23

Starting from 1991
23 years history of LCM manufacturing,
World leading smart display maker.

Advanced technology

- The world thinnest five inch FHD smartphone display module maker
- The world first 2K(1440*2560) resolution smartphone display module maker

Quality Assurance

Quality has been approved by Global Automobile Customers

Total Solution

Products have been widely used in global smartphone, automobile,industrial and medical application.

Stable Supply

The majority of workers are local people, which can enable stable supply.

Smartphone Total Solution

Provide Display, Touch, Camera and Lamination Total Solution

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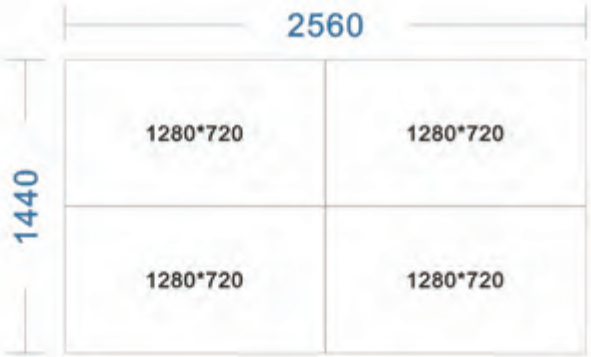
Display 》 2K Display Module

- Resolution: Quad–HD(1440*2560).
- Better display performance for picture, text and video.
- Provide four times sharper display performance than HD720.
- 5.5"/6.0" Quad–HD is in mass production, 5.2" Quad–HD is under developing.



Four times resolution, comparing with HD720,
Quad-HD achieves outstanding display performance

Quad-HD display(1440*2560)

Clear Display Performance

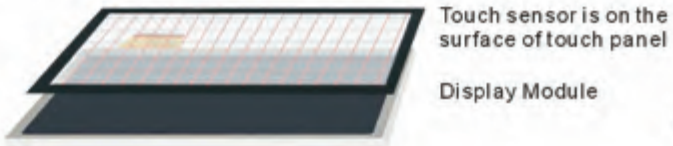
Normal display(720*1280)

Aliasing Performance

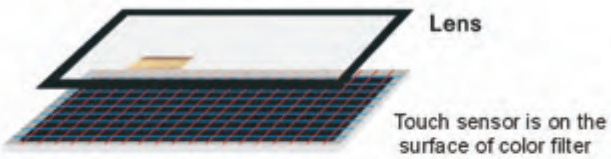
Display 》 On–cell Touch

- Unlike the traditional out–cell touch panel, On–cell Touch sensor is on the surface of color filter, which can enable much more integrated and thinner module design.
- Currently, Truly on–cell touch panel has been in mass production.

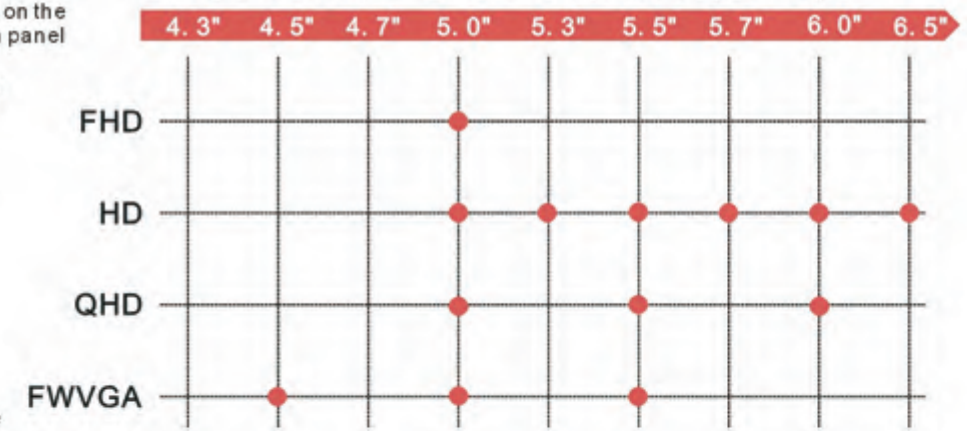
Traditional out-cell touch panel



On-cell Touch



On-cell Touch for Smartphone(G1M)



Display 》 Rainbow RGB Display Technology

- By optimizing sub-pixel arrangements, Rainbow RGB can greatly improve the TFT transmittance. Accordingly the module surface brightness is sharply increased.
- By using special driver IC, Rainbow RGB technology can achieve the similar display PPI performance as RGB FHD display module, while the brightness is much higher.
- Rainbow RGB display technology has advantages of higher surface brightness, lower power consumption, high-definition display performance, and more competitive cost.
- Currently, 5" and 5.5" Rainbow RGB display modules are in mass production.

