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# 公司簡介

## MOCVD 創造世界級之競爭力

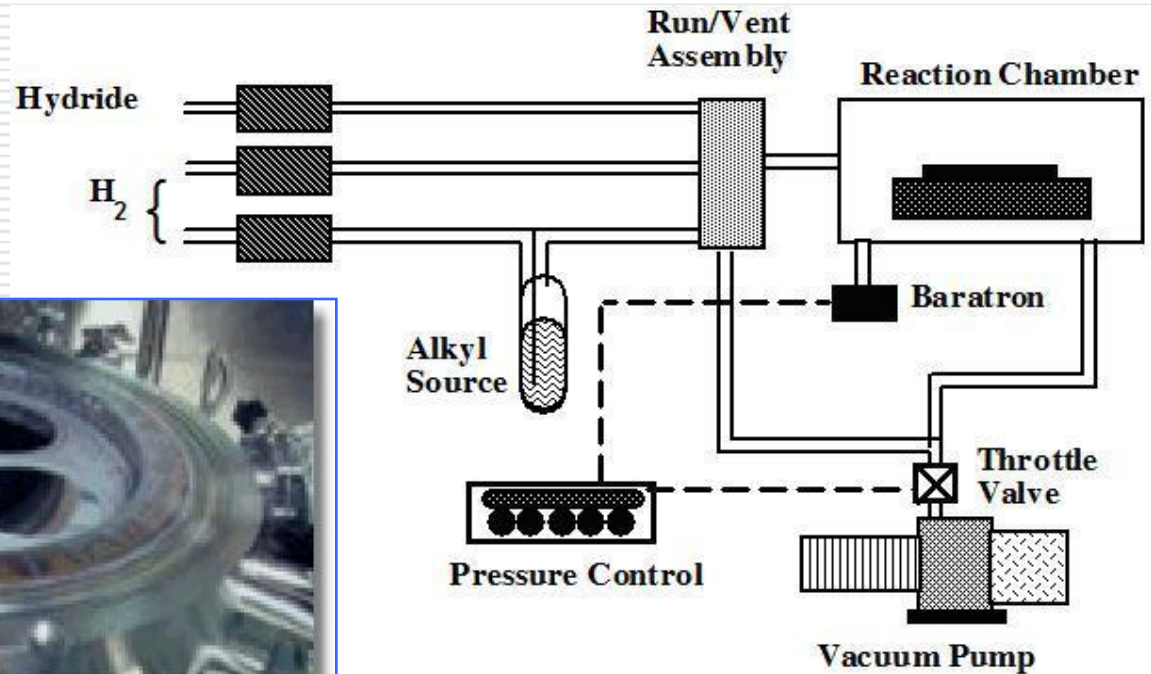




# 核心技術

## MOCVD (有機金屬氣相沉積法)

- Metal Organic Chemical Vapor Deposition





# 核心技術

生產  
機台

MOCVD有機金屬化學氣相沉積法  
Metal Organic Chemical Vapor Deposition

生產  
方式

透過有機金屬化學氣相沉積法，在基板上生長半導體薄膜的方式，同時透過機台即時監控，精確控制磊晶層，完成砷化鎵、磷化銦、氮化鎵等不同產品磊晶片生產。

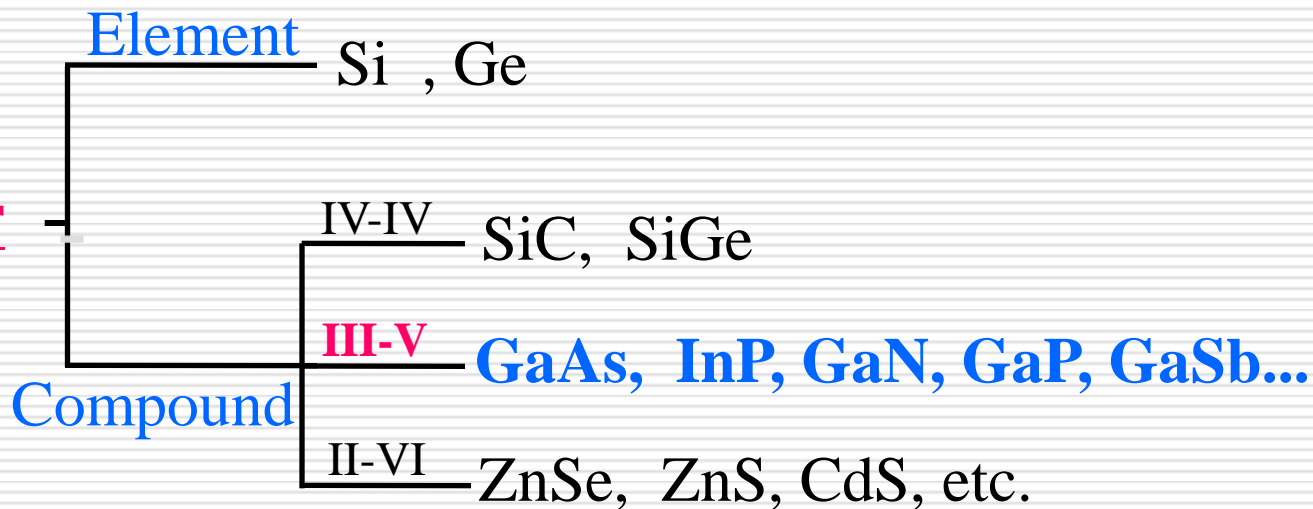
生產  
原理

磊晶層是由MOCVD在腔體中加熱基板，一個原子層，層層堆疊，行成磊晶層。



# 半導體分類 (依使用材料)

## Semiconductor



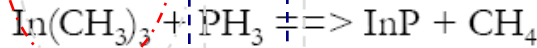
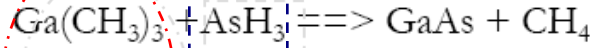
Period	Column II	III	IV	V	VI
2	Be 鈹 Beryllium	B 硼 Boron	C 碳 Carbon	N 氮 Nitrogen	O 氧 Oxygen
3	Mg 鎂 Magnesium	Al 鋁 Aluminum	Si 矽 Silicon	P 磷 Phosphorus	S 硫 Sulfur
4	Zn 鋅 Zinc	Ga 鎵 Gallium	Ge 鍺 Germanium	As 砷 Arsenic	Se 硒 Selenium
5	Cd 鎘 Cadmium	In 銦 Indium	Sn 錫 Tin	Sb 銻 Antimony	Te 碲 Tellurium
6	Hg 汞 Mercury	Tl 鉍 Thallium	Pb 鉛 Lead		

- 二元化合物 Binary : GaAs, InP, GaP, GaN, etc.
- 三元化合物 Ternary : InGaAs, InGaP, AlGaAs, etc.
- 四元化合物 Quaternary : AlGaInP, InGaAsP, etc.
- 五元化合物 Pentanary : AlGaInAsN, etc.



# 磊晶過程中之化學反應

化學反應式：



主要原物料：

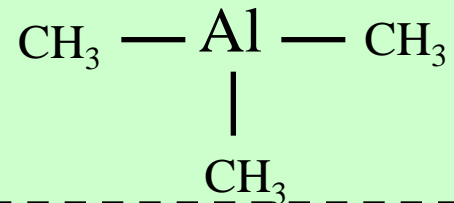
