

/

IDM

2020 2 IDM 9
IDM

IDM

AC-DC DC-AC HV-LV DC-DC LV-HV DC-DC
15 8

IDM

64.4 74.5 82.4 2020 2022
EPS 0.38 0.50 0.60
PE 90.6 69.0 57.7

8

“ ”

	2018A	2019A	2020E	2021E	2022E
	6,271	5,743	6,436	7,446	8,237
(+/-)%	6.73%	-8.42%	12.07%	15.70%	10.62%
	429	401	467	612	733
(+/-)%	511.02%	-6.68%	16.46%	31.17%	19.66%
	0.52	0.48	0.38	0.50	0.60
	0.00	0.00	90.56	69.04	57.70
	0.00	0.00	6.78	6.17	5.58
(%)	10.35%	7.39%	7.48%	8.94%	9.66%
(%)	0.00%	0.00%	0.09%	0.00%	0.00%
()	830	830	1,216	1,216	1,216

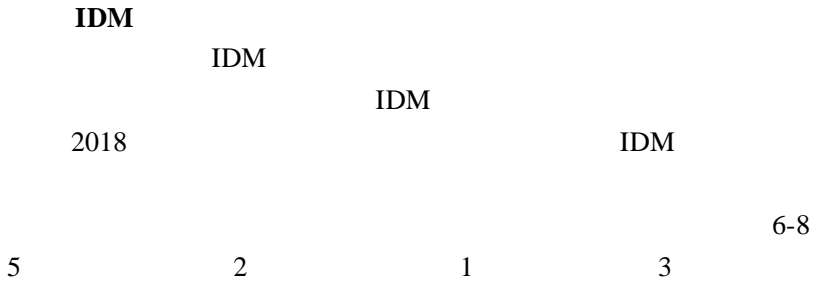
1.	IDM	.....5
1.1.	IDM	.....5
1.2.		.....7
1.3.		.....9
1.4.		.....12
2.		.....13
2.1.		.....13
2.2.	MOSFET	.....15
2.2.1.		.....15
2.2.2.		.....17
2.3.		.....19
2.4.	“ ” MOSFET	.....23
3.		.....24
3.1.	15	.....24
3.2.		.....24
4.		.....27
4.1.		.....27
4.2.		.....30

1	IDM	.....	5
2		.....	6
3	2018	.....	6
4		.....	7
5		.....	7
6		.....	8
7		.....	9
8		.....	9
9		.....	9
10		.....	10
11		.....	10
12		.....	10
13		.....	10
14		.....	10
15		.....	11
16		.....	11
17		.....	11
18		.....	12
19		.....	13
20	Si GaN SiC	.....	13
21	Si GaN SiC	.....	13
22		.....	14
23	IGBT MOSFET BJT	.....	14
24	Si	.....	15
25		.....	16
26	MOSFET	.....	16
27		.....	17
28	wafer	.....	18
29	12	.....	18
30	8	.....	19
31		.....	19

