APACT
Advanced Package & Test

Company Profile

Feb. 2023

Company Overview

Overview

Co. Name	APACT Co., Ltd
Est.	Est. Jun 2007 (Merged with ATS PKG in Nov. '22)
CEO	Lee Sungdong
Biz Loc.	▪ Anseong : Iljuk, Anseong, Gyeonggi ▪ Eumseong : Maengdong, Eumseong, Chungcheongbuk ▪ Jincheon : Jincheon, Chungcheongbuk ▪ Sales office : Pangyo, Seongnam, Gyeonggi
Area	▪ Anseong : Land area 19,173m^2, Floor area 11,240m^2 ▪ Eumseong : Land area 14,876m^2, Floor area 214,876m^2 ▪ Jincheon : Land area 37,014m^2, Floor area 23,471m^2
Employee	650 (380 for PKG, 270 for TEST)
QC	IATF16949, ISO9001, ISO14001, ISO45001
Biz Field	Assembly, Test
PKG Type	Memory(MCP, eMMC, PoP, BOC, TSOP), FBGA, QFP, SiP, QFN
Capital	USD $160 million (End of '22)

2022.11	Turn-Key Biz(Merged ATSemi Assy house)
2022.09	System IC Test Service
2021.06	Sales office for System IC (Pangyo, Seongnam)
2020.06	Est. Eumseong Campus
2014.12	Listed on KOSDAQ
2012.06	Est. Head Factory(Anseong Campus)
2008.08	DRAM Memory Test Service
2007.11	NAND Flash Memory Test Service
2007.06	Establishment of HISEM Co., Ltd.

Location

Business convenience : It is one hour away

Sales Office

Pangyo, Bundang-gu,
Seongnam-si (in 2021)

Jincheon Campus:

PKG (in 1999)
Cleanroom (22,416m^2)

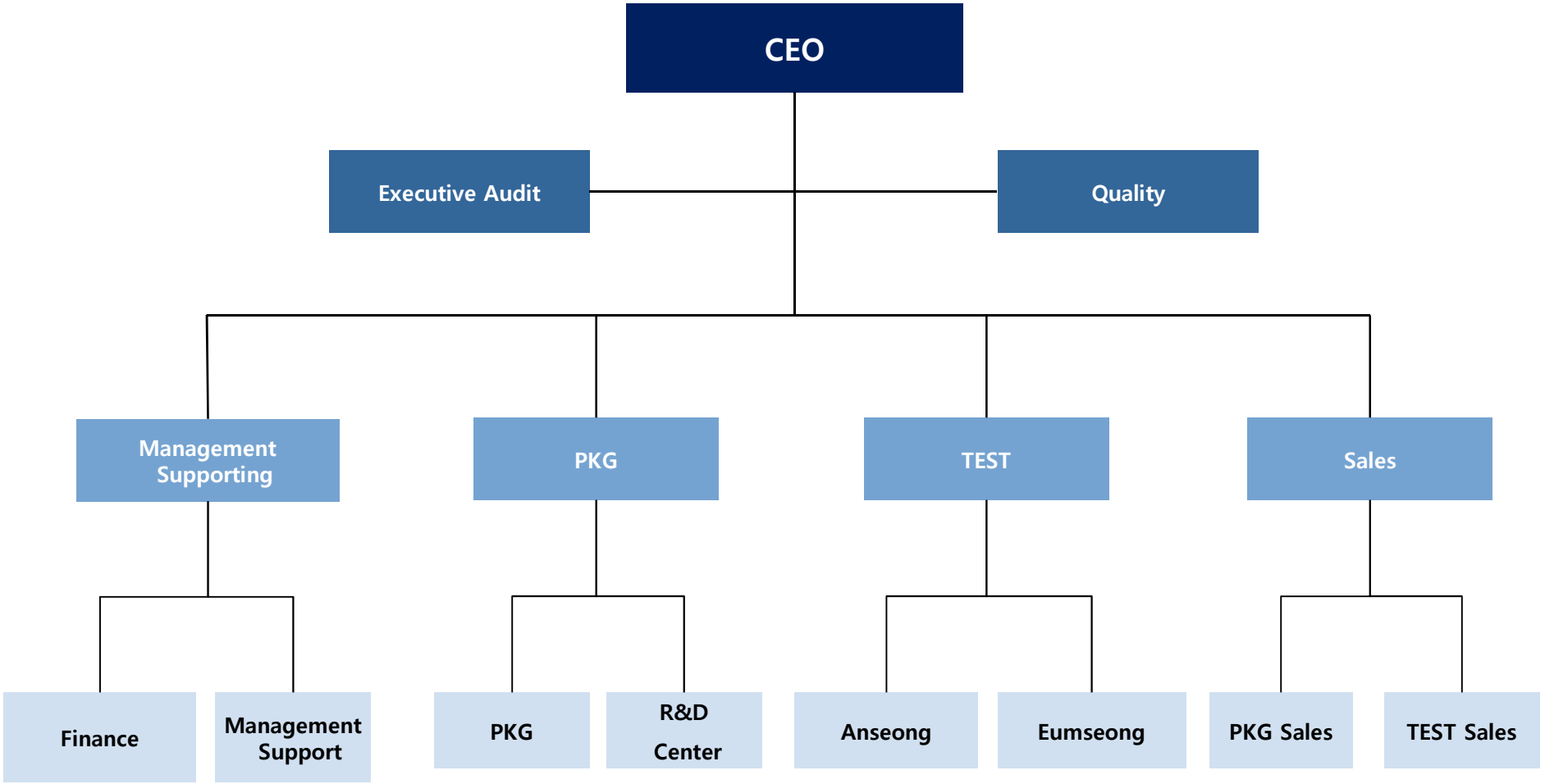
Anseong Campus (Headquarter)

