Exar Quarterly
Quality and Reliability Report

February 2010

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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).

Quarter: October 1, 2009 to December 31, 2009

Devices: Exar Products

Summary: All data is first submission data

Total number of lots inspected:	2477
Total number of lots accepted:	2473
Total number of QC samples inspected:	287,471
Total number fail in QC samples:	6

Process average PPM: $= \Sigma r / \Sigma n \times 10^6$ $= 6/287{,}471 \times 10^6$ r = Total number fail in QC samples n = Total number of QC samples inspected	20.87 PPM

Quarter: October 1, 2009 to December 31, 2009

Devices: Exar Products

Summary: All data is first submission data

Total number of lots inspected:	2,314
Total number of lots accepted:	2,311
Total number of QC samples inspected:	667,335
Total number fail in QC samples:	2

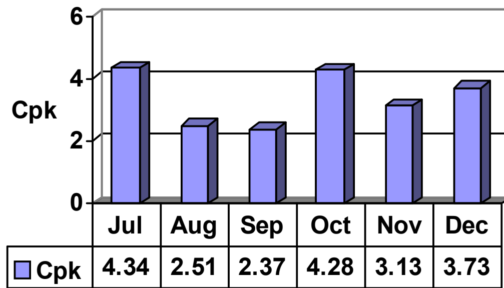
Process average PPM: $= \Sigma r / \Sigma n \times 10^6$ $= 2/667{,}335 \times 10^6$ r = Total number fail in QC samples n = Total number of QC samples inspected	2.99 PPM

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.

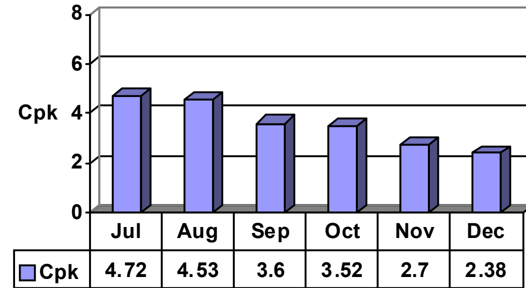
Unisem, Indonesia SPC Program: 2009

Package Technology: LQFP



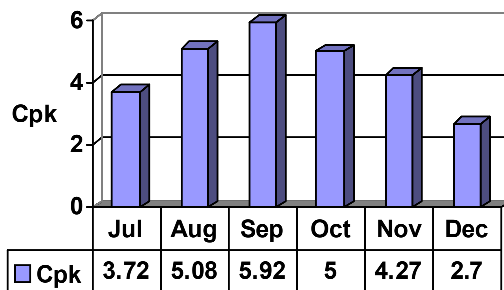
	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	4.34	2.51	2.37	4.28	3.13	3.73

LSL = 6 gms



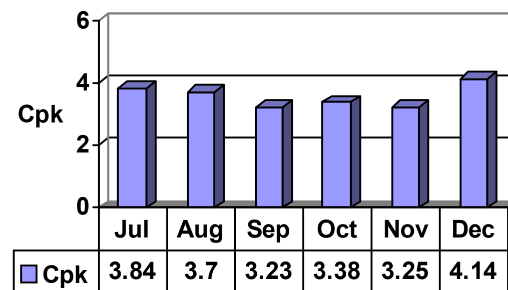
	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	4.72	4.53	3.6	3.52	2.7	2.38

LSL = 20 gms



	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	3.72	5.08	5.92	5	4.27	2.7

LSL = 300µin USL = 800µin

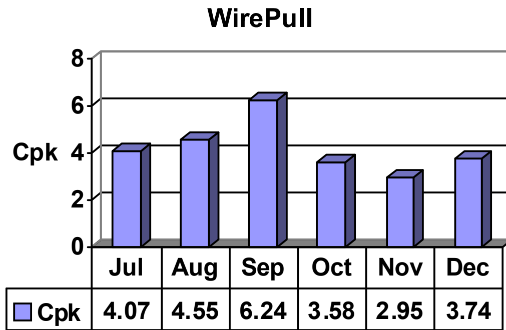


	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	3.84	3.7	3.23	3.38	3.25	4.14

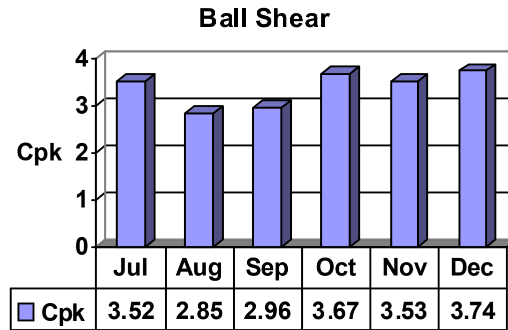
USL = 2.0 mils

Unisem, Indonesia SPC Program: 2009

Package Technology: PDIP



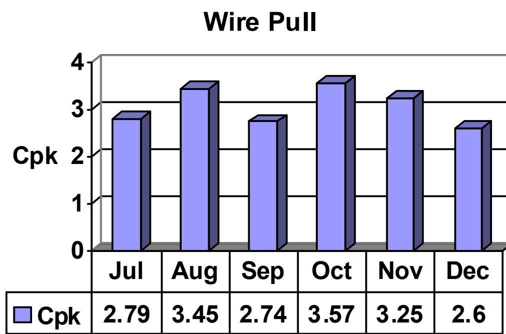
LSL = 6 gms



LSL = 20 gms

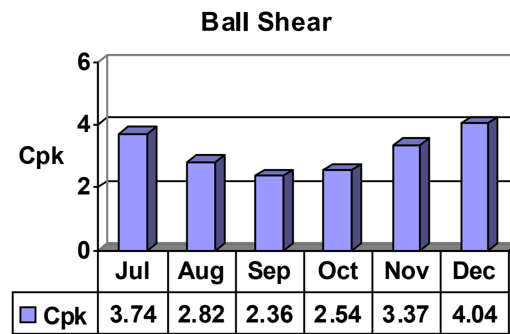
Unisem, Indonesia SPC Program: 2009

Package Technology: PLCC



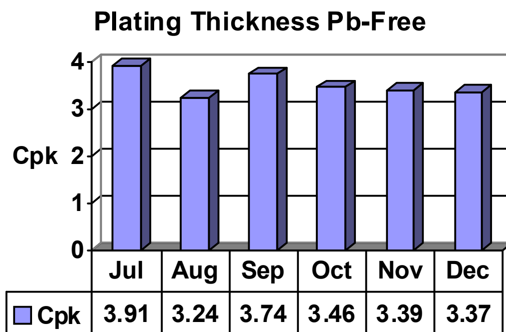
	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	2.79	3.45	2.74	3.57	3.25	2.6

LSL = 6 gms



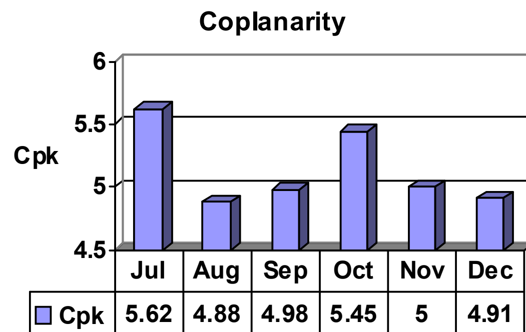
	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	3.74	2.82	2.36	2.54	3.37	4.04

LSL = 20 gms



	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	3.91	3.24	3.74	3.46	3.39	3.37

LSL = 300µin USL = 800µin

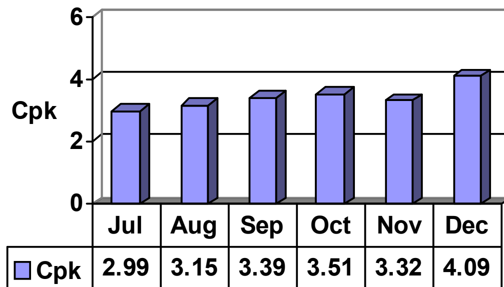


	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	5.62	4.88	4.98	5.45	5	4.91

USL = 3.0 mils

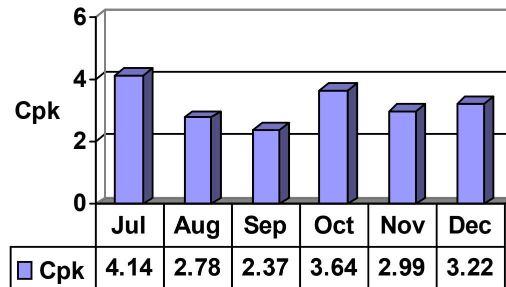
Unisem, Indonesia SPC Program: 2009

Package Technology: SOIC



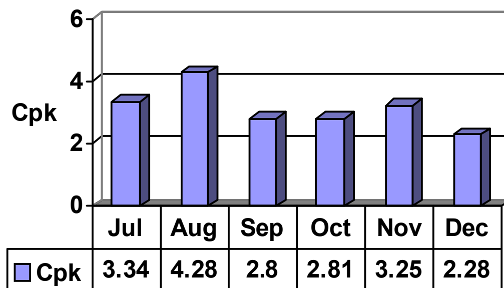
	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	2.99	3.15	3.39	3.51	3.32	4.09

LSL = 6 gms



	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	4.14	2.78	2.37	3.64	2.99	3.22

LSL = 20 gms

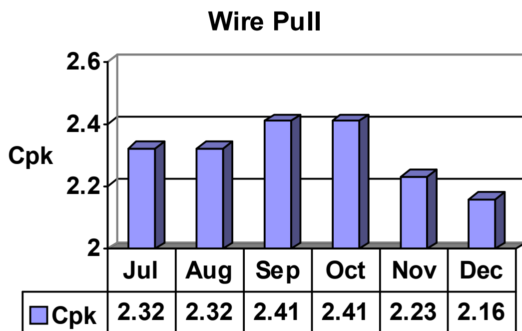


	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	3.34	4.28	2.8	2.81	3.25	2.28

LSL = 300µin USL = 800µin

Unisem, Ipoh SPC Program: 2009

Package Technology: NSOIC



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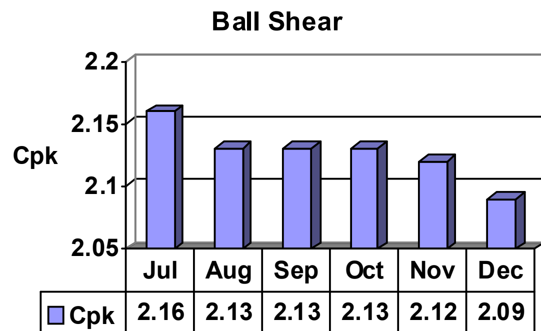
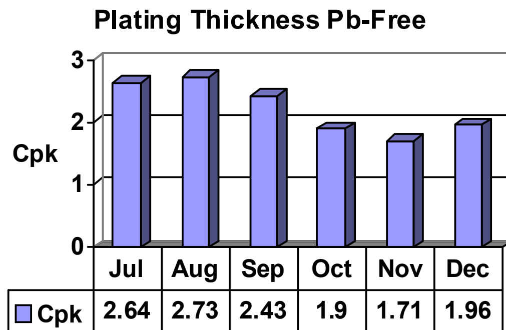


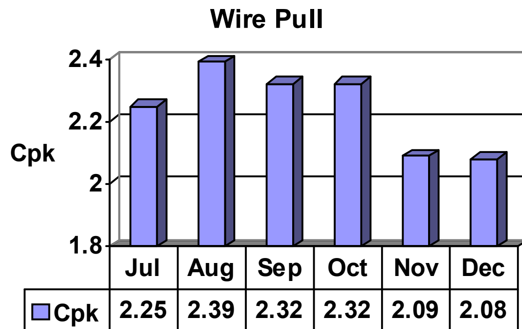
LSL = 20 gms



LSL = 300µin USL = 800µin

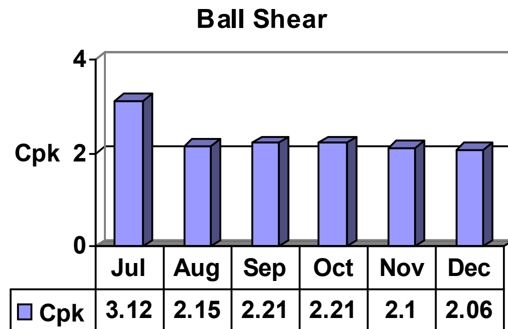
Unisem, Ipoh SPC Program: 2009

Package Technology: PDIP



	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	2.25	2.39	2.32	2.32	2.09	2.08

