

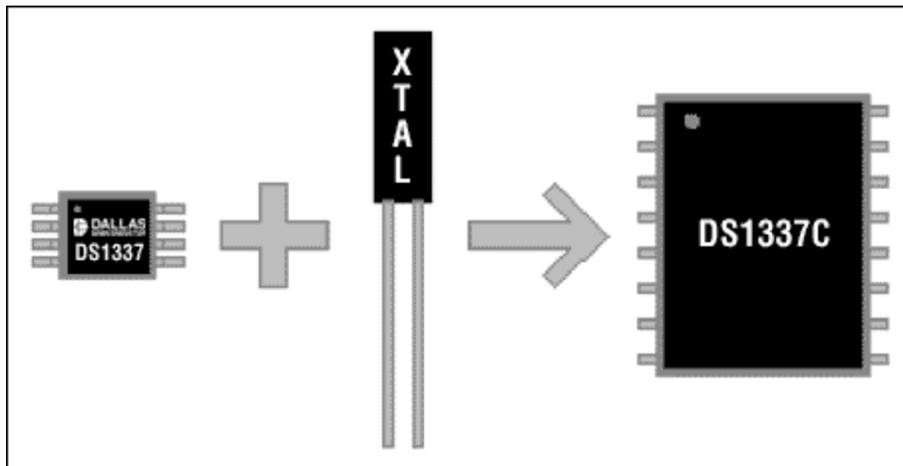
Keywords: Integrated Crystal, Real Time Clock, Timekeeping, 32.768 kHz

## APPLICATION NOTE 3572

# FAQ About the Integrated-Crystal Package Option

Aug 10, 2005

*Abstract: Maxim now offers an integrated-crystal package option for select stand-alone, real-time clocks (RTCs). This new package combines a serial interface (I<sup>2</sup>C, 3-wire, or SPI) RTC device and a compatible 32.768kHz quartz crystal into a single 16-pin SO.*



The following are some frequently asked questions about the new integrated-crystal package option.

## What Real-Time Clocks are Available in this Package?

Available timekeeping devices with this package option are the [DS1337](#), [DS1338](#), [DS1339](#), [DS1340](#), [DS1374](#), [DS3231](#), [DS3232](#), and [DS3234](#). Additional devices will be available in the future.

Some parts that provide this package option have the part number suffix 'C'. For example, the DS1337C specifies the device DS1337 is in the integrated-crystal package. The DS3231, DS3232, DS3234, and DS32X35 are excluded from this naming convention, as they are only available in the integrated-crystal package. Therefore, no package indicator is needed.

## Do any other Maxim Parts Utilize this Package?

This integrated-crystal SO provides a new package option for the [DS32KHZS](#), which is a 32.768kHz temperature-compensated crystal oscillator (TCXO).

## What are the Dimensions of the Package?

The package is a standard 300-mil-wide, 16-pin or 20-pin SO. The dimensions of the 16-pin package are 400 mils x 300 mils x 100 mils. The dimensions of the 20-pin package are 500 mils x 300 mils x 100 mils. A technical drawing is available for [download](#).

## What are the Benefits of this New Package Option?

- Guaranteed operation of the RTC and crystal (proper load capacitance and ESR)
- Elimination of crystal procurement responsibilities
- No crystal printed circuit board (PC board) layout concerns
- No extra manufacturing step requirement for adding a through-hole crystal

## Is there an Improvement in Timekeeping Accuracy?

There could possibly be minor improvements in accuracy due to reduced parasitic capacitance, reduced PCB leakage from contaminants, and proper crystal load capacitance. The device data sheets specify the expected crystal accuracy at nominal  $V_{CC}$  and room temperature (25°C).

## Does Dallas Semiconductor Provide any Accurate Timekeeping Solutions?

Yes, the [DS3231](#) extremely accurate, I<sup>2</sup>C, integrated RTC/TCXO/crystal provides a frequency accuracy of  $\pm 2$ ppm from 0°C to +40°C, and  $\pm 3.5$ ppm from -40°C to 0°C and +40°C to +85°C. Other devices that provide accurate timekeeping include the DS3232, DS3234, and DS32X35.

## Does the New Package Increase the Cost versus Using Discrete Components?

The total solution cost of the integrated crystal package should be equivalent to the cost of the discrete components (crystal and RTC).

## Are there any Special Handling Issues?

The package contains a quartz tuning-fork crystal. Pick-and-place equipment may be used, but precautions should be taken to ensure that excessive shocks are avoided. Ultrasonic cleaning should be avoided.

Moisture-sensitive packages are shipped from the factory dry-packed. Handling instructions listed on the package label must be followed to prevent damage during reflow. Refer to the IPC/JEDEC J-STD-020 standard for moisture-sensitive device (MSD) classifications.

## Are there any Guidelines for PC-Board Layout?

It is recommended that no signal traces run under the package unless a ground plane is placed between the package and the signal line. All NC (no connect) pins must be connected to ground.

## Are there any Special Requirements for Solder Reflow of this Package?

The RoHS packages may be reflowed using a reflow profile that complies with JEDEC J-STD-020.

## How many times Can the Package Go through Reflow?

Exposure to reflow is limited to two times (max).

## Is the Package RoHS-Compliant or Lead-Free (Pb-Free)?

The package has been qualified as an RoHS 5/6-compliant part, which has an exemption for lead in a piezoelectric device. For details, see our lead-free information page. Packages that are available with a Pb-free exemption have a "#" in the part number.

Related Parts		
<a href="#">DS1337</a>	I <sup>2</sup> C Serial Real-Time Clock	<a href="#">Free Samples</a>
<a href="#">DS1338</a>	I <sup>2</sup> C RTC with 56-Byte NV RAM	<a href="#">Free Samples</a>
<a href="#">DS1339</a>	I <sup>2</sup> C Serial Real-Time Clock	<a href="#">Free Samples</a>
<a href="#">DS1340</a>	I <sup>2</sup> C RTC with Trickle Charger	<a href="#">Free Samples</a>
<a href="#">DS1374</a>	I <sup>2</sup> C, 32-Bit Binary Counter Watchdog RTC with Trickle Charger and Reset Input/Output	<a href="#">Free Samples</a>
<a href="#">DS3231</a>	Extremely Accurate I <sup>2</sup> C-Integrated RTC/TCXO/Crystal	<a href="#">Free Samples</a>
<a href="#">DS3232</a>	Extremely Accurate I <sup>2</sup> C RTC with Integrated Crystal and SRAM	<a href="#">Free Samples</a>
<a href="#">DS3234</a>	Extremely Accurate SPI Bus RTC with Integrated Crystal and SRAM	<a href="#">Free Samples</a>
<a href="#">DS32KHZ</a>	32.768kHz Temperature-Compensated Crystal Oscillator	<a href="#">Free Samples</a>

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### More Information

For Technical Support: <http://www.maximintegrated.com/support>

For Samples: <http://www.maximintegrated.com/samples>

Other Questions and Comments: <http://www.maximintegrated.com/contact>

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