RELIABILITY REPORT

FOR MAX7375AXR+

PLASTIC ENCAPSULATED DEVICES

August 10, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
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Conclusion

The MAX7375AXR+ 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 MAX7375 is a silicon oscillator, intended as a low-cost improvement replacing ceramic resonators, crystals, and crystal oscillator modules used as the clock source for microcontrollers and UARTs in 3V, 3.3V, and 5V applications. The MAX7375 is a fully integrated oscillator, supplied at specific factory-trimmed frequencies with a rail-to-rail 50% duty cycle square-wave output. The oscillator frequency is generated directly without the use of a phase-locked loop (PLL). No additional components are used to set or adjust the frequency. Unlike typical crystal and ceramic resonator oscillator circuits, the MAX7375 is highly resistant to vibration and EMI. The high output drive current and absence of high-impedance nodes also makes the oscillator less susceptible to dirty or humid operating conditions. With a wide operating temperature range, the oscillator is a good choice for demanding home appliance and automotive environments. Available in 3-pin space-saving SC70 package, the MAX7375 is offered in standard and nonstandard factory-set frequencies ranging from 600kHz to 9.99MHz. See the MAX7381 data sheet for frequencies >= 10MHz. The MAX7375's standard operating temperature range is -40°C to +125°C. See the Applications Information section in the full data sheet for extended operating temperature range.

II. Manufacturing Information

A. Description/Function:	3-Pin Silicon Oscillator
B. Process:	B6
C. Number of Device Transistors:	
D. Fabrication Location:	California
E. Assembly Location:	Malaysia, Thailand
F. Date of Initial Production:	October 25, 2003

III. Packaging Information

A. Package Type:	3-pin SC70
B. Lead Frame:	Alloy42
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:	#05-9000-0700
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:	340°C/W
K. Single Layer Theta Jc:	115°C/W

IV. Die Information

A. Dimensions:	28 X 28 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al with Ti/TiN Barrier
D. Backside Metallization:	None
E. Minimum Metal Width:	0.6 microns (as drawn)
F. Minimum Metal Spacing:	0.6 microns (as drawn)
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:	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 135°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 50 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 21.5 \times 10^{-9}$

$\lambda = 21.5$ 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 B6 Process results in a FIT Rate of 0.8 @ 25C and 14.2 @ 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 DW69-3 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1000 V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250 mA.

Table 1
Reliability Evaluation Test Results

MAX7375AXR+

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	50	0
Moisture Testing (Note 2)				
85/85	Ta = 85°C RH = 85% Biased Time = 1000hrs.	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