LSL = 6 gms

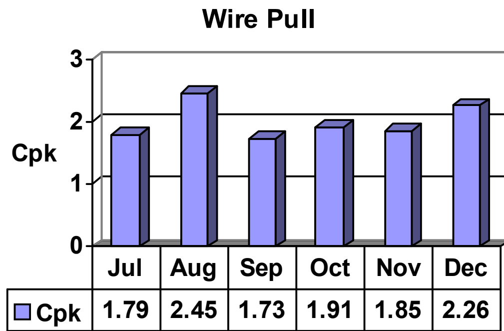


	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	3.12	2.15	2.21	2.21	2.1	2.06

LSL = 20 gms

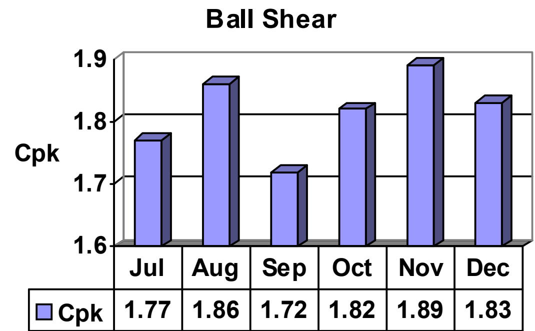
Unisem, Ipoh SPC Program: 2009

Package Technology: SOT223



	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	1.79	2.45	1.73	1.91	1.85	2.26

LSL = 6 gms

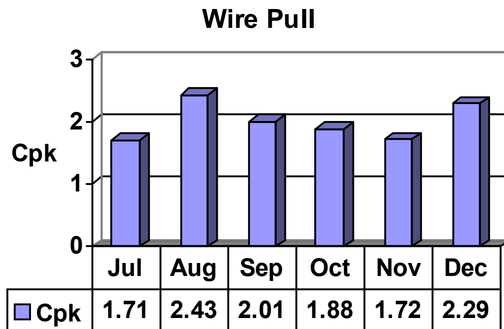


	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	1.77	1.86	1.72	1.82	1.89	1.83

LSL = 20 gms

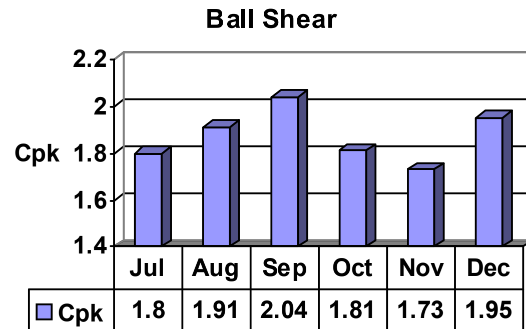
Unisem, Ipoh SPC Program: 2009

Package Technology: SOT23



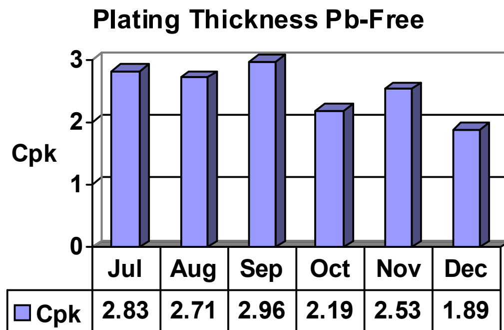
	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	1.71	2.43	2.01	1.88	1.72	2.29

LSL = 6 gms



	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	1.8	1.91	2.04	1.81	1.73	1.95

LSL = 20 gms

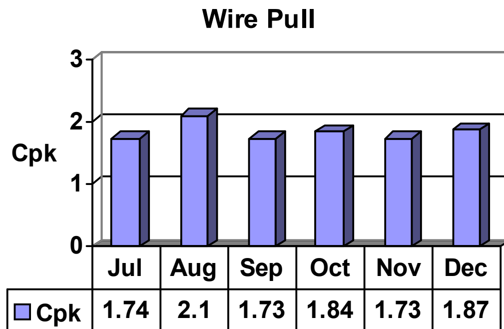


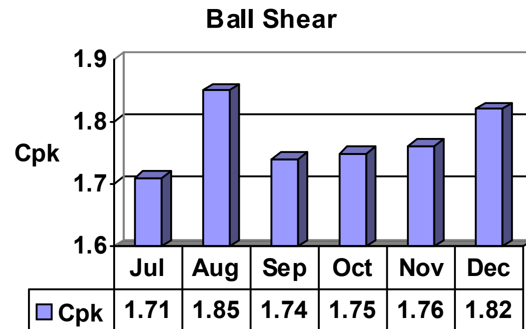
	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	2.83	2.71	2.96	2.19	2.53	1.89

