

RELIABILITY REPORT
FOR
MAX4028EUE+
PLASTIC ENCAPSULATED DEVICES

June 27, 2013

MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134

Approved by
Sokhom Chum
Quality Assurance
Reliability Engineer

Conclusion

The MAX4028EUE+ 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 MAX4028/MAX4029 are 5V, triple/quad, 2:1 voltage-feedback multiplexer-amplifiers with input clamps and a fixed gain of +2V/V (6dB). Channel 1 (IN1A and IN1B) inputs are clamped to the video sync tip of the input signal, while the remaining inputs can be clamped to either the video sync tip or the video sync of channel 1 (IN1_{__}). The latter is referred to as a key clamp and is pin selectable. Selectable clamp/key-clamp inputs and fixed-gain video output buffers make the MAX4028/MAX4029 ideal for video-source switching applications such as automotive entertainment systems, video projectors, and displays/ TVs. Both devices have 20ns channel switching times and low $\pm 10\text{mVP-P}$ switching transients, making them ideal for high-speed video switching applications such as on-screen display (OSD) insertion. The MAX4028/MAX4029 have a -3dB large-signal (2VP-P) bandwidth of 130MHz, a -3dB small-signal bandwidth of 210MHz, and a 300V/ μs slew rate. Low differential gain and phase errors of 0.2% and 0.4°, respectively, make these devices ideal for broadcast video applications. The MAX4028/MAX4029 are specified over the -40°C to +85°C extended temperature range and are offered in 16-pin and 20-pin TSSOP/SO packages.

II. Manufacturing Information

A. Description/Function:	Triple/Quad, 2:1 Video Multiplexer-Amplifiers with Input Clamps
B. Process:	CB2
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Philippines, Thailand, or Malaysia
F. Date of Initial Production:	March 25, 2004

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 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-0942
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:	108 X 133 mils
B. Passivation:	Si ₃ N ₄ (Silicon nitride)
C. Interconnect:	Au
D. Backside Metallization:	None
E. Minimum Metal Width:	2 microns (as drawn)
F. Minimum Metal Spacing:	2 microns (as drawn)
G. Bondpad Dimensions:	
H. Isolation Dielectric:	SiO ₂
I. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

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|-----------------------------------|--|
| 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 150C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 9706 \times 48 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

(where 9706 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$$\lambda = 10.2 \times 10^{-9}$$

$$\lambda = 10.2 \text{ F.I.T. (60\% confidence level @ } 25^{\circ}\text{C)}$$

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 CB2 Process results in a FIT Rate of 0.06 @ 25C and 0.95 @ 55C (0.8 eV, 60% UCL).

B. E.S.D. and Latch-Up Testing (lot NNT1BQ001B, D/C 0401)

The VA26-1 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

MAX4028EUE+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 150°C Biased Time = 192 hrs.	DC Parameters & functionality	48	0	NNT0BQ001C, D/C 0401

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