

RELIABILITY REPORT FOR MAX5071AASA+ PLASTIC ENCAPSULATED DEVICES

July 25, 2012

MAXIM INTEGRATED PRODUCTS

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San Jose, CA 95134

Approved by
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Quality Assurance
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Conclusion

The MAX5071AASA+ 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 MAX5070/MAX5071 BiCMOS, high-performance, current-mode PWM controllers have all the features required for wide input voltage range isolated/nonisolated power supplies. These controllers are used for low- and high-power universal input voltage and telecom power supplies. The MAX5070/MAX5071 contain a fast comparator with only 60ns typical delay from current sense to the output for overcurrent protection. The MAX5070A/MAX5070B have an integrated error amplifier with the output at COMP. Soft-start is achieved by controlling the COMP voltage rise using external components. The frequency is adjustable from 20kHz to 1MHz with an external resistor and capacitor. The timing capacitor discharge current is trimmed allowing for programmable dead time and maximum duty cycle for a given frequency. The available saw-toothed waveform at RTCT can be used for slope compensation when needed. The MAX5071A/MAX5071B include a bidirectional synchronization circuit allowing for multiple controllers to run at the same frequency to avoid beat frequencies. Synchronization is accomplished by simply connecting the SYNC pins of all devices together. When synchronizing with other devices, the MAX5071A/MAX5071B with the highest frequency synchronizes the other devices. Alternatively, the MAX5071A/MAX5071B can be synchronized to an external clock with an opendrain output stage running at a higher frequency. The MAX5071C provides a clock output pulse (ADV_CLK) that leads the driver output (OUT) by 110ns. The advanced clock signal is used to drive the secondary-side synchronous rectifiers. The MAX5070/MAX5071 are available in 8-pin µMAX® and SO packages and operate over the automotive temperature range of -40°C to +125°C.



II. Manufacturing Information

High-Performance, Single-Ended, Current-Mode PWM Controllers

- A. Description/Function:
- B. Process:
- C. Number of Device Transistors:
- D. Fabrication Location:
- E. Assembly Location:
- F. Date of Initial Production:

III. Packaging Information

A. Package Type:	150 mil 8L SOIC
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:	#05-9000-1106 / A
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	1
J. Single Layer Theta Ja:	170°C/W
K. Single Layer Theta Jc:	40°C/W
L. Multi Layer Theta Ja:	132°C/W
M. Multi Layer Theta Jc:	38°C/W

IV. Die Information

Α.	Dimensions:	62 X 85 mils
В.	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:	0.8 microns (as drawn)
F.	Minimum Metal Spacing:	0.8 microns (as drawn)
G.	Bondpad Dimensions:	
Н.	Isolation Dielectric:	SiO ₂
I.	Die Separation Method:	Wafer Saw

B8

Oregon

June 3, 2004

Malaysia, Thailand, Philippines



V. Quality Assurance Information

Α.	Quality Assurance Contacts:	Richard Aburano (Manager, Reliability Engineering)			
		Don Lipps (Manager, Reliability Engineering)			
		Bryan Preeshl (Vice President of QA)			
В.	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 biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

 $\lambda = \underbrace{1}_{\text{MTFF}} = \underbrace{1.83}_{\text{192 x 4340 x 144 x 2}} \text{ (Chi square value for MTTF upper limit)}$ $\lambda = 7.6 \text{ x } 10^{-9}$ $\lambda = 7.6 \text{ F.I.T. (60\% confidence level @ 25°C)}$

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 (ESD lot DRY4DA005B D/C 0819, Latch-up lot SRY1AQ001B D/C 0428)

The NP69-1 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250mA.



Table 1 Reliability Evaluation Test Results

MAX5071AASA+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS			
Static Life Test (Note 1)								
	Ta = 135°C	DC Parameters	48	0	DRY4DA005B, D/C 0819			
	Biased	& functionality	48	0	SRY2BQ003C, D/C 0631			
	Time = 192 hrs.		48	0	SRY0AQ003B, D/C 0448			

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