**MO Source** + **Hydride** + Carrier Gas : **H2**

- TEAl : Tri-ethyl-Aluminum (  $\text{C}_2\text{H}_5$  )<sub>3</sub>Al
- TMGa : Tri-Methyl-Gallium (  $\text{CH}_3$  )<sub>3</sub> Ga
- TMIn : Tri-Methyl-Indium (  $\text{CH}_3$  )<sub>3</sub>In
- DETe : Di-ethyl-Tellurium (  $\text{C}_2\text{H}_5$  )<sub>2</sub>Te
- DEZn : Di-ethyl-Zinc (  $\text{C}_2\text{H}_5$  )<sub>2</sub>Zn
- CP<sub>2</sub>Mg : Bis (cyclo-penta-dienyl) -Magnesium 環戊二烯鎂

- AsH<sub>3</sub> : Arsine
- PH<sub>3</sub> : Phosphine
- SiH<sub>4</sub> : Silane
- Si<sub>2</sub>H<sub>6</sub> : Disilane
- H<sub>2</sub>Se : Hydrogen Selenide
- CB<sub>4</sub> : Carbon Tetrabromide

TMAI Tri - Methyl - Aluminum (  $\text{CH}_3$  )<sub>3</sub>Al

三 甲 基 鋁





# 化合物半導體材料特性

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1. High Electron Mobility 高電子移動速率 (5.7x higher than CMOS)
2. High Frequency Response 高頻率響應
3. Wide Band Width 寬幅之頻寬
4. High Linearity 高線性度
5. High Power 高功率
6. Alternative Choice of Material 材料選擇多元性
7. 抗輻射

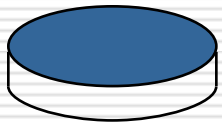
適用於微電子產品—HBT、pHEMT、BiHEMT、GaN on XX  
光電子產品—PIN (PD、APD)、VCSEL、LD、SC



