maxim integrated™

RELIABILITY REPORT

FOR

MAX1153BEUE+T

PLASTIC ENCAPSULATED DEVICES

June 11, 2014

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

Approved by
Sokhom Chum
Quality Assurance
Reliability Engineer

Maxim Integrated. All rights reserved.

Conclusion

The MAX1153BEUE+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

II. ....Manufacturing Information

III. ....Packaging Information

.....Attachments

IV. ....Die Information

V. ....Quality Assurance Information

VI. ....Reliability Evaluation

I. Device Description

A. General

The MAX1153/MAX1154 are stand-alone, 10-channel (8 external, 2 internal) 10-bit system monitor ADCs with internal reference. A programmable single-ended/differential mux accepts voltage and remote-diode temperature-sensor inputs. These devices independently monitor the input channels without microprocessor interaction and generate an interrupt when any variable exceeds user-defined limits. The MAX1153/MAX1154 configure both high and low limits, as well as the number of fault cycles allowed, before generating an interrupt. These ADCs can also perform recursive data averaging for noise reduction. Programmable wait intervals between conversion sequences allow the selection of the sample rate. At the maximum sampling rate of 94ksps (auto mode, single channel enabled), the MAX1153 consumes only 5mW (1.7mA at 3V). AutoShutdown(tm) reduces supply current to 190µA at 2ksps and to less than 8µA at 50sps. Stand-alone operation, combined with ease of use in a small package (16-pin TSSOP), makes the MAX1153/MAX1154 ideal for multichannel system-monitoring applications. Low power consumption also makes these devices a good fit for hand-held and battery-powered applications.

Maxim Integrated. All rights reserved.

II. Manufacturing Information

A. Description/Function: Stand-Alone, 10-Channel, 10-Bit System Monitors with Internal Temperature Sensor and V_{DD} Monitor

B. Process: C6Y

C. Number of Device Transistors: 89473

D. Fabrication Location: California

E. Assembly Location: Philippines, Thailand, Malaysia

F. Date of Initial Production: April 25, 2003

III. Packaging Information

A. Package Type: 16-pin TSSOP

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: #05-9000-0119

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: 106°C/W

K. Single Layer Theta Jc: 27°C/W

L. Multi Layer Theta Ja: 90°C/W

M. Multi Layer Theta Jc: 27°C/W

IV. Die Information

A. Dimensions: 108X144 mils

B. Passivation: Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide)

C. Interconnect: Al with Ti/TiN Barrier

D. Backside Metallization: None

E. Minimum Metal Width: 0.6 microns (as drawn)

F. Minimum Metal Spacing: 0.6 microns (as drawn)

G. Bondpad Dimensions:

H. Isolation Dielectric: SiO_2

I. Die Separation Method: Wafer Saw

Maxim Integrated. All rights reserved.

V. Quality Assurance Information

A. Quality Assurance Contacts: Don Lipps (Manager, Reliability Engineering)
Bryan Preeshl (Vice President 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 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 46 \times 2}$$

(Chi square value for MTTF upper limit)

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

$\lambda = 23.9 \times 10^{-9}$

λ = 23.9 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 C6Y Process results in a FIT Rate of 0.17 @ 25C and 2.89 @ 55C (0.8 eV, 60% UCL).

B. E.S.D. and Latch-Up Testing (lot ILC3BQ001B, D/C 0304)

The AC43-3 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2000V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250mA.

Maxim Integrated. All rights reserved.

maxim integrated

Table 1
Reliability Evaluation Test Results

MAX1153BEUE+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	46	0	ILC0BQ001E, D/C 0304

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

Maxim Integrated. All rights reserved.