

RELIABILITY REPORT FOR MAX31342EWA+

MAX31342EWA+T

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MAXIM INTEGRATED

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Conclusion

The MAX31342 successfully meets the quality and reliability standards required of all Maxim Integrated products. In addition, Maxim Integrated's continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim Integrated's quality and reliability standards.

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I. Device Description

A. General

The MAX31342 low-current, real-time clock (RTC) is a time-keeping device that provides an extremely low timekeeping current, permitting longer life from a power supply. The MAX31342 supports 6pF high-ESR crystals, which broaden the pool of usable crystals for the devices. This device is accessed through an I2C serial interface. An integrated power-on reset function ensures deterministic default register status upon power-up.

Other features include two time-of-day alarms, interrupt outputs, a programmable square-wave output, and a serial bus timeout mechanism. The clock/calendar provides seconds, minutes, hours, day, date, month, and year information. The date at the end of the month is automatically adjusted for months with fewer than 31 days, including corrections for leap year. The clock operates in 24-hour mode. The MAX31342 also includes an input for synchronization. When a reference clock (e.g., 32kHz, 50Hz/60Hz Power Line, GPS 1PPS) is present at the CLKIN pin and the enable external clock input bit (ECLK) is set to 1, the MAX31342 RTC is frequency-locked to the external clock and the clock accuracy is determined by the external source.

The device is available in lead(Pb)-free/RoHS-compliant, 8-pin wafer-level package (WLP) 1mm x 2mm package with 0.5mm pitch. The device supports the -40°C to +85°C extended temperature range.

II. Manufacturing Information



III. Packaging Information

Α.	Package Type:	WLP
В.	Lead Frame:	N/A
C.	Lead Finish:	SAC125
D.	Die Attach:	N/A
Ε.	Bondwire:	N/A
F.	Mold Material:	N/A
G.	Assembly Diagram:	05-101050
н.	Flammability Rating:	N/A
I.	Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J.	Single Layer Theta Ja:	N/A
К.	Single Layer Theta Jc:	N/A
L.	Multi Layer Theta Ja:	91.70 °C/W
М.	Multi Layer Theta Jc:	N/A

IV. Die Information

Α.	Dimensions:	78.7401X39.3701 mils
в.	Passivation:	SiN/ SiO2





V. Quality Assurance Information

Α.	Quality Assurance Contacts:	Ryan Wall (Manager, Reliability) Michael Cairnes (Executive Director, Reliability) Bryan Preeshl (SVP of QA)
В.	Outgoing Inspection Level:	0.1% for all electrical parameters guaranteed by the Datasheet. 0.1% for all Visual Defects.
C.	Observed Outgoing Defect Rate:	< 50 ppm
D.	Sampling Plan:	Mil-Std-105D

VI. Reliability Evaluation

A. Accelerated Life Test

The results of the 125C biased (static) life test are shown in Table 1. Using these results, the Failure Rate λ is calculated as follows:

 $\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \ x \ 2454 \ x \ 80 \ x \ 2}$ (Chi square value for MTTF upper limit)

(where 2454 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

 $\lambda = 24.3 \ x \ 10^{-9}$

 $\lambda = 24.3 FITs (60\% confidence level @25°C)$

Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at <a href="https://www.maximintegrated.com/en/support/qa-reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/reliability/

S18 cumulative process Fit

$$\lambda = 0.02 \ FITs \ (60\% \ confidence \ level \ @25^{\circ}C)$$

 $\lambda = 0.24$ FITs (60% confidence level @55°C)

B. ESD and Latch-Up Testing

The MAX31342 has been found to have all pins able to withstand an HBM transient pulse of ± 2500 V per JEDEC / ESDA JS-001. Latch-Up testing has shown that this device withstands ± 250 mA current injection and supply overvoltage per JEDEC JESD78.



Table 1

Reliability Evaluation Test Results

MAX31342EWA+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 125°C Biased Time = 192 hrs.	DC parameters & functionality	80	0	

Note 1: Life Test Data may represent plastic DIP qualification lots.