

Future leading technology

**ADVANCED
LINK
TECHNOLOGY**

ALT



Company Overview

Advanced Link Technology

Establishment	July 23th, 2003
CEO	BT Chun
COO	EC Lee
Capital	US\$ 3.2Million
Employees	200
Homepage	www.alt-s.kr
Youtube	https://youtu.be/JQ-FnrFrwIU

Business Scope



ALT & AGP



Display Driver IC (DDI)

Wafer Test, COF PKG Test



CMOS Image Sensor (CIS)

Wafer Test, PKG VT test



System On Chip (SOC)

Wafer Test



Power Management IC & Discrete (PMIC)

Wafer Test



Back-End Process

Back Grinding, Dicing, Re-con, P&P, Ring-Cut, Laser Grooving

Subsidiary Company, AGP

CIS PKG PLCC, CLCC, LGA, BGA (Automotive AEC_Q100)

Location

Advanced Link Technology

TEST PLANT (CheongJu City)



Address

(28122) 82-19, Gwahaksaneop 1-ro, Oksan-myeon,
Heungdeok-gu, Cheongju-si, Chungcheongbuk-do, Republic
of Korea

Tel. 043-711-2500

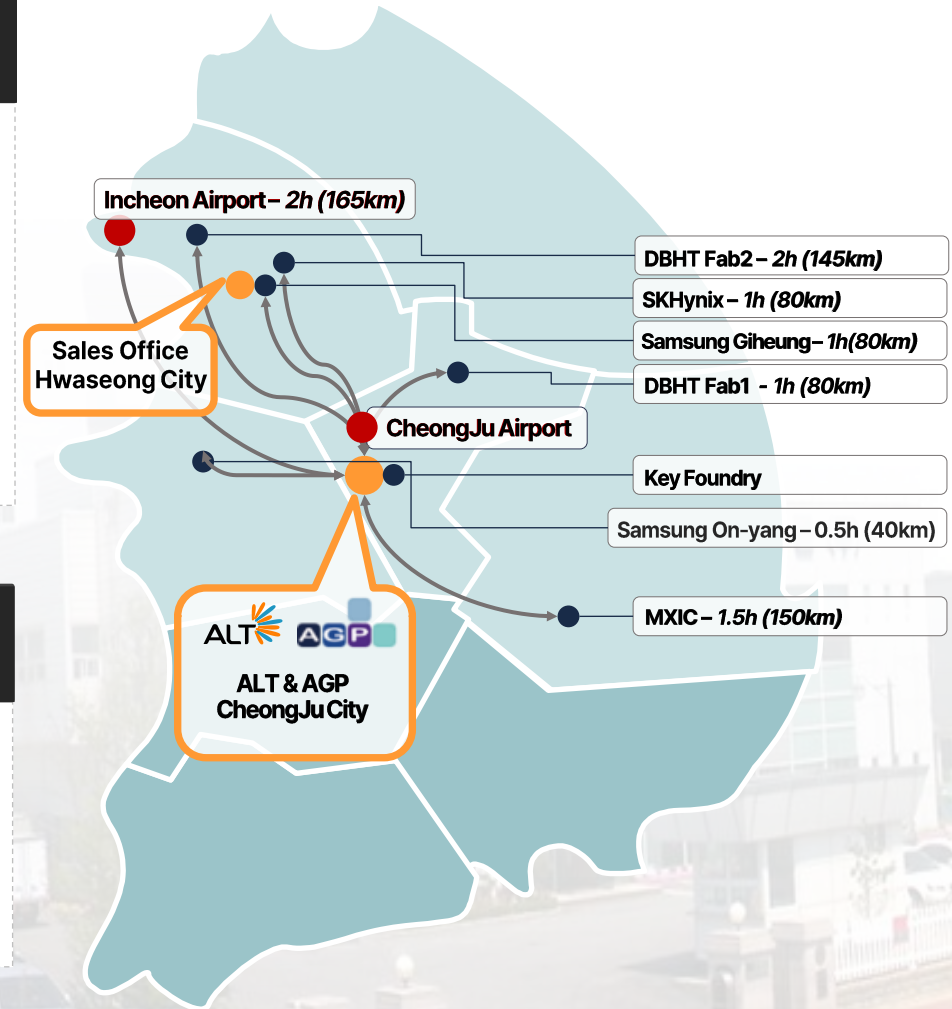
Fax. 043-711-2505

SALES OFFICE (HwaSeong City)



Address

(18449) 815, WonheeCastle, 1-9, Seogu-dong, Hwaseong-si,
Gyeonggi-do, Republic of Korea

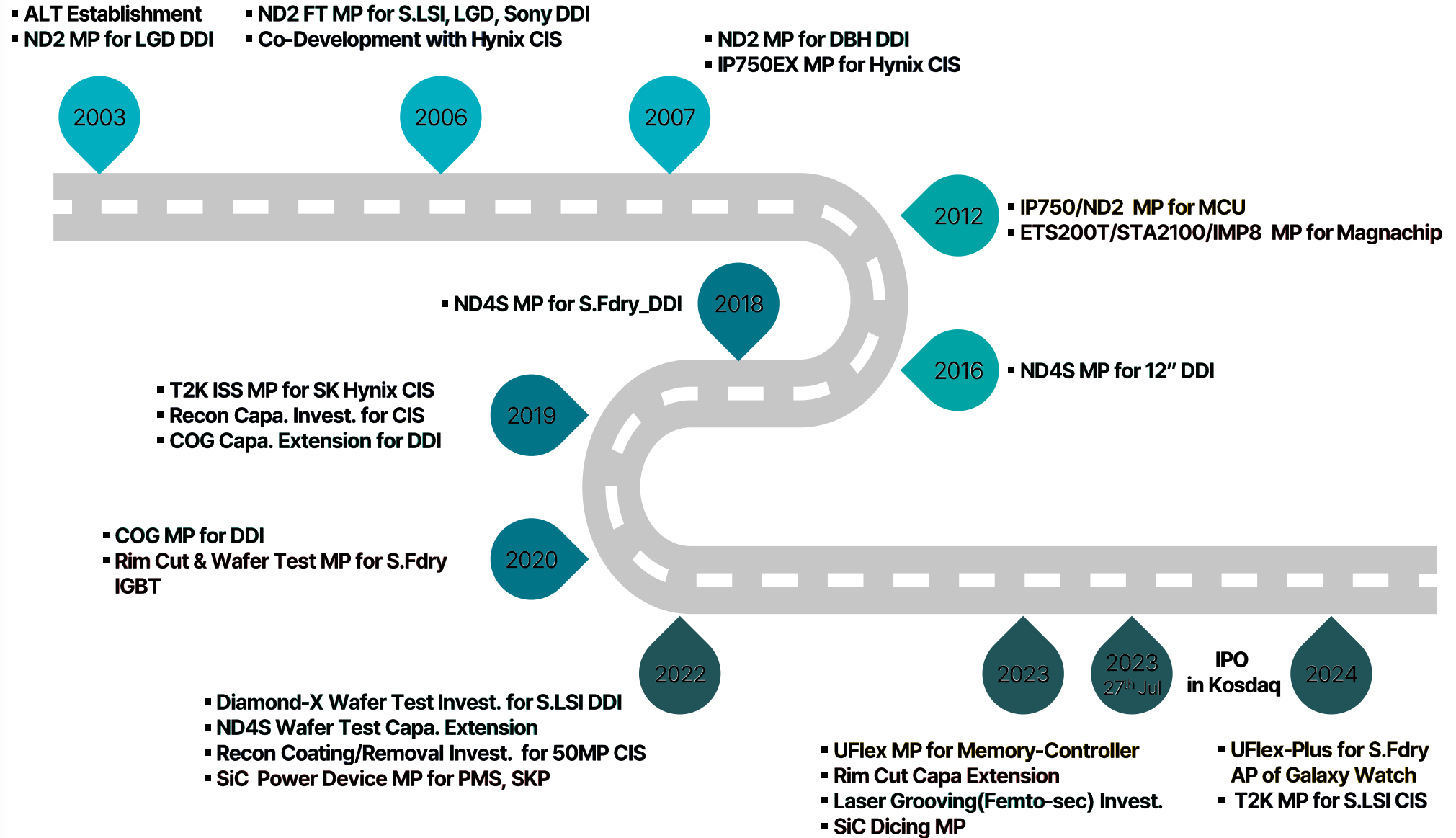


Executive Summary

ALT is located in 15min away from CheongJu Airport and 2hr away from Incheon Airport by driving

Milestone

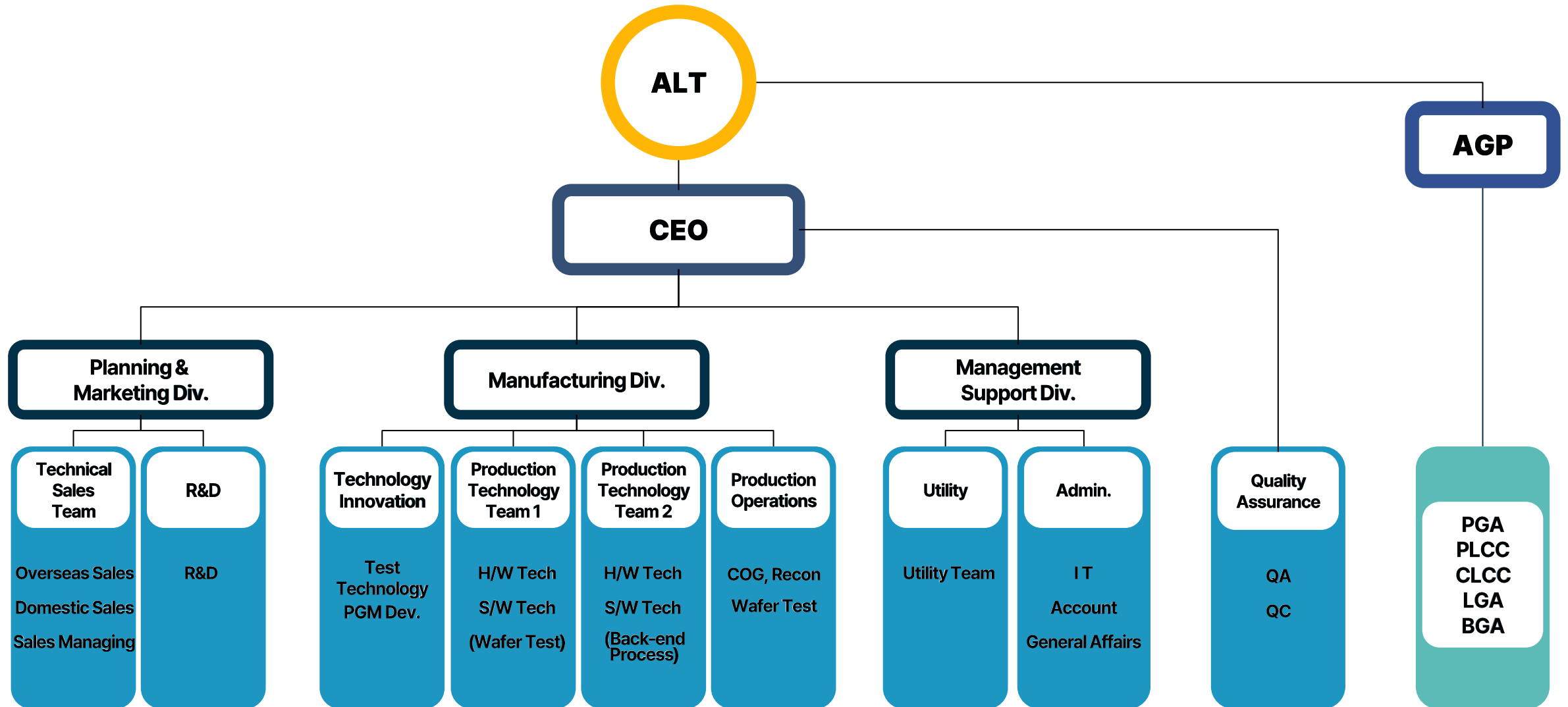
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Executive Summary
 ALT start CIS wafer test biz from 2007,
 Recon biz from 2019 and Recon
 Coating/removal from 2022

