

The World's Most Energy Efficient MCUs with Arm® Cortex® M Core based on SOTB™ process

# RE01 256KB MCU GROUP

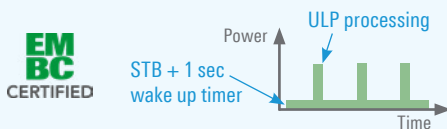
## Delivering Ultra-Low Power with 705 ULPMark™-CP Score Certified by EEMBC

The RE01 256KB is developed based on the Silicon On Thin Buried Oxide (SOTB™) process technology, realizing ultra-low current consumption in both active and standby mode and enabling high-speed operation (64MHz) at low voltage (1.62V), which is impossible to achieve with conventional bulk silicon process.

### Key Benefits

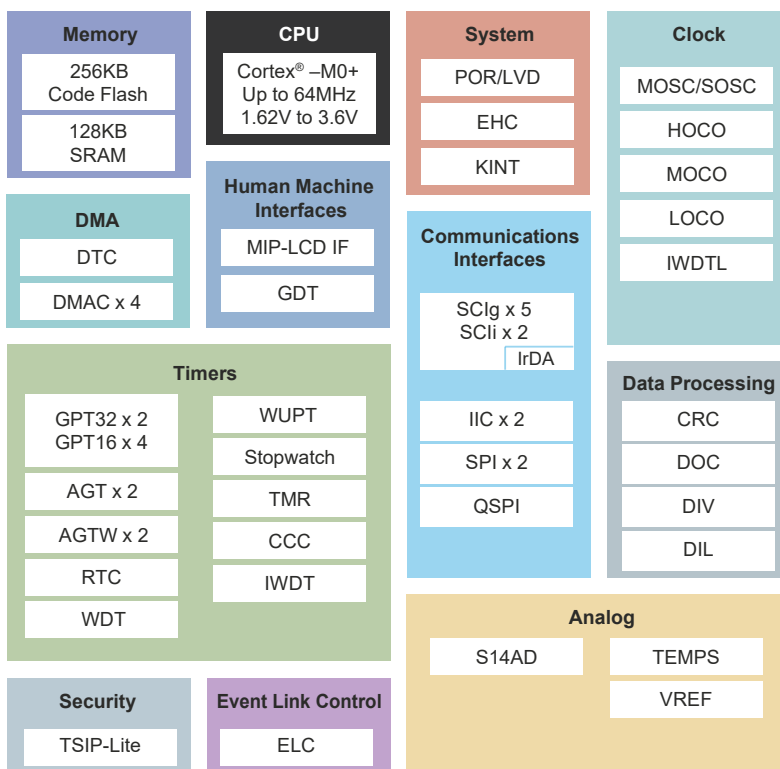
- Certified with the highest score of 705 for the ULPMark-CP by the EEMBC ULPMark™ benchmark, proving it as the industry leading energy efficient MCU.

High score when the total area for one minute is small.



- Significantly extend battery life and deliver high performance with small battery size.
- On-chip energy harvesting controller can eliminate a battery completely in achieving a maintenance-free system.
- High-speed operation of many functions simultaneously at a low voltage.
- Strong security with Trusted Secure IP.
- Realize small form factor and light weight due to a significant reduction of battery size.
- Reduce current consumption further when used with ISL9123 to support always on sensing applications.

