2/20/2013



PRODUCT RELIABILITY REPORT FOR

MAX17050

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:

MAX17050

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
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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	on:								
Process:		Maxim X3	3 & SA Fabs	S18C 3V & 5V CMOS	S, 4 m	netals			
Passivation:		SiN / SiO	2						
Die Size:		59 x 59							
Number of Trans	sistors:								
Interconnect:			n / 0.5% Cop	per					
Gate Oxide Thic	kness:	140Å							
ESD CDM									
DESCRIPTION	DATE	CODE/PRODUCT	r/LOT	CONDITION	REA	DPOIN	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	
					Tota	l:		0	
ESD HBM					Tota	:		0	
ESD HBM DESCRIPTION	DATE	CODE/PRODUCT	T/LOT	CONDITION		DPOIN	QTY	0 FAILS	FA#
-	DATE 1247	CODE/PRODUCT MAX17042		CONDITION JESD22-A114 HBM 500 VOLTS			QTY 5	-	FA#
DESCRIPTION			ZX384937AL	JESD22-A114 HBM 500	REA	DPOIN		FAILS	FA#
DESCRIPTION ESD SENSITIVITY	1247	MAX17042	ZX384937AL ZX384937AL	JESD22-A114 HBM 500 VOLTS JESD22-A114 HBM 1000	REA 1	dpoin Pul's	5	FAILS 0	FA#
DESCRIPTION ESD SENSITIVITY ESD SENSITIVITY	1247 1247	MAX17042 MAX17042	ZX384937AL ZX384937AL ZX384937AL	JESD22-A114 HBM 500 VOLTS JESD22-A114 HBM 1000 VOLTS JESD22-A114 HBM 1500	REA 1	dpoin Pul's Pul's	5	FAILS 0 0	FA#
DESCRIPTION ESD SENSITIVITY ESD SENSITIVITY ESD SENSITIVITY	1247 1247 1247	MAX17042 MAX17042 MAX17042	ZX384937AL ZX384937AL ZX384937AL ZX384937AL	JESD22-A114 HBM 500 VOLTS JESD22-A114 HBM 1000 VOLTS JESD22-A114 HBM 1500 VOLTS JESD22-A114 HBM 2000	REA 1 1	DPOIN PUL'S PUL'S PUL'S	5 5 5	FAILS 0 0 0 0	FA#

DESCRIPTION	DATE	CODE/PRODUCT	/LOT	CONDITION	REA	DPOIN	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									
LATCH-UP DESCRIPTION	DATE	CODE/PRODUCT	/LOT	CONDITION	REA	DPOIN	QTY	FAILS	FA#
_	DATE 1247	CODE/PRODUCT		CONDITION JESD78A, I-TEST 25C 100mA	REAI	DPOIN	QTY 6	FAILS 0	FA#
DESCRIPTION			ZX384937AL	JESD78A, I-TEST 25C	REAI	DPOIN		-	FA#
DESCRIPTION LATCH-UP I	1247	MAX17042	ZX384937AL ZX384937AL	JESD78A, I-TEST 25C 100mA JESD78A, I-TEST 25C	REAI	DPOIN	6	0	FA#
DESCRIPTION LATCH-UP I LATCH-UP I	1247 1247	MAX17042 MAX17042	ZX384937AL ZX384937AL	JESD78A, I-TEST 25C 100mA JESD78A, I-TEST 25C 250mA JESD78A, V-SUPPLY	REAI		6	0	FA#
DESCRIPTION LATCH-UP I LATCH-UP I	1247 1247	MAX17042 MAX17042	ZX384937AL ZX384937AL	JESD78A, I-TEST 25C 100mA JESD78A, I-TEST 25C 250mA JESD78A, V-SUPPLY			6	0 0 0	FA#
DESCRIPTION LATCH-UP I LATCH-UP I LATCH-UP V	1247 1247 1247	MAX17042 MAX17042	ZX384937AL ZX384937AL ZX384937AL	JESD78A, I-TEST 25C 100mA JESD78A, I-TEST 25C 250mA JESD78A, V-SUPPLY	Total		6 6	0 0 0	FA#
DESCRIPTION LATCH-UP I LATCH-UP V DPERATING LIFE	1247 1247 1247	MAX17042 MAX17042 MAX17042	ZX384937AL ZX384937AL ZX384937AL	JESD78A, I-TEST 25C 100mA JESD78A, I-TEST 25C 250mA JESD78A, V-SUPPLY TEST 25C	Total	:	6 6	0 0 0 0	
DESCRIPTION LATCH-UP I LATCH-UP V LATCH-UP V OPERATING LIFE DESCRIPTION	1247 1247 1247 DATE	MAX17042 MAX17042 MAX17042 CODE/PRODUCT	ZX384937AL ZX384937AL ZX384937AL /LOT QJ000200DA	JESD78A, I-TEST 25C 100mA JESD78A, I-TEST 25C 250mA JESD78A, V-SUPPLY TEST 25C	Total	: DPOIN	6 6 6 QTY	0 0 0 0 FAILS	
DESCRIPTION LATCH-UP I LATCH-UP I LATCH-UP V OPERATING LIFE DESCRIPTION HIGH TEMP OP LIFE	1247 1247 1247 DATE 1003	MAX17042 MAX17042 MAX17042 CODE/PRODUCT MAX17042	ZX384937AL ZX384937AL ZX384937AL ZX384937AL QJ000200DA QH000900A	JESD78A, I-TEST 25C 100mA JESD78A, I-TEST 25C 250mA JESD78A, V-SUPPLY TEST 25C CONDITION 125C, 5.5 VOLTS	Total REAI 192	: DPOIN HRS	6 6 6 QTY 45	0 0 0 5 6	
DESCRIPTION LATCH-UP I LATCH-UP V ATCH-UP V OPERATING LIFE DESCRIPTION HIGH TEMP OP LIFE HIGH TEMP OP LIFE	1247 1247 1247 DATE 1003 1018	MAX17042 MAX17042 MAX17042 CODE/PRODUCT MAX17042 DS28E10	ZX384937AL ZX384937AL ZX384937AL QJ000200DA QH000900A ZJ213800AB	JESD78A, I-TEST 25C 100mA JESD78A, I-TEST 25C 250mA JESD78A, V-SUPPLY TEST 25C CONDITION 125C, 5.5 VOLTS 125C, 3.6 VOLTS	Total REAI 192 192	: DPOIN HRS HRS HRS :	6 6 6 QTY 45 45	0 0 0 5 FAILS 0 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.