

強茂 集團

Investor Relations Presentation

**PAN JIT**  
SEMI  
CONDUCTOR



## Chief Strategy Officer

Jasper Lee

AUG 2018

- 關於強茂
- 全球分離器件
- 消費性電子
- 汽車應用
- IGBT



## 無錫至極動能科技有限公司

Sumnergy

成立：2017.6

營業項目：

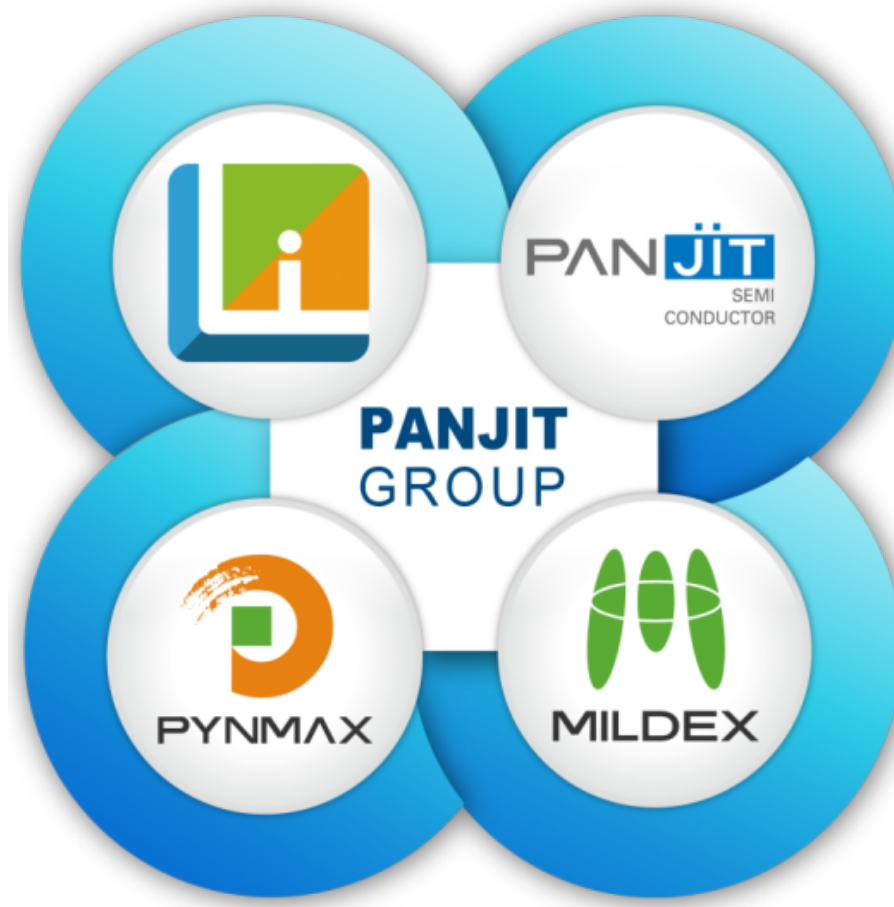
電池管理系統，電池組

## 環茂科技股份有限公司

PYNMAX

成立：2000.3

營業項目：晶圓製造



## 強茂股份有限公司

PANJIT

成立：1986.5

營業項目：

功率式元件、封裝測試

## 熒茂光學股份有限公司

MILDEX

成立：2005.5

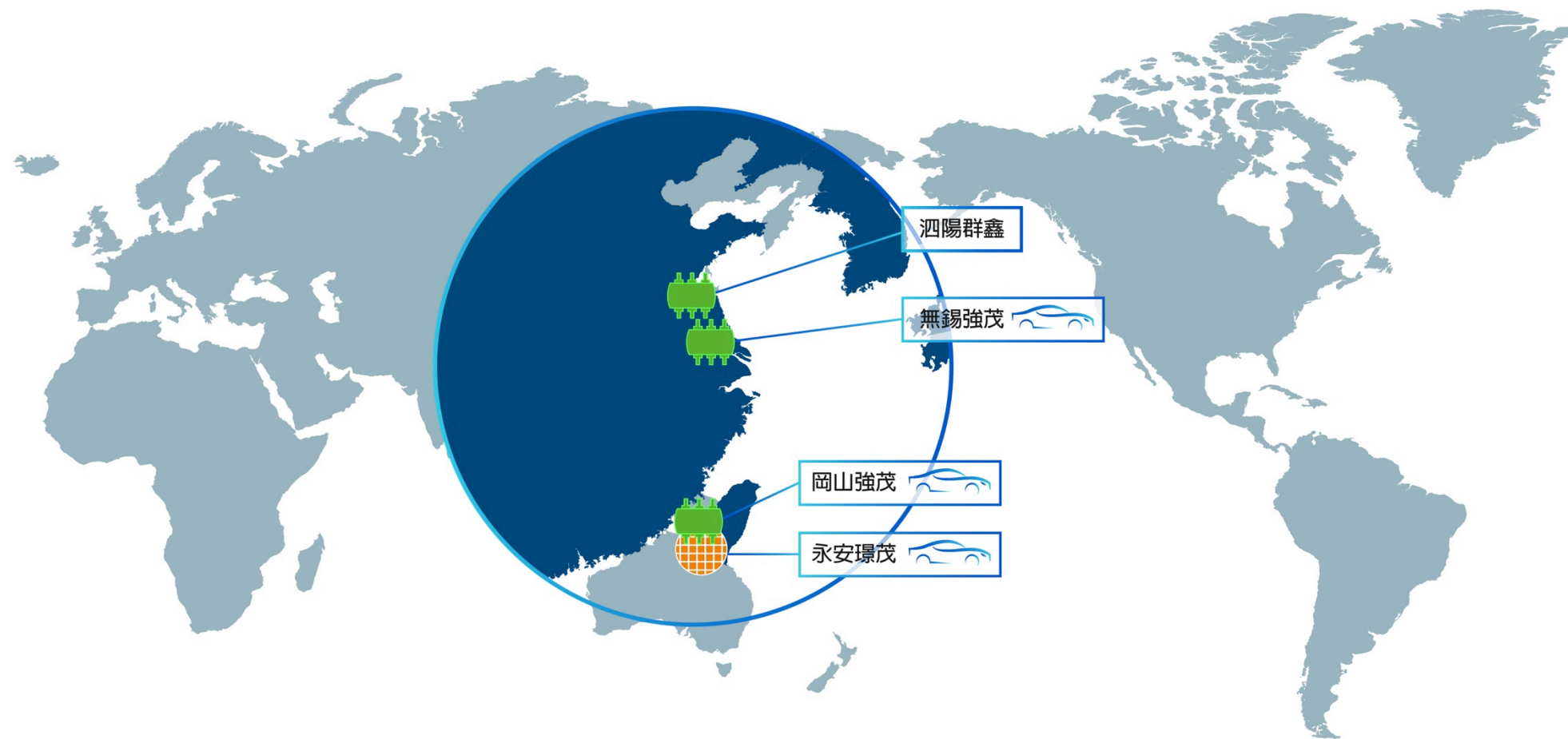
營業項目：

觸控面板 (工業/軍用)



📍 總部 Headquarters    📍 業務據點 Sales Office

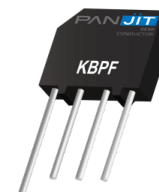
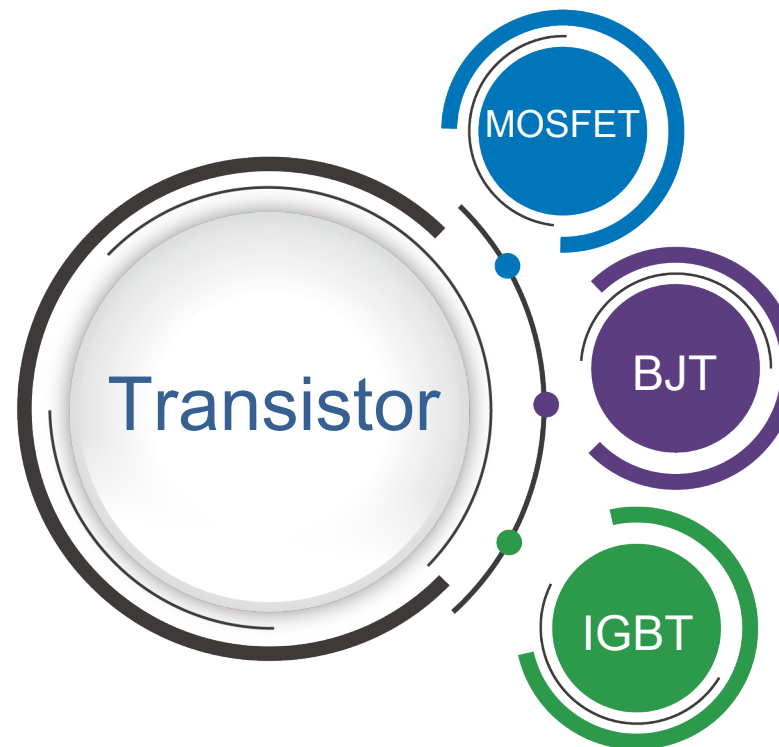
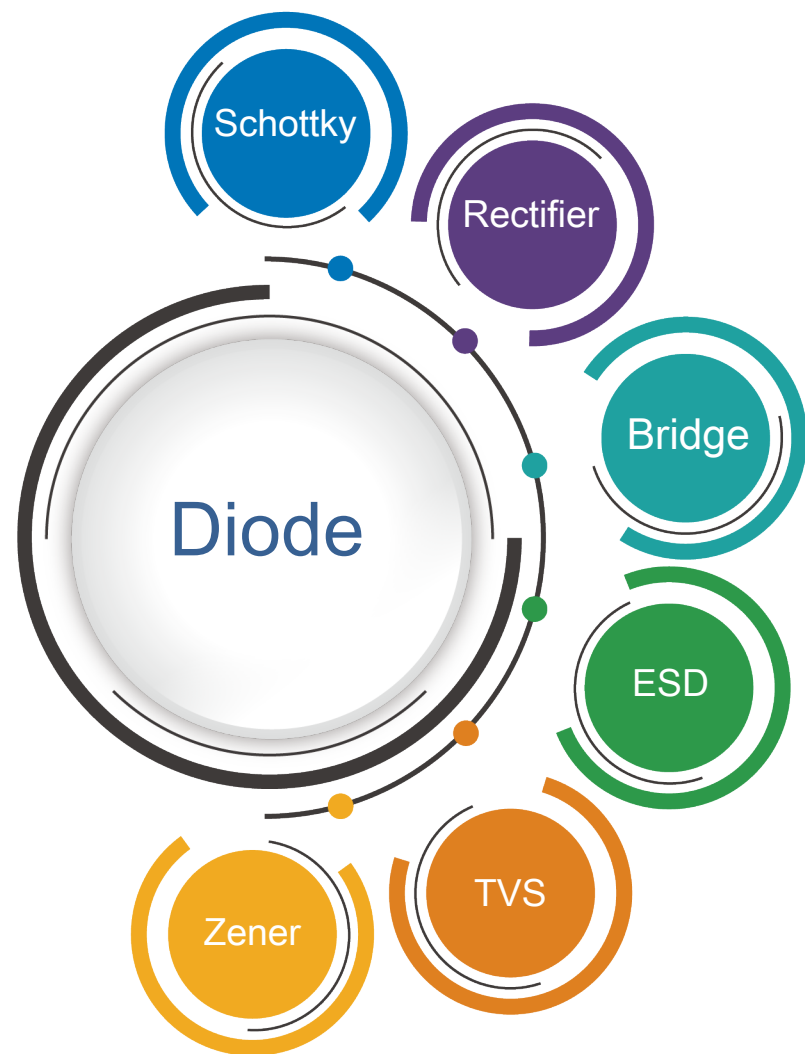




