



RELIABILITY REPORT
FOR
MAX7456EUI+
PLASTIC ENCAPSULATED DEVICES

March 10, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
SUNNYVALE, CA 94086

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering

Conclusion

The MAX7456EUI+ 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 MAX7456 single-channel monochrome on-screen display (OSD) generator lowers system cost by eliminating the need for an external video driver, sync separator, video switch, and EEPROM. The MAX7456 serves all national and international markets with 256 user-programmable characters in NTSC and PAL standards. The MAX7456 easily displays information such as company logo, custom graphics, time, and date with arbitrary characters and sizes. The MAX7456 is preloaded with 256 characters and pictographs and can be reprogrammed in-circuit using the SPI(tm) port. The MAX7456 is available in a 28-pin TSSOP package and is fully specified over the extended (-40°C to +85°C) temperature range.

II. Manufacturing Information

A. Description/Function:	Single-Channel Monochrome On-Screen Display with Integrated EEPROM
B. Process:	E35X
C. Number of Device Transistors:	
D. Fabrication Location:	Dallas
E. Assembly Location:	ATP Philippines, UTL Thailand
F. Date of Initial Production:	July 28, 2007

III. Packaging Information

A. Package Type:	28-pin TSSOP
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive Epoxy
E. Bondwire:	Gold (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-1607
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:	45°C/W
K. Single Layer Theta Jc:	2°C/W
L. Multi Layer Theta Ja:	37°C/W
M. Multi Layer Theta Jc:	2°C/W

IV. Die Information

A. Dimensions:	116 X 226 mils
B. Passivation:	4KÅ SiN ₃ / 4KÅ SiO ₂
C. Interconnect:	Al / 0.5% Cu
D. Backside Metallization:	None
E. Minimum Metal Width:	0.4
F. Minimum Metal Spacing:	0.4
G. Bondpad Dimensions:	5 mil. Sq.
H. Isolation Dielectric:	SiO ₂
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 100°C biased (static) life test are pending. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{1000 \times 525.5 \times 77 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

(where 525.5 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$$\lambda = 22.6 \times 10^{-9}$$

$$\lambda = 22.6 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly 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 E35X Process results in a FIT Rate of 0.28 @ 25C and 17.30 @ 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 VP04 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500V per JEDEC JESD22-A114-D. Latch-Up testing has shown that this device withstands a current of +/-250 mA.

Table 1
Reliability Evaluation Test Results

MAX7456EUI+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)	Ta = 100°C	DC Parameters & functionality	77	0
	Biased Time = 1000 hrs.			
Moisture Testing (Note 2) 85/85	Ta = 85°C	DC Parameters & functionality	77	0
	RH = 85% Biased Time = 1000hrs.			
Mechanical Stress (Note 2) Temperature Cycle	-55°C/125°C	DC Parameters & functionality	77	0
	1000 Cycles Method 1010			

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

Note 2: Generic Package/Process data