RELIABILITY REPORT

FOR

MAX31343EKA+, MAX31343EKA+T

July 17, 2020

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

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Conclusion

The MAX31343 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 MAX31343 is a low-cost, extremely accurate, I2C real-time clock (RTC). The device incorporates a battery input and maintains accurate timekeeping when main power to the device is interrupted. The integration of the microelectromechanical systems (MEMS) resonator enhances the long-term accuracy of the device and eliminates the external crystal requirement in the system. The MAX31343 is available in the 8-pin WLP and TDFN packages.

The RTC maintains seconds, minutes, hours, day, date, month, year, and century information. The date at the end of the month is automatically adjusted for months with fewer than 31 days, including corrections for leap year up to year 2199. The clock operates in the 24-hour format. Other features including two programmable time-ofday alarms, interrupt output, uncompensated programmable clock output, and temperature compensated programmable square-wave output. Address and data are transferred serially through an I2C bidirectional bus. A voltage reference and comparator circuit monitors the status of VCC to detect power failures and automatically switch to the backup supply when necessary. See Typical Application Circuit for more details.

II. Manufacturing Information

A. Description/Function:	±5ppm, I2C Real-Time Clock with Integrated MEMS Oscillator
B. Process:	S18
C. Device Count:	180589
D. Fabrication Location:	USA
E. Assembly Location:	Taiwan
F. Date of Initial Production:	April 2020

III. Packaging Information

A. Package Type:	CoW
B. Lead Frame:	N/A
C. Lead Finish:	N/A
D. Die Attach:	N/A
E. Bondwire:	N/A
F. Mold Material:	N/A
G. Flammability Rating:	UL-94 (V-0 Rating)
H. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
I. Single Layer Theta Ja:	N/A
J. Single Layer Theta Jc:	N/A
K. Multi Layer Theta Ja:	109.10 °C/W
L. Multi Layer Theta Jc:	N/A

IV. Die Information

A. Dimensions:	90.551 x 82.677 mils
B. Passivation:	SiN / SiO2

V. Quality Assurance Information

A. Quality Assurance Contacts:	Ryan Wall (Manager, Reliability) Michael Cairnes (Executive Director, Reliability) Bryan Preeshl (SVP of QA)
B. 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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{1000\ x\ 2454\ x\ 231\ x\ 2}$$ (Chi square value for MTTF upper limit)

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

$$\lambda = 1.61\ x\ 10^{-9}$$

$$\lambda = 1.61\ FITs\ (60\%\ confidence\ level\ @25°C)$$

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

S18 cumulative process data:

$$\lambda = 0.02\ FITs\ (60\%\ confidence\ level\ @25°C)$$
$$\lambda = 0.24\ FITs\ (60\%\ confidence\ level\ @55°C)$$

B. ESD and Latch-Up Testing

The MAX31343 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

MAX31343EKA+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 125°C Biased Time = 1000 hrs.	DC parameters & functionality	77	0	R40606C
Static Life Test (Note 1)	Ta = 125°C Biased Time = 1000 hrs.	DC parameters & functionality	77	0	R40606B
Static Life Test (Note 1)	Ta = 125°C Biased Time = 1000 hrs.	DC parameters & functionality	77	0	R40606A

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