



12/20/2011

**PRODUCT RELIABILITY REPORT
FOR**

MAX72466

Maxim Integrated Products

**4401 South Beltwood Parkway
Dallas, TX 75244-3292**

Prepared by:

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Conclusion:

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

MAX72466

In addition, Maxim'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:

$$\text{MTTF} = 1/\text{Fr}$$

NOTE: MTTF is frequently used interchangeably with MTBF.

The calculated failure rate for this device/process is:

FAILURE RATE: **MTTF (YRS):** **64392** **FITS:** **1.8**
DEVICE HOURS: **51685579** **FAILS:** **0**

Only data from Operating Life or similar stresses are used for this calculation.

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

Cf: 60% **Ea: 0.7** **B: 0** **Tu: 25 °C** **Vu: 3.3 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 and may contain some generic data. **Bold** Product Number denotes specific product data.

Device Information:

Process: TSMC 65nm logic General Purpose, Single poly 9 metal, 1.0V/2.5V
 Passivation: SiO/SiN = 400nm/600nm
 Die Size: 89.37008 x 187.79528
 Number of Transistors: 6000000
 Interconnect: Aluminum / 0.5% Copper
 Gate Oxide Thickness: 20 Å

ESD CDM

| DESCRIPTION | DATE | CODE/PRODUCT/LOT | CONDITION | READPOIN | QTY | FAILS | FA# |
|-----------------|------|------------------|--------------------------------------|----------|-------|----------|-----|
| ESD SENSITIVITY | 0951 | MAX72463 | EX102431LC JESD22-C101 CDM 200 VOLTS | 3 | PUL'S | 3 | 0 |
| Total: | | | | | | 0 | |

ESD HBM

| DESCRIPTION | DATE | CODE/PRODUCT/LOT | CONDITION | READPOIN | QTY | FAILS | FA# |
|-----------------|------|------------------|---------------------------------------|----------|-------|-------|---------|
| ESD SENSITIVITY | 0951 | MAX72463 | EX102431LC JESD22-A114 HBM 500 VOLTS | 1 | PUL'S | 3 | 0 |
| ESD SENSITIVITY | 0951 | MAX72463 | EX102431LC JESD22-A114 HBM 1000 VOLTS | 1 | PUL'S | 3 | 0 |
| ESD SENSITIVITY | 0951 | MAX72463 | EX102431LC JESD22-A114 HBM 2000 VOLTS | 1 | PUL'S | 3 | 0 |
| ESD SENSITIVITY | 0951 | MAX72463 | EX102431LC JESD22-A114 HBM 3000 VOLTS | 1 | PUL'S | 3 | 3 No FA |
| ESD SENSITIVITY | 1015 | MAX72463 | EX103192AA JESD22-A114 HBM 500 VOLTS | 1 | PUL'S | 3 | 0 |
| ESD SENSITIVITY | 1015 | MAX72463 | EX103192AA JESD22-A114 HBM 1000 VOLTS | 1 | PUL'S | 3 | 0 |
| ESD SENSITIVITY | 1015 | MAX72463 | EX103192AA JESD22-A114 HBM 2000 VOLTS | 1 | PUL'S | 3 | 0 |
| ESD SENSITIVITY | 1015 | MAX72463 | EX103192AA JESD22-A114 HBM 2500 VOLTS | 1 | PUL'S | 3 | 3 No FA |

Total: 6

LATCH-UP

| DESCRIPTION | DATE | CODE/PRODUCT/LOT | CONDITION | READPOIN | QTY | FAILS | FA# |
|-------------|------|------------------|--|---------------|-----|----------|-----|
| LATCH-UP I | 0951 | MAX72463 | EX102431LC JESD78A, I-TEST 110C | | 6 | 0 | |
| LATCH-UP V | 0951 | MAX72463 | EX102431LC JESD78A, V-SUPPLY TEST 110C | | 6 | 0 | |
| LATCH-UP I | 1015 | MAX72463 | EX103192AA JESD78A, I-TEST 125C | | 6 | 0 | |
| LATCH-UP V | 1015 | MAX72463 | EX103192AA JESD78A, V-SUPPLY TEST 125C | | 6 | 0 | |
| | | | | Total: | | 0 | |

OPERATING LIFE

| DESCRIPTION | DATE | CODE/PRODUCT/LOT | CONDITION | READPOIN | QTY | FAILS | FA# |
|-------------------|------|------------------|--|---------------|-----|----------|-----|
| HIGH TEMP OP LIFE | 0933 | MAX72018B | GX101843AA 125C, 1.0V, 1.8V, 3.3V | 1000 HRS | 25 | 0 | |
| HIGH TEMP OP LIFE | 0950 | MAX72018B | GX106424AA 125C, 1.0V, 1.8V, 3.3V | 1000 HRS | 21 | 0 | |
| HIGH TEMP OP LIFE | 0951 | MAX72463 | EX102431LC 125C, 1.8V (PS1) & 3.3V (PS2) | 1000 HRS | 44 | 0 | |
| HIGH TEMP OP LIFE | 1004 | MAX72463 | EX102431LC 125C, 1.8V (PS1) & 3.3V (PS2) | 1000 HRS | 43 | 0 | |
| HIGH TEMP OP LIFE | 1006 | MAX72018B | EX102823AD 125C, 1.0V, 1.8V, 3.3V | 1000 HRS | 24 | 0 | |
| HIGH TEMP OP LIFE | 1013 | MAX72018C | EX103085AA 125C, 1.0V, 1.8V, 3.3V | 1000 HRS | 74 | 0 | |
| HIGH TEMP OP LIFE | 1015 | MAX72463 | EX103192AA 125C, 1.8V (PS1) & 3.3V (PS2) | 1000 HRS | 44 | 0 | |
| HIGH TEMP OP LIFE | 1051 | MAX72463 | EX113192AE 125C, 1.8V (PS1) & 3.3V (PS2) | 1000 HRS | 42 | 0 | |
| HIGH TEMP OP LIFE | 1103 | MAX72463 | EX113654JA 125C, 1.8V (PS1) & 3.3V (PS2) | 1000 HRS | 42 | 0 | |
| HIGH TEMP OP LIFE | 1104 | MAX72463 | EX113654JC 125C, 1.8V (PS1) & 3.3V (PS2) | 1000 HRS | 42 | 0 | |
| HIGH TEMP OP LIFE | 1109 | MAX72018C | EX114489AH 125C, 1.0V, 1.8V, 3.3V | 1000 HRS | 22 | 0 | |
| HIGH TEMP OP LIFE | 1112 | MAX72018C | EX114489AB 125C, 1.0V, 1.8V, 3.3V | 1000 HRS | 24 | 0 | |
| HIGH TEMP OP LIFE | 1119 | MAX72018C | EX111726CB 125C, 1.0V, 1.8V, 3.3V | 1000 HRS | 24 | 0 | |
| HIGH TEMP OP LIFE | 1132 | MAX72463 | EX128832AB 125C, 1.8V (PS1) & 3.3V (PS2) | 1000 HRS | 77 | 0 | |
| | | | | Total: | | 0 | |

FAILURE RATE: MTTF (YRS): 64392 FITS: 1.8
DEVICE HOURS: 516855579 FAILS: 0