



5/20/2009

**PRODUCT RELIABILITY REPORT
FOR**

DS1340, Rev A1

Maxim Integrated Products

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Prepared by:

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Conclusion:

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

DS1340, 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):	59175	FITS:	1.9
	DEVICE HOURS:	807500	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: 3.3 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. **Bold** Product Number denotes specific product data.

Device Information:

Process: D6H-2P2M,HPVt,TCN1 ALOCOS:GOI
 Passivation: Passivation w/Nov TEOS Oxide-Nitride
 Die Size: 58 x 84
 Number of Transistors: 12853
 Interconnect: Aluminum / 0.5% Copper
 Gate Oxide Thickness: 150 Å

ELECTRICAL CHARACTERIZATION

DESCRIPTION	DATE	CODE/PRODUCT/LOT	CONDITION	READPOINT	QTY	FAILS	FA#
ESD SENSITIVITY	0318	DS1340 ZK335740C	EOS/ESD S5.1 HBM 500 VOLTS	1 PUL'S	3	0	
ESD SENSITIVITY	0318	DS1340 ZK335740C	EOS/ESD S5.1 HBM 1000 VOLTS	1 PUL'S	3	0	
ESD SENSITIVITY	0318	DS1340 ZK335740C	EOS/ESD S5.1 HBM 2000 VOLTS	1 PUL'S	3	0	
ESD SENSITIVITY	0318	DS1340 ZK335740C	EOS/ESD S5.1 HBM 4000 VOLTS	1 PUL'S	3	0	
ESD SENSITIVITY	0318	DS1340 ZK335740C	EOS/ESD S5.1 HBM 8000 VOLTS	1 PUL'S	3	0	
LATCH-UP	0318	DS1340 ZK335740C	JESD78, I-TEST 125C		6	0	
LATCH-UP	0318	DS1340 ZK335740C	JESD78, V-SUPPLY TEST 125C		6	0	
Total:						0	

ESD CDM

DESCRIPTION	DATE	CODE/PRODUCT/LOT	CONDITION	READPOINT	QTY	FAILS	FA#
ESD SENSITIVITY	0843	DS1340 VJ850487A	JESD22-C101 CDM 200 VOLTS	3 PUL'S	3	0	
ESD SENSITIVITY	0843	DS1340 VJ850487A	JESD22-C101 CDM 500 VOLTS	3 PUL'S	3	0	
ESD SENSITIVITY	0843	DS1340 VJ850487A	JESD22-C101 CDM 1000 VOLTS	3 PUL'S	3	0	
ESD SENSITIVITY	0843	DS1340 VJ850487A	JESD22-C101 CDM 2000 VOLTS	3 PUL'S	3	0	
Total:						0	

OPERATING LIFE

DESCRIPTION	DATE	CODE/PRODUCT/LOT	CONDITION	READPOINT	QTY	FAILS	FA#
HIGH VOLTAGE LIFE	0310	DS1374 DK322801A	125C, 6.0 VOLTS	1000 HRS	45	0	
HIGH VOLTAGE LIFE	0310	DS1375 DJ322875A	125C, 6.0 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0318	DS1340 ZK335740C	125C, 5.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0403	DS1318 ZK401818C	125C, 3.6 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0403	DS12R885-ZK406788A	125C, 5.5 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	0421	DS1392 ZM423327	125C, 5.5 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0421	DS1390 ZM438350	125C, 5.5 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0422	DS1393 ZM438350A	125C, 5.5 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0424	DS1391 ZM439413	125C, 5.5 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0434	DS12R887 ZM430720B	85 C, 3.3 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0440	DS12R887 ZM430720B	85 C, 3.3 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0440	DS12R887 ZM430720B	85 C, 3.3 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0522	DS12R887 ZM430720A	85 C, 3.3 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0527	DS12R887 ZM430720A	85 C, 3.3 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0527	DS12R887 ZM430720A	85 C, 3.3 VOLTS	1000 HRS	45	0	
HIGH TEMP OP LIFE	0750	DS12R887 QM748219	85 C, 3.3 VOLTS	500 HRS	45	0	
HIGH TEMP OP LIFE	0832	DS12R887 DM547055	85 C, 3.3 VOLTS	1000 HRS	46	0	

Total: 0

FAILURE RATE: **MTTF (YRS):** **59175** **FITS:** **1.9**
 DEVICE HOURS: **807500** **FAILS:** **0**