RELIABILITY REPORT

FOR

MAX9153ESE+
(MAX9254)

PLASTIC ENCAPSULATED DEVICES

October 29, 2008

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
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Conclusion

The MAX9153ESE+ 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 MAX9153/MAX9154 low-jitter, low-voltage differential signaling (LVDS) repeaters are ideal for applications that require high-speed data or clock distribution while minimizing power, space, and noise. The devices accept a single LVDS input (MAX9153) or single LVPECL input (MAX9154) and repeat the signal at 10 LVDS outputs. Each differential output drives 100Ω, allowing point-to-point distribution of signals on transmission lines with 100Ω termination at the receiver input.

Ultra-low 90psP-P (max) added deterministic jitter and 1psRMS (max) added random jitter ensure reliable communication in high-speed links that are highly sensitive to timing error, especially those incorporating clock-and-data recovery or serializers and deserializers. The high-speed switching performance guarantees 800Mbps data rate and less than 60ps (max) skew between channels while operating from a single +3.3V supply.

Supply current at 800Mbps is 118mA and reduces to 2µA in power-down mode. LVDS inputs and outputs conform to the ANSI/EIA/TIA -644 standard. A fail-safe feature on the MAX9153 sets the output high when the input is undriven and open, terminated, or shorted. The MAX9153/MAX9154 are available in a 28-pin TSSOP package and are specified for the -40°C to +85°C extended temperature range.

Refer to the MAX9150 data sheet for a pin-compatible 10-port LVDS repeater capable of driving a double-terminated (50Ω) LVDS link.

Refer to the MAX9110/MAX9112 and MAX9111/MAX9113 data sheets for LVDS line drivers and receivers.

II. Manufacturing Information

A. Description/Function:	Low-Jitter, 800Mbps, 10-Port LVDS Repeaters with 100 ohm drive
B. Process:	0.35UM 2 Poly 3 Metal CMOS
C. Number of Device Transistors:	
D. Fabrication Location:	TSMC
E. Assembly Location:	Carsem, ATP
F. Date of Initial Production:	October 27, 2001

III. Packaging Information

A. Package Type:	28-pin TSSOP
B. Lead Frame:	Copper
C. Lead Finish:	85Sn/15Pb
D. Die Attach:	Conductive Epoxy
E. Bondwire:	Gold (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-3001-0171
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:	78°C/W
K. Single Layer Theta Jc:	12.5°C/W

IV. Die Information

A. Dimensions:	59 x 103 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 biased (static) life test are pending. Using these results, the Failure Rate (λ) 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)

$\lambda = 13.59 \times 10^{-9}$

$\lambda = 13.59$ 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 HS17 die type has been found to have all pins able to withstand a HBM transient pulse of 8000 V per pin. Latch-Up testing has shown that this device withstands a current of 250 mA.

Table 1
Reliability Evaluation Test Results

MAX9153ESE+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)				
	Ta = Biased Time = 192 hrs.	DC Parameters & functionality	80	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