TEST (in 2012)
Cleanroom (5,950m^2)

Eumseong Campus

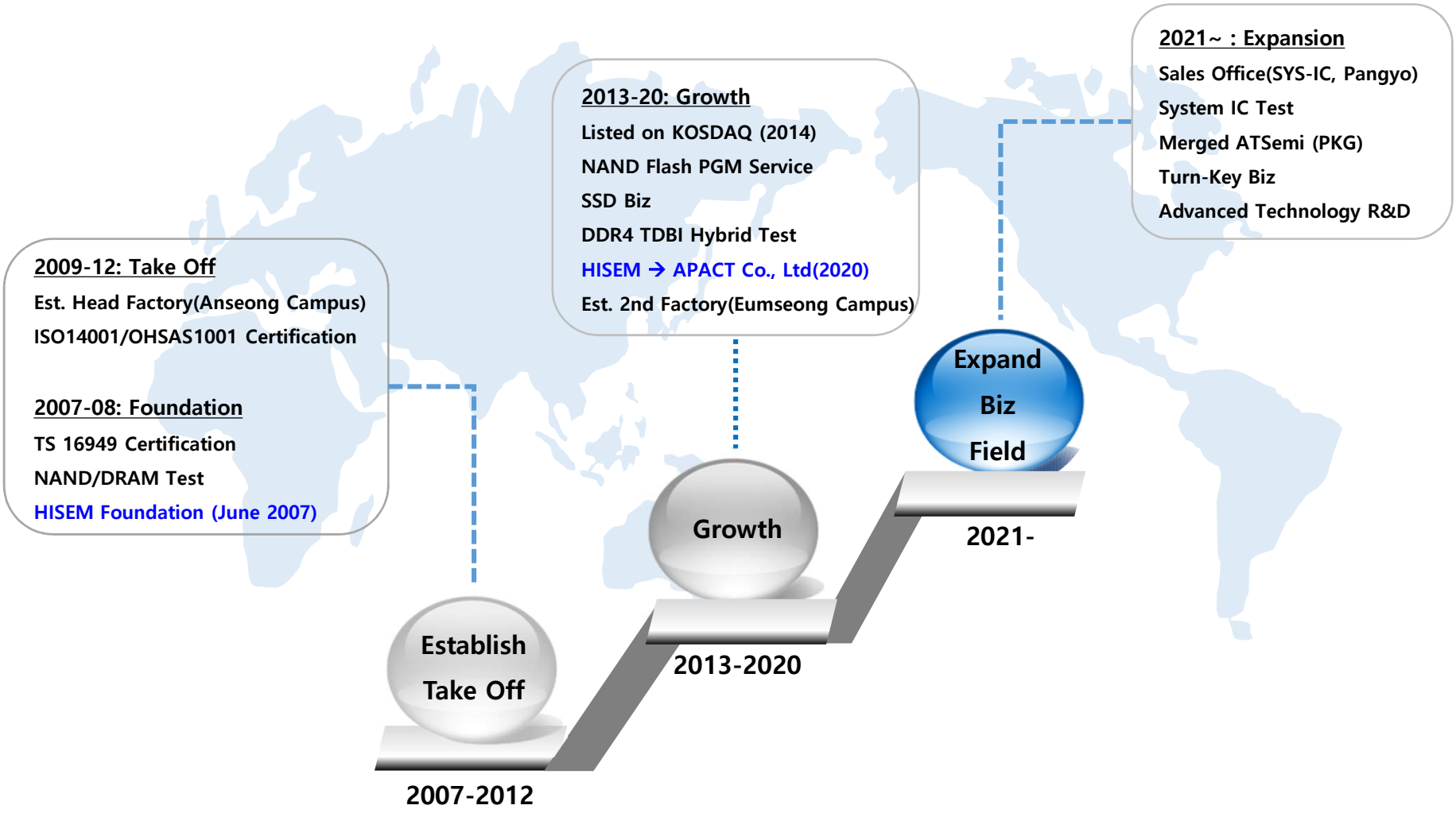
PKG & TEST (in 2020)
Cleanroom(5,785 + 4,793m^2)

