



4/20/2008

RELIABILITY MONITOR REPORT
FOR

DAL 0.35 μ m Silicon Gate CMOS

MAXIM Integrated Products

120 San Gabriel Dr.
Sunnyvale, CA 94086

This Report was prepared by
Maxim Reliability Engineering

Summary:

The data in the tables that follow was generated as the result of an on-going Process Reliability Monitor. The specific products in this process monitor are:

| | | | | |
|---------|-------------|--------|----------|---------|
| DS1080L | DS1099 | DS2155 | DS2431 | DS2704R |
| DS2782 | DS2784 | DS2786 | DS28DG02 | DS3605 |
| DS3650 | DS3882 | DS3991 | DS3994 | DS7505 |
| DS75LX | MAX5478ETE+ | | | |

The calculated failure rate for devices using this process is:

FAILURE RATE: **MTTF (YRS): 137165** **FITS: 0.8**

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

Cf: 60% **Ea: 0.7** **Tu: 25 °C**

The reliability data follows and in this section is the detailed reliability data by stress. The reliability data section includes the latest data available. This report covers data between 4/1/2007 and 3/31/2008 .

Process Information:

Process Description: DAL 0.35µm Silicon Gate CMOS

DATA RETENTION

| DESCRIPTION | DATE CODE | TEST VEHICLE | CONDITION | READPOINT | QUANTITY | FAILS | FA NO |
|--------------|-----------|--------------|-----------|-----------|---------------|----------|-------|
| STORAGE LIFE | 0711 | DS3650 | 150C | 1000 HRS | 77 | 0 | |
| STORAGE LIFE | 0715 | DS3605 | 150C | 1000 HRS | 77 | 0 | |
| STORAGE LIFE | 0730 | DS3991 | 150C | 1000 HRS | 77 | 0 | |
| | | | | | Total: | 0 | |

OPERATING LIFE

| DESCRIPTION | DATE CODE | TEST VEHICLE | CONDITION | READPOINT | QUANTITY | FAILS | FA NO |
|-------------------|-----------|--------------|----------------------------------|-----------|----------|-------|-------|
| HIGH TEMP OP LIFE | | MAX5478ETE+ | 135C, 5.25V | 1000 HRS | 45 | 0 | |
| | | | 135C, 5.25V | 1000 HRS | 45 | 0 | |
| HIGH TEMP OP LIFE | 0705 | DS28DG02 | 125C, 3.6 VOLTS | 1000 HRS | 77 | 0 | |
| HIGH TEMP OP LIFE | 0709 | DS2155 | 125C, 3.5 VOLTS | 1000 HRS | 77 | 0 | |
| HIGH TEMP OP LIFE | 0711 | DS3650 | 125C, 3.0V (PSB) & 3.6V (PSA) | 1000 HRS | 45 | 0 | |
| HIGH TEMP OP LIFE | 0712 | DS2155 | 125C, 3.5 VOLTS | 1000 HRS | 77 | 0 | |
| HIGH TEMP OP LIFE | 0713 | DS3994 | 125C, 5.5 VOLTS | 1000 HRS | 77 | 0 | |
| HIGH TEMP OP LIFE | 0713 | DS75LX | 125C, 3.7 VOLTS | 1000 HRS | 45 | 0 | |
| HIGH TEMP OP LIFE | 0714 | DS2784 | 125C, 5.5 V (PSA) & 15.0 V (PSB) | 1000 HRS | 77 | 0 | |
| HIGH TEMP OP LIFE | 0715 | DS3605 | 125C, 3.6 VOLTS | 1000 HRS | 45 | 0 | |
| HIGH TEMP OP LIFE | 0717 | DS2704R | 125C, 5.5 VOLTS | 1000 HRS | 45 | 0 | |
| HIGH TEMP OP LIFE | 0723 | DS2431 | 150C, 5.25 VOLTS | 816 HRS | 45 | 0 | |
| HIGH TEMP OP LIFE | 0723 | DS2786 | 125C, 5.5 VOLTS | 1000 HRS | 45 | 0 | |

