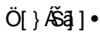


RELIABILITY REPORT
FOR
MAX3107ETG+
PLASTIC ENCAPSULATED DEVICES

July 28, 2010

MAXIM INTEGRATED PRODUCTS

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SUNNYVALE, CA 94086

Approved by

Quality Assurance
Taylor, Reliability Engineering

Conclusion

The MAX3107ETG+ 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 MAX3107 is an advanced universal asynchronous receiver-transmitter (UART) with 128 words each of receive and transmit first-in/first-out (FIFO) that can be controlled through I²C or high-speed SPI(tm). An internal oscillator reduces the need for an external crystal or clock source. The 2x and 4x rate modes allow a maximum of 24Mbps data rates. A phase-locked loop (PLL), prescaler, and fractional baud-rate generator allow for high-resolution baud-rate programming and minimize the dependency of baud rate on reference clock frequency. Autosleep and shutdown modes help reduce power consumption during periods of inactivity. A low 640 μ A (typ) supply current and tiny 24-pin TQFN (3.5mm x 3.5mm) package make the MAX3107 ideal for low-power portable devices. Integrated logic-level translation on the controller and transceiver (RX/TX and active-low RTS/CTS) interfaces enable use with a wide selection of RS-232/RS-485 transceivers. Automatic hardware and software flow control with selectable FIFO interrupt triggering offloads low-level activity from the host controller. Automatic half-duplex transceiver control with programmable setup and hold times allow the MAX3107 to be used in high-speed applications, for example Profibus-DP. The MAX3107 is ideal for use in portable devices, industrial applications, and automotive applications. The MAX3107 is available in a 24-pin SSOP package and a 24-pin TQFN package. It is specified over the -40°C to +85°C extended ambient temperature range.

II. Manufacturing Information

A. Description/Function:	SPI/I ² C UART with 128-Word FIFOs and Internal Oscillator
B. Process:	TS18
C. Number of Device Transistors:	141844
D. Fabrication Location:	Taiwan
E. Assembly Location:	Thailand
F. Date of Initial Production:	U–A–E–U

III. Packaging Information

A. Package Type:	24-pin TQFN 3.5x3.5
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:	#05-9000-3761
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:	65.1°C/W
K. Single Layer Theta Jc:	5.4°C/W
L. Multi Layer Theta Ja:	n/a
M. Multi Layer Theta Jc:	n/a

IV. Die Information

A. Dimensions:	69 X 69 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:	0.18μm
F. Minimum Metal Spacing:	0.18μm
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: Don Lipps (Manager, 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 135°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

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

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

$$\lambda = 22.9 \times 10^{-9}$$

$\lambda = 22.9$ 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 TS18 Process results in a FIT Rate of 0.24 @ 25C and 4.14 @ 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 RU36 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 +/-250mA.

Table 1
Reliability Evaluation Test Results

MAX3107ETG+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)				
	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	48	0
Moisture Testing (Note 2)				
HAST	Ta = 130°C RH = 85% Biased Time = 96hrs.	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