Organization



History

Growth Milestone



Business Scope

■ Turn-Key Service : Assembly and Test

Certification

■ Quality Management, Environmental Management, Ethical Management

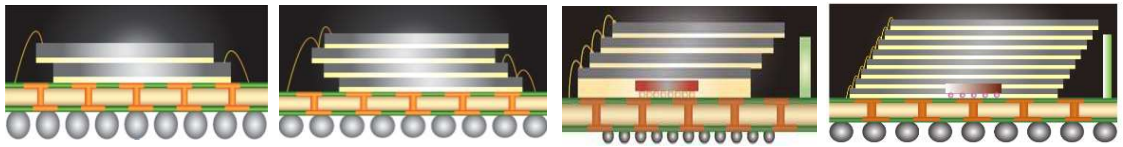
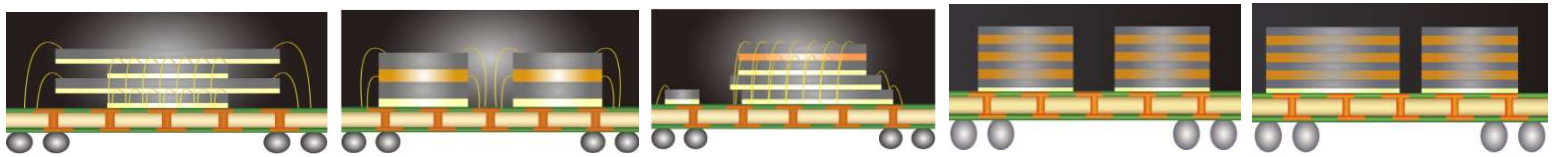
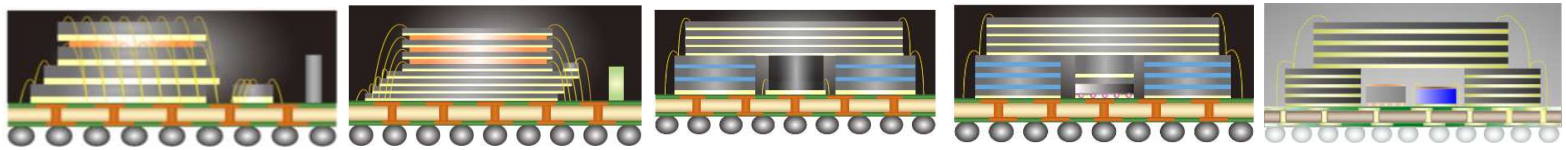
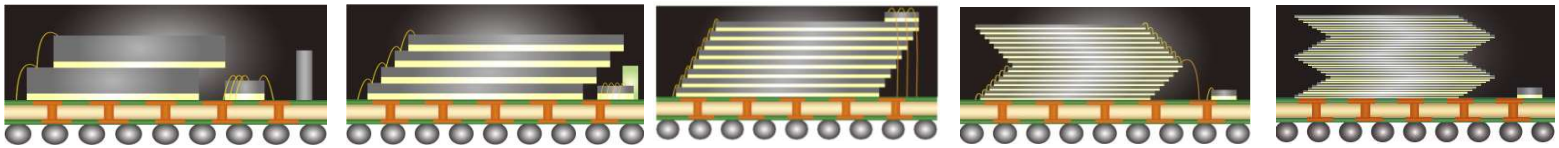
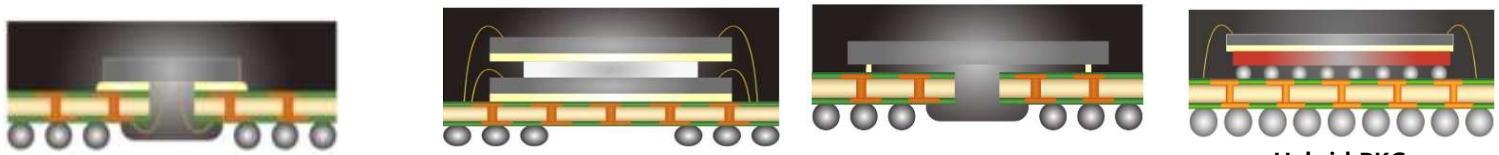
PKG&TEST : Blue