Rainbow RGB display technology

Traditional display technology

With same backlight brightness, Rainbow RGB module has better display performance.

Display 》 Sunlight Readable Enhancement

- SRE:Sunlight Readable Enhancement.
- The TFT driver IC has special algorithm, which can selectively optimize the GAMMA curve, the contrast ratio and surface brightness are greatly improved under sunlight.
- Currently, FHD display module can support this function.

Traditional technology

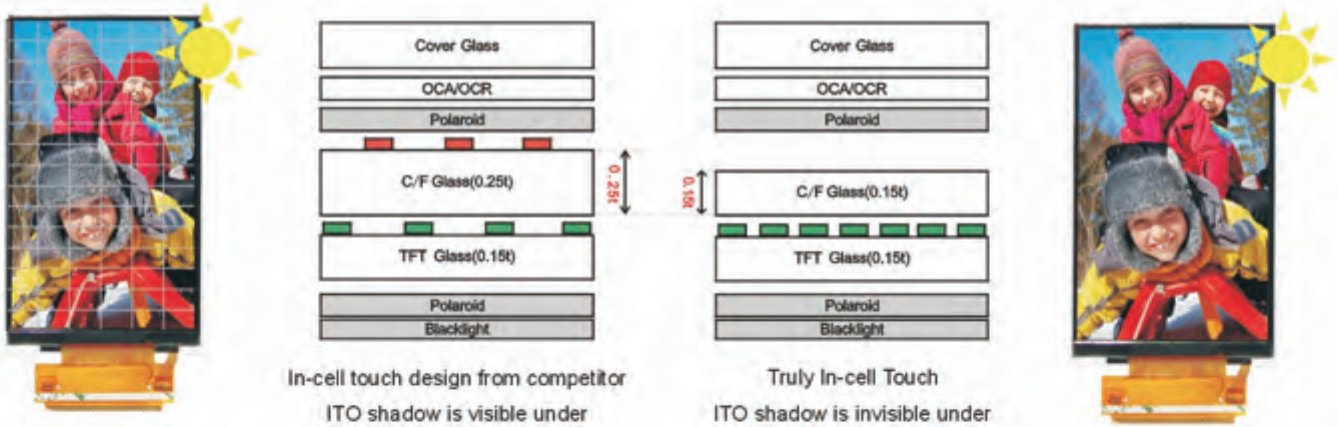
Under strong sunlight, backlight brightness is increased, but contrast ratio drops.

SRE technology

Under strong sunlight,backlight brightness is increased, and contrast ratio is enhanced significantly,which achieves better display performance.

Display 》 In-cell Touch

- By integrating touch sensor into the TFT substrate, In-cell touch can achieve highly integration of display and touch panel design.
- Better display and touch experience.
- Single driver IC solution for both touch and display.
- Truly In-cell Touch will be put into mass production in Q4 2014.



In-cell touch design from competitor

ITO shadow is visible under sunlight (thicker structure).

Truly In-cell Touch

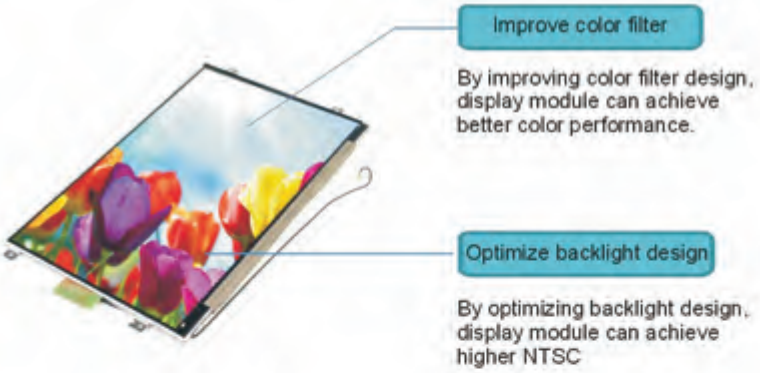
ITO shadow is invisible under sunlight (much thinner).

