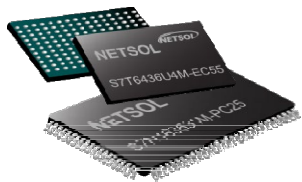




NETSOL Company Profile



High Quality & High Performance Memory Provider

2019

NETSOL Co., Ltd.

NETSOL – History



2019

- Developed 1Gb SPI NAND Flash

2018

- Developed 1/2/4Gb SLC NAND Flash

2017

- Developed 32Mb Customized SRAM

2016

- Developed 1/2/4/8Mb Low Power SRAM

2015

- Developed 144Mb Sync. SRAM

2014

- Move office to Innoplex Bldg.
- Developed 144Mb Quadruple/DDR SRAM

2013

- Developed 4Mb Async Fast SRAM
- Developed 18/36/72Mb Quadruple/DDR SRAM

2012

- Patent License from Samsung Electronics
- Developed 4/18Mb Sync SRAM

2011

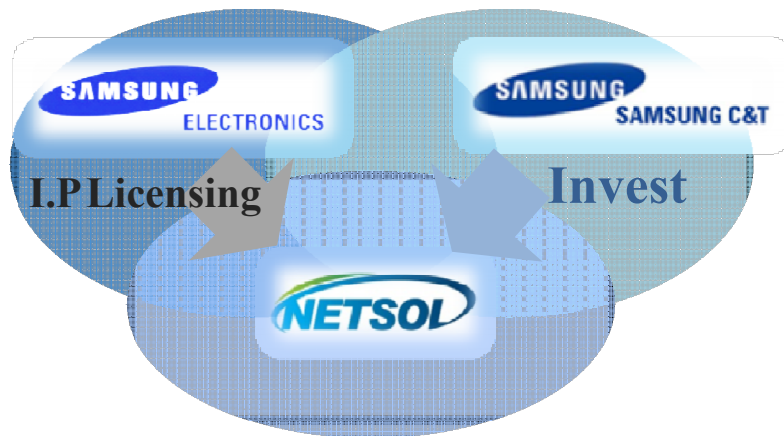
- Developed 9Mb Sync SRAM
- ISO 9001:2008 certification