PKG: White

Scope	Certificate	Sponsor	Certification
QMS	. IATF16949 . ISO9001	. NQA . IIC	
EMS/RoHS	. ISO14001	. IIC	
Safety/Health	. ISO45001	. IIC	
Eco Partner (EMS/RoHS)	. Samsung	. Samsung	
Green Partner (EMS/RoHS)	. Sony	. Sony	

PKG Division

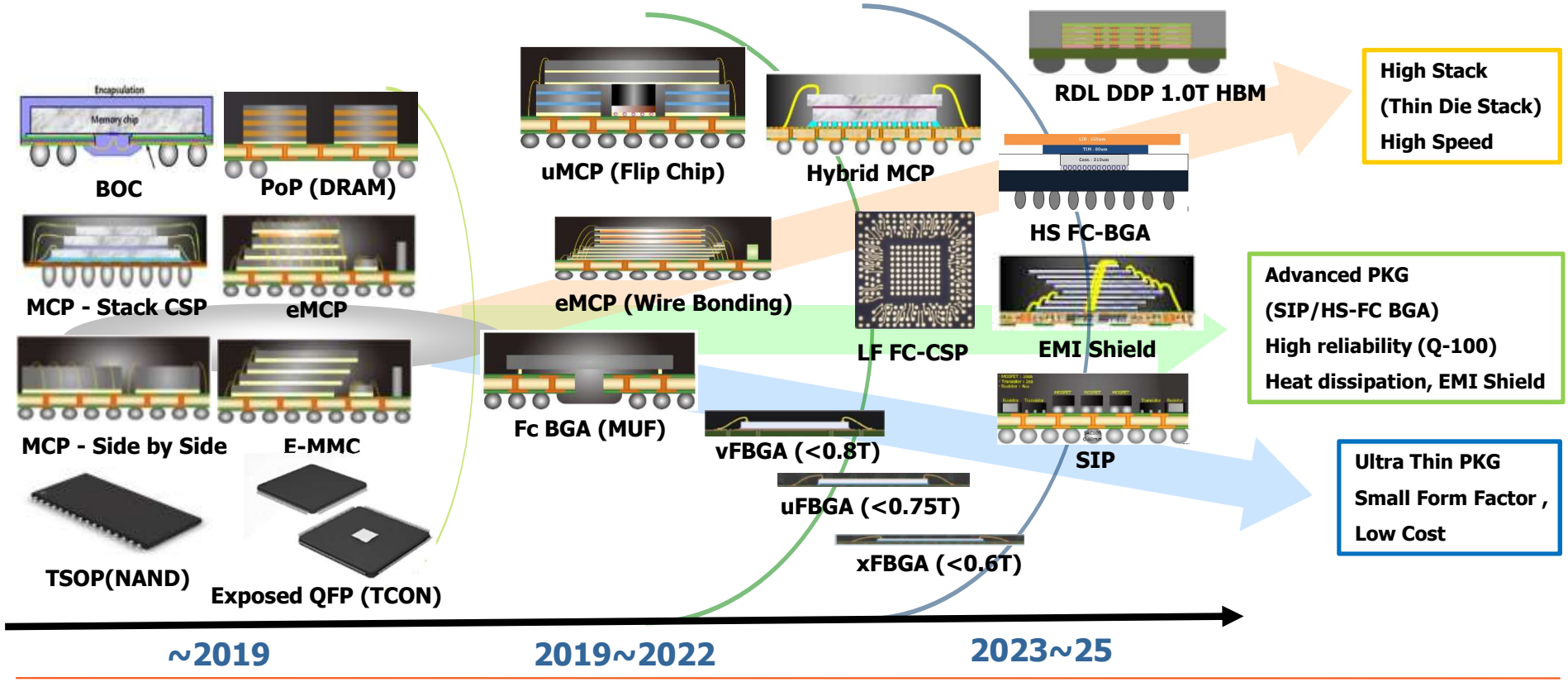
Memory PKG Structure

DVC	Substrate PKG Structure
SSD UFS	 SSD (2stasck ~ 4stack)　UFS (4stack ~8Stack)
Mobile DRAM	 M-DRAM (Rotation)　M-DRAM (Side by Side)　ePoP (4stack)　PoP (4stack ~8stack)　PoP (8stack ~16stack)
eMCP uMCP	 eMCP (Cont + Capacitor)　eMCP (8~12stack)　eMCP (12stack ~15stack)　uMCP (Flip Cont + Capacitor)　uMCP (Flip Cont + PMIC)
eMMC	 eMMC (Cont + Capacitor)　eMMC (4 Stack)　eMMC (8 Stack)　eMMC (16 Stack ~ 32 Stack)
FC-BGA BOC	 BOC　RDL BOC　Flip Chip BGA　Hybrid PKG (NAND+FC-DRAM)

PKG Roadmap

Advanced Technology / Customer Needs

Business Structure	A. High Stack / High Speed MCP Product Expansion B. Thermal performance, SIP, H/S FC BGA Product Development C. Small Form Factor, Ultra Thin PKG Product Development



Reliability Test

	Equipment	Key Performance	Model
Reliability	HTST	RT~500℃	HS-2200
	HTST	RT~200℃	PV-211
	LTST	-75℃~150℃	PG-2KTH
	PCT	100~133℃ / ~100% (2ATM)	PC-242III
	UHAST	121℃/100% 2ATM or 130℃/85% 2ATM	PC-304R7
	T/C	-65~150℃	KR-5002
	T/H	-40~150℃	THG-180
