**REAL TIME CLOCKS**

Intersil’s family of Real Time Clock products offer a wide variety of useful industry-standard functions and features covering basic low-cost clock and calendar RTCs, feature-rich RTCs including supervisory functions and EEPROM memory for system personality data, as well as high-accuracy 3-in-1 RTC modules which integrate RTC, 32kHz crystal, and onboard temperature sensor.

### High-Accuracy RTC Modules

RTC Modules with Embedded Crystal and Temp Comp

**ISL12022M**

3 in 1 RTC Module (RTC + Embedded Crystal + Temp Sensor) Achieves Better than +5ppm Accuracy

**Key Features**

- ±5ppm Accuracy (-40°C to +85°C)
  - Factory programmed RTC for optimal accuracy
  - Onboard temperature sensor
  - Embedded crystal
- Reliable Timekeeping & Power Management
  - Backup battery management
  - Vdd and battery status monitors and switchover timestamp
  - Battery Reseal™ function extends battery shelf life
- User Programmability
  - PC Interface
  - 128 bytes battery-backed user SRAM
- See also
  - ISL12020M (DFN 3 in 1); ISL12022 and ISL12023 standalone RTCs

#### Block Diagram

![Block Diagram of ISL12022M](image)

**High Accuracy Even in Extreme Temperature Conditions**

- Better than ±5.0ppm over -40 to +85°C!

#### High-Accuracy RTC Modules

<table>
<thead>
<tr>
<th>Device</th>
<th>I_BAT (nA)</th>
<th>Alarms</th>
<th>Selectable Frequency Output</th>
<th>CPU Supervisory Function</th>
<th>Battery</th>
<th>Other Functions</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISL12020M</td>
<td>1000</td>
<td>1</td>
<td>15</td>
<td>N</td>
<td>N</td>
<td>Y Y Battery Switchover Time Stamp</td>
<td>20 Ld DFN</td>
</tr>
<tr>
<td>ISL12022M</td>
<td>1000</td>
<td>1</td>
<td>15</td>
<td>N</td>
<td>N</td>
<td>Y Y Battery Switchover Time Stamp Battery Status Monitor</td>
<td>20 Ld SOIC</td>
</tr>
<tr>
<td>ISL12022MA</td>
<td>1000</td>
<td>1</td>
<td>15</td>
<td>N</td>
<td>N</td>
<td>Y Y Battery Switchover Time Stamp Battery Status Monitor</td>
<td>20 Ld SOIC</td>
</tr>
<tr>
<td>ISL12022M-R5421</td>
<td>1000</td>
<td>1</td>
<td>15</td>
<td>N</td>
<td>N</td>
<td>Y Y Battery Switchover Time Stamp</td>
<td>20 Ld SOIC</td>
</tr>
</tbody>
</table>

- Enhanced ESD Performance
- 100% Pin Compatible with ISL12022M and ISL12022M

**Intersil Signal Path Products • 2014 • www.intersil.com**
Feature-Rich RTCs

Feature-Rich RTC with Embedded Unique ID
ISL12024, ISL12025

RTC with Factory Programmed 64-bit Unique ID Enhances Security

Key Features
- Real-Time Clock/Calendar - Tracks Time in Hours, Minutes and Seconds
  - Day of the Week, Day, Month and Year
- 64-Bit Read-Only Unique ID
- Two Non-Volatile Alarms
  - Settable by Seconds, to Months
  - Repeat Mode (Periodic Interrupts)
- Automatic Backup Switching to Battery or SuperCap™
- On-Chip Oscillator Compensation
  - Internal Feedback Resistor and Compensation Capacitors
  - Analog and Digital Trim