2010

- Sep. : Establishment of the company

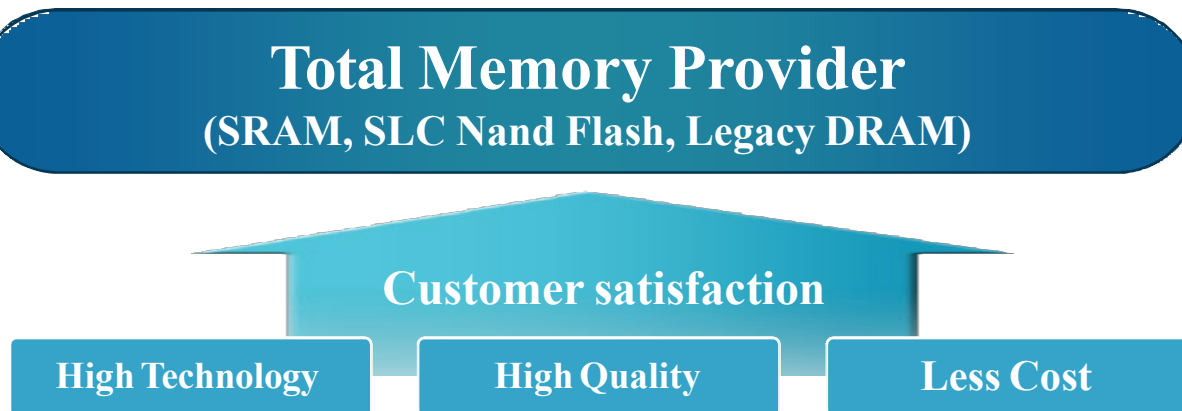


- NETSOL is focusing on Niche Memory Market with Longevity

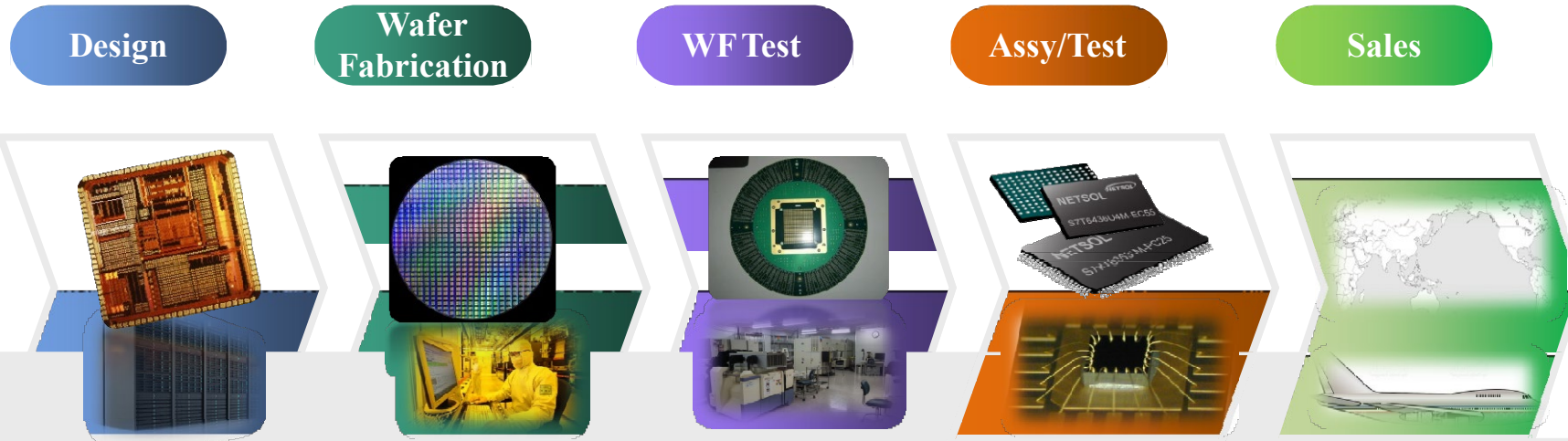


- ✓ **About 20 years** of Key Engineers' career
 - *All from Samsung*
- ✓ **10 years** of Product Supply Guarantee
