RELIABILITY REPORT

FOR

MAX11802ExC+

PLASTIC ENCAPSULATED DEVICES

December 1, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

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Approved by
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Quality Assurance
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Conclusion

The MAX11802ExC+ 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

A. General

The MAX11800-MAX11803 low-power touch-screen controllers operate from a single supply of 1.70V to 3.6V, targeting power-sensitive applications such as handheld equipment. The devices contain a 12-bit SAR ADC and a multiplexer to interface with a resistive touch-screen panel. A digital serial interface provides communications. The MAX11800-MAX11803 include digital preprocessing of the touch-screen measurements, reducing bus loading and application-processor resource requirements. The included smart interrupt function generator greatly reduces the frequency of interrupt servicing to the devices. The MAX11800-MAX11803 enter low-power modes automatically between conversions to save power, making the devices ideal for portable applications. The MAX11800/MAX11801 offer two modes of operation: direct and autonomous. Direct mode allows the application processor to control all touch-screen controller activity. Autonomous mode allows the MAX11800/MAX11801 to control touch-screen activity, thereby freeing the application processor to perform other functions. In autonomous mode, the devices periodically scan the touch screen for touch events without requiring host-processor intervention. This can be used to reduce system power consumption. An on-chip FIFO is used during autonomous mode to store results and increase effective data throughput and lower system power. The MAX11800-MAX11803 support data-tagging, which records the type of measurement performed; X, Y, Z1, or Z2, and the type of touch event; initial touch, continuing touch, or touch release. The MAX11800/MAX11802 support the SPI(tm) serial bus. The MAX11801/MAX11803 support the I²C serial bus. The MAX11800-MAX11803 are available in 12-pin TQFN and 12-pin WLP packages, and are specified over the -40°C to +85°C (extended) and -40°C to +105°C (automotive) temperature ranges.

II. Manufacturing Information

A. Description/Function:	Low-Power, Ultra-Small Resistive Touch-Screen Controllers with I²C/SPI Interface
B. Process:	TS18
C. Number of Device Transistors:	159237
D. Fabrication Location:	Taiwan
E. Assembly Location:	China, Thailand, Japan
F. Date of Initial Production:	7/24/2009

III. Packaging Information

A. Package Type:	12-pin TQFN 4x4	12-pin WLP 3x4
B. Lead Frame:	Copper	NA
C. Lead Finish:	100% matte Tin	SnAgCu (SAC305 Ball)
D. Die Attach:	Conductive	NA
E. Bondwire:	Au (1 mil dia.)	NA
F. Mold Material:	Epoxy with silica filler	NA
G. Assembly Diagram:	#05-9000-3478	#05-9000-3783
H. Flammability Rating:	Class UL94-V0	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1	Level 1
J. Single Layer Theta Ja:	59.3°C/W	
K. Single Layer Theta Jc:	5.7°C/W	
L. Multi Layer Theta Ja:	41°C/W	
M. Multi Layer Theta Jc:	5.7°C/W	

IV. Die Information

A. Dimensions:	87 X 64 mils
B. Passivation:	Si_3N_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:	0.18µm
F. Minimum Metal Spacing:	0.18µm
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:	Ken Wendel (Director, Reliability Engineering) Bryan Preeshl (Managing Director 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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 128 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 8.39 \times 10^{-9}$

$\lambda = 8.39$ 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 TS18 Process results in a FIT Rate of 0.24 @ 25C and 4.14 @ 55C (0.8 eV, 60% UCL)

B. Moisture Resistance Tests

The industry standard 85°C/85%RH or HAST testing is monitored per device process once a quarter.

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

The FP08-1 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500 V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250 mA, 1.5x VCCMax Overvoltage per JESD78.

Table 1

Reliability Evaluation Test Results

MAX11802ExC+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES
Static Life Test (Note 1)				
	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	128	0
Moisture Testing (Note 2)				
HAST	Ta = 130°C RH = 85% Biased Time = 96hrs.	DC Parameters & functionality	77	0
Mechanical Stress (Note 2)				
Temperature Cycle	-65°C/150°C 1000 Cycles Method 1010	DC Parameters & functionality	77	0

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

Note 2: Generic Package/Process data