

RELIABILITY REPORT
FOR
MAX1745AUB+
PLASTIC ENCAPSULATED DEVICES

June 11, 2009

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
SUNNYVALE, CA 94086

Approved by
Ken Wendel
Quality Assurance
Director, Reliability Engineering

Conclusion

The MAX1745AUB+ 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 MAX1744/MAX1745 are step-down DC-DC controllers capable of handling up to 36V inputs. These parts use a proprietary current-limited control scheme for excellent light- and full-load efficiency, while their 330kHz (max) switching frequency permits small external components for space-critical applications. Operation to 100% duty cycle permits the lowest possible dropout voltage.

The MAX1744 contains an internal feedback network that provides a pin-selectable output voltage of either 3.3V or 5V. The MAX1745 uses an external feedback network to generate an adjustable output voltage between 1.25V and 18V.

The MAX1744/MAX1745 are available in a space-saving 10-pin μ MAX® package.

II. Manufacturing Information

A. Description/Function:	High-Voltage, Step-Down DC-DC Controller in μ MAX
B. Process:	B3
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	UTL Thailand
F. Date of Initial Production:	July 22, 2000

III. Packaging Information

A. Package Type:	10-Pin μ MAX 3x3 mm
B. Lead Frame:	Cu Alloy
C. Lead Finish:	Matte Sn Plate
D. Die Attach:	Non Conductive Epoxy
E. Bondwire:	Au (1.0 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:	144°C/W
K. Single Layer Theta Jc:	42°C/W
L. Multi Layer Theta Ja:	116°C/W
M. Multi Layer Theta Jc:	42°C/W

IV. Die Information

A. Dimensions:	88 X 75 mils
B. Passivation:	$\text{Si}_3\text{N}_4/\text{SiO}_2$ (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al/0.5% Cu
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 shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 72 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 14.9 \times 10^{-9}$$

$\lambda = 14.9$ F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim's reliability monitor program. Maxim performs quarterly 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 B3 Process results in a FIT Rate of 1.6 @ 25C and 28.5 @ 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 PX98-1 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2500 V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250 mA.

Table 1
Reliability Evaluation Test Results

MAX1745AUB+

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	72	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