9/12/2013

PRODUCT RELIABILITY REPORT
FOR

MAX31740

Maxim Integrated

14460 Maxim Dr.
Dallas, TX 75244

Approved by:

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Manager, Reliability Engineering

Conclusion:

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

MAX31740

In addition, Maxim Integrated'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.maximintegrated.com/qa/reliability/monitor.

Device Description:

A description of this device can be found in the product data sheet. You can find the product data sheet at http://www.maximintegrated.com/search/parts.mvp.

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):**	**21159**	**FITS:**	**5.4**
	DEVICE HOURS:	**169834216**	**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:	Maxim X3 Fab, S18, 3V & 5V CMOS, 4 metals
Passivation:	SiN / SiO2
Die Size:	46 x 37
Number of Transistors:	7133
Interconnect:	Aluminum / 0.5% Copper
Gate Oxide Thickness:	140Å

ESD HBM

DESCRIPTION	DATE CODE/PRODUCT/LOT			CONDITION	READPOIN		QTY	FAILS	FA#
ESD SENSITIVITY	1311	**MAX31740**	XJ332800AB	JESD22-A114 HBM 500 VOLTS	1	PUL'S	5	0	
ESD SENSITIVITY	1311	**MAX31740**	XJ332800AB	JESD22-A114 HBM 1000 VOLTS	1	PUL'S	5	0	
ESD SENSITIVITY	1311	**MAX31740**	XJ332800AB	JESD22-A114 HBM 1500 VOLTS	1	PUL'S	5	0	
ESD SENSITIVITY	1311	**MAX31740**	XJ332800AB	JESD22-A114 HBM 2000 VOLTS	1	PUL'S	5	0	
ESD SENSITIVITY	1311	**MAX31740**	XJ332800AB	JESD22-A114 HBM 2500 VOLTS	1	PUL'S	5	0	
					Total:			**0**	

LATCH-UP

DESCRIPTION	DATE CODE/PRODUCT/LOT			CONDITION	READPOIN	QTY	FAILS	FA#
LATCH-UP I	1311	**MAX31740**	XJ332800AB	JESD78A, I-TEST 25C 100mA		6	0	
LATCH-UP I	1311	**MAX31740**	XJ332800AB	JESD78A, I-TEST 25C 250mA		6	0	
LATCH-UP V	1311	**MAX31740**	XJ332800AB	JESD78A, V-SUPPLY TEST 25C		6	0	
					Total:		**0**	

OPERATING LIFE

DESCRIPTION	DATE CODE/PRODUCT/LOT			CONDITION	READPOIN		QTY	FAILS	FA#
HIGH TEMP OP LIFE	1003	MAX17042	QJ000200DA	125C, 5.5 VOLTS	192	HRS	45	0	
HIGH TEMP OP LIFE	1018	DS28E10	QH000900A	125C, 3.6 VOLTS	192	HRS	45	0	
HIGH TEMP OP LIFE	1134	MAX17048	ZJ213800AB	125C, 5.0 VOLTS	192	HRS	77	0	
HIGH TEMP OP LIFE	1240	MAX31790	ZX330900AB	125C, 5.5 VOLTS	192	HRS	80	0	
HIGH TEMP OP LIFE	1302	MAX17048	ZJ386023AB	125C, 5.0 VOLTS	192	HRS	77	0	
HIGH TEMP OP LIFE	1311	**MAX31740**	XJ332800AB	125C, 5.5 VOLTS	192	HRS	80	0	
HIGH TEMP OP LIFE	1312	MAX31790	ZX330900AC	125C, 5.5 VOLTS	1000	HRS	80	0	
HIGH TEMP OP LIFE	1319	DS2484	ZJ332803AD	125C, 5.25 VOLTS	500	HRS	45	0	
					Total:			**0**	

FAILURE RATE: **MTTF (YRS):** **21159** **FITS:** **5.4**

DEVICE HOURS: **169834216** **FAILS:** **0**

Cumulative monitor data for the S18 Process results in a FIT Rate of 0.05 @ 25C and 0.93 @ 55C (0.8 eV, 60% UCL).