Display 》 Truly Quantum Display Technology

- Truly Quantum Display refers to high NTSC display with NTSC approaching around 100%.
- High NTSC will become one of the key performance indexes for high–end smartphone .
- Through optimizing Backlight and Color filter, the chroma is improved.
- Currently, Truly Quantum Display is in mass production.

Traditional TFT Display
(NTSC:70%)

Truly Quantum Display
(ABOVE:90%)



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Display 》 Naked-eye 3D Display Technology

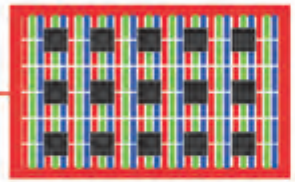
- Cell matrix parallax TN Barrier design(Patented).
- Cell matrix parallax TN Barrier design can both enable landscape and portrait 3D display, which can also increase the module surface brightness.

3D display module from competitiors

Truly 3D display module

By using cell matrix parallax TN barrier design,
Truly 3D display module can achieve outstanding 3D display performance both in portrait and landscape direction.

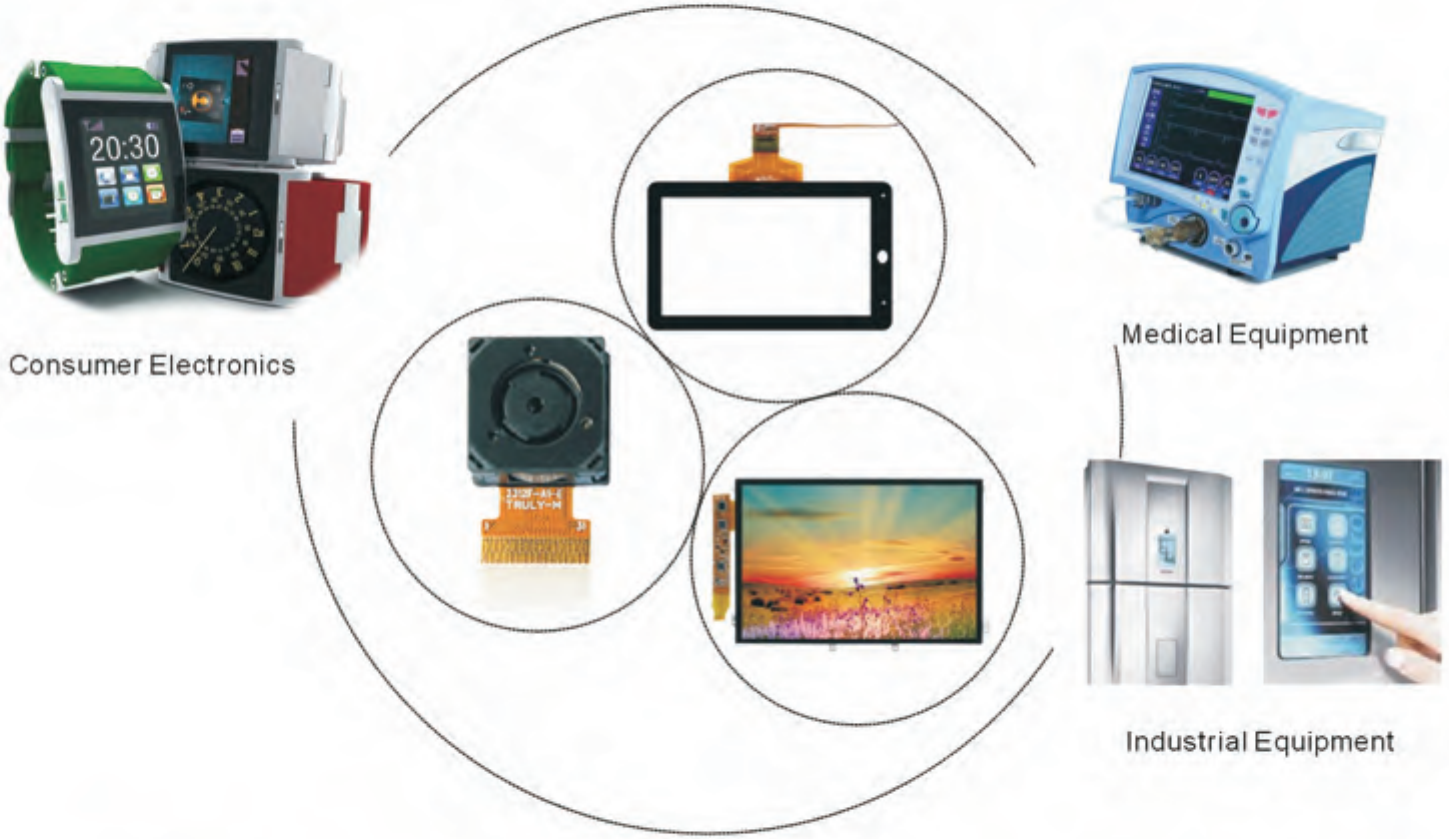
High-precise lamination process



By using the unique high-precise lamination equipment, Truly can achieve high-precise lamination alignment with +/-3um tolerance.

Provide naked-eye 3D display module, touch and 3D camera module total solution for 3D smartphone and tablet.

Industrial, Medical and Consumer Electronics Application



Provide Display, Touch, Camera and Lamination Total Solution

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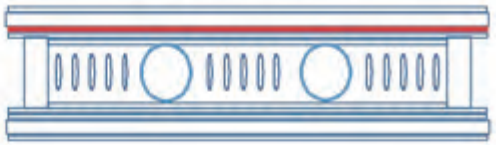
Display 》 Smart Key Display

- SKD (Smart Key Display).
- Mainly applied on MONO Passive LCD Display.
- By integrating touch sensor into LCD cell, SKD can achieve touch and display function.
- Better touch and display performance.
- Application Fields

  Smart Household: Air Conditioning, Refrigerator, Washing Machine, Micro–wave Oven etc.
  Medical Electronics: Hemopiezometer, Glucometer
  OA Instruments: Printer, Copy Machine, IP Phone and Feature Phone.
