



Unicorn



Unicorn Company Profile

2023.03.01



LCD Business History

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JIC

Zastron

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1983

2009

2012

1983

- Incorporated in HongKong.
- Started with LCD EOL & MOL business.

1998

Established 1st LCD front line.

2000

- Become one of Namtai group's subsidiary.
- Established 2nd LCD front line.

2002

Established 3rd LCD front line (automated)

2009

Merged with sister company became Zastron.

2011

- Established 4th LCD front line (automated)
- Outsourced LCD business to Unicorn.

2012

- Acquired LCD business from Zastron.
- Both hardware and software are originated from JIC.

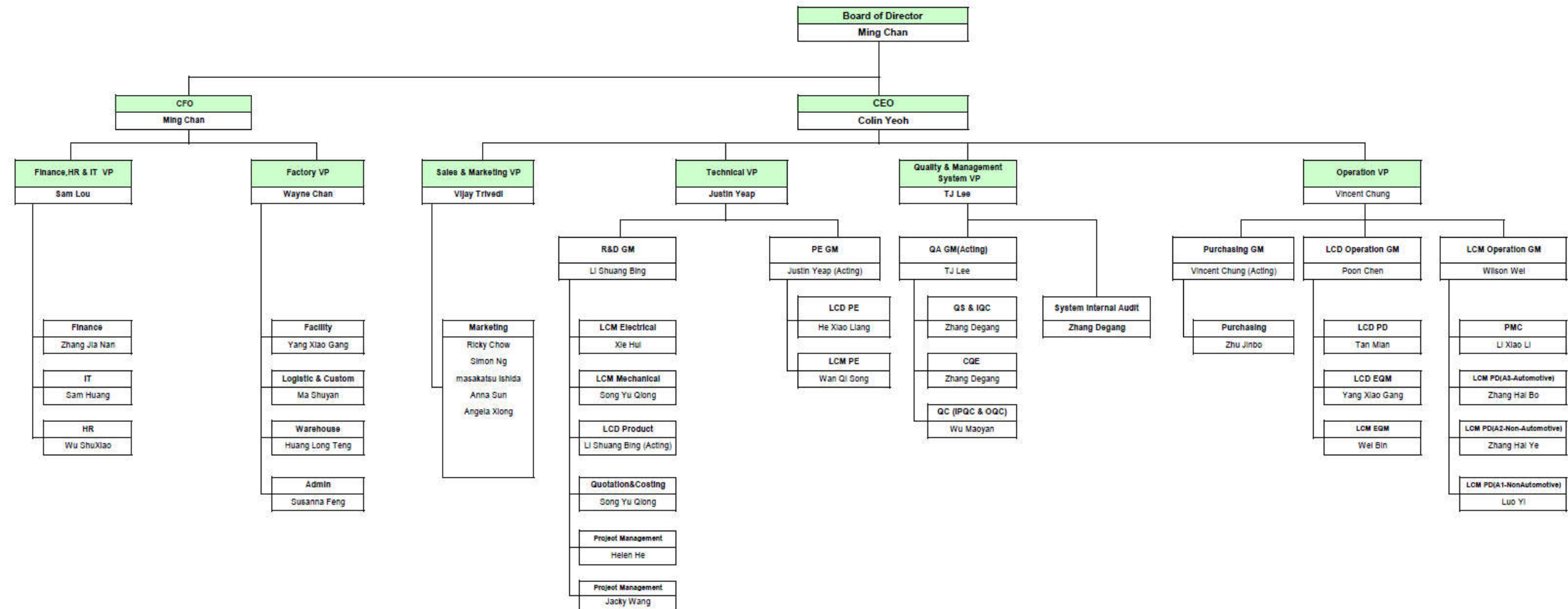
2013-2014

- Acquired TFT backend manufacturing equipment from Zastron.
- Started TFT EMS manufacturing activity.

39 years experience in LCD business!

