RELIABILITY REPORT FOR

MAX9963AJCCQ+

(MAX9964)

PLASTIC ENCAPSULATED DEVICES

November 12, 2008

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering

Conclusion

The MAX9963AJCCQ+ 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.

Table of Contents

I. Device Description

A. General

The MAX9963/MAX9964 four-channel, low-power, high-speed pin electronics driver and comparator ICs include, for each channel, a three-level pin driver, a dual comparator, and variable clamps. The driver features a wide voltage range and high-speed operation, includes high-Z and active-termination (3rd-level drive) modes, and is highly linear even at low-voltage swings. The dual comparator provides low dispersion (timing variation) over a wide variety of input conditions. The clamps provide damping of high-speed DUT waveforms when the device is configured as a high-impedance receiver. High-speed, differential control inputs compatible with ECL, LVPECL, LVDS, and GTL levels are provided for each channel. ECL/LVPECL or flexible open-collector outputs are available for the comparators. The A-grade version provides tight matching of gain and offset for the drivers and comparators, allowing reference levels to be shared across multiple channels in cost-sensitive systems. For system designs that incorporate independent reference levels for each channel, the B-grade version is available at reduced cost. Optional internal resistors at the high-speed inputs provide differential termination of LVDS inputs, while optional internal resistors provide the pullup voltage and source termination for open-collector comparator outputs. These features significantly reduce the discrete component count on the circuit board. Low-leakage, slew rate, and tri-state/terminate controls are operational configurations that are programmed through a 3-wire, low-voltage, CMOS-compatible serial interface. The MAX9963/MAX9964 operating range is -1.5V to +6.5V, with power dissipation of only 825mW per channel. These devices are available in a 100-pin, 14mm x 14mm body, 0.5mm pitch TQFP with an exposed 8mm x 8mm die pad on the top (MAX9963) or bottom (MAX9964) of the package for efficient heat removal. The MAX9963/MAX9964 are specified to operate with an internal die temperature of +70°C to +100°C, and feature a die temperature monitor output.

II. Manufacturing Information

A. Description/Function:	Quad Low-Power 500Mbps ATE Driver/Comparator
B. Process:	CB2
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	ATK Korea
F. Date of Initial Production:	7/25/2003

III. Packaging Information

A. Package Type:	100-pin TQFP
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Ag Filled 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 3
J. Multi Layer Theta Jb:	6.0°C/W
K. Multi Layer Theta Jc:	2°C/W

IV. Die Information

A. Dimensions:	274 X 274 mils
B. Passivation:	Si_3N_4 (Silicon nitride)
C. Interconnect:	Gold
D. Backside Metallization:	None
E. Minimum Metal Width:	2 microns (as drawn)
F. Minimum Metal Spacing:	2 microns (as drawn)
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:	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 pending. 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 CB20 Process results in a FIT Rate of 0.14 @ 25C and 2.14 @ 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 AT05-2 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1000 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

MAX9963AJCCQ+

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