2/20/2013

PRODUCT RELIABILITY REPORT
FOR

MAX17042

Maxim Integrated

14460 Maxim Dr.
Dallas, TX 75244

Approved by:

Don Lipps
Manager, Reliability Engineering

Conclusion:

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

MAX17042

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):**	**3768**	**FITS:**	**30.3**
	DEVICE HOURS:	**30241710**	**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 & SA Fabs S18C 3V & 5V CMOS, 4 metals
Passivation:	SiN / SiO2
Die Size:	59 x 59
Number of Transistors:	150045
Interconnect:	Aluminum / 0.5% Copper
Gate Oxide Thickness:	140Å

ESD CDM

DESCRIPTION	DATE CODE/PRODUCT/LOT			CONDITION	READPOIN		QTY	FAILS	FA#
ESD SENSITIVITY	1051	**MAX17042**	XJ111300AC	JESD22-C101 CDM 250 VOLTS	3	PUL'S	5	0	
ESD SENSITIVITY	1051	**MAX17042**	XJ111300AC	JESD22-C101 CDM 500 VOLTS	3	PUL'S	5	0	
ESD SENSITIVITY	1051	**MAX17042**	XJ111300AC	JESD22-C101 CDM 750 VOLTS	3	PUL'S	5	0	
					Total:			**0**	

ESD HBM

DESCRIPTION	DATE CODE/PRODUCT/LOT			CONDITION	READPOIN		QTY	FAILS	FA#
ESD SENSITIVITY	1247	**MAX17042**	ZX384937AL	JESD22-A114 HBM 500 VOLTS	1	PUL'S	5	0	
ESD SENSITIVITY	1247	**MAX17042**	ZX384937AL	JESD22-A114 HBM 1000 VOLTS	1	PUL'S	5	0	
ESD SENSITIVITY	1247	**MAX17042**	ZX384937AL	JESD22-A114 HBM 1500 VOLTS	1	PUL'S	5	0	
ESD SENSITIVITY	1247	**MAX17042**	ZX384937AL	JESD22-A114 HBM 2000 VOLTS	1	PUL'S	5	0	
ESD SENSITIVITY	1247	**MAX17042**	ZX384937AL	JESD22-A114 HBM 2500 VOLTS	1	PUL'S	5	0	
ESD SENSITIVITY	1247	**MAX17042**	ZX384937AL	JESD22-A114 HBM 3000 VOLTS	1	PUL'S	5	0	

ESD SENSITIVITY	1247	**MAX17042**	ZX384937AL	JESD22-A114 HBM 3500 VOLTS	1	PUL'S	5	0
ESD SENSITIVITY	1247	**MAX17042**	ZX384937AL	JESD22-A114 HBM 4000 VOLTS	1	PUL'S	5	0
					Total:			**0**

ESD MM

DESCRIPTION	DATE CODE	PRODUCT	LOT	CONDITION	READPOIN		QTY	FAILS	FA#
ESD SENSITIVITY	1247	**MAX17042**	ZX384937AL	JESD22-A115 MM 50 VOLTS	1	PUL'S	5	0	
ESD SENSITIVITY	1247	**MAX17042**	ZX384937AL	JESD22-A115 MM 100 VOLTS	1	PUL'S	5	0	
ESD SENSITIVITY	1247	**MAX17042**	ZX384937AL	JESD22-A115 MM 150 VOLTS	1	PUL'S	5	0	
ESD SENSITIVITY	1247	**MAX17042**	ZX384937AL	JESD22-A115 MM 200 VOLTS	1	PUL'S	5	0	
ESD SENSITIVITY	1247	**MAX17042**	ZX384937AL	JESD22-A115 MM 250 VOLTS	1	PUL'S	5	0	
					Total:			**0**	

LATCH-UP

DESCRIPTION	DATE CODE	PRODUCT	LOT	CONDITION	READPOIN	QTY	FAILS	FA#
LATCH-UP I	1247	**MAX17042**	ZX384937AL	JESD78A, I-TEST 25C 100mA		6	0	
LATCH-UP I	1247	**MAX17042**	ZX384937AL	JESD78A, I-TEST 25C 250mA		6	0	
LATCH-UP V	1247	**MAX17042**	ZX384937AL	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	
					Total:			**0**	

FAILURE RATE: MTTF (YRS): 3768 FITS: 30.3

DEVICE HOURS: 30241710 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).
MAX17042, MAX17047, MAX17050 and MAX17051 are built with the identical die.