前端晶圓 後端封測



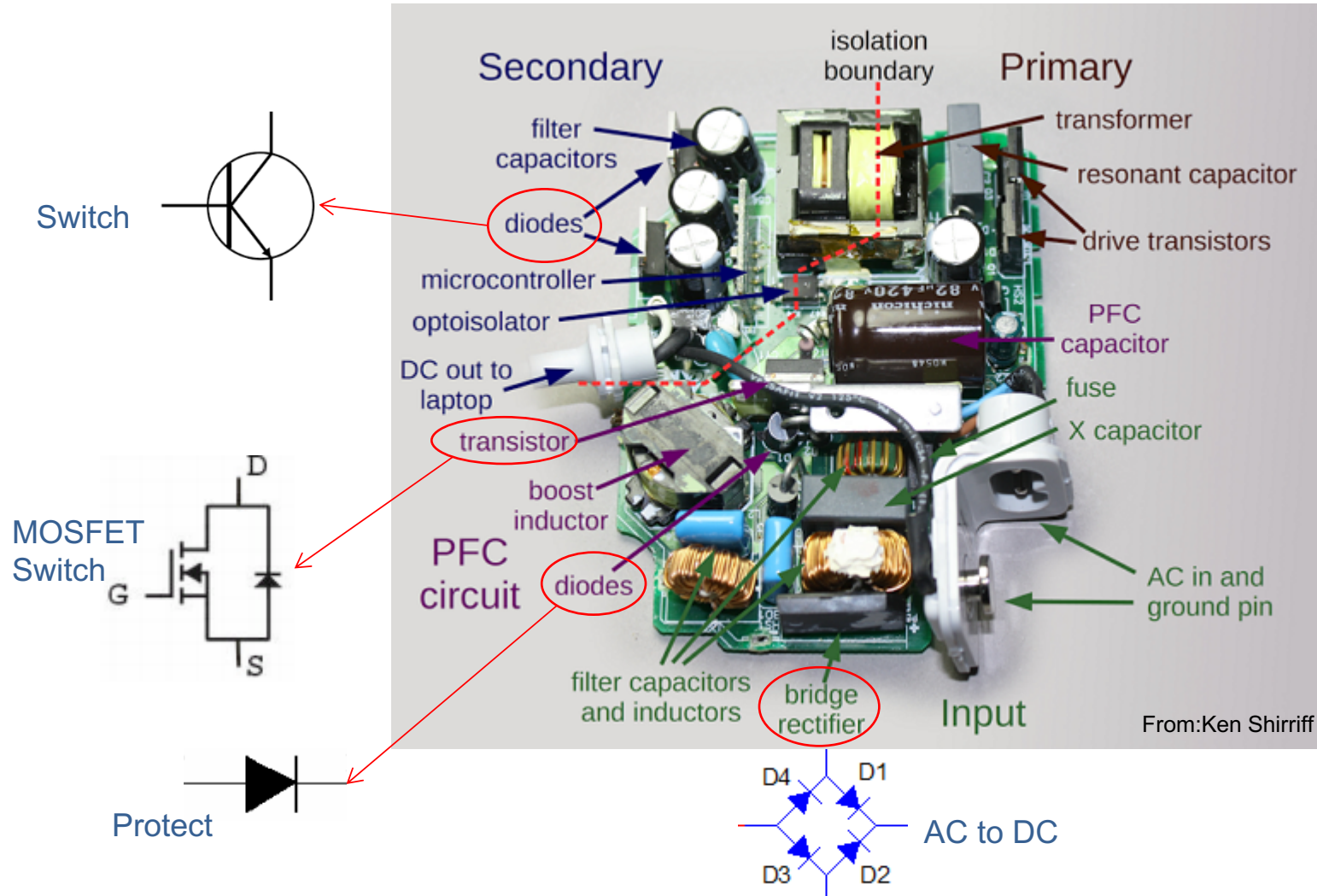
Your Component Our Profession



Your Component Our Profession

Copyright© 2018 PANJIT International Inc. All rights reserved.

# 分離器件在哪?

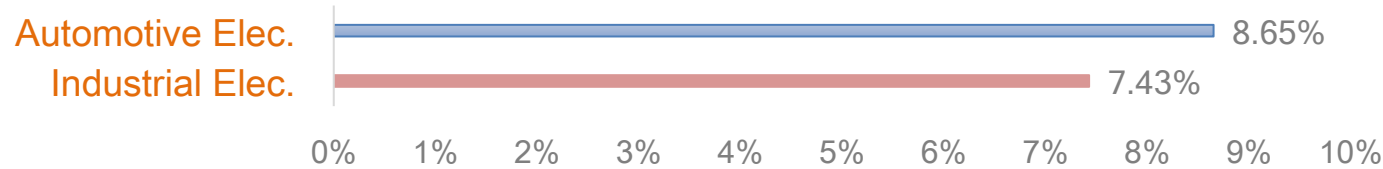


Your Component Our Profession

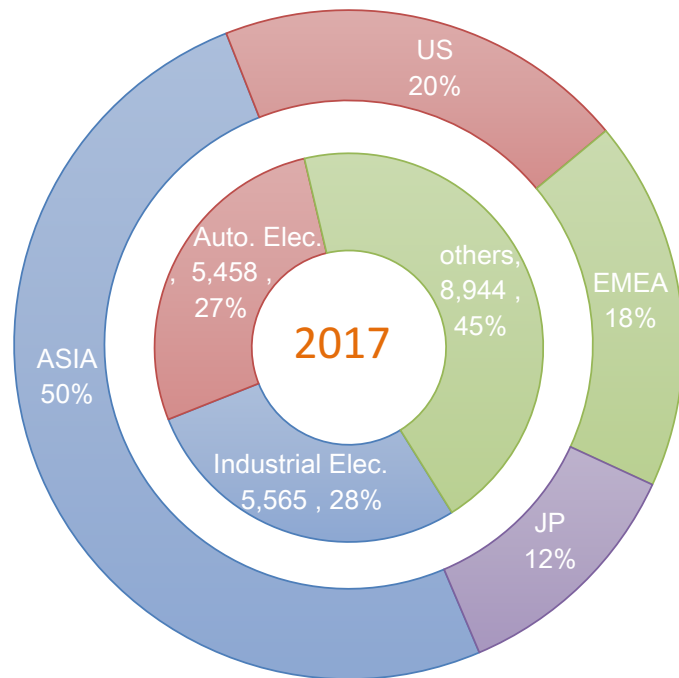


# 全球分離式器件

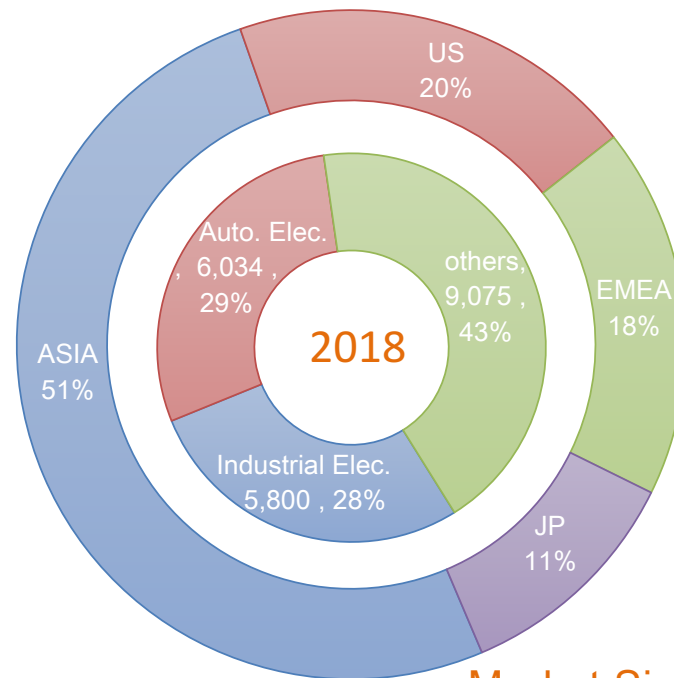
## 2017-2022 CAGRS



Unit: M' USD



Market Size: 19,029



Market Size : 19,973

- 未來分離式器件半導體主要需求，將持續著重在亞太區，市場占比為50%
- 在2018汽車應用以及工業應用將持續為分離式器件的主要應用別。

## 汽車應用



- ADAS
- Body
- Infotainment
- Lighting
- Motor
- Powertrain
- Sensor
- xEV

## 工業應用



- Solar Junction Box
- LED Lighting
- Robotic
- Medical Equipment
- Motor

## 新能源



- EV Charging station
- Quick charger
- Battery module
- UPS

## 消費性電子



- UHD TV
- Set Top Boxes
- Camera
- Home Appliance

## 通訊



- Networking
- PoE
- VOIP
- Infrastructure

## 電腦



- Desktop PC
- Notebook PC
- Tablet
- Graphic Cards



# 全球二極體排名

No.	2016		2017	
1	Vishay	10%	Vishay	11%
2	Rohm	9%	Rohm	10%
3	ON Semiconductor	7%	ON Semiconductor	8%
4	Microsemi	7%	Infineon Technologies	7%
5	Infineon Technologies	7%	Microsemi	7%
6	NXP	6%	Diodes	6%
7	STMicroelectronics	6%	<b>PANJIT</b>	<b>5%</b>
8	Diodes	6%	STMicroelectronics	5%
9	<b>PANJIT</b>	<b>5%</b>	Nexperia	4%
10	Semtech	4%	Good-ark	4%
	Others	33%	Others	33%

• Global Diode Sales Ranking: #7

\* Diodes above 0.5 amps.  
Excluding RF diode

# 全球分離器件排名

No.	2016		2017	
1	Infineon Technologies	13%	Infineon Technologies	14%
2	ON Semiconductor	8%	ON Semiconductor	10%
3	NXP	8%	Mitsubishi	6%
4	Mitsubishi	6%	Nexperia	6%
5	STMicroelectronics	6%	Rohm	6%
6	Vishay	5%	Toshiba	5%
7	Toshiba	5%	Vishay	5%
8	Rohm	5%	STMicroelectronics	5%
9	Renesas Electronics	4%	Renesas Electronics	4%
10	Fuji Electric	3%	Fuji Electric	3%
11	Diodes	3%	Diodes	3%
12	Fairchild Semiconductor	2%	Microsemi	2%
13	Microsemi	2%	AOS	2%
14	Toyota	2%	<b>PANJIT</b>	<b>2%</b>
15	<b>PANJIT</b>	<b>2%</b>	Shindengen Electric	2%
16	Shindengen Electric	2%	Toyota	2%
17	Denso	1%	Denso	1%
18	IXYS	1%	IXYS	1%
	Others	22%	Others	21%

- Global Discrete Sales Ranking: #14 (includes of Diode, MOSFET, IGBT, and etc.)