LSL = 300µin USL = 800µin

Unisem, Ipoh SPC Program: 2009

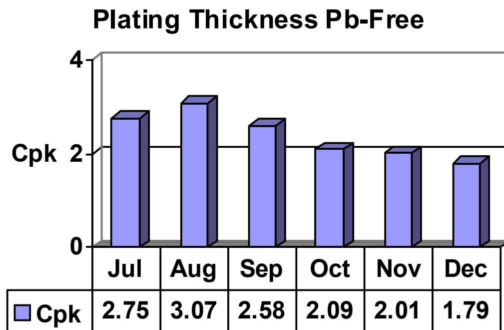
Package Technology: MSOP





LSL = 6 gms

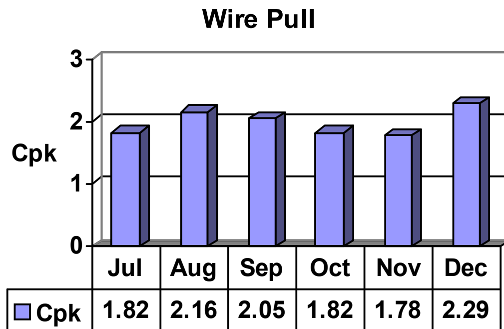
LSL = 20 gms



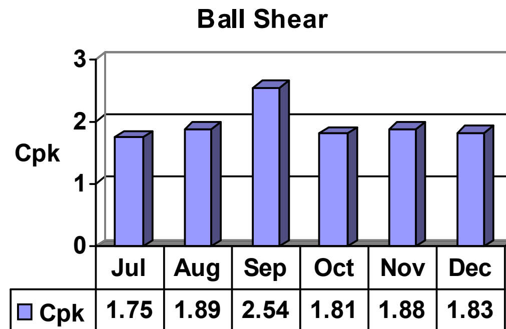
LSL = 300µin USL = 800µin

Unisem, Ipoh SPC Program: 2009

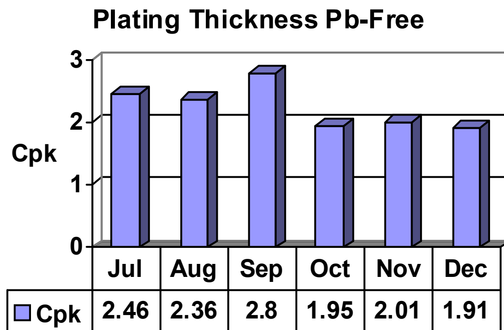
Package Technology: TSSOP



LSL = 6 gms



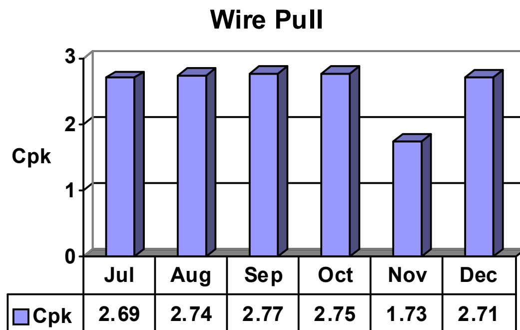
LSL = 20 gms



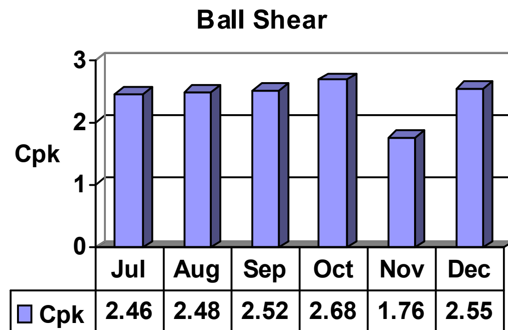
LSL = 300µin USL = 800µin

Carsem M, Malaysia Program: 2009

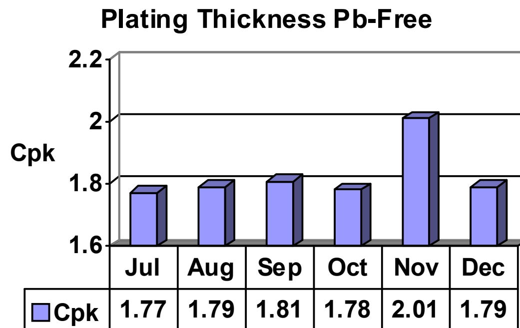
Package Technology: MSOP



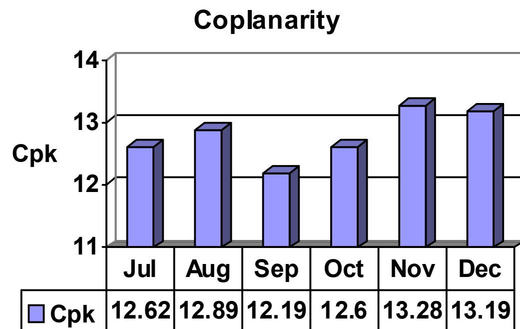
LSL = 6 gms



LSL = 20 gms



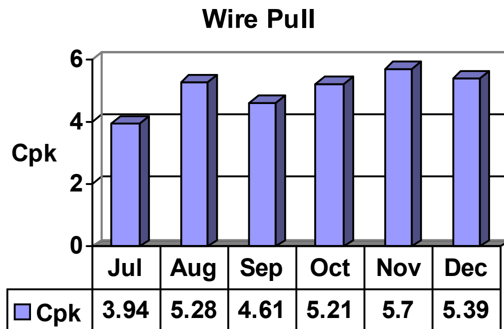
LSL = 300µin USL = 800µin



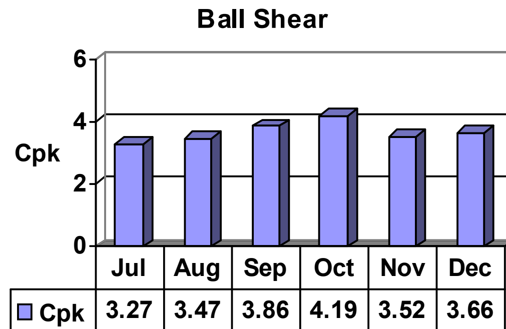
USL = 3.0 mils

Carsem M, Malaysia Program: 2009

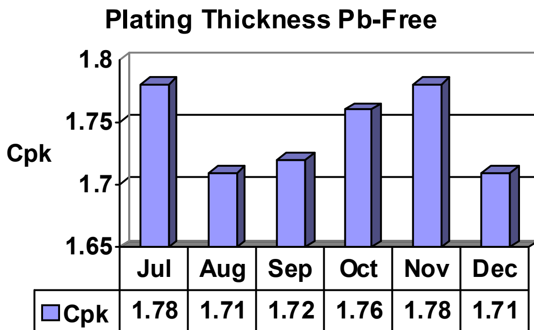
Package Technology: TO220



LSL = 6 gms



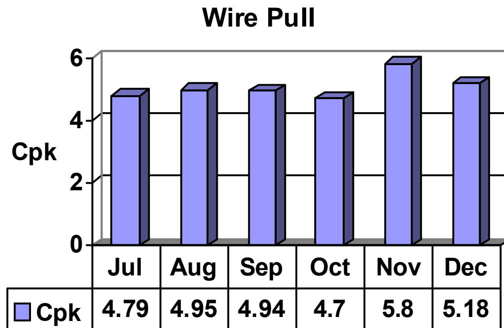
LSL = 20 gms



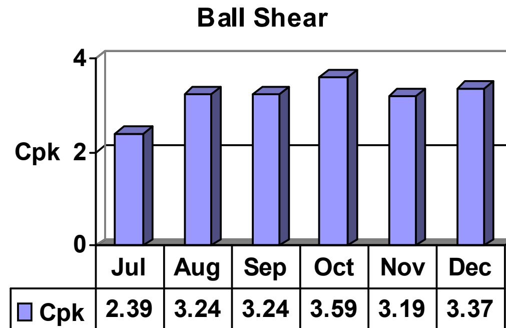
LSL = 300µin USL = 800µin

Carsem M, Malaysia Program: 2009

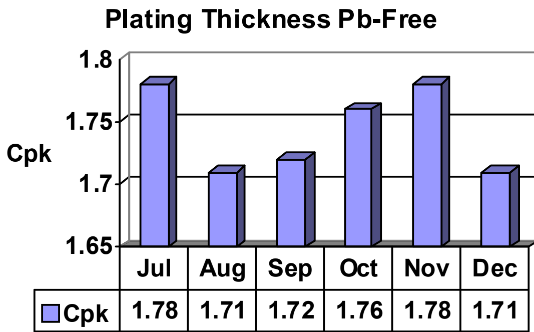
Package Technology: TO263



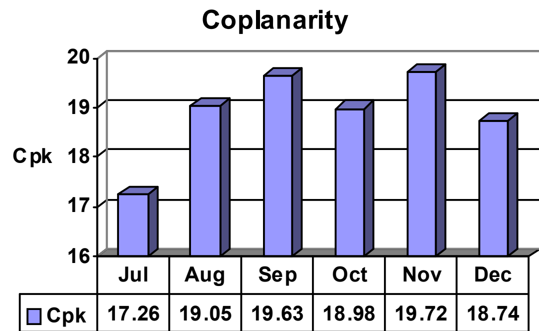
LSL = 6 gms



LSL = 20 gms



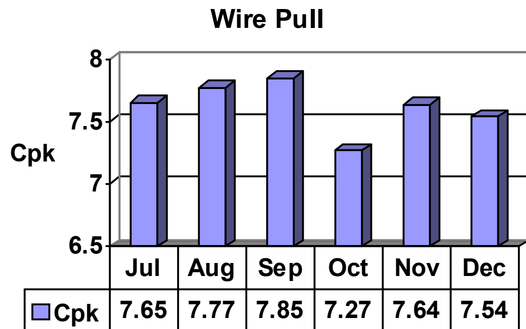
LSL = 300µin USL = 800µin



USL = 3.0 mils

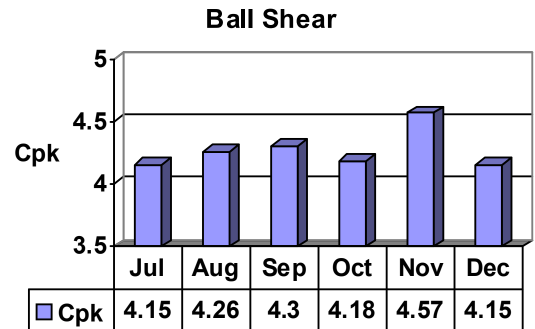
Carsem M, Malaysia Program: 2009

Package Technology: SOT223



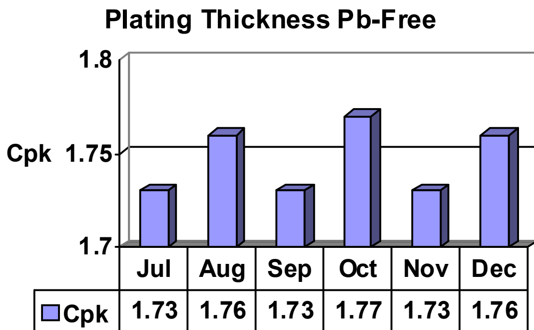
	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	7.65	7.77	7.85	7.27	7.64	7.54

LSL = 6 gms



	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	4.15	4.26	4.3	4.18	4.57	4.15

LSL = 20 gms

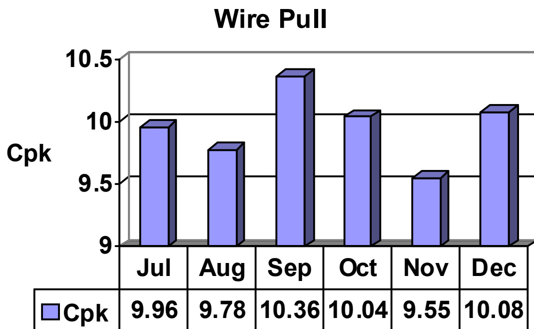


	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	1.73	1.76	1.73	1.77	1.73	1.76