Organization

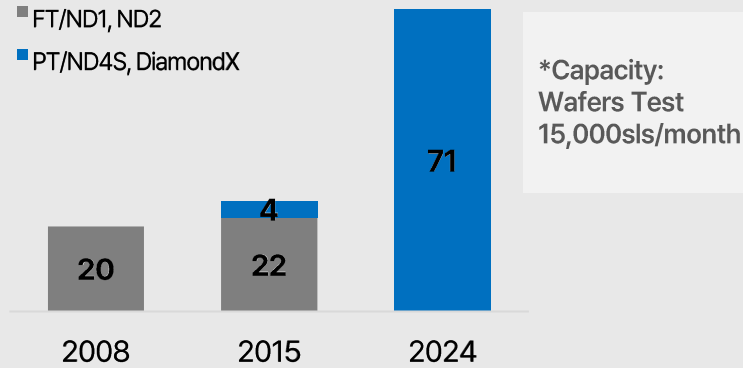
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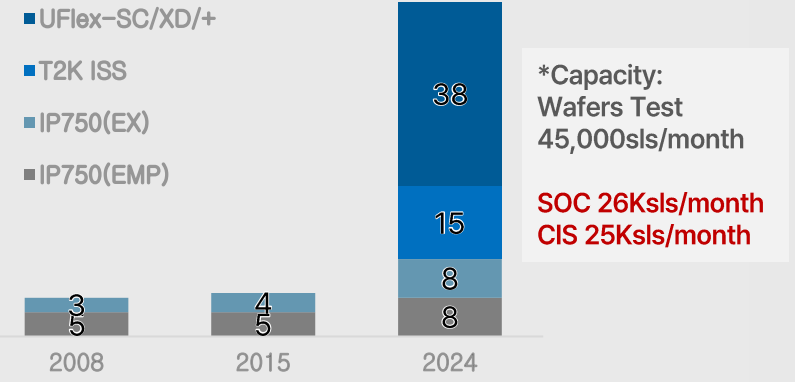
Capacity

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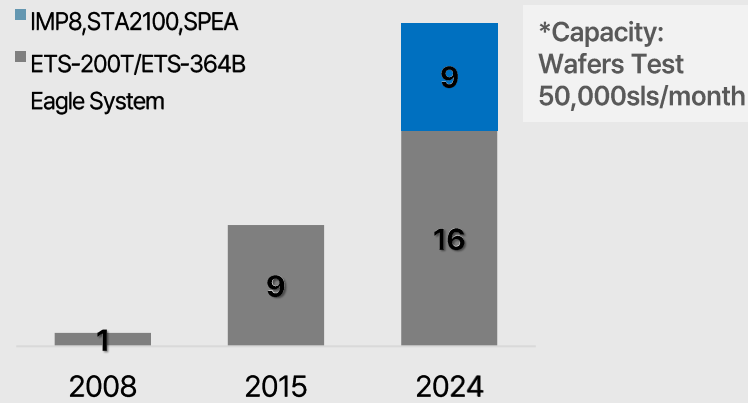
A DDI Test Capacity : 71 Set



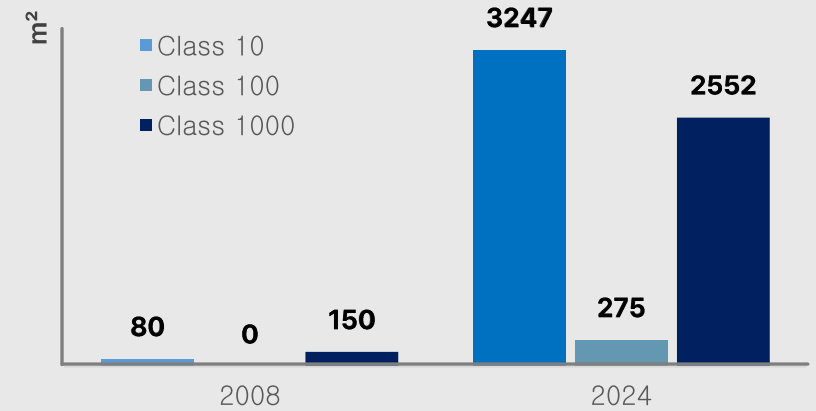
B CIS 31 Set & SOC 38 Set



C Discrete IC(IGBT,MOSFET) Capacity : 25 Set



D Improvement of Class Room



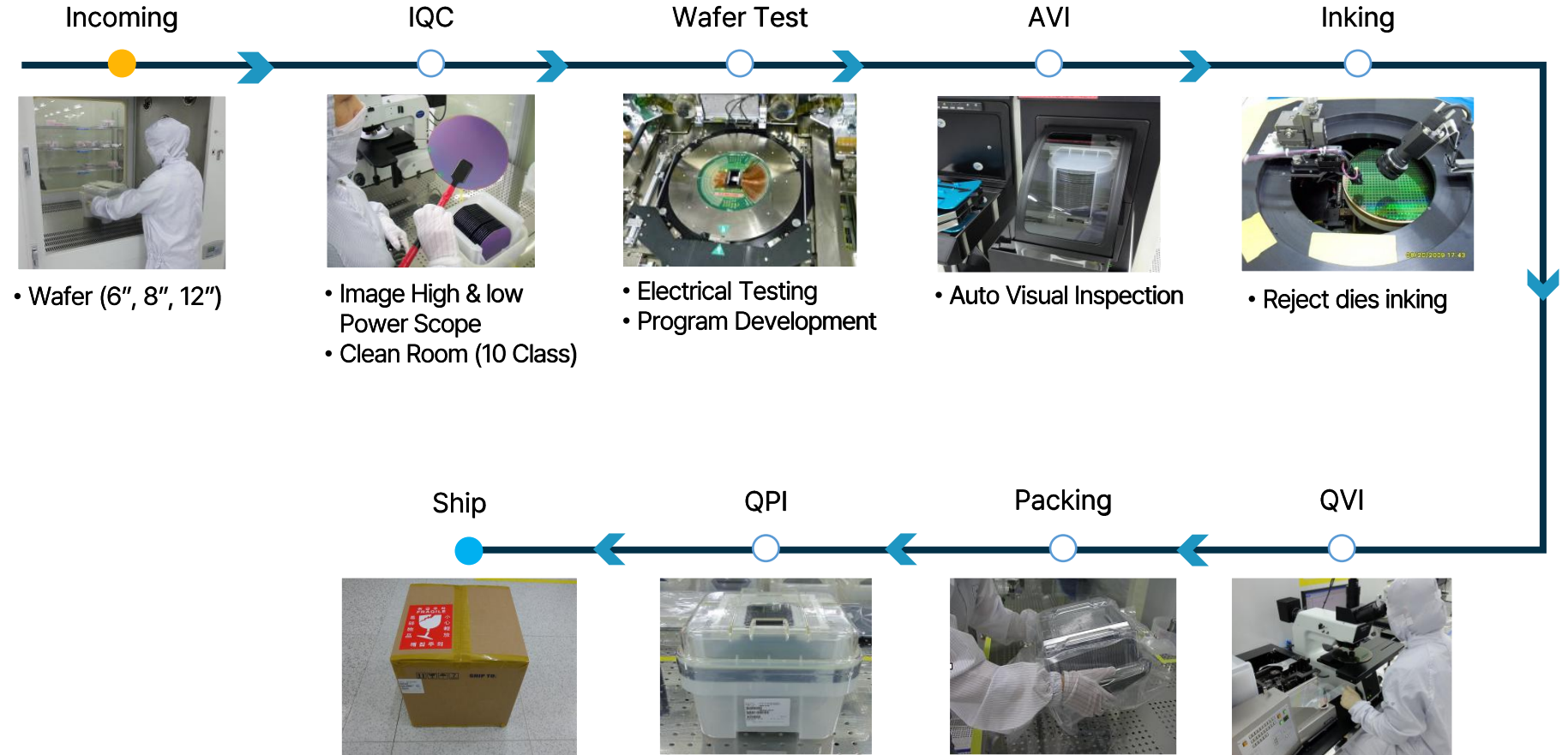
Executive Summary

ALT has about **150 test set** and has tested DDI, CIS, ASIC, SOC, Discrete and PMIC

