



RELIABILITY REPORT  
FOR  
MAX8863REUK+T  
PLASTIC ENCAPSULATED DEVICES

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**MAXIM INTEGRATED PRODUCTS**

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<b>Approved by</b>
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## Conclusion

The MAX8863REUK+T 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 MAX8863T/S/R and MAX8864T/S/R low-dropout linear regulators operate from a +2.5V to +6.5V input range and deliver up to 120mA. A PMOS pass transistor allows the low, 80 $\mu$ A supply current to remain independent of load, making these devices ideal for battery-operated portable equipment such as cellular phones, cordless phones, and modems. The devices feature Dual Mode(tm) operation: their output voltage is preset (at 3.15V for the T versions, 2.84V for the S versions, or 2.80V for the R versions) or can be adjusted with an external resistor divider. Other features include low-power shutdown, short-circuit protection, thermal shutdown protection, and reverse battery protection. The MAX8864 also includes an auto-discharge function, which actively discharges the output voltage to ground when the device is placed in shutdown mode. Both devices come in a miniature 5-pin SOT23 package.

## II. Manufacturing Information

A. Description/Function:	Low-Dropout, 120mA Linear Regulators
B. Process:	B12
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Malaysia, Philippines, Thailand
F. Date of Initial Production:	Pre 1997

## III. Packaging Information

A. Package Type:	5L SOT23
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:	#05-1701-0281 / A
H. Flammability Rating:	Class UL94-V0
I. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	1
J. Single Layer Theta Ja:	324.3°C/W
K. Single Layer Theta Jc:	82°C/W
L. Multi Layer Theta Ja:	255.9°C/W
M. Multi Layer Theta Jc:	81°C/W

## IV. Die Information

A. Dimensions:	38 X 55 mils
B. Passivation:	Si <sub>3</sub> N <sub>4</sub> /SiO <sub>2</sub> (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al/0.5%Cu with Ti/TiN Barrier
D. Backside Metallization:	None
E. Minimum Metal Width:	1.2 microns (as drawn)
F. Minimum Metal Spacing:	1.2 microns (as drawn)
G. Bondpad Dimensions:	
H. Isolation Dielectric:	SiO <sub>2</sub>
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 biased (static) life test are shown in Table 1. Using these results, the Failure Rate ( $\lambda$ ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{1000 \times 4340 \times 145 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 1.4 \times 10^{-9}$$

$$\lambda = 1.4 \text{ F.I.T. (60\% confidence level @ 25}^\circ\text{C)}$$

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 B12 Process results in a FIT Rate of 0.06 @ 25C and 1.06 @ 55C (0.8 eV, 60% UCL)

### B. E.S.D. and Latch-Up Testing (ESD lot NJZAGQ002A D/C 0129, Latch-up lot NJZADC019A D/C 9748)

The PW84-4 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1000V 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

**MAX8863REUK+T**

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
<b>Static Life Test</b> (Note 1)					
	Ta = 135°C	DC Parameters	50	0	NJZAGA104Q, D/C 0733
	Biased	& functionality	50	0	NJZBGA096Q, D/C 0716
	Time = 1000 hrs.		45	0	NJZAGA097Q, D/C 0701

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