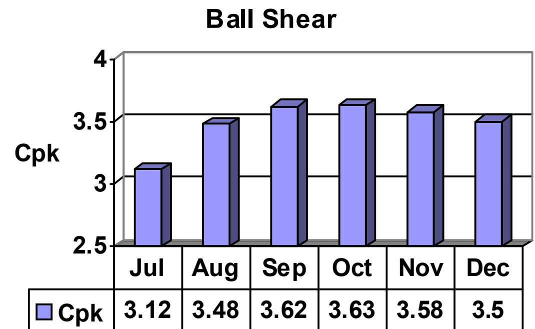
LSL = 300µin USL = 800µin

Carsem M, Malaysia Program: 2009

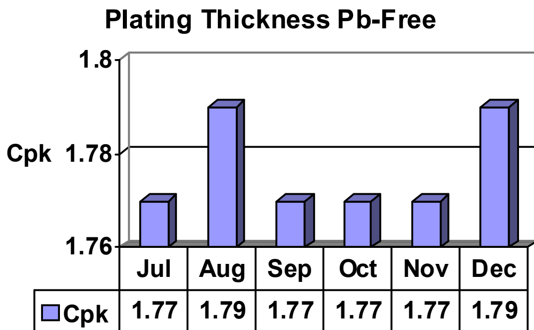
Package Technology: SC70



LSL = 6 gms



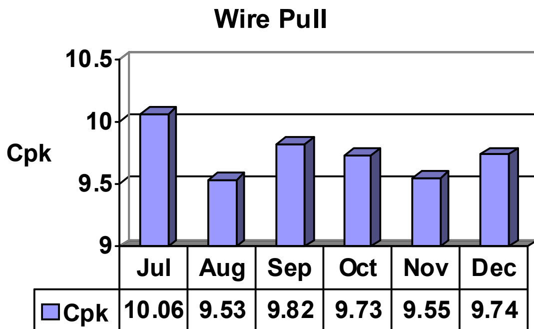
LSL = 20 gms



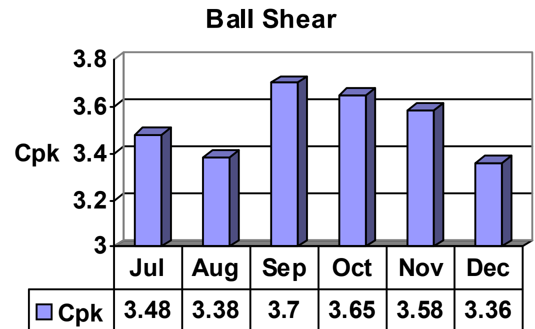
LSL = 300µin USL = 800µin

Carsem M, Malaysia Program: 2009

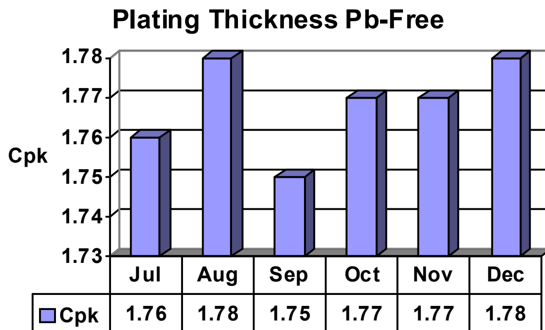
Package Technology: SOT23



LSL = 6 gms



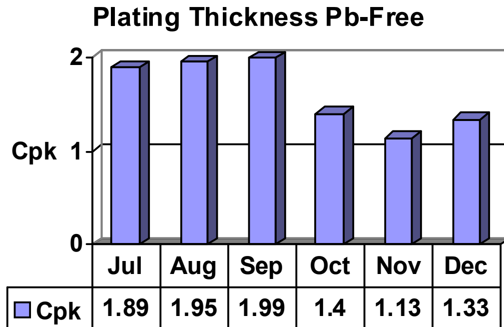
LSL = 20 gms



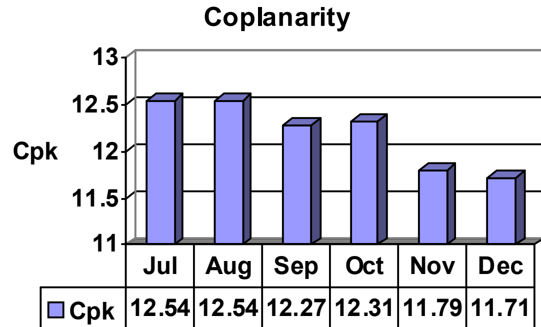
LSL = 300µin USL = 800µin

Carsem S, Malaysia Program: 2009

Package Technology: TSSOP



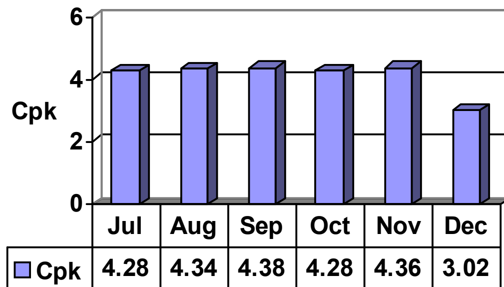
LSL = 300µin USL = 800µin



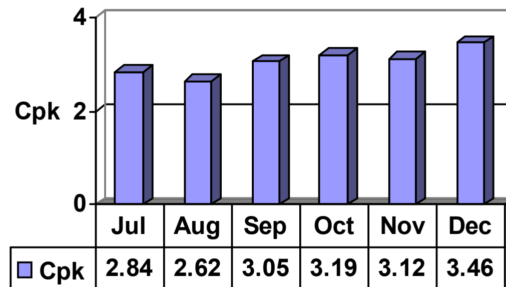
USL = 3.0 mils

Carsem S, Malaysia Program: 2009

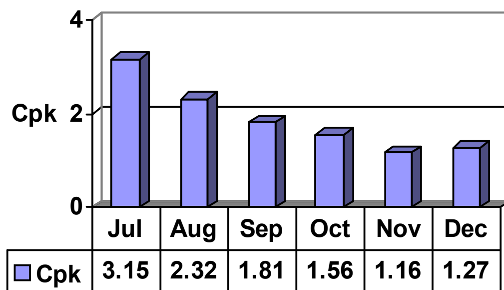
Package Technology: QFP



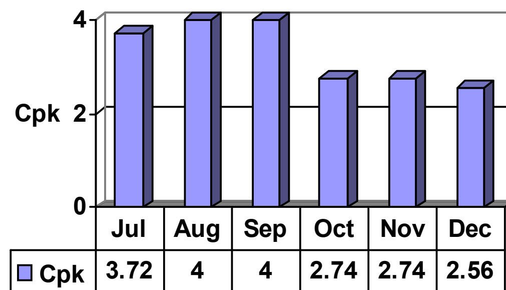
LSL = 6 gms



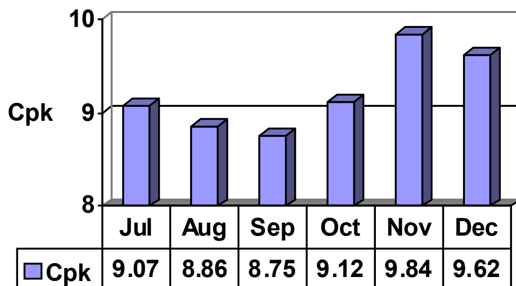
LSL = 20 gms



LSL = 300µin USL = 800µin



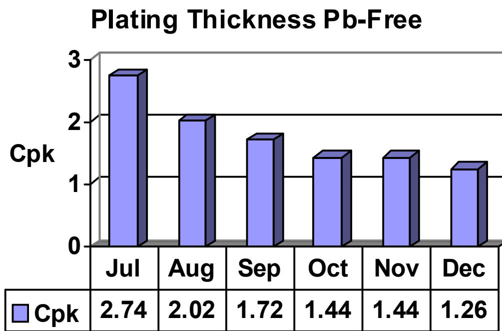
LSL = 80% USL = 90%



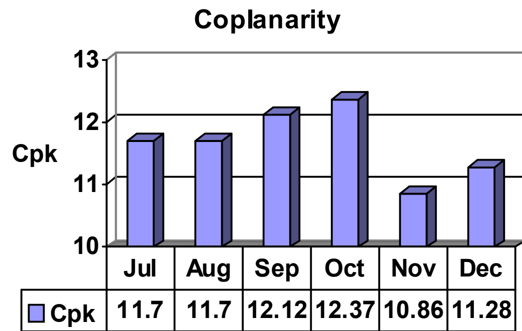
USL = 3.0 mils

Carsem S, Malaysia Program: 2009

Package Technology: SSOP



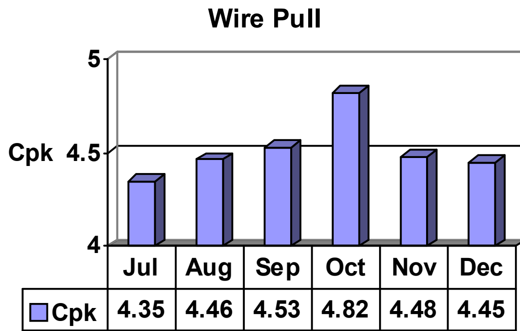
LSL = 300µin USL = 800µin



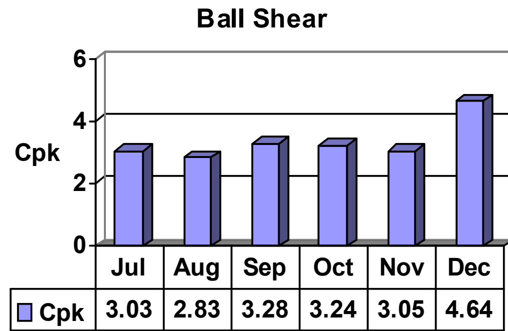
USL = 3.0 mils

Carsem S, Malaysia Program: 2009

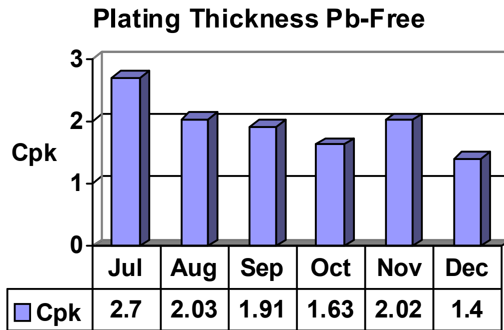
Package Technology: WSOIC



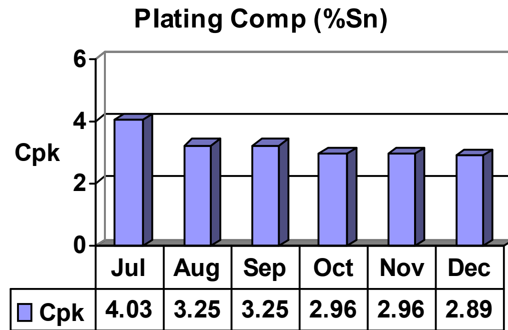
LSL = 6 gms



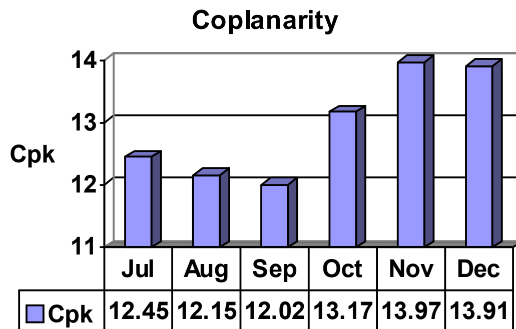
LSL = 20 gms



LSL = 300µin USL = 800µin



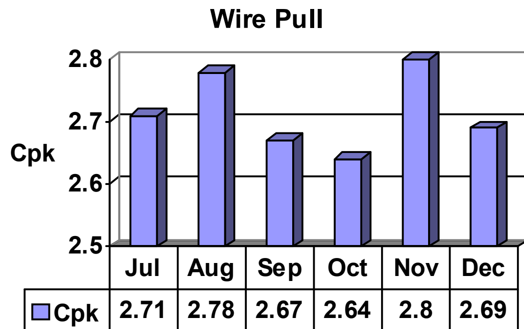
LSL = 80% USL = 90%

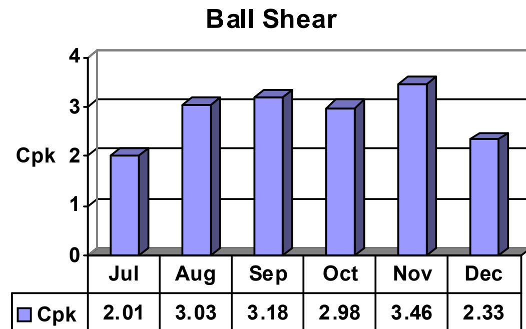


USL = 3.0 mils

Carsem S, Malaysia Program: 2009

Package Technology: PDIP





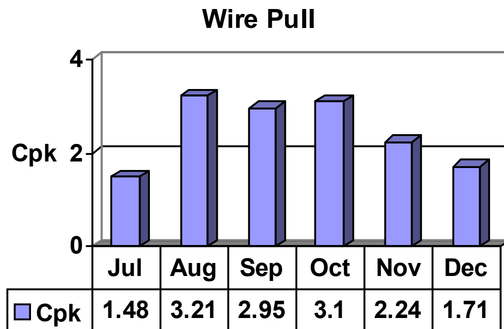
LSL = 6 gms

LSL = 20 gms

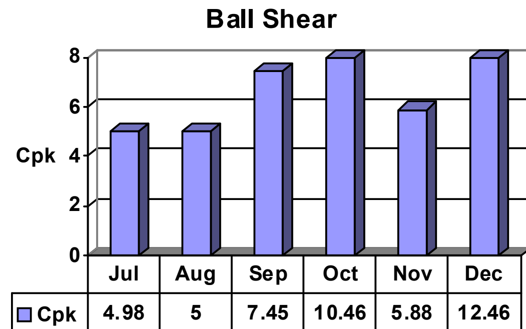
LSL = 300µin USL = 800µin

ASAT, China Program: 2009

Package Technology: BGA



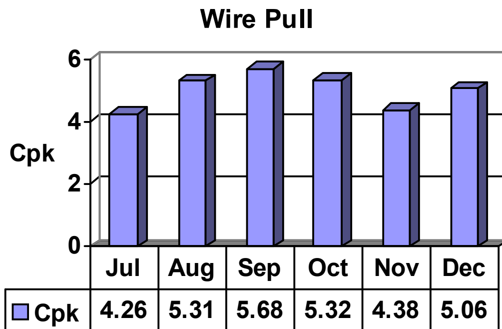
LSL = 6 gms



LSL = 20 gms

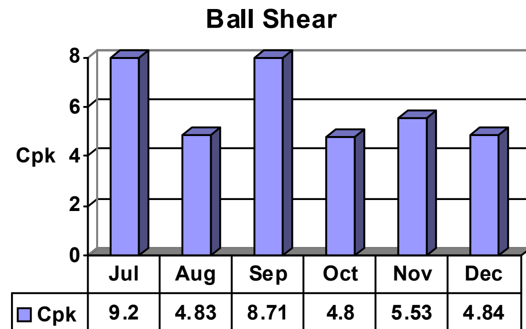
ASAT China Program: 2009

Package Technology: QFP



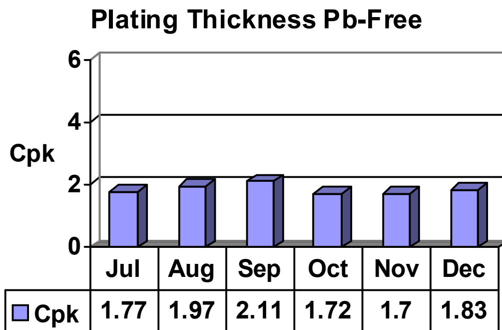
	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	4.26	5.31	5.68	5.32	4.38	5.06

LSL = 6 gms



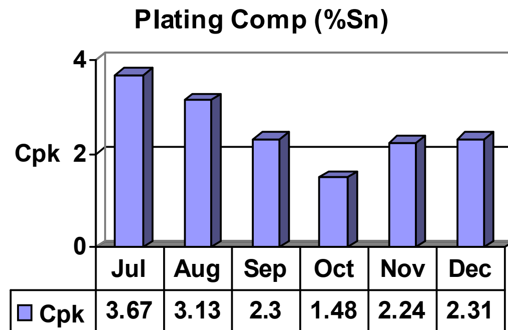
	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	9.2	4.83	8.71	4.8	5.53	4.84

LSL = 20 gms



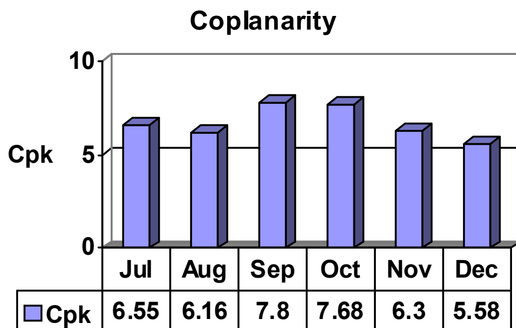
	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	1.77	1.97	2.11	1.72	1.7	1.83

LSL = 300μin USL = 800μin



	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	3.67	3.13	2.3	1.48	2.24	2.31

LSL = 80% USL = 90%

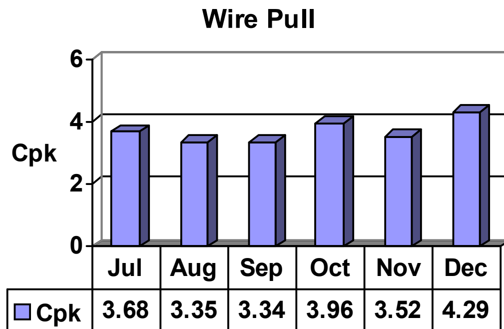


	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	6.55	6.16	7.8	7.68	6.3	5.58