Wafer Test Process Flow

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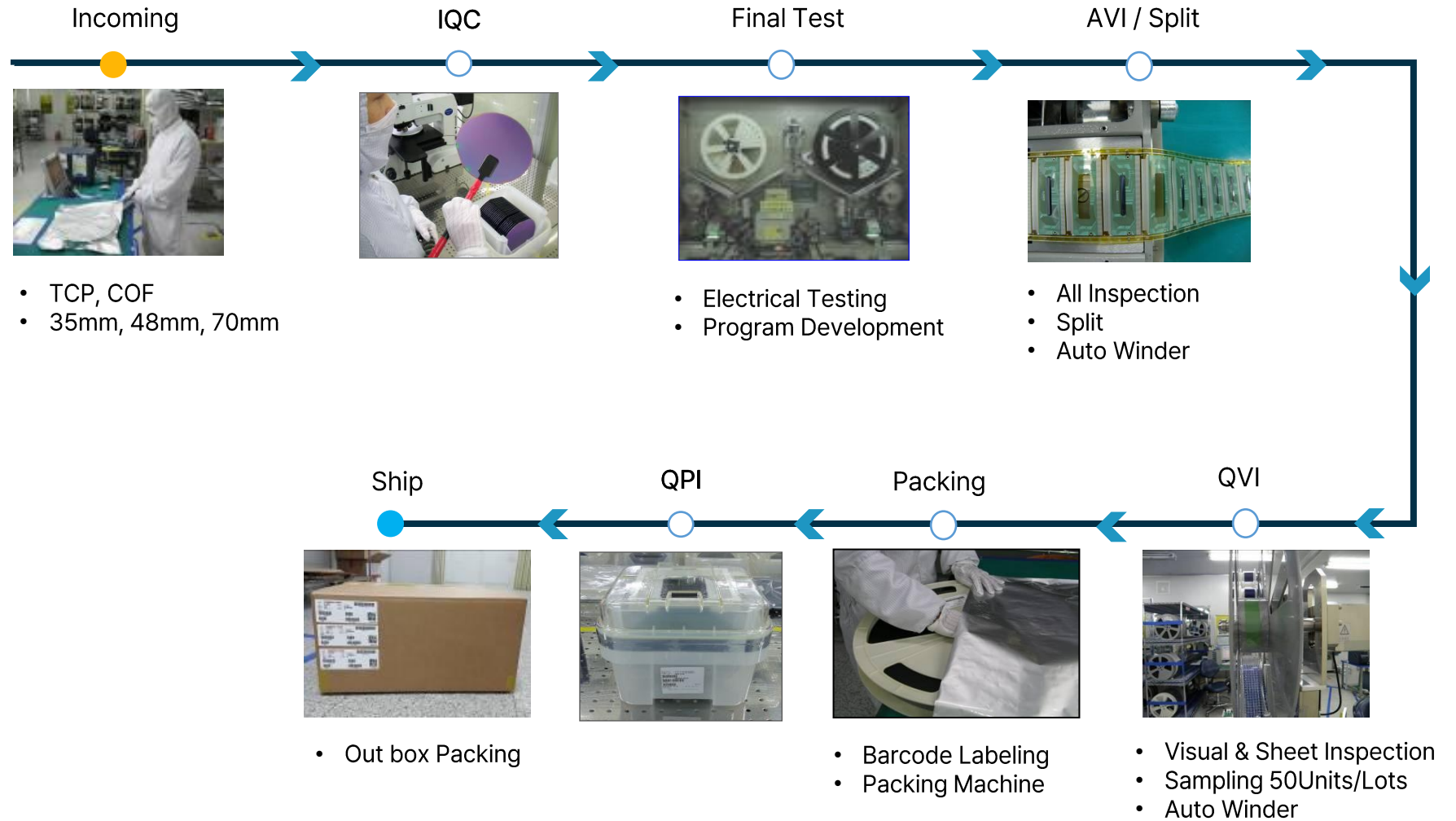
Wafer Test Process



Final Test Process Flow

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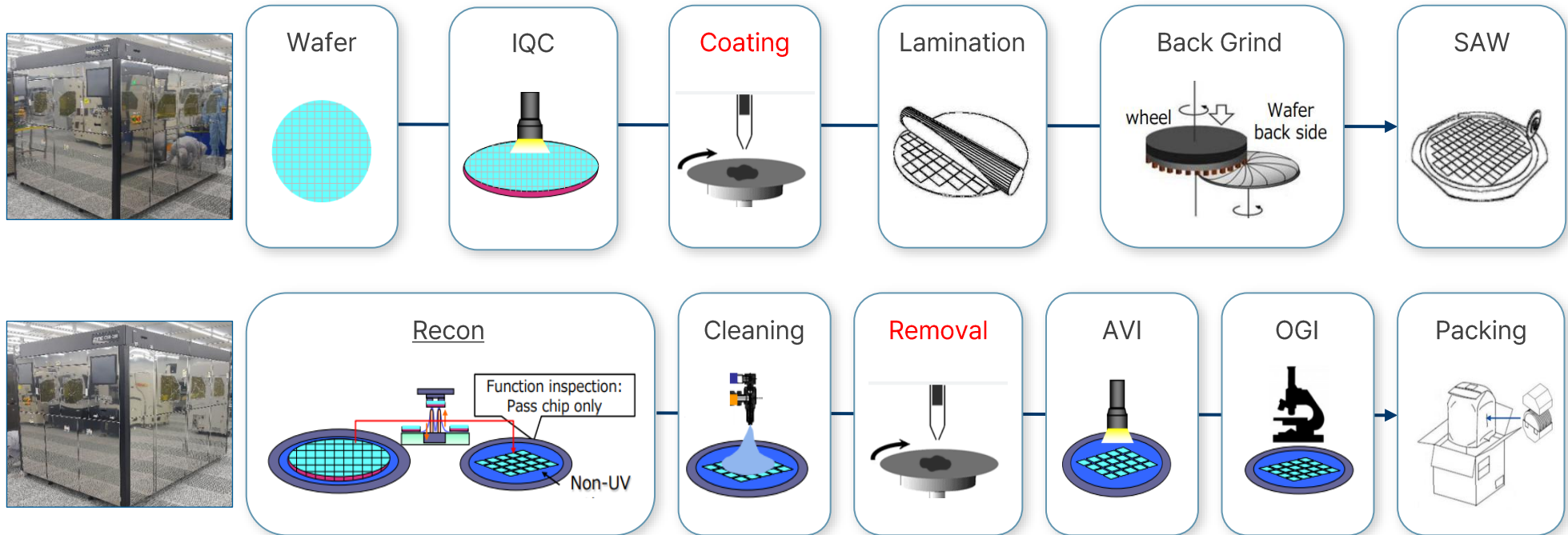
Final Test Process - DDI



ReCon(*Reconstruction) Process

ReCon* Process *Reconstruction

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Why ALT Recon

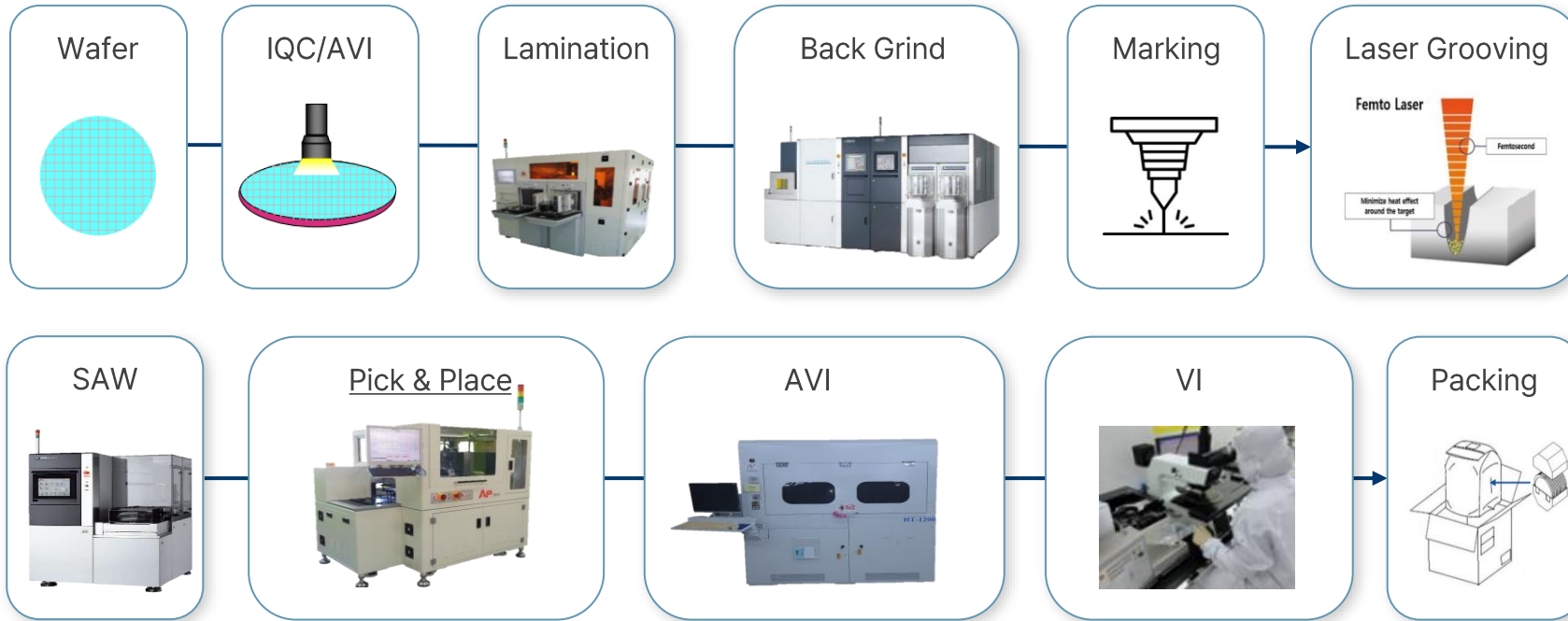
- ❖ Superior Quality & yield – Class 10 , Auto Visual inspection
- ❖ Expert Engineering team – More than 10 years experience
- ❖ Happy customers – 100% meet the delivery date and good price
- ❖ Cutting-edge In line machines
- ❖ High Reliability – In line R/T, and F/A

COG Process (DDI)

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Executive Summary

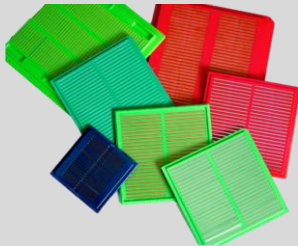
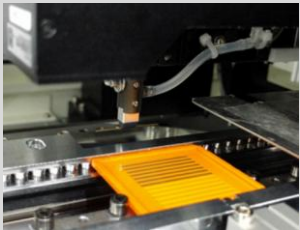
ALT's COG rearrange selected good chips to enable customers to speed up and improve subsequent processes, aiding in production schedules.



LGV(Laser Grooving) Laser

DISCO	ASM	E.O Tech	ALT
Nanosecond	Picosecond	Nanosecond Picosecond	Femtosecond

Micro	0.000001	10 ⁻⁶
Nano	0.000000001	10 ⁻⁹
Pico	0.000000000001	10 ⁻¹²
Femto	0.000000000000001	10 ⁻¹⁵



Why ALT COG

- ❖ B/G Max. Capability : 35um(8" and 12")
- ❖ Laser grooving : 12inch low-K, S/L 45um under
- ❖ AVI detective : 100% fail die verify and Chip tracking

Ring-Cut Process (IGBT, Power IC)

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Executive Summary

ALT has the Rim Cut for high voltage power device with taiko type wafer after wafer test.

