

RELIABILITY REPORT
FOR
MAX5360LEUK+
PLASTIC ENCAPSULATED DEVICES

May 10, 2012

MAXIM INTEGRATED PRODUCTS

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Approved by
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Conclusion

The MAX5360LEUK+T 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 MAX5360/MAX5361/MAX5362 are low-cost, 6-bit digital-to-analog converters (DACs) in miniature 5-pin SOT23 packages with a simple 2-wire serial interface that allows communication with multiple devices. The MAX5360 has an internal +2V reference and operates from a +2.7V to +3.6V supply. The MAX5361 has an internal +4V reference and operates from a +4.5V to +5.5V supply. The MAX5362 operates over the full +2.7V to +5.5V supply range and has an internal reference equal to 0.9 5 VDD. The fast-mode I²C-compatible serial interface allows communication at data rates up to 400kbps, minimizing board space and reducing interconnect complexity in many applications. Each device is available with one of four factory-preset addresses (see *Selector Guide* in the full data sheet). The MAX5360/MAX5361/MAX5362 also include an output buffer, a low-power shutdown mode, and a power-on reset that ensures the DAC outputs are at zero when power is initially applied. In shutdown mode, the supply current is reduced to less than 1 μ A and the output is pulled down with a 10 kilohm resistor to GND. The MAX5360/MAX5361/MAX5362 are available in miniature 5-pin SOT23 packages.

II. Manufacturing Information

A. Description/Function:	Low-Cost, Low-Power 6-Bit DACs with 2-Wire Serial Interface in SOT23 Package
B. Process:	C6
C. Number of Device Transistors:	2899
D. Fabrication Location:	Japan
E. Assembly Location:	Malaysia, Thailand
F. Date of Initial Production:	July 22, 2000

III. Packaging Information

A. Package Type:	5L SOT23
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:	#05-0401-0525 / 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:	324.3°C/W
K. Single Layer Theta Jc:	82°C/W
L. Multi Layer Theta Ja:	255.9°C/W
M. Multi Layer Theta Jc:	81°C/W

IV. Die Information

A. Dimensions:	57 X 38 mils
B. Passivation:	Si ₃ N ₄ /SiO ₂ (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al with Ti/TiN Barrier
D. Backside Metallization:	None
E. Minimum Metal Width:	0.6 microns (as drawn)
F. Minimum Metal Spacing:	0.6 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:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 388 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 2.8 \times 10^{-9}$$

$$\lambda = 2.8 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 C6 Process results in a FIT Rate of 0.90 @ 25C and 15.55 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot I8PADZ002H D/C 0037)

The DA68 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2000V 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

MAX5360LEUK+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS	
Static Life Test (Note 1)	Ta = 135°C	DC Parameters	78	0	I8PAAZ001C, D/C 9946	
	Biased	& functionality	78	0	I8PAFQ003C, D/C 0212	
	Time = 192 hrs.			79	0	I8PADZ002H, D/C 0037
				79	0	I8PKBZ002B, D/C 0026
				74	0	I8PBBZ001B, D/C 0023

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