Conclusion

The MAX1606EUA+T successfully meets the quality and reliability standards required of all Maxim Integrated products. In addition, Maxim Integrated's continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim Integrated's quality and reliability standards.

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I. Device Description

A. General

The MAX1606 is a step-up DC-DC converter that contains a 0.5A internal power switch and a 0.5A output isolation switch in an 8-pin µMAX® package. The IC operates from a 2.4V to 5.5V supply voltage but can boost battery voltages as low as 0.8V up to 28V. The MAX1606 uses a unique control scheme that provides high efficiency over a wide range of load conditions. An internal 0.5A MOSFET reduces external component count, and a high switching frequency (up to 500kHz) allows for tiny surface-mount components. The current limit can be set to 500mA, 250mA, or 125mA, allowing the user to reduce the output ripple and component size in low-current applications. Additional features include a low quiescent supply current and a true shutdown mode that saves power by disconnecting the output from the input. The MAX1606 is ideal for small LCD panels with low current requirements but can also be used in other applications. A MAX1606 evaluation kit is available to help speed up design time.

II. Manufacturing Information

A. Description/Function:	28V Internal Switch LCD Bias Supply with True Shutdown(tm)
B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	California or Texas
E. Assembly Location:	Thailand
F. Date of Initial Production:	July 19, 2000

III. Packaging Information

A. Package Type:	3x3 mm 8L UMAX
B. Lead Frame:	NiPdAu
C. Lead Finish:	NiPdAu
D. Die Attach:	Non-conductive
E. Bondwire:	Au (1 mil dia.)
F. Mold Material:	Epoxy with silica filler
G. Assembly Diagram:	#05-2301-0050
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:	8°C/W
L. Multi Layer Theta Ja:	170°C/W
M. Multi Layer Theta Jc:	8°C/W

IV. Die Information

A. Dimensions:	75 X 88 mils
B. 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:	
H. Isolation Dielectric:	SiO_2
I. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

A. Quality Assurance Contacts:	Richard Aburano (Manager, Reliability Engineering) Don Lipps (Manager, Reliability Engineering) Bryan Preeshl (Vice President 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:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 239 \times 2}$$ (Chi square value for MTTF upper limit)

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

$\lambda = 4.6 \times 10^{-9}$

$\lambda = 4.6$ F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim Integrated's reliability monitor program. Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at http://www.maximintegrated.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 (lot D2VAEQ001A D/C 0414)

The PY32 die type has been found to have all pins able to withstand a HBM transient pulse of +/-2000V per Mil-Std 883 Method 3015.7. Latch-Up testing has shown that this device withstands a current of +/-250mA.

Table 1
Reliability Evaluation Test Results

MAX1606EUA+T

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135°C	DC Parameters	80	0	D2VAEQ001B, D/C 0414
	Biased	& functionality	80	0	I2VAC3020B, D/C 0215
	Time = 192 hrs.		79	0	I2VABQ003A, D/C 0049

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