Feature-Rich RTCs

<table>
<thead>
<tr>
<th>Device</th>
<th>( I_{\text{MAX}} ) (mA)</th>
<th>Alarms</th>
<th>Selectable Frequency Output</th>
<th>CPU Supervisory Functions</th>
<th>Battery Backup</th>
<th>IRQ</th>
<th>( F_{\text{OPT}} )</th>
<th>SRAM</th>
<th>Other Functions</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISL12030</td>
<td>N/A</td>
<td>2</td>
<td>N N N N N</td>
<td></td>
<td></td>
<td>Y</td>
<td>N</td>
<td>128 Bytes</td>
<td>• AC Input</td>
<td>8 Ld SOIC</td>
</tr>
<tr>
<td>ISL12032</td>
<td>800</td>
<td>2</td>
<td>7 Y Y N Y Y</td>
<td></td>
<td></td>
<td>Y</td>
<td>Y</td>
<td>128 Bytes</td>
<td>• AC Input, Crystal Backup, Trickle Charger</td>
<td>14 Ld TSSOP</td>
</tr>
<tr>
<td>ISL12022</td>
<td>1000</td>
<td>1</td>
<td>15 N N Y Y</td>
<td></td>
<td>Shared Pin</td>
<td></td>
<td>128 Bytes</td>
<td></td>
<td>• Battery Switchover Time Stamp, Battery Status Monitor</td>
<td>8 Ld SOIC</td>
</tr>
<tr>
<td>ISL12023</td>
<td>1000</td>
<td>1</td>
<td>15 N N Y Y</td>
<td></td>
<td>Dedicated Pin</td>
<td>Dedicated Pin</td>
<td>128 Bytes</td>
<td>• Battery Switchover Time Stamp, Battery Status Monitor</td>
<td>14 Ld TSSOP</td>
<td></td>
</tr>
<tr>
<td>ISL12026</td>
<td>850</td>
<td>2</td>
<td>3 N N N</td>
<td></td>
<td>Shared Pin</td>
<td></td>
<td>512x8-Bit EEPROM</td>
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<td></td>
<td>8 Ld SOIC, 8 Ld TSSOP</td>
</tr>
<tr>
<td>ISL12024</td>
<td>850</td>
<td>2</td>
<td>3 N N N</td>
<td></td>
<td>Shared Pin</td>
<td></td>
<td>512x8-Bit EEPROM</td>
<td></td>
<td>• 64-bit Unique ID</td>
<td>8 Ld SOIC, 8 Ld TSSOP</td>
</tr>
<tr>
<td>ISL12024RTCZ</td>
<td>850</td>
<td>2</td>
<td>3 N N N</td>
<td></td>
<td>Shared Pin</td>
<td></td>
<td>512x8-Bit EEPROM</td>
<td></td>
<td>• 64-bit Unique ID</td>
<td>8 Ld TDFN</td>
</tr>
<tr>
<td>ISL12027</td>
<td>850</td>
<td>2</td>
<td>Y Y N Y</td>
<td></td>
<td>-</td>
<td>-</td>
<td>512x8-Bit EEPROM</td>
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<td></td>
<td>8 Ld SOIC, 8 Ld TSSOP</td>
</tr>
<tr>
<td>ISL12028</td>
<td>850</td>
<td>2</td>
<td>3 Y Y N Y</td>
<td></td>
<td>Shared Pin</td>
<td></td>
<td>512x8-Bit EEPROM</td>
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<td>• CMOS output on alarms</td>
<td>14 Ld SOIC, 14 Ld TSSOP</td>
</tr>
<tr>
<td>ISL12029</td>
<td>850</td>
<td>2</td>
<td>3 Y Y N Y</td>
<td></td>
<td>Shared Pin</td>
<td></td>
<td>512x8-Bit EEPROM</td>
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<td>• Open drain output on alarms</td>
<td>14 Ld SOIC, 14 Ld TSSOP</td>
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<tr>
<td>ISL12025</td>
<td>850</td>
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<td>Y Y N Y</td>
<td></td>
<td>-</td>
<td>-</td>
<td>512x8-Bit EEPROM</td>
<td></td>
<td>• 64-bit Unique ID, CPU Supervisor</td>
<td>8 Ld SOIC, 8 Ld TSSOP</td>
</tr>
</tbody>
</table>

High Precision RTC with On-Chip Temperature Sensor

ISL12022
1000
1
15
N
N
Y
Y
Shared Pin
128 Bytes
• Battery Switchover Time Stamp
• Battery Status Monitor
8 Ld SOIC

ISL12023
1000
1
15
N
N
Y
Y
Dedicated Pin
Dedicated Pin
128 Bytes
• Battery Switchover Time Stamp
• Battery Status Monitor
14 Ld TSSOP

