RELIABILITY REPORT

FOR

MAX5079EUD+

PLASTIC ENCAPSULATED DEVICES

December 16, 2008

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering

Conclusion

The MAX5079EUD+ 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 MAX5079 ORing MOSFET controller replaces ORing diodes in high-reliability redundant, parallel-connected power supplies. Despite their low forward-voltage drop, ORing Schottky diodes cause excessive power dissipation at high currents. The MAX5079 allows for the use of low-on-resistance n-channel power MOSFETs to replace the Schottky diodes. This results in low power dissipation, smaller size, and elimination of heatsinks in high-power applications. The MAX5079 operates from 2.75V to 13.2V and includes a charge pump to drive the high-side n-channel MOSFET. Operation down to 1V is possible if an auxiliary voltage of at least 2.75V is available. When the controller detects a positive voltage difference between IN and BUS, the n-channel MOSFET is turned on. The MOSFET is turned off as soon as the MAX5079 sees a negative potential at IN with respect to the BUS voltage, and is automatically turned back on when the positive potential is restored. Under fault conditions, the ORing MOSFET's gate is pulled down with a 1A current, providing an ultra-fast 200ns turn-off. The reverse voltage turn-off threshold is externally adjustable to avoid unintentional turn-off of the ORing MOSFET due to glitches at IN or BUS caused by hot plugging the power supply. Additional features include an OVP flag to facilitate shutdown of a failed power supply due to an overvoltage condition, and a PGOOD signal that indicates if VIN is either below the undervoltage lockout or VBUS is in an overvoltage condition. The MAX5079 operates over the -40°C to +85°C temperature range and is available in a space-saving 14-pin TSSOP package.

II. Manufacturing Information

A. Description/Function:	ORing MOSFET Controller with Ultra-Fast 200ns Turn-Off
B. Process:	BCD8
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	ATP Philippines, Carsem Malaysia
F. Date of Initial Production:	January 22, 2005

III. Packaging Information

A. Package Type:	14-pin TSSOP
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive Epoxy
E. Bondwire:	Gold (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-9000-1174
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:	110°C/W
K. Single Layer Theta Jc:	30°C/W
L. Multi Layer Theta Ja:	100.4°C/W
M. Multi Layer Theta Jc:	30°C/W

IV. Die Information

A. Dimensions:	108 X 140 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide
C. Interconnect:	Aluminum/Si (Si = 1%)
D. Backside Metallization:	None
E. Minimum Metal Width:	3.0 microns (as drawn)
F. Minimum Metal Spacing:	3.0 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:	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 complete. 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)

$\lambda = 22.4 \times 10^{-9}$

$\lambda = 22.4$ F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly 1000 hour life test monitors on its processes. This data is published in the Product Reliability Report found at http://www.maxim-ic.com/. Current monitor data for the BCD8 Process results in a FIT Rate of 2.3 @ 25C and 39.6 @ 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 NP61 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500 V per JEDEC JESD22-A114-D. Latch-Up testing has shown that this device withstands a current of +/-250 mA.

Table 1
Reliability Evaluation Test Results

MAX5079EUD+

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	48	0
Moisture Testing (Note 2)				
85/85	Ta = 85°C RH = 85% Biased Time = 1000hrs.	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