USL = 2.0 mils

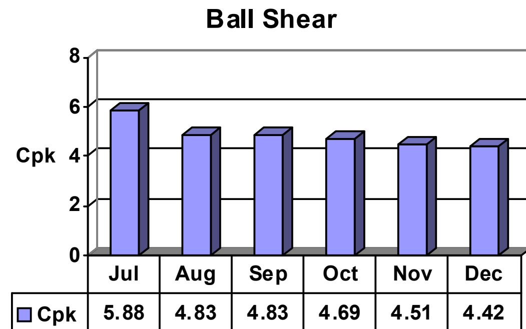
ASAT China Program: 2009

Package Technology: LPCC



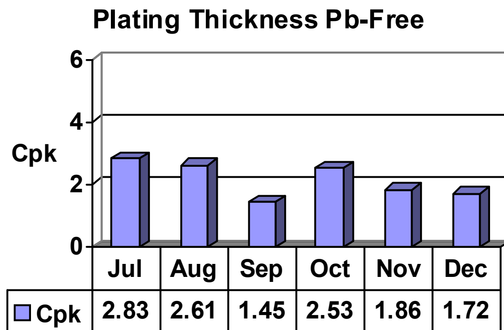
	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	3.68	3.35	3.34	3.96	3.52	4.29

LSL = 6 gms



	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	5.88	4.83	4.83	4.69	4.51	4.42

LSL = 20 gms



	Jul	Aug	Sep	Oct	Nov	Dec
Cpk	2.83	2.61	1.45	2.53	1.86	1.72

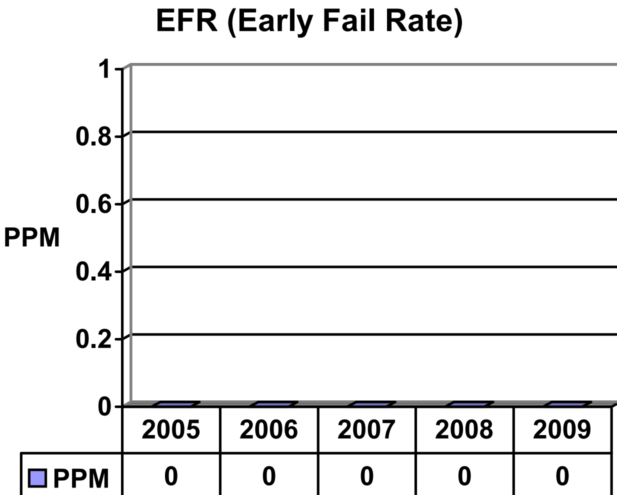
LSL = 300µin USL = 800µin

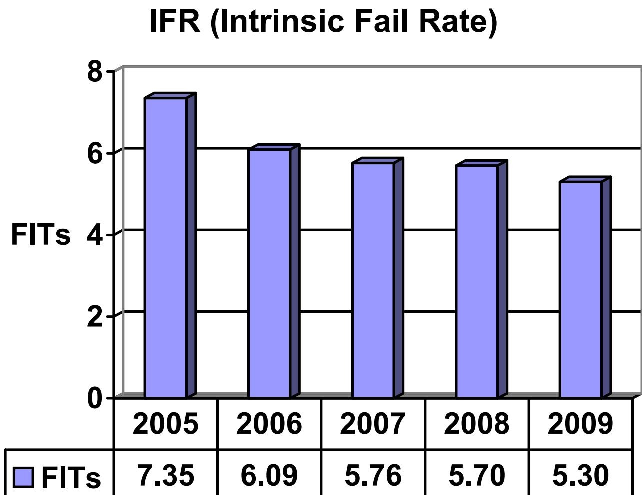
Reliability

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: CSM, Singapore

Process: 0.25µ/0.35µ CMOS





Year	Sample Size	# Fail	PPM
2005	311	0	0
2006	315	0	0
2007	90	0	0
2008	20	0	0
2009	105	0	0

Year	Sample Size	Device Hours	# Fail
2005	215	122,120	0
2006	270	208,080	0
2007	90	90,000	0
2008	20	20,000	0
2009	105	105,000	0

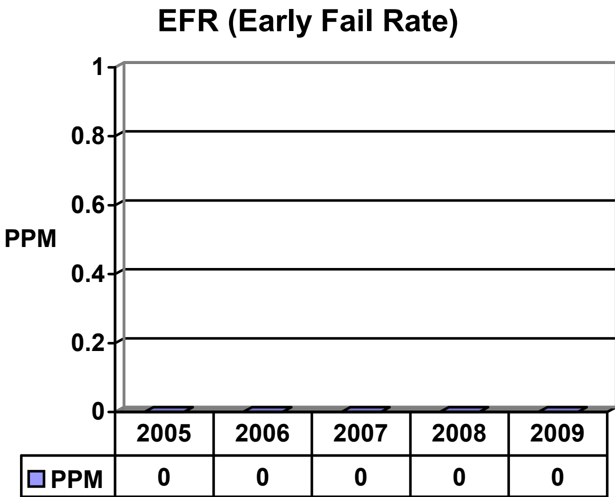
FIT: Failure in Time; 60% CL, 55°C, Ea = .7eV

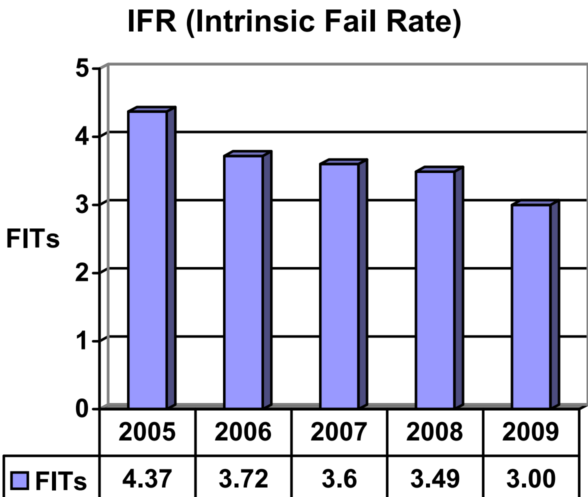
IFR: Intrinsic Failure Rate > 168 hours @ the test temperature of 125°C or > 72 hours @ 150°C

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

Factory: CSM Fab 2, Singapore

Process: 0.6µ CMOS





Year	Sample Size	# Fail	PPM
2005	369	0	0
2006	498	0	0
2007	90	0	0
2008	100	0	0
2009	180	0	0

Year	Sample Size	Device Hours	# Fail
2005	323	323,000	0
2006	498	498,000	0
2007	90	90,000	0
2008	100	100,000	0
2009	180	180,000	0

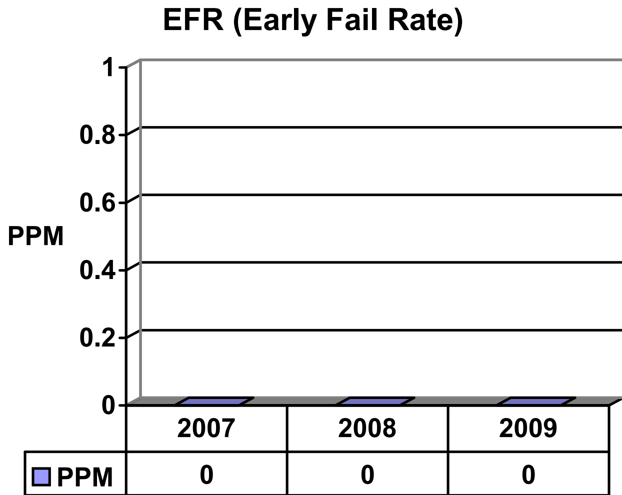
FIT: Failure in Time; 60% CL, 55°C, Ea = .7eV

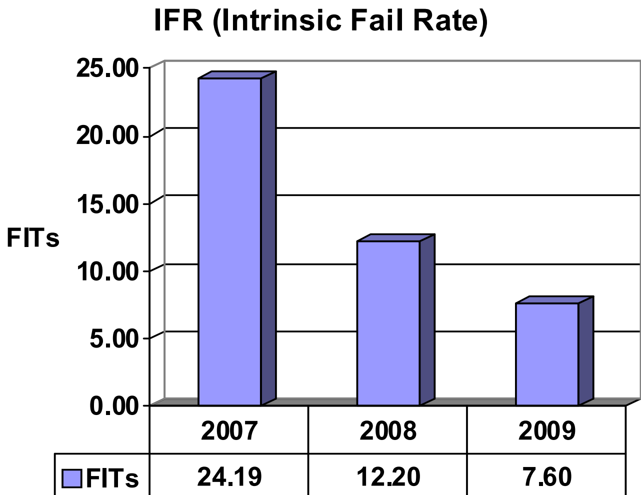
IFR: Intrinsic Failure Rate > 168 hours @ the test temperature of 125°C or > 72 hours @ 150°C

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

Factory: Jazz, USA

Process: 0.5µ CMOS





Year	Sample Size	# Fail	PPM
2007	486	0	0
2008	311	0	0
2009	747	0	0

Year	Sample Size	Device Hours	# Fail
2007	486	486,000	0
2008	311	311,000	0
2009	747	747,000	0

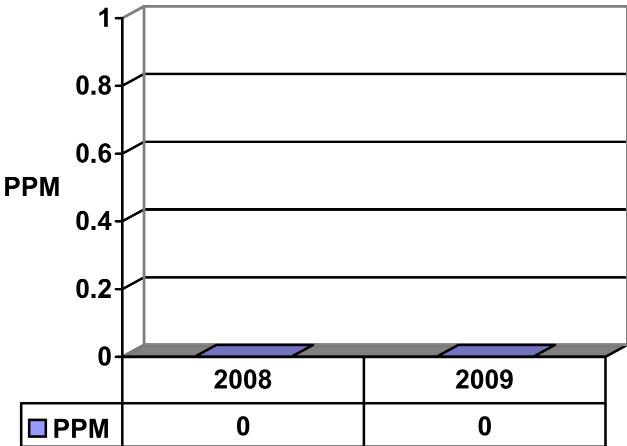
FIT: Failure in Time; 60% CL, 55°C, Ea = .7eV

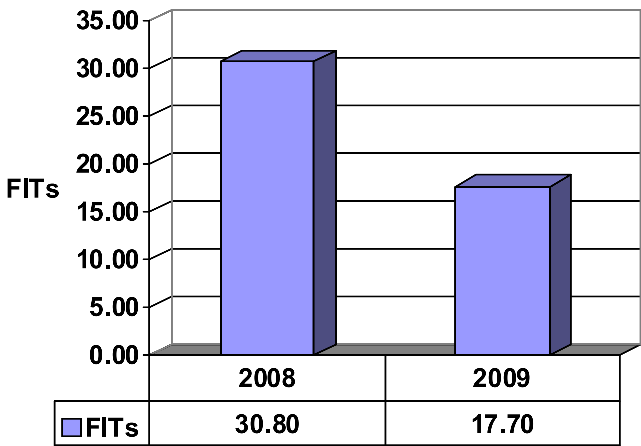
IFR: Intrinsic Failure Rate > 168 hours @ the test temperature of 125°C or > 72 hours @ 150°C

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

Factory: Polar, USA

Process: 0.5µ BiCMOS





Year	Sample Size	# Fail	PPM
2008	267	0	0
2009	280	0	0

Year	Sample Size	Device Hours	# Fail
2008	387	387,000	0
2009	280	280,000	0

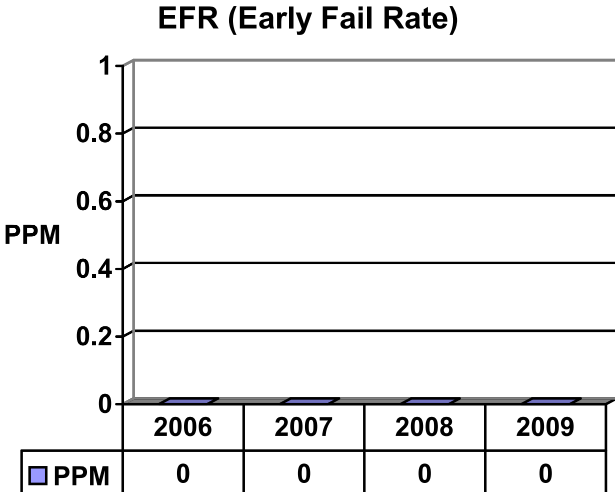
FIT: Failure in Time; 60% CL, 55°C, Ea = .7eV