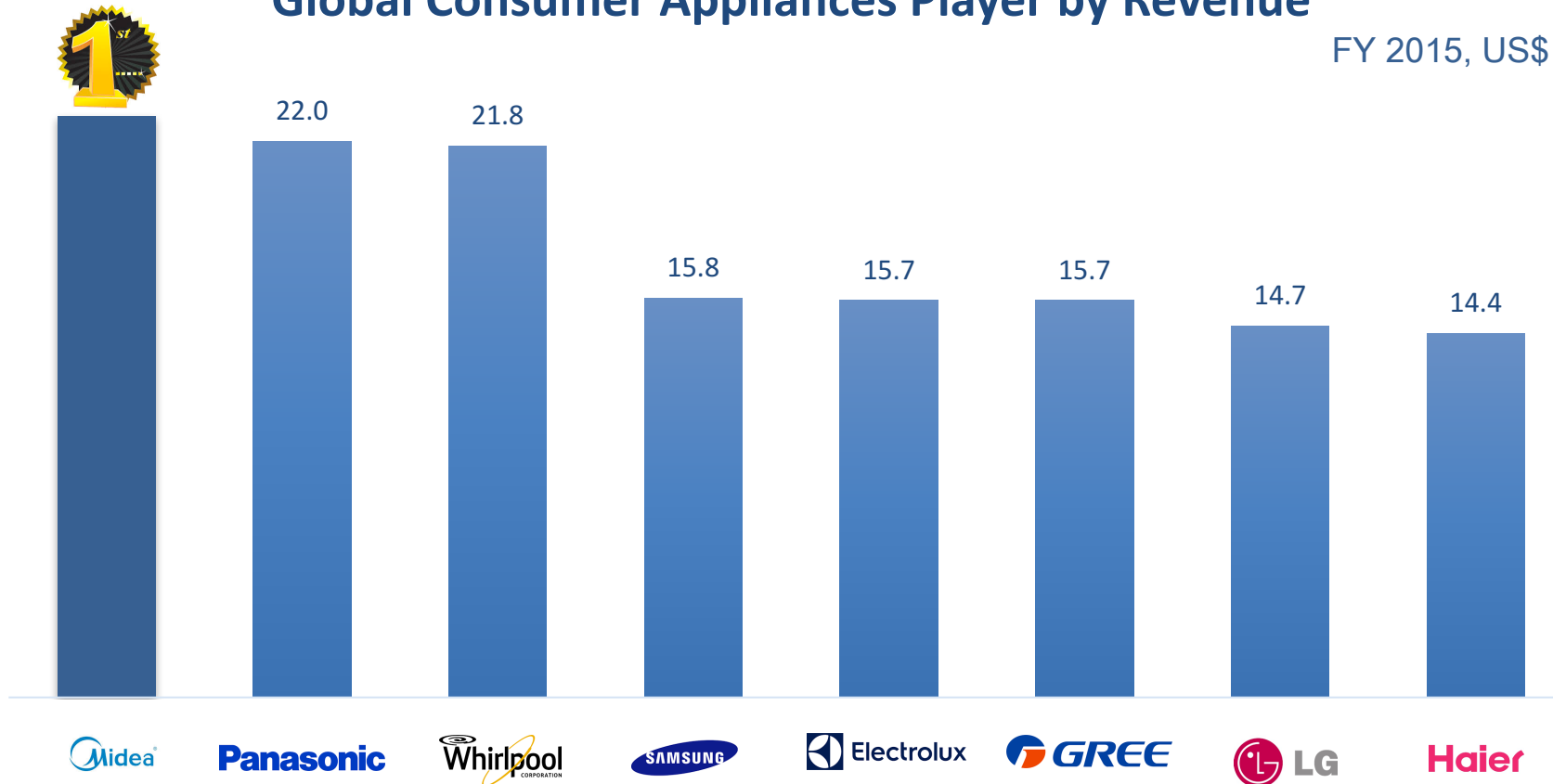
Excluding RF diode

# 消費性電子



## Global Consumer Appliances Player by Revenue

FY 2015, US\$ Bn

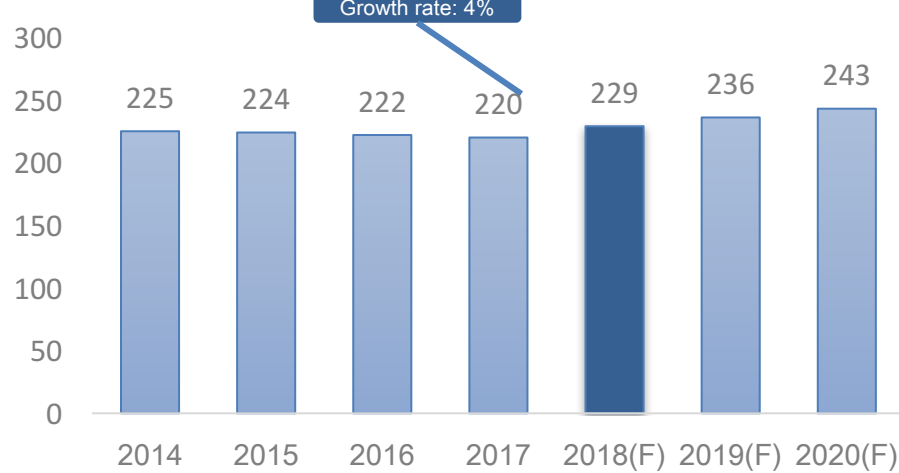


- 2021, 市場主要家用電器產值預計達到 281億美金

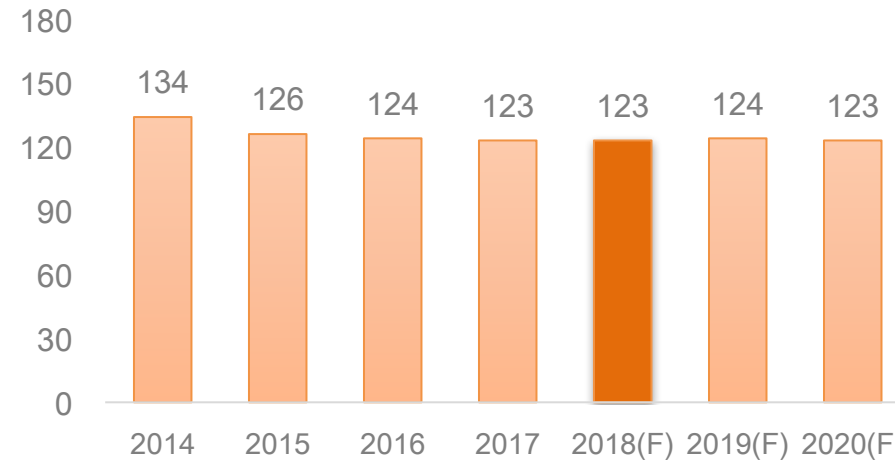
# 面板在2018的成長

## Panel - 4% Growth in 2018

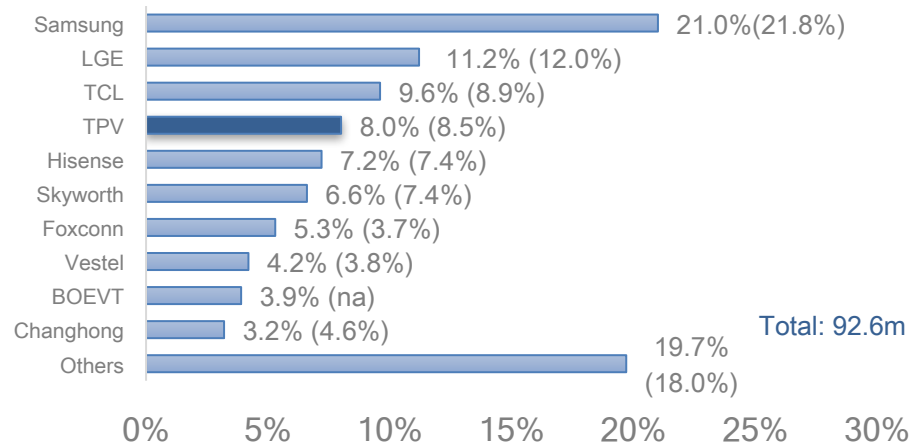
TV Global Shipment Forecast (Units M)



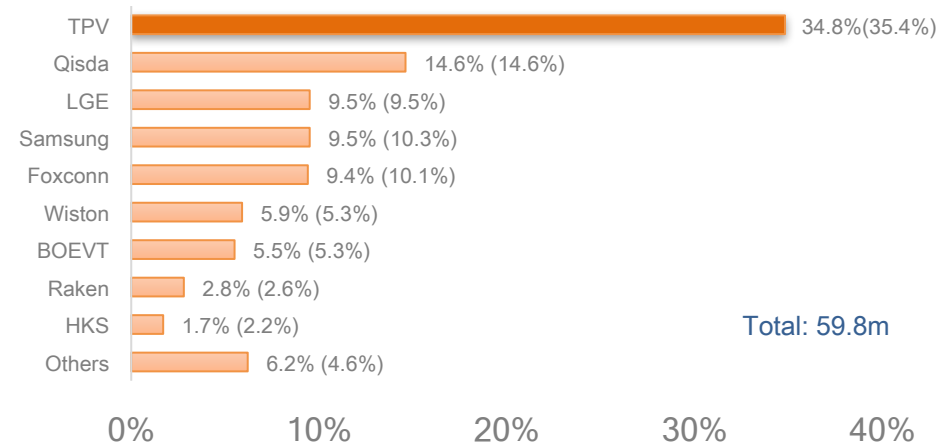
Monitor Global Shipment Forecast (Units M)



