

RELIABILITY REPORT FOR MAX663 PLASTIC ENCAPSULATED DEVICES

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MAXIM INTEGRATED

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Conclusion

The MAX663 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 MAX663/664/666 CMOS voltage regulators have a maximum quiescent current of 12uA. They can be used either as 5 volt, fixed output regulators with no additional components, or can be adjusted from 1.3V to 16V using two external resistors. Fixed or adjustable operation is automatically selected via the V_{set} input. The MAX66X series, ideally suited for battery powered systems, has an input voltage range of 2 to 16.5V, an output current capability of 40mA, and can operate with low input-output differentials. Other features include current limiting and low power shut down. The MAX663 positive regulator and MAX664 negative regulator are both pin and electronically compatible with the ICL7663 and ICL7664 and can plug-in replace these devices, improving performance and eliminating the need for external resistors in 5V applications. The MAX666 has a positive output and includes on-chip low-battery detection circuitry.



II. Manufacturing Information

A. Description/Function: Dual Mode[™] 5V/Programmable Micropower Voltage Regulators
B. Process: M6
C. Fabrication Location: USA
D. Assembly Location: Malaysia, Thailand, Philippines

Pre 1997

E. Date of Initial Production:

D. Minimum Metal Width:

F. Isolation Dielectric:

E. Minimum Metal Spacing:

G. Die Separation Method:

III. Packaging Information

	A. Package Type:	8-pin SOIC (N)
	B. Lead Frame:	Copper
	C. Lead Finish:	100% matte Tin
	D. Bondwire:	Au (1.3 mil dia.)
	E. Mold Material:	Epoxy with silica filler
	F. Assembly Diagram:	#05-0701-0756
	G. Flammability Rating:	Class UL94-V0
	H. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1
	I. Single Layer Theta Ja:	170°C/W
	J. Single Layer Theta Jc:	40°C/W
	K. Multi Layer Theta Ja:	132°C/W
	L. Multi Layer Theta Jc:	38°C/W
IV. Die Ir	ofrmation	
	A. Dimensions:	90X66 mils
	B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxic
	C. Interconnect:	Al/1.0%Si

 Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide) Al/1.0%Si Metal1 = 0.5 / Metal2 = 0.6 / Metal3 = 0.6 microns (as drawn) Metal1 = 0.45 / Metal2 = 0.5 / Metal3 = 0.6 microns (as drawn) SiO_2 Wafer Saw



V. Quality Assurance Information

Α.	Quality Assurance Contacts:	Eric Wright (Reliability Engineering) Brian Standley (Manager, Reliability) 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
υ.	Sampling Flan.	MII-310-105D

VI. Reliability Evaluation

A. Accelerated Life Test

The results of the 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (A) is calculated as follows:

$$\frac{\lambda = 1}{\text{MTF}} = \frac{1.83 \quad (\text{Chi square value for MTTF upper limit})}{192 \times 4340 \times 960 \times 2}$$
(where 4340 = Temperature Acceleration factor assuming an activation energy of 0.8eV)
$$\lambda = 1.15 \times 10^{-9}$$

 λ = 1.15 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 M6 Process results in a FIT Rate of 0.22 @ 25C and 3.73 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing

The PS84 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 +/-100mA and overvoltage per JEDEC JESD78.



Table 1 Reliability Evaluation Test Results

MAX663

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS		
Static Life Test (Note 1)							
	Ta = 135C	DC Parameters	960	0			
	Biased Time = 192 hrs.	& functionality					

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