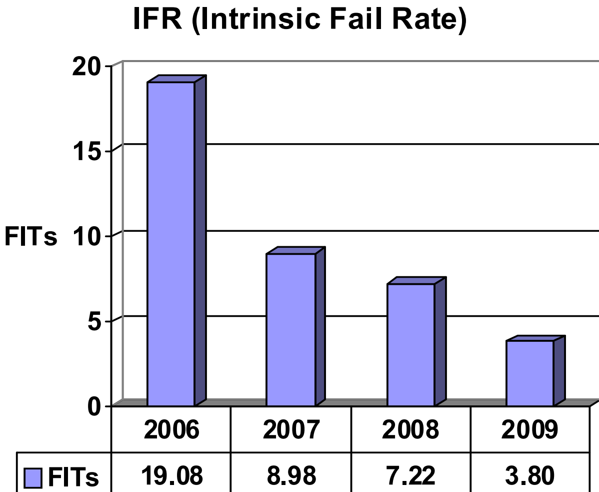
IFR: Intrinsic Failure Rate > 168 hours @ the test temperature of 125°C or > 72 hours @ 150°C

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

Factory: Episil, Taiwan

Process: 1.2µ / 2µ CMOS





Year	Sample Size	# Fail	PPM
2006	616	0	0
2007	693	0	0
2008	319	0	0
2009	1290	0	0

Year	Sample Size	Device Hours	# Fail
2006	616	616,000	0
2007	693	693,000	0
2008	319	559,000	0
2009	1290	1,290,000	0

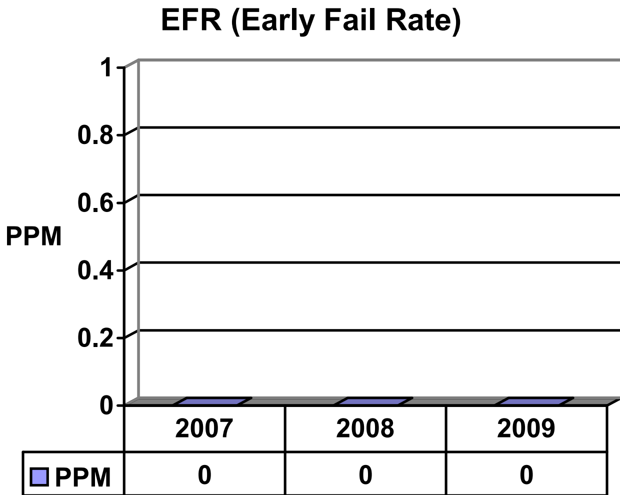
FIT: Failure in Time; 60% CL, 55°C, Ea = .7eV

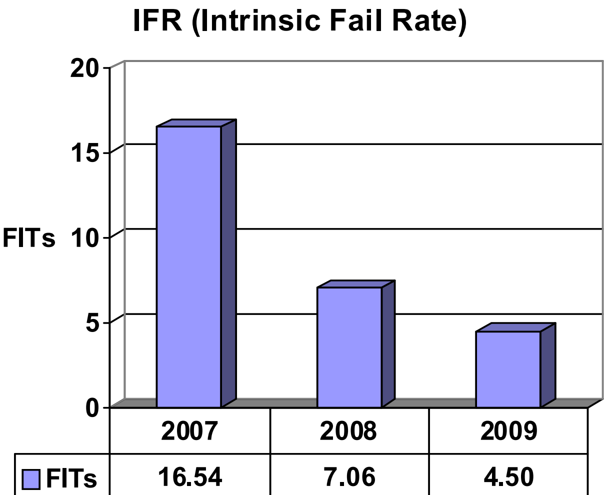
IFR: Intrinsic Failure Rate > 168 hours @ the test temperature of 125°C or > 72 hours @ 150°C

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

Factory: Silan, China

Process: 2µ CMOS





Year	Sample Size	# Fail	PPM
2007	711	0	0
2008	953	0	0
2009	946	0	0

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

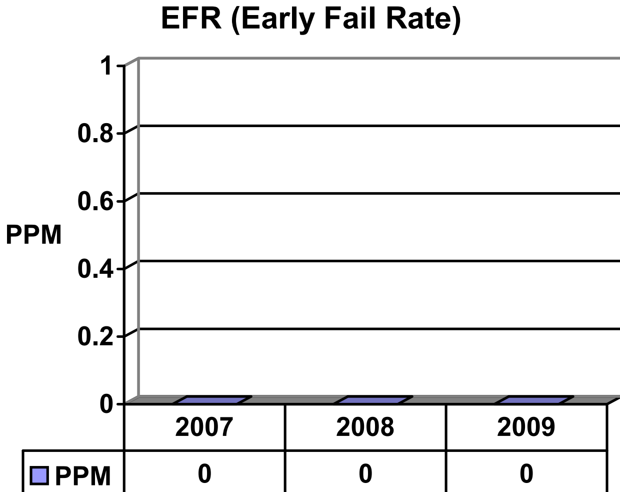
FIT: Failure in Time; 60% CL, 55°C, Ea = .7eV

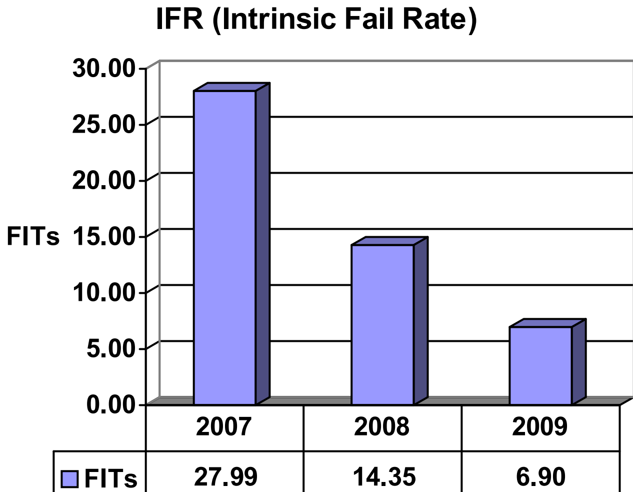
IFR: Intrinsic Failure Rate > 168 hours @ the test temperature of 125°C or > 72 hours @ 150°C

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

Factory: Silan, China

Process: 5µ CMOS





Year	Sample Size	# Fail	PPM
2007	420	0	0
2008	399	0	0
2009	893	0	0

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

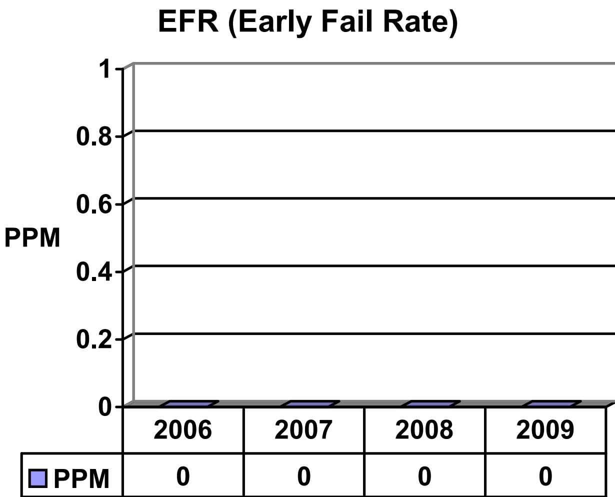
FIT: Failure in Time; 60% CL, 55°C, Ea = .7eV

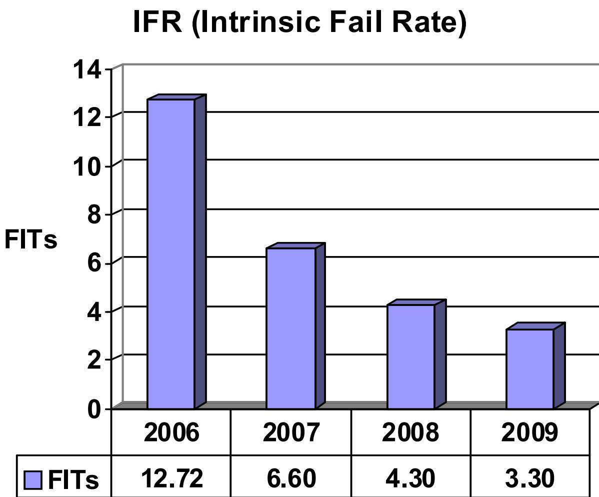
IFR: Intrinsic Failure Rate > 168 hours @ the test temperature of 125°C or > 72 hours @ 150°C

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
2006	1,600	0	0
2007	856	0	0
2008	721	0	0
2009	989	0	0

Year	Sample Size	Device Hours	# Fail
2006	924	924,000	0
2007	858	856,000	0
2008	721	721,000	0
2009	989	604,000	0

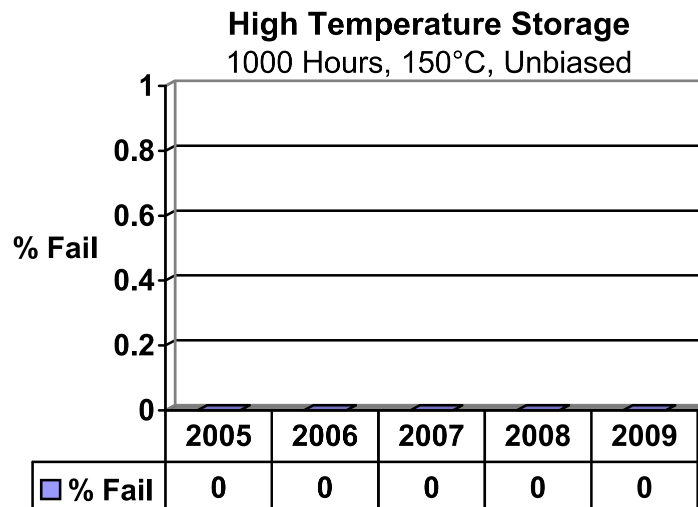
FIT: Failure in Time; 60% CL, 55°C, Ea = .7eV

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: CSM, Singapore

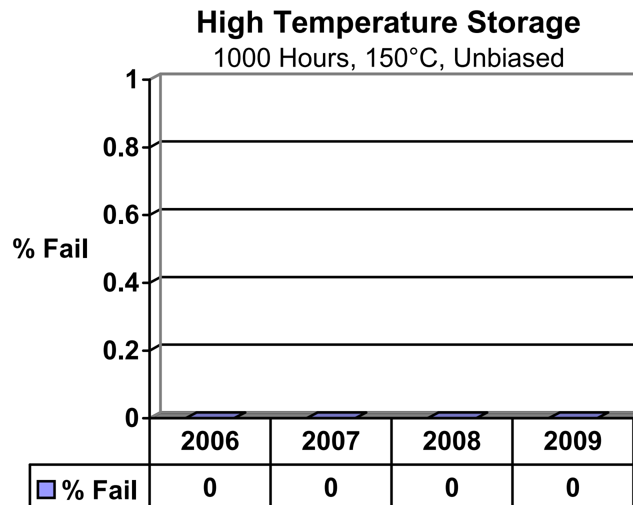
Process: 0.35µ CMOS



Year	Sample Size	# Fail	% Fail
2005	432	0	0
2006	322	0	0
2007	157	0	0
2008	75	0	0
2009	170	0	0