Worldwide LCD TV Manufacturer Share

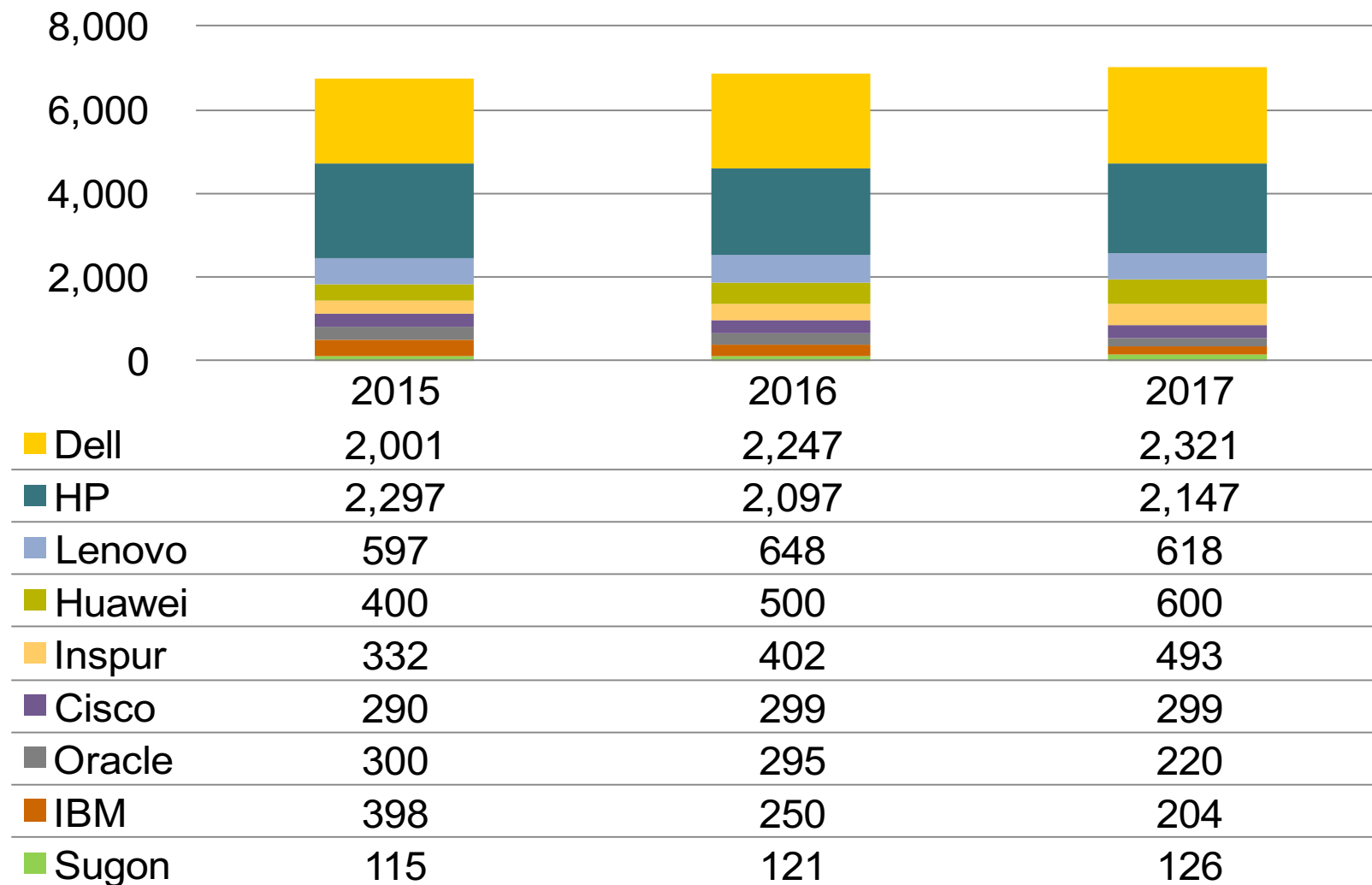


Worldwide Monitor Manufacturer Share



Unit : K

## WW server shipment (OEM)

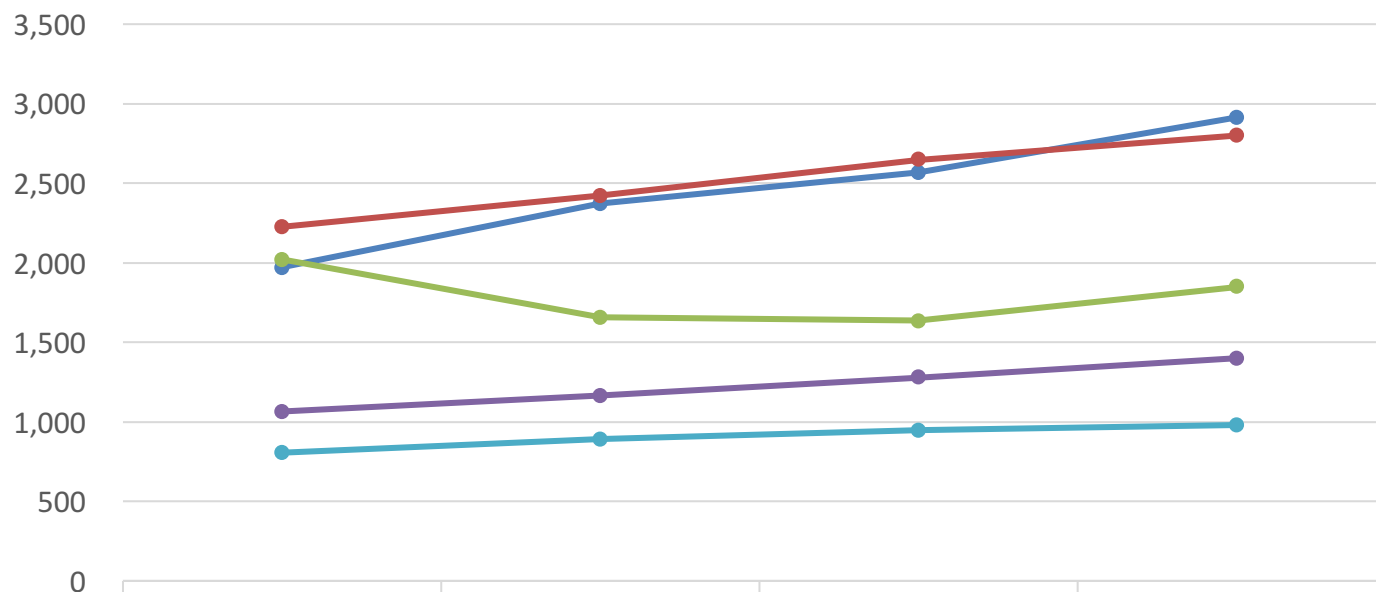




# 伺服器主機板出貨量 v.s. 強茂

Unit : K

## Server MB shipment (EMS)



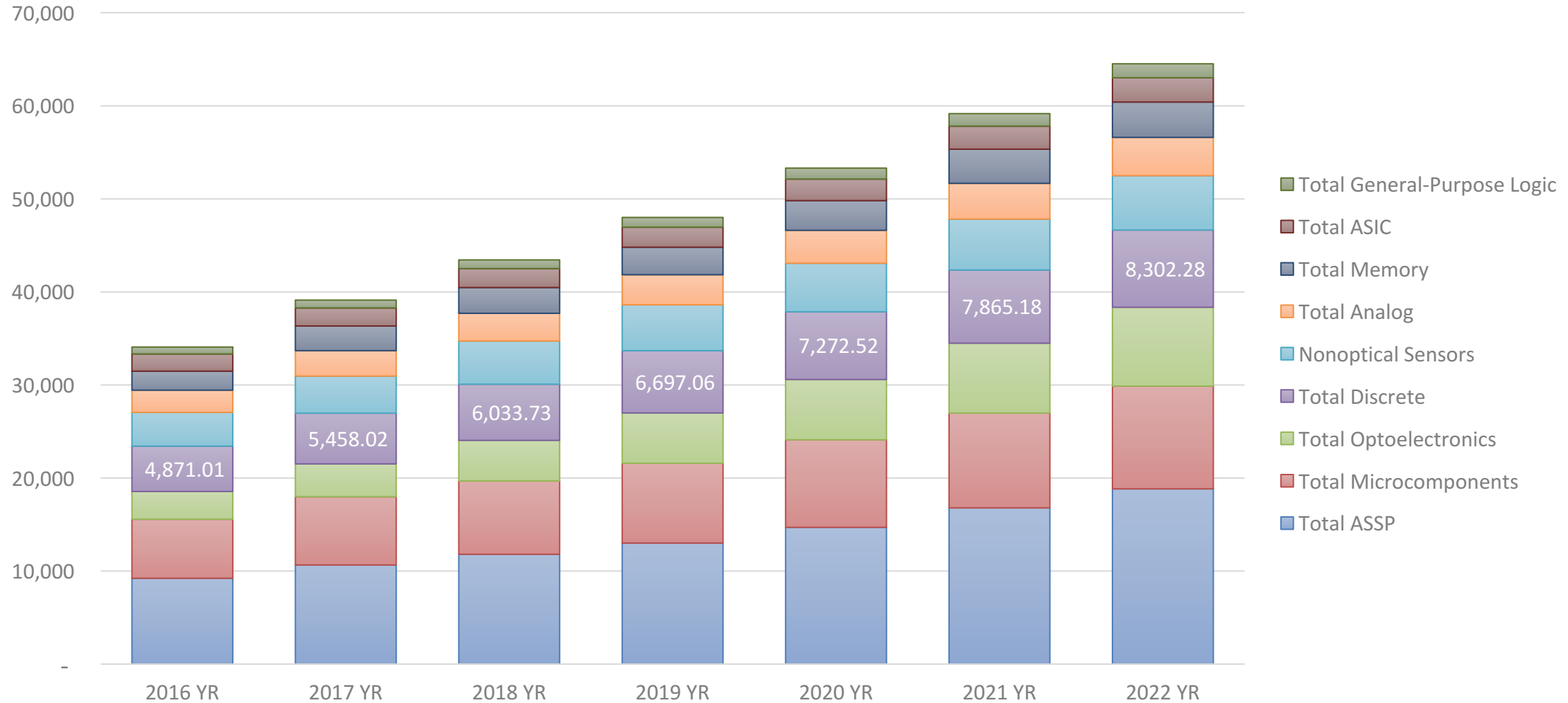
	2015	2016	2017	2018(e)
緯創 wistron	1,972	2,374	2,570	2,914
英業達 Inventec	2,226	2,425	2,649	2,800
鴻海 Foxconn	2,021	1,655	1,637	1,850
廣達 Quanta	1,065	1,165	1,280	1,400
神達 MiTAC	806	890	950	980

