



# Exar Quarterly Quality and Reliability Report

---

November 2011

## Report Contents:

---

<b>Outgoing Quality (PPM) Data .....</b>	<b>4</b>
<i>Quarterly QC Electrical PPM Report .....</i>	5
<b>SPC – Cpk Trends .....</b>	<b>6</b>
<i>SPC – Cpk Trends - Assembly .....</i>	7
Unisem, Indonesia – LQFP .....	7
Unisem, Indonesia – PDIP .....	8
Unisem, Indonesia – PLCC .....	9
Unisem, Indonesia – SOIC .....	10
Unisem, Ipoh – 8L NSOIC .....	11
Unisem, Ipoh – 8L PDIP .....	12
Unisem, Ipoh – SOT223 .....	13
Unisem, Ipoh – SOT23 .....	14
Unisem, Ipoh – MSOP .....	15
Unisem, Ipoh – TSSOP .....	16
Carsem M - SOICW .....	17
Carsem M – TO220 .....	18
Carsem M – TO263 .....	19
Carsem M – SOT23 .....	20
Carsem M – SC70 .....	21
Carsem M – SSOP .....	22
Carsem M – TSSOP .....	23
Carsem S – QFP .....	24
<i>SPC – Cpk Trends – Assembly.....</i>	25
UTAC, China – BGA .....	25
<i>SPC – Cpk Trends – Assembly.....</i>	26
UTAC, China – QFP .....	26
<i>SPC – Cpk Trends - Assembly .....</i>	27
UTAC, China – LPCC .....	27
<b>Reliability.....</b>	<b>28</b>
GLOBALFOUNDRIES, Singapore – 0.35 $\mu$ CMOS .....	29
GLOBALFOUNDRIES, Singapore – 0.6 $\mu$ CMOS .....	30
Episil, Taiwan – 1.2 $\mu$ CMOS.....	31
Silan, China – 2 $\mu$ CMOS .....	32
Silan, China – 5 $\mu$ CMOS .....	33
Silan, China – Bipolar.....	34
<i>Die Stress Data .....</i>	35
GLOBALFOUNDRIES, Singapore – 0.35 $\mu$ CMOS .....	35

<u>GLOBALFOUNDRIES</u> , Singapore – 0.18 $\mu$ CMOS .....	36
<u>GLOBALFOUNDRIES</u> , Singapore – 0.6 $\mu$ CMOS .....	37
<i>Die Stress Data</i> .....	38
Episil, Taiwan – 2 $\mu$ CMOS .....	38
<i>Die Stress Data</i> .....	39
Silan, China – 2 $\mu$ CMOS .....	39
<i>Die Stress Data</i> .....	40
Silan, China – 5 $\mu$ CMOS .....	40
<i>Die Stress Data</i> .....	41
Silan, China –Bipolar .....	41
<i>Package Stress Data</i> .....	42
BGA Families .....	42
PDIP .....	43
PLCC .....	44
T/S/LQFP .....	45
TO .....	46
SOT, TSOT, SC-70 .....	47
MSOP, TSSOP, SSOP, SOIC .....	48
QFN, DFN .....	49

## Outgoing Quality (PPM) Data

---

The outgoing quality data are the results of electrical and visual/mechanical inspection on samples of all Exar's products. The results are measured in parts per million (PPM).

## Quarterly QC Electrical PPM Report

---

**Quarter:** July 1, 2011 to September 30, 2011

**Devices:** Exar Products

**Summary:** All data is first submission data

<b>Total number of lots inspected:</b>	4406
<b>Total number of lots accepted:</b>	4404
<b>Total number of QC samples inspected:</b>	1,329,644
<b>Total number fail in QC samples:</b>	2
<b>Process average PPM:</b> = $\Sigma r / \Sigma n \times 10^6$ = $2 / 1,329,644 \times 10^6$ r = Total number fail in QC samples n = Total number of QC samples inspected	1.5 PPM

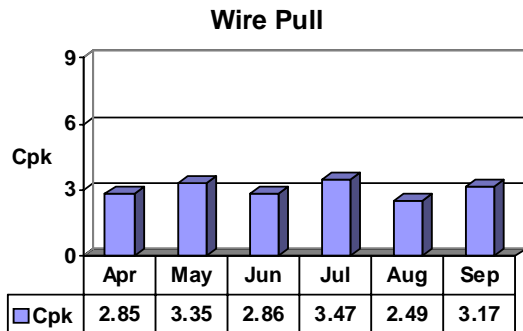
## SPC – Cpk Trends

---

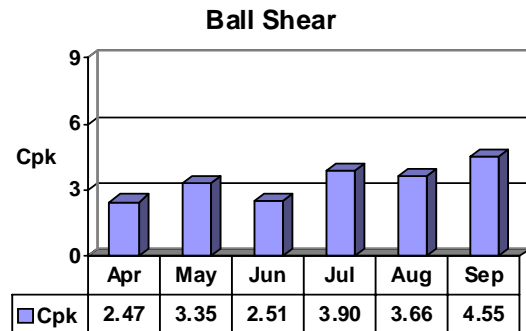
Data on Cpk and Cpk trends for critical processes of Exar's assembly subcontractors and foundry fabs are reported in order to assure our customers that our suppliers have an on-going SPC plan to control and continually improve their critical processes. This also serves as an early warning system which keeps processes from becoming marginal.

