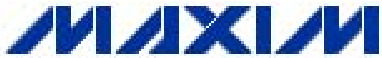

RELIABILITY REPORT

FOR

MAX9955BDCCB+D

PLASTIC ENCAPSULATED DEVICES

January 13, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering

Conclusion

The MAX9955BDCCB+D 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 MAX9955 high-speed, dual comparator/terminator IC includes a dual comparator and a terminator for each channel. The dual comparator features programmable cable-droop compensation at its input and offers low dispersion (timing variation) over a wide variety of input conditions, programmable hysteresis, and differential outputs. The terminator provides a 50 buffered termination to a programmed level. The MAX9955 comparator operating range is -1.1V to +3.6V, and the terminator operating range is -1.0V to +3.5V. The MAX9955 comparator provides high-speed, open-collector outputs with internal 50 termination resistors that are compatible with doubly terminated 0.4VP-P (typ) CML. These features significantly reduce the discrete component count on the circuit board. The MAX9955 power dissipation is only 800mW per channel under static conditions and 850mW per channel at 2Gbps toggling conditions. The device is available in a 64-pin, 10mm x 10mm body and 0.5mm pitch TQFP. A 5mm x 5mm exposed die paddle on the top of the package facilitates efficient heat removal. The device is specified to operate with an internal die temperature of +50°C to +90°C, and features a die temperature monitor output.

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II. Manufacturing Information

A. Description/Function:	Dual Comparator/Terminator with Cable-Droop Compensation
B. Process:	CB3
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Anam Korea
F. Date of Initial Production:	January 18, 2007

III. Packaging Information

A. Package Type:	64-pin TQFP
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive Epoxy
E. Bondwire:	Gold (1.2 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-2344
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 3
J. Multi Layer Theta Ja:	8°C/W
K. Multi Layer Theta Jc:	2°C/W

IV. Die Information

A. Dimensions:	105 X 104 mils
B. Passivation:	Si_3N_4 (Silicon nitride)
C. Interconnect:	Gold
D. Backside Metallization:	None
E. Minimum Metal Width:	Metal1 = 0.5 / Metal2 = 0.6 / Metal3 = 0.6 microns (as drawn)
F. Minimum Metal Spacing:	Metal1 = 0.45 / Metal2 = 0.5 / Metal3 = 0.6 microns (as drawn)
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

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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 150°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 48 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 22.4 \times 10^{-9}$

λ = 22.4 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 CB3 Process results in a FIT Rate of 0.14 @ 25C and 2.42 @ 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 AT22 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500 V per JEDEC JESD22-A114-D. Latch-Up testing has shown that this device withstands a current of +/-250 mA.

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Table 1
Reliability Evaluation Test Results

MAX9955BDCCB+D

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)				
	Ta = 150°C Biased Time = 192 hrs.	DC Parameters & functionality	48	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

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