RELIABILITY REPORT

FOR

MAX9134GHJ+
(MAX9132/MAX9134/MAX9135)

PLASTIC ENCAPSULATED DEVICES

April 18, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
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Conclusion

The MAX9134GHJ+ 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 MAX9132/MAX9134/MAX9135 high-speed, multiple-port, low-voltage differential signaling (LVDS) cross-bar switches are specially designed for digital video and camera signal transmission. These switches have a wide bandwidth, supporting data rates up to 840Mbps. The MAX9132 has three input ports and two output ports, the MAX9134 has three input ports and four output ports, and the MAX9135 has four input ports and three output ports. The digital video or camera signal can go through the switches from an input port to one or multiple output ports. The MAX9132/MAX9134/MAX9135 switch routing is programmable through either an I²C interface or a Local Interconnect Network (LIN) serial interface. In addition, the MAX9134/MAX9135 provide pins to set switch routing. These pins also set the initial conditions for the I²C mode. To generate more input or output ports, these switches can be connected in parallel or in cascade. The MAX9132/MAX9134/MAX9135 operate from a +3.3V supply and are specified over the -40°C to +105°C temperature range. The MAX9134/MAX9135 are available in a 32-pin (5mm x 5mm) TQFP package, while the MAX9132 is available in a 20-pin (6.5mm x 4.4mm) TSSOP package. The input/output port pins are rated up to ±25kV ESD for the ISO Air-Gap Discharge Model, ±15kV ESD for the IEC Air-Gap Discharge Model, and ±10kV for the ESD Contact Discharge Model. All other pins support up to ±3kV ESD for the Human Body Model.

II. Manufacturing Information

A. Description/Function:	Programmable, High-Speed, Multiple Input/Output LVDS Crossbar Switches
B. Process:	TS352P4M
C. Number of Device Transistors:	45603
D. Fabrication Location:	Taiwan
E. Assembly Location:	UTL Thailand
F. Date of Initial Production:	7/23/2008

III. Packaging Information

A. Package Type:	32-pin TQFP
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive Epoxy
E. Bondwire:	Au (1.0 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J. Multi Layer Theta Ja:	36°C/W
K. Multi Layer Theta Jc:	4°C/W

IV. Die Information

A. Dimensions:	88 X 120 mils
B. Passivation:	Silicon Dioxide/Silicon Nitride
C. Interconnect:	Al/Cu
D. Backside Metallization:	None
E. Minimum Metal Width:	0.35 um
F. Minimum Metal Spacing:	0.35 um
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	Silicon Dioxide
I. Die Separation Method:	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°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)

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

$\lambda = 22.4$ 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 TS352P3M Process results in a FIT Rate of 0.43 @ 25C and 7.50 @ 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 HS59 die type has been found to have all pins able to withstand a HBM transient pulse of 2500 per JEDEC JESD22-A114-D. Latch-Up testing has shown that this device withstands a current of 250.

Table 1
Reliability Evaluation Test Results

MAX9134GHJ+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)				
	Ta = 135°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