- 台灣EMS廠商生產了90%的主機板

# 汽車應用

# 半導體汽車應用 – 分離器件 CAGR 8.75%

Discrete in Semiconductor Automotive CAGR 2017-2022 8.75%

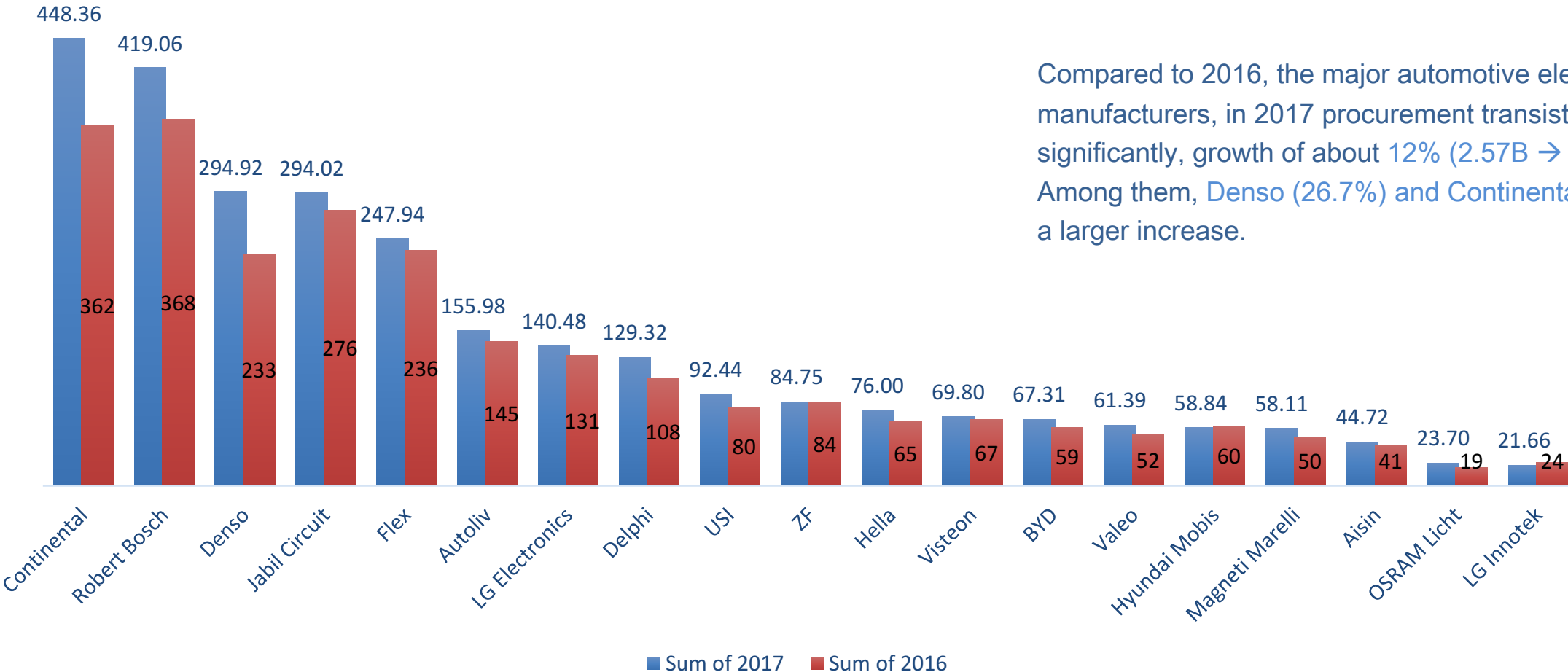


Your Component Our Profession

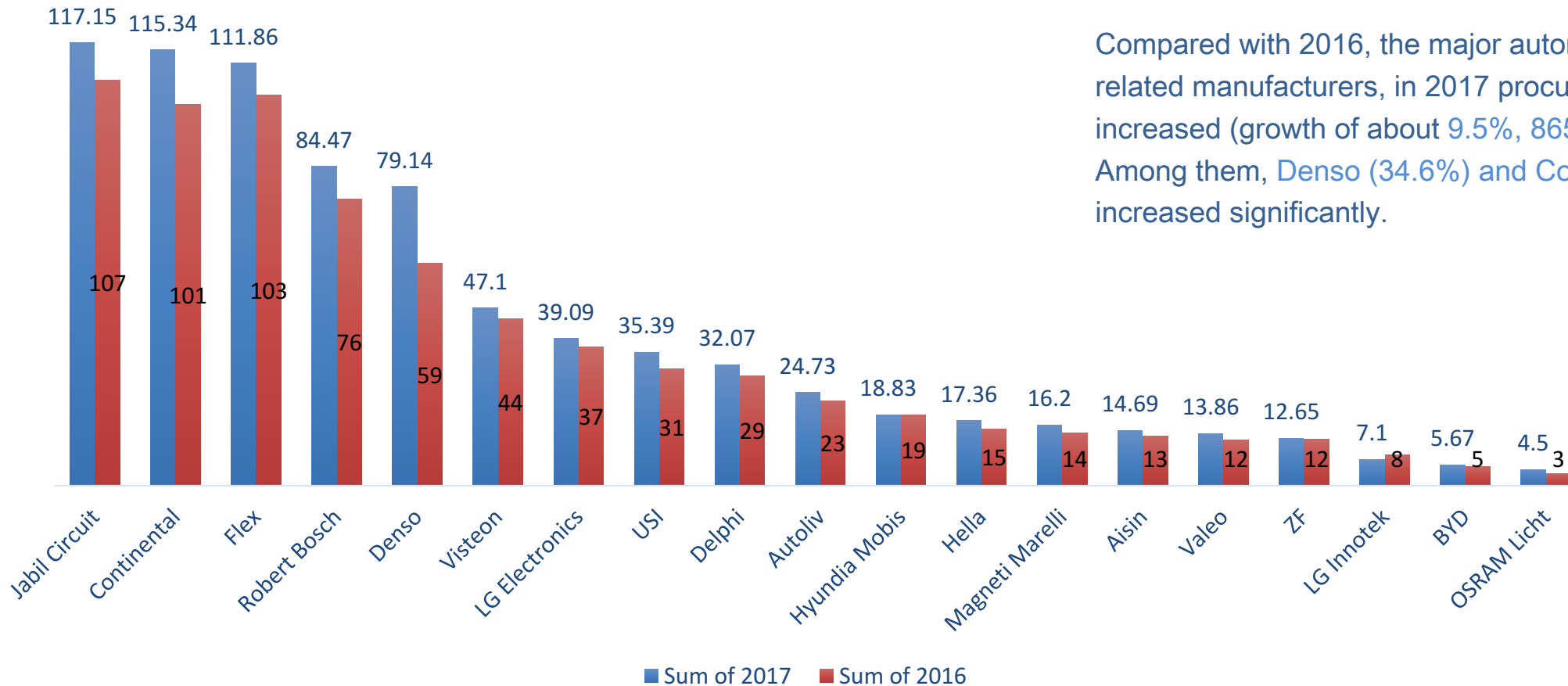


## Purchasing TAM - Transistors (M\$)

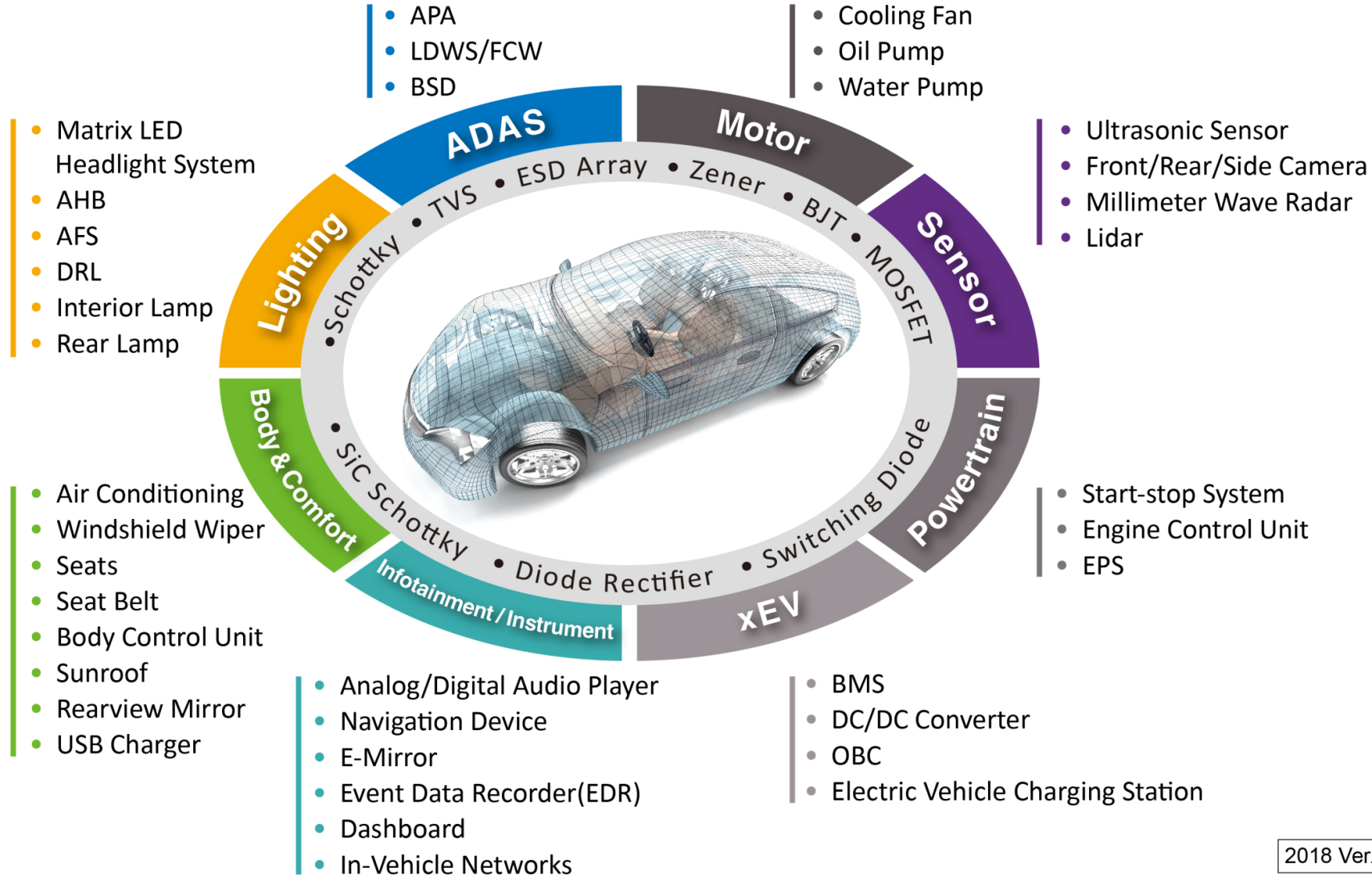
Compared to 2016, the major automotive electronics related manufacturers, in 2017 procurement transistors increase significantly, growth of about 12% (2.57B → 2.89B\$). Among them, Denso (26.7%) and Continental (23.9%) recorded a larger increase.



