

RELIABILITY REPORT
FOR
MAX13054AEASA+
PLASTIC ENCAPSULATED DEVICES

May 23, 2018

MAXIM INTEGRATED

160 RIO ROBLES
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Conclusion

The MAX13054 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.

Table of Contents

I.Device Description	IV.Die Information
II.Manufacturing Information	V.Quality Assurance Information
III.Packaging Information	VI.Reliability Evaluation
.....Attachments	

I. Device Description

A. General

The MAX13054A is +5V CAN (Control Area Network) transceiver with integrated protection for industrial applications. This device has extended $\pm 65\text{V}$ fault protection for equipment where overvoltage protection is required. It also incorporates high $\pm 25\text{kV}$ ESD HBM and an input common mode range (CMR) of $\pm 25\text{V}$, exceeding the ISO11898 specification of -2V to $+7\text{V}$. This makes these parts well suited for applications that are in electrically noisy environments, where the ground planes are shifting relative to each other. This family features a variety of options to address common CAN application requirements; logic-level supply input VL for interfacing with 1.62V to 5.5V logic, low-current standby mode, silent-mode to disable the transmitter, and a slow slew rate to minimize EMI.

II. Manufacturing Information

A. Description/Function:	+5V, 2Mbps CAN Transceiver with $\pm 65\text{V}$ Fault Protection, $\pm 25\text{V}$ CMR, and $\pm 25\text{kV}$ ESD
B. Process:	S18
C. Device Count:	8817
D. Fabrication Location:	USA
E. Assembly Location:	Phillipines, Thailand, Malaysia
F. Date of Initial Production:	February 8, 2018

III. Packaging Information

A. Package Type:	SOIC
B. Lead Frame:	CU194
C. Lead Finish:	Matte Tin
D. Die Attach:	84-1LMISR4, AB8290, AB2200D
E. Bondwire:	1 mil Au
F. Mold Material:	G600
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:	170 °C/W
J. Single Layer Theta Jc:	40 °C/W
K. Multi Layer Theta Ja:	132 °C/W
L. Multi Layer Theta Jc:	38 °C/W

IV. Die Information

A. Dimensions:	76.4X109.4 mils
B. Passivation:	40nm SiN 18KA SiO2

V. Quality Assurance Information

A. Quality Assurance Contacts:	Ryan Wall (MTS, 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:

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

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

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

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

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>.

S18 Quarterly Process FIT from Q1FY18

$$\lambda = 0.1 \text{ FITs (60\% confidence level @25°C)}$$

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

The MAX13054AEASA+ 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
MAX13054AEASA+

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

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