RL78/I1A

The Ultimate Lighting Microcontroller

Renesas Electronics' RL78/I1A microcontrollers implement lighting control, power supply control including Power Factor Correction, advanced safety and communication functions in a single chip, enabling lower cost, regulation compliance, fine dimming, lighting sequence and colour temperature control. RL78/I1A adopts the Renesas Electronics 16-bit RL78 CPU, which achieves both high computational performance and ultra low power consumption, and includes 32 to 64 kilobytes of Flash memory in 20- to 38-pin packages. Safety hardware functions for IEC60730 compliance are also embedded.

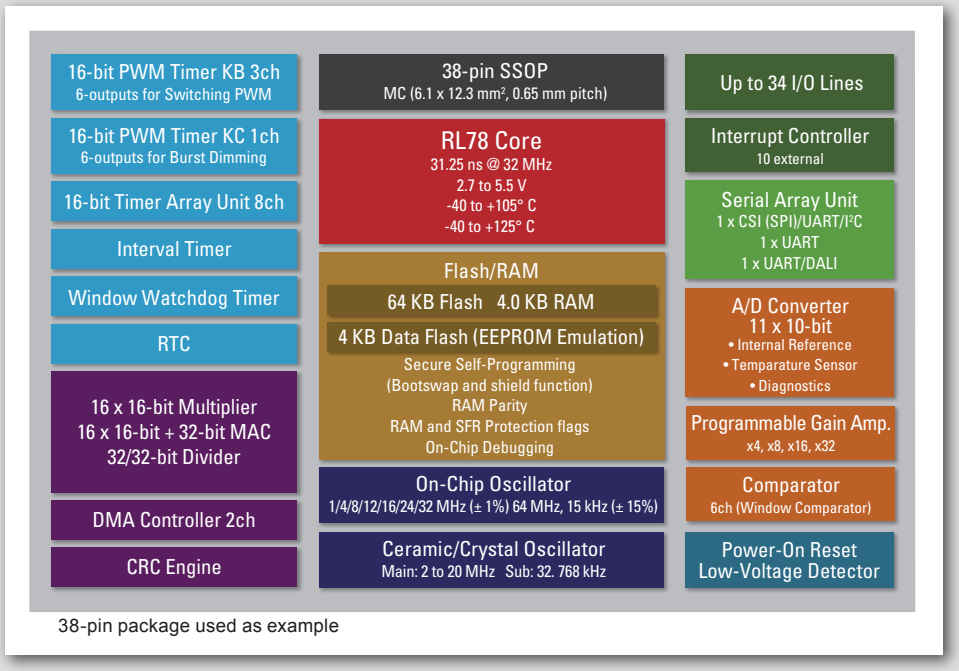
Applications

- LED drivers
- Fluorescent ballasts
- HID ballasts
- Emergency lighting
- Lighting controls
- Digital power supplies
- Low-cost inverter controls

Key Benefits

- Single-chip solution for power stage control and driving multiple LED channels
- High resolution dimming and accurate dynamic CRI and CCT control
- Supports 16-, 17- & 24-bit extended DALI, DMX512 and multiple sensor & user interface controls
- Ultra low power consumption, high system efficiency and LED diagnostics & lifetime compensation
- Easy integration into building automation networks
- Enables high intelligence light innovation at low system cost

Block Diagram



38-pin package used as example

Key Features

High Performance

- CPU: 32 MHz (1.27 DMIPS/MHz)
  32 MHz @-40~+85° C
  24 MHz @-40~125° C
- Signed/Unsigned H/W MAC
- Signed/Unsigned H/W Multiplier
- Unsigned H/W Divider
- DMA 2ch

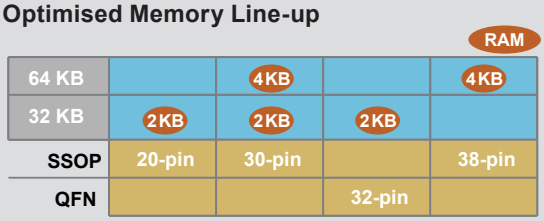
Ultra Low Power

- 66 µA/MHz Operation
- 0.2 µA in STOP mode
- “Snooze” mode <1.0 µA Standby with DALI wake-up

Optimised Peripherals

- 16-bit PWM Timer 2 outputs x 3ch
  - » 64 MHz operation
  - » Minimum 0.97 ns resolution
  - » 4-Bit dithering
  - » Soft-start function
  - » 16-bit Burst Dimming PWM (6ch)
  - » Digital interleave PFC control
  - » Interlock operation with comparator
- Real-time clock
- Analog functions
  - » 10bit A/D Converter – up to 11ch
  - » Comparator - 6ch with windowing capability
  - » PGA – x4/x8/x16/x32
- Serial interfaces
  - » UART/DALI, I²C, CSI, DMX512

Optimised Memory Line-up



Integrated Safety Functions

- Over-current & over-voltage detection
- Thermal management
- Flash memory CRC calculation
- RAM parity bit rrror detection
- Illegal access detection
- RAM / SFR guard protection
- Clock frequency detection
- A/D test function

System Cost Reduction

- 32 MHz ± 1% Internal Oscillator
- 64 MHz PLL for PWM Timers
- 4 KB Data Flash with background operation & 1000K times endurance
- Power-on-reset & low voltage indicator

Ordering Information

Pin Count	Flash ROM	Data Flash	RAM	Package	Part Number
20-pin	32 K	4 K	2 K	20-pin plastic TSSOP (5.72 mm (225))	R5F1076CGSP
30-pin	32 K	4 K	2 K	30-pin plastic SSOP (7.62 mm (300))	R5F107ACGSP
30-pin	64 K	4 K	4 K	30-pin plastic SSOP (7.62 mm (300))	R5F107AEGSP
32-pin	32 K	4 K	2 K	32-pin plastic VQFN (5 x 6 mm (300))	R5F107BCGNA
38-pin	64 K	4 K	4 K	38-pin plastic SSOP (7.62 mm (300))	R5F107DEGSP

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