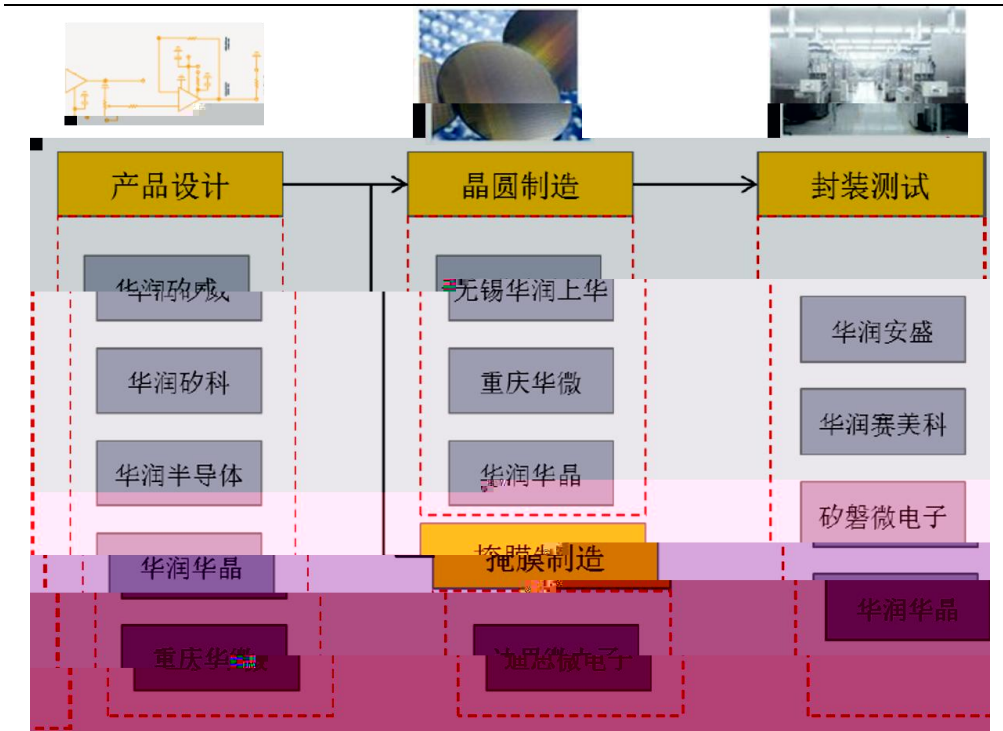
32	Infine on	2019	.....	19
33			.....	20
34	DC-AC		.....	21
35	DC-DC		.....	21
36			.....	22
37			.....	22
38			.....	23
39	2017	MOSFET	.....	23
40			.....	24
41	SiC	GaN	.....	25
42	SiC MOSFET	Si IGBT	.....	25
43	Si-IGBT	SiC-MOSFET	.....	26
44	Si-IGBT	SiC-MOSFET	.....	26
45	8		.....	27
46			.....	28
47			.....	29
48		PE	.....	30
49	IDM		PE Band	30
50			PE Band	31

1. IDM

1.1. IDM



1 IDM

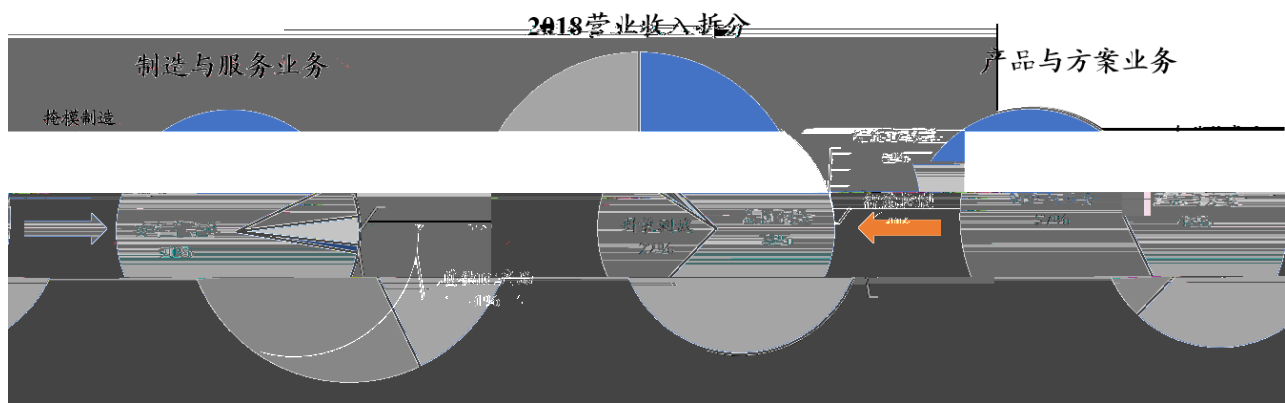


2

排名	企业	2018年销售额(亿元)	业务模式
1	深圳市海思半导体有限公司	509	设计
2	三星电子株式会社	278	封测
3	南通华达微电子股份有限公司	239	封测
4	中芯国际集成电路制造有限公司	225	代工
5	北京紫光展锐科技有限公司	111	设计
6	上海华虹(集团)有限公司	107	代工
7	天水华天科技股份有限公司	92	封测
8	北京北方微电子产业基地有限公司	85	代工
9	华大半导体有限公司	65	设计
10	发行人	63	封测