	T/H	0~120℃	KR-1005C
	Reflow	Max 350℃	XPM- 520N

No	Equipment	Ref. Standard
1	PRECONDITION	JSTD020D-01, JESD22-A113
2	HTST	JESD22A-103
3	LTST	JESD22A-119
4	THS	JEDS22A-101
5	PCT	JESD22A-102
6	T/C	JESD22A-104
7	UHAST	JESD22A-118
8	SAM	JSTD035, JSTD020D-01
9	Whisker Test	JESD22-A121
10	Warpage Measurement	JESD22B-112

Failure Analysis

	Character	Equipment	Key Performance	Model
Failure Analysis	Visual	SAM (Scanning Acoustic Microscope)	Non-destructive detection of delamination, void, crack	Quantum-350 EXHO-LS
		SEM (Scanning Electron Microscope)	Up to x150,000 Magnification Inspection	EVO-MA10
		X-Ray	Real time Microfocus X-ray	ME4100-N3W FXS-160.40 SFX-100
		High Power Scope	Up to x1,000 Visual Inspection	INM100
	Mechanical	Warpage simulation	Package warpage simulation test	AXP
		Grinder / Polisher / Section	Disc size : 8" / 50-350 RPM (10RPM step)	RB 209
		BST (Wire Ball Shear Test) BST (Solder Ball Shear Test)	Joint Strength Testers Joint Strength Testers	Dage4000 Dage2400A
		WPT (Wire Pull Test)	Joint Strength Testers	Dage4000
	Chemical	EDX (Energy Dispersive X-ray)	Surface Composition Analysis	NSS
		Inter-metalic test	Joint Strength Testers (Bond-ability)	-
		Wet Station	Chemical analysis stage [De-capsulation, Cratering test)	Wet Station

