MHz, standby (STOP): 230 nA) and a high performance of 32.4 DMIPS (24 MHz)
Power	ISL80505	Single output LDO capable of sourcing up to 500mA /1A output current
Analog	ISL29501	The ISL29501 is a Time of Flight (ToF) based signal processing integrated circuit

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RL78/G13 – Standard Functions MCU

Low Power and Abundant Lineup for General Purpose Applications
High Performance Peripheral Functions

- 43.2 DMIPS (32 MHz)
- On-chip oscillator, data flash, 10-bit A/D converter
- Built-in safety features enable support for the household appliance safety standard (IEC/UL 60730)

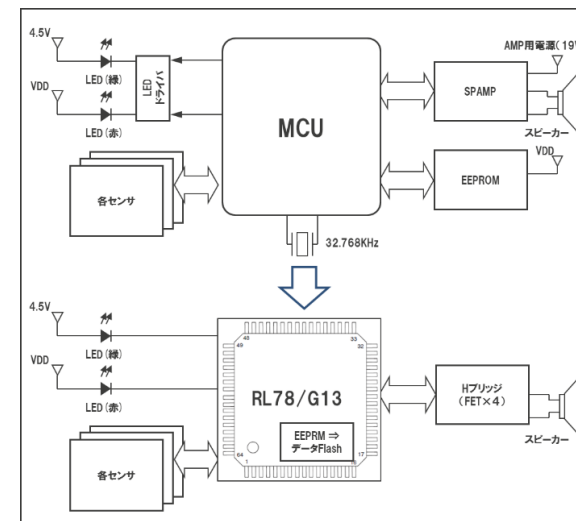
Low Power

- CPU: 66 μA/MHz, standby (STOP): 230 nA
- 0.57 μA (RTC_LVD, HALT mode)

Abundant Lineup

- 16-512KB ROM / 2-32KB RAM
- 20-128 pin package

Part #	Flash ROM	RAM	Package(mm)
R5F1006/7/8x R5F1016/7/8x	16 ~ 64 KB	2 ~ 4 KB	20-LSSOP, 24-HWQFN(4 x 4), 25-WFLGA(3 x 3)
R5F100A/B/Cx R5F101A/B/Cx	16 ~ 128 KB	2 ~ 12 KB	20-LSSOP, 32-HWQFN(5 x 5), 36-WFLGA(4 x 4)
R5F100Ex R5F101Ex	16 ~ 192 KB	2 ~ 16 KB	40-HWQFN(6 x 6)
R5F100F/Gx R5F101F/Gx	16 ~ 512 KB	2 ~ 32 KB	44-LQFP(10 x 10), 48-LFQFP(7 x 7), 48-HWQFN(7 x 7)
R5F100J/Lx R5F101J/Lx	32 ~ 512 KB	2 ~ 32 KB	52-LQFP(10 x 10), 64-LQFP(12 x 12), 64-LFQFP(10 x 10), 64-VFBGA(4 x 4),
R5F100M/Px R5F101M/Px	96 ~ 512 KB	8 ~ 32 KB	80-LQFP(14 x 14), 80-LFQFP(12 x 12), 100-LQFP(14 x 20), 100-LFQFP(14 x 14),
R5F100Sx R5F101Sx	192 ~ 512 KB	16 ~ 32 KB	128-LFQFP(14 x 20)



BOM Cost Reduction Use Case



Renesas Starter Kit for RL78/G13



QB-R5F100LE-TB Easy Evaluation Kit



ISL80505/510 – High Performance 0.5A/1A LDO

High PSRR for Instrumentation, Industrial, and Medical applications

Stable Output Voltage

- $\pm 1.8\%$ V_{OUT} accuracy guaranteed over line, load
- Stable with a 4.7 μ F output ceramic capacitor

High Efficiency

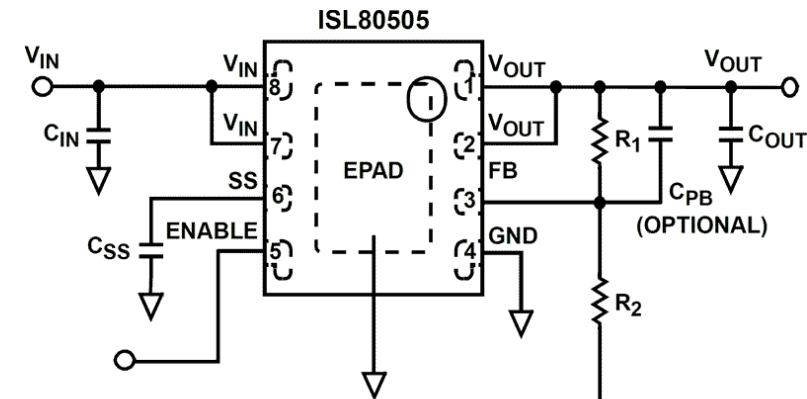
- Very low 45mV dropout voltage at $V_{OUT} = 2.5V$
- Very fast transient response