2018
57%
43%
75%
90%

3 2018

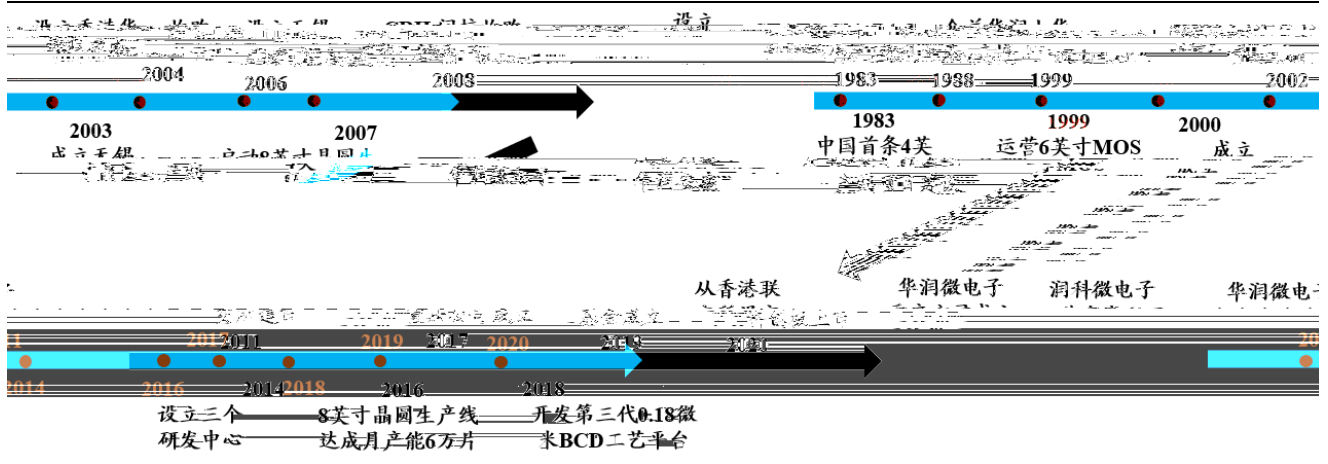


Wind

CMOS/ANALOG BICMOS RF/Mixed-Signal CMOS
BCD MEMS
0.8μm/1.0μm UHV BCD
DMOS DMOS IGBT BJT

