



RELIABILITY REPORT
FOR
DS1925
PLASTIC ENCAPSULATED DEVICES

April 3, 2017

MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134

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Conclusion

The DS1925 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 iButton® temperature logger (DS1925) is a rugged, self-sufficient system that measures temperature and records the result in a protected memory section. The recording is done at a user-defined rate. A total of 122K 8-bit readings or 61K 16-bit readings taken at equidistant intervals ranging from 5min to 273hrs can be stored. In addition, there are 512 bytes of nonvolatile memory for storing application-specific information. A mission to collect data can be programmed to begin immediately, after a user-defined delay, or after a temperature alarm. Access to the memory and control functions can be password protected. The DS1925 is configured and communicates with a host computing device through the serial 1-Wire® protocol, which requires only a single data lead and a ground return. Every DS1925 is factory-lasered with a guaranteed unique 64-bit registration number that allows for absolute traceability. The durable stainless-steel package is highly resistant to environmental hazards such as dirt, moisture, and shock. Accessories permit the DS1925 to be mounted on almost any object, including containers, pallets, and bags.

II. Manufacturing Information

A. Description/Function:	iButton High-Capacity Temperature Logger with 122KB Data-Log Memory
B. Fabrication Location:	USA
C. Assembly Location:	Philippines, China, Thailand
D. Date of Initial Production:	March 11, 2016

III. Packaging Information

A. Package Type:	Puk Can F50 Insert Mold Bump, Battery w-SMT Crystal (RoHS)
B. Lead Frame:	PCB; FR4
C. Lead Finish:	High Pb Ball (Pb95/Sn5)
D. Die Attach:	Underfill Fp4527, Dexter Hysol Underfill Epoxy (blue)
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-100104
H. Flammability Rating:	Class UL94-V0

IV. Quality Assurance Information

- A. Quality Assurance Contacts: Eric Wright (Reliability Engineering)
Brian Standley (Manager, Reliability)
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

V. 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:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 80 \times 2} \text{ (Chi square value for MTTF upper limit)}$$

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

$$\lambda = 13.7 \times 10^{-9}$$

$\lambda = 13.7 \text{ F.I.T. (60\% confidence level @ 25°C)}$

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

The ES05-0 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250mA and overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results
DS1925

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135C Biased Time = 192 hrs.	DC Parameters & functionality	80	0	

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