# 微電子產品 產業供應鏈

Sumitomo, Freiberg, AXT

2~6 "GaAs Substrate

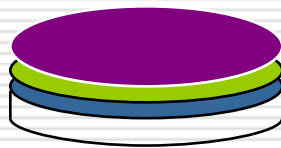


GaAs Epi- Wafer  
磊晶片



MOCVD Reactor

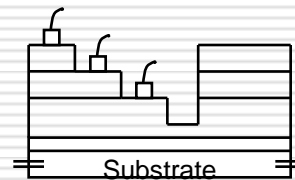
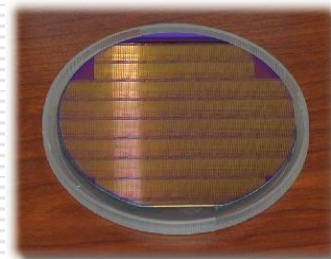
VPEC is a Pure  
Epi Provider



IDM : Qorvo, Skyworks

Fabless : Avago,  
Qualcomm, Richwave,

Microelectronics  
IC Process



Foundry :  
WIN, AWSC



Wireless  
Communication



IC Package & Testing





# 2020年-2023年前三季度损益情形

	2023前三季度	%	2022	%	2021	%	2020	%
Revenue	1,757,167	100%	2,603,629	100%	3,608,521	100%	2,645,003	100%
Gross margin	696,955	40%	1,089,007	42%	1,519,713	42%	1,114,404	42%
Operating Profit	270,743	15%	579,950	22%	1,056,519	29%	687,515	26%
Non-operating income & expense	35,452	2%	87,533	3%	-3,842	0%	-40,212	-2%
Tax	-44,341	-3%	-122,755	-5%	-197,596	-5%	-114,715	-4%
Net income	261,854	15%	544,728	21%	855,081	24%	532,588	20%
EPS	1.42		2.95		4.62		2.88	





# 微電子產品 未來展望

### 5G Mobile Penetration



### WiFi6/6E and WiFi7



### IoT Smart Link



**Micro  
Electronics**

### V2X PA



### LEO Satellite



### 5G Base Station



### Military





# 光電子產品 未來展望

AR / VR Sensing (VCSEL/PD)



Data Center Communication  
(PD/VCSEL)



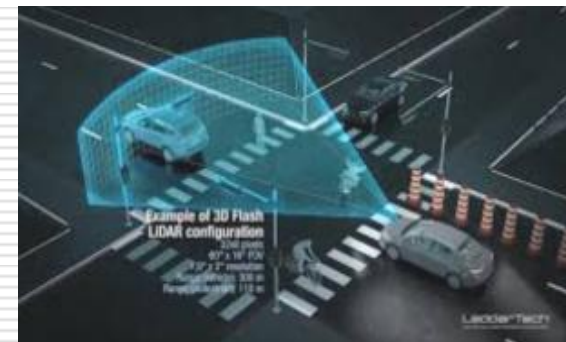
短期

3D-Sensing & ToF



中期

Car LiDAR (LD/PD)



長期

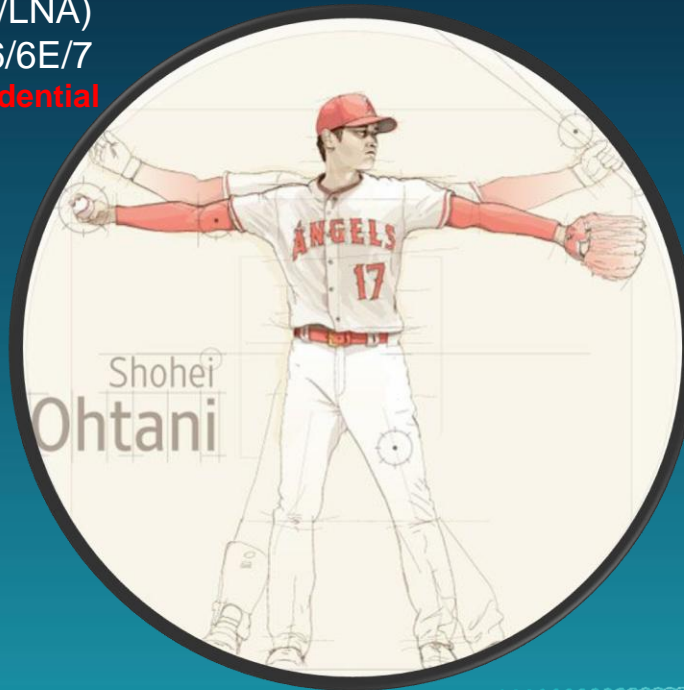
## AR / VR

Emitter: VCSEL  
Detector: PD  
Eye-safety

## Wireless

HBT (PA)  
pHEMT (Switch/LNA)  
WiFi 6/6E/7

**VPEC Proprietary and Confidential**



## LiDAR Turnkey Solution

Emitter: VCSEL, EEL  
Detector: GaAs PIN, APD  
Eye-safety (1400nm ~ 1600nm)  
Long Range Detection (400m)

## V2X

HBT (PA)  
pHEMT (Switch/LNA)  
WiFi 6/6E/7