Unisem, Indonesia SPC Program: 2011

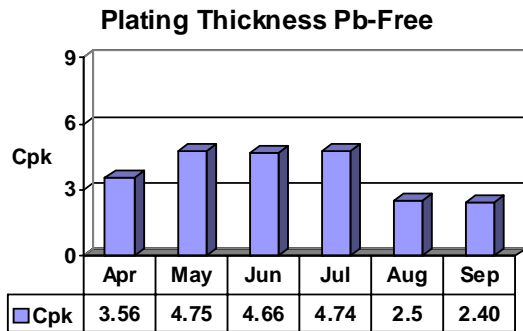
Package Technology: LQFP



LSL = 6 gms

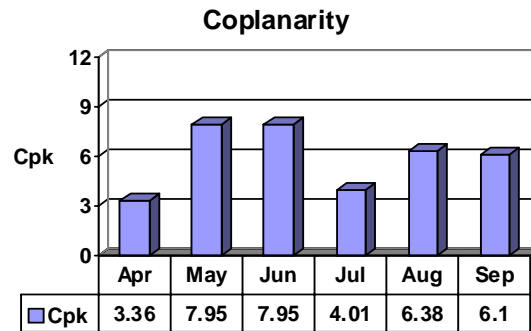


LSL = 12 gms



LSL = 400µin

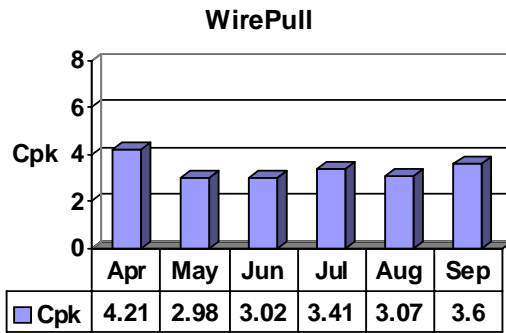
USL = 800µin



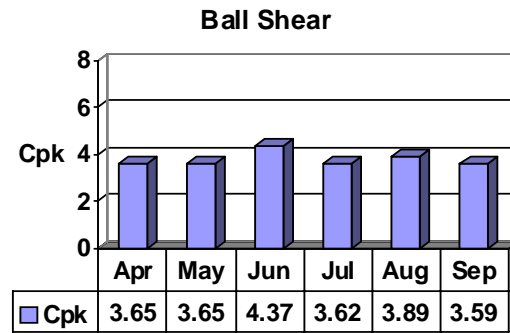
USL = 2.0 mils

Unisem, Indonesia SPC Program: 2011

Package Technology: PDIP



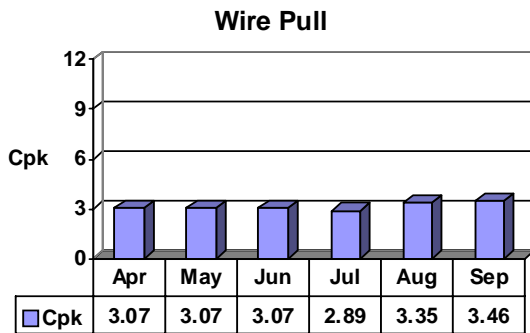
LSL = 6 gms



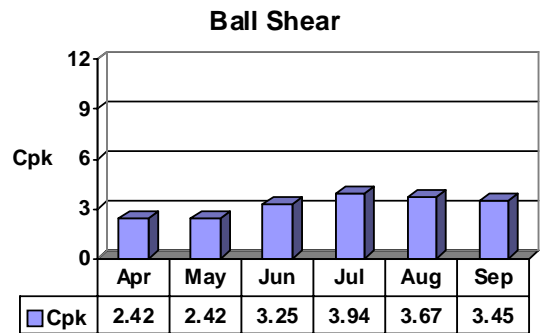
LSL = 12 gms

Unisem, Indonesia SPC Program: 2011

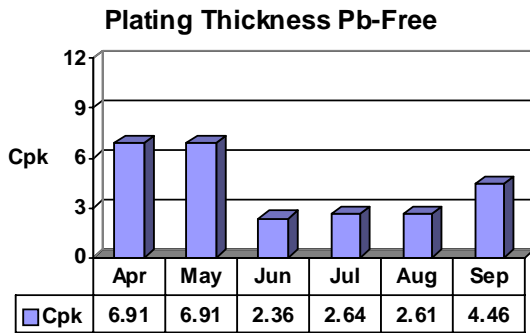
Package Technology: PLCC



LSL = 6 gms

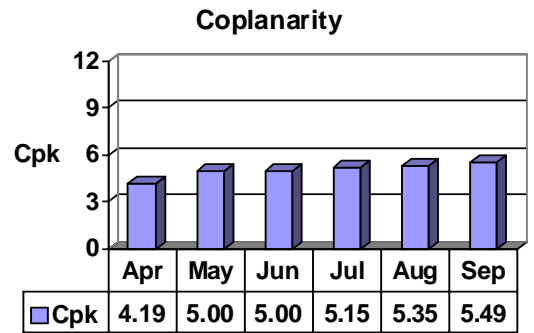


LSL = 12 gms



LSL = 400 $\mu$ in

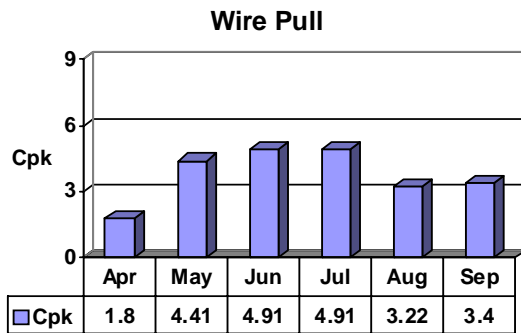
USL = 800 $\mu$ in



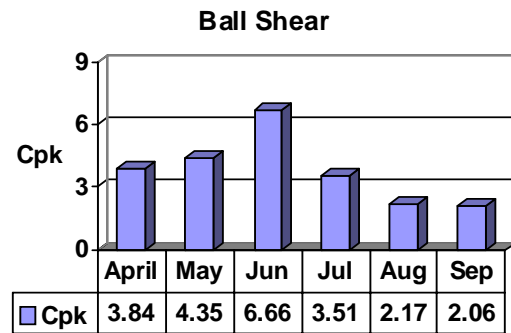
USL = 3.0 mils

Unisem, Indonesia SPC Program: 2011

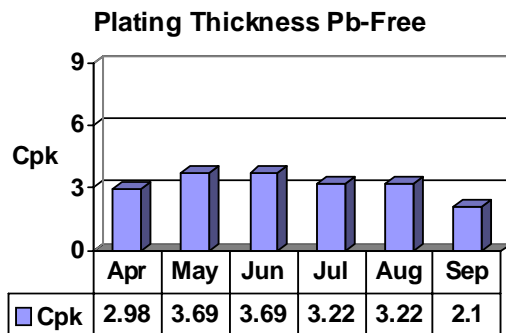
Package Technology: SOIC



LSL = 6 gms



LSL = 15 gms



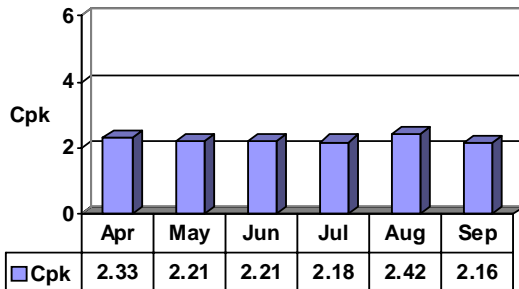
LSL = 400µin

USL = 800µin

Unisem, Ipoh SPC Program: 2011

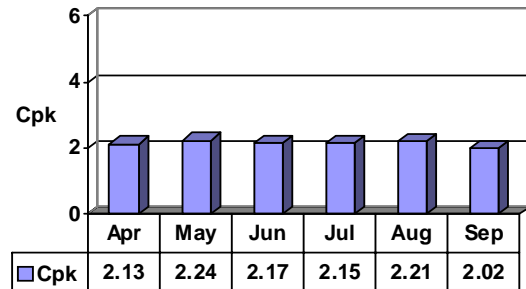
Package Technology: NSOIC

Wire Pull



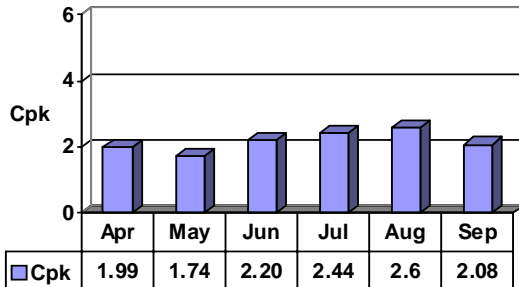
LSL = 6 gms

Ball Shear



LSL = 20 gms

Plating Thickness Pb-Free

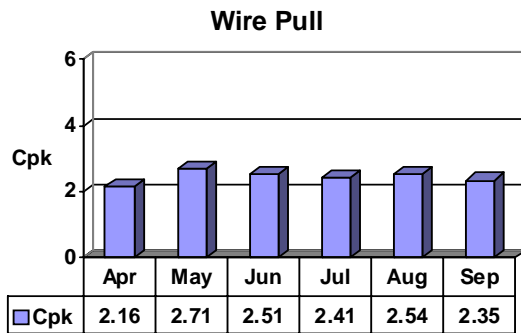


LSL = 400µin

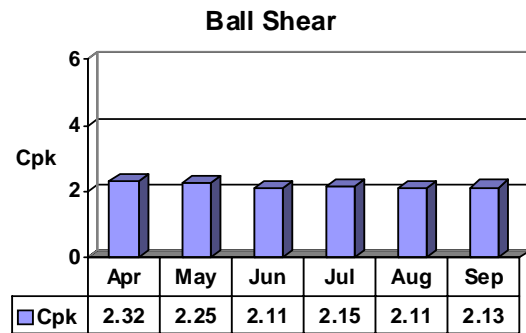
USL = 800µin

Unisem, Ipoh SPC Program: 2011

Package Technology: PDIP



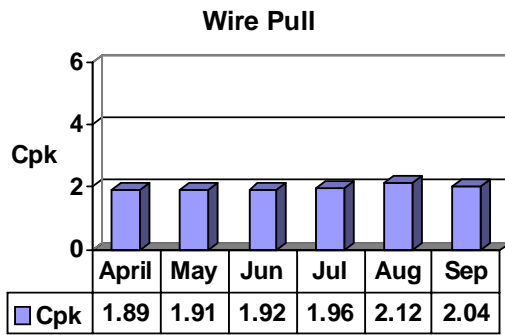
LSL = 6 gms



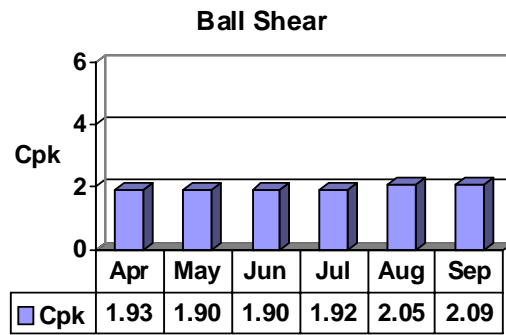
LSL = 20 gms

