1.1. S34ML-1 Product

48nm SLC NAND

48 nm SLC NAND was introduced in July 2012 and utilize tunnel Oxide, Polysilicon floating gate and interconnections are three metal layers with contact plugs and barrier metals. The 1st Metal layer for 48 nm SLC NAND is using Tungsten.

Data Summary and Failure Rate Estimation using Exponential Model HTOL Stress Temperature - 125°C

Failure Mechanisms	Read Point / Test Result		Modeling Parameters @ 55°C					Average Failure Rate	
	Early Life (hrs)	Inherent Life (hrs)	Ea eV	TAF	VAF	OAF	MTTF (yrs)	Early Life (PPM)	Inherent Life (FITS)
	96	1000							
Sample Size	496	150							
125C, Zero fails, Process ave. Ea	0	0	0.7	74	1	74		0	14
							8317		

Data Retention Bake - 150°C

Reliability Stress	Sample Size	Reject	PPM	FITS
1000	77	0	0	2

Endurance - 90°C

Reliability Stress	Sample Size	Reject	PPM	FITS
10000	60	0	0	2
100000(Decade)	64	0	0	

1.2. S34ML-1 Product Families

41 nm SLC NAND

41 nm SLC NAND were introduced in Jun 2012 and utilize tunnel Oxide, Polysilicon floating gate and interconnections are three metal layers with contact plugs and barrier metals. The 1st Metal layer for 41 nm SLC NAND is using Copper.

Data Summary and Failure Rate Estimation using Exponential Model HTOL Stress Temperature - 125°C

Failure Mechanisms	Read Point / Test Result		Modeling Parameters @ 55°C					Average Failure Rate	
	Early Life (hrs)	Inherent Life (hrs)	Ea eV	TAF	VAF	OAF	MTTF (yrs)	Early Life (PPM)	Inherent Life (FITS)
	96	1000							
Sample Size	500	150							
125C, Zero fails, Process ave. Ea	0	0	0.7	74	1	74		0	12
							9259		

Data Retention Bake - 150°C

Reliability Stress	Sample Size	Reject	PPM	FITS
1000	76	0	0	1

Endurance - 90°C

Reliability Stress	Sample Size	Reject	PPM	FITS
10000	60	0	0	2
100000(Decade)	64	0	0	

1.3. S34ML-2 Product

Families

32 nm SLC NAND

32 nm SLC NAND were introduced in October 2012 and utilize tunnel Oxide, Polysilicon floating gate and interconnections are three metal layers with contact plugs and barrier metals. The 1st Metal layer for 32 nm SLC NAND is using Copper

Data Summary and Failure Rate Estimation using Exponential Model HTOL Stress Temperature - 125°C

Failure Mechanisms	Read Point / Test Result		Modeling Parameters @ 55°C					Average Failure Rate	
	Early Life (hrs)	Inherent Life (hrs)	Ea eV	TAF	VAF	OAF	MTTF (yrs)	Early Life (PPM)	Inherent Life (FITS)
	96	1000							
Sample Size	499	150							
125C, Zero fails, Process ave. Ea	0	0	0.7	74	1	74	12198	0	9

Data Retention Bake - 150°C

Reliability Stress	Sample Size	Reject	PPM	FITS
1000	76	0	0	<1

Endurance - 90°C

Reliability Stress	Sample Size	Reject	PPM	FITS
10000	60	0	0	2
100000(Decade)	64	0	0	

1.4. S34ML-3 Product

Families

16nm SLC NAND

16 nm SLC NAND were introduced in December 2019 and utilize tunnel Oxide, Polysilicon floating gate and interconnections are three metal layers with contact plugs and barrier metals. The 1st Metal layer for 16 nm SLC NAND is using Copper

Data Summary and Failure Rate Estimation using Exponential Model HTOL Stress Temperature - 125°C

Failure Mechanisms	Read Point / Test Result		Modeling Parameters @ 55°C					Average Failure Rate	
	Early Life (hrs)	Inherent Life (hrs)	Ea eV	TAF	VAF	OAF	MTTF (yrs)	Early Life (PPM)	Inherent Life (FITS)
	96	1000							
Sample Size	500	126							
125C, Zero fails, Process ave. Ea	0	0	0.7	74	1	74	10185	0	8

Data Retention Bake - 150°C

Reliability Stress	Sample Size	Reject	PPM	FITS
1000	76	0	0	<1

Endurance - 90°C

Reliability Stress	Sample Size	Reject	PPM	FITS
10000	60	0	0	2
100000(Decade)	64	0	0	

2. Data Summaries by Package Family

2.1. BGA (Ball Grid Array)

Reliability Stress		Sample Size	Reject	Failure Rate PPM
HAST	96hrs	1770	0	0
	264hrs	3470	0	0
HIGH TEMP STORAGE	1000hrs	6075	0	0
TEMP CYCLE	500cycle	3737	0	0
	1000cycle	4579	0	0
UNBIASED HAST TEST	96hrs	4115	0	0
	264hrs	1064	0	0

2.2. TSOP (Thin Small Outline Package)

Reliability Stress		Sample Size	Reject	Failure Rate PPM
HAST	96hrs	3767	0	0
	264hrs	125	0	0
HIGH TEMP STORAGE	1000hrs	5239	0	0
PRESSURE COOKER TEST	96hrs	90	0	0
	168hrs	2491	0	0
TEMP CYCLE	500cycle	5748	0	0
	1000cycle	840	0	0
UNBIASED HAST TEST	96hrs	2145	0	0