

RELIABILITY REPORT
FOR
MAX1479ATE+C2R
PLASTIC ENCAPSULATED DEVICES

October 8, 2014

MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134

Approved by
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Conclusion

The MAX1479ATE+C2R 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 MAX1479 crystal-referenced phase-locked-loop (PLL) VHF/UHF transmitter is designed to transmit ASK, OOK, and FSK data in the 300MHz to 450MHz frequency range. The MAX1479 supports data rates up to 100kbps in ASK mode and 20kbps in FSK mode (both Manchester coded). The device provides an adjustable output power of more than +10dBm into a 50 Ω load. The crystal-based architecture of the MAX1479 eliminates many of the common problems of SAW-based transmitters by providing greater modulation depth, faster frequency settling, higher tolerance of the transmit frequency, and reduced temperature dependence. These improvements enable better overall receiver performance when using the MAX1479 together with a superheterodyne receiver such as the MAX1470, MAX1471, MAX1473, or MAX7033. The MAX1479 is available in a 16-pin TQFN package (3mm x 3mm) and is specified for the automotive temperature range from -40°C to +125°C.

II. Manufacturing Information

A. Description/Function:	300MHz to 450MHz Low-Power, Crystal-Based +10dBm ASK/FSK Transmitter
B. Process:	TS35
C. Number of Device Transistors:	
D. Fabrication Location:	Taiwan
E. Assembly Location:	China, Thailand, Malaysia
F. Date of Initial Production:	July 24, 2004

III. Packaging Information

A. Package Type:	16-pin TQFN 3x3
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:	#05-9000-0898
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:	64°C/W
K. Single Layer Theta Jc:	6.9°C/W
L. Multi Layer Theta Ja:	48°C/W
M. Multi Layer Theta Jc:	6.9°C/W

IV. Die Information

A. Dimensions:	55X53 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:	0.35um
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: | 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:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{1000 \times 4340 \times 48 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 4.4 \times 10^{-9}$$

$$\lambda = 4.4 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 TS35 Process results in a FIT Rate of 0.11 @ 25C and 1.80 @ 55C (0.8 eV, 60% UCL).

B. E.S.D. and Latch-Up Testing (lot QOL0CQ003C, D/C 0519)

The SC79 die type has been found to have all pins able to withstand a HBM transient pulse of +/-800V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250mA.

Table 1
Reliability Evaluation Test Results

MAX1479ATE+C2R

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135°C Biased Time = 1000 hrs.	DC Parameters & functionality	48	0	QOL0CQ003C, D/C 0519

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