



# CN059

## Smart Lighting Control with RGB Light Sensor

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# Smart Lighting Control with RGB Light Sensor

## ■ Overview

Lighting control is increasingly becoming a high growth market. This new technology provides new functionalities to improve the quality of life and enable technological advancements in critical areas. These areas include personalized healthcare, emergency response, traffic management, smart manufacturing, defense, home security, and smart energy distribution and utilization. Voice recognition is also becoming a more integral part of lighting control, not only for in home use, but for industrial and medical applications as well.

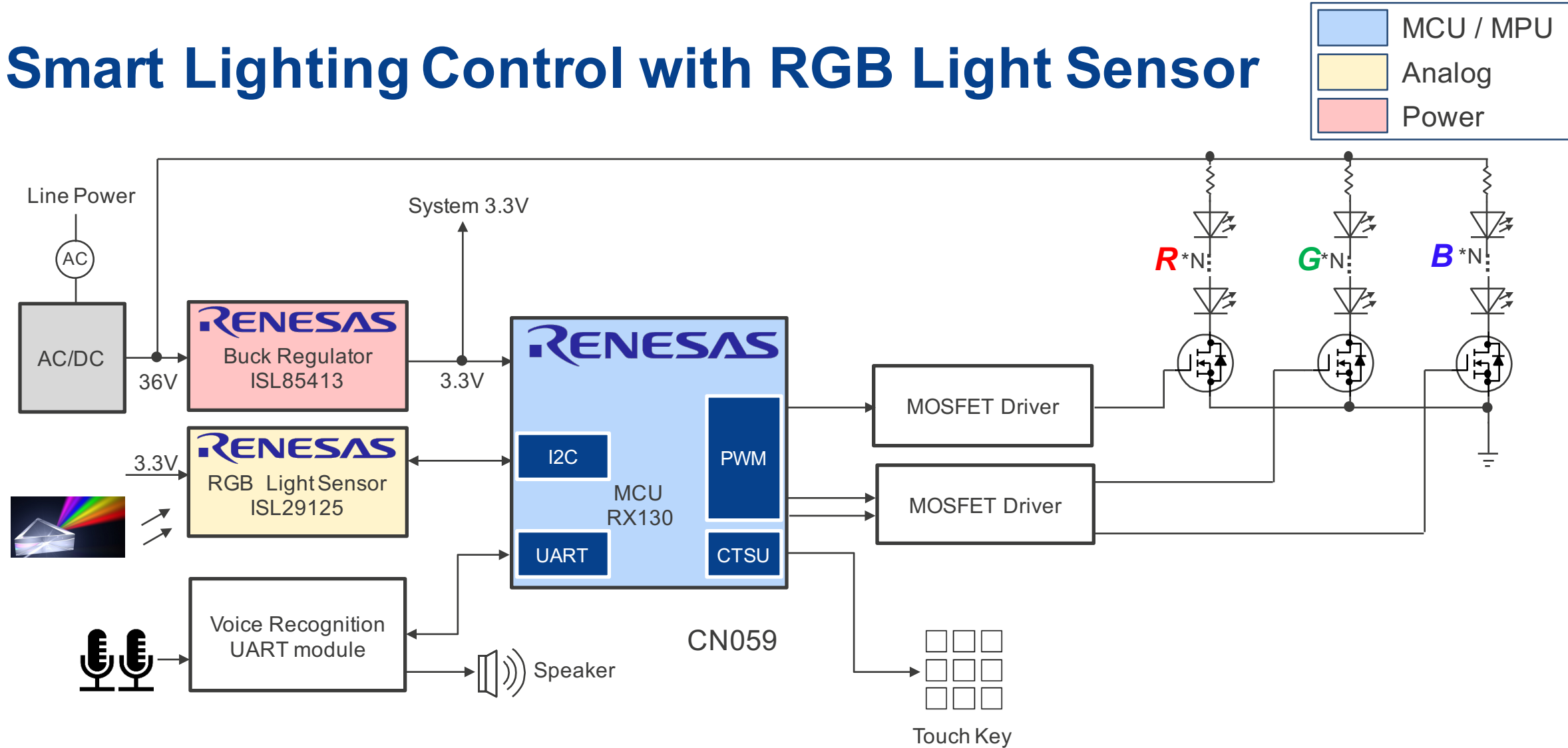
Renesas provides MCUs for lighting control systems, along with some key technologies, such as capacitive touch, light sensors and power solutions.