Unisem, Ipoh SPC Program: 2011

Package Technology: SOT223



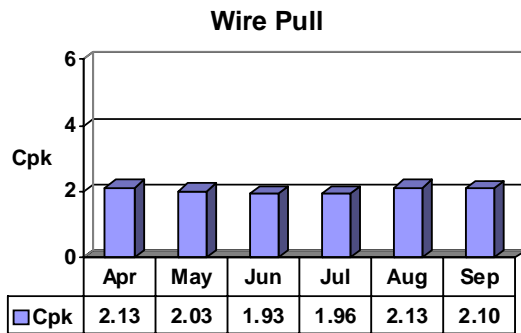
LSL = 6 gms



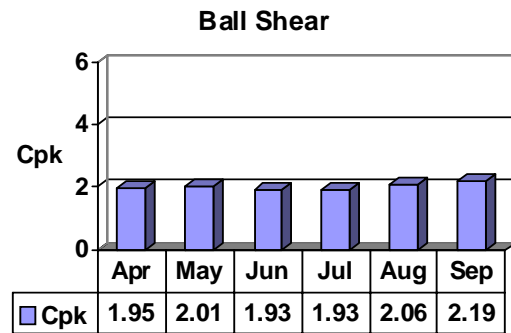
LSL = 20 gms

Unisem, Ipoh SPC Program: 2011

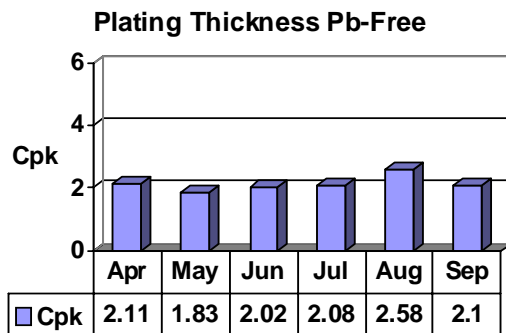
Package Technology: SOT23



LSL = 6 gms



LSL = 20 gms

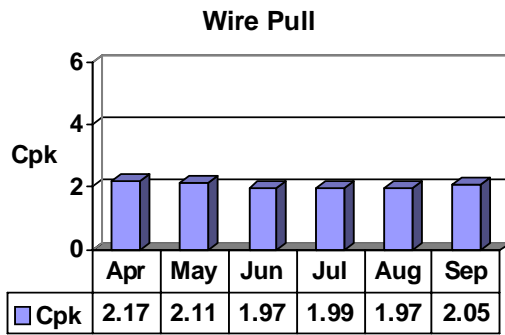


LSL 400µin

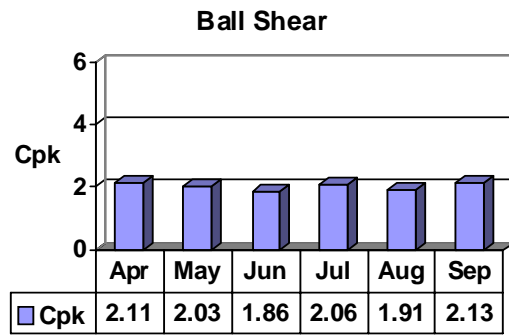
USL = 800µin

Unisem, Ipoh SPC Program: 2011

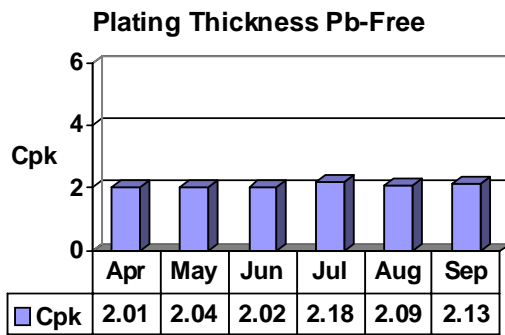
Package Technology: MSOP



LSL = 6 gms



LSL = 20 gms

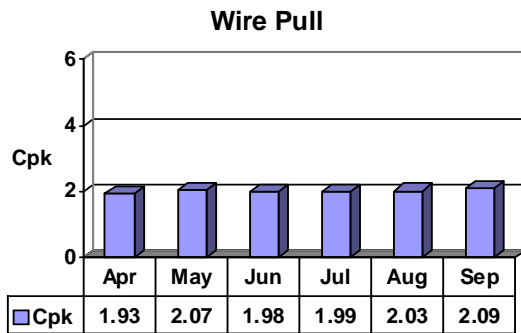


LSL = 400µin

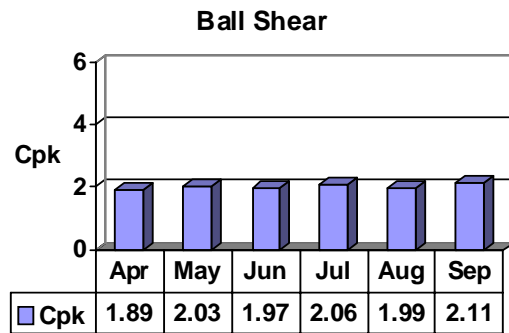
USL = 800µin

Unisem, Ipoh SPC Program: 2011

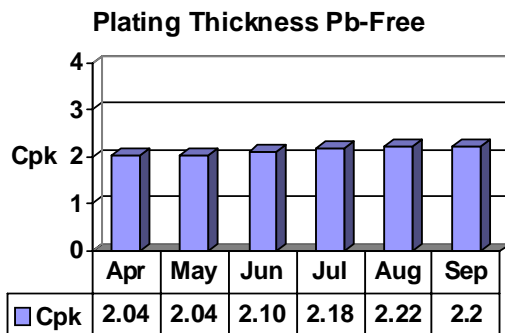
Package Technology: TSSOP



LSL = 6 gms



LSL = 20 gms

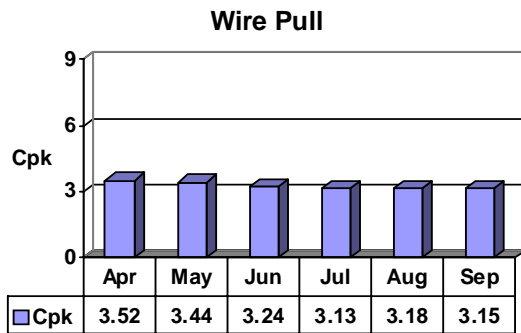


LSL = 400µin

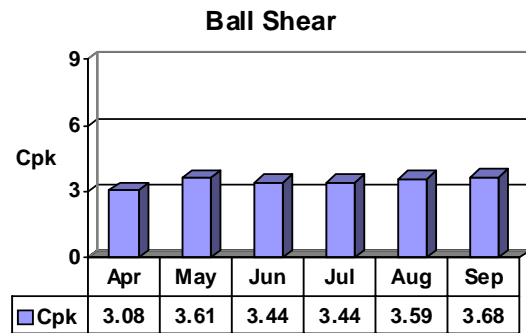
USL = 800µin

Carsem M, Malaysia Program: 2011

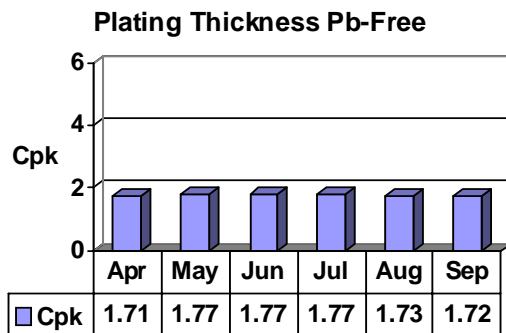
Package Technology: SOICW



LSL = 6 gms

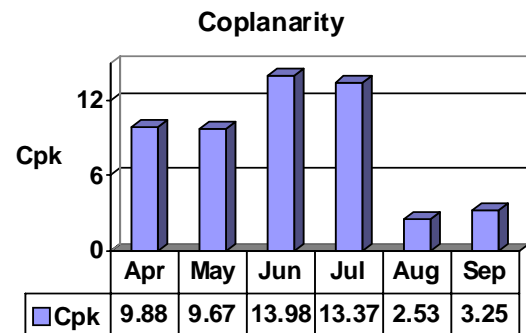


LSL = 20 gms



LSL = 400µin

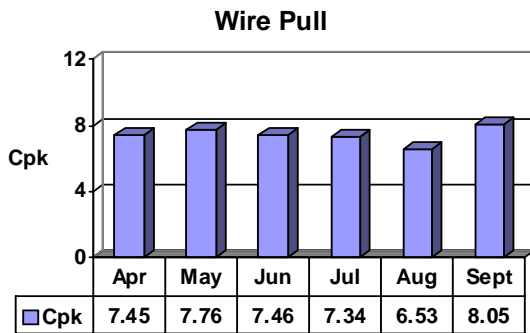
USL = 800µin



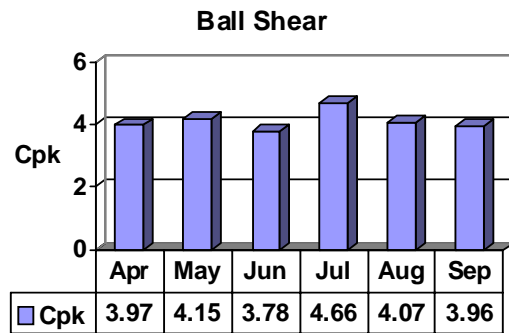
USL = 1.3 mils

Carsem M, Malaysia Program: 2011

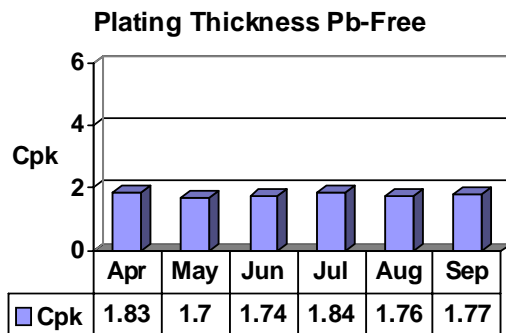
Package Technology: TO220



LSL = 6 gms



LSL = 20 gms

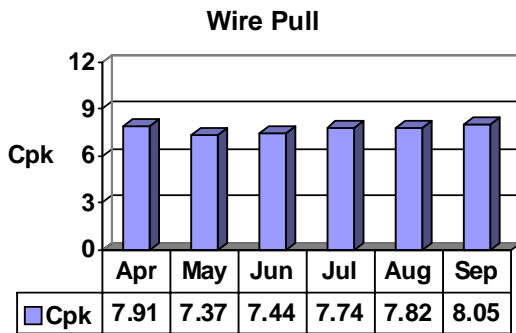


LSL = 400µin

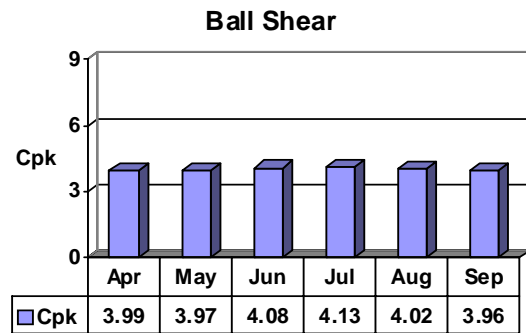
USL = 800µin

Carsem M, Malaysia Program: 2011

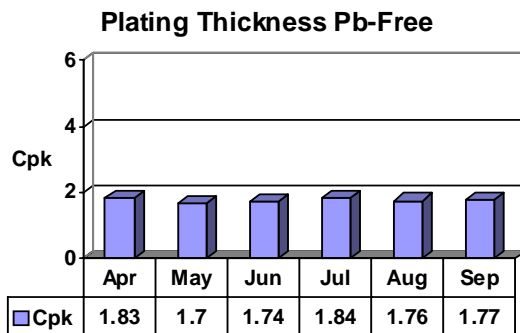
