RELIABILITY REPORT
FOR

DS2703 Rev A2-6"

Dallas Semiconductor

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Prepared by:

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Conclusion:
The following Reliability Test successfully meets the quality and reliability standards set forth by this special Temperature Cycle Evaluation:

DS2703 Rev A2-6"

Device Description:
A description of the device used in this qualification 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.

$$ AfT = \exp((Ea/k)*(1/Tu - 1/Ts)) = \frac{tu}{ts} $$

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:

$$ Fr = \frac{X}{(ts * AfV * AfT * N * 2)} $$

$X$ = Chi-Sq statistical upper limit

$N$ = Life test sample size
The calculated failure rate for this device/process/assembly is:

**FAILURE RATE:** FITS: 21.6

The parameters used to calculate this failure rate are as follows:

- $C_f$: 60%
- $E_a$: 0.7
- $B$: 0
- $T_u$: 25°C
- $V_u$: 5.5 Volts

The reliability data follows. A the start of this data is the device information. This is a description of the device for this report. Following this is the assembly information. This section includes a description of the assembly vehicle used to generate this reliability data for both qualifications and monitors. The next section is the detailed reliability data for each stress found in the qualification / monitor. If there are additional assemblies used as part of this report, a description of each will follow which includes the respective reliability data for that assembly. The reliability data section includes the latest data available.

### Device Information:
- Device: DS2703
- Process: D35WN-3P3M,DPE2,NTC,DSD,PDESD,PDRES,Cap,ENPN,
- Passivation: TopMetal 2 Mask NRL: TEOS Ox/Nitride
- Die Size: 41 x 70
- Number of Transistors: 0
- Interconnect: Aluminum / 1% Silicon / 0.5% Copper
- Gate Oxide Thickness: 131 Å

### Assembly Information:
- Qualification Vehicle: DS2703
- Assembly Site: ATP (Amkor, PI)
- Pin Count: 8
- Package Type: uSOP
- Body Size: 3x0.85
- Mold Compound: Nitto MP8000C
- Lead Frame: Stamped Copper C7025
- Lead Finish: SnPb Plate
- Die Attach: 84-1 LMISR4 Epoxy Silverfilled Ablebond
- Bond Wire / Size: Au / 1.0 mil
- Theta JA: 221
- Theta JC: 39
- Flammability: UL 94-V0
- Moisture Sensitivity (JEDEC J-STD20A): Level 1
- Date Code Range: 0449 to 0449

### ELECTRICAL CHARACTERIZATION

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>DATE CODE</th>
<th>CONDITION</th>
<th>READPOINT</th>
<th>QTY</th>
<th>FAILS</th>
<th>FA#</th>
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<tbody>
<tr>
<td>ESD SENSITIVITY</td>
<td>0449</td>
<td>EOS/ESD S5.1 HBM 500 VOLTS</td>
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<td>PUL'S</td>
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<td>DESCRIPTION</td>
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<td>CONDITION</td>
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<td>QTY</td>
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<td>-55C TO 125C</td>
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<td>HAST</td>
<td>0449</td>
<td>130C, 85% R.H., 5.5V</td>
<td>96 HRS</td>
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<td>AUTOCLAVE</td>
<td>0449</td>
<td>121C, 2 ATM STEAM, UNBIASED</td>
<td>168 HRS</td>
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**Total:** 5

**FAILURE RATE:**

- **MTTF (YRS):** 5288
- **FITS:** 21.6