RELIABILITY REPORT

FOR

MAX11811ETP+T

PLASTIC ENCAPSULATED DEVICES

May 2, 2013

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

Approved by
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Quality Assurance
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Conclusion

The MAX11811ETP+T 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 MAX11811 low-power touch-screen controller operates from a 1.7V to 3.6V single supply targeting power-sensitive applications such as handheld equipment. The device contains a 12-bit SAR ADC and a multiplexer to interface with a resistive touch-screen panel. A digital serial interface provides communications. The MAX11811 includes digital preprocessing of the touch-screen measurements, reducing bus loading and application processor (AP) resource requirements. The included smart interrupt function generator greatly reduces the frequency of interrupt servicing to the device. The MAX11811 enters low-power mode automatically between conversions to save power, making the device ideal for portable applications. The MAX11811 offers two modes of operation: direct and autonomous. Direct mode allows the application processor to control all touch-screen controller activity. Autonomous mode allows the MAX11811 to control touch-screen activity, thereby freeing the application processor to perform other functions. In autonomous mode, the device periodically scans the touch screen for a touch event 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 MAX11811 supports 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 MAX11811 features a haptic driver to either drive a vibration motor directly or to interface with an external piezo actuator driver. The device generates PWM signals that can drive the MAX11835 haptic piezo controller. The device includes a general-purpose current DAC output and a general-purpose input that can be used to drive IR and visible LEDs, as well as IR photo-detectors in applications such as proximity detectors. The MAX11811 supports the I²C serial bus. The MAX11811ETP+ is available in a 20-pin TQFN package and is specified over the extended industrial temperature range of -40°C to +85°C. The MAX11811GTP/V+ is specified over the -40°C to +105°C automotive temperature range.

II. Manufacturing Information

A. Description/Function:	TacTouch(tm), Low-Power, Ultra-Small, Resistive Touch-Screen Controller with Haptic Driver
B. Process:	TS18
C. Number of Device Transistors:	
D. Fabrication Location:	Taiwan
E. Assembly Location:	China or Thailand
F. Date of Initial Production:	January 21, 2010

III. Packaging Information

A. Package Type:	20-pin TQFN 4x4
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:	#05-9000-3735
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:	59°C/W
K. Single Layer Theta Jc:	5.7°C/W
L. Multi Layer Theta Ja:	39°C/W
M. Multi Layer Theta Jc:	5.7°C/W

IV. Die Information

A. Dimensions:	83x83 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:	0.18um
F. Minimum Metal Spacing:	0.18um
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 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

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

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

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

$\lambda = 22.9$ F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim Integrated's reliability monitor program. Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at http://www.maximintegrated.com/qa/reliability/monitor. Cumulative monitor data for the TS18 Process results in a FIT Rate of 0.11 @ 25C and 1.87 @ 55C (0.8 eV, 60% UCL).

B. E.S.D. and Latch-Up Testing (lot QWWBZQ001D, D/C 0952)

The FP09 die type has been found to have all pins able to withstand a transient pulse of:

ESD-HBM:	+/- 2500V per JEDEC JESD22-A114
ESD-CDM:	+/- 750V per JEDEC JESD22-C101

Latch-Up testing has shown that this device withstands a current of +/-100mA and overvoltage per JEDEC ESD78.

Table 1
Reliability Evaluation Test Results

MAX11811ETP+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	QWWZBQ001C, D/C 0950

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