08/20/2004

RELIABILITY REPORT
FOR

DS1866, Rev A2

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:

DS1866, Rev A2

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): 102463 FITS: 1.1

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, 0.8um, PdplDiode, Low Vts , N+ESDII, WJ BPSG
Passivation:	Passivation w/Nov TEOS Oxide-Nitride
Die Size:	43 x 43
Number of Transistors:	256
Interconnect:	Aluminum / 1% Silicon / 0.5% Copper
Gate Oxide Thickness:	175 Å

OPERATING LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QTY	FAILS	FA#
HIGH VOLTAGE LIFE	0105	125C, 7.0 VOLTS	1000 HRS	77	0	
HIGH VOLTAGE LIFE	0105	125C, 7.0 VOLTS	1000 HRS	80	0	
HIGH VOLTAGE LIFE	0111	125C, 7.0 VOLTS	1000 HRS	79	0	
HIGH VOLTAGE LIFE	0147	125C, 6.0 VOLTS	1000 HRS	80	0	
HIGH VOLTAGE LIFE	0210	125C, 7.0 VOLTS	1000 HRS	78	0	
HIGH VOLTAGE LIFE	0218	125C, 6.0 VOLTS	1000 HRS	80	0	
HIGH VOLTAGE LIFE	0222	125C, 7.0 VOLTS	1000 HRS	78	0	
HIGH VOLTAGE LIFE	0252	125C, 7.0 VOLTS	1000 HRS	80	0	
HIGH TEMP OP LIFE	0310	125C, 5.5 VOLTS	1000 HRS	80	0	
HIGH TEMP OP LIFE	0327	125C, 5.5 VOLTS	1000 HRS	80	0	
HIGH TEMP OP LIFE	0403	125C, 5.5 VOLTS	1000 HRS	80	0	
			Total:		**0**	

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QTY	FAILS	FA#
TEMP CYCLE	0105	-55C TO 125C	1000 CYS	40	1	No FA
TEMP CYCLE	0105	-55C TO 125C	1000 CYS	40	0	
TEMP CYCLE	0111	-55C TO 125C	1000 CYS	40	0	
TEMP CYCLE	0222	-55C TO 125C	1000 CYS	77	0	

TEMP CYCLE	0252	-55C TO 125C	1000	CYS	40	0	
TEMP CYCLE	0310	-55C TO 125C	1000	CYS	40	0	
TEMP CYCLE	0327	-55C TO 125C	1000	CYS	40	0	
TEMP CYCLE	0403	-55C TO 125C	1000	CYS	40	0	
TEMP CYCLE	0429	-55C TO 125C	500	CYS	77	0	
				Total:		**1**	

TEMPERATURE HUMIDITY BIAS

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QTY	FAILS	FA#
HAST	0105	130C, 85%R.H.,5.5V	88	HRS	77	0	
HAST	0105	130C, 85%R.H.,5.5V	100	HRS	77	1	No FA
HAST	0111	130C, 85%R.H.,5.5V	96	HRS	77	0	
BIASED MOISTURE	0222	85/85, 5.5 VOLTS	959	HRS	78	0	
HAST	0252	130C, 85%R.H.,5.5V	96	HRS	77	0	
HAST	0310	130C, 85%R.H.,5.5V	96	HRS	77	0	
HAST	0327	130C, 85%R.H.,5.5V	96	HRS	77	0	
				Total:		**1**	

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QTY	FAILS	FA#
AUTOCLAVE	0105	121C, 2 ATM STEAM, UNBIASED	96	HRS	40	0	
AUTOCLAVE	0105	121C, 2 ATM STEAM, UNBIASED	96	HRS	39	0	
AUTOCLAVE	0111	121C, 2 ATM STEAM, UNBIASED	168	HRS	40	0	
AUTOCLAVE	0222	121C, 2 ATM STEAM, UNBIASED	168	HRS	76	0	
AUTOCLAVE	0252	121C, 2 ATM STEAM, UNBIASED	168	HRS	40	0	
AUTOCLAVE	0310	121C, 2 ATM STEAM, UNBIASED	168	HRS	40	0	
AUTOCLAVE	0327	121C, 2 ATM STEAM, UNBIASED	168	HRS	40	0	
AUTOCLAVE	0403	121C, 2 ATM STEAM, UNBIASED	96	HRS	40	0	
AUTOCLAVE	0429	121C, 2 ATM STEAM, UNBIASED	168	HRS	77	0	
				Total:		**0**	

FAILURE RATE: **MTTF (YRS): 102463** **FITS: 1.1**