DALLAS SEMICONDUCTOR MAXIM

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RELIABILITY REPORT
FOR

DS1135

Dallas Semiconductor

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Prepared by:

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Conclusion:

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

DS1135

In addition, Dallas Semiconductor'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): 117049 FITS: 1.0

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. A 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.

Device Information:

Process:	D6W-1P2M,HPVt,E2,TCZ PBL:GOI
Passivation:	Passivation w/Nov TEOS Oxide-Nitride
Die Size:	48 x 64
Number of Transistors:	6150
Interconnect:	Aluminum / 1% Silicon / 0.5% Copper
Gate Oxide Thickness:	150 Å

ELECTRICAL CHARACTERIZATION

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
ESD SENSITIVITY	0019	EOS/ESD S5.1 HBM 500 VOLTS	2	PUL'S	3	0
ESD SENSITIVITY	0019	EOS/ESD S5.1 HBM 1000 VOLTS	2	PUL'S	3	0
ESD SENSITIVITY	0019	EOS/ESD S5.1 HBM 2000 VOLTS	2	PUL'S	3	0
ESD SENSITIVITY	0019	EOS/ESD S5.1 HBM 4000 VOLTS	2	PUL'S	3	1
ESD SENSITIVITY	0019	EOS/ESD S5.1 HBM 8000 VOLTS	2	PUL'S	3	3
LATCH-UP	0019	JESD78, I-TEST 85C			3	0
LATCH-UP	0019	JESD78, Vsupply TEST 85C			3	0
				Total:		**4**

LOW TEMPERATURE OPERATING LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
BIASED BAKE	9905	-20C, 6.0 VOLTS	1000	HRS	77	0
BIASED BAKE	0017	-20C, 6.0 VOLTS	1000	HRS	77	0
BIASED BAKE	0017	-20C, 6.0 VOLTS	1000	HRS	77	0
				Total:		**0**

OPERATING LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
INFANT LIFE	9905	125C, 6.0 VOLTS	48	HRS	347	0
HIGH VOLTAGE LIFE	9905	125C, 6.0 VOLTS	1000	HRS	116	0

INFANT LIFE	0017	125C, 6.0 VOLTS	54	HRS	347	0
HIGH VOLTAGE LIFE	0017	125C, 6.0 VOLTS	1000	HRS	116	0
INFANT LIFE	0017	125C, 6.0 VOLTS	54	HRS	347	0
HIGH VOLTAGE LIFE	0017	125C, 6.0 VOLTS	1000	HRS	116	0
HIGH VOLTAGE LIFE	0126	125C, 6.0 VOLTS	1000	HRS	77	0
HIGH VOLTAGE LIFE	0132	125C, 6.0 VOLTS	1000	HRS	77	0
HIGH VOLTAGE LIFE	0223	125C, 6.0 VOLTS	1000	HRS	80	0
HIGH VOLTAGE LIFE	0230	125C, 6.0 VOLTS	1000	HRS	80	0
HIGH VOLTAGE LIFE	0243	125C, 6.0 VOLTS	1000	HRS	80	0
HIGH TEMP OP LIFE	0312	125C, 5.5 VOLTS	1000	HRS	80	0
HIGH TEMP OP LIFE	0323	125C, 5.5 VOLTS	1000	HRS	80	0
HIGH TEMP OP LIFE	0333	125C, 5.5 VOLTS	500	HRS	80	0
				Total:		**0**

STORAGE LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
STORAGE LIFE	9905	150C	1000	HRS	77	0
STORAGE LIFE	0017	150C	1000	HRS	77	0
STORAGE LIFE	0017	150C	1000	HRS	77	0
				Total:		**0**

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
TEMP CYCLE	9905	-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0017	-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0017	-55C TO 125C	1000	CYS	77	0
TEMP CYCLE	0126	-55C TO 125C	1000	CYS	40	0
TEMP CYCLE	0132	-55C TO 125C	1000	CYS	40	0
TEMP CYCLE	0230	-55C TO 125C	1000	CYS	40	0
TEMP CYCLE	0243	-55C TO 125C	1000	CYS	40	0
TEMP CYCLE	0312	-55C TO 125C	1000	CYS	40	0
TEMP CYCLE	0323	-55C TO 125C	1000	CYS	40	0
TEMP CYCLE	0333	-55C TO 125C	500	CYS	40	0
				Total:		**0**

TEMPERATURE HUMIDITY BIAS

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
BIASED MOISTURE	0126	85/85, 5.5 VOLTS	1000	HRS	77	0
BIASED MOISTURE	0132	85/85, 5.5 VOLTS	1000	HRS	77	0
BIASED MOISTURE	0230	85/85, 5.5 VOLTS	1000	HRS	77	0

BIASED MOISTURE	0243	85/85, 5.5 VOLTS	1000	HRS	77	0
BIASED MOISTURE	0312	85/85, 5.5 VOLTS	1000	HRS	77	0
BIASED MOISTURE	0323	85/85, 5.5 VOLTS	1000	HRS	77	0
BIASED MOISTURE	0333	85/85, 5.5 VOLTS	500	HRS	77	0
				Total:		**0**

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
AUTOCLAVE	0126	121C, 2 ATM STEAM, UNBIASED	168	HRS	40	0
AUTOCLAVE	0132	121C, 2 ATM STEAM, UNBIASED	168	HRS	39	0
AUTOCLAVE	0230	121C, 2 ATM STEAM, UNBIASED	168	HRS	40	0
AUTOCLAVE	0243	121C, 2 ATM STEAM, UNBIASED	168	HRS	40	0
AUTOCLAVE	0312	121C, 2 ATM STEAM, UNBIASED	168	HRS	39	0
AUTOCLAVE	0323	121C, 2 ATM STEAM, UNBIASED	168	HRS	40	0
AUTOCLAVE	0333	121C, 2 ATM STEAM, UNBIASED	168	HRS	40	0
				Total:		**0**

W/E ENDURANCE AND DATA RET'N

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QUANTITY	FAILS
WRITE CYCLE STRESS	0207	85 C, 6.0 VOLTS	30	KCYS	77	0
STORAGE LIFE		150C	1000	HRS	77	0
				Total:		**0**

FAILURE RATE: **MTTF (YRS): 117049** **FITS: 1.0**