



RELIABILITY REPORT
FOR
MAX115CAX+ / MAX115EAX+
PLASTIC ENCAPSULATED DEVICES

September 1, 2011

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
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Conclusion

The MAX115CAX+/MAX115EAX+ 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 MAX115/MAX116 are high-speed, multichannel, 12-bit data-acquisition systems (DAS) with simultaneous track/holds (T/Hs). These devices contain a 12-bit, 2 μ s, successive-approximation analog-to-digital converter (ADC), a +2.5V reference, a buffered reference input, and a bank of four simultaneous-sampling T/H amplifiers that preserve the relative phase information of the sampled inputs. The MAX115/MAX116 have two multiplexed inputs for each T/H, allowing a total of eight inputs. In addition, the converter is overvoltage tolerant to ± 17 V. A fault condition on any channel will not damage the IC. Available input ranges are ± 5 V (MAX115) and ± 2.5 V (MAX116). The parallel interface's data access and bus release timing specifications are compatible with most popular digital signal processors and 16-bit/32-bit microprocessors. The MAX115/MAX116 conversion results can be accessed without resorting to wait-states.

II. Manufacturing Information

A. Description/Function:	2x4-Channel, Simultaneous-Sampling 12-Bit ADCs
B. Process:	S3
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Texas, Malaysia
F. Date of Initial Production:	January 27, 2001

III. Packaging Information

A. Package Type:	36L SSOP
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:	#05-2101-0019 / B
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	1
J. Single Layer Theta Ja:	84.7°C/W
K. Single Layer Theta Jc:	19.3°C/W
L. Multi Layer Theta Ja:	57.6°C/W
M. Multi Layer Theta Jc:	19.3°C/W

IV. Die Information

A. Dimensions:	166 X 213 mils
B. Passivation:	Si ₃ N 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:	3.0 microns (as drawn)
F. Minimum Metal Spacing:	3.0 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:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 159 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 6.9 \times 10^{-9}$$

$$\lambda = 6.9 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 S3 Process results in a FIT Rate of 0.04 @ 25C and 0.69 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot NULADQ003G D/C 0051)

The AC05 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 +/-150mA.

Table 1
Reliability Evaluation Test Results

MAX115

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135°C	DC Parameters	79	0	NULBDQ003D, D/C 0051
	Biased	& functionality	80	0	NULADQ003G, D/C 0051
	Time = 192 hrs.				

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