

RELIABILITY REPORT
FOR
MAX2616ETA+T
PLASTIC ENCAPSULATED DEVICES

August 30, 2013

MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134

Approved by
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Quality Assurance
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Conclusion

The MAX2616ETA+T 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 MAX2612-MAX2616 is a family of high-performance broadband gain blocks designed for use as a PA predriver, low-noise amplifier, or as a cascadable 50 Ω amplifier with up to +19.5dBm output power. These devices are suited for many applications that include cellular infrastructure, private or commercial microwave radios, and CATV or cable modems. The operating frequency range extends from 40MHz to 4000MHz. The amplifier operates on a +3V to a +5.25V supply with input and output ports internally matched to 50 Ω . The device family is available in a pin-to-pin compatible, compact 2mm x 3mm TDFN lead-free package.

II. Manufacturing Information

A. Description/Function:	40MHz to 4GHz Linear Broadband Amplifiers
B. Process:	MB3
C. Number of Device Transistors:	410
D. Fabrication Location:	California
E. Assembly Location:	Taiwan or Thailand
F. Date of Initial Production:	June 6, 2012

III. Packaging Information

A. Package Type:	8-pin TDFN 2x3
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:	#05-9000-4648
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:	60°C/W
K. Single Layer Theta Jc:	11°C/W
L. Multi Layer Theta Ja:	60°C/W
M. Multi Layer Theta Jc:	11°C/W

IV. Die Information

A. Dimensions:	38.98 X 26.77 mils
B. Passivation:	BCB
C. Interconnect:	Al with top layer 100% Cu
D. Backside Metallization:	None
E. Minimum Metal Width:	0.35um
F. Minimum Metal Spacing:	0.35um
G. Bondpad Dimensions:	
H. Isolation Dielectric:	SiO ₂
I. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

- 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 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 79 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 13.9 \times 10^{-9}$$

$$\lambda = 13.9 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 MB3 Process results in a FIT Rate of 0.02 @ 25C and 0.4 @ 55C (0.8 eV, 60% UCL).

B. E.S.D. and Latch-Up Testing (lot S3LYAQ001D, D/C 1211)

The WV61-1 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 and overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results

MAX2616ETA+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	79	0	S3LVAQ001D, D/C 1136

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