Package Technology: TO263



LSL = 6 gms

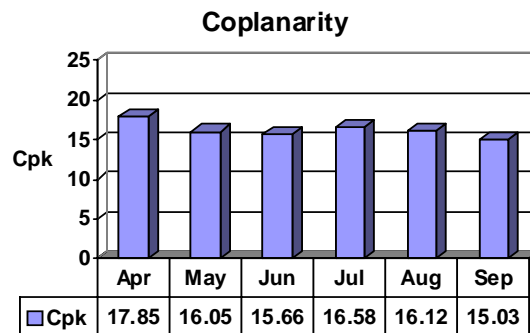


LSL = 20 gms



LSL = 400µin

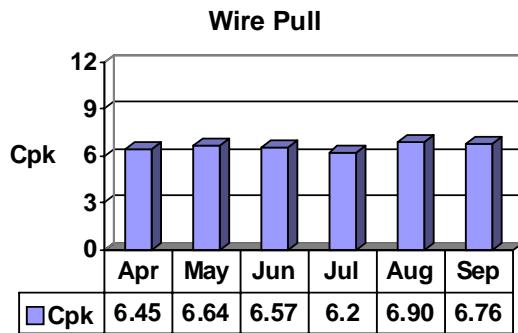
USL = 800µin



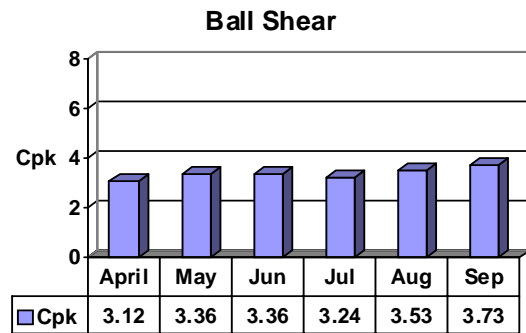
USL = 3.0 mils

Carsem M, Malaysia Program: 2011

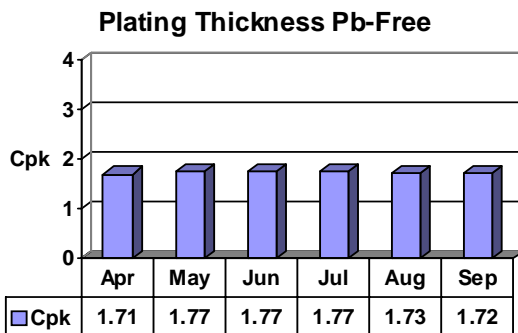
Package Technology: SOT23



LSL = 3 gms



LSL = 20 gms

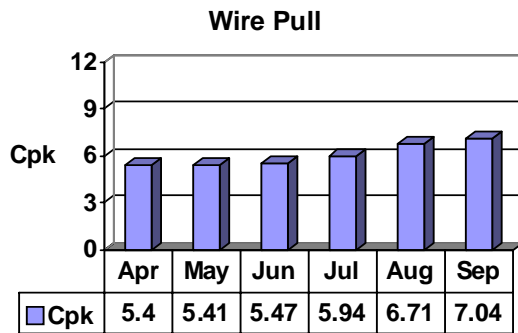


LSL = 400µin

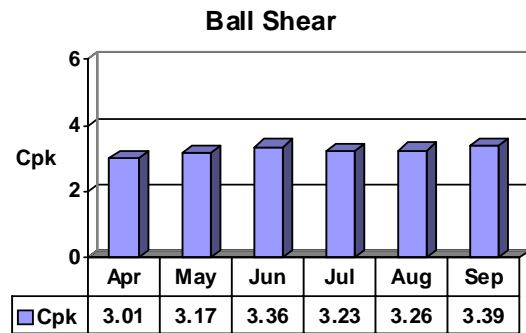
USL = 800µin

Carsem M, Malaysia Program: 2011

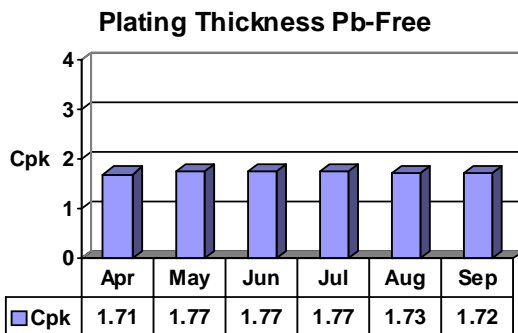
Package Technology: SC70



LSL = 3 gms



LSL = 20 gms

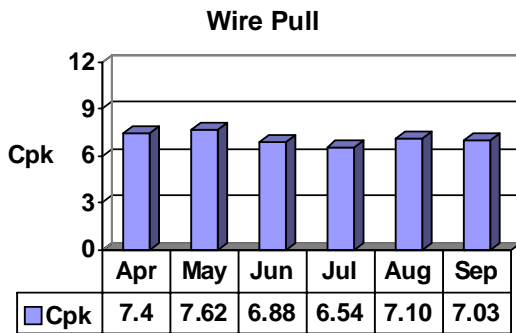


LSL = 400µin

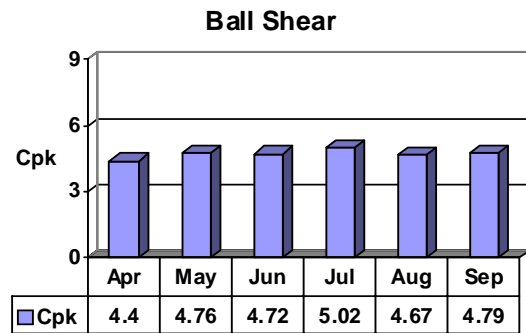
USL = 800µin

Carsem M, Malaysia Program: 2011

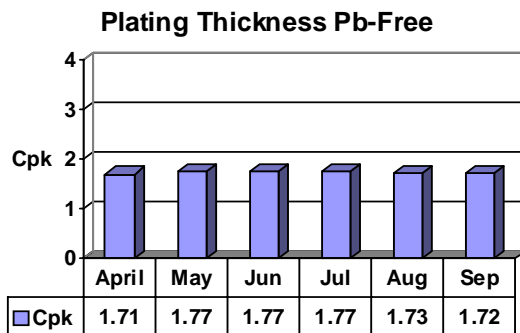
Package Technology: SSOP



LSL = 3 gms



LSL = 13 gms

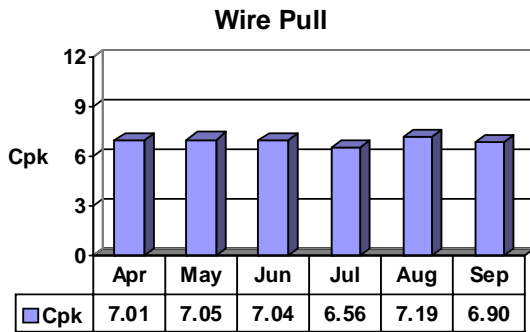


LSL = 400µin

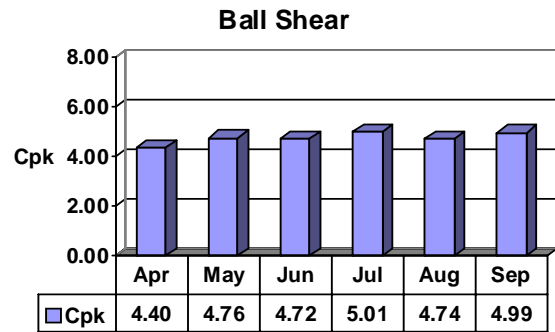
USL = 800µin

Carsem M, Malaysia Program: 2011

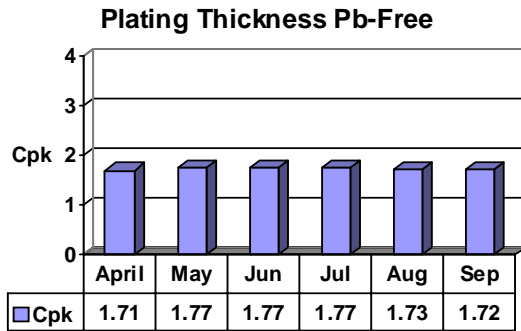
Package Technology: TSSOP



LSL = 3.0 gms



LSL = 20 gms



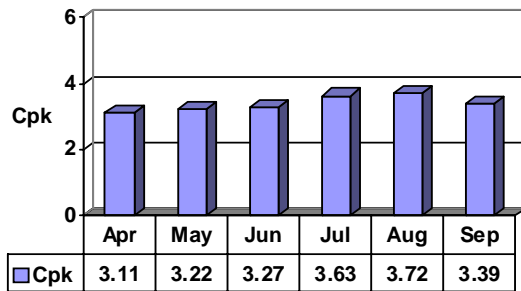
LSL = 400µin

USL = 800µin

Carsem S, Malaysia Program: 2011

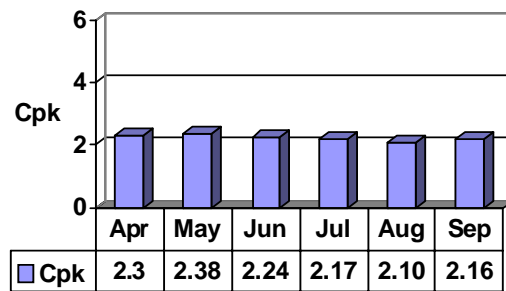
Package Technology: QFP

Wire Pull



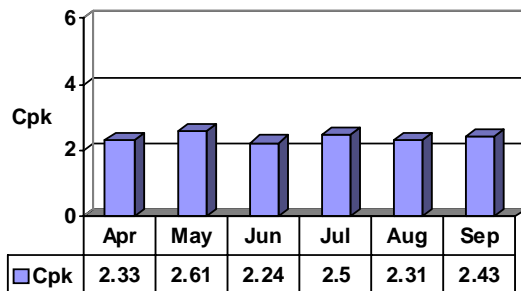
LSL = 6 gms

Ball Shear



LSL = 20 gms

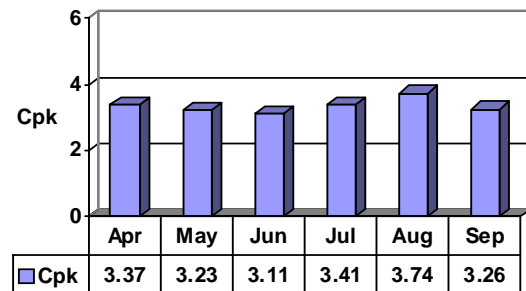
Plating Thickness Pb-Free



LSL = 400µin

USL = 800µin

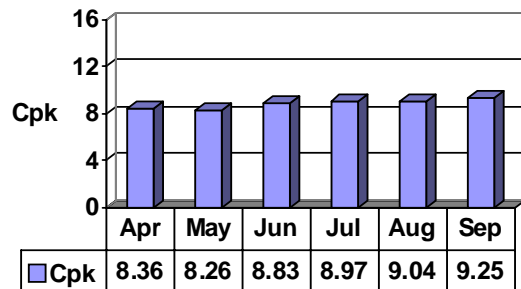
Plating Comp (%Sn)