## ■ System Benefits

- ⌘ The RX130 provides cap-touch for touch control
- ⌘ The ISL29125 is an RGB light sensor for light control systems
- ⌘ Low cost and high performance, voice recognition module

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Device Category	P/N	Key Features
MCU	RX130 <a href="#">R5F5130xxxxx</a>	32-MHz, 32-bit RX MCUs, 50 DMIPS, up to 512-KB flash memory, up to 36 pins capacitive touch sensing unit, up to 6 comms channels, 12-bit A/D, D/A, RTC, IEC60730 compliance
Analog	ISL29125	RGB light sensor with IR blocking filter and small package
Power	ISL85413	300mA/40V DC/DC, synchronous buck regulator, wide Vin 3-40V, Vout 0.6-34V

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# RX130 – 32-bit MCU with Up to 36 Touch Key Channels

## Cost Optimized and High Performance RX MCU 5V Operation Support

### Cost Optimized and High Performance

- Max. operating frequency: 32MHz
- Accumulator support DSP instructions
- Up to 512 Kbytes code flash and 48 Kbytes SRAM, no wait states
- Incorporating external components into MCU like POR/LVD, RTC, E2 data flash, temperature sensor and port with 5V support

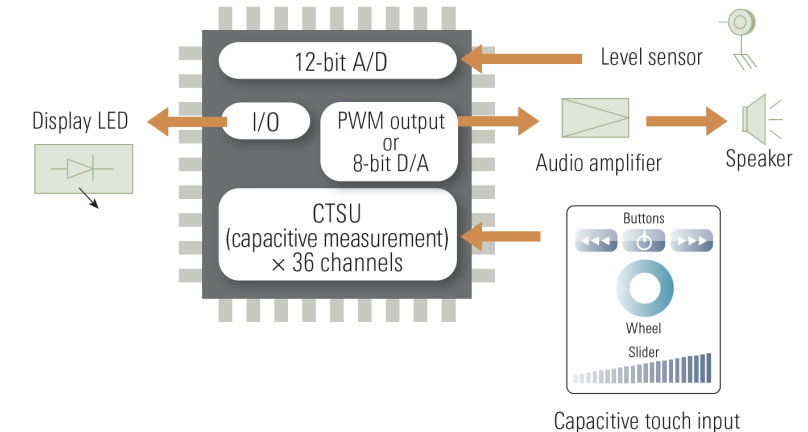
### Capacitive Touch Sensors with Sensitivity and Noise Tolerance

- Up to 36 capacitive touch sensor (CTSUs) channels
- Improved noise immunity, sensitivity and water resistance
- Supports wet environments, supports a variety of materials like wood, acrylic, glass or stone
- Operation possible when wearing gloves

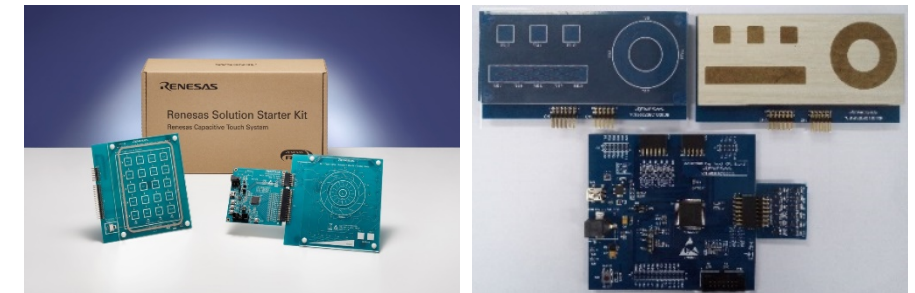
### Rich Peripheral Functions and Low Power Design

