THE DATASHEET OF

MAX5110GWX+TG074

RELIABILITY REPORT

FOR

MAX5110GTJ+/GWX+

PLASTIC ENCAPSULATED DEVICES
WAFER LEVEL PRODUCTS

September 24, 2010

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
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Quality Assurance
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Conclusion

The MAX5110GTJ+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

A. General

The MAX5110 is a 14-bit, 9-channel, current output digital-to-analog converter (DAC). The device operates from a low +3.0V power supply and provides 14-bit performance without any adjustment. The device's output ranges are optimized to bias a high-power tunable laser source. Each of the 9 channels provides a current source. Connect DAC outputs in parallel to obtain additional current or to achieve higher resolution. The MAX5110 contains an internal reference. An SPI(tm) interface drives the device with clock rates up to 25MHz. An active-high asynchronous CLR input resets DAC codes to zero independent of the serial interface. The device provides a separate power-supply input for driving the interface logic. The MAX5110 is specified over a temperature range of -40°C to +105°C and are available in 3mm x 3mm 36-WLP and 5mm x 5mm 32-TQFN packages.

II. Manufacturing Information

A. Description/Function:	9-Channel, 14-Bit Current DAC with SPI Interface
B. Process:	S45
C. Number of Device Transistors:	57126
D. Fabrication Location:	California, Texas or Japan
E. Assembly Location:	Thailand
F. Date of Initial Production:	August 27, 2010

III. Packaging Information

A. Package Type:	32-pin TQFN 5x5	36-bump WLP 6x6 array
B. Lead Frame:	Copper	N/A
C. Lead Finish:	100% matte Tin	N/A
D. Die Attach:	Conductive	None
E. Bondwire:	Au (0.8 mil dia.)	N/A (N/A mil dia.)
F. Mold Material:	Epoxy with silica filler	N/A
G. Assembly Diagram:	#05-9000-3961	#05-9000-3959
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:	47°C/W	°C/W
K. Single Layer Theta Jc:	1.7°C/W	°C/W
L. Multi Layer Theta Ja:	29°C/W	38°C/W
M. Multi Layer Theta Jc:	1.7°C/W	4°C/W

IV. Die Information

A. Dimensions:	124 X 120 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:	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:	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 Operations) 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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 48 \times 2}$$ (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'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 S45 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 (lot TC9ZDQ002B, D/C 1011)

The DB46 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 +/- 250mA and overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results

MAX5110GTJ+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	TC9ZDQ002B, D/C 1011

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

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