LSL =70%

USL = 90%

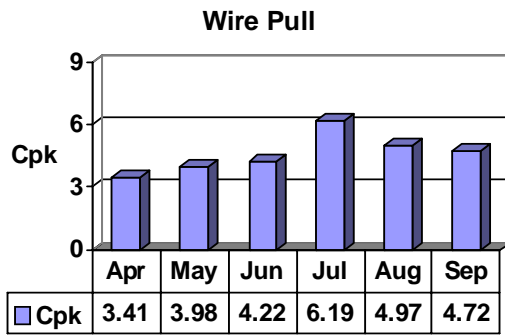
Coplanarity



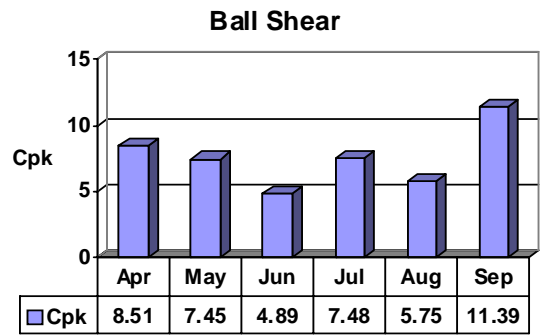
USL = 3.0 mils

UTAC, China Program: 2011

Package Technology: BGA



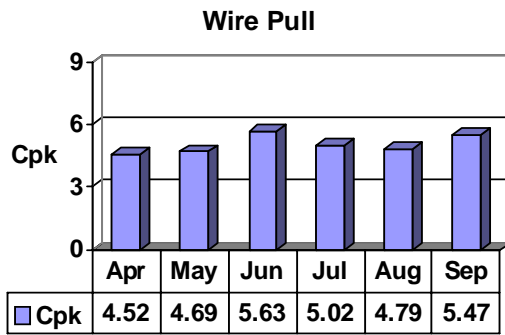
LSL = 3 gms



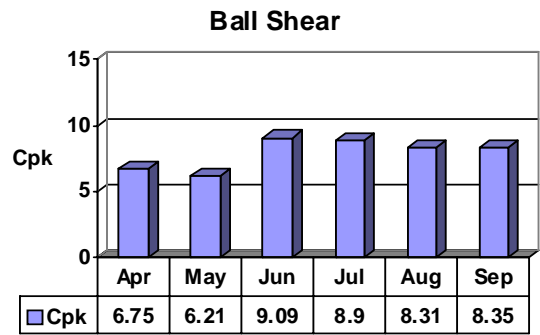
LSL = 8 grams

UTAC, China Program: 2011

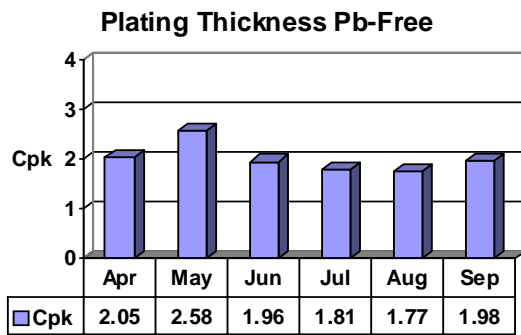
Package Technology: QFP



LSL = 3 gms



LSL = 20 gms



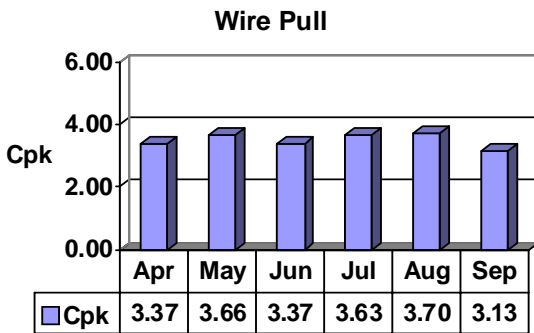
LSL = 400µin

USL = 800µin

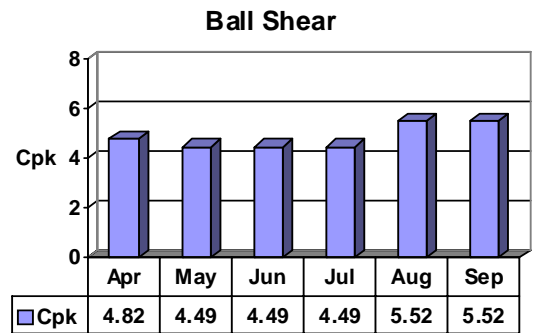
## SPC – Cpk Trends - Assembly

**UTAC, China Program:** 2011

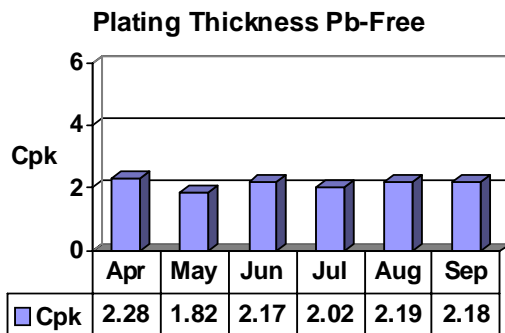
**Package Technology:** LPCC



LSL = 3 gms



LSL = 20 gms



LSL = 400 $\mu$ in

USL = 800 $\mu$ in

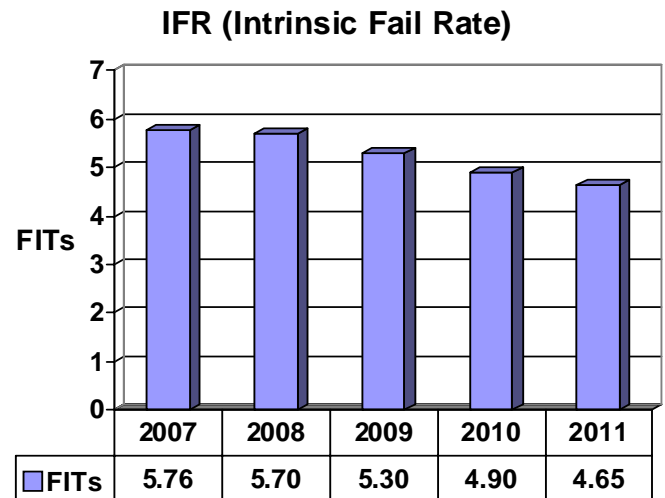
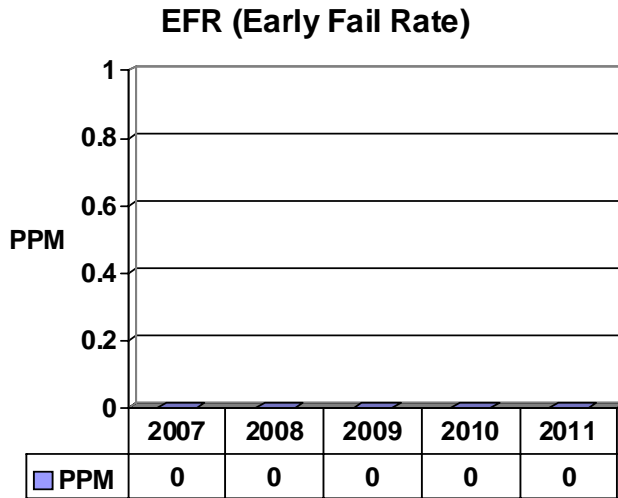
## Reliability

---

Reliability data trends of Exar's wafer fab processes and package types are reported in order to assure our customers that our foundry fabs and assembly subcontractors are continuing to improve their reliability performance.

**Factory:** GLOBALFOUNDRIES, Singapore

**Process:** 0.25 $\mu$ /0.35 $\mu$  CMOS



Year	Sample Size	# Fail	PPM
2007	90	0	0
2008	20	0	0
2009	105	0	0
2010	70	0	0
2011	125	0	0

Year	Sample Size	Device Hours	# Fail
2007	90	90,000	0
2008	20	20,000	0
2009	105	105,000	0
2010	70	70,000	0
2011	125	125,000	0

**FIT:** Failure in Time; 60% CL, 55°C, Ea = .7eV

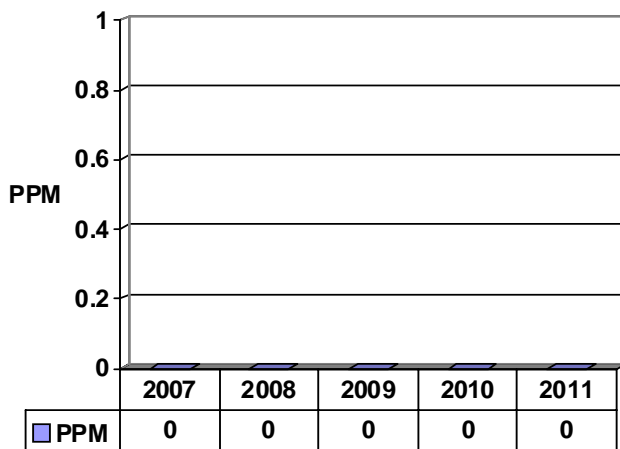
**IFR:** Intrinsic Failure Rate > 168 hours @ the test temperature of 125°C or > 72 hours @ 150°C

**IFR:** Early Failure Rate < 168 hours @ the test temperature of 125°C or < 72 hours @ 150°C

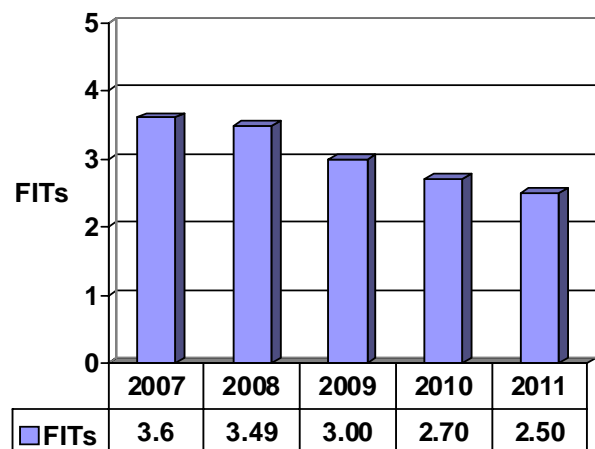
**Factory:** GLOBALFOUNDRIES Fab 2, Singapore

**Process:** 0.6 $\mu$  CMOS

**EFR (Early Fail Rate)**



**IFR (Intrinsic Fail Rate)**



Year	Sample Size	# Fail	PPM
2007	90	0	0
2008	100	0	0
2009	180	0	0
2010	140	0	0
2011	250	0	0

Year	Sample Size	Device Hours	# Fail
2007	90	90,000	0
2008	100	100,000	0
2009	180	180,000	0
2010	140	140,000	0
2011	250	250,000	0

**FIT:** Failure in Time; 60% CL, 55°C, Ea = .7eV

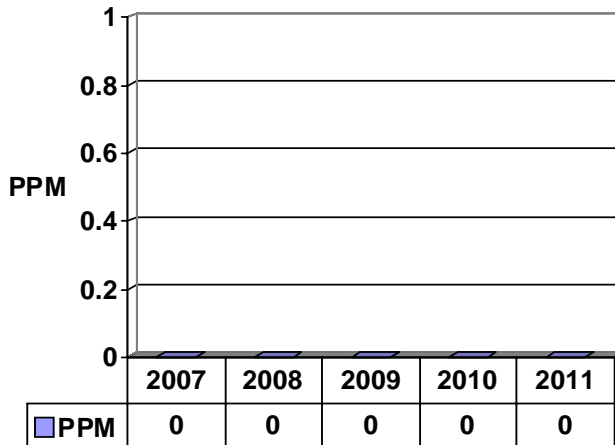
**IFR:** Intrinsic Failure Rate > 168 hours @ the test temperature of 125°C or > 72 hours @ 150°C

**IFR:** Early Failure Rate < 168 hours @ the test temperature of 125°C or < 72 hours @ 150°C

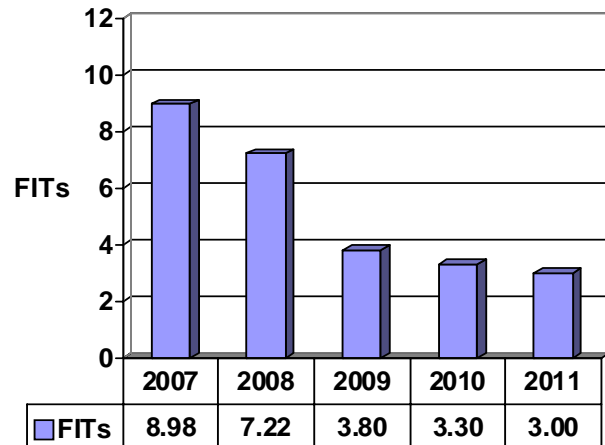
**Factory:** Episil, Taiwan

**Process:** 1.2 $\mu$  / 2 $\mu$  CMOS

**EFR (Early Fail Rate)**



**IFR (Intrinsic Fail Rate)**



Year	Sample Size	# Fail	PPM
2007	693	0	0
2008	319	0	0
2009	1290	0	0
2010	527	0	0
2011	250	0	0

Year	Sample Size	Device Hours	# Fail
2007	693	693,000	0
2008	319	559,000	0
2009	1290	1,290,000	0
2010	527	527,000	0
2011	250	250,000	0

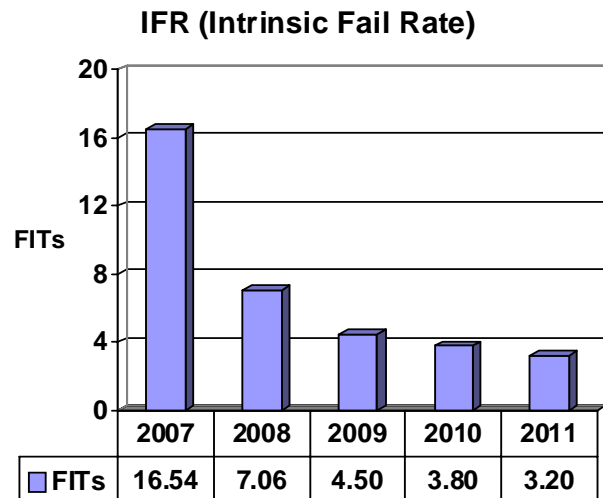
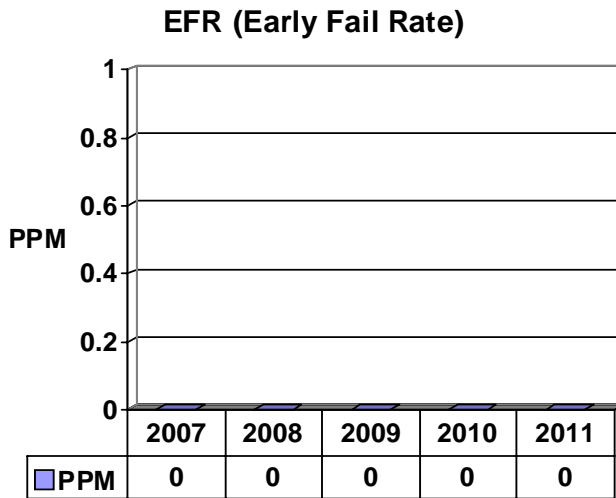
**FIT:** Failure in Time; 60% CL, 55°C, Ea = .7eV

