



5/7/2008

RELIABILITY REPORT
FOR

DS2433 Rev A9-8"

Maxim Integrated Products

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Conclusion:

The following qualification successfully meets the quality and reliability standards required of all Maxim products and processes:

DS2433 Rev A9-8"

Device Description:

A description of the device used in this qualification can be found in the product data sheet. You can find the product data sheet at http://dbserv.maxim-ic.com/l_datasheet3.cfm.

Reliability Derating:

The Arrhenius model will be used to determine the acceleration factor for failure mechanisms that are temperature accelerated.

$$AfT = \exp((Ea/k) * (1/Tu - 1/Ts)) = tu/ts$$

AfT = Acceleration factor due to Temperature
tu = Time at use temperature (e.g. 55°C)
ts = Time at stress temperature (e.g. 125°C)
k = Boltzmann's Constant (8.617 x 10⁻⁵ eV/°K)
Tu = Temperature at Use (°K)
Ts = Temperature at Stress (°K)
Ea = Activation Energy (e.g. 0.7 ev)

The activation energy of the failure mechanism is derived from either internal studies or industry accepted standards, or activation energy of 0.7ev will be used whenever actual failure mechanisms or their activation energies are unknown. All deratings will be done from the stress ambient temperature to the use ambient temperature.

An exponential model will be used to determine the acceleration factor for failure mechanisms, which are voltage accelerated.

$$AfV = \exp(B * (Vs - Vu))$$

AfV = Acceleration factor due to Voltage
Vs = Stress Voltage (e.g. 7.0 volts)
Vu = Maximum Operating Voltage (e.g. 5.5 volts)
B = Constant related to failure mechanism type (e.g. 1.0, 2.4, 2.7, etc.)

The Constant, B, related to the failure mechanism is derived from either internal studies or industry accepted standards, or a B of 1.0 will be used whenever actual failure mechanisms or their B are unknown. All deratings will be done from the stress voltage to the maximum operating voltage. Failure rate data from the operating life test is reported using a Chi-Squared statistical model at the 60% or 90% confidence level (Cf).

The failure rate, Fr, is related to the acceleration during life test by:

$$Fr = X / (ts * AfV * AfT * N * 2)$$

X = Chi-Sq statistical upper limit
N = Life test sample size

Failure Rates are reported in FITs (Failures in Time) or MTTF (Mean Time To Failure). The FIT rate is related to MTTF by:

$$MTTF = 1/Fr$$

NOTE: MTTF is frequently used interchangeably with MTBF.

The calculated failure rate for this device/process/assembly is:

FAILURE RATE:	MTTF (YRS):	27143	FITS:	4.2
	DEVICE HOURS:	231000	FAILS:	0

Only data from Operating Life or similar stresses are used for this calculation.

The parameters used to calculate this failure rate are as follows:

Cf: 60%	Ea: 0.7	B: 0	Tu: 25 °C	Vu: 6 Volts
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The reliability data follows. At the start of this data is the device information. This is a description of the device for this report. Following this is the assembly information. This section includes a description of the assembly vehicle used to generate this reliability data for both qualifications and monitors. The next section is the detailed reliability data for each stress found in the qualification / monitor. If there are additional assemblies used as part of this report, a description of each will follow which includes the respective reliability data for that assembly. The reliability data section includes the latest data available.

Device Information:

Device:	DS2433
Process:	EC6WA-2P2M,HPVt,E2,EPROG Vt,TCN3,PF,ALOCOS:GOI, 5" Reticles
Passivation:	NRL Laser w/Nov TEOS Oxide-Nitride
Die Size:	102 x 113
Number of Transistors:	22348
Interconnect:	Aluminum / 0.5% Copper
Gate Oxide Thickness:	150 Å

Assembly Information:

Qualification Vehicle:	DS2433
Assembly Site:	Hana AYUTHAYA
Pin Count:	8
Package Type:	SOIC (Pb-Free)
Body Size:	208x1.9
Mold Compound:	Sumitomo G600
Lead Frame:	Stamped Copper CDA194
Lead Finsh:	Sn Plate 100% Matte (With Anneal Bake)
Die Attach:	2200D Ablebond Silverfiled Epoxy
Bond Wire / Size:	Au / 1.0 mil
Theta JA:	170
Theta JC:	40
Flammability:	UL 94-V0
Moisture Sensitivity (JEDEC J-STD20A)	Level 1
Date Code Range:	0742 to 0807

