

RELIABILITY REPORT
FOR
MAX14523CATA+T
PLASTIC ENCAPSULATED DEVICES

January 26, 2012

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
SUNNYVALE, CA 94086

Approved by
Sokhom Chum
Quality Assurance
Reliability Engineer

Conclusion

The MAX14523CATA+T 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.

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 MAX14523A/MAX14523AL/MAX14523B/MAX14523C programmable current-limit switches feature internal current limiting to prevent damage to host devices due to faulty load conditions. These current-limit switches feature a low 70m Ω on-resistance and operate from a +1.7V to +5.5V input voltage range. The current limit is adjustable from 250mA to 1.5A, making these devices ideal for SDIO (secure digital input/output) and other load-switching applications. Each device in the family handles an overcurrent event differently depending on the option selected. The MAX14523A/MAX14523AL go into an autoretry mode, the MAX14523B latches off the switch, and the MAX14523C features a continuous current-limit mode. Additional safety features include thermal shutdown to prevent overheating and reverse-current blocking to prevent current from being driven back into the source. The MAX14523A/MAX14523AL/MAX14523B/MAX14523C are available in a tiny 8-pin, 3mm x 3mm, TDFN package and operate over the -40°C to +125°C automotive temperature range.

II. Manufacturing Information

A. Description/Function:	250mA to 1.5A, Adjustable Current-Limit Switches
B. Process:	S4
C. Number of Device Transistors:	4940
D. Fabrication Location:	Texas
E. Assembly Location:	Taiwan
F. Date of Initial Production:	July 25, 2009

III. Packaging Information

A. Package Type:	8L TDFN 3x3
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (1.3 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-3577 / 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:	54°C/W
K. Single Layer Theta Jc:	8°C/W
L. Multi Layer Theta Ja:	41°C/W
M. Multi Layer Theta Jc:	8°C/W

IV. Die Information

A. Dimensions:	40 X 60 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:	Metal1 = 0.5 / Metal2 = 0.6 / Metal3 = 0.6 microns (as drawn)
F. Minimum Metal Spacing:	Metal1 = 0.45 / Metal2 = 0.5 / Metal3 = 0.6 microns (as drawn)
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:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 48 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 22.9 \times 10^{-9}$$

$$\lambda = 22.9 \text{ F.I.T. (60\% confidence level @ 25}^\circ\text{C)}$$

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 S4 Process results in a FIT Rate of 0.49 @ 25C and 8.49 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (ESD lot TONVBQ001L D/C 0918, Latch-Up lot TONVBQ001M D/C 0918)

The AJ58-4 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 +/-175mA and overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results

MAX14523CATA+T

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	48	0	TONXBQ001M, D/C 0918

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