

RELIABILITY REPORT
FOR
MAX6620ATI+, MAX6620ATI-T

July 30, 2020

MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134


Sheena Karlyn Basinang
Engineer, Reliability


Ryan Wall
Manager, Reliability

Conclusion

The MAX6620 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.

Table of Contents

I.Device Description	IV.Die Information
II.Manufacturing Information	V.Quality Assurance Information
III.Packaging Information	VI.Reliability Evaluation
.....Attachments	

I. Device Description

A. General

The MAX6620 controls the speeds of up to four fans using four independent linear voltage outputs. The drive voltages for the fans are controlled directly over the I2C interface. Each output drives the base of an external bipolar transistor or the gate of a FET in highside drive configuration. Voltage feedback at the fan's power-supply terminal is used to force the correct output voltage.

The MAX6620 offers two methods for fan control. In RPM mode, the MAX6620 monitors four fan tachometer logic outputs for precise ($\pm 1\%$) control of fan RPM and detection of fan failure. In DAC mode, each fan is driven with a voltage resolution of 9 bits and the tachometer outputs of the fans are monitored for failure.

The DAC_START input selects the fan power-supply voltage at startup to ensure appropriate fan drive when power is first applied. A watchdog feature turns the fans fully on to protect the system if there are no valid I2C communications within a preset timeout period.

The MAX6620 operates from a 3.0V to 5.5V power supply with low 250 μ A supply current, and the I2C-compatible interface makes it ideal for fan control in a wide range of cooling applications. The MAX6620 is available in a 28-pin TQFN package and operates over the -40°C to +125°C automotive temperature range.

II. Manufacturing Information

A. Description/Function:	Quad Linear Fan-Speed Controller
B. Process:	EB8
C. Device Count:	N/A
D. Fabrication Location:	USA
E. Assembly Location:	China, Thailand, Taiwan
F. Date of Initial Production:	January 26, 2008

III. Packaging Information

A. Package Type:	TQFN
B. Lead Frame:	Copper
C. Lead Finish:	Matte Tin
D. Die Attach:	AB8200T, EN4900G
E. Bondwire:	1.00 mil AU
F. Mold Material:	G770HCD, G770HJ
G. Assembly Diagram:	05-9000-2866
H. Flammability Rating:	UL-94 (V-0 Rating)
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
J. Single Layer Theta Ja:	47 °C/W
K. Single Layer Theta Jc:	2 °C/W
L. Multi Layer Theta Ja:	21 °C/W
M. Multi Layer Theta Jc:	2 °C/W

IV. Die Information

A. Dimensions:	109X129 mils
B. Passivation:	SiN/SiO ₂

V. Quality Assurance Information

A. Quality Assurance Contacts:	Ryan Wall (Manager, Reliability) Michael Cairnes (Executive Director, Reliability) Bryan Preeshl (SVP 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 125C biased (static) life test are shown in Table 1. Using these results, the Failure Rate λ is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 2454 \times 48 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

(where 2454 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$$\lambda = 40.51 \times 10^{-9}$$

$$\lambda = 40.51 \text{ FITs (60\% confidence level @25°C)}$$

Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at <https://www.maximintegrated.com/en/support/qa-reliability/reliability/reliability-monitor-program.html>.

EB8 cumulative process Fit

$$\lambda = 0.35 \text{ FITs (60\% confidence level @25°C)}$$

$$\lambda = 4.22 \text{ FITs (60\% confidence level @55°C)}$$

B. ESD and Latch-Up Testing

The MAX6620ATI+T has been found to have all pins able to withstand an HBM transient pulse of ± 2500 V per JEDEC / ESDA JS-001. Latch-Up testing has shown that this device withstands ± 250 mA current injection and supply overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results
MAX6620ATI+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 125°C Biased Time = 192 hrs.	DC parameters & functionality	48	0	

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