  Automotive Dashboard and Industrial Control.

SKD Structure



Items	Mechanical key	Outboard RTP	Outboard CTP	Smart Key Display
Life Span	Within 3 years	3 years	Over 5 years	Over 5 years
Dust-proof Ability	Weak	Strong	Strong	Strong
Water-proof Ability	Weak	Strong	Strong	Strong
Sensitivity	Poor	Poor	Better	Good
Product Structure	Complicated	Compact	Compact	Compacter
Product Thickness	Thicker	Thick	Thick	Thin
Cost Comparisons	•	•••	••••	••

Display 》 Transflective TFT Display

- By reflecting ambient light, Transflective TFT can display image without backlight turning on, which can be widely used on outdoor applications, such as GPS, Smartwatch and Interphone, The power consumption is much decreased.
- Truly 2.5G TFT production line, which is committed to industrial and automobile applications with long–term and stable supply, can support fully customized transflective TFT display.

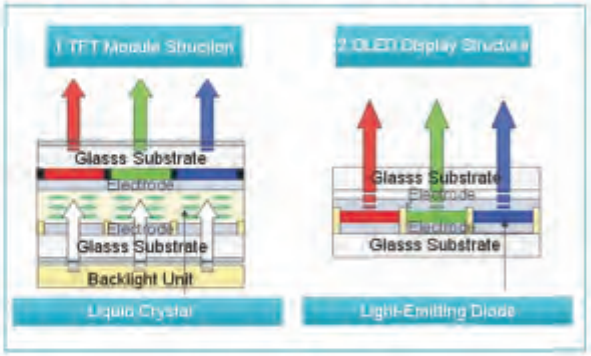
Outdoor display performance based on transflective TFT

Outdoor display performance based on transmissive TFT

Display 》 OLED

- OLED (Organic Light Emitting Display) is a light-emitting diode (LED) in which the emissive electroluminescent layer is a film of organic compound which emits light in response to an electric current. OLED technology has the advantage of solid, active lighting(No Backlight needed),ultra-thin, low power consumption, free view angle, fast response time, low voltage dc drive, wide operation temperature range and flexible design enabled feature, which has been publicly acknowledged as the perfect new generation of flat panel display technology.
- Truly produces passive type OLED with mature capability of single color, area color and full color OLED displays. PMOLED has the advantages of low power consumption, free view angle, fast response, ultra-thin design and flexible, which has been widely used in consumer electronics and industrial applications.