| | | | | | | | | |
|-------------------|------|---------|----------------------------------|------|-----|----|----------|----------|
| HIGH TEMP OP LIFE | 0730 | DS3991 | 125C, 5.5V (PSA) & 3.0V (PSB) | 1000 | HRS | 45 | 0 | |
| HIGH TEMP OP LIFE | 0732 | DS2784 | 125C, 5.5 V (PSA) & 15.0 V (PSB) | 1000 | HRS | 77 | 0 | |
| HIGH TEMP OP LIFE | 0732 | DS1099 | 125C, 5.5 VOLTS | 408 | HRS | 45 | 0 | |
| HIGH TEMP OP LIFE | 0732 | DS1099 | 125C, 5.5 VOLTS | 408 | HRS | 32 | 0 | |
| HIGH TEMP OP LIFE | 0732 | DS1080L | 125C, 3.6 VOLTS | 1000 | HRS | 45 | 0 | |
| HIGH TEMP OP LIFE | 0745 | DS1099 | 125C, 5.5 VOLTS | 240 | HRS | 45 | 0 | |
| HIGH TEMP OP LIFE | 0746 | DS7505 | 125C, 3.7 VOLTS | 1000 | HRS | 77 | 0 | |
| Total: | | | | | | | 0 | 0 |

STORAGE LIFE

| DESCRIPTION | DATE CODE | TEST VEHICLE | CONDITION | READPOINT | QUANTITY | FAILS | FA NO | |
|---------------|-----------|--------------|-----------|-----------|----------|-------|----------|----------|
| STORAGE LIFE | 0711 | DS3882 | 150C | 500 | HRS | 77 | 0 | |
| STORAGE LIFE | 0715 | DS2782 | 150C | 1000 | HRS | 77 | 0 | |
| STORAGE LIFE | 0723 | DS2431 | 150C | 2000 | HRS | 77 | 0 | |
| STORAGE LIFE | 0723 | DS2431 | 175C | 500 | HRS | 77 | 0 | |
| STORAGE LIFE | 0723 | DS3882 | 150C | 500 | HRS | 68 | 0 | |
| STORAGE LIFE | 0723 | DS3882 | 150C | 500 | HRS | 77 | 0 | |
| STORAGE LIFE | 0732 | DS1099 | 150C | 1000 | HRS | 77 | 0 | |
| STORAGE LIFE | 0732 | DS1080L | 150C | 1000 | HRS | 55 | 0 | |
| Total: | | | | | | | 0 | 0 |

TEMPERATURE CYCLE

| DESCRIPTION | DATE CODE | TEST VEHICLE | CONDITION | READPOINT | QUANTITY | FAILS | FA NO |
|--------------------------------|-----------|--------------|---------------------------|-----------|----------|-------|-------|
| TEMP CYCLE, 5' RAMP, 10' DWELL | 0709 | DS2155 | -55C TO 125C | 1000 | CYS | 77 | 0 |
| BOND STRENGTH | 0711 | DS3882 | MIL-STD-883-2011 : COND D | 60 | WIRES | 5 | 0 |
| TEMP CYCLE, 5' RAMP, 10' DWELL | | | -55C TO 125C | 1000 | CYS | 77 | 0 |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 0712 | DS2155 | -55C TO 125C | 1000 | CYS | 75 | 0 |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 0715 | DS2782 | -55C TO 125C | 1000 | CYS | 77 | 0 |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 0723 | DS3882 | -55C TO 125C | 1000 | CYS | 77 | 0 |
| BOND STRENGTH | | | MIL-STD-883-2011 : COND D | 60 | WIRES | 5 | 0 |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 0723 | DS2431 | -65C TO 150C | 1000 | CYS | 77 | 0 |
| BOND STRENGTH | | | MIL-STD-883-2011 : COND D | 30 | WIRES | 15 | 0 |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 0723 | DS3882 | -55C TO 125C | 1000 | CYS | 77 | 0 |
| BOND STRENGTH | | | MIL-STD-883-2011 : COND D | 60 | WIRES | 5 | 0 |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 0732 | DS1099 | -55C TO 125C | 1000 | CYS | 77 | 0 |
| BOND STRENGTH | | | MIL-STD-883-2011 : COND D | 30 | WIRES | 5 | 0 |