 - *No PCN, Stable Supply*
 - *Stable Quality Management*

- NETSOL Goal



- NETSOL Profile



- 100% Samsung Designer
- 9 Products For 7 Years
- 100% Success

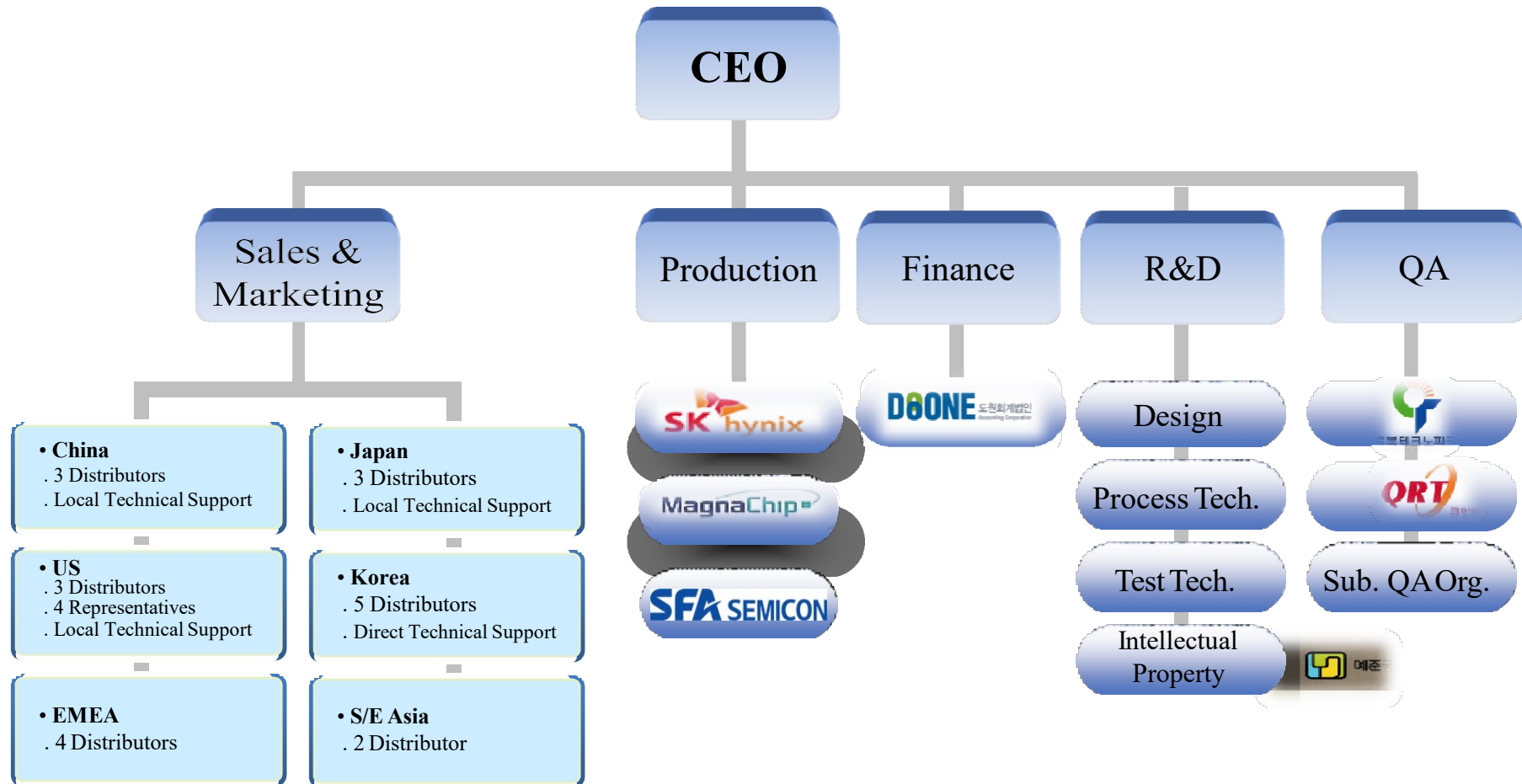
- 8" Wafer Fab.
- 90nm Process But 65nm Process (@Contact Process)
- SRAM Cell Shrink : 1.1um² -+ 0.73um²

