

RELIABILITY REPORT
FOR
DS1088CX-133+T
WAFER LEVEL DEVICES

August 15, 2018

MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134

Handwritten signature of Norbert Paul Gerena in black ink.

Norbert Paul Gerena
Engineer, Reliability

Handwritten signature of Brian Standley in black ink.

Brian Standley
Manager, Reliability

Conclusion

The DS1088C 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 DS1088C is a low-cost clock generator that produces a square-wave output without external timing components. The fixed-frequency oscillator is available in a factory-calibrated frequency of 133MHz. The device has a power-down pin for power-sensitive applications.

II. Manufacturing Information

A. Description/Function:	Fixed-Frequency EconOscillator™
B. Process:	E35
C. Device Count:	3839
D. Fabrication Location:	USA
E. Assembly Location:	Taiwan/China
F. Date of Initial Production:	March 27, 2018

III. Packaging Information

A. Package Type:	WLP
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:	87 °C/W
L. Multi Layer Theta Jc:	N/A

IV. Die Information

A. Dimensions:	51 x 52 mils
B. Passivation:	Si ₃ N ₄ /SiO ₂

V. Quality Assurance Information

- | | |
|-----------------------------------|--|
| A. Quality Assurance Contacts: | Norbert Gerena (Engineer, Reliability)
Brian Standley (Manager, 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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{1000 \times 2454 \times 77 \times 2} \text{ (Chi square value for MTTF upper limit)}$$

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

$$\lambda = 4.85 \times 10^{-9}$$

$$\lambda = 4.85 \text{ FITs (60\% confidence level @25°C)}$$

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>.

E35 Quarterly Process FIT from Q2FY18

$$\lambda = 2.4 \text{ FITs (60\% confidence level @25°C)}$$

B. E.S.D. and Latch-Up Testing

The DS1088C has been found to have all pins able to withstand an HBM transient pulse of +/- 4000 V per JEDEC / ESDA JS-001. Latch-Up testing has shown that this device withstands +/- 100 mA current injection and supply overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results

DS1088L (DS1088C QBS)

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

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