RELIABILITY REPORT

FOR

MAX1464AAI+
(MAX1463)

PLASTIC ENCAPSULATED DEVICES

February 19, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
Director, Reliability Engineering

Conclusion

The MAX1464AAI+ successfully meets the quality and reliability standards required of all Maxim products. In addition, Maxim"s continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim"s quality and reliability standards.

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I. Device Description

A. General

The MAX1464 is a highly integrated, low-power, lownoise multichannel sensor signal processor optimized for industrial, automotive, and process-control applications such as pressure sensing and compensation, RTD and thermocouple linearization, weight sensing and classification, and remote process monitoring with limit indication. The MAX1464 accepts sensors with either single-ended or differential outputs. The MAX1464 accommodates sensor output sensitivities from 1mV/V to 1V/V. The MAX1464 provides amplification, calibration, signal linearization, and temperature compensation that enable an overall performance approaching the inherent repeatability of the sensor without requiring any external trim components. Two 16-bit voltage-output DACs and two 12-bit PWMs can be used to indicate each of the temperature-compensated sensor signals independently, as a sum or difference signal, or user-defined relationship between each signal and temperature. Uncommitted op amps are available to buffer the DAC outputs, drive heavier external loads, or provide additional gain and filtering. The MAX1464 incorporates a 16-bit CPU, user-programmable 4kB of FLASH program memory, 128 bytes of FLASH user information, one 16-bit ADC, two 16-bit DACs, two 12-bit PWM digital outputs, four rail-to-rail op amps, one SPI™-compatible interface, two GPIOs, and one on-chip temperature sensor. The MAX1464 operates from a single 5.0V (typ) supply and is packaged for automotive, industrial, and commercial temperature ranges in a 28-pin SSOP package.

II. Manufacturing Information

A. Description/Function:	Low-Power, Low-Noise Multichannel Sensor Signal Processor
B. Process:	TSMC 0.5um, 3 Poly, 3 Metal, Silicon Gate CMOS
C. Number of Device Transistors:	
D. Fabrication Location:	Taiwan
E. Assembly Location:	Unisem Malaysia, UTL Thailand, Carsem Malaysia
F. Date of Initial Production:	January 22, 2005

III. Packaging Information

A. Package Type:	28-pin SSOP
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive Epoxy
E. Bondwire:	Gold (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-1506
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:	110°C/W
K. Single Layer Theta Jc:	25°C/W
L. Multi Layer Theta Ja:	67.1°C/W
M. Multi Layer Theta Jc:	25°C/W

IV. Die Information

A. Dimensions:	115 X 127 mils
B. Passivation:	SiO_2 (Oxide)/Si_3N_4 (Nitride)
C. Interconnect:	Al/Cu (0.5%)
D. Backside Metallization:	None
E. Minimum Metal Width:	0.5um
F. Minimum Metal Spacing:	0.5um
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	Silicon dioxide
I. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

A. Quality Assurance Contacts:	Ken Wendel (Director, Reliability Engineering) Bryan Preeshl (Managing Director 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 135 biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 45 \times 2}$$ (Chi square value for MTTF upper limit)

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

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

$\lambda = 23.9$ F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly 1000 hour life test monitors on its processes. This data is published in the Product Reliability Report found at http://www.maxim-ic.com/. Current monitor data for the TSMC 0.5um Process results in a FIT Rate of 4.5 @ 25C and 77.5 @ 55C (0.8 eV, 60% UCL)

B. Moisture Resistance Tests

The industry standard 85°C/85%RH or HAST testing is monitored per device process once a quarter.

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

The SC64 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1500 V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250 mA.

Table 1
Reliability Evaluation Test Results

MAX1464AAI+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)				
	Ta = 135 Biased Time = 192 hrs.	DC Parameters & functionality	45	0
Moisture Testing (Note 2)				
85/85	Ta = 85°C RH = 85% Biased Time = 1000hrs.	DC Parameters & functionality	77	0
Mechanical Stress (Note 2)				
Temperature Cycle	-65°C/150°C 1000 Cycles Method 1010	DC Parameters & functionality	77	0

Note 1: Life Test Data may represent plastic DIP qualification lots.
Note 2: Generic Package/Process data