



4/28/2011

**PRODUCT RELIABILITY REPORT
FOR**

MAXQ618

Maxim Integrated Products

**4401 South Beltwood Parkway
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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:

MAXQ618

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):** **61573** **FITS:** **1.9**
DEVICE HOURS: **494227776** **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. **Bold** Product Number denotes specific product data.

Device Information:

Process: TSMC 0.18um Mixed signal, Embedded Flash, General Purpose, Two Poly Five Metal, 1.8V/3.3V Polyimide - No
 Passivation: SiO/SiN
 Die Size: 78 x 80
 Number of Transistors: 28534110
 Interconnect: Aluminum / 0.5% Copper
 Gate Oxide Thickness: 32 Å

ESD HBM

DESCRIPTION	DATE	CODE/PRODUCT/LOT	CONDITION	READPOIN	QTY	FAILS	FA#
ESD SENSITIVITY	1103	MAXQ618	ZJ112624AB- JESD22-A114 HBM 500 VOLTS	1	PUL'S	5	0
ESD SENSITIVITY	1103	MAXQ618	ZJ112624AB- JESD22-A114 HBM 1000 VOLTS	1	PUL'S	5	0
ESD SENSITIVITY	1103	MAXQ618	ZJ112624AB- JESD22-A114 HBM 1500 VOLTS	1	PUL'S	5	0
ESD SENSITIVITY	1103	MAXQ618	ZJ112624AB- JESD22-A114 HBM 2000 VOLTS	1	PUL'S	5	0
ESD SENSITIVITY	1103	MAXQ618	ZJ112624AB- JESD22-A114 HBM 2500 VOLTS	1	PUL'S	5	0
Total:						0	

LATCH-UP

DESCRIPTION	DATE	CODE/PRODUCT/LOT	CONDITION	READPOIN	QTY	FAILS	FA#
LATCH-UP I	1103	MAXQ618	ZJ112624AB- JESD78A, I-TEST 25C 100mA			6	0
LATCH-UP I	1103	MAXQ618	ZJ112624AB- JESD78A, I-TEST 25C 250mA			6	0
LATCH-UP V	1103	MAXQ618	ZJ112624AB- JESD78A, V-SUPPLY TEST 25C			6	0
Total:						0	

OPERATING LIFE

DESCRIPTION	DATE CODE/PRODUCT/LOT	CONDITION	READPOIN	QTY	FAILS	FA#
HIGH TEMP OP LIFE	0814 MAXQ1103 QN089294A	125C, 3.6V (PSA) & 2.0V (PSB)	1000 HRS	77	0	
HIGH TEMP OP LIFE	0828 MAXQ2010 QK086138C	125C, 3.6 VOLTS	1000 HRS	76	0	
HIGH TEMP OP LIFE	0837 MAX2990 QN096322A	125C, 3.6V (PSA) & 2.0V (PSB)	1000 HRS	77	0	
HIGH TEMP OP LIFE	0851 MAXQ3108 QJ091011AC	125C, 3.6 VOLTS	192 HRS	73	0	
HIGH TEMP OP LIFE	0851 MAXQ610 QJ091123AB	125C, 3.6V (PSA) & 2.0V (PSB)	1000 HRS	77	0	
HIGH TEMP OP LIFE	0852 MAXQ1850 QJ091074AA	125C, 3.6 VOLTS	192 HRS	75	0	
HIGH TEMP OP LIFE	0906 MAXQ61H QJ091049AB	125C, 3.6 VOLTS	192 HRS	45	0	
HIGH TEMP OP LIFE	0909 MAXQ8913 NQQ8ZAD	125C, 3.6V (PSA) & 5.0V (PSB)	192 HRS	77	0	
HIGH TEMP OP LIFE	0934 MAXQ1103 QN101437A	125C, 3.6V (PSA) & 2.0V (PSB)	192 HRS	77	0	
HIGH TEMP OP LIFE	0946 MAXQ622 QN091481C	125C, 3.6V (PSA) & 5.5V (PSB)	192 HRS	77	0	
HIGH TEMP OP LIFE	0951 MAXQ61C QJ101202AC	125C, 3.6 VOLTS	192 HRS	45	0	
HIGH TEMP OP LIFE	1006 MAXQ1004 QS101775AB	125C, 3.6V (PSA) & 5.0V (PSB)	192 HRS	45	0	
HIGH TEMP OP LIFE	1011 MAXQ3103 QJ101246AB	125C, 3.6 VOLTS	192 HRS	48	0	
HIGH TEMP OP LIFE	1011 MAXQ3103 QJ101246AB	125C, 3.6 VOLTS	1000 HRS	77	0	
HIGH TEMP OP LIFE	1024 MAXQ1010 QJ101790AG	125C, 5.5V (PS1) & 3.6V (PS2)	192 HRS	45	0	
HIGH TEMP OP LIFE	1030 MAXQ613 QJ101861CH	135C, 3.6 V (PSA)	192 HRS	45	0	
HIGH TEMP OP LIFE	1111 MAXQ618 ZJ112624AD	125C, 3.6 VOLTS	192 HRS	48	0	

Total: 0

FAILURE RATE: MTTF (YRS): 61573 FITS: 1.9
DEVICE HOURS: 494227776 FAILS: 0