PKG Design & Mechanical Simulation

Software

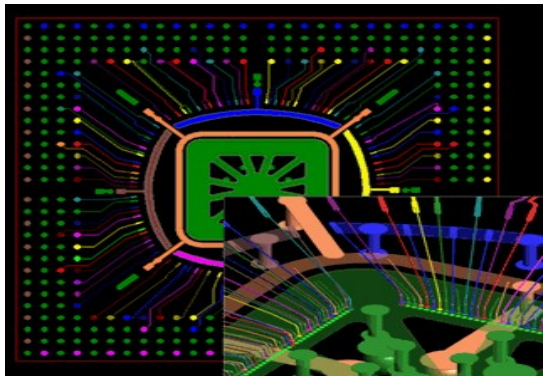
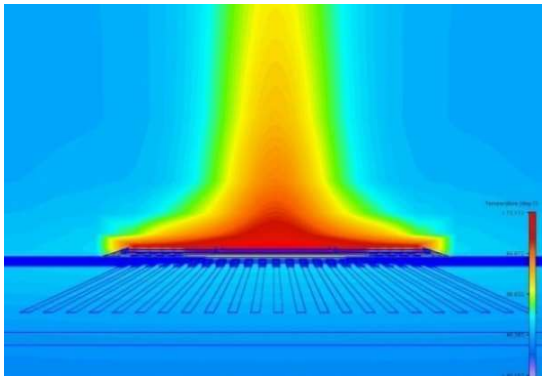
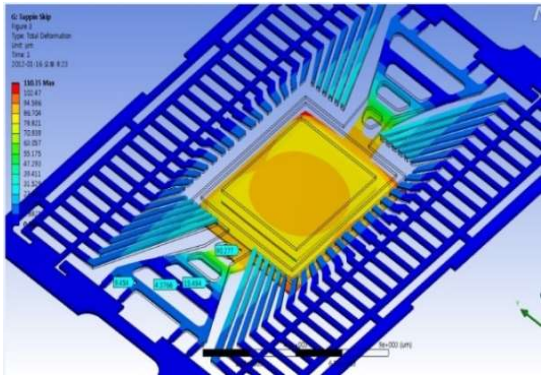
- Cadence Allegro Package Designer 16.6

  ① Package/pin-delay length report, ② Constraint Manager (electrical and physical)
- Cadence Allegro Sigrity 16.6 : Generates IBIS package RLGC models with coupling
- ANSYS Mechanical v15
- Mechanical Simulation : Strip/Unit Warpage, Solder Joint Reliability, Thermal Stress
- Thermal Simulation

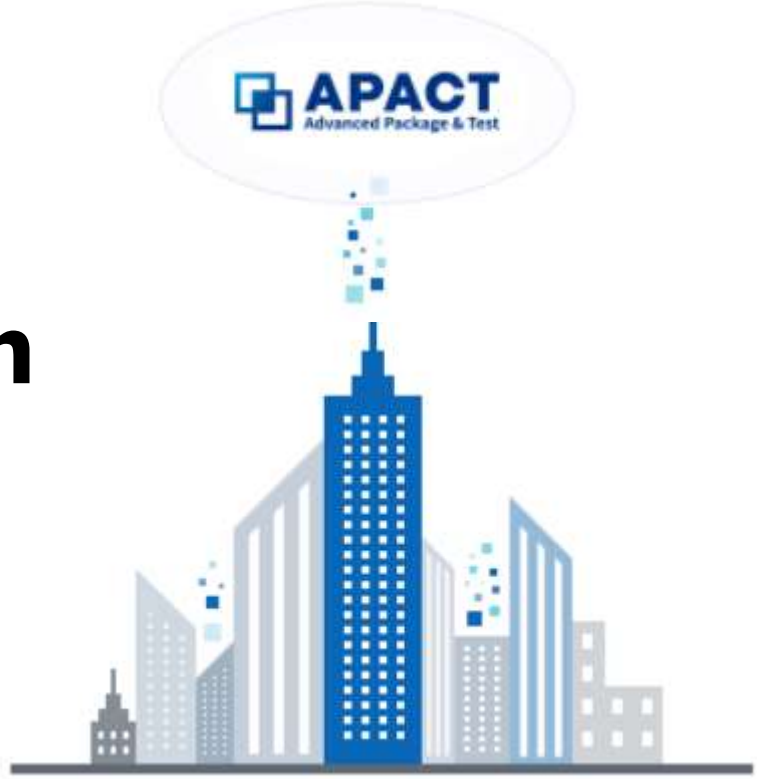
  - Θ_{JA} : Junction to Ambient Thermal Resistance & Θ_{JC} : Junction to Case Thermal Resistance