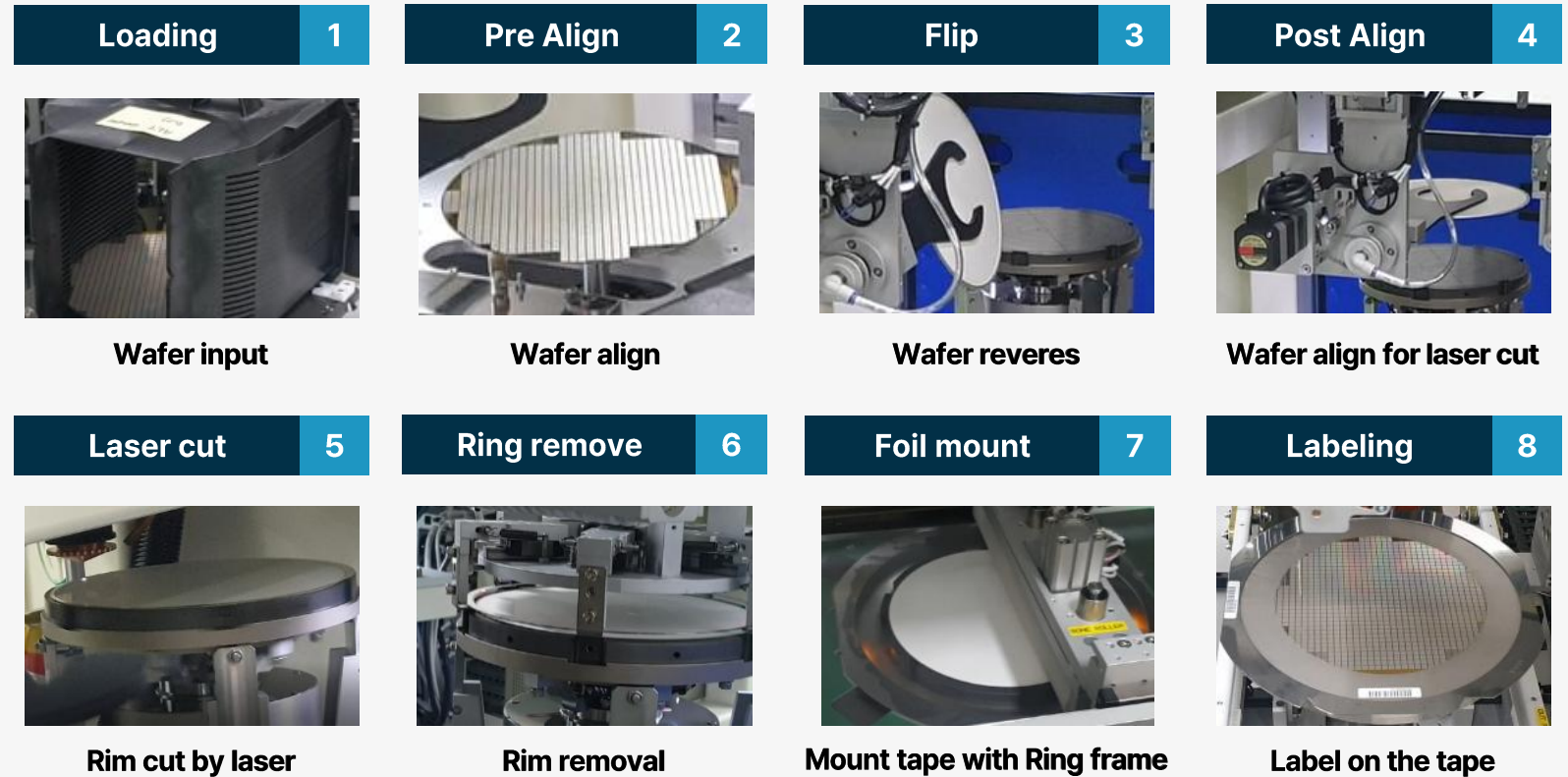
ALT Rim cut, Core competence

- ❖ First development and MP start
- ❖ Kerf width of Rim cut : 40um
- ❖ Void, Debris free, NO handling risk

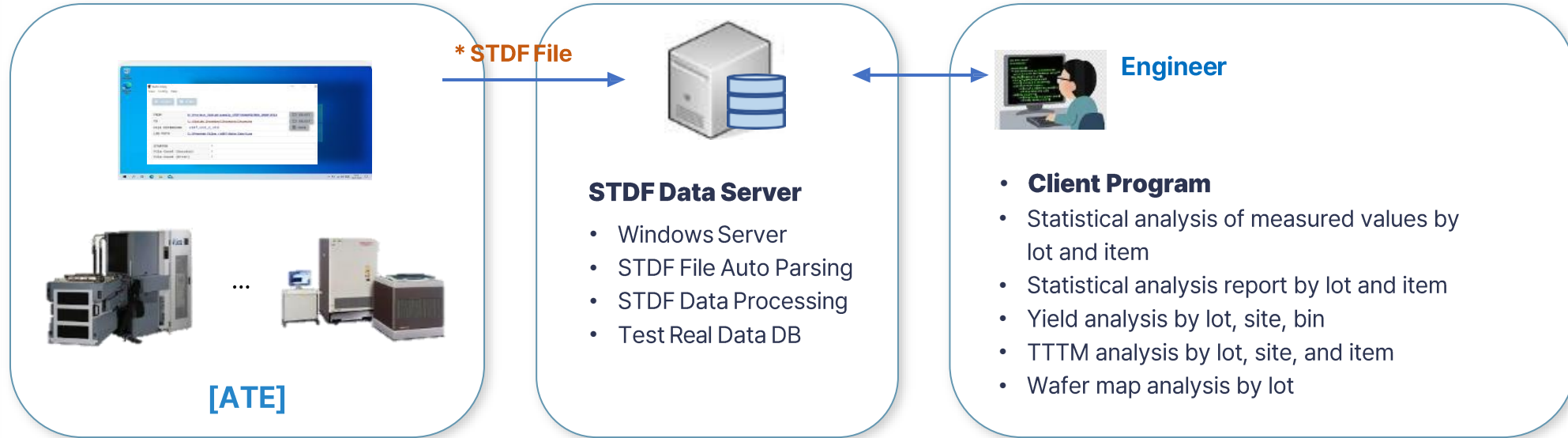


"ALT, developed a new Rim Cut process for Taiko wafer, full automation system from Rim cut to foil mount"

Rim or Ring Cut Process (IGBT, Power IC)



Bin Monitoring System



What we provide:

- Data Unity: Build a measurement data DB on the server and analyze the same data for multiple users
- Securing the foundation for introducing an alert system based on lot-specific measurement data: ex. TTTM Email Alert (**tool to tool matching of hardware**)
- Process improvement: Identifying defect levels through statistical analysis of measured values and chart analysis (ex. **Improvement of yield deviation by site**)
- Establishment of a data database of measured values: writing a quick and accurate analysis report (**securing global competitiveness**)
- **Immediate response to customer requests (defect cause analysis/report):** Provide utmost customer satisfaction

Real time Bin Monitoring Software

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Executive Summary

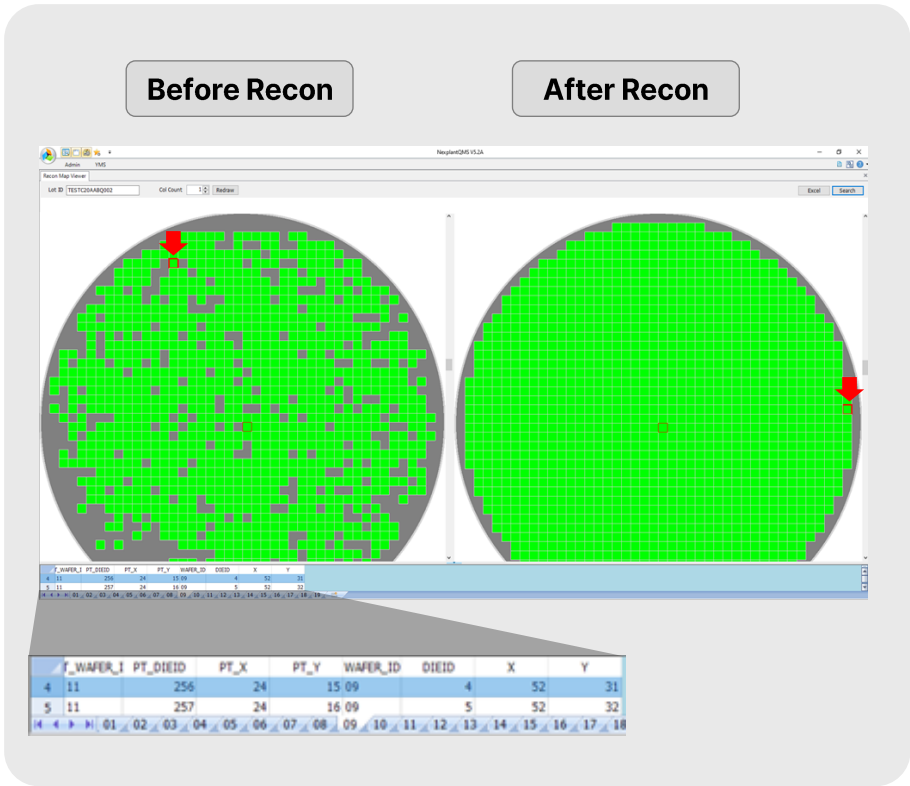
ALT has the analysis software to define real time binning and real root cause.

Recon Traceability System

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Executive Summary
ALT has the QMS Mapping system for Recon Traceability

Die position can be traced before and after the Recon.

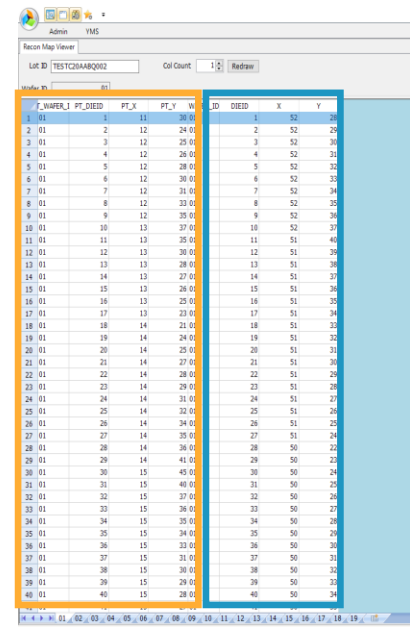


Coordinates can be checked on the table.

Example)

Wafer TEST map coordinates: Wafer No. 11, X-24, Y-15
= RECON map coordinates: Wafer No. 9, X-52, Y-31

After Recon, Wafer test map coordinates can be checked with die map coordinates.



After recon, each die's original position on the wafer can be traced.

