

RELIABILITY REPORT
FOR
MAX3543CTL+
PLASTIC ENCAPSULATED DEVICES

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MAXIM INTEGRATED PRODUCTS

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Conclusion

The MAX3543CTL+ 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 MAX3543 hybrid broadband single-conversion television tuner is designed for use in analog (PAL, SECAM) + digital (DVB-T, GB20600) television sets and terrestrial receivers. It receives all television bands from 47MHz to 862MHz and converts the selected channel to an industry-standard 36MHz IF. The MAX3543 includes a variable-gain low-noise input amplifier; an RF tracking filter; an image rejection mixer; a peak detector; an optional internal, self-contained RF gain-control loop (RFAGC); a VCO with fractional-N PLL; an IF bandpass filter; an IF variable-gain amplifier; separate analog and digital IF outputs; and a crystal oscillator. The MAX3543 is available in a small, 6mm x 6mm, thin QFN package, and the application circuit fits in 20mm x 25mm on a two-layer board with single-sided component mounting.

II. Manufacturing Information

A. Description/Function:	Multiband Analog and Digital Television Tuner
B. Process:	MB3
C. Number of Device Transistors:	39991
D. Fabrication Location:	California
E. Assembly Location:	Taiwan, China, Thailand
F. Date of Initial Production:	October 10, 2009

III. Packaging Information

A. Package Type:	40L TQFN
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:	#05-9000-3710 / A
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	1
J. Single Layer Theta Ja:	39°C/W
K. Single Layer Theta Jc:	2°C/W
L. Multi Layer Theta Ja:	28°C/W
M. Multi Layer Theta Jc:	2°C/W

IV. Die Information

A. Dimensions:	107.1 X 122.8 mils
B. Passivation:	BCB
C. Interconnect:	Al with top layer 100% Cu
D. Backside Metallization:	None
E. Minimum Metal Width:	0.35µm
F. Minimum Metal Spacing:	0.35µm
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 biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 47 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 23.4 \times 10^{-9}$$

$$\lambda = 23.4 \text{ F.I.T. (60\% confidence level @ 25}^\circ\text{C)}$$

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 MB3 Process results in a FIT Rate of 0.08 @ 25C and 1.33 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (SWHZAQ001F D/C 0934)

The WG52 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

MAX3543CTL+

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	47	0	SWHZAQ001F, D/C 0934

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