Thermal Modeling

- Using JESD51 Standard for modeling
- For Gaining an Accurate Results, Using Detail Model

RLC Simulation	Thermal Simulation	Thermal Strain
		

TEST Division



Test Business field

Test Develop Engineering

- Test PGM Conversion / Development
- Hardware Tooling Support / Solution
- Load Board / Probe Card Design
- Socket / Accessory Design

Product & Service

- Memory / Non-Memory Test
- Chip Probing and Final Test
- Automotive & Tri-Temp (R/H/C)
- System IC Burn-In

Production Engineering

- Correlation / Debug
- Real Time Yield Monitoring / Analysis
- Low Yield Improvement
- Final Yield Enhancement

Customer Services

- Turn-Key Solution
- Web / WIP Report
- Drop Ship
- Warehousing

Test Process

CP & Final Test → Back-End → Shipment

1. Incoming Inspection

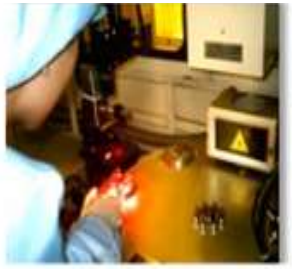
2. Burn-In

3. Hot Test

4. Room Test

5. Cold Test

6. Marking



7. Final Visual Inspection(LIS)

8. Tape & Reel Pack

9. Packing

10. Finished Goods Store

Test Platform

		MAKER	MODEL	SPEC		TARGET DEVICE
TESTER	MEMORY	ADVANTEST	T5503HS	4.511Gbps	512 DUTS(Max)	DDR4/LPDDR4
			T5503	2.286Gbps	512 DUTS(Max)	DDR3,4/LPDDR3/EMCP
			T5833	2.4Gbps	512 DUTS(Max)	LPDDR4
			T5558/T5588S	800Mbps	1024/512 DUTS(Max)	DDR3/LPDDR2,3,4
			T5593	1.06Gbps	128 DUTS(Max)	DDR3/GDDR3
			T5377/77S	286Mbps	256 DUTS(Max)	NAND FLASH
		NEXTEST	MAGNUM SSV	100Mbps	320 DUTS(Max)	NAND FLASH
			MAGNUM 5X	1.6Gbps	640 DUTS(Max)	EMCP
		UNITEST	SHM-9G	4.5Gbps	512 DUTS(Max)	DDR4/LPDDR4/GDDR4,5
	SYSTEM IC	ADVANTEST	V93K-S	PS1600, DPS64, WS-RF		RF
			V93K-S (Mar '23)	PS1600, FVI16, AVI64		Power Management
			V93K-S (Q3 '23)	PS1600, FVI16, AVI64, DPS64		Power, Analog, Controller
			V93K-S (Q4 '23)	PS1600, WS-MX, DPS64		AP & MCU
		UNITEST	Burn-In Tester	16 / 32 Slot		Dynamic Burn-In
		CHROMA	C3680 (Apr '23)	Cost Effective Test Solution		Mid/Low End Application

Handler Status

		MAKER	MODEL	SPEC	
HANDLER	MEMORY	MIRAE	M500HT	Max Par 512	-40°C~125°C
			M500H	Max Par 512	-40°C~125°C
			M500	Max Par 512	-40°C~125°C
			M510	Max Par 512	-40°C~125°C
			M330H	Max Par 128	-40°C~125°C
		ADVANTEST	M6300	Max Par 256	-40°C~125°C
			M6243	Max Par 512	-40°C~125°C
		TECHWING	TW350HT	Max Par 512	-40°C~125°C
			TW-S7	Max Par 786	-40°C~125°C
			TW312	Max Par 320	-40°C~125°C
	SYSTEM IC	TECHWING	TW-153	Dual Temp	
			TW-154T	Tri-Temp	
		CHIPRIGHT	CHR9508	Tri-Temp	
		SEMES	OPUS-3 (Apr '23)	Chip Prober	

Thank You!