RELIABILITY REPORT

FOR

MAX6626PMTT+T

PLASTIC ENCAPSULATED DEVICES

February 9, 2017

**MAXIM INTEGRATED**

160 RIO ROBLES

SAN JOSE, CA 95134

| | |
|---|---|
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## Conclusion

The MAX6626PMTT+T 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

A. General

The MAX6625/MAX6626 combine a temperature sensor, a programmable overtemperature alarm, and an I²C-compatible serial interface into single compact packages. They convert their die temperatures into digital values using internal analog-to-digital converters (ADCs). The result of the conversion is held in a temperature register, readable at any time through the serial interface. A dedicated alarm output, OT, activates if the conversion result exceeds the value programmed in the high-temperature register. A programmable fault queue sets the number of faults that must occur before the alarm activates, preventing spurious alarms in noisy environments. OT has programmable output polarity and operating modes. The MAX6625/MAX6626 feature a shutdown mode that saves power by turning off everything but the power-on reset and the I²C-compatible interface. Four separate addresses can be configured with the ADD pin, allowing up to four MAX6625/MAX6626 devices to be placed on the same bus. The MAX6625P/MAX6626P OT outputs are open drain, and the MAX6625R/MAX6626R OT outputs include internal pullup resistors. The MAX6625 has a 9-bit internal ADC and can function as a replacement for the LM75 in most applications. The MAX6626 has a 12-bit internal ADC. Both devices come in the space-saving 6-pin SOT23 package, or the 6-pin TDFN package.

## II. Manufacturing Information

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|---|---|
| A. Description/Function: | 9-Bit/12-Bit Temperature Sensors with I²C-Compatible Serial Interface in a SOT23 |
| B. Process: | B8 |
| C. Number of Device Transistors: | 7384 |
| D. Fabrication Location: | USA |
| E. Assembly Location: | Thailand |
| F. Date of Initial Production: | October 21, 2000 |

## III. Packaging Information

| | |
|---|---|
| A. Package Type: | 6-pin TDFN 3x3 |
| B. Lead Frame: | Copper |
| C. Lead Finish: | 100% matte Tin |
| D. Die Attach: | Conductive |
| E. Bondwire: | Au (1 mil dia.) |
| F. Mold Material: | Epoxy with silica filler |
| G. Assembly Diagram: | #05-1601-0141 |
| H. Flammability Rating: | Class UL94-V0 |
| I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C | Level 1 |
| J. Single Layer Theta Ja: | 55°C/W |
| K. Single Layer Theta Jc: | 8.5°C/W |
| L. Multi Layer Theta Ja: | 42°C/W |
| M. Multi Layer Theta Jc: | 8.5°C/W |

## IV. Die Information

| | |
|---|---|
| A. Dimensions: | 45X90 mils |
| B. Passivation: | $Si_3N_4/SiO_2$ (Silicon nitride/ Silicon dioxide) |
| C. Interconnect: | Al/0.5%Cu with Ti/TiN Barrier |
| D. Backside Metallization: | None |
| E. Minimum Metal Width: | 0.8 microns (as drawn) |
| F. Minimum Metal Spacing: | 0.8 microns (as drawn) |
| G. Isolation Dielectric: | $SiO_2$ |
| H. Die Separation Method: | Wafer Saw |

## V. Quality Assurance Information

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|---|---|
| A. Quality Assurance Contacts: | Eric Wright (Reliability Engineering)<br>Brian Standley (Manager, Reliability)<br>Bryan Preeshl (Vice President 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 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate ($\lambda$) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 80 \times 2}$$ (Chi square value for MTTF upper limit)

(where 4340 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$\lambda = 13.7 \times 10^{-9}$

$\lambda = 13.7$ F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim Integrated's reliability monitor program. Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at http://www.maximintegrated.com/qa/reliability/monitor. Cumulative monitor data for the B8 Process results in a FIT Rate of 0.06 @ 25C and 0.99 @ 55C (0.8 eV, 60% UCL)

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

The MS29-2 die type has been found to have all pins able to withstand an HBM transient pulse of +/-1000V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-150mA and overvoltage per JEDEC JESD78.

**Table 1**

Reliability Evaluation Test Results

**MAX6626PMTT+T**

| TEST ITEM | TEST CONDITION | FAILURE IDENTIFICATION | SAMPLE SIZE | NUMBER OF FAILURES | COMMENTS |
|---|---|---|---|---|---|
| **Static Life Test** (Note 1) | | | | | |
| | Ta = 135C<br>Biased<br>Time = 192 hrs. | DC Parameters<br>& functionality | 80 | 0 | |

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