RELIABILITY REPORT

FOR

MAX1280BEUP

PLASTIC ENCAPSULATED DEVICES

May 3, 2010

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
Don Lipps
Quality Assurance
Manager, Reliability Engineering

Conclusion

The MAX1280BEUP 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 MAX1280/MAX1281 12-bit ADCs combine an 8-channel analog-input multiplexer, high-bandwidth track/hold, and serial interface with high conversion speed and low power consumption. The MAX1280 operates from a single +4.5V to +5.5V supply; the MAX1281 operates from a single +2.7V to +3.6V supply. Both devices' analog inputs are software configurable for unipolar/bipolar and single-ended/pseudo-differential operation. The 4-wire serial interface connects directly to SPI(tm)/QSPI(tm)/MICROWIRE(tm) devices without external logic. A serial strobe output allows direct connection to TMS320-family digital signal processors. The MAX1280/MAX1281 use an external serial-interface clock to perform successive-approximation analog-to-digital conversions. Both parts feature an internal +2.5V reference and a reference-buffer amplifier with a ±1.5% voltage-adjustment range. An external reference with a 1V to VDD1 range may also be used. The MAX1280/MAX1281 provide a hard-wired active-low SHDN pin and four software-selectable power modes (normal operation, reduced power, fast power-down, and full power-down). These devices can be programmed to automatically shut down at the end of a conversion or to operate with reduced power. When using the power-down modes, accessing the serial interface automatically powers up the devices, and the quick turn-on time allows them to be powered down between all conversions. This technique can cut supply current to under 100µA at reduced sampling rates. The MAX1280/MAX1281 are available in 20-pin TSSOP packages. These devices are higher-speed versions of the MAX146/MAX147 (for more information, see the respective data sheet).

II. Manufacturing Information

A. Description/Function:	400ksps/300ksps, Single-Supply, Low-Power, 8-Channel, Serial 12-Bit ADCs with Internal Reference
B. Process:	B12
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon, California or Texas
E. Assembly Location:	Philippines, Thailand
F. Date of Initial Production:	April 22, 2000

III. Packaging Information

A. Package Type:	20-pin TSSOP
B. Lead Frame:	Copper
C. Lead Finish:	85Sn/15Pb plate
D. Die Attach:	Conductive
E. Bondwire:	Au (1.3 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-0101-0508
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J. Single Layer Theta Ja:	91°C/W
K. Single Layer Theta Jc:	20°C/W
L. Multi Layer Theta Ja:	73.8°C/W
M. Multi Layer Theta Jc:	20°C/W

IV. Die Information

A. Dimensions:	85 X 130 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:	5 mil. Sq.
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

A. Quality Assurance Contacts:	Don Lipps (Manager, 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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 318 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 3.5 \times 10^{-9}$

$\lambda = 3.5$ 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 B12 Process results in a FIT Rate of 0.06 @ 25C and 1.06 @ 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 AD95 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1500V 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

MAX1280BEUP

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	318	0
Moisture Testing (Note 2)				
HAST	Ta = 130°C RH = 85% Biased Time = 96hrs.	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