

RELIABILITY REPORT  
FOR  
MAX1082AEUE+T  
PLASTIC ENCAPSULATED DEVICES

January 15, 2013

**MAXIM INTEGRATED**

160 RIO ROBLES  
SAN JOSE, CA 95134

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## Conclusion

The MAX1082AEUE+T successfully meets the quality and reliability standards required of all Maxim Integrated products. In addition, Maxim Integrated's continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim Integrated's quality and reliability standards.

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### I. Device Description

#### A. General

The MAX1082/MAX1083 10-bit analog-to-digital converters (ADCs) combine a 4-channel analog-input multiplexer, high-bandwidth track/hold (T/H), and serial interface with high conversion speed and low power consumption. The MAX1082 operates from a single +4.5V to +5.5V supply; the MAX1083 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/QSPI(tm) and MICROWIRE® devices without external logic. A serial strobe output allows direct connection to TMS320-family digital signal processors. The MAX1082/ MAX1083 use an external serial-interface clock to perform successive-approximation analog-to-digital conversions. The devices feature an internal +2.5V reference and a reference-buffer amplifier with a  $\pm 1.5\%$  voltage-adjustment range. An external reference with a 1V to VDD range may also be used. The MAX1082/MAX1083 provide a hard-wired active-low SHDN pin and four software-selectable power modes (normal operation, reduced power (REDP), fast power-down (FASTPD), and full power-down (FULLPD)). These devices can be programmed to shut down automatically 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 shut down between all conversions. The MAX1082/MAX1083 are available in 16-pin TSSOP packages.

## II. Manufacturing Information

A. Description/Function:	300ksps/400ksps, Single-Supply, 4-Channel, Serial 10-Bit ADCs with Internal Reference
B. Process:	B12
C. Number of Device Transistors:	4286
D. Fabrication Location:	USA
E. Assembly Location:	Malaysia, Philippines and Thailand
F. Date of Initial Production:	April 22, 2000

## III. Packaging Information

A. Package Type:	16-pin TSSOP
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:	#05-0101-0509
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:	106°C/W
K. Single Layer Theta Jc:	27°C/W
L. Multi Layer Theta Ja:	90°C/W
M. Multi Layer Theta Jc:	27°C/W

## IV. Die Information

A. Dimensions:	85 X 130 mils
B. Passivation:	Si <sub>3</sub> N <sub>4</sub> /SiO <sub>2</sub> (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:	1.8 microns (as drawn)
G. Bondpad Dimensions:	
H. Isolation Dielectric:	SiO <sub>2</sub>
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 135°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate ( $\lambda$ ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 188 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 5.8 \times 10^{-9}$$

$$\lambda = 5.8 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

The following failure rate represents data collected from Maxim Integrated's reliability monitor program. Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at <http://www.maximintegrated.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. E.S.D. and Latch-Up Testing (lot S4DCCQ001F, D/C 0649)

The AD95-2 die type has been found to have all pins able to withstand a HBM transient pulse of +/- 1000V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/- 100mA and overvoltage per JEDEC JESD78.

**Table 1**  
Reliability Evaluation Test Results

**MAX1082AEUE+T**

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
<b>Static Life Test</b> (Note 1)	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	188	0	J4DCFA053E, D/C 1103

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