- Nesol has Own WF Test Line
- WF Tester & Laser Repair

- Using SEC SRAM ASS'Y/Test Line
- PKG Tester & Marking

- World Wide Biz. : Partners in WW
- Export 95%

NETSOL – Organization Chart



I Longevity

II Cost Competitiveness

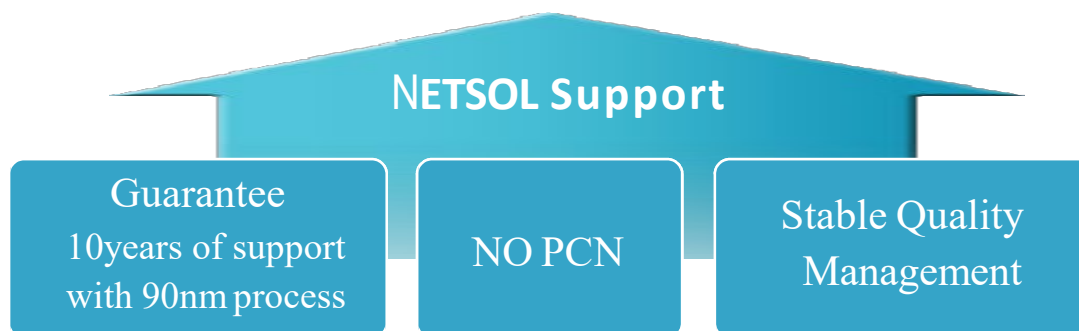
III High Quality

IV Customer Oriented Management

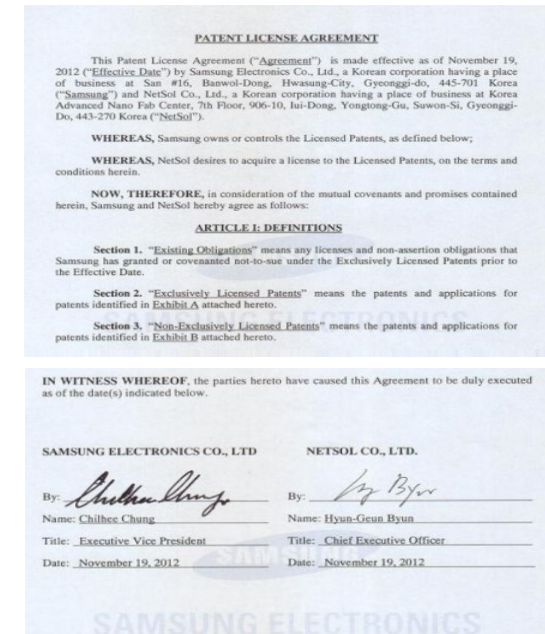
I. Longevity

Customer Requirement

Application		Long-Term Support Requirement
Commercial	. Office Appliance . POS, ATM	5~7 years
Network	. Switch . Router	More than 10 years
Industrial/ Medical	. Factory Automation . Medical Diagnostic	10 years
IoT/Smart	. Smart Grid . Smart Home	5~10 years



Strongest IP Holder



- **Foundry (SK Hynix M8 Line)**
 - . Capacity : 100K wafers/m
 - . Allocated to NETSOL : 20K wafers/m
- **Wafer Test**
 - . In-House Clean Room
- **Backend (SFA semi.)**
 - . Capacity : 35Mpcs/m
 - . Allocated to NETSOL : 2Mpcs/m

II. Cost Competitiveness & High Quality *Confidential*



• Tile Type Cell Architecture

	NETSOL	Competitors
Cell Type	Tile Type	Thin Type
Cell Architecture		
Layer	1 Poly, 2 metal	1 poly, 3 metal
Contact per cell	9.5 contacts (contact, via-1)	16 contacts (contact, via-1, via-2)
Vcc/Vss	One common Vcc/Vss	2 separated Vcc/Vss

✓ **Better Reliability :** Symmetric Type Cell
 Common Power
 Less Contact and Metal Layer

✓ **Less Cost :** Small Cell Size (30~40% Shrink)

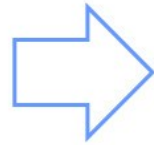
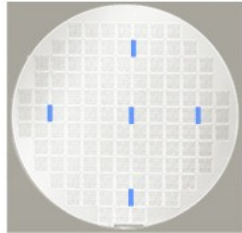
III. High Quality

Superior Quality Control

Maverick Die Control by IET(In-line Electrical Test)

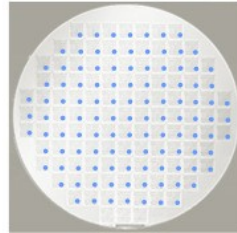
•Others

→ 5 Point per Wafer, 1~2 wafer per Lot
Normal ET(Electrical Test) using HP4145 or HP4062

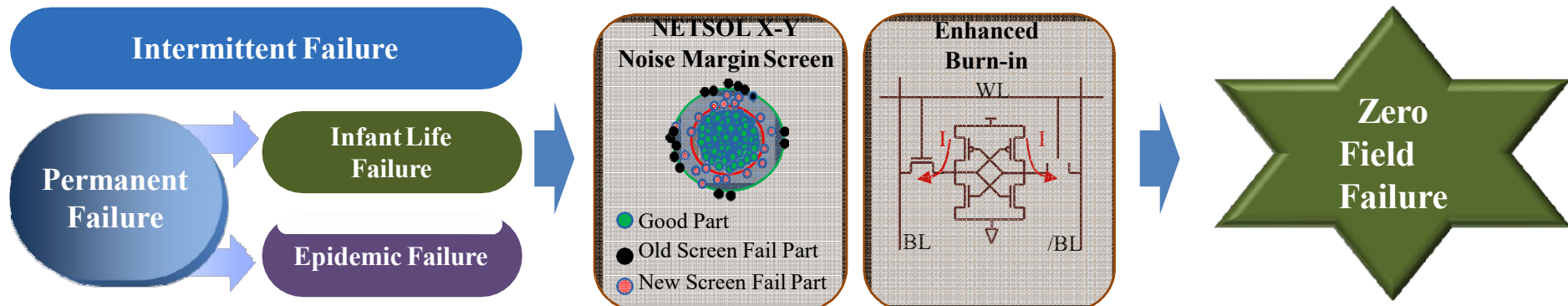


•NETSOL

→ All chip and All Lot
IET(In-line Electrical Test) during Wafer Sort Test




Advanced Screen-Ability



III. High Quality- ISO Certification

Quality Certification



CERTIFICATE OF REGISTRATION

This is to certify that:
Netsol CO., LTD.
 Rm 604, 3-dong, Innoplex, 304, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Republic of Korea

operates a
QUALITY MANAGEMENT SYSTEM
 which complies with the requirements of
ISO 9001:2015

NETSOL Certification

NETSOL comply with the provisions of ISO and also attach subcontractor's ISO document.

