**PRODUCT RELIABILITY REPORT
FOR**

DS1091L, Rev A1

Maxim Integrated Products

**4401 South Beltwood Parkway
Dallas, TX 75244-3292**

Prepared by:

**Don Lipps
Manager, Reliability Engineering
Maxim Integrated Products
4401 South Beltwood Pkwy.
Dallas, TX 75244-3292
Email: don.lipps@maxim-ic.com
ph: 972-371-3739
fax: 972-371-6016**

Conclusion:

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

DS1091L, Rev A1

In addition, Maxim's continuous reliability monitor program ensures that all outgoing product will continue to meet Maxim's quality and reliability standards. The current status of the reliability monitor program can be viewed at http://www.maxim-ic.com/TechSupport /dsreliability.html.

Device Description:

 A description of this device 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 is:

FAILURE RATE:	MTTF (YRS):	43508	FITS:	2.6
	DEVICE HOURS:	370272	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: 3.6 Volts

The reliability data follows. At the start of this data is the device information. The next section is the detailed reliability data for each stress. The reliability data section includes the latest data available and may contain some generic data. "*" after DATE CODE denotes specific product data and SEQ No. to identify specific line items in the report for comments when required.

Device Information:

Process:	E35X-3P3M,DPE2,CrSi,DSD,PDESD,PDRES,Cap,ENPN,DPT,HTO,SgHalo
Passivation:	TEOS Ox-Nit Passivation for E35X; Full BEOL at SA; PT only in Dallas
Die Size:	55 x 56
Number of Transistors:	4887
Interconnect:	Aluminum / 0.5% Copper
Gate Oxide Thickness:	120 Å

ELECTRICAL CHARACTERIZATION

DESCRIPTION	DATE CODE/SEQ		CONDITION	READPOINT		QTY	FAILS	FA#
ESD SENSITIVITY	0719	* 2	EOS/ESD S5.1 HBM 500 VOLTS	1	PUL'S	3	0	
ESD SENSITIVITY	0719	* 3	EOS/ESD S5.1 HBM 1000 VOLTS	1	PUL'S	3	0	
ESD SENSITIVITY	0719	* 4	EOS/ESD S5.1 HBM 2000 VOLTS	1	PUL'S	3	0	
ESD SENSITIVITY	0719	* 5	EOS/ESD S5.1 HBM 3000 VOLTS	1	PUL'S	3	0	
ESD SENSITIVITY	0719	* 6	EOS/ESD S5.1 HBM 4000 VOLTS	1	PUL'S	3	1	No FA
LATCH-UP	0719	* 7	JESD78, I-TEST 125C			6	0	
LATCH-UP	0719	* 8	JESD78, V-SUPPLY TEST 125C			6	0	
ESD SENSITIVITY	0719	* 9	JESD22-C101 CDM 200 VOLTS	3	PUL'S	3	0	
ESD SENSITIVITY	0719	* 10	JESD22-C101 CDM 500 VOLTS	3	PUL'S	3	0	
ESD SENSITIVITY	0719	* 11	JESD22-C101 CDM 750 VOLTS	3	PUL'S	3	0	
ESD SENSITIVITY	0719	* 12	JESD22-C101 CDM 1000 VOLTS	3	PUL'S	3	0	
ESD SENSITIVITY	0719	* 13	JESD22-C101 CDM 2000 VOLTS	3	PUL'S	3	3	No FA
ESD SENSITIVITY	0719	* 14	JESD22-A115 MM 50 VOLTS	1	PUL'S	3	0	

DESCRIPTION	DATE CODE/SEQ		CONDITION	READPOINT		QTY	FAILS	FA#
ESD SENSITIVITY	0719	* 15	JESD22-A115 MM 100 VOLTS	1	PUL'S	3	0	
ESD SENSITIVITY	0719	* 16	JESD22-A115 MM 200 VOLTS	1	PUL'S	3	0	
ESD SENSITIVITY	0719	* 17	JESD22-A115 MM 400 VOLTS	1	PUL'S	3	3	No FA
					Total:		**7**	

OPERATING LIFE

DESCRIPTION	DATE CODE/SEQ		CONDITION	READPOINT		QTY	FAILS	FA#
HIGH TEMP OP LIFE	0632		125C, 3.6V (PSA) & 3.9V (PSB)	1000	HRS	45	0	
HIGH TEMP OP LIFE	0651		125C, 3.6 VOLTS	1000	HRS	45	0	
HIGH TEMP OP LIFE	0711		125C, 3.0V (PSB) & 3.6V (PSA)	1000	HRS	45	0	
HIGH TEMP OP LIFE	0715		125C, 3.6 VOLTS	1000	HRS	45	0	
HIGH TEMP OP LIFE	0719	* 2	125C, 3.6 VOLTS	1000	HRS	45	0	
HIGH TEMP OP LIFE	0719	* 3	125C, 3.6 VOLTS	408	HRS	32	0	
HIGH TEMP OP LIFE	0732		125C, 5.5 VOLTS	408	HRS	45	0	
HIGH TEMP OP LIFE	0732		125C, 5.5 VOLTS	408	HRS	32	0	
HIGH TEMP OP LIFE	0745		125C, 5.5 VOLTS	240	HRS	45	0	
HIGH TEMP OP LIFE	0747		125C, 3.6V (PSA) & 3.0V (PSB)	1000	HRS	45	0	
HIGH TEMP OP LIFE	0827		125C, 3.6 VOLTS	1000	HRS	45	0	
					Total:		**0**	

FAILURE RATE: **MTTF (YRS):**   **43508**   **FITS:**   **2.6**

DEVICE HOURS: **370272**   **FAILS:**   **0**