| | | | | | | | |
|-----------------------------------|------|---------|---------------------------|-----|-------|----------|----------|
| TEMP CYCLE, 5' RAMP, 10' DWELL | 0732 | DS1080L | -65C TO 150C | 500 | CYS | 77 | 0 |
| BOND STRENGTH | | | MIL-STD-883-2011 : COND D | 40 | WIRES | 5 | 0 |
| Total: | | | | | | 0 | 0 |

TEMPERATURE HUMIDITY BIAS

| DESCRIPTION | DATE CODE | TEST VEHICLE | CONDITION | READPOINT | QUANTITY | FAILS | FA NO |
|-----------------|-----------|--------------|--------------------|-----------|----------|----------|----------|
| HAST | 0709 | DS2155 | 130C, 85%R.H.,3.5V | 96 | HRS | 45 | 0 |
| BIASED MOISTURE | 0711 | DS3882 | 85/85, 5.5 VOLTS | 1000 | HRS | 77 | 0 |
| HAST | 0712 | DS2155 | 130C, 85%R.H.,3.5V | 96 | HRS | 45 | 0 |
| BIASED MOISTURE | 0715 | DS2782 | 85/85, 5.5 VOLTS | 1000 | HRS | 77 | 0 |
| HAST | 0723 | DS2431 | 130C, 85%R.H.,5.5V | 192 | HRS | 76 | 0 |
| BIASED MOISTURE | 0723 | DS3882 | 85/85, 5.5 VOLTS | 1000 | HRS | 77 | 0 |
| BIASED MOISTURE | 0723 | DS3882 | 85/85, 5.5 VOLTS | 1000 | HRS | 77 | 0 |
| HAST | 0732 | DS1099 | 130C, 85%R.H.,5.5V | 96 | HRS | 77 | 0 |
| HAST | 0732 | DS1080L | 130C, 85%R.H.,3.5V | 96 | HRS | 77 | 0 |
| Total: | | | | | | 0 | 0 |

UNBIASED MOISTURE RESISTANCE

| DESCRIPTION | DATE CODE | TEST VEHICLE | CONDITION | READPOINT | QUANTITY | FAILS | FA NO |
|---------------|-----------|--------------|--------------------------------|-----------|----------|----------|----------|
| AUTOCLAVE | 0711 | DS3882 | 121C, 2 ATM STEAM, UNBIASED | 168 | HRS | 77 | 0 |
| AUTOCLAVE | 0723 | DS2431 | 121C, 2 ATM STEAM, UNBIASED | 336 | HRS | 77 | 0 |
| AUTOCLAVE | 0723 | DS3882 | 121C, 2 ATM STEAM, UNBIASED | 168 | HRS | 77 | 0 |
| AUTOCLAVE | 0723 | DS3882 | 121C, 2 ATM STEAM, UNBIASED | 168 | HRS | 75 | 0 |
| AUTOCLAVE | 0732 | DS1099 | 121C, 2 ATM STEAM, UNBIASED | 168 | HRS | 77 | 0 |
| AUTOCLAVE | 0732 | DS1080L | 121C, 2 ATM STEAM, UNBIASED | 168 | HRS | 77 | 0 |
| Total: | | | | | | 0 | 0 |

