RELIABILITY REPORT

FOR

MAX22344BAAP+, MAX22344BAAP+T,
MAX22344CAAP+, MAX22344CAAP+T

April 13, 2020

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

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Manager, Reliability

Conclusion

The MAX22344 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 MAX22344–MAX22346 are reinforced, fast, lowpower 4-channel digital galvanic isolators using Maxim's proprietary process technology. These devices transfer digital signals between circuits with different power domains, using as little as 0.74mW per channel at 1Mbps (1.8V supply). All of the devices in the family feature reinforced isolation for a withstand voltage rating of 3.75kVRMS for 60 seconds. The MAX22344–MAX22346 family offers all possible unidirectional channel configurations to accommodate any 4-channel design, including SPI, RS-485, and digital I/O applications. Output enable for the A side of the MAX22345R/S is active-low, making them ideal for isolating a port on a shared SPI bus since the CS signal can directly enable the MISO signal on the isolator. All other output enables in the MAX22344–MAX22346 family are the traditional active-high. Devices are available with a maximum data rate of either 25Mbps or 200Mbps, and feature a selectable default state for the outputs. The default is the state the output assumes when the input is either not powered or is open-circuit. See the Ordering Information and Product Selector Guide for suffixes associated with each option. Independent 1.71V to 5.5V supplies on each side of the isolator also make the devices suitable for use as level translators.

II. Manufacturing Information

A. Description/Function:	Reinforced, Fast, Low-Power, Four-Channel 3.75kVRMS Digital Isolators
B. Process:	Hybrid – S18
C. Device Count:	N/A
D. Fabrication Location:	USA
E. Assembly Location:	Thailand
F. Date of Initial Production:	April 5, 2019

III. Packaging Information

A. Package Type:	20L SSOP Hybrid
B. Lead Frame:	CU194
C. Lead Finish:	Matte Tin
D. Die Attach:	AB8200T
E. Bondwire:	1 mil Au
F. Mold Material:	G605L
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:	N/A
L. Multi Layer Theta Jc:	N/A

IV. Die Information

A. Dimensions:	N/A
B. Passivation:	N/A

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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192\ x\ 2454\ x\ 77\ x\ 2}$$ (Chi square value for MTTF upper limit)

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

$$\lambda = 25.2\ x\ 10^{-9}$$

$$\lambda = 25.2\ FITs\ (60\%\ confidence\ level\ @25°C)$$

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:

$$\lambda = 0.02\ FITs\ (60\%\ confidence\ level\ @25°C)$$
$$\lambda = 0.25\ FITs\ (60\%\ confidence\ level\ @55°C)$$

B. ESD and Latch-Up Testing

The MAX22344 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 ±100 mA current injection and supply overvoltage per JEDEC JESD78.

Table 1

Reliability Evaluation Test Results

MAX22344

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	77	0	

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