**IFR:** Intrinsic Failure Rate > 168 hours @ the test temperature of 125°C or > 72 hours @ 150°C

**IFR:** Early Failure Rate < 168 hours @ the test temperature of 125°C or < 72 hours @ 150°C

**Factory:** Silan, China

**Process:** 2 $\mu$  CMOS



Year	Sample Size	# Fail	PPM
2007	711	0	0
2008	953	0	0
2009	946	0	0
2010	460	0	0
2011	480	0	0

Year	Sample Size	Device Hours	# Fail
2007	711	711,000	0
2008	953	953,000	0
2009	946	946,000	0
2010	460	460,000	0
2011	480	480,000	0

**FIT:** Failure in Time; 60% CL, 55°C, Ea = .7eV

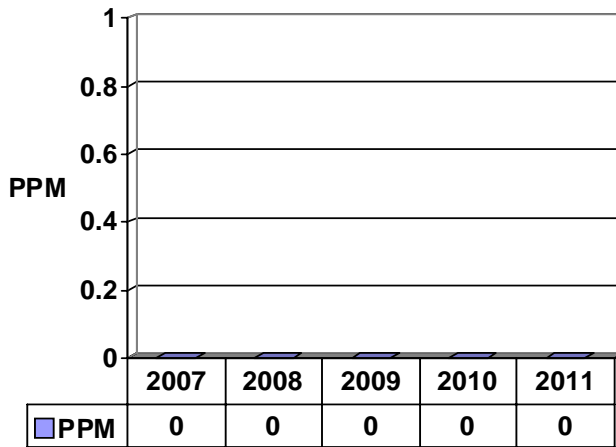
**IFR:** Intrinsic Failure Rate > 168 hours @ the test temperature of 125°C or > 72 hours @ 150°C

**IFR:** Early Failure Rate < 168 hours @ the test temperature of 125°C or < 72 hours @ 150°C

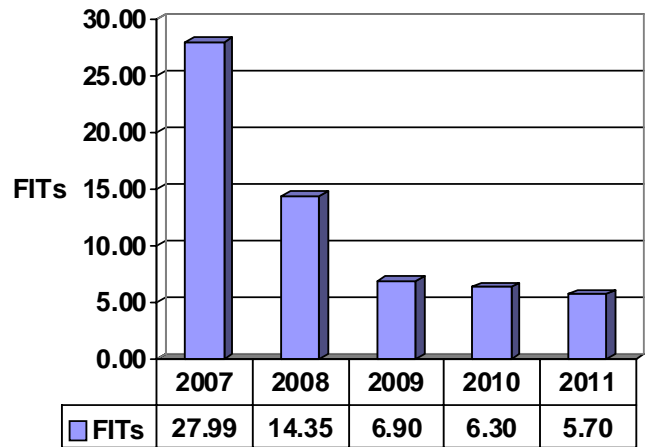
**Factory:** Silan, China

**Process:** 5 $\mu$  CMOS

**EFR (Early Fail Rate)**



**IFR (Intrinsic Fail Rate)**



Year	Sample Size	# Fail	PPM
2007	420	0	0
2008	399	0	0
2009	893	0	0
2010	160	0	0
2011	250	0	0

Year	Sample Size	Device Hours	# Fail
2007	420	420,000	0
2008	399	399,000	0
2009	893	893,000	0
2010	160	160,000	0
2011	250	250,000	0

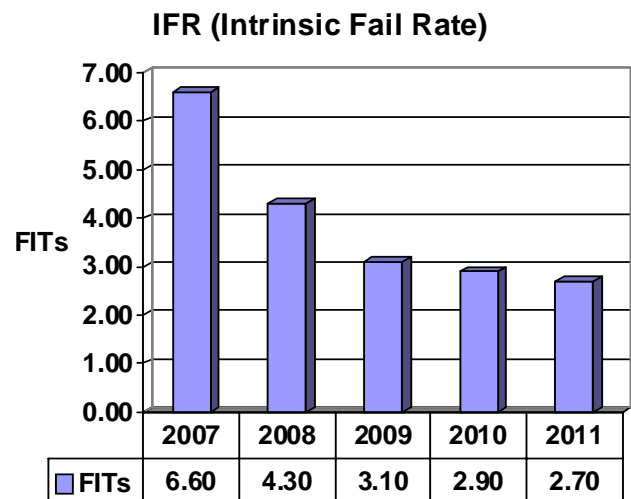
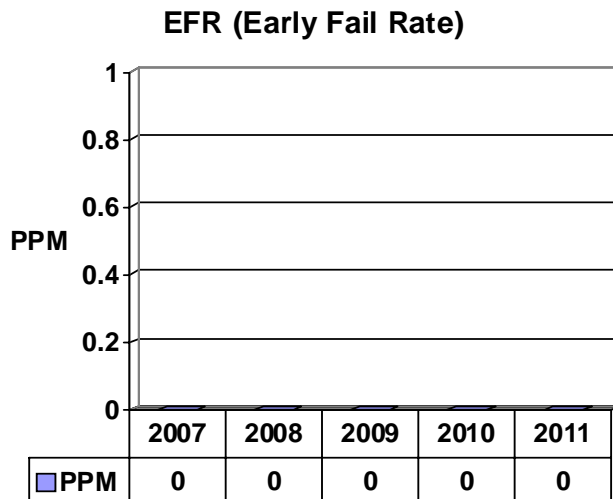
**FIT:** Failure in Time; 60% CL, 55°C, Ea = .7eV

**IFR:** Intrinsic Failure Rate > 168 hours @ the test temperature of 125°C or > 72 hours @ 150°C

**IFR:** Early Failure Rate < 168 hours @ the test temperature of 125°C or < 72 hours @ 150°C

**Factory:** Silan, China

**Process:** Bipolar



Year	Sample Size	# Fail	PPM
2007	856	0	0
2008	721	0	0
2009	989	0	0
2010	560	0	0
2011	240	0	0

Year	Sample Size	Device Hours	# Fail
2007	858	856,000	0
2008	721	721,000	0
2009	989	604,000	0
2010	560	560,000	0
2011	240	240,000	0

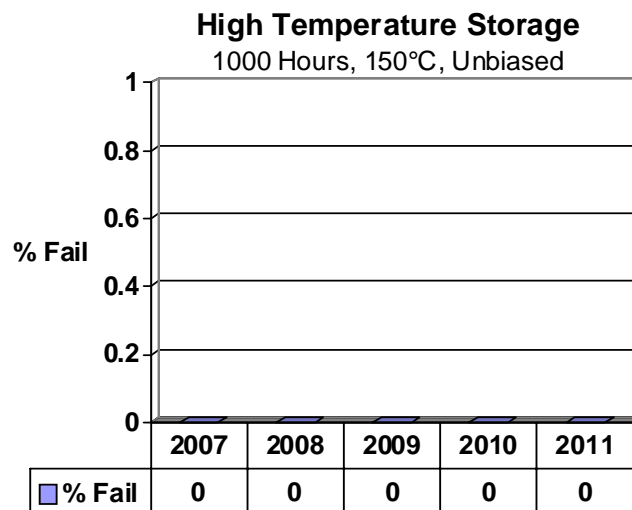
**FIT:** Failure in Time; 60% CL, 55°C, Ea = .7eV

**IFR:** Intrinsic Failure Rate > 168 hours @ the test temperature of 125°C or > 72 hours @ 150°C

**IFR:** Early Failure Rate < 168 hours @ the test temperature of 125°C or < 72 hours @ 150°C

**Factory:** GLOBALFOUNDRIES, Singapore

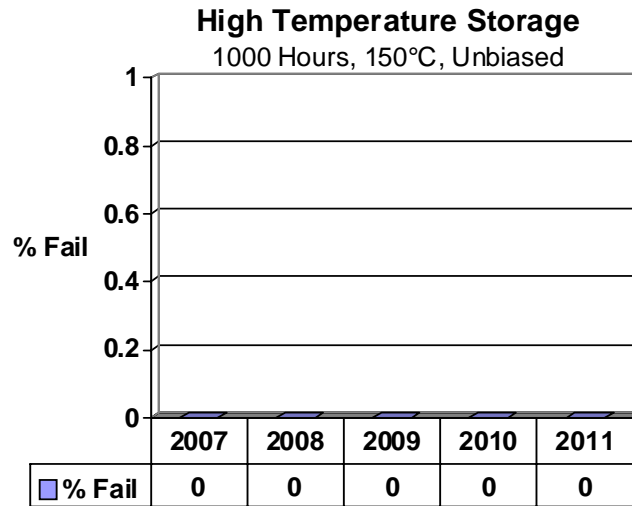
**Process:** 0.35 $\mu$  CMOS



Year	Sample Size	# Fail	% Fail
2007	157	0	0
2008	75	0	0
2009	170	0	0
2010	165	0	0
2011	180	0	0

**Factory:** GLOBALFOUNDRIES, Singapore

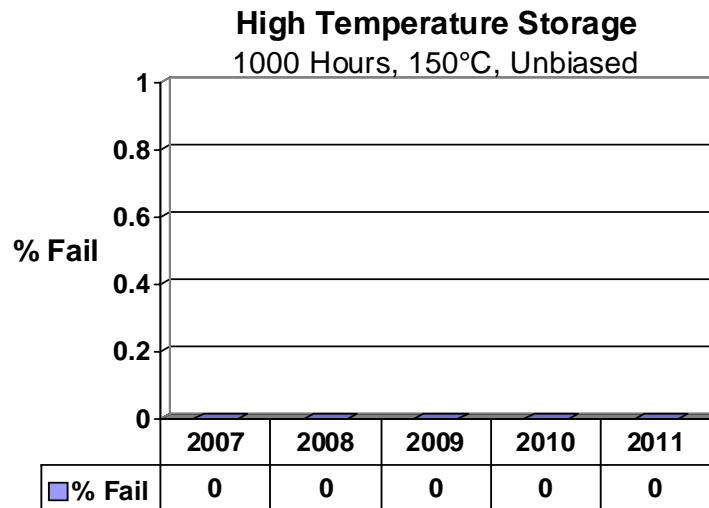
**Process:** 0.18 $\mu$  CMOS



Year	Sample Size	# Fail	% Fail
2007	83	0	0
2008	45	0	0
2009	65	0	0
2010	185	0	0
2011	70	0	0