Unicorn Organization Chart

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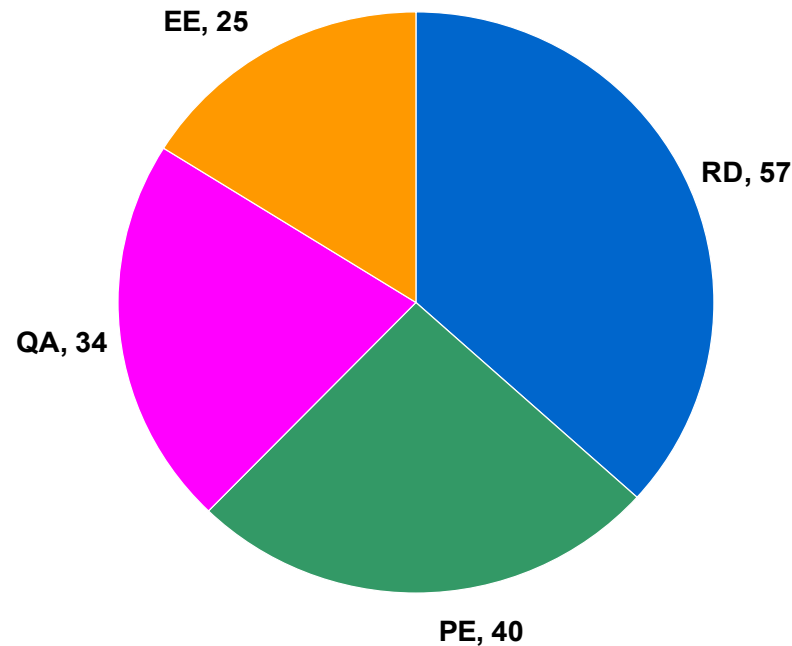


Employee (Q4 2022)

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● Direct Labor	700
● Indirect Labor	300
● Total Labor	1,000

Technical team breakdown (Q4 2022)



