RELIABILITY REPORT

FOR

MAX22246
MAX22246CAWA+
MAX22246CAWA+T

September 21, 2020

**MAXIM INTEGRATED**

160 RIO ROBLES

SAN JOSE, CA 95134

Sheena Karlyn Basinang
Engineer, Reliability

Ryan Wall
Manager, Reliability

## Conclusion

The MAX22246 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 MAX22245/MAX22246 are a family of 2-channel reinforced, fast, low-power digital galvanic isolators using Maxim's proprietary process technology. These devices transfer digital signals between circuits with different power domains, using as little as 0.76mW per channel at 1Mbps (1.8V supply). All of the devices in the family feature reinforced isolation for a withstand voltage rating of 5kVRMS for 60 seconds.

The MAX22245 features two channels transferring data in the same direction. The two channels of the MAX22246 transfer data in opposite directions, and this makes the MAX22246 ideal for isolating the Tx and Rx lines of a transceiver.

Devices are available with a maximum data rate of 25Mbps or 200Mbps, and with outputs that are either default high or default low. 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.

The MAX22245/MAX22246 family is available in an 8- pin wide-body SOIC package with 8mm of creepage and clearance. The package material has a minimum comparative tracking index (CTI) of 400, which gives it a group II rating in creepage tables. All devices are rated for operation at ambient temperatures of -40°C to +125°C.

## II. Manufacturing Information

| | |
|---|---|
| **A.** Description/Function: | Reinforced, Fast, Low-Power, Two-Channel Digital Isolators |
| **B.** Process: | S18 |
| **C.** Device Count: | N/A |
| **D.** Fabrication Location: | USA |
| **E.** Assembly Location: | Taiwan |
| **F.** Date of Initial Production: | July 2, 2020 |

## III. Packaging Information

| | |
|---|---|
| **A.** Package Type: | SOIC HYBRID (W) |
| **B.** Lead Frame: | CU194 |
| **C.** Lead Finish: | Matte Tin |
| **D.** Die Attach: | EN4900G |
| **E.** Bondwire: | 1 mil Au |
| **F.** Mold Material: | G700LA |
| **G.** Assembly Diagram: | 05-101516 |
| **H.** Flammability Rating: | UL-94 (V-0 Rating) |
| **I.** Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C | Level 3 |
| **J.** Single Layer Theta Ja: | N/A |
| **K.** Single Layer Theta Jc: | N/A |
| **L.** Multi Layer Theta Ja: | 88.10 °C/W |
| **M.** Multi Layer Theta Jc: | 42.40 °C/W |

## IV. Die Information

| | |
|---|---|
| **A.** Dimensions: | 37.4016X58.267 mils |
| **B.** Passivation: | SiO2/SiN |

## V. Quality Assurance Information

| | |
|---|---|
| **A.** Quality Assurance Contacts: | Ryan Wall (Manager, Reliability)<br>Michael Cairnes (Executive Director, Reliability)<br>Bryan Preeshl (SVP of QA) |
| **B.** Outgoing Inspection Level: | 0.1% for all electrical parameters guaranteed by the Datasheet.<br>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 $\lambda$ 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 https://www.maximintegrated.com/en/support/qa-reliability/reliability/reliability-monitor-program.html.

S18 cumulative process Fit

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

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

**B.** ESD and Latch-Up Testing

The MAX22246 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

**MAX22246CAWA+**

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

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