08/20/2004

RELIABILITY REPORT
FOR

DS2175, Rev D1

Dallas Semiconductor

4401 South Beltwood Parkway
Dallas, TX 75244-3292

Prepared by:

Ken Wendel
Reliability Engineering Manager
Dallas Semiconductor
4401 South Beltwood Pkwy.
Dallas, TX 75244-3292
Email : ken.wendel@dalsemi.com
ph: 972-371-3726
fax: 972-371-6016
mbl: 214-435-6610

Conclusion:

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

DS2175, Rev D1

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): 91938 FITS: 1.2

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:	1P, 1M, 2.0um, Pfield , WJ BPSG ,
Passivation:	Passivation w/Nitride
Die Size:	138 x 101
Number of Transistors:	7500
Interconnect:	Aluminum / 1% Silicon / 0.5% Copper
Gate Oxide Thickness:	250 Å

OPERATING LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QTY	FAILS	FA#
INFANT LIFE	9643	125C, 7.0 VOLTS	48 HRS	229	0	
HIGH VOLTAGE LIFE	9643	125C, 7.0 VOLTS	1000 HRS	77	0	
INFANT LIFE	9712	125C, 7.0 VOLTS	48 HRS	231	0	
HIGH VOLTAGE LIFE	9712	125C, 7.0 VOLTS	1000 HRS	77	0	
INFANT LIFE	9745	125C, 7.0 VOLTS	48 HRS	234	0	
HIGH VOLTAGE LIFE	9745	125C, 7.0 VOLTS	1000 HRS	77	0	
INFANT LIFE	9811	125C, 7.0 VOLTS	48 HRS	234	0	
HIGH VOLTAGE LIFE	9811	125C, 7.0 VOLTS	1000 HRS	77	0	
INFANT LIFE	9838	125C, 7.0 VOLTS	48 HRS	234	0	
HIGH VOLTAGE LIFE	9838	125C, 7.0 VOLTS	1000 HRS	77	0	
INFANT LIFE	0001	125C, 7.0 VOLTS	48 HRS	234	0	
HIGH VOLTAGE LIFE	0001	125C, 7.0 VOLTS	1000 HRS	77	0	
INFANT LIFE	0042	125C, 7.0 VOLTS	48 HRS	234	0	
HIGH VOLTAGE LIFE	0042	125C, 7.0 VOLTS	1000 HRS	77	0	
INFANT LIFE	0046	125C, 7.0 VOLTS	48 HRS	233	0	
HIGH VOLTAGE LIFE	0046	125C, 7.0 VOLTS	1000 HRS	77	0	
HIGH VOLTAGE LIFE	0050	125C, 7.0 VOLTS	1000 HRS	77	0	
			Total:		**0**	

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QTY	FAILS	FA#
TEMP CYCLE	9643	-55C TO 125C	1000 CYS	36	0	
TEMP CYCLE	9712	-55C TO 125C	1000 CYS	39	0	
TEMP CYCLE	9745	-55C TO 125C	1000 CYS	40	0	
TEMP CYCLE	9811	-55C TO 125C	1000 CYS	40	0	
TEMP CYCLE	9838	-55C TO 125C	1000 CYS	40	0	
TEMP CYCLE	0001	-55C TO 125C	1100 CYS	40	0	
TEMP CYCLE	0042	-55C TO 125C	1000 CYS	40	0	
TEMP CYCLE	0046	-55C TO 125C	1000 CYS	40	0	
TEMP CYCLE	0050	-55C TO 125C	1000 CYS	40	0	
			Total:		**0**	

TEMPERATURE HUMIDITY BIAS

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QTY	FAILS	FA#
BIASED MOISTURE	9643	85/85, 5.5 VOLTS	959 HRS	77	0	
BIASED MOISTURE	9712	85/85, 5.5 VOLTS	959 HRS	77	0	
BIASED MOISTURE	9745	85/85, 5.5 VOLTS	959 HRS	77	0	
BIASED MOISTURE	9811	85/85, 5.5 VOLTS	959 HRS	77	0	
BIASED MOISTURE	9838	85/85, 5.5 VOLTS	959 HRS	77	0	
BIASED MOISTURE	0001	85/85, 5.5 VOLTS	959 HRS	77	0	
BIASED MOISTURE	0042	85/85, 5.5 VOLTS	959 HRS	77	0	
BIASED MOISTURE	0046	85/85, 5.5 VOLTS	959 HRS	77	0	
BIASED MOISTURE	0050	85/85, 5.5 VOLTS	959 HRS	77	0	
			Total:		**0**	

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QTY	FAILS	FA#
AUTOCLAVE	9643	121C, 2 ATM STEAM, UNBIASED	96 HRS	38	0	
AUTOCLAVE	9712	121C, 2 ATM STEAM, UNBIASED	96 HRS	38	0	
AUTOCLAVE	9745	121C, 2 ATM STEAM, UNBIASED	96 HRS	40	0	
AUTOCLAVE	9811	121C, 2 ATM STEAM, UNBIASED	96 HRS	40	0	
AUTOCLAVE	9838	121C, 2 ATM STEAM, UNBIASED	96 HRS	40	0	
AUTOCLAVE	0001	121C, 2 ATM STEAM, UNBIASED	96 HRS	40	0	
AUTOCLAVE	0042	121C, 2 ATM STEAM, UNBIASED	96 HRS	40	0	
AUTOCLAVE	0046	121C, 2 ATM STEAM, UNBIASED	96 HRS	39	0	
AUTOCLAVE	0050	121C, 2 ATM STEAM, UNBIASED	96 HRS	40	0	
			Total:		**0**	

FAILURE RATE: **MTTF (YRS): 91938** **FITS: 1.2**