- 3 low power consumption modes
- Low power timer (LPT) that operates during the software standby states
- Supply current: high-speed operating mode: 96  $\mu$ A/MHz, software standby mode: 0.37  $\mu$ A
- Up to 6 communication functions, up to 12 extended-function timers, 12-bit ADC, 8-bit DAC, comparator, remote control signal reception

Part #	ROM (Kbytes)	RAM (Kbytes)	E2 DataFlash (Kbytes)	Package
R5F51308AGFP	512	48	8	LFQFP100/0.50
R5F51307AGFN	384	48	8	LFQFP80/0.50
R5F51306BGFM	256	32	8	LFQFP64/0.50
R5F51305AGFL	128	16	8	LFQFP48/0.50
R5F51303AGNE	64	10	8	HWQFN48/0.50



System Block



Evaluation Kits

# ISL29125 – RGB Color Light Sensor

## Digital RGB Color Light Sensor with IR Blocking Filter

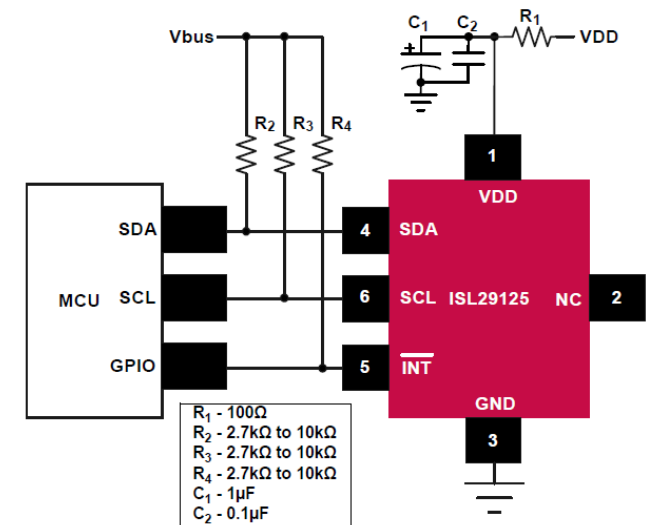
### High Sensitivity, Accurate and Flexible Design

- Selectable range (Via I<sup>2</sup>C)
- I<sup>2</sup>C (SMBus compatible) output
- ADC resolution 16 bits
- Programmable interrupt windows
- Two optical sensitivity ranges:  
Range 0 = 5.7m lux to 375 lux  
Range 1 = 0.152 lux to 10,000 lux

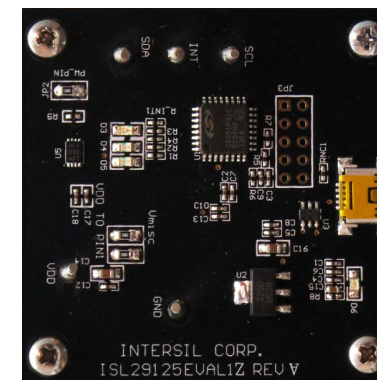
### Low Power and Small Package

- 56μA operating current, 0.5μA shutdown current
- Operating power supply 2.25 to 3.63V
- I<sup>2</sup>C power supply 1.7V to 3.63V
- 6 Ld ODFN (1.65x1.65x0.7mm) package