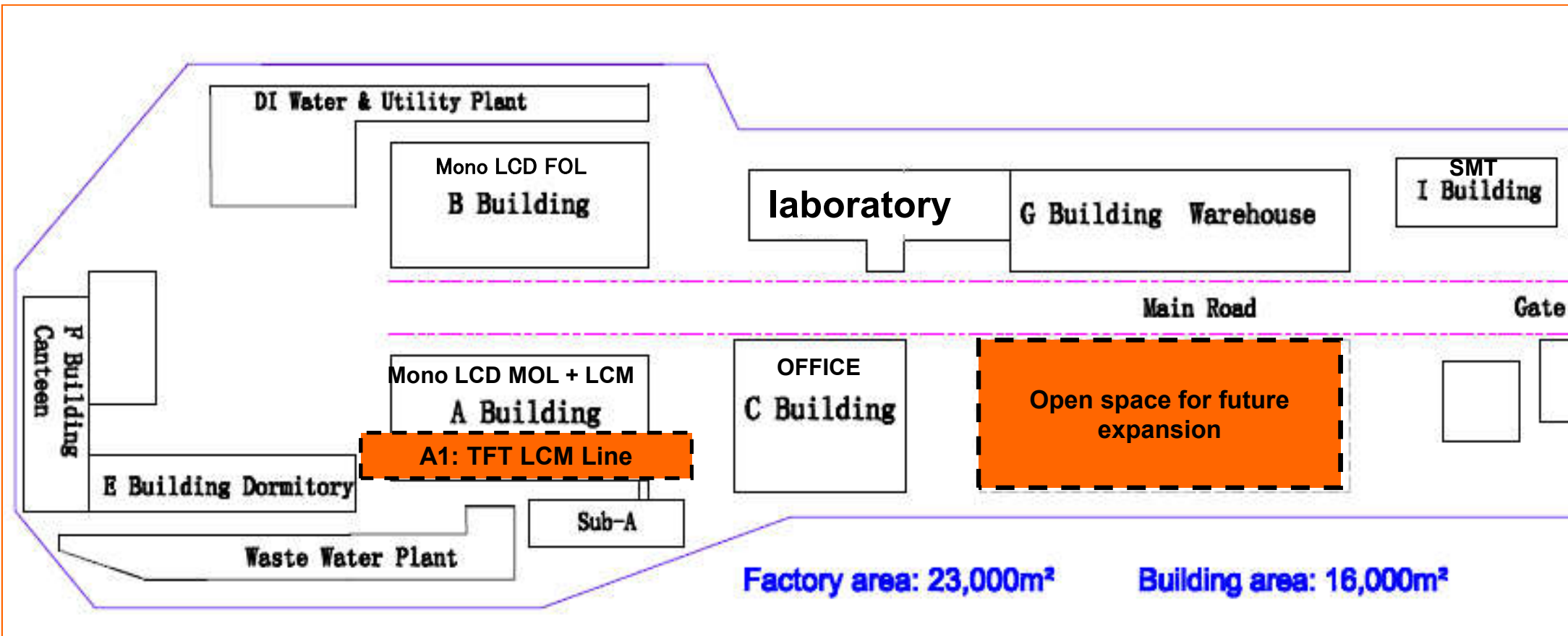
Location

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Factory Layout

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Remarks:

- 2013 – 2014 – Planned investment for expansion of TFT backend manufacturing + LCM manufacturing. Purchased total of 15 production lines from Zastron.
- Step1: 2013 Q4 ~ 2014 Q1 – A1 setup approx. 4 production lines for TFT LCM backend and LCM assembly.
- Step2: 2016 – Setup additional capacities for TFT / monochrome backend manufacturing in planned new Building D with additional 11 LCM production lines subject to business growth.

Expansion of Manufacturing Capacities & Capabilities

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Block A			
Floor	Manufacturing Process		
A4	MOL		
A3	LCM 3 (Dedicated automotive line)		
A2	LCM 2	A2-S	Screen printing, hot bar soldering, reliability lab
A1	LCM 1 (include TFT-LCM)	A1-S	Warehouse

Block B	
Floor	Manufacturing Process
B3	FOL (C-line): Patterning processes FOL (D-line): Patterning processes
B2	FOL (C-line): Alignment → Coupling → Heatpress processes
B1	FOL (D-line): Alignment → Coupling → Heatpress processes

Block C	
Floor	Description
C2	Office
C1	Office

Remarks -

- Investment of USD 5 mill for TFT –LCM production line set up in 2013
- A 1 F Q4 2013 – setup 4 lines for TFT OEM (from Scribing)
- TFT-LCM line include : Clean Room, Scriber, Toray COG Bonding machine(x5), FOG Bonding machine, Aging Chamber, Washing Machine, Measurement Equipment, etc..

Equipment

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FOL ITO Cleaning



FOL Developing



Inner Offset Printing



LC Filling



Irregular Scribing



Equipment

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Fully-Auto COG Bonder, Toray FG2500



Fully-Auto COG Bonder, Toray CL2000



Fully-Auto COG Bonder, Panasonic TBX



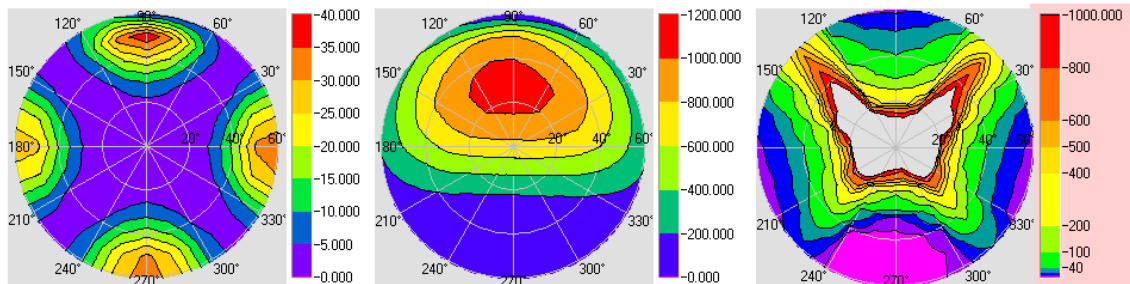
Fully-Auto COG+FOG Bonder, Comwin CYAC650



Validation Equipment

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Autronic, DMS501





Otsuka, Photal LCD-5200






Aging Test

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Name	Test Item	Capacity	Application
Walk-in Aging Test Room	<ul style="list-style-type: none"> -High temperature agint test -High temperature and high humidity aging test 	<ul style="list-style-type: none"> -The total number of equipment: 6 sets -Temp. range: RT~85°C -Humidity range: ≥90%RH -Total capacity 540K pcs/ month 	<ul style="list-style-type: none"> -Applied for high temperature or high temperature humidity burn-in test. -Inspect the product display function in room temperature after aging test.
Transparent Window Aging Test Cabinet	<ul style="list-style-type: none"> -High temperature agint test -High temperature and high humidity aging test 	<ul style="list-style-type: none"> -The total number of equipment: 6 set -Temp. range: RT~100°C -Humidity range: ≥90%RH -Total capacity 230K pcs/ month 	<ul style="list-style-type: none"> -Applied for high temperature or high temperature/humid ity burn-in test. -Inspect the product display function in high temperature condition.

