

RELIABILITY REPORT
FOR
MAX9155EXT+T
PLASTIC ENCAPSULATED DEVICES

July 5, 2011

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
SUNNYVALE, CA 94086

Approved by
Sokhom Chum
Quality Assurance
Reliability Engineer

Conclusion

The MAX9155EXT+T 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 MAX9155 is a low-voltage differential signaling (LVDS) repeater, which accepts a single LVDS input and duplicates the signal at a single LVDS output. Its low-jitter, low-noise performance makes it ideal for buffering LVDS signals sent over long distances or noisy environments, such as cables and backplanes. The MAX9155's tiny size makes it especially suitable for minimizing stub lengths in multidrop backplane applications. The SC70 package (half the size of a SOT23) allows the MAX9155 to be placed close to the connector, thereby minimizing stub lengths and reflections on the bus. The point-to-point connection between the MAX9155 output and the destination IC, such as an FPGA or ASIC, allows the destination IC to be located at greater distances from the bus connector. Ultra-low, 23psP-P added deterministic jitter and 0.6psRMS added random jitter ensure reliable communication in high-speed links that are highly sensitive to timing errors, especially those incorporating clock-and-data recovery, PLLs, serializers, or deserializers. The MAX9155's switching performance guarantees a 200Mbps data rate, but minimizes radiated noise by guaranteeing 0.5ns minimum output transition time. The MAX9155 has fail-safe circuitry that sets the output high for undriven open, short, or terminated inputs. The MAX9155 operates from a single +3.3V supply and consumes only 10mA over a -40°C to +85°C temperature range. Refer to the MAX9129 data sheet for a quad bus LVDS driver, and to the MAX9156 data sheet for a low-jitter, low-noise LVPECL-to-LVDS level translator in an SC70 package.

II. Manufacturing Information

A. Description/Function:	Low-Jitter, Low-Noise LVDS Repeater in an SC70 Package
B. Process:	TS35
C. Number of Device Transistors:	
D. Fabrication Location:	Taiwan
E. Assembly Location:	Malaysia, Thailand
F. Date of Initial Production:	October 27, 2001

III. Packaging Information

A. Package Type:	6-pin SC70
B. Lead Frame:	NiPd
C. Lead Finish:	100% matte Tin
D. Die Attach:	Non-conductive
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-2801-0029
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:	326°C/W
K. Single Layer Theta Jc:	115°C/W
L. Multi Layer Theta Ja:	326.5°C/W
M. Multi Layer Theta Jc:	115°C/W

IV. Die Information

A. Dimensions:	32 X 31 mils
B. Passivation:	Si ₃ N ₄ /SiO ₂ (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al/0.5%Cu with Ti/TiN Barrier
D. Backside Metallization:	None
E. Minimum Metal Width:	0.35µm
F. Minimum Metal Spacing:	0.35µm
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	SiO ₂
I. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

- A. Quality Assurance Contacts: Richard Aburano (Manager, Reliability Engineering)
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 135°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 79 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 13.9 \times 10^{-9}$$

$$\lambda = 13.9 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at <http://www.maxim-ic.com/qa/reliability/monitor>. Cumulative monitor data for the TS35 Process results in a FIT Rate of 0.11 @ 25C and 1.93 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot Q7W0AQ001B D/C 0132)

The HS15 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-200mA.

Table 1
Reliability Evaluation Test Results

MAX9155EXT+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	79	0	Q7W0AQ001B, D/C 0132

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