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PRODUCT RELIABILITY REPORT
FOR

DS3906, Rev A2

Dallas Semiconductor

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Conclusion

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

DS3906, 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): 207117** **FITS: 0.6**

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. "*" after DATE CODE denotes specific product

Device Information:

Process:	E6W-2P2M,HPVt,E2,EPROGVt,TCZ ALOCOS:GOI
Passivation:	Passivation w/Nov TEOS Oxide-Nitride
Die Size:	62 x 87
Number of Transistors:	16651
Interconnect:	Aluminum / 1% Silicon / 0.5% Copper
Gate Oxide Thickness:	150 Å

ELECTRICAL CHARACTERIZATION

DESCRIPTION	DATE CODE		CONDITION	READPOINT		QTY	FAILS	FA#
ESD SENSITIVITY	0513	*	EOS/ESD S5.1 HBM 500 VOLTS	1	PUL'S	3	0	
ESD SENSITIVITY	0513	*	EOS/ESD S5.1 HBM 1000 VOLTS	1	PUL'S	3	0	
ESD SENSITIVITY	0513	*	EOS/ESD S5.1 HBM 2000 VOLTS	1	PUL'S	3	0	
ESD SENSITIVITY	0513	*	EOS/ESD S5.1 HBM 4000 VOLTS	1	PUL'S	3	0	
ESD SENSITIVITY	0513	*	EOS/ESD S5.1 HBM 8000 VOLTS	1	PUL'S	3	3	No FA
LATCH-UP	0513	*	JESD78, I-TEST 85C	2	DYS	6	0	
LATCH-UP	0513	*	JESD78, Vsupply TEST 85C	2	DYS	6	0	
					Total:		**3**	

OPERATING LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT		QTY	FAILS	FA#
HIGH TEMP OP LIFE	0335	125C, 5.5 VOLTS	1000	HRS	77	0	
HIGH TEMP OP LIFE	0345	125C, 5.25 VOLTS	1000	HRS	77	0	
HIGH TEMP OP LIFE	0405	125C, 5.5 VOLTS	1000	HRS	45	0	
HIGH TEMP REVERSE BIAS	0416	125C, 5.5 VOLTS	1000	HRS	48	0	
HIGH TEMP OP LIFE	0416	125C, 5.5 VOLTS	1000	HRS	77	0	
HIGH TEMP REVERSE BIAS	0417	125C, 5.5 VOLTS	1000	HRS	48	0	

HIGH TEMP REVERSE BIAS	0417	125C, 5.5 VOLTS	1000	HRS	48	0
HIGH TEMP OP LIFE	0417	125C, 5.5 VOLTS	1000	HRS	77	0
HIGH TEMP OP LIFE	0418	125C, 5.5 VOLTS	1000	HRS	77	0
HIGH TEMP OP LIFE	0418	125C, 5.5 VOLTS	1000	HRS	77	0
HIGH TEMP OP LIFE	0424	125C, 5.5 VOLTS	1000	HRS	77	0
HIGH TEMP OP LIFE	0425	125C, 5.5 VOLTS	1000	HRS	45	0
HIGH TEMP OP LIFE	0425	125C, 3.6V (PSA) & -4.0V (PSB)	1000	HRS	45	0
HIGH TEMP OP LIFE	0426	125C, 5.5 VOLTS	1000	HRS	45	0
HIGH TEMP OP LIFE	0427	125C, 5.5 VOLTS	1000	HRS	45	0
HIGH TEMP OP LIFE	0440	125C, 5.5 VOLTS	1000	HRS	77	0
HIGH TEMP OP LIFE	0442	125C, 5.5 VOLTS	1000	HRS	62	0
HIGH TEMP OP LIFE	0442	125C, 5.5 VOLTS	1000	HRS	62	0
HIGH TEMP OP LIFE	0442	125C, 5.5 VOLTS	1000	HRS	77	0
HIGH TEMP REVERSE BIAS	0443	125C, 5.25 VOLTS	1000	HRS	48	0
HIGH TEMP OP LIFE	0447	125C, 5.5 VOLTS	1000	HRS	77	0
		125C, 5.5 VOLTS	1000	HRS	77	0
HIGH TEMP REVERSE BIAS	0447	125C, 5.5 VOLTS	1000	HRS	45	0
HIGH VOLTAGE LIFE	0452	125C, 5.5 VOLTS	1000	HRS	77	0
HIGH TEMP REVERSE BIAS	0504	125C, 5.5 VOLTS	1000	HRS	45	0
HIGH TEMP REVERSE BIAS	0504	125C, 5.5 VOLTS	1000	HRS	45	0
HIGH TEMP REVERSE BIAS	0513	125C, 5.5 VOLTS	1000	HRS	77	0
HIGH TEMP OP LIFE	0523	125C, 5.5 VOLTS	1000	HRS	77	0
HIGH TEMP OP LIFE	0523 *	125C, 5.5 VOLTS	192	HRS	45	0
				Total:		**0**

W/E ENDURANCE AND DATA RET'N

DESCRIPTION	**DATE CODE**	**CONDITION**	**READPOINT**		**QTY**	**FAILS**	**FA#**
WRITE CYCLE STRESS (KCYS)	0335	85 C, 5.5 VOLTS	25	KCYS	77	0	
STORAGE LIFE		150C	1000	HRS	76	0	
WRITE CYCLE STRESS (KCYS)	0401	25 C, 5.0 VOLTS	50	KCYS	76	0	
STORAGE LIFE		250C	4	HRS	76	0	
WRITE CYCLE STRESS (KCYS)	0416	70 C, 5.5 VOLTS	30	KCYS	77	0	
STORAGE LIFE		150C	1000	HRS	77	0	

WRITE CYCLE STRESS (KCYS)	0418		55 C, 5.5 VOLTS	30	KCYS	77	0
STORAGE LIFE			150C	1000	HRS	77	0
WRITE CYCLE STRESS (KCYS)	0418		70 C, 5.5 VOLTS	30	KCYS	77	0
STORAGE LIFE			150C	1000	HRS	77	0
WRITE CYCLE STRESS (KCYS)	0424		85 C, 5.5 VOLTS	30	KCYS	77	0
STORAGE LIFE			150C	1000	HRS	77	0
WRITE CYCLE STRESS (KCYS)	0440		70 C, 5.5 VOLTS	30	KCYS	77	0
STORAGE LIFE			150C	1000	HRS	77	0
WRITE CYCLE STRESS (KCYS)	0442		70 C, 5.5 VOLTS	30	KCYS	77	0
STORAGE LIFE			150C	1000	HRS	74	0
WRITE CYCLE STRESS (KCYS)	0447		85 C, 5.5 VOLTS	25	KCYS	77	0
			85 C, 5.5 VOLTS	25	KCYS	77	0
STORAGE LIFE			150C	1000	HRS	77	0
			150C	1000	HRS	77	0
WRITE CYCLE STRESS (KCYS)	0452		85 C, 5.5 VOLTS	50	KCYS	77	0
STORAGE LIFE			150C	1000	HRS	77	0
WRITE CYCLE STRESS (KCYS)	0523		70 C, 5.5 VOLTS	30	KCYS	77	0
STORAGE LIFE			150C	96	HRS	77	0
WRITE CYCLE STRESS (KCYS)	0523	*	70 C, 5.5 VOLTS	30	KCYS	77	0
STORAGE LIFE		*	150C	96	HRS	75	0
					Total:		**0**

FAILURE RATE: **MTTF (YRS): 207117** **FITS: 0.6**