



RELIABILITY REPORT
FOR
MAX15019AASA+
PLASTIC ENCAPSULATED DEVICES

February 1, 2010

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
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Approved by
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Conclusion

The MAX15019AASA+ 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 MAX15018A/MAX15018B/MAX15019A/MAX15019B high-frequency, 125V half-bridge, n-channel MOSFET drivers drive high- and low-side MOSFETs in high-voltage applications. These drivers are independently controlled, and their 35ns (typ) propagation delay, from input to output, are matched to within 2ns (typ). The high-voltage operation with very low and matched propagation delay between drivers, and high source-/sink-current capabilities in a thermally enhanced package make these devices suitable for high-power, high-frequency telecom power converters. The 125V maximum input voltage provides plenty of margin over the 100V input transient requirement of telecom standards. A reliable on-chip bootstrap diode connected between VDD and BST eliminates the need for an external discrete diode. The MAX15018A/MAX15019A both offer noninverting drivers. The MAX15018B/MAX15019B offer a noninverting high-side driver and an inverting low-side driver (see the *Selector Guide* in the full data sheet). The MAX15018_ feature CMOS (VDD/2) logic inputs. The MAX15019_ feature TTL-logic inputs. The drivers are available in the industry standard 8-pin SO footprint and pin configuration with a thermally enhanced 8-pin SO package. All devices operate over the -40°C to +125°C automotive temperature range.

II. Manufacturing Information

A. Description/Function:	125V/3A, High-Speed, Half-Bridge MOSFET Drivers
B. Process:	BCD250
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Philippines, Thailand
F. Date of Initial Production:	04/26/2008

III. Packaging Information

A. Package Type:	8-pin SOIC (N)
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:	#05-9000-3021
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:	52°C/W
K. Single Layer Theta Jc:	6°C/W

IV. Die Information

A. Dimensions:	85 X 112 mils
B. Passivation:	Si ₃ N 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 = 1.5µm / Metal2 = 3.0µm
F. Minimum Metal Spacing:	Metal1 = 1.5µm / Metal2 = 3.0µm
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:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 41 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 26.2 \times 10^{-9}$$

$$\lambda = 26.2 \text{ F.I.T. (60\% confidence level @ } 25^{\circ}\text{C)}$$

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 BCD250 Process results in a FIT Rate of 0.43 @ 25C and 7.42 @ 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 NQ03-1 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.

Table 1
Reliability Evaluation Test Results

MAX15019AASA+

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	41	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