Reliability Test

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Name	Test Item	Capacity	Application
Climate Environment Reliability Test Chamber	<ul style="list-style-type: none"> -High temperature test -Low temperature test -Thermal cycling test -High temperature and high humidity test -Programmable temperature/humidity cycling test -Thermal shock test 	<p>-The total number of equipment: 11 sets</p> <p>-Temp. range: -40°C~150°C</p> <p>-Humidity range: ≥90%RH</p>  	<p>-Applied for temperature climate environment reliability test.</p>
Electrostatic Discharge Generator	-ESD Test	<p>-The total number of equipment: 1 set</p> <p>-Output voltage range: $\pm 0.2\text{kV} \sim \pm 30\text{kV}$</p> 	<p>-Applied for IEC61000-4-2</p> <p>ISO10605</p>



Unicorn's Commitment

(Dedicated Quality Control)



AOI for Display Inspection

- ✓ *2 high resolution camera system*
- ✓ *Max detection area: 160x130mm*
- ✓ *Detection resolution: down to 0.13mm*
- ✓ *Detectable defects: additional or missing segment, black/white dot defects, line defects, uneven contrast.*
- ✓ *Set to over-reject and manually confirmed by inspector to ensure no escapee to customers.*
- ✓ *Already implemented in Mass production since Q3 2012.*

Quality System

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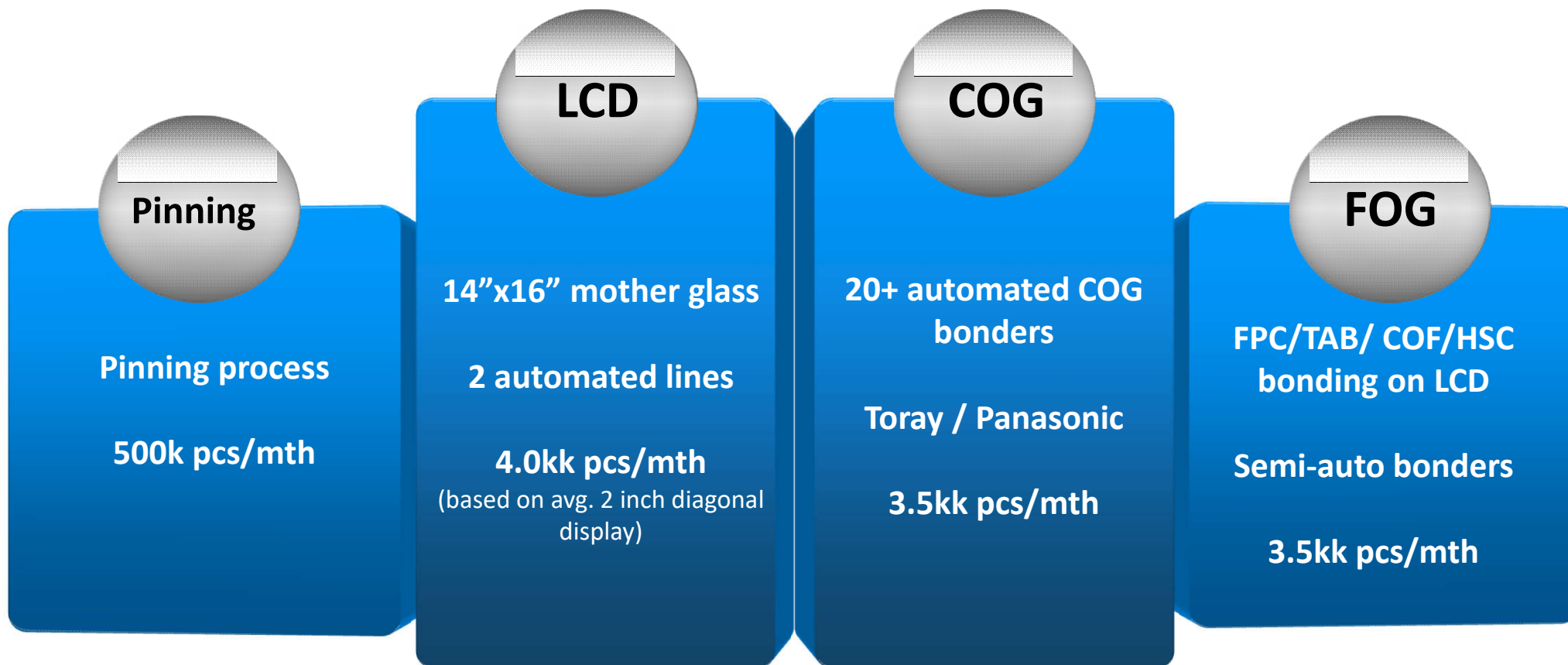
IATF16949