Structure comparison between OLED and TFT



Performance comparison between OLED and TFT

ITEM	OLED	TFT LCD
Power consumption	5mW/inch^2	20mW/inch^2
Temperature range	-40~85℃	-35~65℃
View angle	170~180°	120~180°
Response time	μs	ms
Ligting efficiency	4~81M/W	>151M/W
Lighting type	Active lighting	Backlight needed
Manufacturing process	5MASK	10MASK

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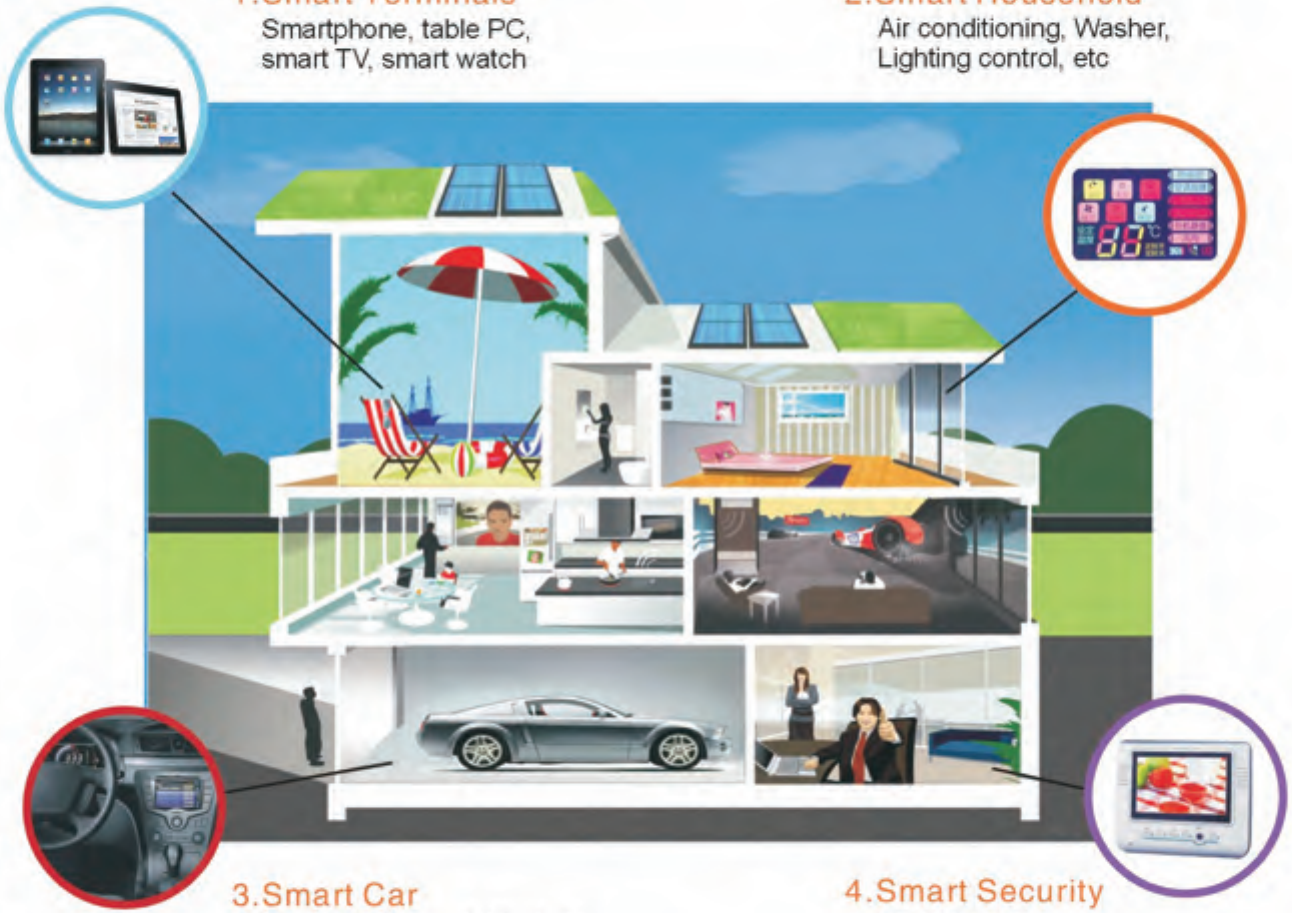
Smart Home Solution



1.Smart Terminals
Smartphone, table PC,
smart TV, smart watch

2.Smart Household
Air conditioning, Washer,
Lighting control, etc

3.Smart Car
Dashboard, Touch Control ,
Camera Monitor

4.Smart Security
Video phone,
Security Access Control etc.

