



Smartphone Market Decode_4Q19

November 26, 2019



To provide members with a more comprehensive view of the smartphone market, TrendForce has launched a new smartphone report covering the entire smartphone industry's development. The report is a joint effort by many of the company's key research divisions, including *DRAMeXchange*, *WitsView*, *LEDinside*, and *Topology*. Its aim is to help members gain a better understanding of the ongoing trends in the smartphone industry. At the same time, it can also be used to help clients make better business decisions and risk management policies. In addition to providing key statistical data and figures from the smartphone industry, the report will offer insights on the statuses and outlooks of major smartphone components, including memory chips, panels, processors, ICs, biometric recognition systems, cameras, and facial identification technologies.



Device categories: Smartphone



Format : Excel(Smartphone Production Data Base) and PDF(Market Status)



Update frequency : Quarterly(Issued on 25th~31th of Feb, May, Aug and Nov.)

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1 Smartphone Market

2 Memory

3 AP & Modem

4 Display

5 DDI/Biometric

6 Camera/3D Sensing

7 AR/VR & New Application

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2019 Top 10 Branded Smartphone Production Volume

2019 Share % 2020

Overview of Major Smartphone Brands

Worldwide Smartphone Market

The global smartphone market is becoming saturated. With the limited growth of the mobile phone market in 2020, 5G will become the prime focus.

Samsung	
Apple	
Huawei	
Xiaomi	
OPPO/VIVO	

WW Supply Bit Distribution

Mobile DRAM Revenue Market Distribution

LPDDR4 series have become Mainstream from 2018

Overall Demand Outlook of Devices

Mobile DRAM Industry Outlook

2019/2020 ASP Projection - Sequential

	QoQ %	3Q19	4Q19E	2019 Forecast (YoY)	1Q20F	2Q20F	3Q20F	4Q20F	2020 Forecast (YoY)
PC DRAM									
Server DRAM									
Mobile DRAM									
Graphic DRAM									
Specialty DRAM									
Total DRAM									

TRENDFORCE Source: DRAMExchange, Nov., 2019
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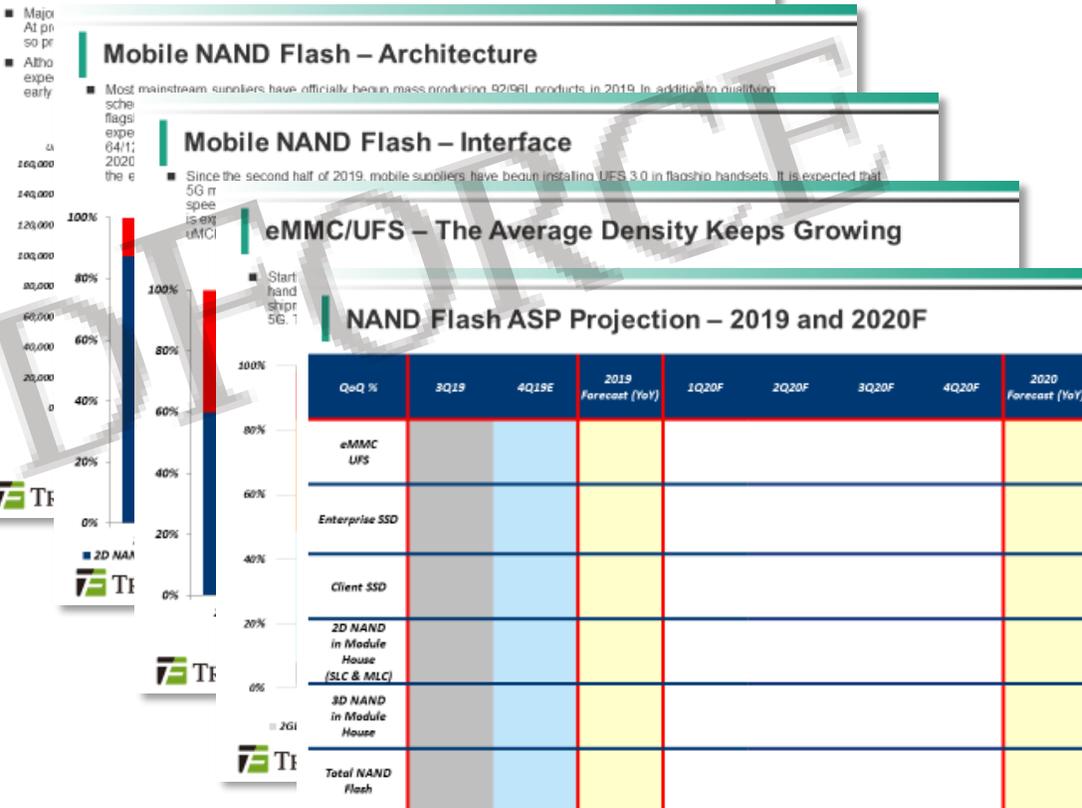
NAND Flash – Showing Bottom Out Signs

