RELIABILITY REPORT

FOR

MAX203EEWP+

PLASTIC ENCAPSULATED DEVICES

May 11, 2011

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
Director, Reliability Engineering

Conclusion

The MAX203E 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 MAX200-MAX211/MAX213 transceivers are designed for RS-232 and V.28 communication interfaces where ±12V supplies are not available. On-board charge pumps convert the +5V input to the ±10V needed for RS-232 output levels. The MAX201 and MAX209 operate from +5V and +12V, and contain a +12V to -12V charge-pump voltage converter. The MAX200-MAX211/MAX213 drivers and receivers meet all EIA/TIA-232E and CCITT V.28 specifications at a data rate of 20kbps. The drivers maintain the ±5V EIA/TIA-232E output signal levels at data rates in excess of 120kbps when loaded in accordance with the EIA/TIA-232E specification. The 5µW shutdown mode of the MAX200, MAX205, MAX206, and MAX211 conserves energy in battery powered systems. The MAX213 has an active-low shutdown and an active-high receiver enable control. Two receivers of the MAX213 are active, allowing ring indicator (RI) to be monitored easily using only 75µW power. The MAX211 and MAX213 are available in a 28-pin wide small-outline (SO) package and a 28-pin shrink small-outline (SSOP) package, which occupies only 40% of the area of the SO. The MAX207 is now available in a 24-pin SO package and a 24-pin SSOP. The MAX203 and MAX205 use no external components, and are recommended for applications with limited circuit board space.

II. Manufacturing Information

A. Description/Function:	+5V, RS-232 Transceivers with 0.1µF External Capacitors
B. Process:	M5
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Date of Initial Production:	Pre 1997

III. Packaging Information

A. Package Type:	20-pin PDIP	20-Pin SOIC
B. Lead Frame:	Copper	Copper
C. Lead Finish:	100% matte Tin	100% matte Tin
D. Die Attach:	Conductive Epoxy	Conductive Epoxy
E. Bondwire:	Gold (1.3 mil dia.)	Gold (1.3 mil dia.)
F. Mold Material:	Epoxy with silica filler	Epoxy with silica filler
G. Assembly Diagram:	#31-4839	#31-4840
H. Flammability Rating:	Class UL94-V0	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1	Level 1
J. Single Layer Theta Ja:	100°C/W	67°C/W
K. Single Layer Theta Jc:	20°C/W	23°C/W
L. Assembly Location:	Philippines	Philippines

IV. Die Information

A. Dimensions:	70 X 112 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide
C. Interconnect:	Aluminum/0.5% Cu
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

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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 400 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 2.7 \times 10^{-9}$

$\lambda = 2.7$ 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 G4 Process results in a FIT Rate of 0.43 @ 25C and 2.33 @ 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 RS33P die type has been found to have all pins able to withstand a HBM transient pulse of +/-1500 V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-100 mA.

Table 1
Reliability Evaluation Test Results

MAX203ECxP+

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	400	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