

RELIABILITY REPORT FOR MAX1420ECM+

PLASTIC ENCAPSULATED DEVICES

October 9, 2014

MAXIM INTEGRATED

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Approved by
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Conclusion

The MAX1420ECM+ 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

.....Attachments

The MAX1420, 3.3V, 12-bit analog-to-digital converter (ADC) features a fully-differential input, pipelined, 12-stage ADC architecture with wideband track-and-hold (T/H) and digital error correction, incorporating a fully-differential signal path. The MAX1420 is optimized for low-power, high dynamic performance applications in imaging and digital communications. The converter operates from a single 3.3V supply, and consumes only 221mW. The fully-differential input stage has a small signal -3dB bandwidth of 400MHz and may be operated with single-ended inputs. An internal 2.048V precision bandgap reference sets the full-scale range of the ADC. A flexible reference structure accommodates an internal reference, or externally applied buffered or unbuffered reference for applications that require increased accuracy and a different input voltage range. In addition to low operating power, the MAX1420 features two power-down modes: reference power-down and shutdown mode. In reference power-down, the internal bandgap reference is deactivated, which results in a typical 2mA supply current reduction. A full shutdown mode is available to maximize power savings during idle periods. The MAX1420 provides parallel, offset binary, CMOS-compatible three-state outputs. The MAX1420 is available in a 7mm x 7mm x 1.4mm, 48-pin TQFP package, and is specified over the commercial (0°C to +70°C) and the extended industrial (-40°C to +85°C) temperature range. Pin-compatible lower speed versions of the MAX1420 are also available. Please refer to the MAX1421 data sheet for 40Msps and the MAX1422 data sheet for 20Msps.



A. Description/Function: 12-Bit, 60Msps, +3.3V, Low-Power ADC with Internal Reference B. Process: TS35

July 06, 2001

Korea, Taiwan, Malaysia

Taiwan

- C. Number of Device Transistors:
- D. Fabrication Location:
- E. Assembly Location:
- F. Date of Initial Production:

III. Packaging Information

A. Package Type:	48-pin LQFP	
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:	#05-2101-0025	
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:	N/A	
K. Single Layer Theta Jc:	N/A	
L. Multi Layer Theta Ja:	46°C/W	
M. Multi Layer Theta Jc:	10°C/W	

IV. Die Information

Α.	Dimensions:	117X106 mils
В.	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:	0.35um
F.	Minimum Metal Spacing:	0.35um
G.	Bondpad Dimensions:	
Н.	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 (Vice President of QA)
В.	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 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \underbrace{1}_{\text{MTTF}} = \underbrace{1.83}_{1000 \text{ x } 4340 \text{ x } 229 \text{ x } 2} \text{ (Chi square value for MTTF upper limit)}$$

$$\lambda = 0.92 \text{ x } 10^{-9}$$

$$\lambda = 0.92 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 TS35 Process results in a FIT Rate of 0.11 @ 25C and 1.8 @ 55C (0.8 eV, 60% UCL).

B. E.S.D. and Latch-Up Testing (lot Q4AAEQ002B, D/C 0423)

The AC07 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250mA.



Table 1 Reliability Evaluation Test Results

MAX1420ECM+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note	e 1)				
	Ta = 135°C	DC Parameters	79	0	Q4QBAQ001A, D/C 0219
	Biased Time = 1000 hrs.	& functionality	150	0	Q4AAEA004Q, D/C 1045

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