

PRODUCT RELIABILITY REPORT FOR

78M6631

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:

78M6631

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:

MTTF = 1/Fr

NOTE: MTTF is frequently used interchangeably with MTBF.

The calculated failure rate for this device/process is:

FAILURE RATE: MTTF (YRS): 226874 FITS: 0.5

DEVICE HOURS: 1821051974 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: 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 and may contain some generic data. **Bold** Product Number denotes specific product data.

Device Information:

Process: TSMC 0.25um, Mixed signal, Embedded flash, General Purpose, Double

poly Quad metal, 2.5V/3.3V

Passivation: SiO/SiN = 1000nm/700nm

Die Size: 157 x 148 Number of Transistors: 1620549

Interconnect: Aluminum / 0.5% Copper

Gate Oxide Thickness: 70 Å

ESD HBM									
DESCRIPTION	DATE CODE/PRODUCT/LOT			CONDITION	READPOIN		QTY FAILS		FA#
ESD SENSITIVITY	1118	78M6631	GW110677A	JESD22-A114 HBM 500 VOLTS	3	PUL'S	5	0	
ESD SENSITIVITY	1118	78M6631	GW110677A	JESD22-A114 HBM 1000 VOLTS	3	PUL'S	5	0	
ESD SENSITIVITY	1118	78M6631	GW110677A	JESD22-A114 HBM 1500 VOLTS	3	PUL'S	5	0	
ESD SENSITIVITY	1118	78M6631	GW110677A	JESD22-A114 HBM 2000 VOLTS	3	PUL'S	5	0	
ESD SENSITIVITY	1118	78M6631	GW110677A	JESD22-A114 HBM 2500 VOLTS	3	PUL'S	5	0	
ESD SENSITIVITY	1118	78M6631	GW110677A	JESD22-A114 HBM 3000 VOLTS	3	PUL'S	5	0	
ESD SENSITIVITY	1118	78M6631	GW110677A	JESD22-A114 HBM 3500 VOLTS	3	PUL'S	5	0	
ESD SENSITIVITY	1118	78M6631	GW110677A	JESD22-A114 HBM 4000 VOLTS	3	PUL'S	5	0	
					Total	:		0	

ESD MM								
DESCRIPTION	DATE CODE/PRODUCT	/LOT	CONDITION	REA	DPOIN	QTY	FAILS	FA#
ESD SENSITIVITY	1118 78M6631	GW110677A	JESD22-A115 MM 200 VOLTS	3	PUL'S	5	0	

CCD CENICITIVITY	4440	70140004	C) \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	IECDOO AAAE MAA OEO	2	DIIIIC	_	_	N = E A
ESD SENSITIVITY	1118	78M6631	GW110677A	JESD22-A115 MM 250 VOLTS	3	PUL'S	5	5	No FA
ESD SENSITIVITY	1118	78M6631	GW110677A	JESD22-A115 MM 300 VOLTS	3	PUL'S	5	5	No FA
					Total			10	
LATCH-UP									
DESCRIPTION	DATE CODE/PRODUCT/LOT			CONDITION	REAL	POIN	QTY	FAILS	FA#
LATCH-UP I	1118	78M6631	GW110677A	JESD78A, I-TEST 25C 100mA			6	0	
LATCH-UP I	1118	78M6631	GW110677A	JESD78A, I-TEST 25C 250mA			6	0	
LATCH-UP V	1118	78M6631	GW110677A	JESD78A, V-SUPPLY TEST 25C			6	0	
					Total	;		0	
OPERATING LIFE									
OI ENATING EILE									
DESCRIPTION	DATE	CODE/PRODUCT	/LOT	CONDITION	REAL	POIN	QTY	FAILS	FA#
	DATE 0222	CODE/PRODUCT 78M6613	7/LOT 26728	CONDITION 125C, 3.6 VOLTS		DPOIN HRS	QTY 76	FAILS	FA#
DESCRIPTION									FA#
DESCRIPTION HIGH TEMP OP LIFE	0222	78M6613	26728 26803	125C, 3.6 VOLTS	1000	HRS	76	0	FA#
DESCRIPTION HIGH TEMP OP LIFE HIGH TEMP OP LIFE	0222 1026	78M6613 71M6103	26728 26803	125C, 3.6 VOLTS 125C, 3.3 VOLTS	1000 500	HRS HRS	76 200	0	FA#
DESCRIPTION HIGH TEMP OP LIFE HIGH TEMP OP LIFE HIGH TEMP OP LIFE	0222 1026 1042	78M6613 71M6103 71M6543	26728 26803 QB112428AE 445AN	125C, 3.6 VOLTS 125C, 3.3 VOLTS 125C, 3.3 VOLTS	1000 500 500 192	HRS HRS HRS	76 200 100	0 0	FA#
DESCRIPTION HIGH TEMP OP LIFE HIGH TEMP OP LIFE HIGH TEMP OP LIFE HIGH TEMP OP LIFE	0222 1026 1042 1052	78M6613 71M6103 71M6543 71M6543G	26728 26803 QB112428AE 445AN	125C, 3.6 VOLTS 125C, 3.3 VOLTS 125C, 3.3 VOLTS 125C, 3.6 VOLTS	1000 500 500 192	HRS HRS HRS HRS	76 200 100 77	0 0 0 0	FA#
DESCRIPTION HIGH TEMP OP LIFE HIGH TEMP OP LIFE HIGH TEMP OP LIFE HIGH TEMP OP LIFE	0222 1026 1042 1052	78M6613 71M6103 71M6543 71M6543G	26728 26803 QB112428AE 445AN GW110677A	125C, 3.6 VOLTS 125C, 3.3 VOLTS 125C, 3.3 VOLTS 125C, 3.6 VOLTS 125C, 5.0 VOLTS	1000 500 500 192 1000	HRS HRS HRS HRS	76 200 100 77	0 0 0 0 0	FA#