RELIABILITY REPORT

FOR

MAX5353AEUA+

PLASTIC ENCAPSULATED DEVICES

August 14, 2012

MAXIM INTEGRATED PRODUCTS

160 Rio Robles

San Jose, CA 95134

Approved by
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Conclusion

The MAX5353AEUA+ 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 MAX5352/MAX5353 combine a low-power, voltage-output, 12-bit digital-to-analog converter (DAC) and a precision output amplifier in an 8-pin µMAX&reg or DIP package. The MAX5352 operates from a single +5V supply, and the MAX5353 operates from a single +3.3V supply. Both devices draw less than 280µA of supply current. The output amplifier's inverting input is available to the user, allowing specific gain configurations, remote sensing, and high output current capability. This makes the MAX5352/MAX5353 ideal for a wide range of applications, including industrial process control. Other features include a software shutdown and power-on reset. The serial interface is compatible with SPI(tm)/QSPI(tm) and MICROWIRE(tm). The DAC has a double-buffered input, organized as an input register followed by a DAC register. A 16-bit serial word loads data into the input register. The DAC register can be updated independently or simultaneously with the input register. All logic inputs are TTL/CMOS-logic compatible and buffered with Schmitt triggers to allow direct interfacing to optocouplers.

II. Manufacturing Information

A. Description/Function:	Low-Power, 12-Bit Voltage-Output DACs with Serial Interface
B. Process:	S12
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Malaysia, Philippines, Thailand
F. Date of Initial Production:	Pre 1997

III. Packaging Information

A. Package Type:	3x3 mm 8L UMAX
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-0401-0475 / A
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	1
J. Single Layer Theta Ja:	221°C/W
K. Single Layer Theta Jc:	42°C/W
L. Multi Layer Theta Ja:	206.3°C/W
M. Multi Layer Theta Jc:	42°C/W

IV. Die Information

A. Dimensions:	58 X 84 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:	1.2 microns (as drawn)
F. Minimum Metal Spacing:	1.2 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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 320 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 3.4 \times 10^{-9}$

$\lambda = 3.4$ F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly 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 S12 Process results in a FIT Rate of 0.17 @ 25C and 3.00 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot NNDACX002L D/C 9809)

The DA61 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 +/-250mA.

Table 1
Reliability Evaluation Test Results

MAX5353AEUA+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C	DC Parameters	80	0	BNDAAV005D, D/C 9709
	Biased	& functionality	80	0	BNDAAZ001A, D/C N/A
	Time = 192 hrs.		80	0	NNDACQ001D, D/C 9801
			80	0	BNDAAZ001D, D/C N/A

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