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Smart Watch Total Solution

Provide total solution for smartwatch

Display Module

0.98"~2.8"PMOLED
1.2"~2.2"Transflective TFT
Free shape display

Touch panel

GF
GFF,G1M
On-cell OLED

Camera

Low power consumption
and ultra-thin design

Full lamination

(OCA)
(OCR)

TYPE	SIZE	Resolution	Shape	Display technology	Status
TFT	1.42"	160*160	Square	TN(TF)	MP
	1.60"	240*240	Square	TN(TF)	MP
	1.80"	240*240	Square	TN(TF)	Planning
	1.26"	320*320	Round	TN(TF)	Planning
	1.35"	240*240	Round	TN(TF)	Planning
	1.38"	220*220	Round	TN(TM)	MP
	1.22"	240*208	Round	TN(TF)	2014.08
PM-OLED	1.1"	96*96	Square	OLED(Full color)	MP
	1.12"	96*96	Square	OLED(single color)	MP
	1.5"	128*128	Square	OLED(single color)	MP
	1.13"	128*128	Round	OLED(single color)	MP

SIZE	Corresponding CTP		
	LENS Thickness	CTP Thickness	CTP Type
1.4"	1.1mm	1.625mm	GGM
1.5"	0.8mm	1.050mm	GF
1.5"	0.55mm	1.125mm	GG

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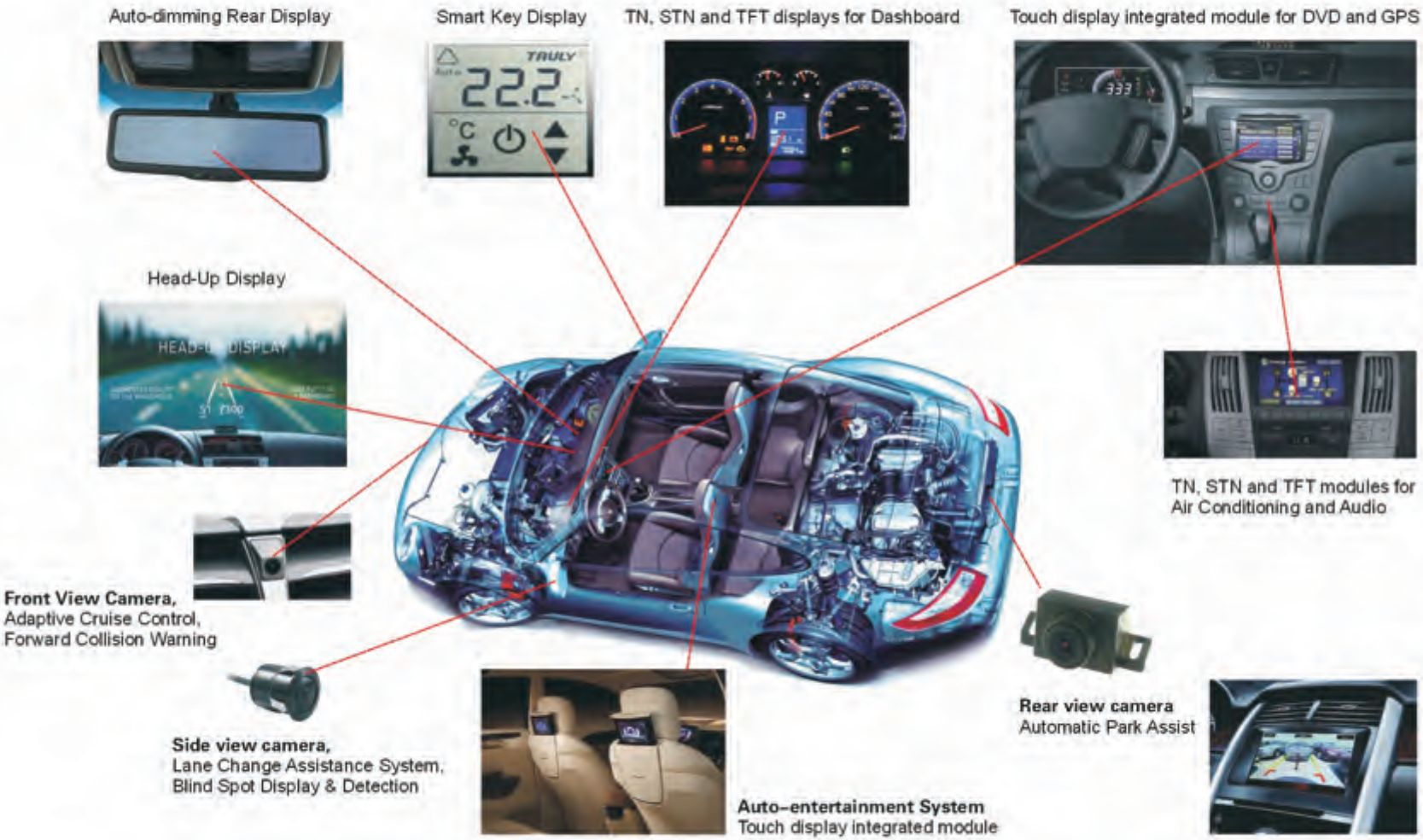
Automotive Solution



