

RELIABILITY REPORT
FOR
MAX4356ECD+
PLASTIC ENCAPSULATED DEVICES

November 18, 2013

MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134

Approved by
Sokhom Chum
Quality Assurance
Reliability Engineer

Conclusion

The MAX4356ECD+ 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 MAX4356 is a 16 x 16 highly integrated video crosspoint switch matrix with input and output buffers and On-Screen Display (OSD) Insertion. This device operates from dual $\pm 3V$ to $\pm 5V$ supplies or from a single +5V supply. Digital logic is supplied from an independent single +2.7V to +5.5V supply. Individual outputs can be switched between an input video signal source and OSD information through an internal, dedicated fast 2:1 mux (40ns switching times) located before the output buffer. All inputs and outputs are buffered, with all outputs able to drive standard 75 Ω reverse-terminated video loads. The switch matrix configuration and output buffer gain are programmed via an SPI(tm)/QSPI(tm)-compatible, three-wire serial interface and initialized with a single update signal. The unique serial interface operates in two modes facilitating both fast updates and initialization. On power-up, all outputs are initialized in the disabled state to avoid output conflicts in large-array configurations. Superior flexibility, high integration, and space-saving packaging make this nonblocking switch matrix ideal for routing video signals in security and video-on-demand systems. The MAX4356 is available in a 128-pin TQFP package and specified over an extended -40°C to 85°C temperature range.

II. Manufacturing Information

A. Description/Function:	16 x 16 Nonblocking Video Crosspoint Switch with On-Screen Display Insertion and I/O Buffers
B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	California or Texas
E. Assembly Location:	Philippines or Thailand
F. Date of Initial Production:	July 28, 2001

III. Packaging Information

A. Package Type:	128L LQFP
B. Lead Frame:	N/A
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:	#05-2501-0101
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	3
J. Single Layer Theta Ja:	N/A
K. Single Layer Theta Jc:	N/A
L. Multi Layer Theta Ja:	30°C/W
M. Multi Layer Theta Jc:	8°C/W

IV. Die Information

A. Dimensions:	177X205 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:	0.8 microns (as drawn)
F. Minimum Metal Spacing:	0.8 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 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 149 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 7.4 \times 10^{-9}$$

$$\lambda = 7.4 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 B8 Process results in a FIT Rate of 0.015 @ 25C and 0.261 @ 55C (0.8 eV, 60% UCL).

B. E.S.D. and Latch-Up Testing (lot I150BQ002B, D/C 0121)

The OX30 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500V 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

MAX4356ECD+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135°C	DC Parameters	77	0	I150BQ002B, D/C 0121
	Biased	& functionality	72	0	I150AQ001H, D/C 0051
	Time = 192 hrs.				

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