Wafer test **Recon**

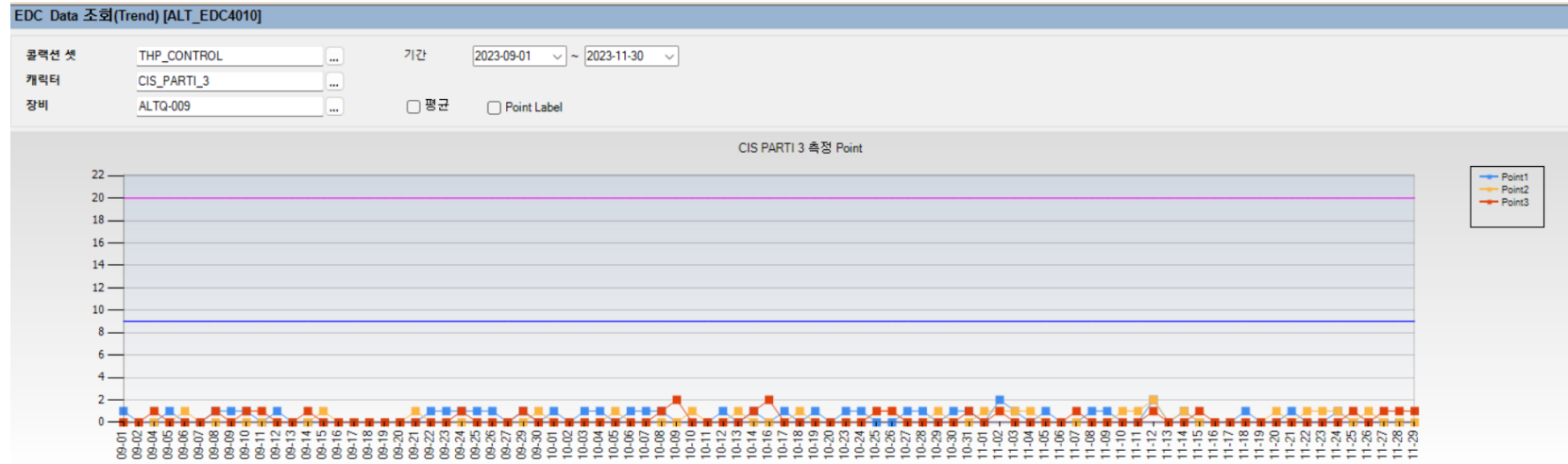
- Wafer Test map coordinates**
(Wafer No, Die No, X coordinate, Y coordinate)
- RECON map coordinates**
(Wafer No, Die No, X coordinate, Y coordinate)

Test & Recon Line Conditions System

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Executive Summary
ALT strictly controls Line conditions, optimizing for CIS test and Recon

Particle control



Temp. and Humidity control



- ❖ **ALT has 10 Class line from Wafer Test to Recon (Test~B/G+Sawing+Recon)**
- ❖ **ALT strictly control the environment through the system**
→ With sensors installed in clean rooms, ALT constantly monitor particle counts, temperature and humidity.
- ❖ **The entire process is done on one site.**
→ **Only ALT can provide this in Korea.**
→ Shortest TAT : Save 3days of logistic time

Quality System

IATF16949:2016



CERTIFICATE OF REGISTRATION

This is to certify that:
ALT Co., Ltd.
 82-19, Gwahaksaneop1-ro, Oksan-myeon, Heungdeok-gu, Cheongju-si, Chungcheongbuk-do, 28122, Korea

Operates a
QUALITY MANAGEMENT SYSTEM
 Which complies with the requirements of
IATF 16949:2016
 For the following scope of registration:
 Manufacturing of Machining for Semiconductor Parts
 Exclusion – Product Design

Certificate No.: ALTO41269
 IATF Database No.: 0395275
 Issue Date: 19 April 2021
 Expiry Date: 18 April 2024

Frank Camasta
 Global Head of Technical Services
 SAI Global Assurance

Dusan Nikolic
 Automotive Technical Manager
 Global Scheme Owner

SAI GLOBAL

ISO9001:2015



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operates a
QUALITY MANAGEMENT SYSTEM
 which complies with the requirements of
ISO 9001:2015
 for the following scope
Testing of Semiconductor Parts (LDI, CIS, PMIC, MCU)

Certificate No: QMS42327
 Issued: 2019.08.09
 Expires: 2022.11.29
 Originally Certified: 2007.11.30
 Current Certification: 2019.11.30

Heather Mahon
 Global Head of Technical Services
 SAI Global Assurance

SAI GLOBAL

ISO14001:2015



CERTIFICATE OF REGISTRATION

This is to certify that:
ALT Co., Ltd.
 2F, 82-19, Gwahaksaneop 1-ro, Oksan-myeon, Heungdeok-gu, Cheongju-si, Chungcheongbuk-do, 28122, Republic of Korea,

operates a
ENVIRONMENTAL MANAGEMENT SYSTEM
 which complies with the requirements of
ISO 14001:2015
 for the following scope
**Manufacture of Machining for Semiconductor Parts
 Providing of inspection service for Semiconductor Parts**

Certificate No: EMS41778
 Issued: 2021.03.02
 Expires: 2024.03.01
 Originally Certified: 2021.03.02
 Current Certification: 2021.03.02

Frank Camasta
 Global Head of Technical Services
 SAI Global Assurance

SAI GLOBAL

Customers



ADVANCED GLOBAL PACKAGE

Trusted Partner for CIS Assembly



Company Overview

Advanced Global Package

Overview Of AGP

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Company Name	AGP Co., Ltd
CEO	BT Chun
Establishment	2013.06.10
Business	Assembly and Test Service for Optic Sensor such as Image Sensor Feasibility : BGA, PGA, LGA, CLCC and PLCC, LCC (Leadless Chip Carrier)
Address	82-19 Gwahaksaneop 1-ro, Oksan-myeon, Heungdeok-gu
Employees	70
Homepage	www.agp-s.kr
Tel.	+82-43-711-2600

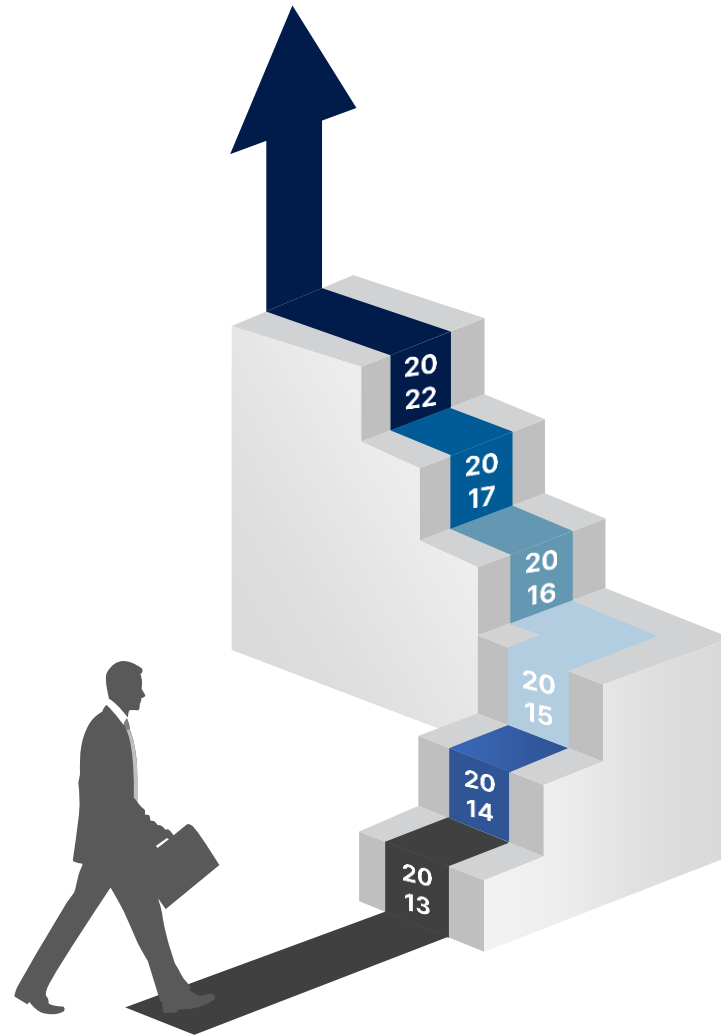
- ▶ AGP is located in the same building with ALT (ALT Co, Ltd.) as a child company.
- ▶ Full Turn Key Service of CIS Test(ALT) and Assembly(AGP)

Executive Summary

AGP is the CIS assembly company located in Cheong-ju

Milestone

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Qual & Patent

AEC-Q100-G2 Automotive向 BGA



Production Record

4,000K/month



Patent

Transparent Epoxy mold assembly method



Pixelplus社 - Mass Production

SST社 - Mass Production



Patent

Anti-thermal damage CBGA



Brigate社 - Mass Production

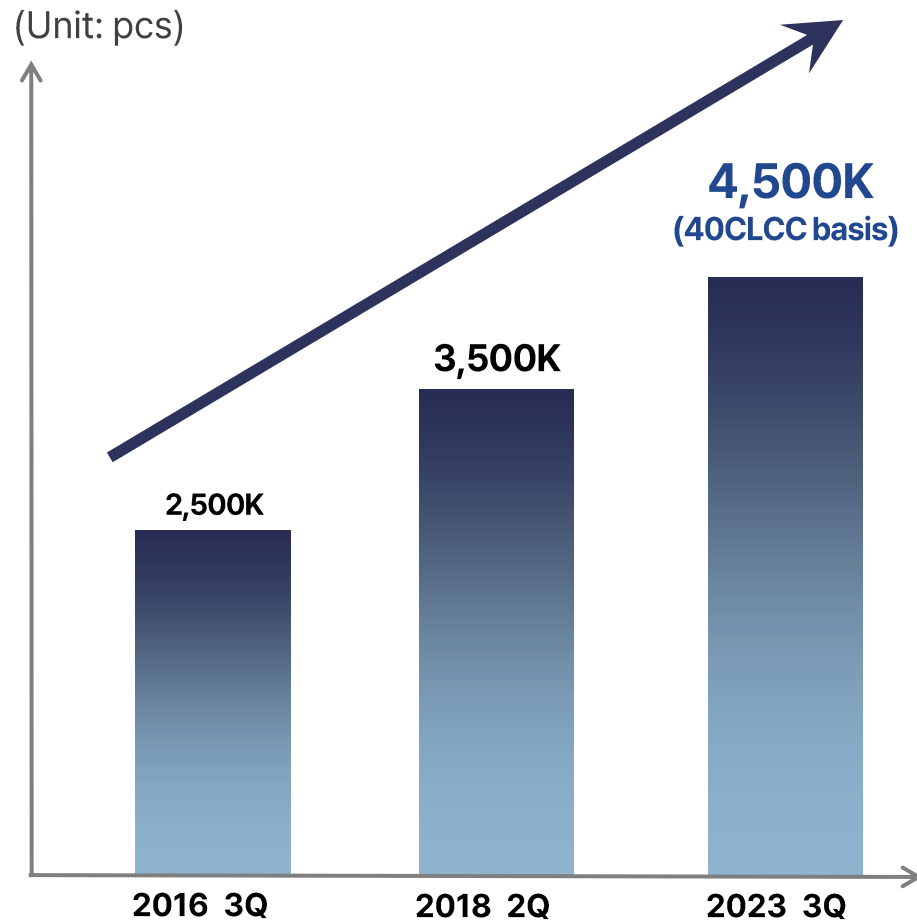
Executive Summary

AGP' biz scope is being extended to **automotive market** and MVS from Security since

Assembly Capacity

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Assembly Monthly Capacity



Equipment

* On Hand : Flip-chip Bonder , Solder Ball Mounter, Stud Bump

Process	Q'ty
Sawing	5set
Boat loading	3set
Die Attach	5set
Wire Bonding	26set
Glass Attach	6set
Laser Marking	3set
Total	48set