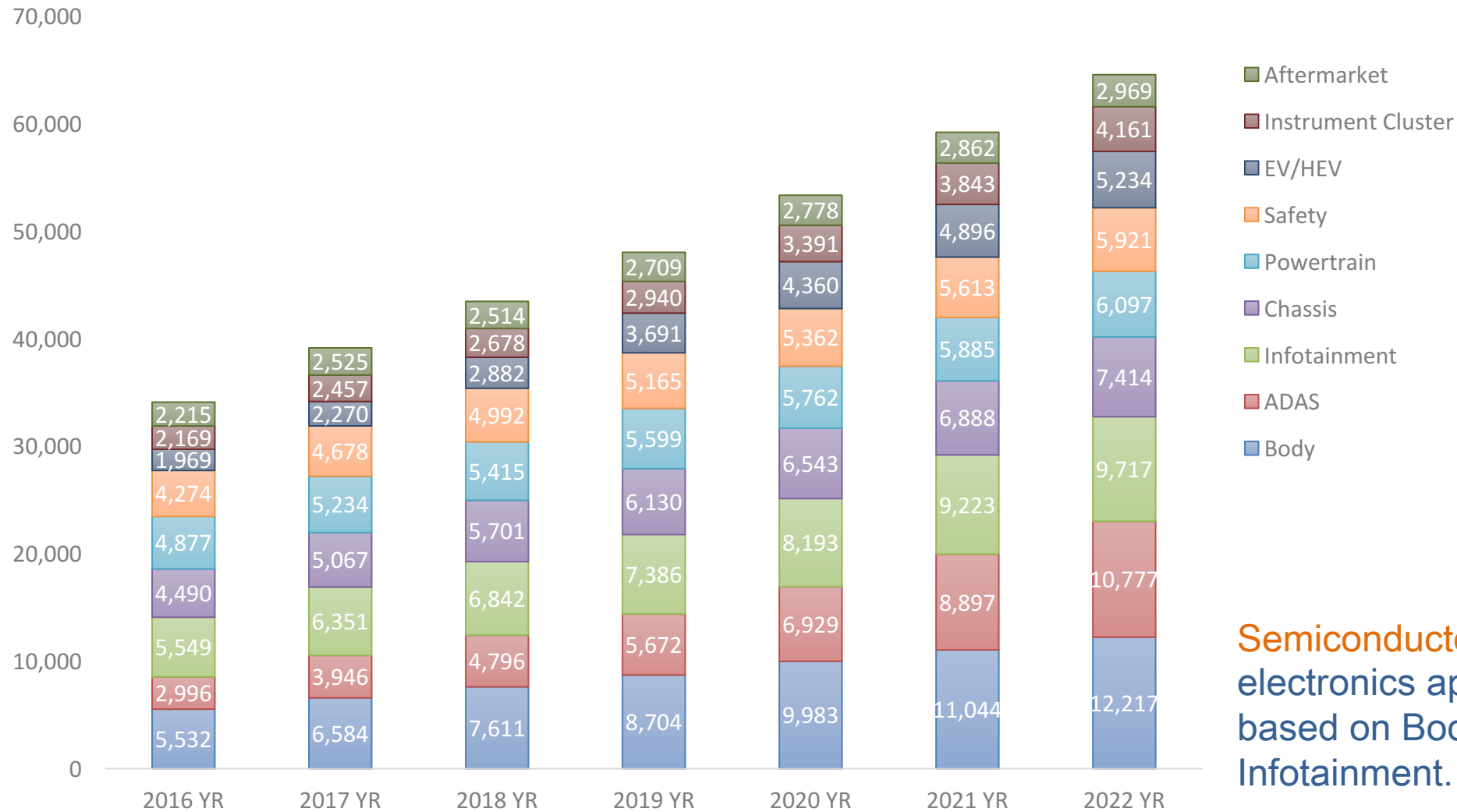
## Purchasing TAM – Diodes (M\$)



Compared with 2016, the major automotive electronics-related manufacturers, in 2017 procurement diodes have increased (growth of about 9.5%, 865M → 947M). Among them, Denso (34.6%) and Continental (14.4%) increased significantly.