With Integrated EEPROM

ISL12026
850
2
3
N
N
N
Y
Shared Pin
512x8-Bit EEPROM
8 Ld SOIC, 8 Ld TSSOP

With Integrated EEPROM and Embedded Unique ID

ISL12024
850
2
3
N
N
N
Y
Shared Pin
512x8-Bit EEPROM
8 Ld SOIC, 8 Ld TSSOP

ISL12024RTCZ
850
2
3
N
N
N
Y
Shared Pin
512x8-Bit EEPROM
8 Ld TDFN

With Integrated EEPROM and CPU Supervisory Functions

ISL12027
850
2
Y
Y
N
Y
-
- 512x8-Bit EEPROM
8 Ld SOIC, 8 Ld TSSOP

ISL12028
850
2
3
Y
Y
N
Y
Shared Pin
512x8-Bit EEPROM
14 Ld SOIC, 14 Ld TSSOP

ISL12029
850
2
3
Y
Y
N
Y
Shared Pin
512x8-Bit EEPROM
14 Ld SOIC, 14 Ld TSSOP

With Integrated EEPROM, Embedded Unique ID, and CPU Supervisory Functions

ISL12025
850
2
Y
Y
N
Y
-   - 512x8-Bit EEPROM
8 Ld SOIC, 8 Ld TSSOP

Do you track your product for warranty purposes?
• Can be used to identify each node. Data from each node can be encrypted with a unique ID for security purposes.
• Unique ID can be accessed for reading purposes only.

Embedded 64-bit Unique ID

- Can be used to identify each node. Data from each node can be encrypted with a unique ID for security purposes.
- Unique ID can be accessed for reading purposes only.

512x8-bits EEPROM
- 16-byte page write mode (32 total pages)
- 8 modes of BlockLock™ protection
- >2,000,000 write cycle and 50 years endurance reliability
Real Time Clocks

Low-Cost, Low-Power RTCs

Low-Cost, Low-Power RTC

ISL12058

World’s Smallest, Low Cost and Low Power RTC

Key Features
- Low Power
  - Time keeping current = 650nA max @ 1.8V
- Ideal for Portable Applications
  - Operates over 1.4V to 3.6V supplies
- 56% Smaller than Competitive Solutions
  - 8-µTDFN (2x2x0.55mm)
- Easy to Design-in
  - Pin-to-pin replacement: 8-TDFN (3x3mm), 8-MSOP, 8-SOIC

Low-Cost, Low-Power RTCs

<table>
<thead>
<tr>
<th>Device</th>
<th>$I_{BYP}$ (µA)</th>
<th>Alarms</th>
<th>Selectable Frequency Output</th>
<th>CPU Supervisory Function</th>
<th>Battery</th>
<th>Other Functions</th>
<th>Other Functions</th>
<th>Package</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>POR</td>
<td>Watchdog Timer</td>
<td>ReSeal™ Backup</td>
<td>IRQ FOUT SRAM</td>
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<tr>
<td>With IRQs, Alarm and Timer</td>
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<td>2</td>
<td>4</td>
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<td>8 Ld SOIC, 8 Ld MSOP, 8 Ld TDFN</td>
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<td>2</td>
<td>4</td>
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<td>10 Ld MSOP, 8 Ld SOIC</td>
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<td>With Battery Backup</td>
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<tr>
<td>ISL1209</td>
<td>800</td>
<td>1</td>
<td>1</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>8 Ld SOIC</td>
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<tr>
<td>With Battery Backed SRAM</td>
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<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>8 Ld MSOP, 8 Ld SOIC</td>
</tr>
<tr>
<td>ISL1220</td>
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<td>1</td>
<td>15</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>8 Ld MSOP, 8 Ld SOIC</td>
</tr>
<tr>
<td>With Battery Backed SRAM and Event Detection</td>
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</tr>
<tr>
<td>ISL1209</td>
<td>400</td>
<td>1</td>
<td>15</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>8 Ld MSOP</td>
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<tr>
<td>ISL1219</td>
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<td>Y</td>
<td>8 Ld MSOP</td>
</tr>
<tr>
<td>ISL1221</td>
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<td>15</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>8 Ld MSOP</td>
</tr>
</tbody>
</table>

RTC Evaluation Platform
Now Compatible with Windows™ 7 & 8!

RTC Daughter Boards
- Contains RTC sample
- 32.768kHz Crystal (if needed)
- Provides Jumper and LED to monitor IRQ/FOUT interrupt

ISLUSB RTC Mother Board
- Provides I²C interface via USB
- Provides Main Supply (3.3V or 5.5V)
- Provides Battery Backup Supply