ISO14001

ISO9001

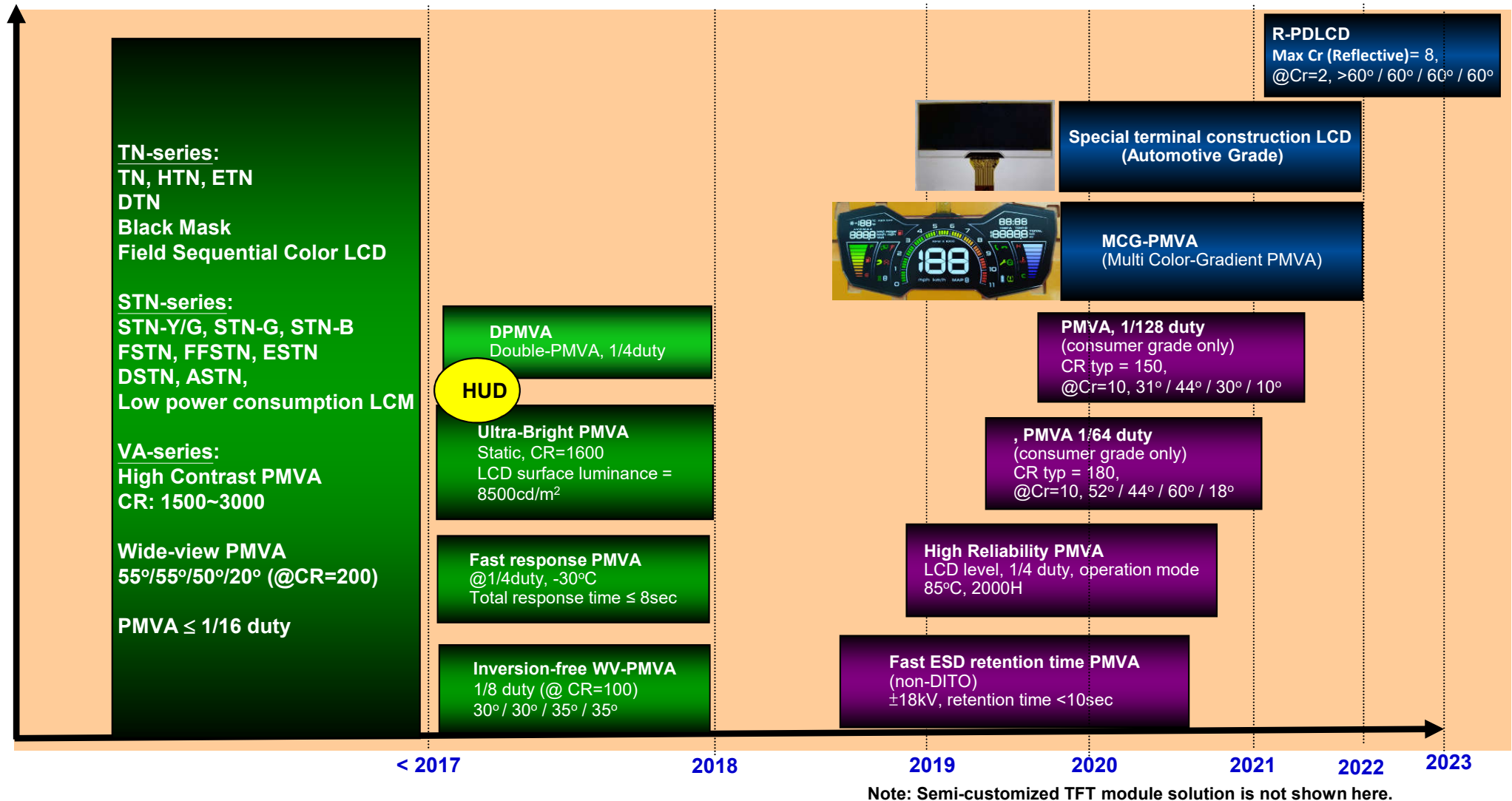
Production Capacity (Monochrome LCD & LCM)

