

RELIABILITY REPORT
FOR

DS2480B, Rev B1/B2

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:

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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): 34050** **FITS: 3.4**

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.

Device Information:

Process: 1P, 1M, 0.8um, ND & PD-E DSD ,WJ BPSG, N+ ESDI
 Passivation: Passivation w/Nov TEOS Oxide-Nitride
 Die Size: 114 x 77
 Number of Transistors: 0
 Interconnect: Aluminum / 1% Silicon / 0.5% Copper
 Gate Oxide Thickness: 175 Å

OPERATING LIFE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
HIGH VOLTAGE LIFE	9726	125C, 7.0 VOLTS	24 HRS	315	0
INFANT LIFE		125C, 7.0 VOLTS	96 HRS	295	0
HIGH VOLTAGE LIFE	9726	125C, 7.0 VOLTS	1000 HRS	116	0
HIGH VOLTAGE LIFE	9746	125C, 7.0 VOLTS	24 HRS	315	1
INFANT LIFE		125C, 7.0 VOLTS	72 HRS	307	0
HIGH VOLTAGE LIFE	9746	125C, 7.0 VOLTS	1000 HRS	116	0
HIGH VOLTAGE LIFE	9813	125C, 7.0 VOLTS	1000 HRS	256	0
HIGH VOLTAGE LIFE	9915	125C, 7.0 VOLTS	336 HRS	256	0
Total:					1

TEMPERATURE CYCLE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
TEMP CYCLE	9726	-55C TO 125C	1000 CYS	66	0
TEMP CYCLE	9746	-55C TO 125C	1000 CYS	74	0
Total:					0

TEMPERATURE HUMIDITY BIAS

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
BIASED MOISTURE	9726	85/85, 5.5 VOLTS	959 HRS	66	0
BIASED MOISTURE	9746	85/85, 5.5 VOLTS	959 HRS	77	0
Total:					0

UNBIASED MOISTURE RESISTANCE

DESCRIPTION	DATE CODE	CONDITION	READPOINT	QUANTITY	FAILS
AUTOCLAVE	9726	121C, 2 ATM STEAM, UNBIASED	168 HRS	34	0
AUTOCLAVE	9746	121C, 2 ATM STEAM, UNBIASED	168 HRS	37	0
				Total:	0

FAILURE RATE:**MTTF (YRS): 34050****FITS: 3.4**