

RELIABILITY REPORT
FOR
MAX8664AEEP+
PLASTIC ENCAPSULATED DEVICES

May 10, 2012

MAXIM INTEGRATED PRODUCTS

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Approved by
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Quality Assurance
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Conclusion

The MAX8664AEFP+ 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 MAX8664 dual-output PWM controller is a low-cost, high-performance solution for systems requiring dual power supplies. It provides two individual outputs that operate 180° out-of-phase to minimize input current ripple, and therefore, capacitance requirements. Built-in drivers are capable of driving external MOSFETs to deliver up to 25A output current from each channel. The MAX8664 operates from a 4.5V to 28V input voltage source and generates output voltages from 0.6V up to 90% of the input voltage on each channel. Total output regulation error is less than $\pm 0.8\%$ over load, line, and temperature. The MAX8664 operates with a constant switching frequency adjustable from 100kHz to 1MHz. Built-in boost diodes reduce external component count. Digital soft-start eliminates input inrush current during startup. The second output has an optional external REFIN2, facilitating tracking supply applications. Each output is capable of sourcing and sinking current, making the device a great solution for DDR applications. The MAX8664 employs Maxim's proprietary peak voltage-mode control architecture that provides superior transient response during either load or line transients. This architecture is easily stabilized using two resistors and one capacitor for any type of output capacitors. Fast transient response requires less output capacitance, consequently reducing total system cost. The MAX8664B latches off both controllers during a fault condition, while the MAX8664A allows one controller to continue to function when there is a fault in the other controller.

II. Manufacturing Information

A. Description/Function:	Low-Cost, Dual-Output, Step-Down Controller with Fast Transient Response
B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	Oregon
E. Assembly Location:	Philippines, Malaysia, Thailand
F. Date of Initial Production:	May 22, 2007

III. Packaging Information

A. Package Type:	0.150 20L QSOP
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:	#05-9000-2232 / 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:	110°C/W
K. Single Layer Theta Jc:	34°C/W
L. Multi Layer Theta Ja:	90.5°C/W
M. Multi Layer Theta Jc:	34°C/W

IV. Die Information

A. Dimensions:	86 X 104 mils
B. Passivation:	Si ₃ N 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 biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 48 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

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

$$\lambda = 22.9 \times 10^{-9}$$

$$\lambda = 22.9 \text{ F.I.T. (60\% confidence level @ 25}^\circ\text{C)}$$

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 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 TQ90DQ002G D/C 0701)

The PP47 die type has been found to have all pins able to withstand a HBM transient pulse of +/-1000V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250mA.

Table 1
Reliability Evaluation Test Results

MAX8664AEEP+

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)	Ta = 135°C Biased Time = 192 hrs.	DC Parameters & functionality	48	0	TQ90DQ002G, D/C 0701

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