Factory: CSM, Singapore

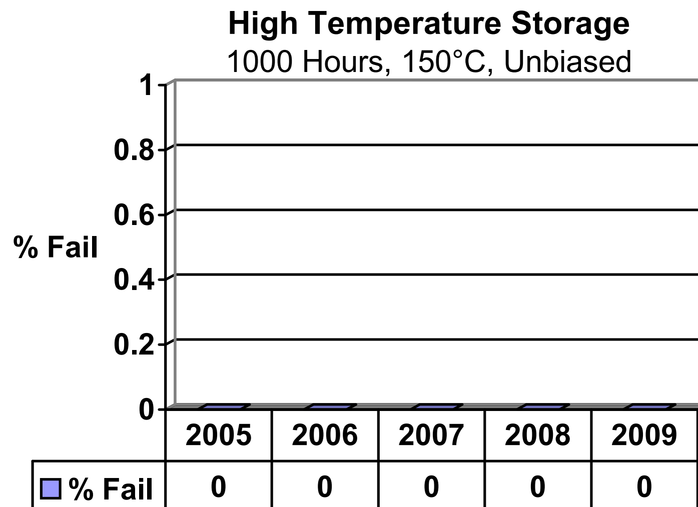
Process: 0.18µ CMOS



Year	Sample Size	# Fail	% Fail
2006	75	0	0
2007	83	0	0
2008	45	0	0
2009	65	0	0

Factory: CSM Fab 2, Singapore

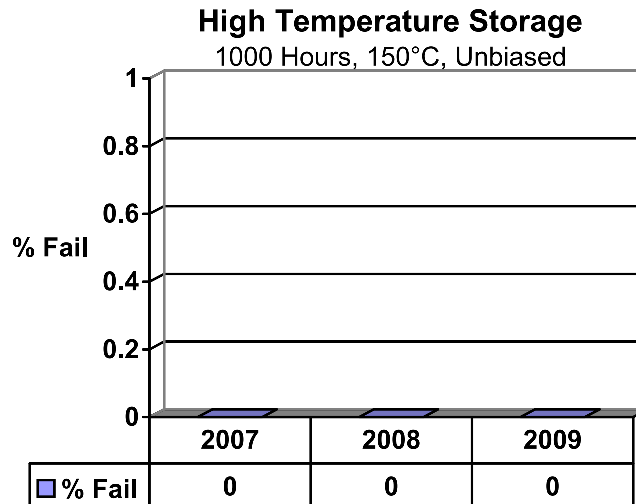
Process: 0.6μ CMOS



Year	Sample Size	# Fail	% Fail
2005	180	0	0
2006	579	0	0
2007	135	0	0
2008	100	0	0
2009	180	0	0

Factory: Jazz, CA USA

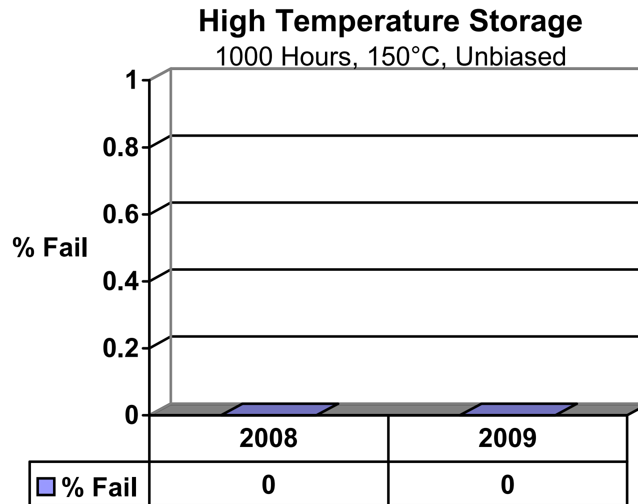
Process: 0.5µ CMOS



Year	Sample Size	# Fail	% Fail
2007	231	0	0
2008	25	0	0
2009	282	0	0

Factory: Episil, Taiwan

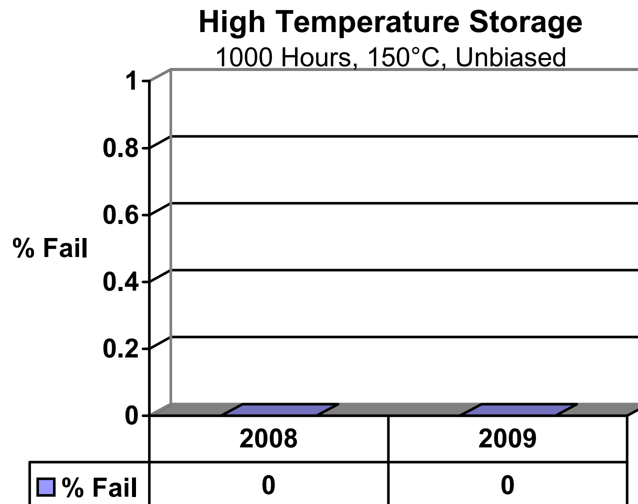
Process: 1.2µ CMOS



Year	Sample Size	# Fail	% Fail
2008	80	0	0
2009	225	0	0

Factory: Episil, Taiwan

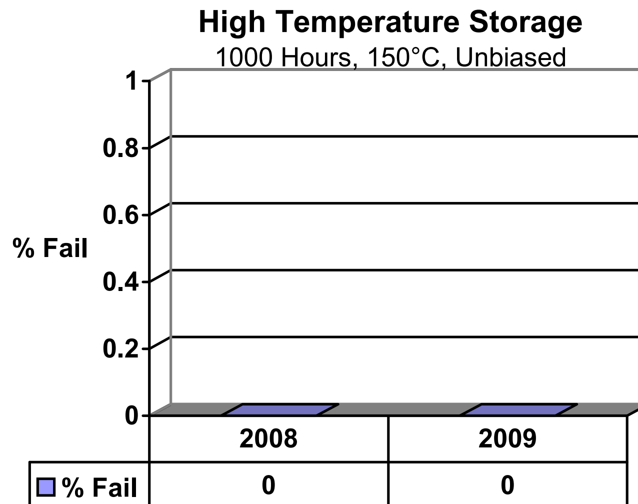
Process: 2μ CMOS



Year	Sample Size	# Fail	% Fail
2008	462	0	0
2009	137	0	0

Factory: Silan, China

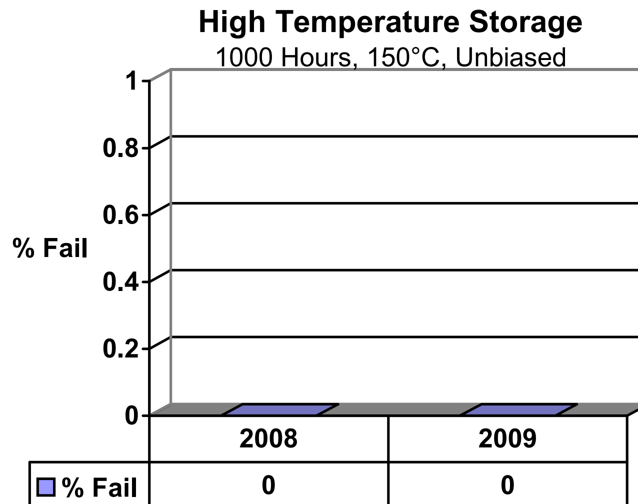
Process: 2μ CMOS



Year	Sample Size	# Fail	% Fail
2008	204	0	0
2009	878	0	0

Factory: Silan, China

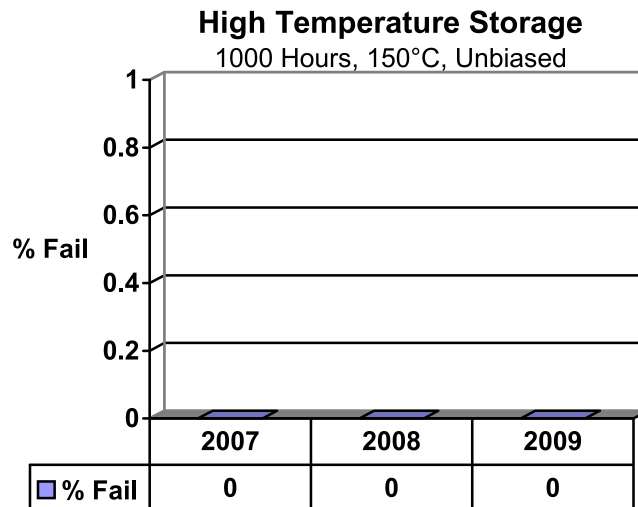
Process: 5µ CMOS



Year	Sample Size	# Fail	% Fail
2008	77	0	0
2009	185	0	0

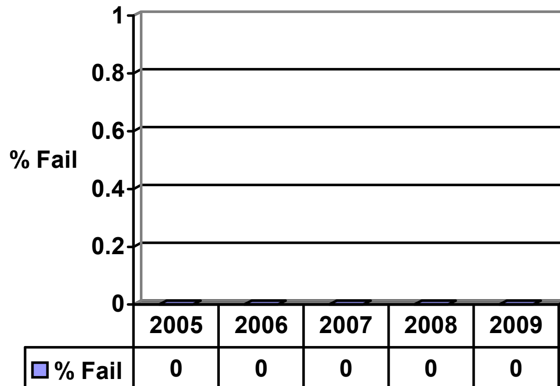
Factory: Silan, China

Process: Bipolar



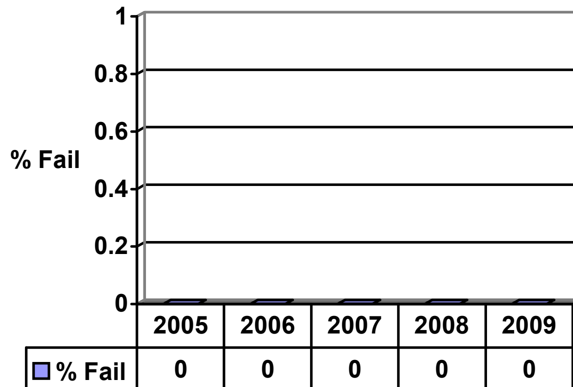
Year	Sample Size	# Fail	% Fail
2007	180	0	0
2008	116	0	0
2009	347	0	0

Package: BGA Families



Year	Sample Size	# Fail	% Fail
2005	268	0	0
2006	256	0	0
2007	127	0	0
2008	47	0	0
2009	74	0	0

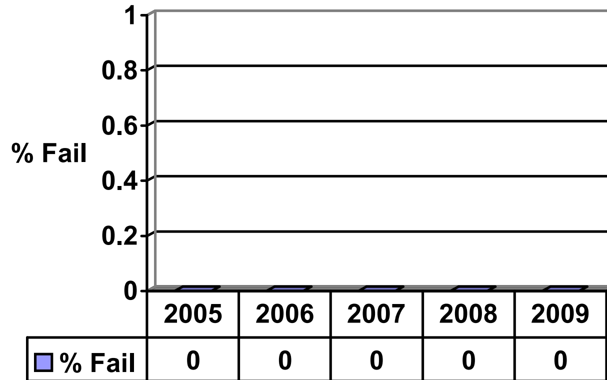
Conditions:
1000 Cycles -55/125°C.