Mobile NAND Flash – Architecture

Mobile NAND Flash – Interface

eMMC/UFS – The Average Density Keeps Growing

NAND Flash ASP Projection – 2019 and 2020F



TRENDFORCE Source: DRAMExchange, Nov., 2019
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Samsung 4G/5G AP, and 5G Modem in 19H2

Huawei 4G/5G SoC Development in 19H2

4G Low end 4G AP in 19H2

Competition of AI Computing Power Among Smartphone SoCs, AI Architecture is the Key

Major Chip Manufacturers Strengthen Foundation in Developing Products for 5G

Exynos

- + 2 x Cortex-A71
- + Mali
- + 4G5
- + 8nm
- + Released 2018

Flagship Performer

Middle

Forecast

- Flaps
- Mid-e
- It ren
- Nova

ZTE

Intel

SICC

YANCHIP

TrendForce

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2017~2024 Market Trends of Smartphone Sizes

2017~2024 Market Trends of Smartphone Resolutions

AMOLED Capacity Plan by Region

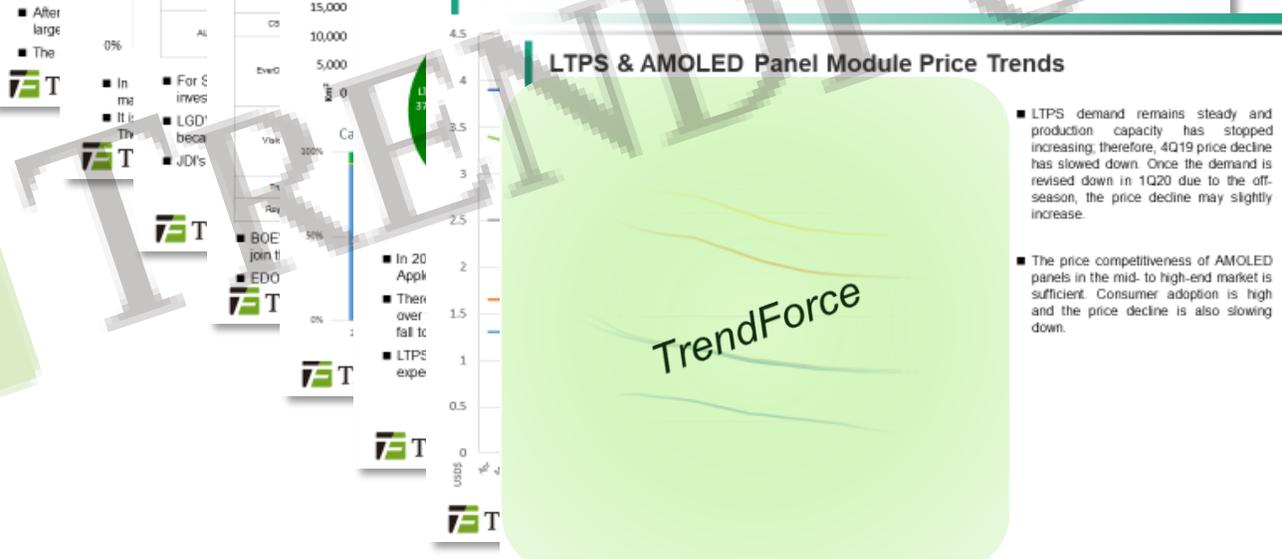
AMOLED Capacity Plan by Region

S&M AMOLED Capacity Growth in Area

Market Trends of Smartphone Display Specifications

a-Si & LTPS Cell Panel Price Trends

LTPS & AMOLED Panel Module Price Trends



2016~2022 TDDI IC Shipment Forecast(Smartphone)

Smartphone COF Share, 2017-2022

The Schedule of New TDDI IC

Fingerprint Solution Trend

ASP of Smartphone Fingerprint Recognition Modules (Android)

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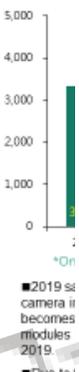
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- The second-generation optical fingerprint identification module quote has fallen sharply, accelerating customer adoption.
- Since 4Q19, the third-generation ultra-thin optical fingerprint identification module has been used in some customer handsets. In the future, 5G will be the focus, which will help save space for the mechanic of mobile phones. The current unit price falls between the second-generation optical fingerprint identification module and ultrasonic fingerprint identification module.