High Performance

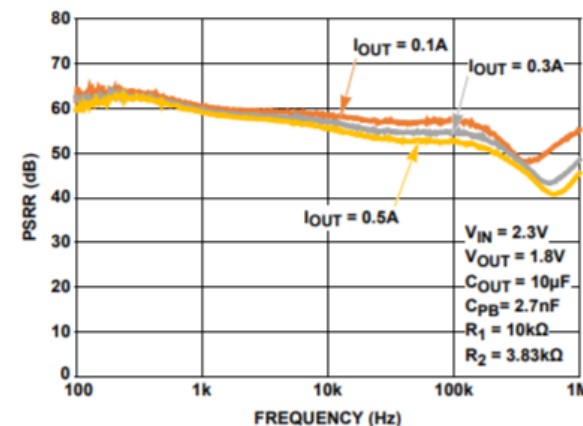
- Excellent PSRR over wide frequency range
- Programmable output soft-start time

Excellent Safety

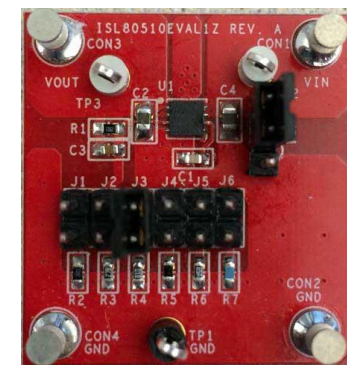
- Current limit protection
- Thermal shutdown function



Typical Application Circuit



PSRR (power supply rejection ratio)



ISL80510EVAL1Z 1A LDO Eval Board

Part #	Vin (V)	Iout (A)	Package
ISL80505IRAJZ	1.8V to 6V	0.5	3x3 DFN
ISL80510IRAJZ	2.2V to 6V	1	3x3 DFN



ISL29501 – Time of Flight (ToF) Signal Processing IC

Low cost, Low power, and Long Range Optical Distance Sensing

Application-Level Integrated

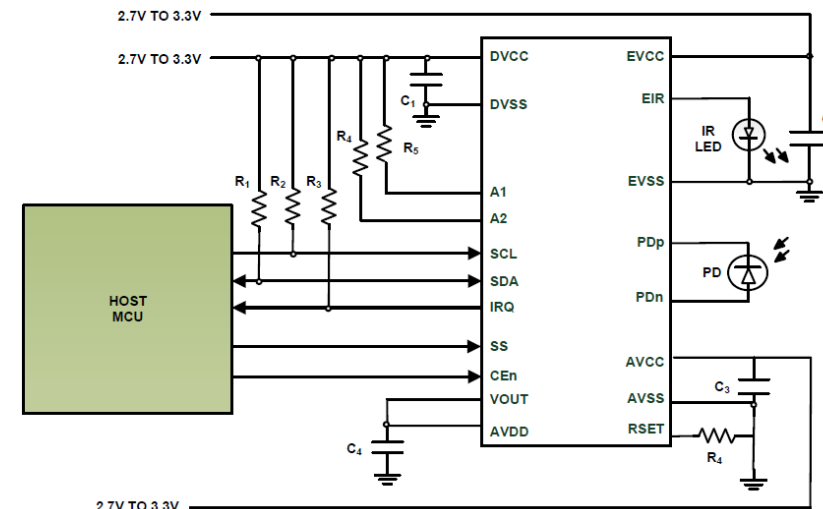
- On-chip Digital Signal Processor calculates the time of flight
- Built-in current DAC circuit that drives LED or laser
- On-chip active ambient light rejection

Easy Control

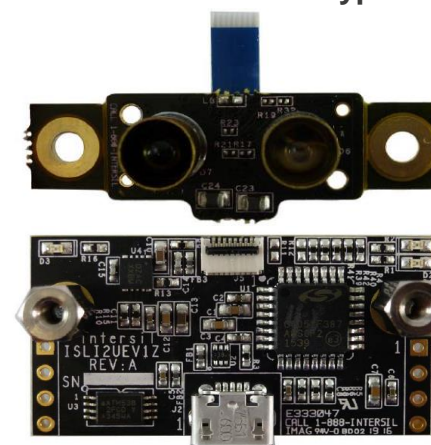
- I²C interface for configuration and control.
- Operates in Continuous and Single Shot mode
- Auto gain control mechanism
- Interrupt controller
- Modulation frequency of 4.5MHz

Suitable for Different Designs

- Enables proximity detection and distance measurement
- allows to optimize for performance/power/distance, etc
- wavelength agnostic
- Emitter DAC with programmable current up to 255mA
- I2C interface supporting 1.8V and 3.3V bus
- Low profile 24 Ld 4x5 QFN package



Typical Application Circuit



ISL29501-CS-EVKIT1Z Cat Shark



ISL29501-ST-EV1Z Sand Tiger

Part #	VDD RANGE (V)	TEMP RANGE (°C)	Package
ISL29501IRZ-T7	2.7V to 3.3V	-40 to +85	24 Ld QFN
ISL29501IRZ-T7A	2.7V to 3.3V	-40 to +85	24 Ld QFN

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