### Block Diagram



### Key Features

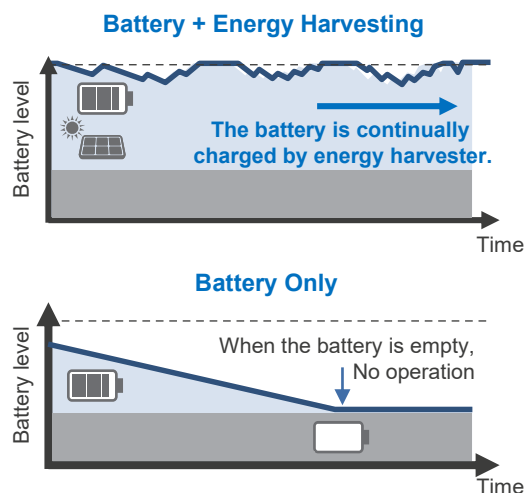
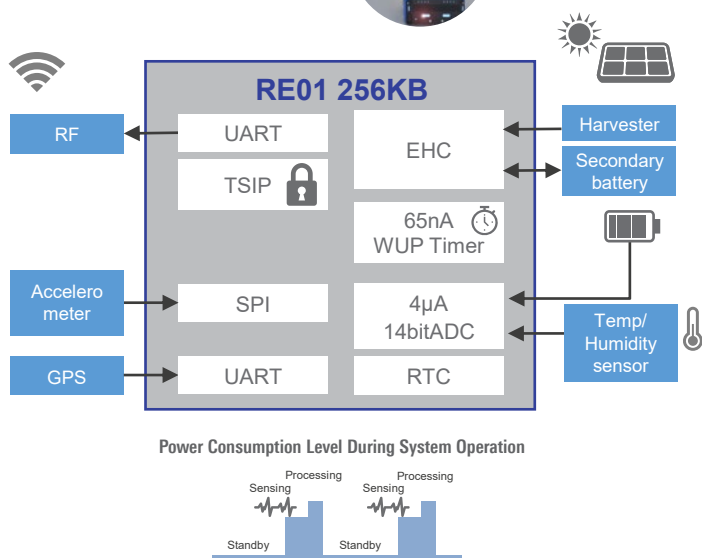
- 32-bit CPU Arm® Cortex®-M Core (up to 64MHz)
- 256kB Flash Memory and 128kB SRAM
- Run 25µA/MHz (12µA/MHz with ext. DC/DC), Standby 400nA
- 14-bit ADC 4µA & Flash Programming 600µA
- Energy Harvesting Control Circuit
- Memory in Pixel Display Parallel Interface
- 2D Graphics Engine
- Deep Standby with RTC 300nA at 1.8V
- 32-bit Wake Up Timer and Low Power Timer (WUPT)
- Trusted Secure IP

### Applications

- Smart Home/Building
- Structural Health Monitoring
- Wearable
- Tracker
- Smart Agriculture
- Healthcare

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## Application Example – GPS Tracker



## Development Tools

| IDE         | Renesas e <sup>2</sup> studio                      | IAR EWARM                      |
|-------------|--|--------------------------------|
| Compiler    | ■ GCC GNU Compiler                                 | ■ IAR Arm Compiler             |
| Debugger    | ■ Renesas E2/E2 Lite<br>■ SEGGER J-Link            | ■ IAR I-Jet<br>■ SEGGER J-Link |
| Programmer  | ■ Renesas PG-FP6, RFP<br>■ SEGGER J-Flash, Flasher |                                |
| Driver      | ■ Arm CMSIS Driver<br>■ Renesas HAL Driver         |                                |
| Sample code | ■ Driver sample code<br>■ Low level code           |                                |

## Evaluation Kit

EK-RE01 256KB supports MCU current measurement, energy harvesting evaluation and sensor connectivity expansion through PMOD or/and Arduino interfaces. Available stocks are found at the website.

**EK-RE01 256KB**  
RTK70E0118S00000BJ



### Kit includes

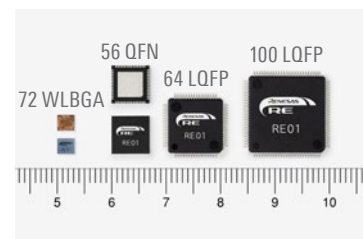
- Main board
- Solar panel
- MIP-LCD expansion board
- USB cable(type-A male to micro-B male)

### Web download

- Software tool
- Sample code
- User's manual
- Schematics
- Gerber data
- BOM file

## Ordering References

|           | 100 LQFP      | 72 WLBGA         | 64 LQFP       | 56 QFN        |
|-----------|---------------|------------------|---------------|---------------|
| w/ TSIP   | R7F0E01182CFP | R7F0E01182DBR    | R7F0E01182CFM | R7F0E01182DNG |
| w/o TSIP  | R7F0E01082CFP | R7F0E01082DBR    | R7F0E01082CFM | R7F0E01082DNG |
| Size      | 14mm x 14mm   | 3.16mm x 2.88 mm | 10mm x 10mm   | 7mm x 7mm     |
| Pin pitch | 0.5mm         | 0.3mm            | 0.5mm         | 0.4mm         |



For more details, please visit [www.renesas.com/RE](http://www.renesas.com/RE)

renesas.com

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