

RELIABILITY REPORT
FOR
MAX8585EUA+
PLASTIC ENCAPSULATED DEVICES

September 14, 2010

MAXIM INTEGRATED PRODUCTS

120 SAN GABRIEL DR.
SUNNYVALE, CA 94086

Approved by
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Quality Assurance
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Conclusion

The MAX8585EUA+ 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

Critical loads often employ parallel-connected power supplies with redundancy in order to enhance system reliability. The MAX8535/MAX8536/MAX8585 are highly integrated but inexpensive MOSFET controllers that provide isolation and redundant power capability in high-reliability systems. The MAX8535/MAX8585 are used in 12V systems, and have an internal charge pump to drive the gates of the n-channel pass elements to VCC + 10V. The MAX8536 is used in 3.3V and 5V systems, with a chargepump output of VCC + 5V. During startup, the MAX8535/MAX8536/MAX8585 monitor the voltage drop across external MOSFETs. Once VCC approaches or exceeds the bus voltage, the MOSFETs are turned on. The MAX8535/MAX8536/MAX8585 feature a dual-purpose TIMER input. A single external resistor from TIMER to ground sets the turn-on speed of the external MOSFETs. Optionally, the TIMER input can be used as a logic-enable pin. Once the device is turned on, the MAX8535/MAX8536/MAX8585 monitor the load, protecting against overvoltage, undervoltage, and reverse-current conditions. Overvoltage and undervoltage fault thresholds are adjustable and can be disabled. The current-limit trip points are set by the external MOSFETs' RDS(ON), reducing component count. An open-drain logic-low fault output indicates if an overvoltage, undervoltage, or reverse-current fault occurs. All devices come in a space-saving 8-pin μ MAX[®] package and are specified over the extended -40°C to +85°C temperature range.

II. Manufacturing Information

A. Description/Function:	ORing MOSFET Controllers with Fastest Fault Isolation for Redundant Power Supplies
B. Process:	B8
C. Number of Device Transistors:	
D. Fabrication Location:	California or Texas
E. Assembly Location:	Malaysia, Philippines, Thailand
F. Date of Initial Production:	April 14, 2004

III. Packaging Information

A. Package Type:	8-pin uMAX
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:	#05-9000-0416
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:	221°C/W K.
Single Layer Theta Jc:	41.9°C/W
L. Multi Layer Theta Ja:	206.3°C/W
M. Multi Layer Theta Jc:	41.9°C/W

IV. Die Information

A. Dimensions:	84 X 51 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:	5 mil. Sq.
H. Isolation Dielectric:	SiO ₂
I. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

- A. Quality Assurance Contacts: Don Lipps (Manager, 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:

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

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

$$\lambda = 22.9 \times 10^{-9}$$
$$\lambda = 22.9 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

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 SEF0BQ002A, 0405)

The PM84-1 die type has been found to have all pins able to withstand a HBM transient pulse of +/-400V 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

MAX8585EUA+

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	SEF0BQ002A, D/C 0405

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