SK hynix SK Hynix Certification

[ISO/TS 16949]




[ISO 14001]




[ISO 18001]




[TS 16949]




[ISO 14001]




[OHSAS 18001]




[SONY Green-Partner]



[SEC Eco-Partner]



SFA(STS) Certification



Customer Satisfaction

Small Qty Batch Production

- 180 different products with small Qty to support all customers demand
- Small MOQ

Short Lead Time

- Normal Lead Time 8 weeks
- Special Lead Time 5 weeks (Hot Run)








Quick Response Time

- within 12 hours, answer to inquiry of price/leadtime
- within 24 hours, preliminary FA report after receipt of samples
- within 2 weeks, final FA report after receipt of samples
- Engineer Dispatch : within 2 days after requested by customers








NETSOL Design win Status

NETSOL's Customers by Applications








Commercial

Panasonic - IP Phone, MFP	
Toshiba - MFP, POS	
Polycom - IP Phone	
Unify - IP Phone	
Avaya - IP Phone	
Ditron - POS	
Smuff Bio - Security	








Industrial

Hitachi - Radio system	
Bosch Rexroth - Automotive	
Sick AG - Factory Auto.	
Rigol - Oscilloscope	
LTX Credence - Tester	
AGFA Healthca - Medical	
Ziehm Imaging - Medical	

Network

Nokia - Switch / Router	
Palo Alto NW - Switch / Router	
Radware - Switch / Router	
Avaya - Switch / Router	
Zhone - Switch / Router	
cPacket - Switch / Router	
ECI Telecom - Switch / Router	

IoT

Sunrise - Smart Meter	
Kaifa - Smart Meter	
Commax - Smart Home	
Seagate - Storage Server	
Inspur - Storage Server	
Sugon - Storage Server	
Harmonic - Broadcast	

Confidential

Product



Product Roadmap

· SRAM

Memory	Density	2019				2020				2021				2022			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Async Fast SRAM	1Mb, 2Mb	1.65V~3.6V, 5.0V (8ns, 10ns)															
	4Mb, 8Mb																
	16Mb, 32Mb																
Async Low Power SRAM	1Mb, 2Mb	2.3V~3.6V, 5.0V (45ns, 55ns, 70ns, Isb1 < 10uA)															
	4Mb, 8Mb																
	16Mb																
Sync/QDDR SRAM	4Mb, 9Mb	1.8V Vdd, 1.5/1.8V VddQ (250~550MHz, QDDR-I/II/II+, ODT support)															
	18Mb, 36Mb																
	72Mb, 144Mb																
Frame Buffer SRAM	32Mb	2.3V~3.6V (100MHz)															

Product Roadmap

- FLASH

Memory	Density	2019				2020				2021				2022			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
SLC NAND	1G bit	128Mx8 / 2.7V~3.6V / 1bit ECC / 48 TSOP-I															
	2G bit	256Mx8 / 2.7V~3.6V / 4bit ECC / 48 TSOP-I															
	4G bit	512Mx8 / 2.7V~3.6V / 4bit ECC / 48 TSOP-I															
	8G bit (TBD)	1Gx8 / 2.7V~3.6V / 4bit ECC / 48 TSOP-I															

Product Roadmap

- FLASH

Memory	Density	2019				2020				2021				2022			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
SPI NAND	1G bit	M-die / 2.7V~3.6V / Quad SPI / WSON,SOIC															
	2G bit	M-die / 2.7V~3.6V / Quad SPI / WSON,SOIC															
	4G bit	M-die / 2.7V~3.6V / Quad SPI / WSON,SOIC															

ELEKTRONIK **Blume**

Christoph Haßenpflug

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WWW.BLUME-ELEKTRONIK.DE

partnership in excellence

The background is a gradient of blue, transitioning from a darker shade at the top to a lighter shade at the bottom. It features abstract patterns of overlapping circles and dots, creating a sense of depth and movement. The text "Thank You!" is centered in a bold, blue, serif font.

Thank You!