Year	Sample Size	# Fail	% Fail
2005	151	0	0
2006	212	0	0
2007	97	0	0
2008	68	0	0
2009	74	0	0

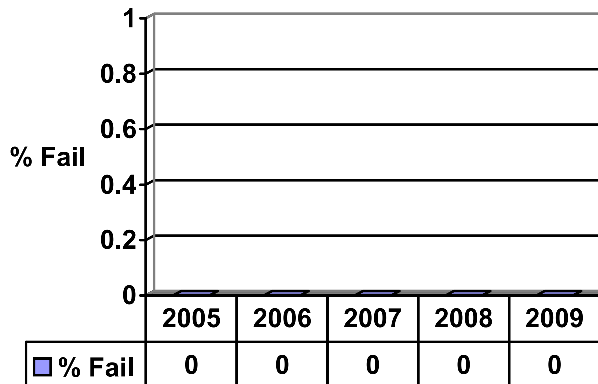
Conditions:
96 Hours, 130°C, 85% RH

Package: PDIP



Year	Sample Size	# Fail	% Fail
2005	275	0	0
2006	90	0	0
2007	243	0	0
2008	135	0	0
2009	225	0	0

Conditions:
1000 Cycles -65/150°C

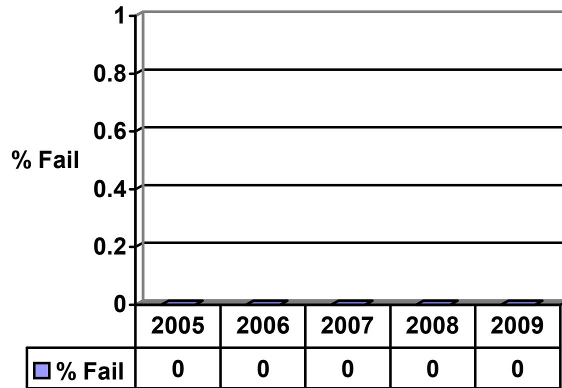


Year	Sample Size	# Fail	% Fail
2005	540	0	0
2006	225	0	0
2007	353	0	0
2008	135	0	0
2009	225	0	0

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

Package: PLCC

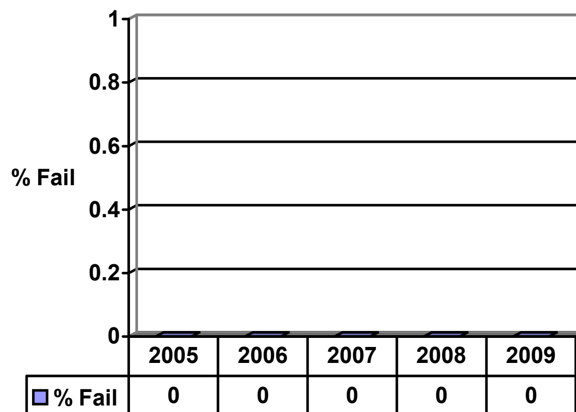
Temperature Cycle



Year	Sample Size	# Fail	% Fail
2005	280	0	0
2006	135	0	0
2007	45	0	0
2008	90	0	0
2009	45	0	0

Conditions:
1000 Cycles -65/150°C

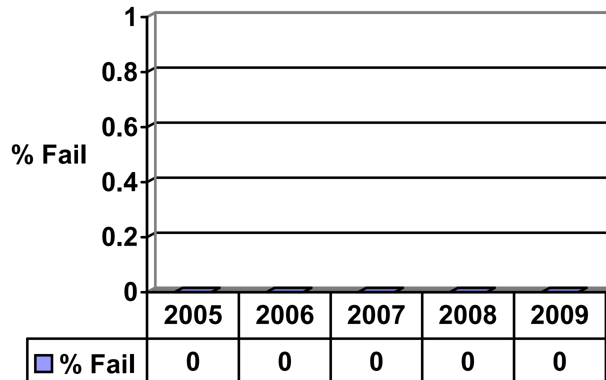
Pressure Pot/UHAST



Year	Sample Size	# Fail	% Fail
2005	360	0	0
2006	360	0	0
2007	90	0	0
2008	180	0	0
2009	45	0	0

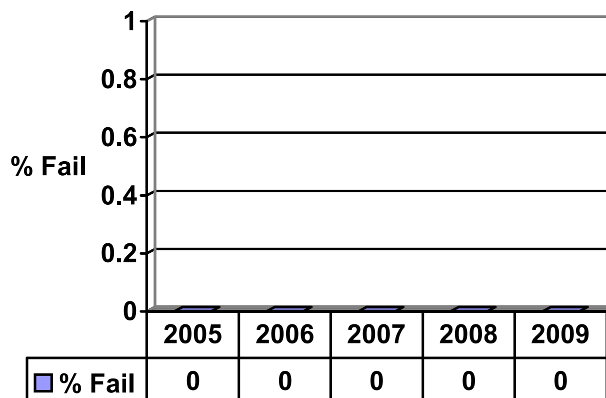
Conditions:
96 Hours, 130°C, 85% RH

Package: T/S/LQFP



Year	Sample Size	# Fail	% Fail
2005	536	0	0
2006	724	0	0
2007	645	0	0
2008	180	0	0
2009	310	0	0

Conditions:
300/1000 Cycles -65/150°C

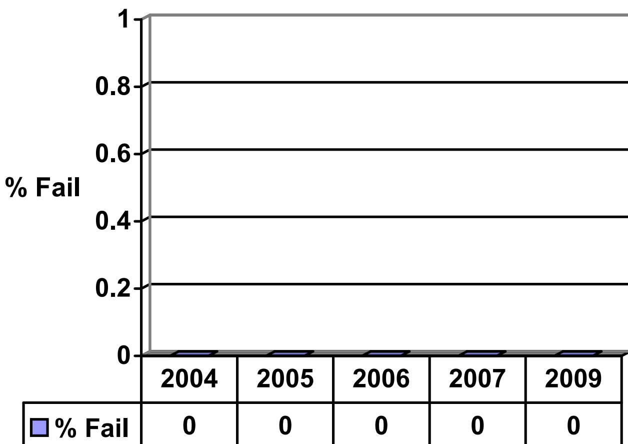


Year	Sample Size	# Fail	% Fail
2005	662	0	0
2006	820	0	0
2007	460	0	0
2008	225	0	0
2009	321	0	0

Conditions:
96 Hours,130°C, 85% RH

Package: TO

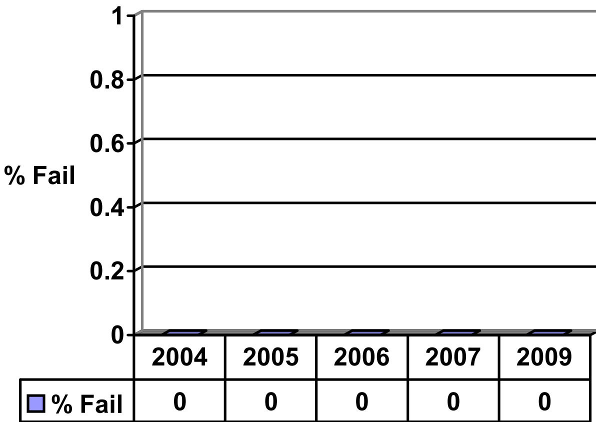
Temperature Cycle



Year	Sample Size	# Fail	% Fail
2004	320	0	0
2005	500	0	0
2006	180	0	0
2007	180	0	0
2009	855	0	0

Conditions:
1000Cycles, -65/150°C

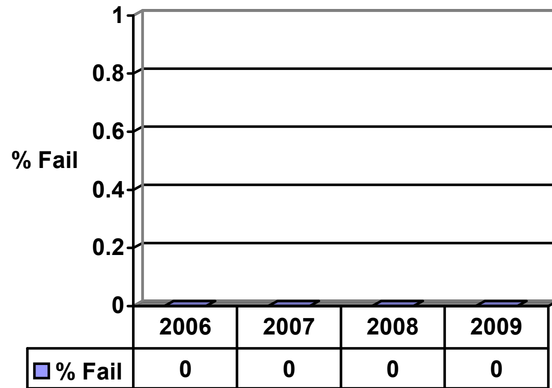
Pressure Pot/UHAST



Year	Sample Size	# Fail	% Fail
2004	760	0	0
2005	855	0	0
2006	310	0	0
2007	313	0	0
2009	855	0	0

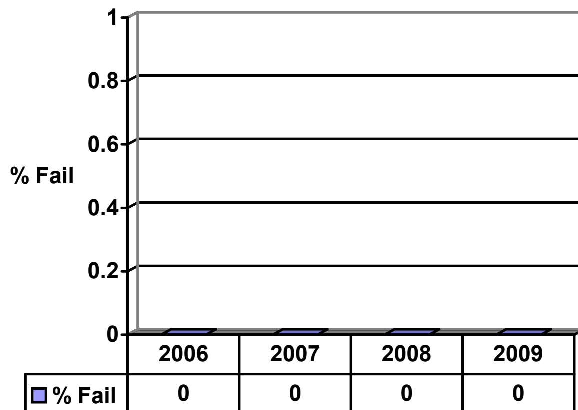
Conditions:
96 Hours, 130°C, 85% RH

Package: SOT, TSOT, SC-70



Year	Sample Size	# Fail	% Fail
2006	77	0	0
2007	908	0	0
2008	1780	0	0
2009	1042	0	0

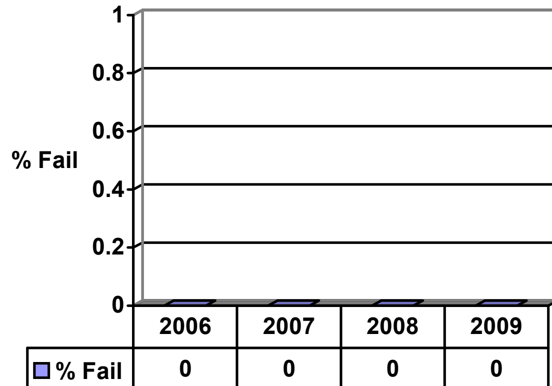
Conditions:
500/1000 Cycles -65/150°C



Year	Sample Size	# Fail	% Fail
2006	77	0	0
2007	915	0	0
2008	836	0	0
2009	1042	0	0

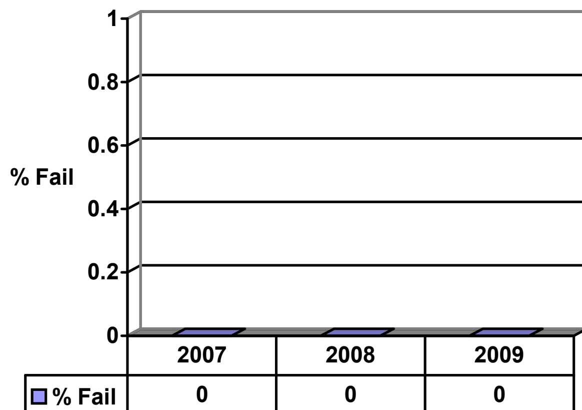
Conditions:
96 Hours, 121°C, 100% RH / or 96 Hours, 130°C, 85% RH

Package: MSOP, TSSOP, SSOP, SOIC



Year	Sample Size	# Fail	% Fail
2006	539	0	0
2007	2731	0	0
2008	2538	0	0
2009	3058	0	0

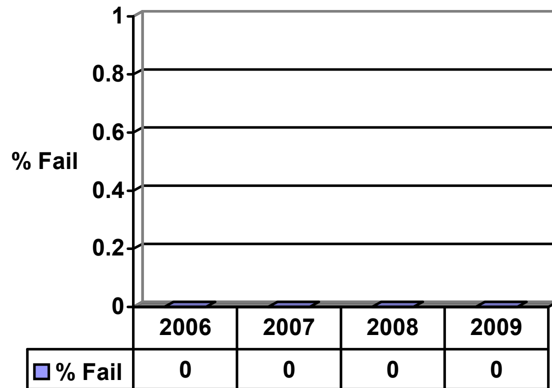
Conditions:
300/1000Cycles, -65/150°C



Year	Sample Size	# Fail	% Fail
2007	1131	0	0
2008	2253	0	0
2009	3189	0	0

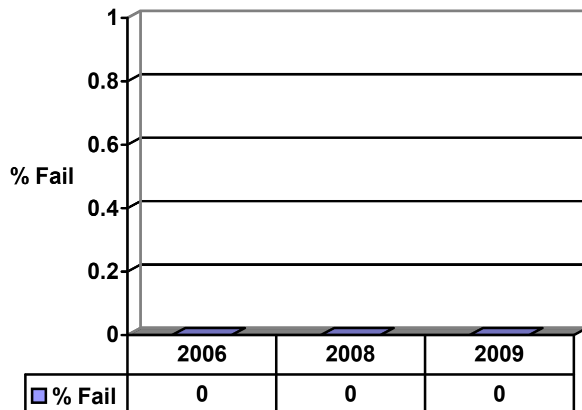
Conditions:
96 Hours, 121°C, 100% RH / or 96 Hours, 130°C, 85% RH

Package: DFN/QFN



Year	Sample Size	# Fail	% Fail
2006	231	0	0
2007	77	0	0
2008	45	0	0
2009	85	0	0

Conditions:
1000 Cycles -65/150°C,



Year	Sample Size	# Fail	% Fail
2006	308	0	0
2008	25	0	0
2009	220	0	0

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