

RELIABILITY REPORT FOR MAX16056ATA26+ MAX16056ATA26+T PLASTIC ENCAPSULATED DEVICES

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# **MAXIM INTEGRATED**

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### Conclusion

The MAX16056 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 MAX16056–MAX16059 are ultra-low-current 125nA (typ) microprocessor (µP) supervisory circuits that monitor a single system supply voltage. These devices assert an active-low reset signal whenever the VCC supply voltage drops below the factory trimmed reset threshold, manual reset is pulled low, or the watchdog timer runs out (MAX16056/MAX16058). The reset output remains asserted for an adjustable reset timeout period after VCC rises above the reset threshold. Factory-trimmed reset threshold voltages are offered from 1.575V to 4.625V in approximately 100mV increments. These devices feature adjustable reset and watchdog timeout using external capacitors. The MAX16056/MAX16058 contain a watchdog timer with a watchdog select input (WDS) that multiplies the watchdog timeout period by 128.



# II. Manufacturing Information

A. Description/Function:	Supervisory Circuit with Capacitor-Adjustable Reset and Watchdog Timeout
B. Process:	C6
C. Device Count:	4406
D. Fabrication Location:	Japan
E. Assembly Location:	Thailand/China/Taiwan
F. Date of Initial Production:	July 16, 2009

F. Date of Initial Production:

# III. Packaging Information

A.	Package Type:	TDFN
В.	Lead Frame:	Cu194
C.	Lead Finish:	Matte Tin
D.	Die Attach:	AB8200T/EN4900G
E.	Bondwire:	1.00 mil Au
F.	Mold Material:	G770HCD/G770HJ
G	Assembly Diagram:	05-9000-3393
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:	54 °C/W
K.	Single Layer Theta Jc:	8 °C/W
L.	Multi Layer Theta Ja:	41 °C/W
М	. Multi Layer Theta Jc:	8 °C/W
IV. Die Infor	mation	

Α.	Dimensions:	55 x 63 mils
В.	Passivation:	Si <sub>3</sub> N <sub>4</sub> /SiO <sub>2</sub>



#### V. Quality Assurance Information

A.	Quality Assurance Contacts:	Norbert Gerena (Engineer, Reliability) Brian Standley (Manager, Reliability) Bryan Preeshl (SVP of QA)
В.	Outgoing Inspection Level:	0.1% for all electrical parameters guaranteed by theDatasheet. 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  $\alpha$  is calculated as follows:

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

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

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

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

Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at <a href="https://www.maximintegrated.com/en/support/ga-reliability/

C6 Quarterly Process FIT from Q1FY18  $\lambda = 1.0 \ FITs \ (60\% \ confidence \ level \ @25^{\circ}C)$ 

B. E.S.D. and Latch-Up Testing

The MAX16056 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

# MAX16056TA16+ (MAX16056ATA26+ QBS)

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

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