DATE CODE: 0742 **LOT NUMBER:** QU802166AC

OPERATING LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QTY	FAILS	FA#
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HIGH TEMP OP LIFE	0742	125C, 6.0 VOLTS	1000 HRS	77	0
Total:					0

W/E ENDURANCE AND DATA RET'N

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QTY	FAILS	FA#
WRITE CYCLE STRESS (KCYS)	0742	25 C, 5.0 VOLTS	50 KCYS	150	0	
STORAGE LIFE		150C	1000 HRS	150	0	
Total:					0	

DATE CODE: 0747 **LOT NUMBER:** QU802168AB

ELECTRICAL CHARACTERIZATION

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QTY	FAILS	FA#
ESD SENSITIVITY	0747	EOS/ESD S5.1 HBM 500 VOLTS	1 PUL'S	3	0	
ESD SENSITIVITY	0747	EOS/ESD S5.1 HBM 1000 VOLTS	1 PUL'S	3	0	
ESD SENSITIVITY	0747	EOS/ESD S5.1 HBM 2000 VOLTS	1 PUL'S	3	0	
ESD SENSITIVITY	0747	EOS/ESD S5.1 HBM 4000 VOLTS	1 PUL'S	3	0	
ESD SENSITIVITY	0747	EOS/ESD S5.1 HBM 8000 VOLTS	1 PUL'S	3	0	
ESD SENSITIVITY	0747	IEC 61000-4-2 CONTACT 2000 VOLTS	10 PUL'S	3	0	
ESD SENSITIVITY	0747	IEC 61000-4-2 CONTACT 4000 VOLTS	10 PUL'S	3	0	
ESD SENSITIVITY	0747	IEC 61000-4-2 CONTACT 6000 VOLTS	10 PUL'S	3	0	
ESD SENSITIVITY	0747	IEC 61000-4-2 CONTACT 8000 VOLTS	10 PUL'S	3	0	
ESD SENSITIVITY	0747	IEC 61000-4-2 AIR 2000 VOLTS	10 PUL'S	3	0	
ESD SENSITIVITY	0747	IEC 61000-4-2 AIR 4000 VOLTS	10 PUL'S	3	0	
ESD SENSITIVITY	0747	IEC 61000-4-2 AIR 8000 VOLTS	10 PUL'S	3	0	
ESD SENSITIVITY	0747	IEC 61000-4-2 AIR 15000 VOLTS	10 PUL'S	3	0	
LATCH-UP	0747	JESD78, V-SUPPLY TEST 125C		6	0	
Total:					0	

DATE CODE: 0807 **LOT NUMBER:** VU816050AB-QUAL

OPERATING LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QTY	FAILS	FA#
HIGH TEMP OP LIFE	0807	125C, 6.0 VOLTS	1000 HRS	77	0	
Total:					0	

W/E ENDURANCE AND DATA RET'N

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QTY	FAILS	FA#
WRITE CYCLE STRESS (KCYS)	0807	25 C, 5.0 VOLTS	50 KCYS	231	0	
STORAGE LIFE		150C	1000 HRS	231	0	
Total:					0	

Assembly Information:

Qualification Vehicle: DS2433
 Assembly Site: UTL (NSEB) UTAC Thailand
 Pin Count: 8
 Package Type: SOIC (Pb-Free)
 Body Size: 208x1.9
 Mold Compound: Sumitomo G600
 Lead Frame: Stamped Copper CDA194
 Lead Finish: Sn Plate 100% Matte (With Anneal Bake)
 Die Attach: 2200D Ablebond Silverfiled Epoxy
 Bond Wire / Size: Au / 1.0 mil
 Theta JA: 170
 Theta JC: 40
 Flammability: UL 94-V0
 Moisture Sensitivity (JEDEC J-STD20A) Level 1
 Date Code Range: 0805 to 0805

DATE CODE: 0805 **LOT NUMBER:** VJ816050BB-QUAL

OPERATING LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QTY	FAILS	FA#
HIGH TEMP OP LIFE	0805	125C, 6.0 VOLTS	1000 HRS	77	0	
			Total:		0	

W/E ENDURANCE AND DATA RET'N

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QTY	FAILS	FA#
WRITE CYCLE STRESS (KCYS)	0805	25 C, 5.0 VOLTS	50 KCYS	231	0	
STORAGE LIFE		150C	1000 HRS	231	0	
			Total:		0	

FAILURE RATE: MTTF (YRS): 27143 FITS: 4.2
DEVICE HOURS: 231000 FAILS: 0