

RELIABILITY REPORT
FOR
MAX6822xUK+T
PLASTIC ENCAPSULATED DEVICES

June 6, 2011

MAXIM INTEGRATED PRODUCTS

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Conclusion

The MAX6822xUK+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.

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I. Device Description

A. General

The MAX6821-MAX6825 are low-voltage microprocessor (μP) supervisory circuits that combine voltage monitoring, watchdog timer, and manual reset input functions in a 5-pin SOT23 package. Microprocessor supervisory circuits significantly improve system reliability and accuracy compared to separate ICs or discrete components. These devices assert a reset signal whenever the monitored voltage drops below its preset threshold, keeping it asserted for a minimum timeout period after VCC rises above the threshold. In addition, a watchdog timer monitors against code execution errors. A debounced manual reset is also available. The MAX6821-MAX6825 monitor voltages from +1.8V to +5.0V. These outputs are guaranteed to be in the correct state for VCC down to +1.0V. Nine preprogrammed reset threshold voltages are available (see the *Threshold Suffix Guide*). The MAX6821, MAX6822, and MAX6823 all have a manual reset input and a watchdog timer. The MAX6821 has push-pull RESET, the MAX6822 has open-drain active-low RESET, and the MAX6823 has push-pull active-low RESET. The MAX6824 has a watchdog timer and both push-pull active-low RESET and push-pull RESET. The MAX6825 has a manual reset input and both push-pull active-low RESET and push-pull RESET. The *Selector Guide* explains the functions offered in this series of parts.

II. Manufacturing Information

A. Description/Function:	Low-Voltage SOT23 μ P Supervisors with Manual Reset and Watchdog Timer
B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	USA
E. Assembly Location:	Malaysia, Philippines, Thailand
F. Date of Initial Production:	December 29, 2000

III. Packaging Information

A. Package Type:	5-pin SOT23
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-1601-0124
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:	324.3°C/W
K. Single Layer Theta Jc:	82°C/W
L. Multi Layer Theta Ja:	255.9°C/W
M. Multi Layer Theta Jc:	81°C/W

IV. Die Information

A. Dimensions:	45 X 35 mils
B. Passivation:	$\text{Si}_3\text{N}_4/\text{SiO}_2$ (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al/0.5%Cu with Ti/TiN Barrier
D. Backside Metallization:	None
E. Minimum Metal Width:	0.8 microns (as drawn)
F. Minimum Metal Spacing:	0.8 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: 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 135°C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 96 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 11.5 \times 10^{-9}$$

$$\lambda = 11.5 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 B8 Process results in a FIT Rate of 0.06 @ 25C and 0.99 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing (lot J0ACEQ012A, D/C 0912)

The MS61-2 die type has been found to have all pins able to withstand a HBM transient pulse of +/- 500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/- 250mA and overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results

MAX6822xUK+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135°C	DC Parameters	48	0	JOACEQ012A, D/C 0912
	Biased	& functionality	48	0	JOAIEQ001A, D/C 0912
	Time = 192 hrs.				

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