W/E ENDURANCE AND DATA RET'N

| DESCRIPTION | DATE CODE | TEST VEHICLE | CONDITION | READPOINT | QUANTITY | FAILS | FA NO |
|------------------------------|-----------|--------------|-------------------------------------|-----------|----------|-------|-------|
| WRITE CYCLE STRESS (KCYS) | 0705 | DS28DG02 | 25 C, 3.6 VOLTS | 200 | KCYS | 77 | 0 |
| STORAGE LIFE | | | 150C | 1000 | HRS | 77 | 0 |
| WRITE CYCLE STRESS (KCYS) | 0711 | DS3882 | 85 C, 5.25 VOLTS | 30 | KCYS | 77 | 0 |
| STORAGE LIFE | | | 150C | 500 | HRS | 77 | 0 |
| WRITE CYCLE STRESS (KCYS) | 0713 | DS3994 | 70 C, 5.5 VOLTS | 30 | KCYS | 77 | 0 |
| STORAGE LIFE | | | 150C | 1000 | HRS | 77 | 0 |
| WRITE CYCLE STRESS (KCYS) | 0714 | DS2784 | 50 C, 5.5 V (PSA) & 15.0 V (PSB) | 50 | KCYS | 77 | 0 |

| | | | | | | |
|---------------------------|------|--------|----------------------------------|----------|----|----------|
| STORAGE LIFE | | | 150C | 1000 HRS | 77 | 0 |
| WRITE CYCLE STRESS (KCYS) | 0723 | DS3882 | 85 C, 5.25 VOLTS | 30 KCYS | 77 | 0 |
| STORAGE LIFE | | | 150C | 500 HRS | 77 | 0 |
| WRITE CYCLE STRESS (KCYS) | 0723 | DS3882 | 85 C, 5.25 VOLTS | 30 KCYS | 77 | 0 |
| STORAGE LIFE | | | 150C | 500 HRS | 77 | 0 |
| WRITE CYCLE STRESS (KCYS) | 0732 | DS2784 | 50 C, 5.5 V (PSA) & 15.0 V (PSB) | 50 KCYS | 77 | 0 |
| STORAGE LIFE | | | 150C | 1000 HRS | 77 | 0 |
| WRITE CYCLE STRESS (KCYS) | 0746 | DS7505 | 25 C, 3.7 VOLTS | 80 KCYS | 77 | 0 |
| STORAGE LIFE | | | 150C | 1000 HRS | 77 | 0 |
| STORAGE LIFE | 0746 | DS7505 | 150C | 1000 HRS | 77 | 0 |
| WRITE CYCLE STRESS (KCYS) | | | 85 C, 3.7 VOLTS | 20 KCYS | 77 | 0 |
| Total: | | | | | | 0 |

W/E ENDURANCE AND OPERATING LIFE

| DESCRIPTION | DATE CODE | TEST VEHICLE | CONDITION | READPOINT | QUANTITY | FAILS | FA NO |
|---------------------------|-----------|--------------|------------------|-----------|----------|----------|-------|
| WRITE CYCLE STRESS (KCYS) | 0711 | DS3882 | 85 C, 5.25 VOLTS | 30 KCYS | 77 | 0 | |
| HIGH TEMP OP LIFE | | | 125C, 5.25 VOLTS | 432 HRS | 73 | 0 | |
| WRITE CYCLE STRESS (KCYS) | 0723 | DS3882 | 85 C, 5.25 VOLTS | 30 KCYS | 77 | 0 | |
| HIGH TEMP OP LIFE | | | 125C, 5.25 VOLTS | 408 HRS | 75 | 0 | |
| HIGH TEMP OP LIFE | 0725 | DS3882 | 125C, 5.25 VOLTS | 408 HRS | 76 | 0 | |
| WRITE CYCLE STRESS (KCYS) | | | 85 C, 5.25 VOLTS | 30 KCYS | 77 | 0 | |
| Total: | | | | | | 0 | |

FAILURE RATE:

MTTF (YRS): 137165

FITS: 0.8