RELIABILITY REPORT

FOR

MX7535KN

PLASTIC ENCAPSULATED DEVICES

January 25, 2012

MAXIM INTEGRATED PRODUCTS

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Approved by
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Conclusion

The MX7535KN 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
II. .....Manufacturing Information
III. .....Packaging Information
.....Attachments
IV. .....Die Information
V. .....Quality Assurance Information
VI. .....Reliability Evaluation

I. Device Description

A. General

The MX7534/MX7535 are high-performance, CMOS, monolithic, 14-bit digital-to-analog converters (DACs). Wafer-level, laser-trimmed, thin-film resistors and temperature-compensated NMOS switches assure operation over the full operating temperature range with exceptional linear and gain stability. The MX7534 accepts right-justified data in two bytes from an 8-bit bus, while the MX7535 operates with a 14-bit data bus with separate MS-byte and LS-byte select controls. In addition, all digital inputs are compatible with both TTL and 5V CMOS-logic levels. The MX7534/MX7535 are intended for unipolar operation, but may be operated as bipolar DACs with additional external components. Both devices are protected against CMOS latchup, and neither requires the use of external Schotty protection diodes. The MX7534 is available in 20-pin narrow (0.3") DIP, wide SO, or PLCC packages. The MX7535 is available in 28-pin, 600 mil wide DIP, wide SO, or PLCC packages.

II. Manufacturing Information

A. Description/Function:	Microprocessor-Compatible, 14-Bit DACs
B. Process:	SG5
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Philippines
F. Date of Initial Production:	Pre 1997

III. Packaging Information

A. Package Type:	600 mil 28L PDIP
B. Lead Frame:	Copper
C. Lead Finish:	
D. Die Attach:	Conductive
E. Bondwire:	Au (1.3 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-0401-0153 / C
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	1
J. Single Layer Theta Ja:	70°C/W
K. Single Layer Theta Jc:	21°C/W
L. Multi Layer Theta Ja:	N/A
M. Multi Layer Theta Jc:	N/A

IV. Die Information

A. Dimensions:	141 X 168 mils
B. Passivation:	Si_3N_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:	5.0 microns (as drawn)
F. Minimum Metal Spacing:	5.0 microns (as drawn)
G. Bondpad Dimensions:	
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 biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 240 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 4.6 \times 10^{-9}$

$\lambda = 4.6$ 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 SG5 Process results in a FIT Rate of 0.12 @ 25C and 2.04 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (ESD lot MDWBAQ002A D/C 9146, Latch-up lot NDWBF3062A D/C 0239)

The DA24-1 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1000V 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

MX7535KN

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C	DC Parameters	80	0	XDWBCA007A
	Biased	& functionality	80	0	MDXBJA011E
	Time = 192 hrs.		80	0	MDWBAQ002

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