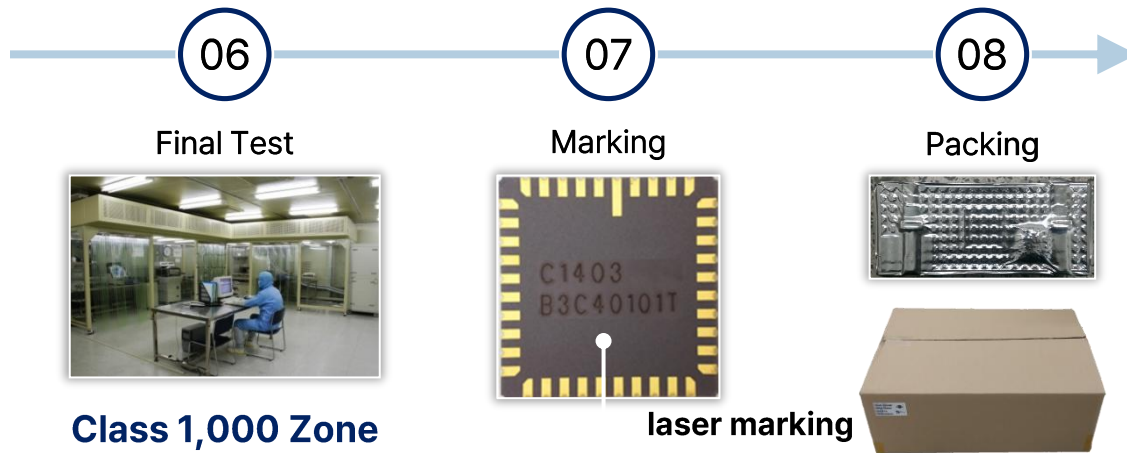
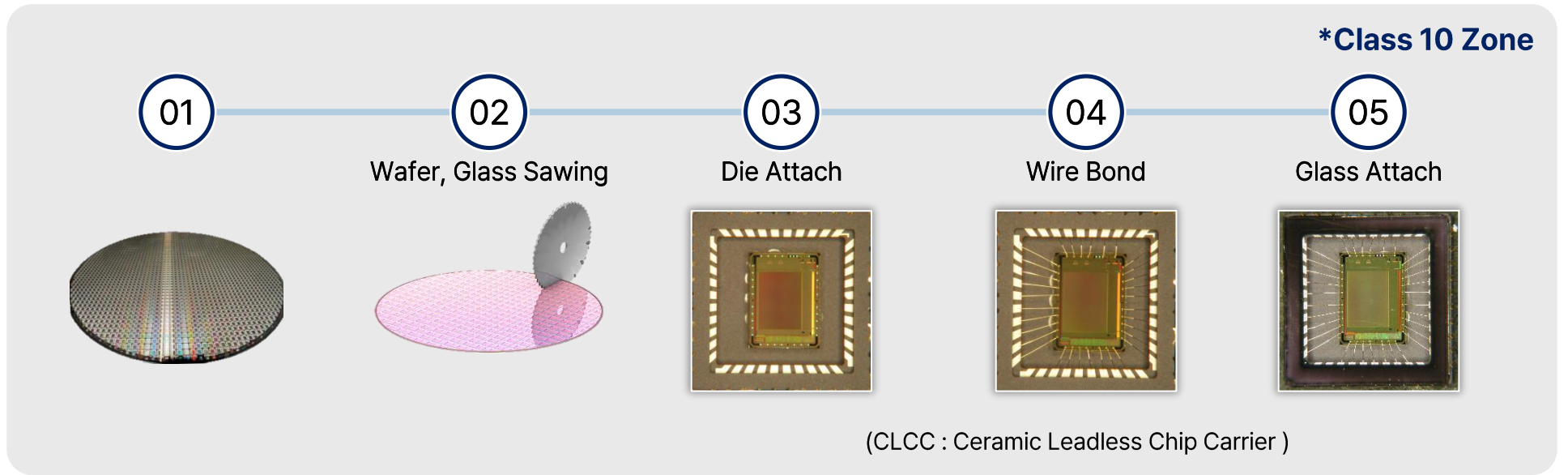
Executive Summary

AGP has 5,000Kpcs assembly capacity such as CLCC 4,500K and BGA 500Kpcs per month.

Assembly Process

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PKG Process Flow (CLCC)



Type	40 CLCC
Lead Quantity	40 Leads
Size (mm)	10.16SQ x 1.60(T)
Substrate	Ceramic

Type	48 CLCC
Lead Quantity	48 Leads
Size (mm)	14.22SQ x 1.65(T)
Substrate	Ceramic

Executive Summary

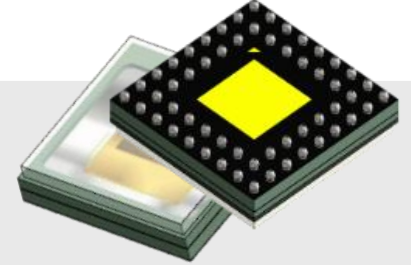
AGP has the CLCC assembly process as follows

BGA Line

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BGA PKG Process

BGA is a process of attaching a solder ball to the PKG bottom surface so that customers can work on SMT.



Process Flow

Stencil Flux Print
- Squeeze



Solder Ball Drop
- Stencil Mask jig



Reflow
- N2



Capacity

- 600K ea/Month *CLCC 10mmSQ , ϕ 0.5mm, 130 ball
- Applicable ball size : min ϕ 200um
- Area : 40sqm , Line Class 1,000

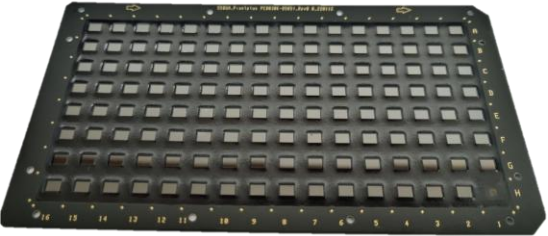
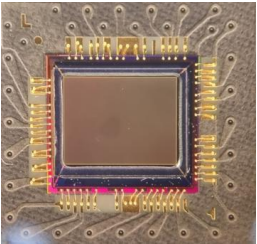
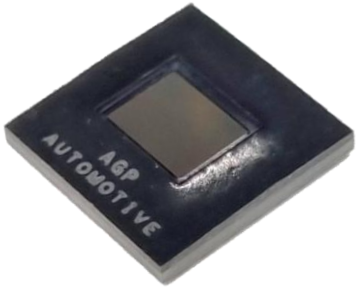
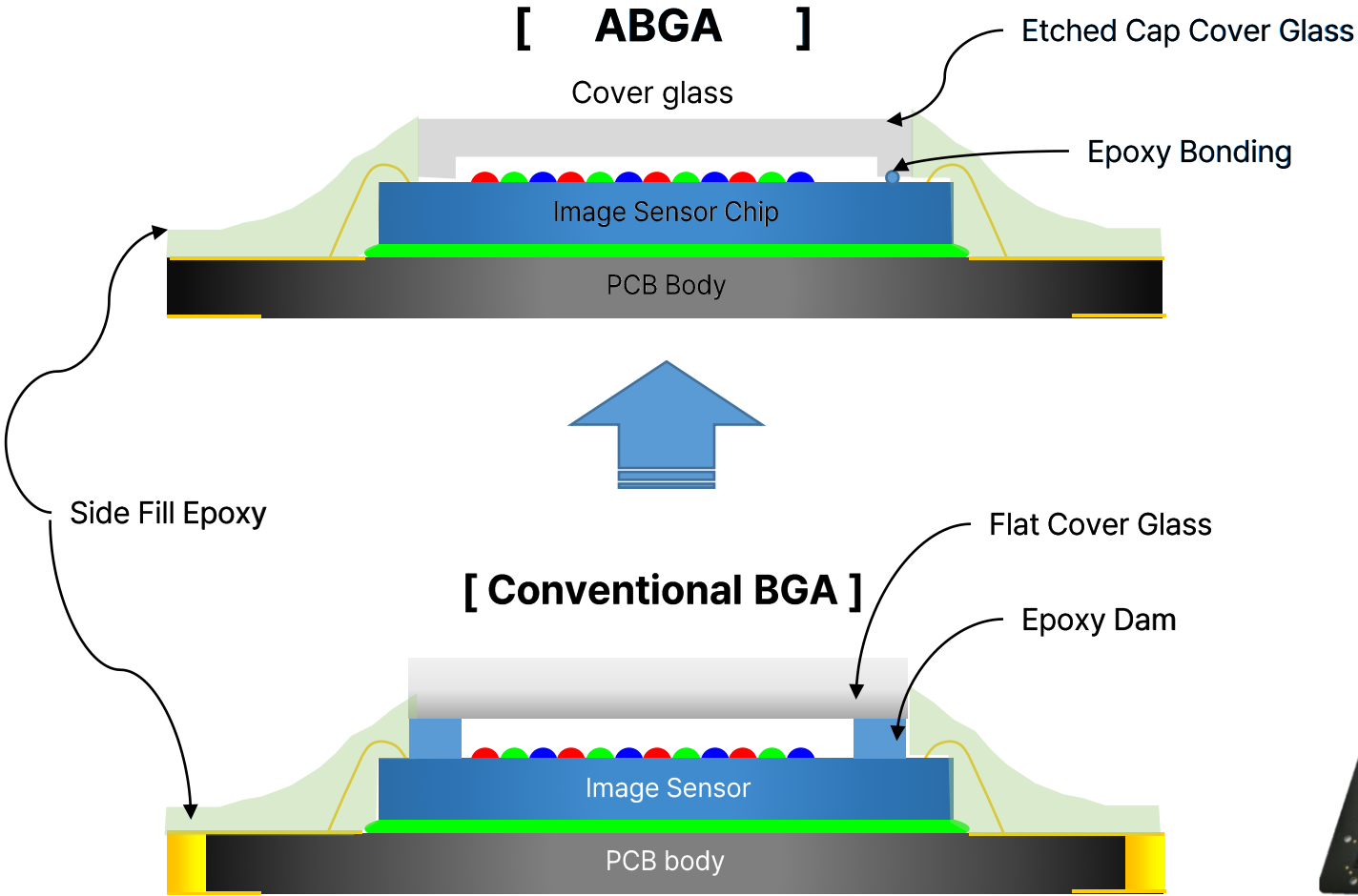
Executive Summary

AGP has the PKG Line-up such as MCP_BGA of ceramic and BGA&LGA of Ceramic.