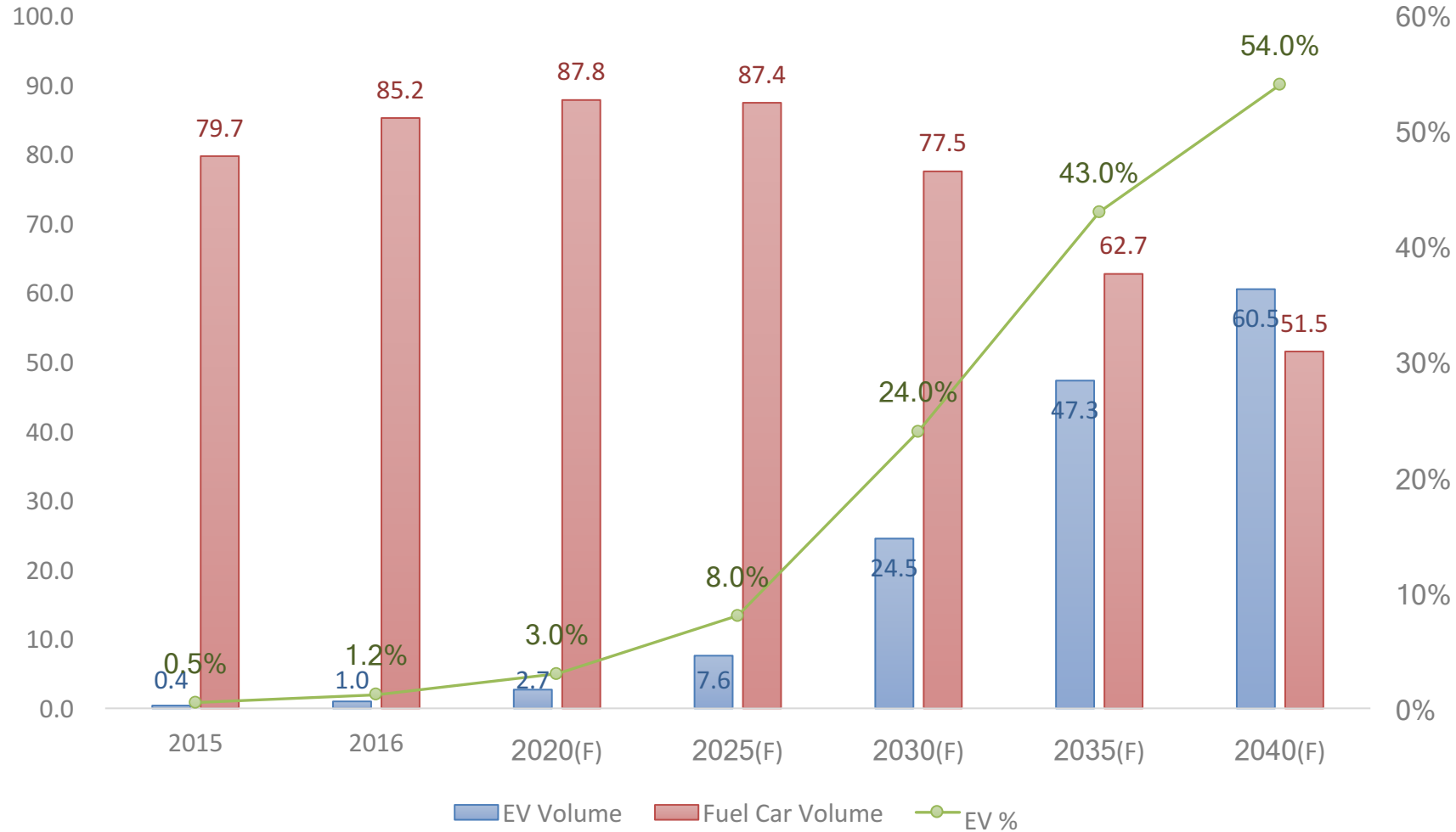
2018 Ver.2



**Semiconductors** in automotive electronics applications, are mainly based on Body, ADAS and Infotainment.

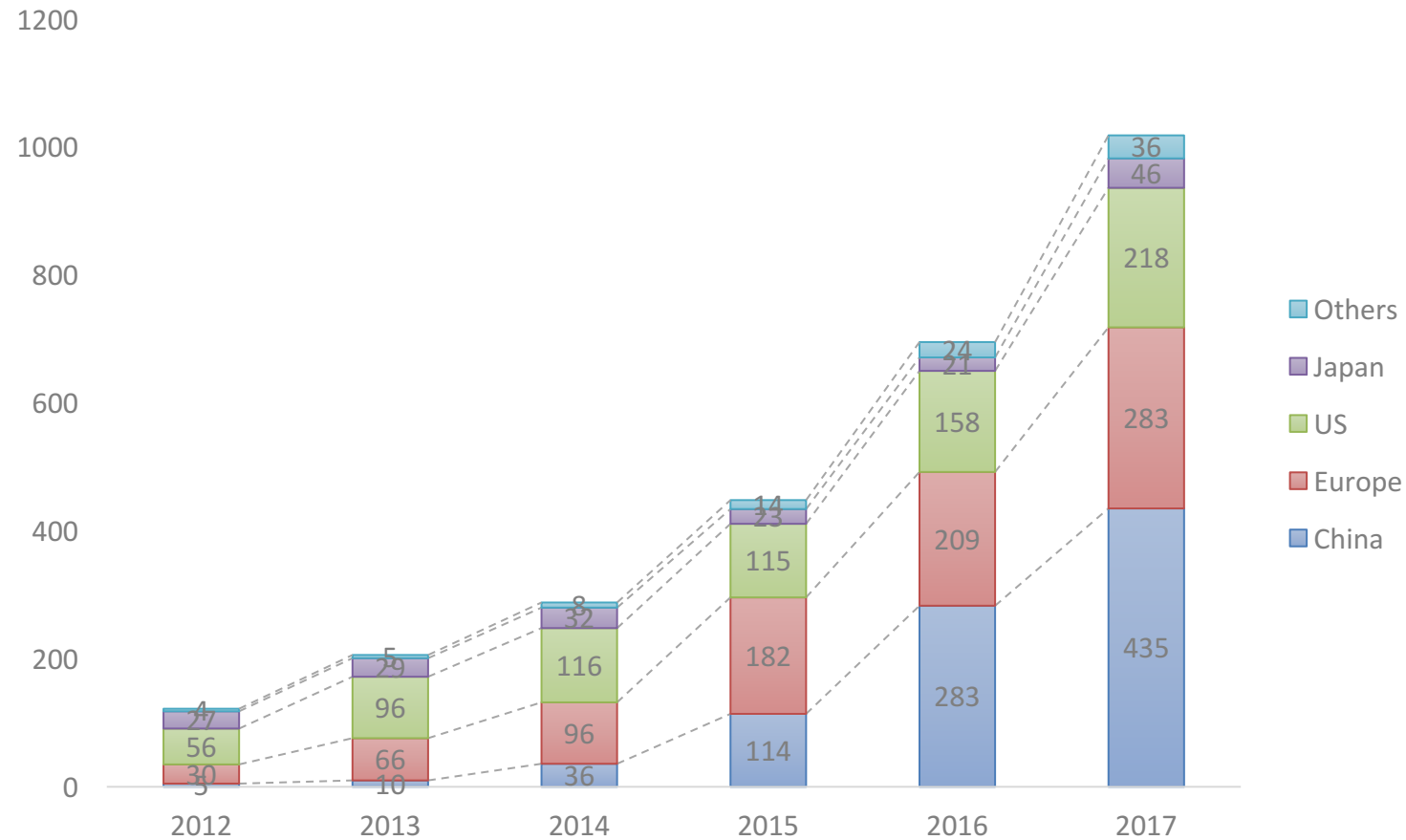


## Global Vehicle Sales Forecast (-2040)

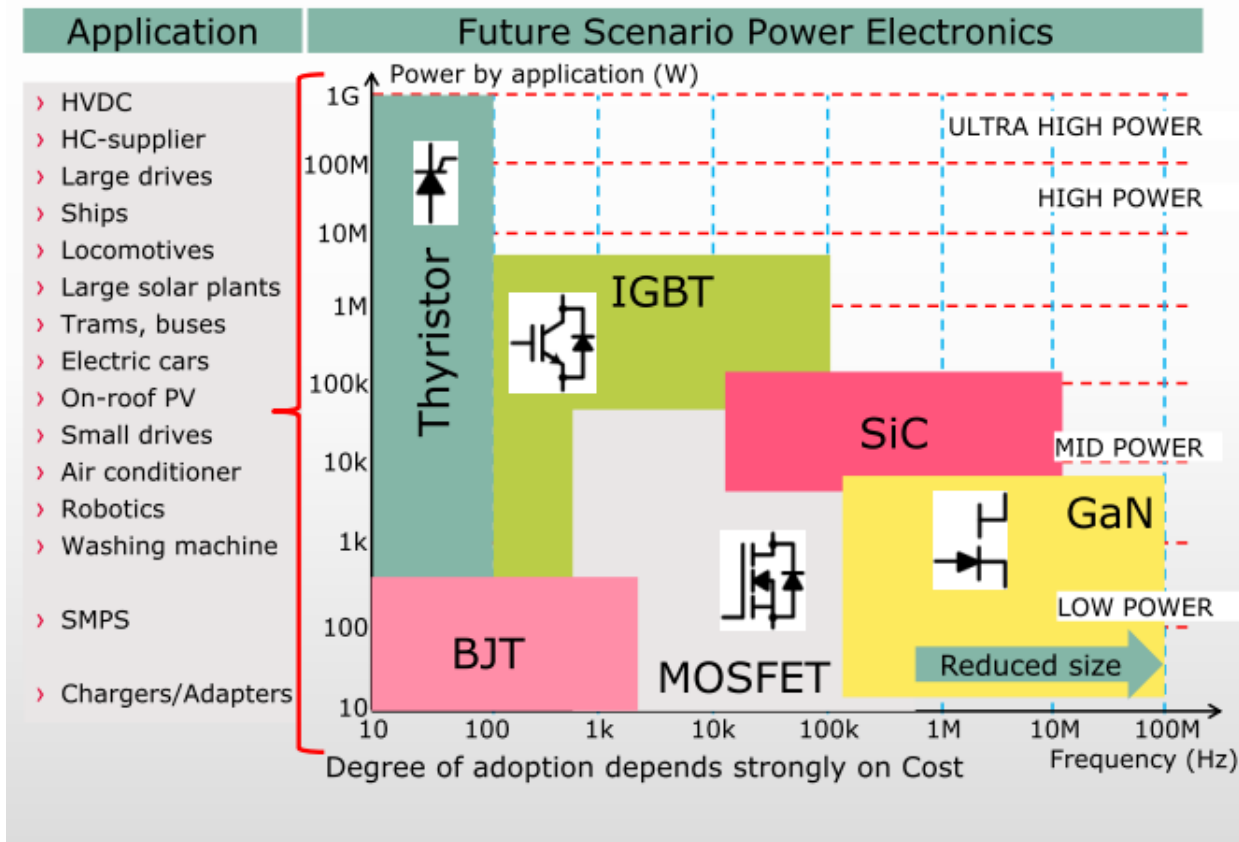


Your Component Our Profession

## 2012-2017 Global EV Sales by Region



# IGBT



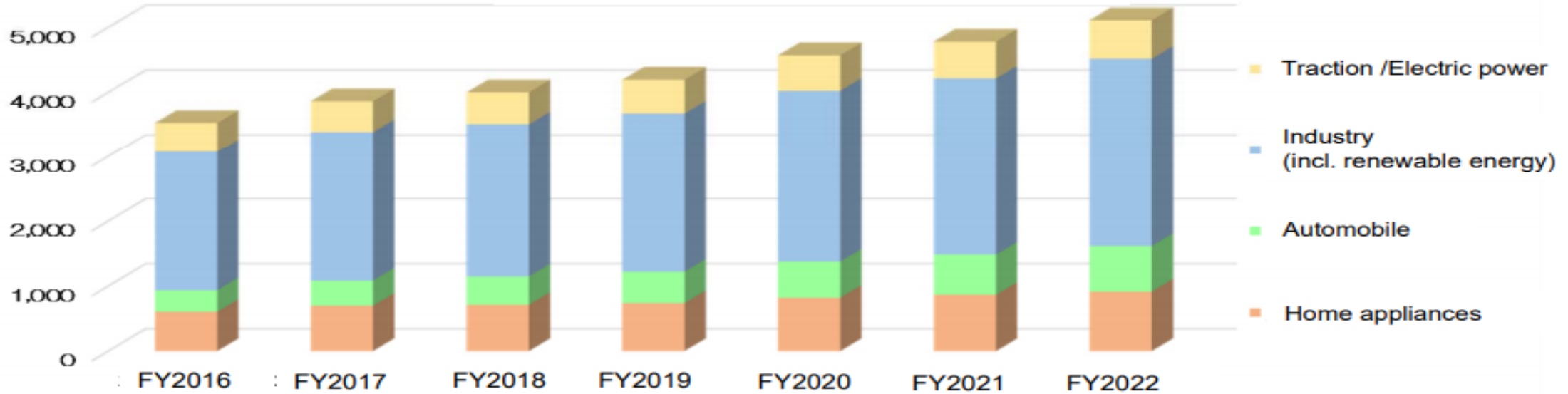
## Report covers

- IGBTs
- MOSFETs
- GaN
- SiC
- Controllers
- Passives

## Detailed discussion of

- Market Drivers
- Key Metrics
- Trends
- Challenges

# 全球IGBT年成長率6%



功率元件市場擴大之背景: 民生應用:

白色家電節能需求持續擴大，推動DC直流變頻成為主流技術。

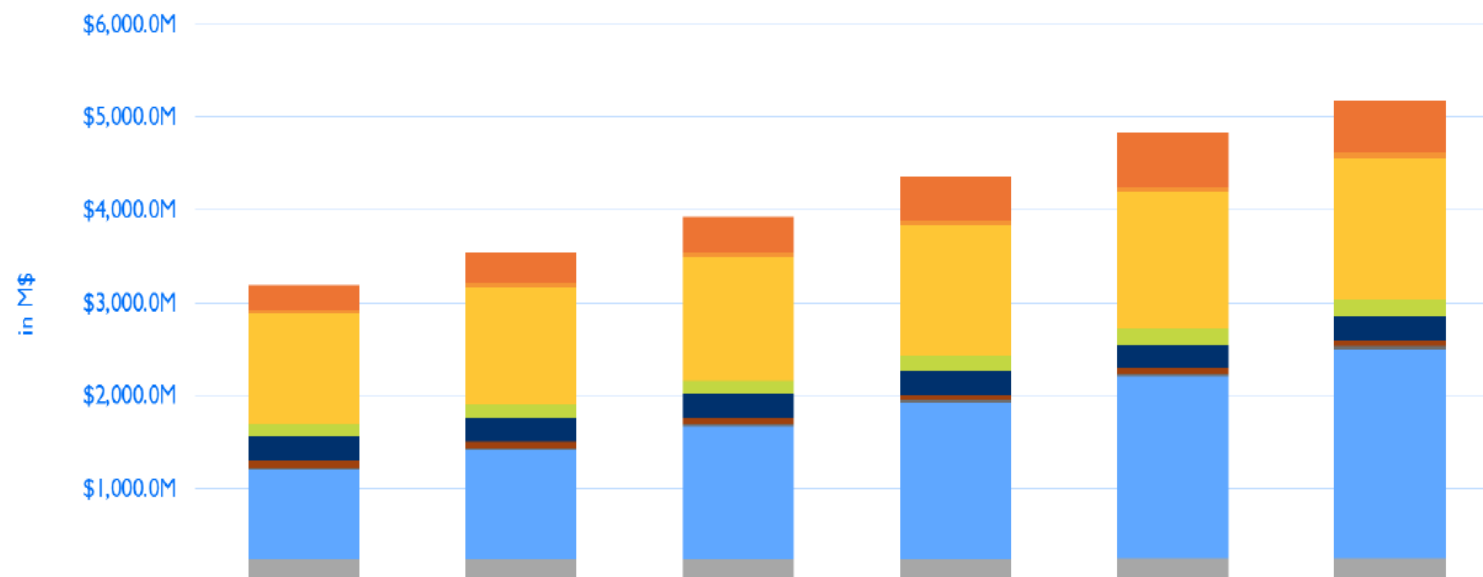
工業應用:智慧製造帶動自動化設備(工具機、機器人)投資、工業馬達透過高頻驅動達成節能目的，以及再生能源市場持續成長。

軌道車與電力:都市人口增加，提高對輕軌、電車等大眾運輸工具需求，低功耗高壓直流輸電(HVDC)逐漸取代傳統交流電力系統。

電動載具:各國陸續宣告燃油車退場時程，加速車輛電動化腳步。

































Power modules market, split by application (inM\$)



	2016	2017	2018	2019	2020	2021	CAGR 16-21
Others	\$264M	\$323M	\$379M	\$465M	\$593M	\$551M	15.9%
HVDC	\$39M	\$44M	\$48M	\$63M	\$52M	\$62M	10.1%
Motors	\$1,192M	\$1,264M	\$1,333M	\$1,399M	\$1,462M	\$1,526M	5.1%
UPS	\$124M	\$134M	\$146M	\$160M	\$175M	\$187M	8.5%
Rail	\$266M	\$261M	\$256M	\$254M	\$251M	\$249M	-1.4%
Wind	\$80M	\$72M	\$68M	\$66M	\$64M	\$63M	-4.7%
Electric/Hybrid bus	\$19M	\$22M	\$24M	\$26M	\$28M	\$29M	9.3%
EV/HEV	\$969M	\$1,179M	\$1,437M	\$1,688M	\$1,964M	\$2,254M	18.4%
PV	\$233M	\$235M	\$233M	\$235M	\$245M	\$252M	1.6%

