

RELIABILITY REPORT
FOR
MAX9247ECM+
PLASTIC ENCAPSULATED DEVICES

October 29, 2008

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
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Conclusion

The MAX9247ECM+ 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 MAX9247 digital video parallel-to-serial converter serializes 27 bits of parallel data into a serial-data stream. Eighteen bits of video data and 9 bits of control data are encoded and multiplexed onto the serial interface, reducing the serial-data rate. The data-enable input determines when the video or control data is serialized.

The MAX9247 pairs with the MAX9248/MAX9250 deserializers to form a complete digital video serial link. Interconnect can be controlled-impedance PCB traces or twisted-pair cable. Proprietary data encoding reduces EMI and provides DC balance. DC balance allows ACcoupling, providing isolation between the transmitting and receiving ends of the interface. The LVDS output is internally terminated with 100Ω. For operating frequencies less than 35MHz, the MAX9247 can also pair with the MAX9218 deserializer.

ESD tolerance is specified for ISO 10605 with ±10kV Contact Discharge and ±30kV Air-Gap Discharge.

The MAX9247 operates from a +3.3V core supply and features a separate input supply for interfacing to 1.8V to 3.3V logic levels. This device is available in a 48-lead LQFP package and is specified from -40°C to +85°C or -40°C to +105°C..

II. Manufacturing Information

A. Description/Function:	27-Bit, 2.5MHz-to-42MHz DC-Balanced LVDS Serializer
B. Process:	0.35UM 2 Poly 4 Metal CMOS
C. Number of Device Transistors:	
D. Fabrication Location:	TSMC
E. Assembly Location:	Carsem Malaysia, NSEB/UTL Thailand, Unisem Malaysia
F. Date of Initial Production:	January 21, 2006

III. Packaging Information

A. Package Type:	48-pin LQFP 7x7
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Ag Filled Epoxy
E. Bondwire:	1.0 (mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#
H. Flammability Rating:	Class UL94-V2 or less
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J. Multi Layer Theta Ja:	46.0°C/W
K. Multi Layer Theta Jc:	10.0°C/W

IV. Die Information

A. Dimensions:	99 x 119 mils
B. Passivation:	Silicon Dioxide/Silicon Nitride
C. Interconnect:	Al/Cu
D. Backside Metallization:	None
E. Minimum Metal Width:	0.35 um
F. Minimum Metal Spacing:	0.35 um
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	Silicon Dioxide
I. Die Separation Method:	Saw

V. Quality Assurance Information

- A. Quality Assurance Contacts: Ken Wendel (Director, Reliability Engineering)
Bryan Preeshl (Managing Director 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 pending. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 48 \times 2} \text{ (Chi square value for MTTF upper limit)}$$

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

$$\lambda = 22.37 \times 10^{-9}$$

$$\lambda = 22.37 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly 1000 hour life test monitors on its processes. This data is published in the Product Reliability Report found at <http://www.maxim-ic.com/>. Current monitor data for the TS352P4M Process results in a FIT Rate of 0.43 @ 25C and 7.50 @ 55C (0.8 eV, 60% UCL)

B. Moisture Resistance Tests

The industry standard 85°C/85%RH or HAST testing is monitored per device process once a quarter.

C. E.S.D. and Latch-Up Testing

The HS47Z die type has shown the following ESD performance per pin:

HBM	3KV
MM	200
IEC Contact	10KV
IEC Air	15KV
ISO Contact	10KV
ISO Air	30KV

Latch-Up testing has shown that this device withstands a current of 250 mA.

Table 1
Reliability Evaluation Test Results

MAX9247ECM+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)	Ta = Biased Time = 192 hrs.	DC Parameters & functionality	48	0
Moisture Testing (Note 2) 85/85	Ta = 85°C RH = 85% Biased Time = 1000hrs.	DC Parameters & functionality	77	0
Mechanical Stress (Note 2) Temperature Cycle	-65°C/150°C 1000 Cycles Method 1010	DC Parameters & functionality	77	0

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

Note 2: Generic Package/Process data