BGA PKG Process

Brand New BGA PKG

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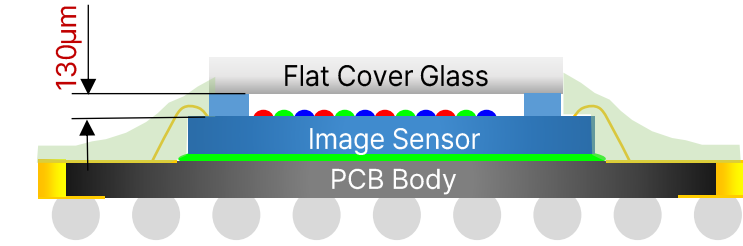
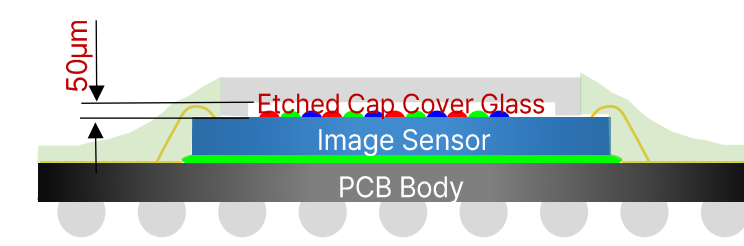
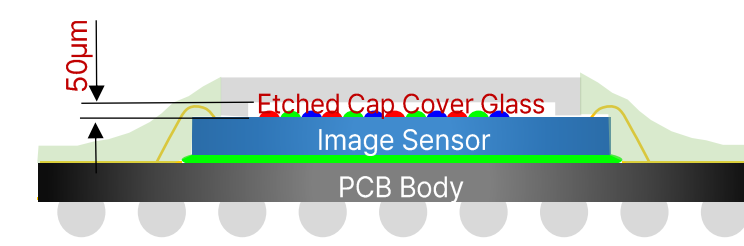
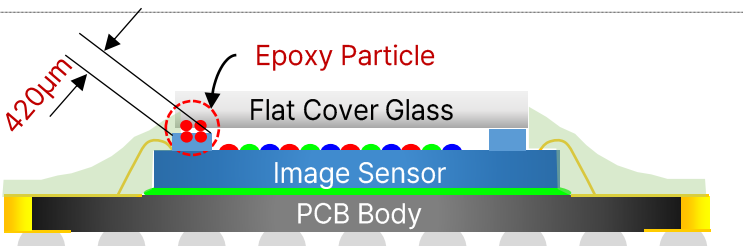
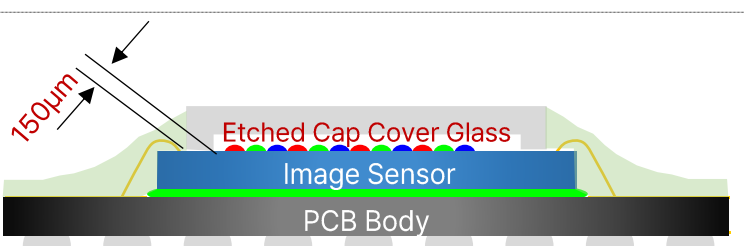
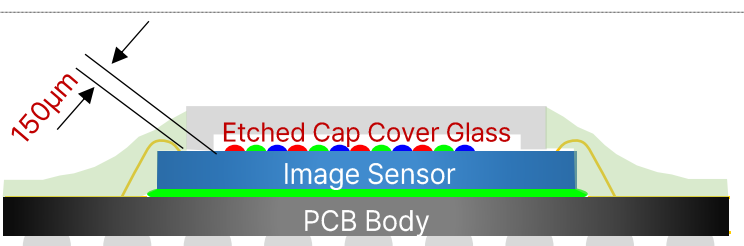
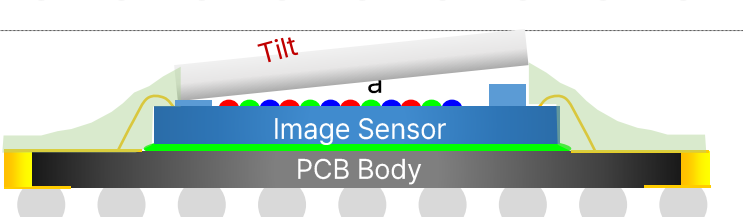
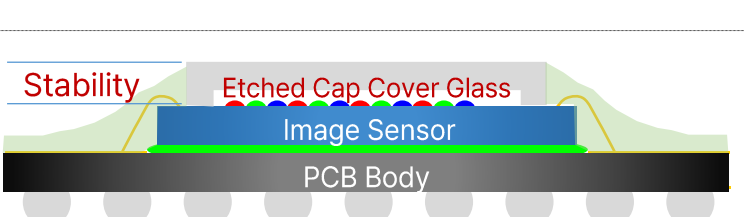
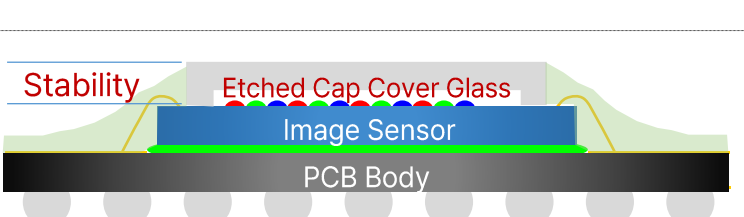
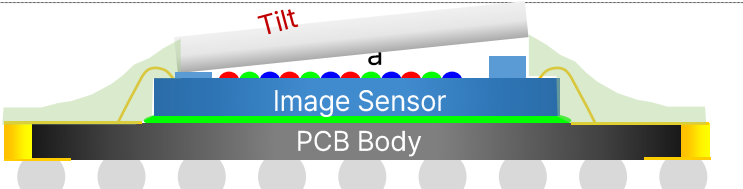
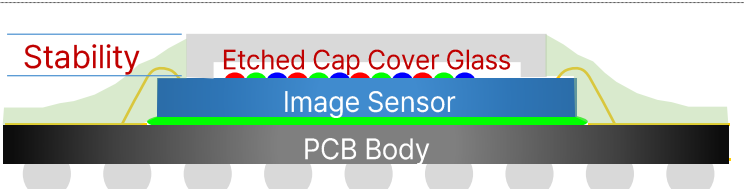
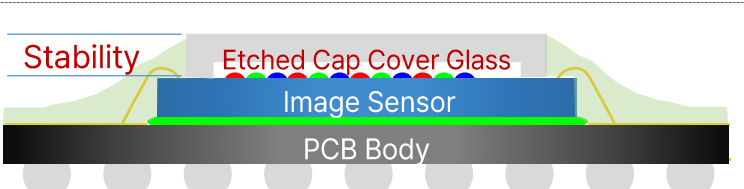


Executive Summary

AGP's BGA PKG has a specialty using an etched glass lid to clear potential particle source.

Specialty of ABGA'

1. Air **cavity volume is 50%** of iBGA/iM2BGA: **Strong against Condensation** and good performance for light bandpass
2. Etched glass dam make to **clear any moving particle** inside the air cavity of PKG body.
3. Minimized **dam width, 150μm**, make it some **flexibility in the Chip and PKG design**.
4. **Etched glass dam** make it **stable** rather than epoxy dam on the PCB body.
5. **1month PKG development lead time** make it **time-to-market** by customer **without RDL or mold process**.

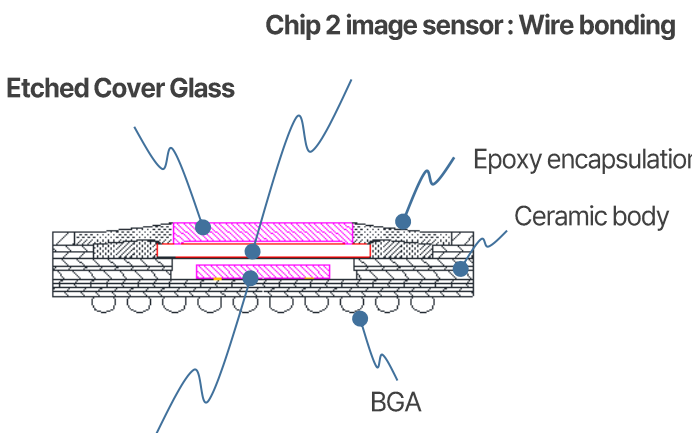
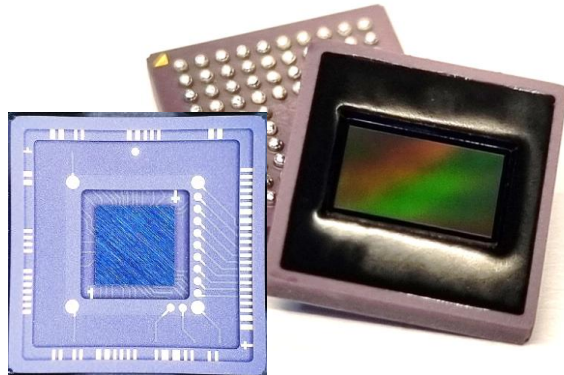
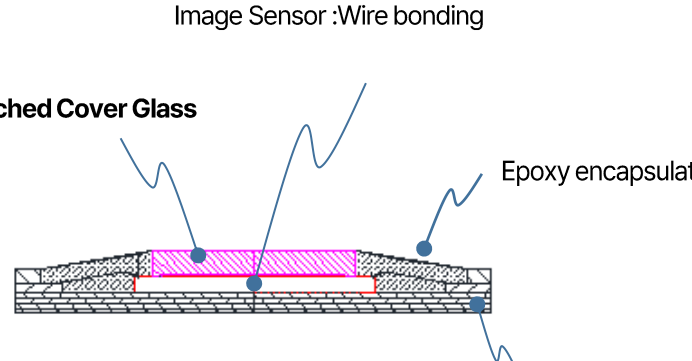
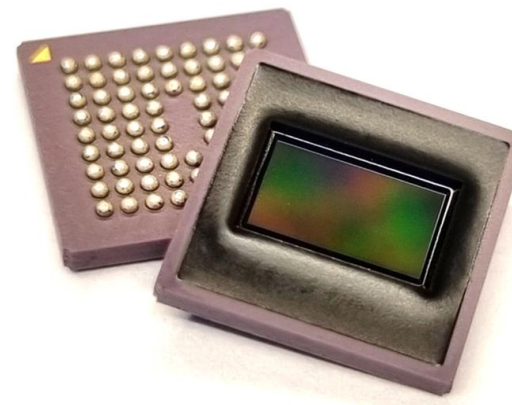
Item	Im2BGA (K***@TW)	iBGA (U***@Sig)	ABGA (AGP@KR)
Air Cavity (Condensation, internal pressure)			
Moving Particle			
Dam width			
Glass Stability			

MCP_BGA CLGA,CBGA

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Executive Summary
AGP's BGA PKG has a lot of specialties using an etched glass as follows

MCP_BGA & CLGA & CBGA

PKG Type	Illustration	Image
<p>MCP_BGA</p>	<p>Chip 2 image sensor : Wire bonding</p>  <p>Etched Cover Glass</p> <p>Epoxy encapsulation</p> <p>Ceramic body</p> <p>BGA</p> <p>Chip 1 : Flipchip Bonding</p>	
<p>CLGA & CBGA</p>	<p>Image Sensor : Wire bonding</p>  <p>Etched Cover Glass</p> <p>Epoxy encapsulation</p> <p>Ceramic Body</p>	

MCP_BGA CLGA, CBGA

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Executive Summary
AGP has the PKG Line-up such as MCP_BGA of ceramic and BGA&LGA of Ceramic.

