RELIABILITY REPORT

FOR

MAX15026BETD+

PLASTIC ENCAPSULATED DEVICES

July 3, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.

SUNNYVALE, CA 94086

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Conclusion

The MAX15026BETD+ 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 MAX15026 synchronous step-down controller operates from a 4.5V to 28V input voltage range and generates an adjustable output voltage from 85% of the input voltage down to 0.6V while supporting loads up to 25A. The device allows monotonic startup into a prebiased bus without discharging the output and features adaptive internal digital soft-start. The MAX15026 offers the ability to adjust the switching frequency from 200kHz to 2MHz with an external resistor. The MAX15026's adaptive synchronous rectification eliminates the need for an external freewheeling Schottky diode. The device also utilizes the external low-side MOSFET's on-resistance as a current-sense element, eliminating the need for a current-sense resistor. This protects the DC-DC components from damage during output overloaded conditions or output shortcircuit faults without requiring a current-sense resistor. Hiccup-mode current limit reduces power dissipation during short-circuit conditions. The MAX15026 includes a power-good output and an enable input with precise turn-on/turn-off threshold, which can be used for input supply monitoring and for power sequencing. Additional protection features include sink-mode current limit and thermal shutdown. Sink-mode current limit prevents reverse inductor current from reaching dangerous levels when the device is sinking current from the output. The MAX15026 is available in a space-saving and thermally enhanced 3mm x 3mm, 14-pin TDFN-EP package. The MAX15026 operates over the -40°C to +85°C temperature range.

II. Manufacturing Information

A. Description/Function:	Low-Cost, Small, 4.5V to 28V Wide Operating Range, DC-DC Synchronous Buck Controller
B. Process:	S4
C. Number of Device Transistors:	
D. Fabrication Location:	California
E. Assembly Location:	UTL Thailand
F. Date of Initial Production:	May 23, 2008

III. Packaging Information

A. Package Type:	14-pin TDFN 3x3
B. Lead Frame:	Copper
C. Lead Finish:	100% matte Tin
D. Die Attach:	Conductive Epoxy
E. Bondwire:	Au (1.3 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#
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:	54°C/W
K. Single Layer Theta Jc:	8.3°C/W
L. Multi Layer Theta Ja:	41°C/W
M. Multi Layer Theta Jc:	8.3°C/W

IV. Die Information

A. Dimensions:	66 X 73 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide
C. Interconnect:	Aluminum/0.5% Cu
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:	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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 43 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 25.0 \times 10^{-9}$

$\lambda = 25.0$ 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 S4 Process results in a FIT Rate of 0.28 @ 25C and 4.85 @ 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 NQ08 die type has been found to have all pins able to withstand a HBM transient pulse of

HBM: +/- 2500V Per JESD22-A114
CDM: +/- 750V per JESD22-C101
MM: +/-250V per JESD22-A115

Latch-Up testing has shown that this device withstands a current of +/-250 mA, 1.5x VCCMax Overvoltage per JESD78.

Table 1
Reliability Evaluation Test Results

MAX15026BETD+

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	43	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