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Display 》 Free Viewing Angle Mono TFT Display

- Wide viewing angle, high transmittance, high Contrast ratio and competitive cost.
- Widely used in industrial, medical and automotive customers who has higher request on mono display performance.
- This technology has already been in mass production.

1 WideViewing angle

2 High transmission ratio

3 Low cost with self-made CF

4 High contrast ratio Black background

Item	Normal-white MONO TFT	Normal-black MONO TFT
Transmittance	Good	Good
Outdoor Performance	Normal	Normal
Viewing angle	Poor	Good
Background color	Grey	Black
Contrast ratio	Good	Good
Response time	Good	Good
Power consumption	Good	Good
Cost	Good	Normal

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Display 》 Auto Dimming Rear Display

- Auto dimming rear display can effectively reduce the affect of glare to driver, which improves driving safety.
- By using liquid crystal reversing, Truly auto dimming rear display can achieve anti–glare performance, Which has been successfully patented.
- This technology has been in mass production.

Jo Kessler effect

Average Braking distance at 100KMH

42 meters(with auto dimming function)

81 meters(wihtout auto dimming function)

Remark: Jo kessler effect means driver needs 1.4 seconds more to react in glare light than it in normal ambient light.

Normal Rear Display

Auto-dimming Rear Display

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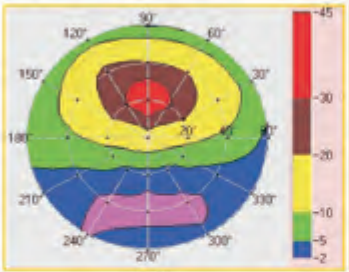
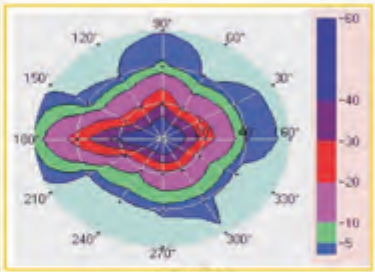
Display 》 TBN(True Black Negative)

- TBN can achieve higher contrast and wider viewing angle.
- Without light leak issue, suitable for varied color backlight.
- This technology has been in mass production.

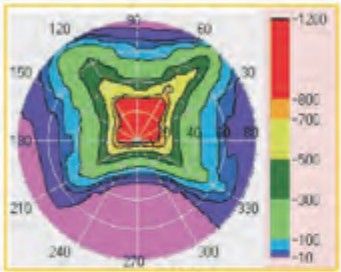
High contrast ratio



TN

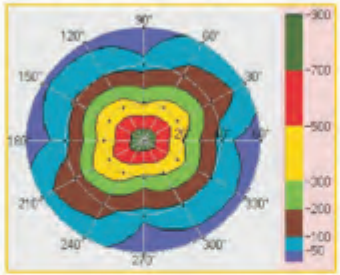


DSTN



TBN

Wide viewing angle



TFT panel with polarizer

CR	>50
U	45
D	45
L	50
R	50

Display 》 Head–Up Display

- HUD stands for Head–up Display which can be applied on smart car.
  It can reduce the frequency of driver to look at the dashboard,
  Which can avoid the negative effect of attention interruption to driving safety.

TRULY Standard TFT LCD For HUD			
	HUD Standard-1	HUD Standard-2	HUD Standard-3
Dimension	1.8"	1.8"	1.8"
Resolution	480*240(RGB)	480*240*3	480*240(RGG)
PPI	299	299	299
Technology	a-Si	a-Si	a-Si
Display mode	NW Color	NW Mono	NW Yellow-green
Sample	OK	OK	OK