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
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

<table>
<thead>
<tr>
<th>Pin Count</th>
<th>Flash ROM</th>
<th>Data Flash</th>
<th>RAM</th>
<th>Package</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-pin</td>
<td>32 K</td>
<td>4 K</td>
<td>2 K</td>
<td>20-pin plastic TSSOP (5.72 mm (225))</td>
<td>R5F1076CGSP</td>
</tr>
<tr>
<td>30-pin</td>
<td>32 K</td>
<td>4 K</td>
<td>2 K</td>
<td>30-pin plastic SSOP (7.62 mm (300))</td>
<td>R5F107ACGSP</td>
</tr>
<tr>
<td>30-pin</td>
<td>64 K</td>
<td>4 K</td>
<td>4 K</td>
<td>30-pin plastic SSOP (7.62 mm (300))</td>
<td>R5F107AEGSP</td>
</tr>
<tr>
<td>32-pin</td>
<td>32 K</td>
<td>4 K</td>
<td>2 K</td>
<td>32-pin plastic QFN (5 x 6 mm (300))</td>
<td>R5F107BCGNA</td>
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<tr>
<td>38-pin</td>
<td>64 K</td>
<td>4 K</td>
<td>4 K</td>
<td>38-pin plastic SSOP (7.62 mm (300))</td>
<td>R5F107DEGSP</td>
</tr>
</tbody>
</table>

Integrated Safety Functions
- Over-current & over-voltage detection
- Thermal management
- Flash memory CRC calculation
- RAM parity bit error 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

Before purchasing or using any Renesas Electronics products listed herein, please refer to the latest product manual and/or data sheet in advance.