



7/14/2010

**PRODUCT RELIABILITY REPORT
FOR**

DS26556, Rev A2

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:

DS26556, Rev A2

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):** **291484** **FITS:** **0.4**
DEVICE HOURS: **2339658070** **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: 5.5** 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: 2P, 4M,0.35um,Sil.P1,P2Cap,Ti/TiN M1-M4,BPSG,Masked N+ESD,
 Passivation: Passivation w/Nov TEOS Oxide-Nitride
 Die Size: 403 x 481
 Number of Transistors: 3700000
 Interconnect: Aluminum / 0.5% Copper
 Gate Oxide Thickness: 75 Å

ELECTRICAL CHARACTERIZATION

DESCRIPTION	DATE CODE/PRODUCT/LOT	CONDITION	READPOIN	QTY	FAILS	FA#
ESD SENSITIVITY	0440 DS26556 QK534422B	EOS/ESD S5.1 HBM 500 VOLTS	1	PUL'S	3	0
ESD SENSITIVITY	0440 DS26556 QK534422B	EOS/ESD S5.1 HBM 1000 VOLTS	1	PUL'S	3	0
ESD SENSITIVITY	0440 DS26556 QK534422B	EOS/ESD S5.1 HBM 2000 VOLTS	1	PUL'S	3	0
ESD SENSITIVITY	0440 DS26556 QK534422B	EOS/ESD S5.1 HBM 4000 VOLTS	1	PUL'S	3	3 No FA
ESD SENSITIVITY	0440 DS26556 QK534422B	EOS/ESD S5.1 HBM 8000 VOLTS	1	PUL'S	3	3 No FA
LATCH-UP	0440 DS26556 QK534422B	JESD78, I-TEST 125C			6	0
LATCH-UP	0440 DS26556 QK534422B	JESD78, V-SUPPLY TEST 125C			6	0
Total:					6	

OPERATING LIFE

DESCRIPTION	DATE CODE/PRODUCT/LOT	CONDITION	READPOIN	QTY	FAILS	FA#
HIGH VOLTAGE LIFE	0131 DS2155 ZK051026FB	125C, 3.5 VOLTS	1000 HRS	77	0	

HIGH VOLTAGE LIFE	0134	DS2155	ZC051028BA	125C, 3.5 VOLTS	1000 HRS	77	0
HIGH VOLTAGE LIFE	0150	DS2155	ZK143024AB	125C, 3.5 VOLTS	1000 HRS	77	0
HIGH VOLTAGE LIFE	0213	DS3160	ZK124064AB	125C, 3.5 VOLTS	1000 HRS	71	0
HIGH VOLTAGE LIFE	0222	DS2156	ZK216161BA	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH VOLTAGE LIFE	0233	DS2155	ZK326158AA	125C, 3.5 VOLTS	1000 HRS	77	0
HIGH VOLTAGE LIFE	0234	DS3154	ZK228078AB	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0317	DS3154	ZK408111AE	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0403	DS3184	ZS448224BB	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0417	DS21458	ZK447252AB	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0418	DS26502	ZN450308AB	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0425	DS26528	QK449364A	125C, 3.5 VOLTS	1000 HRS	44	0
HIGH TEMP OP LIFE	0436	DS3170	QK526391B	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0440	DS26556	QK534422B	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0442	DS3184	QS525109A	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0447	MAXQ3311	QK521357C	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0448	DS26334	QK544026B	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0501	DS3254	QK522385A	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0518	DS21458	QK539078A	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0520	DS26504	QN611329B	125C, 3.5 VOLTS	1000 HRS	44	0
HIGH TEMP OP LIFE	0525	DS2155	QK619663A	125C, 3.5 VOLTS	1000 HRS	77	0
HIGH TEMP OP LIFE	0527	DS26303	QN610221B	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0536	DS33R41	QK561458C	125C, 3.5V (PSA) & 2.0V (PSB)	1000 HRS	45	0
HIGH TEMP OP LIFE	0537	DS26528	QK069183A	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0542	DS26521	QN064481B	125C, 3.5 VOLTS	192 HRS	45	0
HIGH TEMP OP LIFE	0548	DS26303	QN060221A	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0604	DS26522	QL064481BC	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0617	DS3184	QS069028AF	125C, 3.6 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0617	DS3184	QS069028A	125C, 3.6 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0617	DS3184	QS069028A	125C, 3.6 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0618	DS2155	QK068011A	125C, 3.5 VOLTS	1000 HRS	77	0
HIGH TEMP OP LIFE	0620	DS26528	QK060309A	125C, 3.5 VOLTS	1000 HRS	45	0

HIGH TEMP OP LIFE	0632	DS26334	QK064057B	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0632	DS26303	QN066205A	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0641	DS3254	QK072332A	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0650	DS26522	QL064481AB	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0650	DS26522	QL064481AC	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0706	DS33R41	QK562042AJ	125C, 3.5V (PSA) & 2.0V (PSB)	1000 HRS	45	0
HIGH TEMP OP LIFE	0716	DS26900	QN077106B	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0811	DS26303	QN080344B	125C, 3.5 VOLTS	1000 HRS	45	0
HIGH TEMP OP LIFE	0831	DS33R41	QK080847AJ	125C, 2.0V (PSB) & 3.5V (PSA)	1000 HRS	45	0
HIGH TEMP OP LIFE	0831	DS33R41	QK080847A	125C, 2.0V (PSB) & 3.5V (PSA)	1000 HRS	45	0
HIGH TEMP OP LIFE	0831	DS33R41	QK080847AI	125C, 2.0V (PSB) & 3.5V (PSA)	1000 HRS	45	0
HIGH TEMP OP LIFE	0913	DS2155	QK097040A	125C, 3.5 VOLTS	1000 HRS	77	0
HIGH TEMP OP LIFE	0913	DS2155	QK096061A	125C, 3.5 VOLTS	1000 HRS	77	0
HIGH TEMP OP LIFE	0916	DS2155	QK098054A	125C, 3.5 VOLTS	1000 HRS	77	0
HIGH TEMP OP LIFE	0931	DS26528	QP099206A	125C, 3.5 VOLTS (PSA)	1000 HRS	45	0
HIGH TEMP OP LIFE	0931	DS26528	QP099206A	125C, 3.5 VOLTS (PSA)	1000 HRS	45	0
HIGH TEMP OP LIFE	0931	DS26528	QP099206A	125C, 3.5 VOLTS (PSA)	1000 HRS	45	0

Total: 0

FAILURE RATE: MTTF (YRS): 291484 FITS: 0.4
DEVICE HOURS: 2339658070 FAILS: 0