CIS-PKG

Co2 MicroJet cleaner for Glass Lid Cleaning

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Executive Summary

As these four phenomena repeat simultaneously, foreign materials are removed

1. Physical Blasting

CO2 Snow & Pellet is sprayed with high-speed compressed air.
Removal of contamination by collision with surface contamination particles

2. Thermal shock

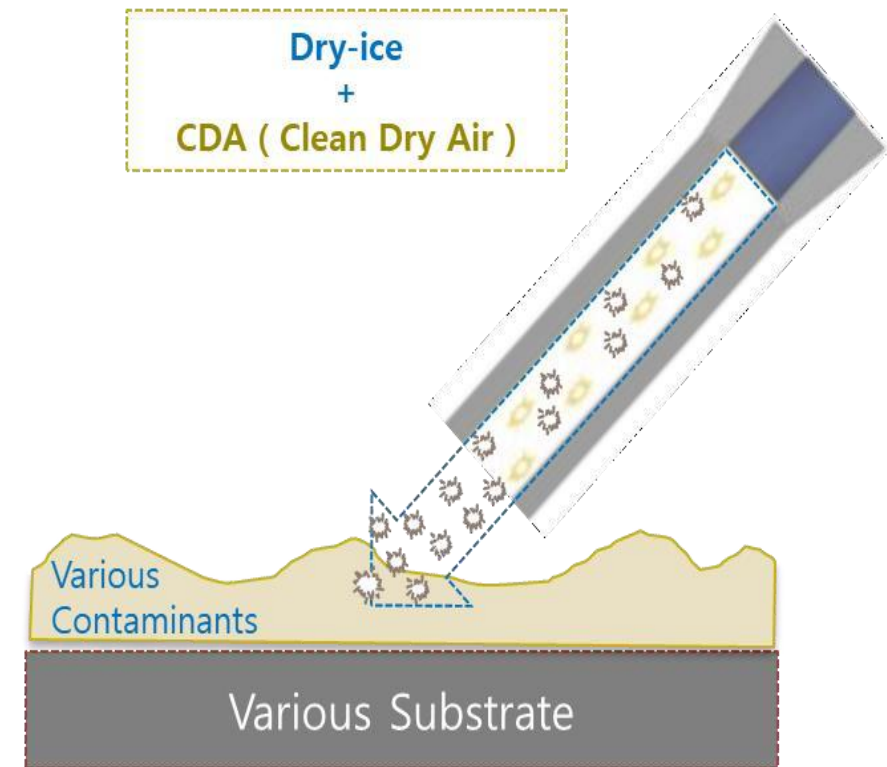
At the sublimation point: -78.5°C
Cooling and shrinking of the contaminated film by low-temperature air currents cause cracks in the film.

3. Sublimation expansion

Isolation between surface and pollutants during CO2 sublimation expansion

4. Solubility of pollutants (Organic solubility)

Solubility of organic substances (Solubility coefficient: 23)
L-CO2 has a solubility similar to that of acetone (IPA).



Configuration Final Test

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Final Tester Config

Class 1K zone

#1 : IP750EMP + NS8080MS (Cold option) : Digital 256ch, DPS32ch, AW1000(100x45mm)

#2 : IP750EP + AL0408NT (N/A) : Digital 128ch, DPS16ch, AW1000(100x45mm)



Teradyne IP750EMP

Image Sensor Test System

Teradyne IP750EMP Tester includes IPC *4 plus Workstation.
The Teradyne IP750EMP is the second generation image sensor tester from Teradyne, offering faster capture and processing of image sensor test data. Please contact us for additional information.

Features:

- License Configuration-
- Digital clock: 100 MHz
- Image capture clock for ICUD clock: 50 MHz
- DPS CH: 32
- Digital CH: 256
- LVM Size: 16



HIGH SPEED IC HANDLER	
MODEL	NS-8080MS
SYSTEM NO.	121600
POWER SOURCE	200-240 VAC(SINGLE PHASE) 50/60Hz, 6KVA max
AIR	0.49MPa (5Kg/cm ²) 120 N0/min
MOTOR	
INPUT/OUTPUT MAIN axis	750W(AC SERVO)
INPUT/OUTPUT ARM axis	200W(AC SERVO)
HAND XZ axis	2W(STEPPING)
TEST ARM Y axis	200W(AC SERVO)
Z,U axis	750W(AC SERVO)
SHUTTLE	200W(AC SERVO)
TRAY HANDLING ROBOT	200W(AC SERVO)
TRAY L/R/LUL	5W(INDUCTION)
FIX TRAY	2W (STEPPING)
DIMENSIONS	W1850 x D1500 x H1970
WEIGHT APPROX.	1090 kg
DATE	15.04
SEIKO EPSON CORP. 3-5, Owa 3-chome, Suwa-shi, Nagano-ken, 392-8502 JAPAN	



Final Test Process

Class 1K zone

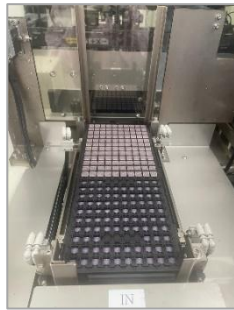
Process

Final Test

Advanced Global Package

01

Tray Loading



02

PKG Pick-up



03

Auto Test (Hot test)



04

PKG Bin Split



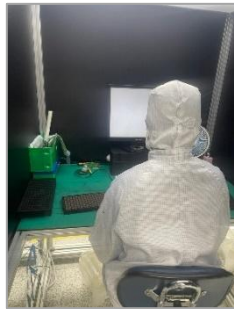
05

Tray Unloading



06

Manual VT (Fail bin only)



07

Bake



08

FVI



09

Protection film Attach



10

Packing



Executive Summary

AGP has the final test process as followings in the class 1000 clean room

Reliability Equipment

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Reliability Equipment

Reliability Item

THC
Temperature Humidity Chamber
(constant temp. & humidity test)

PCT / U-HAST
Pressure Cooker Test
(high temp. & high pressure test)

T/C
Temperature Cycling
(thermal shock test)

Equipment



SPEC

- . Model : YM-THC 420S
- . Temp Rang : -40°C~+150°C
- . Humidity Rang : 30~98% R.H
- . Out Size : 1250(W)×1150(D)
×1650(H)mm
- . Electricity : AC380V, 60Hz, 3ø / 12KW
- . Water is used in the machine

- . Model : YM-PCT 600
- . Temp Rang : 85°C~150°C
- . Humidity Rang : 75%~100% R.H
- . Steam Pressure : 3 atm.
- . Out Size : 1350(W)×1150(D)
×1750(H)mm
- . Electricity : AC220V, 60Hz, 3ø / 10KW
- . Water is used in the machine

- . Model : YM-TST600 (2 Zone)
- . Temp Rang : -70°C~+150°C
- . Out Size : 1600(W)×1400(D)
×2050(H)mm
- . Electricity : AC380V 60Hz, 3ø / 30KW
- . Compressed air is used in the machine

Executive Summary

AGP has the key reliability equipment to shorten the evaluation period of PKG reliability experiment

Customers

Advanced Global Package

The logo for Teledyne, featuring a blue stylized arrow icon pointing upwards and to the right, followed by the word "TELEDYNE" in a bold, blue, sans-serif font.The logo for PixelPlus, featuring the word "PIXELPLUS" in a blue, sans-serif font, followed by a cluster of five orange dots of varying sizes.The logo for Luxima Technology, featuring the word "LUXIMA" in a bold, black, sans-serif font with a red arc above it, and the word "TECHNOLOGY" in a smaller, red, sans-serif font below it.The logo for Brigates Inc, featuring a stylized blue and green icon of a person's head and shoulders, followed by the Chinese characters "昆山锐芯微电子" and the text "BRIGATES INC" in a blue, sans-serif font.The logo for LX Semicon, featuring a red square icon with a white stylized 'L' and 'X' inside, followed by the text "LX Semicon" in a black, sans-serif font.The logo for BYD, featuring the letters "BYD" in a bold, red, sans-serif font inside a red oval.The logo for SmartSens, featuring a stylized black icon of a person's head and shoulders, followed by the word "SMARTSENS" in a bold, black, sans-serif font.The logo for DB HiTek, featuring a stylized icon of three overlapping circles in blue, green, and red, followed by the text "DB HiTek" in a green, sans-serif font.The logo for GalaxyCore CMOS, featuring the word "GALAXYCORE" in a blue, sans-serif font with a stylized blue and orange icon of a person's head and shoulders, and the text "CMOS" in a smaller, black, sans-serif font below it.The logo for Gpixel, featuring the word "Gpixel" in a blue, sans-serif font.The logo for ClairPixel, featuring the text "Specialized CMOS Image Sensor Company!" in a small, black, sans-serif font above the word "CLAIRPIXEL" in a bold, black, sans-serif font.The logo for Meere Company, featuring the word "meerecompany" in a red, sans-serif font.

Quality System

Advanced Global Package

ISO14001:2015



CERTIFICATE OF REGISTRATION

This is to certify that:

AGP Co., Ltd.

82-19, Gwahaksaneop 1-ro, Oksan-myeon, Heungdeok-gu, Cheongju-si, Chungcheongbuk-do, 28122, Republic of Korea

operates an
ENVIRONMENTAL MANAGEMENT SYSTEM

which complies with the requirements of
ISO 14001:2015

for the following scope
Manufacture of CLCC(Ceramic Leadless Chip Carriers) and PLCC(Plastic Leadless Chip Carriers)

Certificate No: EMS41079

Issued: 27 April 2021 Originally Certified: 4 May 2015
Expires: 3 May 2024 Current Certification: 27 April 2021

Frank Camasta
Global Head of Technical Services
SAI Global Assurance

SAI GLOBAL

IATF16949:2016



CERTIFICATE OF REGISTRATION

This is to certify that:

AGP Co., Ltd.

3F, 82-19, Gwahaksaneop 1-ro, Oksan-myeon, Heungdeok-gu, Cheongju-si, Chungcheongbuk-do, 28122, Republic of Korea

Operates a
QUALITY MANAGEMENT SYSTEM

Which complies with the requirements of
IATF 16949:2016

For the following scope of registration:
The manufacture of CLCC (ceramic leadless chip carriers) and PLCC (plastic leadless chip carriers). Exclusions-product design.

Certificate No.: AUTO40666 Issue Date: 25 November 2021
IATF Database No.: 0436056 Expiry Date: 24 November 2024

Frank Camasta Dusan Nikolic
Global Head of Technical Services Automotive Technical Manager
SAI Global Assurance Global Scheme Center

SAI GLOBAL

ISO9001:2015



CERTIFICATE OF REGISTRATION

This is to certify that:

AGP Co., Ltd.

3F, 82-19, Gwahaksaneop 1-ro, Oksan-myeon, Heungdeok-gu, Cheongju-si, Chungcheongbuk-do, 28122, Republic of Korea

operates a
QUALITY MANAGEMENT SYSTEM

which complies with the requirements of
ISO 9001:2015

for the following scope
The manufacture of CLCC (ceramic leadless chip carriers) and PLCC (plastic leadless chip carriers). Exclusions-product design.

Certificate No: QMS43357

Issued: 25 November 2021 Originally Certified: 5 December 2018
Expires: 24 November 2024 Current Certification: 25 November 2021

Frank Camasta
Global Head of Technical Services
SAI Global Assurance

SAI GLOBAL



Thanks for your attention