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Product Technology Roadmap

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Reference Customers

Customer Reference

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Telecommunication



Panasonic

vtech

uniden

Alcatel-Lucent 

SIEMENS

UNIFY

AGFEO
einfach | perfekt | kommunizieren

NEC

Automotive



Continental 
The Future in Motion


HOSIDEN

 **YAZAKI**

STANLEY

**MAGNETI
MARELLI**

• APTIV •

 METHODE ELECTRONICS, INC.

 Visteon® 

 **S&T Motiv**

Industrial/Consumer Electronics



CASIO®

SONY®

POLAR®

 GROUPE
ATLANTIC

 **SENNHEISER**

VAILLANT GROUP


B/S/H/ 

BOSCH

 **ZOJIRUSHI**

Office Automation



Canon


brother®

RICOH

FUJI XEROX 


wacom®

 **FUNAI**

Customer Reference

(Telecommunication – cordless phone)

Unicorn

Panasonic



uniden



vtech



Customer Reference

(Telecommunication – IP phone)

Unicorn

SIEMENS



Alcatel-Lucent



AGFEO
einfach | perfekt | kommunizieren



Customer Reference

(Consumer Electronics)

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CASIO®



POLAR®



SENNHEISER



Reference Projects

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Oven
4.3", 480x272 TFT-LCM



DJ Mixer
4.3", 480x272 TFT-LCM



Alcatel-Lucent 

IP Phone
3.5", 320x240 TFT-LCM

Reference Projects

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Panasonic
ideas for life

Phone

1.77", 128x160 TFT-LCM



brother®

Printer

1.77", 128x160 TFT-LCM

Reference End Customers (Automotive)

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Remarks:

Unicorn is in OEM partnership for Stanley, supplying LCD/LCM to Japan & Korea automotive customers (Honda, Toyota, Mazda, Nissan)

Reference Customer & Application

(Instrument Cluster)



STANLEY **S&T** Motiv



Reference Customer & Application

(Instrument Cluster)



1/132 duty ASTN



Reference Customer & Application

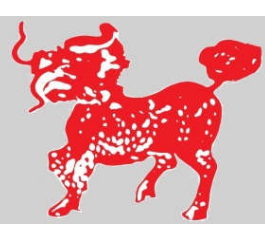
(Climate Control)

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DELPHI





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TFT Backend LCM Production Line

2022.12.22



A1TFT LCM Production Line

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A1F Production Line

CF Scribing

TFTScribing

Ishiyama Full Automatic Polarizer Attachment Machine

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Panel	CT(sec)	Work time			Time capacity (pcs/H)	Day capacity (pcs/D)	Monthly capacity (pcs/M)
		Days per monthly (D)	Time per day (H)	Utilization rate (%)			
3"	2.5	26	20	90%	1296	25920	673920
6"	3.0	26	20	90%	1080	21600	561600
8"	4.0	26	20	90%	810	16200	421200