**Factory:** GLOBALFOUNDRIES, Fab 2, Singapore

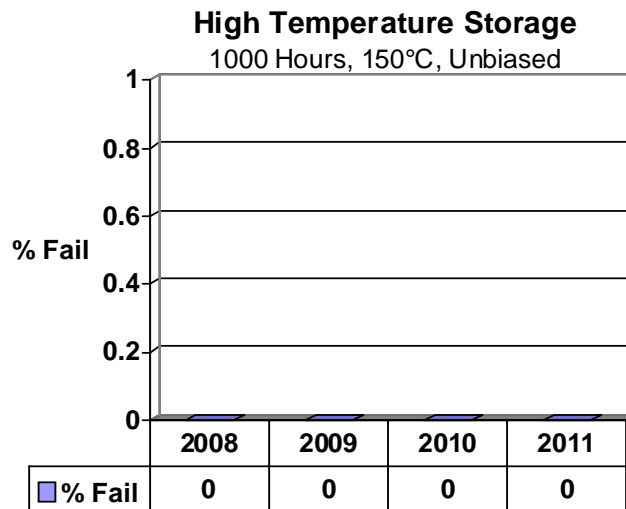
**Process:** 0.6 $\mu$  CMOS



Year	Sample Size	# Fail	% Fail
2007	135	0	0
2008	100	0	0
2009	180	0	0
2010	225	0	0
2011	150	0	0

**Factory:** Episil, Taiwan

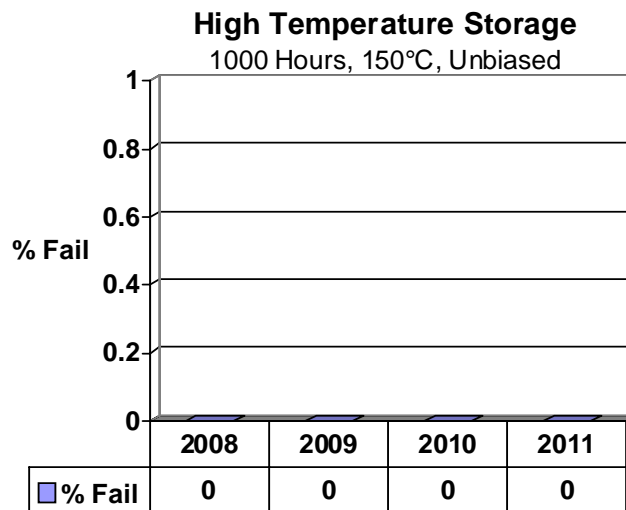
**Process:** 2 $\mu$  CMOS



Year	Sample Size	# Fail	% Fail
2008	462	0	0
2009	137	0	0
2010	254	0	0
2011	270	0	0

**Factory:** Silan, China

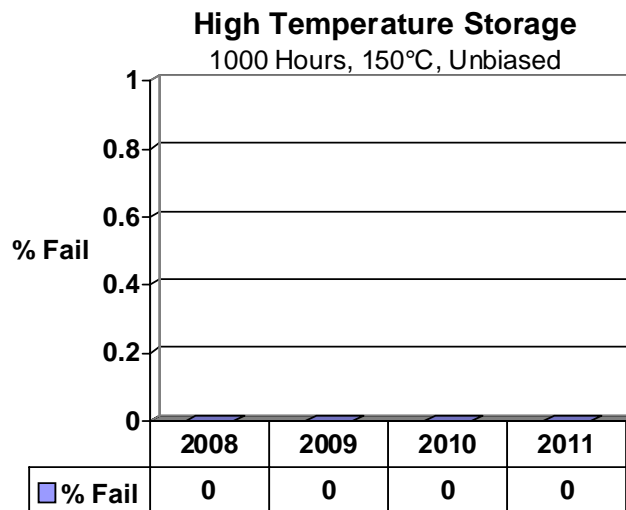
**Process:** 2 $\mu$  CMOS



Year	Sample Size	# Fail	% Fail
2008	204	0	0
2009	878	0	0
2010	201	0	0
2011	633	0	0

**Factory:** Silan, China

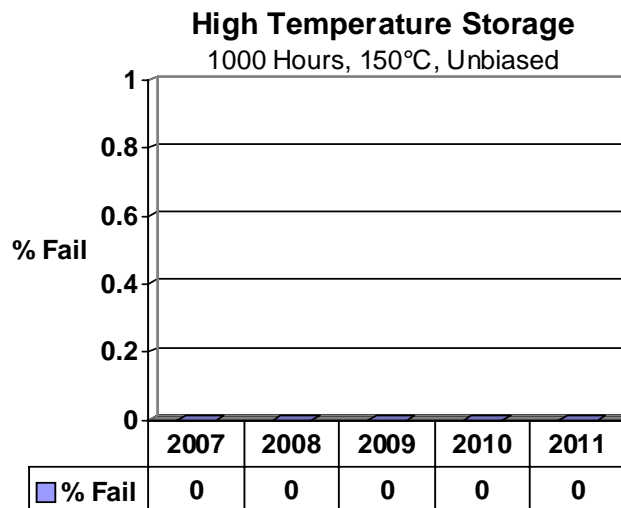
**Process:** 5 $\mu$  CMOS



Year	Sample Size	# Fail	% Fail
2008	77	0	0
2009	185	0	0
2010	157	0	0
2011	253	0	0

**Factory:** Silan, China

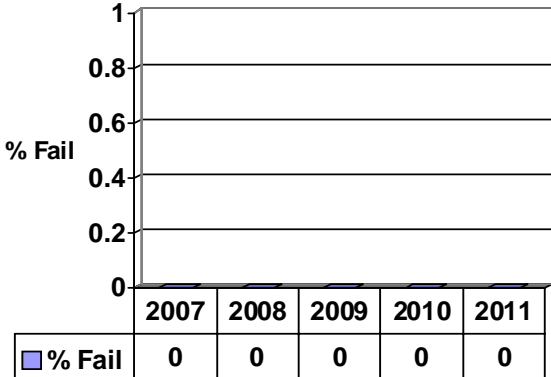
**Process:** Bipolar



Year	Sample Size	# Fail	% Fail
2007	180	0	0
2008	116	0	0
2009	347	0	0
2010	295	0	0
2011	170	0	0

Package: BGA Families

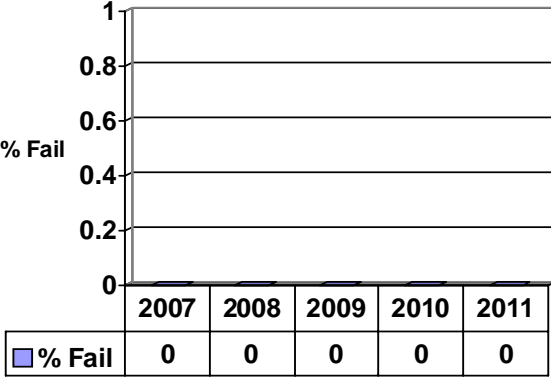
**Temperature Cycle**



Year	Sample Size	# Fail	% Fail
2007	127	0	0
2008	47	0	0
2009	74	0	0
2010	281	0	0
2011	160	0	0

**Conditions:**  
300/1000 Cycles time points, -65/150°C

**Pressure Pot/UHAST**

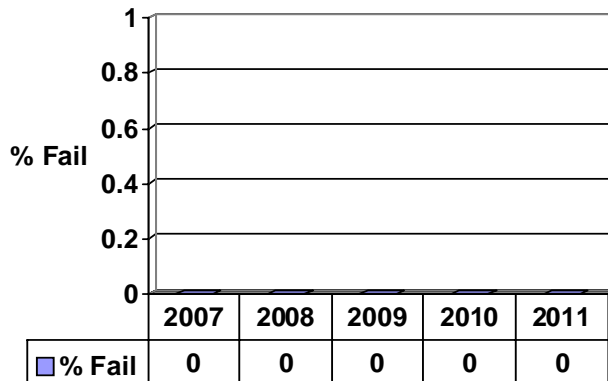


Year	Sample Size	# Fail	% Fail
2007	97	0	0
2008	68	0	0
2009	74	0	0
2010	281	0	0
2011	160	0	0

**Conditions:**  
96 Hours, 130°C, 85% RH

Package: PDIP

**Temperature Cycle**

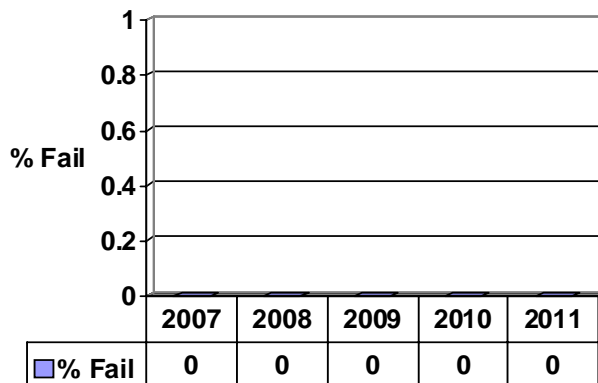


Year	Sample Size	# Fail	% Fail
2007	243	0	0
2008	135	0	0
2009	225	0	0
2010	237	0	0
2011	122	0	0

**Conditions:**

300/1000 Cycles time points, -65/150°C

**Pressure Pot/UHAST**



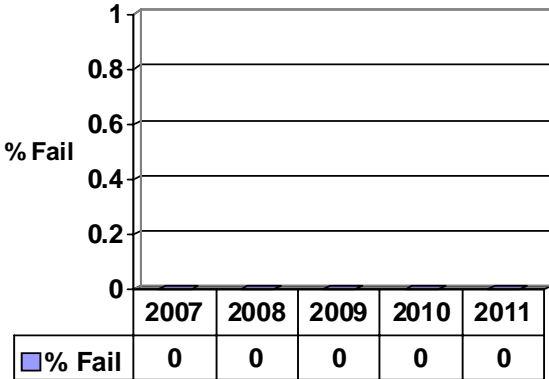
Year	Sample Size	# Fail	% Fail
2007	353	0	0
2008	135	0	0
2009	225	0	0
2010	237	0	0
2011	122	0	0

**Conditions:**

96/168 Hours, 121°C, 100% RH / or 96 Hours, 130°C, 85% RH

Package: PLCC

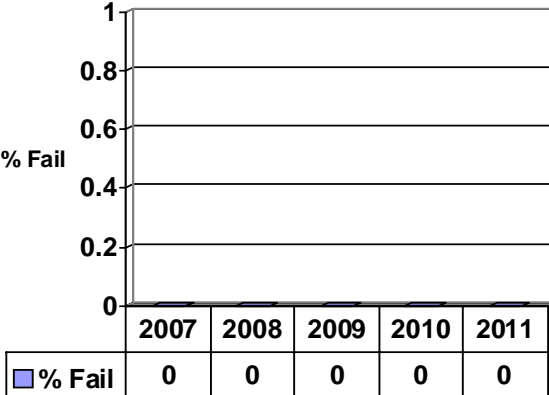
**Temperature Cycle**



Year	Sample Size	# Fail	% Fail
2007	45	0	0
2008	90	0	0
2009	45	0	0
2010	225	0	0
2011	135	0	0

