RELIABILITY REPORT

FOR

MAX5186BEEI+

PLASTIC ENCAPSULATED DEVICES

March 22, 2010

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
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Conclusion

The MAX5186BEEI+ 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 MAX5186 contains two 8-bit, simultaneous-update, current-output digital-to-analog converters (DACs) designed for superior performance in communications systems requiring analog signal reconstruction with low distortion and low-power operation. The MAX5189 provides equal specifications, with on-chip precision resistors for voltage output operation. The MAX5186/ MAX5189 are designed for a 10pV-s glitch operation to minimize unwanted spurious signal components at the output. An on-board 1.2V bandgap circuit provides a well-regulated, low-noise reference that can be disabled for external reference operation. The MAX5186/MAX5189 are designed to provide a high level of signal integrity for the least amount of power dissipation. Both DACs operate from a single supply voltage of 2.7V to 3.3V. Additionally, these DACs have three modes of operation: normal, low-power standby, and complete shutdown, which provides the lowest possible power dissipation with a 1µA (max) shutdown current. A fast wake-up time (0.5µs) from standby mode to full DAC operation allows power conservation by activating the DACs only when required. The MAX5186/MAX5189 are packaged in a 28-pin QSOP and are specified for the extended (-40°C to +85°C) temperature range. For higher resolution, dual 10-bit versions, refer to the MAX5180/MAX5183 data sheet.

II. Manufacturing Information

A. Description/Function:	Dual, 8-Bit, 40MHz, Current/Voltage, Simultaneous-Output DACs
B. Process:	TC06
C. Number of Device Transistors:	
D. Fabrication Location:	Taiwan
E. Assembly Location:	Malaysia, Philippines, Thailand
F. Date of Initial Production:	October 23, 1999

III. Packaging Information

A. Package Type:	28-pin QSOP
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:	#05-0401-0505
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:	93°C/W
K. Single Layer Theta Jc:	27°C/W
L. Multi Layer Theta Ja:	79.3°C/W
M. Multi Layer Theta Jc:	27°C/W

IV. Die Information

A. Dimensions:	85 X 97 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Aluminum/Si (Si = 1%)
D. Backside Metallization:	None
E. Minimum Metal Width:	Metal 1 - 0.9 microns / Metal 2 - 0.9 microns (as drawn)
F. Minimum Metal Spacing:	Metal 1 - 0.9 microns / Metal 2 - 0.9 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 (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 biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{8.315}{192 \times 4340 \times 319 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 15.7 \times 10^{-9}$

$\lambda = 15.7$ F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim"s reliability monitor program. Maxim performs quarterly 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 Process results in a FIT Rate of 0.5 @ 25C and 8.57 @ 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 DA70 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

MAX5186BEEI+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)				
	Ta = 135 Biased Time = 192 hrs.	DC Parameters & functionality	319	3
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