中國大陸電動車市場快速成長，造成工業/車用Si IGBT功率模組缺貨潮，正是台廠切入的契機

## IGBT Manufacturers Ranking by Voltage Range

	No.1	No.2	No.3	No.4	No.5
400V and Less			 Leading Innovation >>>	 life.augmented	 SEMICONDUCTOR
600-650V					 life.augmented
1200V					 life.augmented
1700V					
2500V-3300V					
4500V and More					

- IGBT器件行業正在改變，隨著電動汽車市場的成長，電源模組正在成為價值鏈中的關鍵部分；2013年以后，中國市場約占全球IGBT器件市場的三分之一，中國市場為強茂未來重點發展對象

China Total IGBT - Based Module Supplier Market Share Estimates (US \$ Revenue)				
2015 Rank	Manufacturer	2014 Share	2015 Share	Change
1	Infineon Technologies*	29.2%	23.4%	-5.8%
2	Mitsubishi(inc. Powerex)	19.9%	19.0%	-0.9%
3	Fuji Electric	13.2%	15.5%	2.3%
4	Semikron	9.3%	11.8%	2.5%
5	Starpower Semiconductor	4.5%	4.5%	0.1%
6	On Semiconductor	4.7%	4.4%	-0.3%
7	ABB Semiconductors	2.6%	3.9%	1.4%
8	Vincotech	2.5%	3.9%	1.4%
9	IXYS	1.5%	1.8%	0.3%
10	CRRC Times Electric (inc. Dynex)***	0.4%	1.6%	1.2%
11	Fairchild Semiconductor	1.2%	1.3%	0.1%
12	Hitachi	0.2%	1.1%	0.9%
13	Danfoss	0.7%	1.0%	0.3%
	International Rectifier*	2.2%	N/A	N/A
	LS Power Semitech**	1.1%	N/A	N/A
	Others	7.0%	6.8%	-0.2%
	Total Market Size =	\$ 1,082.9 m	\$ 962.5 m	-11.1%

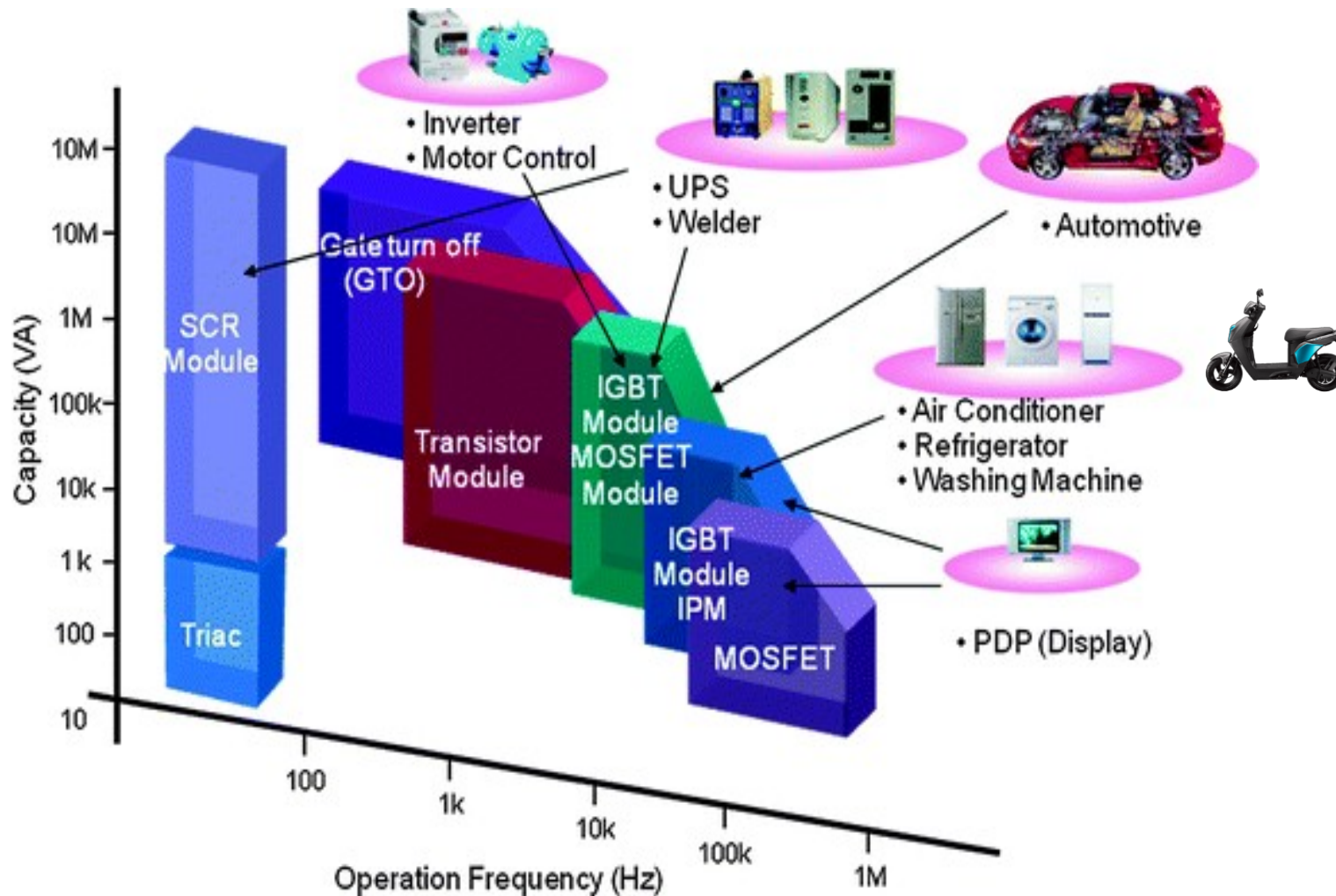
### Notes

\* Infineon Technologies acquired International Rectifier in Jan 2015. Both companies are reported separately in 2014 and combined as Infineon in 2015

\*\* Infineon also took a controlling interest in former JV company LS Power Semitech part way through 2014

\*\*\* Zhuzhou CSR Times Electric Co., Ltd (the owners of Dynes Semiconductor Ltd.) and China CNR Corporation Merged in June 2015 to form Zhuzhou CRRC Times Electric Co., Ltd  
r= revised since 2015 edition

Source: IHS



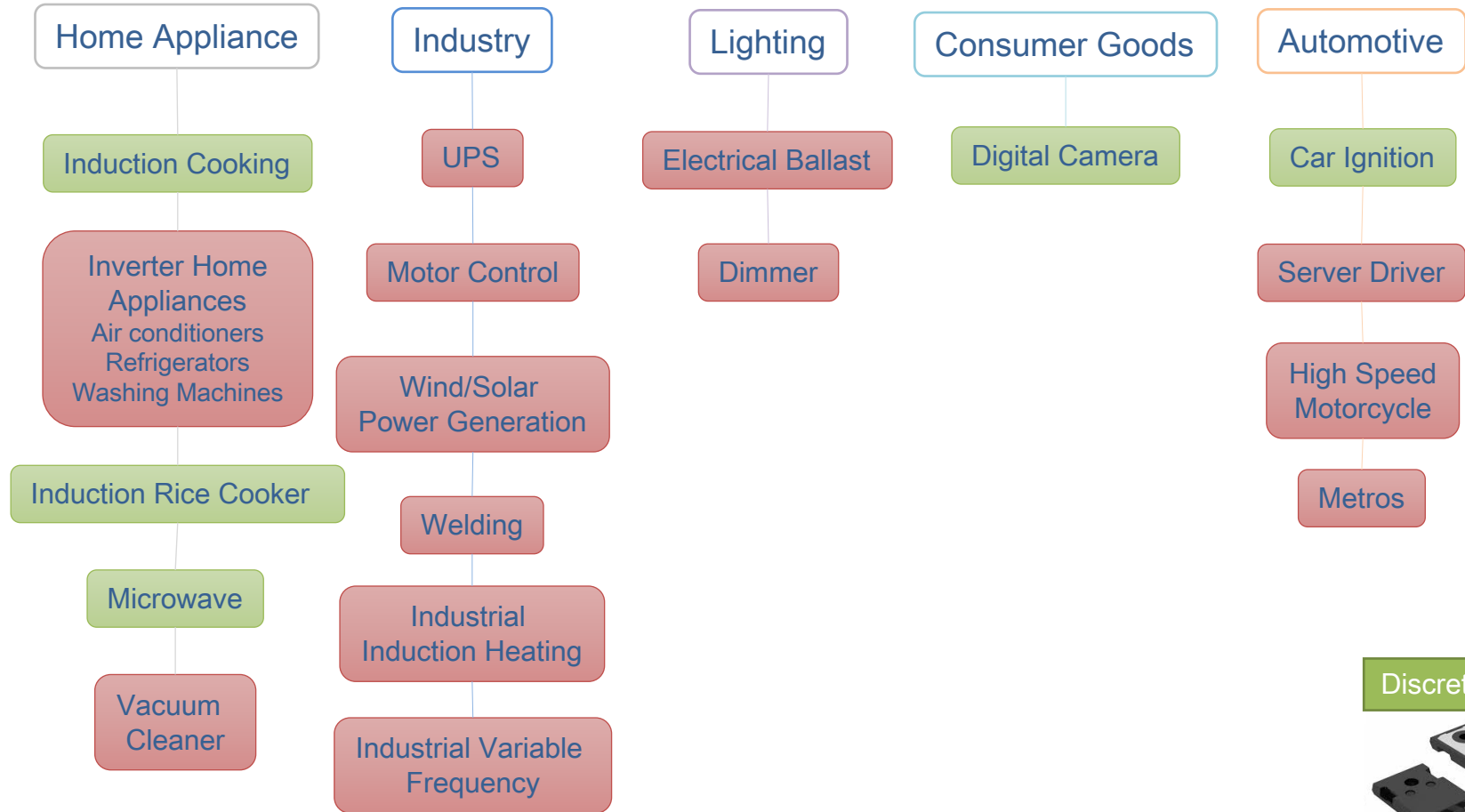
Benefit from the growth in the demand for electric vehicles, the output of IGBT components from international manufacturers is fully loaded, and the China packaging and testing plants have considered to use **Taiwan-made IGBT** components.

There are over 20 million motorcycles in Taiwan, with a mass production scale, the demand for **vehicle MOSFET** power modules has appeared.

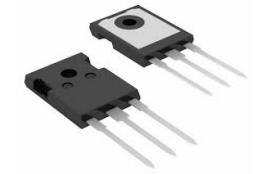
China's tier 2 electric vehicle factory and Taiwan invested companies successively established Electric Vehicle factory in China and are actively seeking for good value **vehicle IGBT** module alternative.

The use of MOSFET & IGBT smart power modules has a **high price sensitivity**. The world's largest manufacturing companies have the advantage of manufacturing costs. Taiwan company is not easy to replace, but can try to attack the market with power of 650V/75A.

## Application Segment



Discrete IGBT



IGBT Module







Thank you