**Conditions:**  
300/1000 Cycles time points, -65/150°C

**Pressure Pot/UHAST**

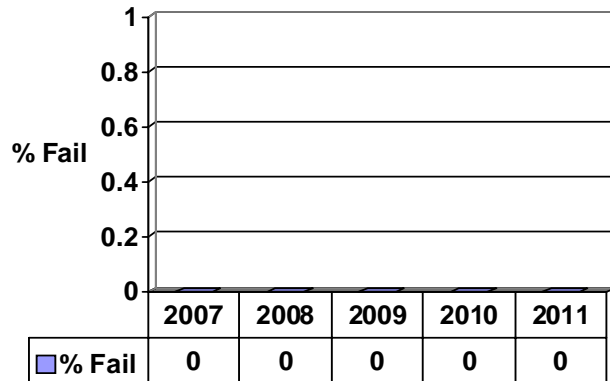


Year	Sample Size	# Fail	% Fail
2007	90	0	0
2008	180	0	0
2009	45	0	0
2010	225	0	0
2011	135	0	0

**Conditions:**  
96 Hours, 130°C, 85% RH

Package: T/S/LQFP

**Temperature Cycle**

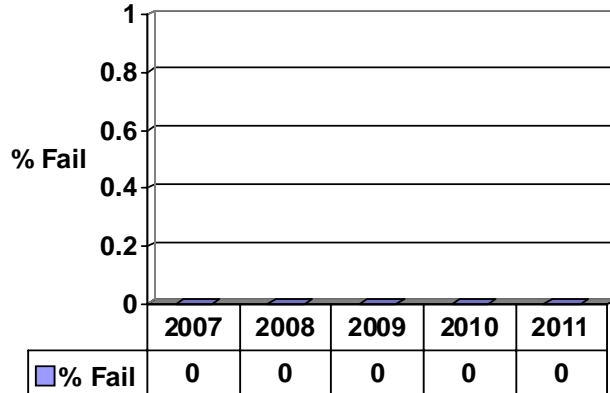


Year	Sample Size	# Fail	% Fail
2007	645	0	0
2008	180	0	0
2009	310	0	0
2010	270	0	0
2011	230	0	0

**Conditions:**  
300/1000 Cycles time points, -65/150°C

C

**Pressure Pot/UHAST**

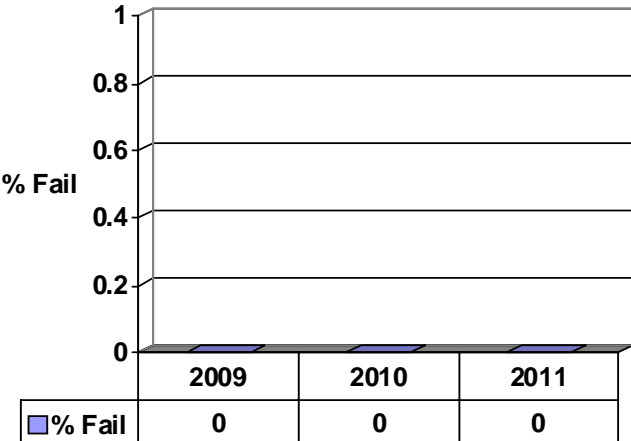


Year	Sample Size	# Fail	% Fail
2007	460	0	0
2008	225	0	0
2009	321	0	0
2010	270	0	0
2011	230	0	0

**Conditions:**  
96 Hours, 130°C, 85% RH

Package: TO

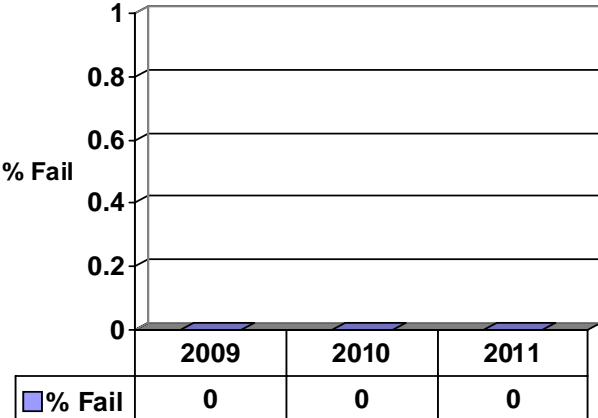
**Temperature Cycle**



Year	Sample Size	# Fail	% Fail
2009	855	0	0
2010	1176	0	0
2011	456	0	0

**Conditions:**  
300/1000 Cycles time points, -65/150°C

**Pressure Pot/UHAST**

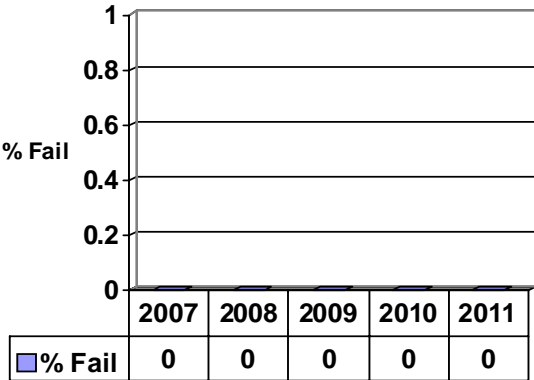


Year	Sample Size	# Fail	% Fail
2009	855	0	0
2010	1176	0	0
2011	456	0	0

**Conditions:**  
96 Hours, 130°C, 85% RH

Package: SOT, TSOT, SC-70

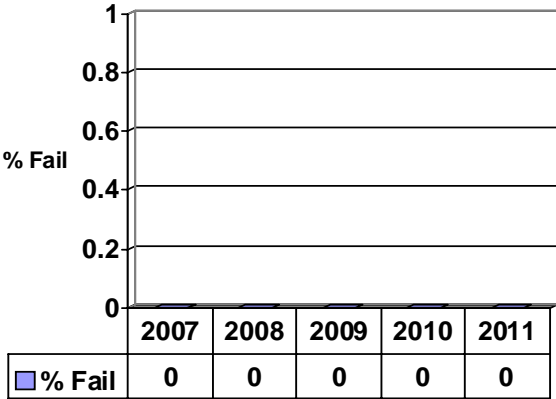
**Temperature Cycle**



Year	Sample Size	# Fail	% Fail
2007	908	0	0
2008	1780	0	0
2009	1042	0	0
2010	2429	0	0
2011	752	0	0

**Conditions:**  
300/1000 Cycles time points, -65/150°C

**Pressure Pot/UHAST**

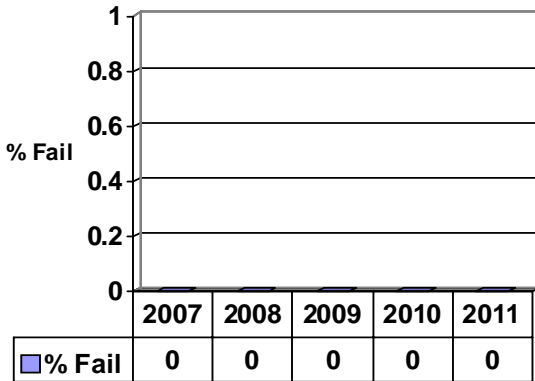


Year	Sample Size	# Fail	% Fail
2007	915	0	0
2008	836	0	0
2009	1042	0	0
2010	2429	0	0
2011	752	0	0

**Conditions:**  
96 Hours, 121°C, 100% RH / or 96 Hours, 130°C, 85% RH

Package: MSOP, TSSOP, SSOP, SOIC

**Temperature Cycle**

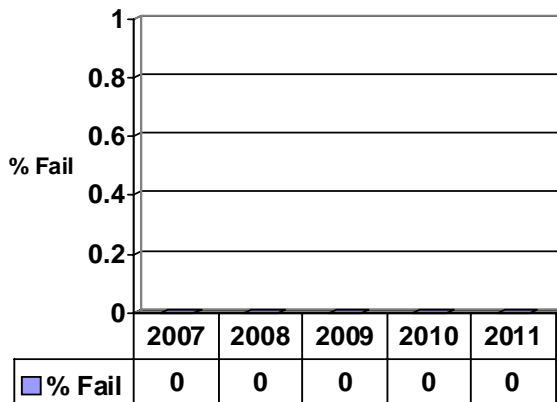


Year	Sample Size	# Fail	% Fail
2007	2731	0	0
2008	2538	0	0
2009	3058	0	0
2010	4689	0	0
2011	2455	0	0

**Conditions:**

300/1000 Cycles time points, -65/150°C

**Pressure Pot/UHAST**



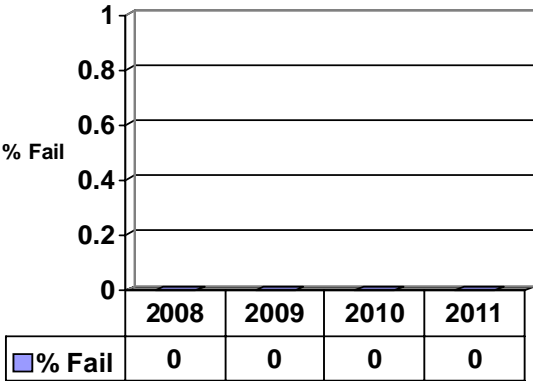
Year	Sample Size	# Fail	% Fail
2007	1131	0	0
2008	2253	0	0
2009	3189	0	0
2010	4923	0	0
2011	2455	0	0

**Conditions:**

96 Hours, 121°C, 100% RH / or 96 Hours, 130°C, 85% RH

**Package: DFN/QFN**

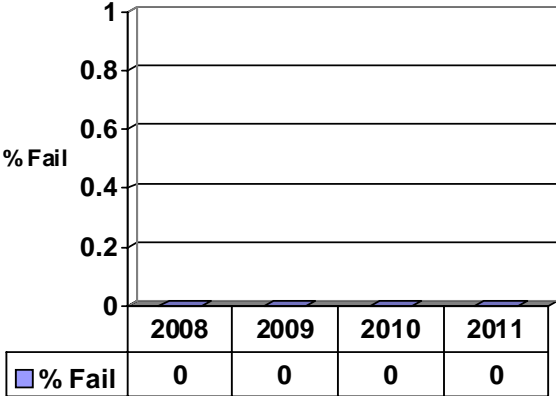
**Temperature Cycle**



Year	Sample Size	# Fail	% Fail
2008	45	0	0
2009	85	0	0
2010	70	0	0
2011	125	0	0

**Conditions:**  
300/1000 Cycles time points, -65/150°C

**Pressure Pot/UHAST**



Year	Sample Size	# Fail	% Fail
2008	25	0	0
2009	220	0	0
2010	70	0	0
2011	125	0	0

**Conditions:**  
96 Hours, 121°C, 100% RH / or 96 Hours, 130°C, 85% RH