Trends towards Triple and Four Camera Set-up

Global Sh
(M units)



各品牌手機的三鏡頭設計方案

價格區間



Xiaomi's CC9 Pro Features a 100MP Camera

- The g
- 100M addn supp

Slight Increase in 3D Sensing Smartphone Penetration Rate

- As rear ToF 3D sensing modules become a standard requirement in mid-range and high-end smartphones, the number of 3D sensing smartphones has increased. The overall penetration rate of 3D sensing in smartphones is expected to reach 15.7% in 2019, driven by the growing 3D sensing smartphone shipments from Apple, Huawei, and Samsung.
- As new iPhones are expected to feature a rear 3D ToF sensing unit on the back and more Android smartphones will follow suit, the penetration rate and number of 3D sensing modules will grow further in 2020.
- Despite Google's new front-facing 3D sensing solution, this solution is unlikely to make a comeback as most brands are not interested in facial recognition functions in the near future.



VR Device Shipments by Brands, 2019 - 2020

- PS VR device game console decline.
- HTC is unlikely see significant
- Due to a low-2019, become
- Huawei's new

Oculus' Strategy for Quest

- Make up for the lost revenue from the lower cost pricing for its VR headset (US\$399) with software revenue.
- Direct Oculus
- Enhance social
- Turn the device

Apple Reduces Development Entry Barriers and Enhance Body Tracking Functions with ARKit 3.0

- ARKit 3.0 unveiled in 2019 includes RealityKit and Reality Composer to lower the barrier to entry for AR development while supporting motion tracking to enhance functionality. With 3D sensors, ARKit will be able to provide better motion capture and AR performance.
- iOS 13 boosts Face ID unlocking speed by 30%
- Enhanced street view provided by Apple Maps builds a foundation for future AR navigation.

M-Units

Motion tracking will become a main requirement in next-gen products again

Enhanced Face ID unlocking

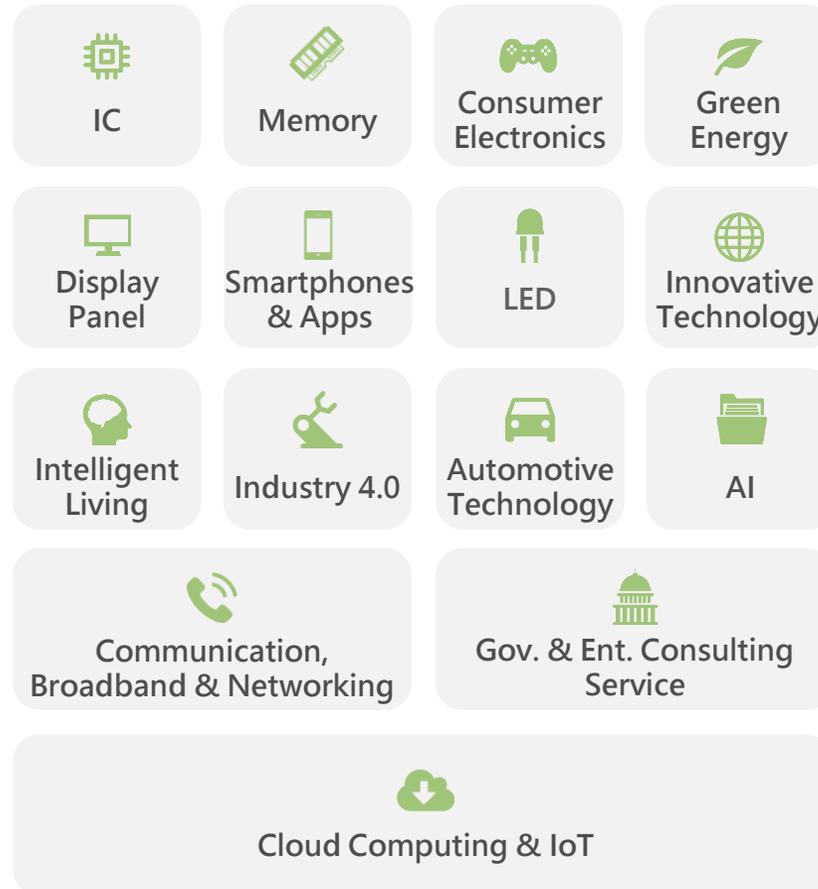
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Components	Supply/Demand Trend			Status
	3Q19	4Q19	1Q20	
DRAM				
NAND Flash				
Panel				

Components	Technology Trend & Status
AP	
DDI/Biometric	
Camera/ 3D Sensing	
AR/VR	

TrendForce & TRI Research Areas



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