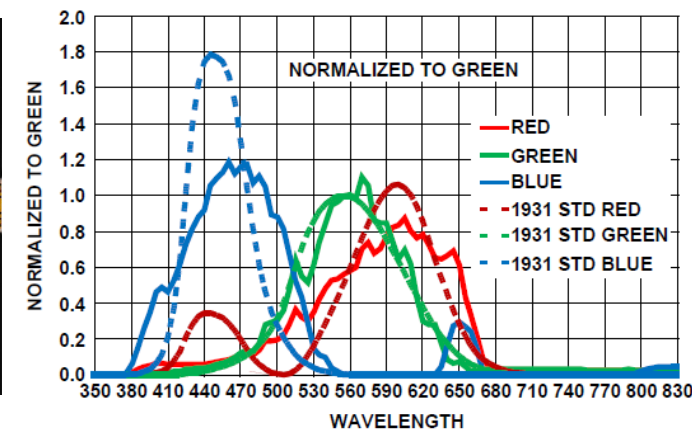
Part #	Temp range	Tape and Reel Quantity	Package
ISL29125IROZ-T7	-40 to 85 °C	3000	6 Ld 1.65 x 1.65 ODFN
ISL29125IROZ-T7A	-40 to 85 °C	250	6 Ld 1.65 x 1.65 ODFN



Typical Application Diagram



ISL29125EVAL1Z  
Evaluation Board



Normalized Spectral  
Response for RGB Sensing

# ISL85413 – 300mA Synchronous Buck Regulator

Supports 3.5V-40V Input Voltage Range for Buck

## Wide Working Range and Small Package

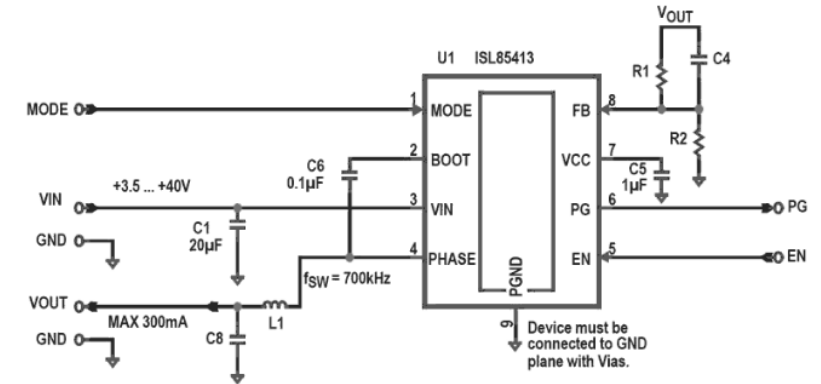
- Power input voltage range variable 3.5V to 40V
- Internal switching frequency 700kHz
- Continuous output current up to 300mA
- 3mm x 3mm TDFN

## High Integration to Reduce Cost

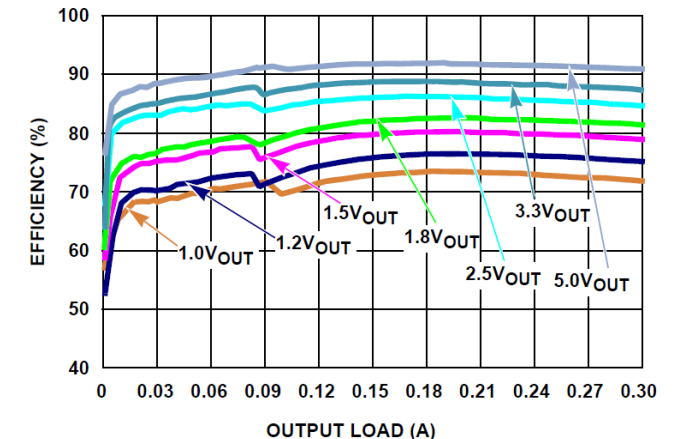
- Integrates both high-side and low-side NMOS FETs

## Best Fit for Applications

- PFM mode for improved efficiency at light loads, could be disable as well
- Requires very robust design for high voltage industrial applications
- High efficient requirement for battery powered applications



Typical Application Circuit



Efficiency vs Load, PFM,  $V_{IN} = 12V$

Part #	$V_{IN} / V_{out}$ Range(V)	Switch frequency	Peak efficiency	Package
<a href="#">ISL85413FRTZ</a>	3.5 to 40	0.6-0.784 MHz	92%	8 Ld TDFN

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[Renesas.com](https://www.renesas.com)