RELIABILITY REPORT

FOR

MX7528KCWP+

PLASTIC ENCAPSULATED DEVICES

December 2, 2011

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
Sokhom Chum
Quality Assurance
Reliability Engineer

Conclusion

The MX7528KCWP+ 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 MX7528/MX7628 contains two 8-bit multiplying digital-to-analog converters (DACs). Separate on-chip latches hold the input data for each DAC to allow easy interface to microprocessors. The data load operation is similar to a static RAM write cycle. Data is loaded using only active-low CS, active-low WR, and DAC Select (active-low DAC A /DAC B) inputs. Each DAC has a separate reference input and internal feedback resistor which allow fully independent operation while maintaining excellent DAC-to-DAC matching. The MX7528 operates from a single +5 to +15V power supply whereas the MX7628 operates from +12V to +15V. The MX7528 has TTL compatible inputs at +5V supply only and the MX7628 has TTL compatible inputs from +12V to +15V supplies. The MX7528/MX7628 is supplied in 20-lead narrow DIP and Small Outline Packages.

II. Manufacturing Information

A. Description/Function:	CMOS, Dual, Buffered, 8-Bit Multiplying DAC
B. Process:	SG5
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Malaysia
F. Date of Initial Production:	Pre 1997

III. Packaging Information

A. Package Type:	300 mil 20L SOIC
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (1.3 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-0401-0061 / 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:	100°C/W
K. Single Layer Theta Jc:	20°C/W
L. Multi Layer Theta Ja:	67°C/W
M. Multi Layer Theta Jc:	23°C/W

IV. Die Information

A. Dimensions:	82 X 79 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:	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 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 (lot XXCAQN048E D/C 9609)

The DA29 die type has been found to have all pins able to withstand a HBM transient pulse of +/-600V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-100mA.

Table 1
Reliability Evaluation Test Results

MX7528KCWP+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C	DC Parameters	80	0	XXCACQ001B, D/C 9749
	Biased	& functionality	80	0	XXCAQA053D, D/C N/A
	Time = 192 hrs.		80	0	XXCAQN048G, D/C 9609

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