A1TFT LCM Production Line



COG



Post FOG Process

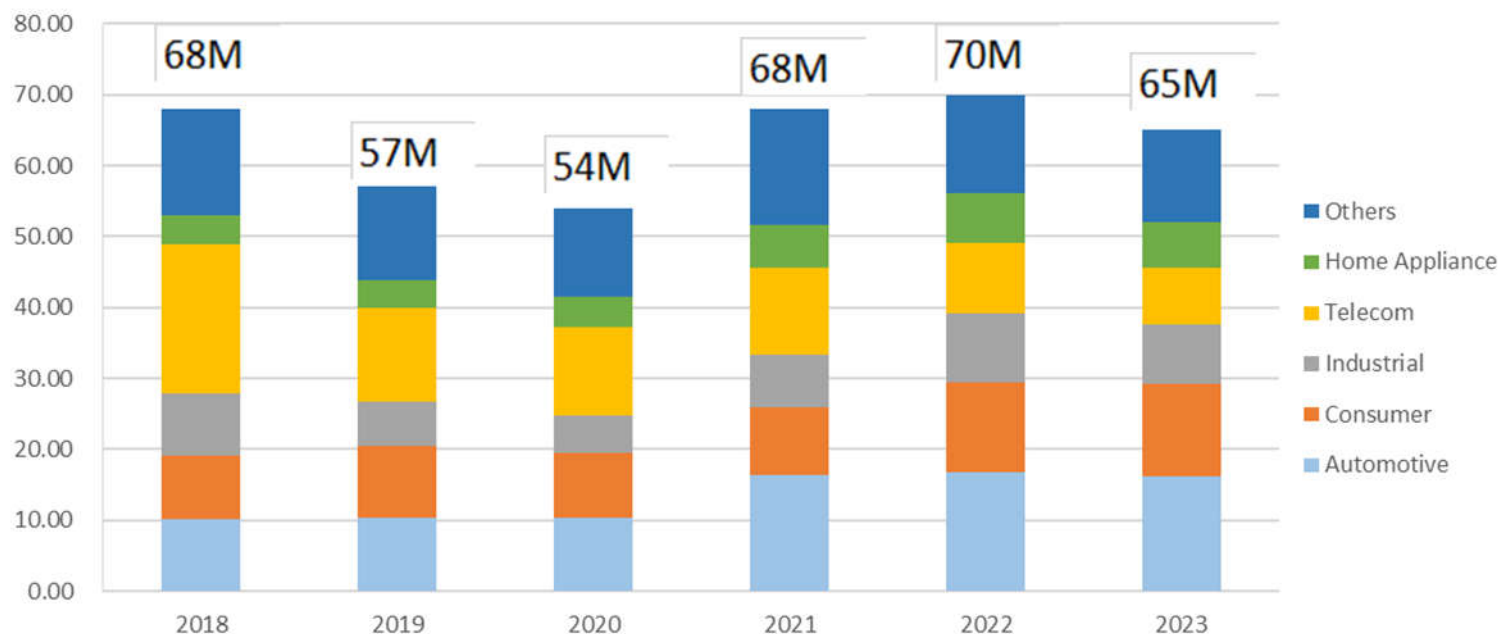


FOG

Unicorn Sales Revenue(USD)

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Unicorn Sales Revenue From Yr 2018 to Yr 2023~By Application



By Category						
Year	2018	2019	2020	2021	2022	2023
Application	% of sales	% of sales	% of sales	% of sales	% of sales	% of Budget
Automotive	15%	18%	19%	24%	24%	25%
Consumer	13%	18%	17%	14%	18%	20%
Industrial	13%	11%	10%	11%	14%	13%
Telecom	31%	23%	23%	18%	14%	12%
Home Appliance	6%	7%	8%	9%	10%	10%
Others	22%	23%	23%	24%	20%	20%

Key Summary



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Service & Support

Highly experienced engineering staffs in operation, QA and R&D to provide best services & solutions in LCD/ LCM customization.

Competitive Cost at Better Quality:

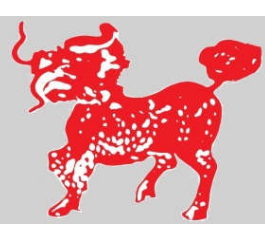
Automated processes and control leading towards:

- ✓ higher efficiency
- ✓ competitive manufacturing cost
- ✓ at a better quality

Technology Upgrade & Development:

Continuous technology development to meet full scope monochrome display demand for next 10 years:

- ✓ Automotive displays
- ✓ Vertical alignment displays
- ✓ High resolution STN displays.



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Thank You !