



RELIABILITY REPORT
FOR MAX9635EDT+T
PLASTIC ENCAPSULATED DEVICES

August 24, 2010

MAXIM INTEGRATED PRODUCTS

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Approved by
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Conclusion

The MAX9635EDT+T 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 MAX9635 is an Ambient Light Sensor with an I2C Digital Output that is ideal for a number of portable applications such as smart phones, notebooks and industrial sensors. It is the lowest power Ambient Light Sensor in the industry, and features an ultra-wide dynamic range - from 0.03 lux to 130,000 lux. The on-chip photodiode array is optimized to mimic the human eye's perception of ambient light - with a peak sensitivity of 550nm, and incorporates IR and UV blocking capability. It is designed to operate from Vcc of 1.7V to 3.6V, and consumes only 1uA in full operation! It is available in a small 2mm x 2mm x 0.6mm ODFN package.

II. Manufacturing Information

A. Description/Function:	World's Lowest-Power Ambient Light Sensor with ADC
B. Process:	S4
C. Number of Device Transistors:	12841
D. Fabrication Location:	California, Texas or Japan
E. Assembly Location:	Thailand
F. Date of Initial Production:	August 17, 2010

III. Packaging Information

A. Package Type:	6-pin Ultra TDFN Opto 2x2
B. Lead Frame:	Copper
C. Lead Finish:	NiPdAu
D. Die Attach:	Conductive
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Optical epoxy
G. Assembly Diagram:	#05-9000-4051
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 3
J. Single Layer Theta Ja:	83.9°C/W
K. Single Layer Theta Jc:	37°C/W
L. Multi Layer Theta Ja:	°C/W
M. Multi Layer Theta Jc:	°C/W

IV. Die Information

A. Dimensions:	58 X 38 mils
B. Passivation:	Si ₃ N ₄ /SiO ₂ (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al with Ti/TiN Barrier
D. Backside Metallization:	None
E. Minimum Metal Width:	Metal1 = 0.5 / Metal2 = 0.6 / Metal3 = 0.6 microns (as drawn)
F. Minimum Metal Spacing:	Metal1 = 0.45 / Metal2 = 0.5 / Metal3 = 0.6 microns (as drawn)
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	SiO ₂
I. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

A. Quality Assurance Contacts:	Richard Aburano (Manager, Reliability Operations) 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 135°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 238 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 4.6 \times 10^{-9}$$

$$\lambda = 4.6 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 S4 Process results in a FIT Rate of 0.05 @ 25C and 0.83 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot SFOXBU003B, D/C 1020)

The OY44-2 die type has been found to have all pins able to withstand a HBM transient pulse of +/- 2500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/- 100mA and overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results

MAX9635EDT+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C	DC Parameters	79	0	SF0XBU003A, D/C 1018
	Biased	& functionality	80	0	SF0XBA004B, D/C 1019
	Time = 192 hrs.		79	0	SF0XBU003B, D/C 1020

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