IGBT 3300 V-6500 V

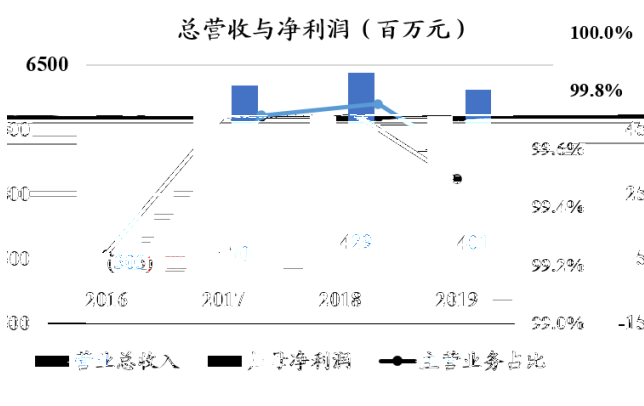
7



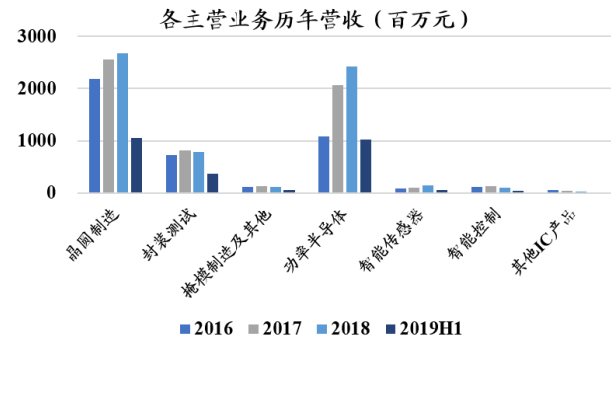
1.3.

2018 62.7 2017
2018 4.3 2019
99%

8



9



IC

“ ”

43.4%

20%-35%

2019

“ ”

“ ”

“ ”

10%-20%

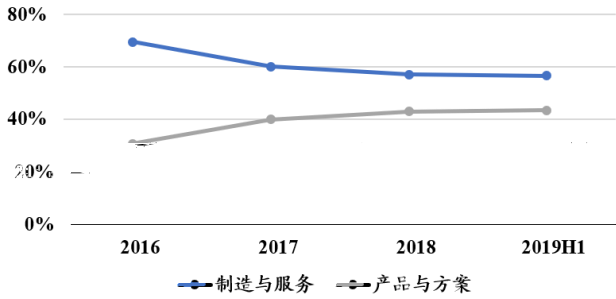
“ ”

“ ”

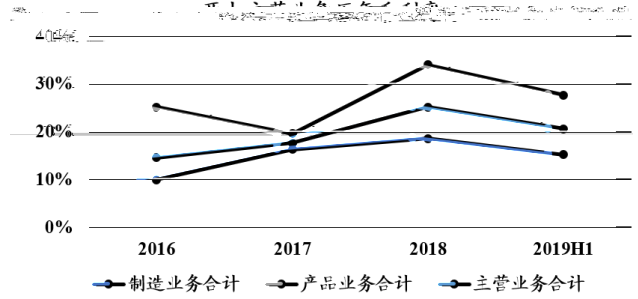
“ ”

10

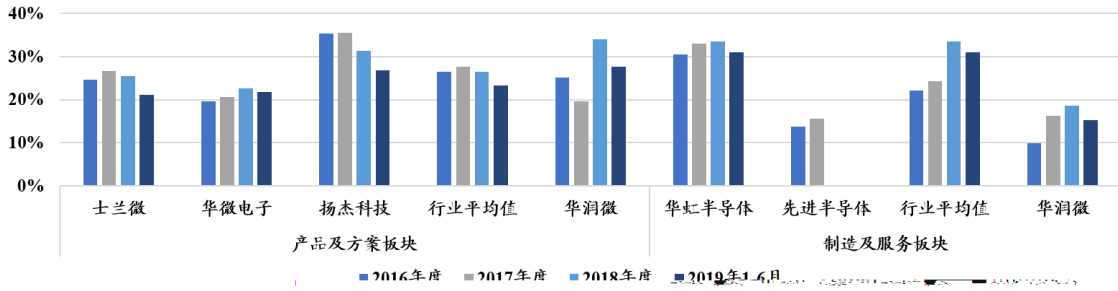
两大主营业务历年占比变化



11



12



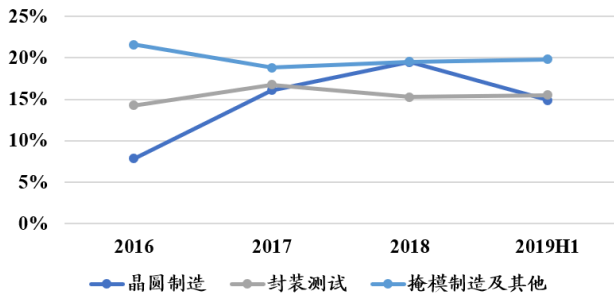
“ ” “ ”

“ ”

77%

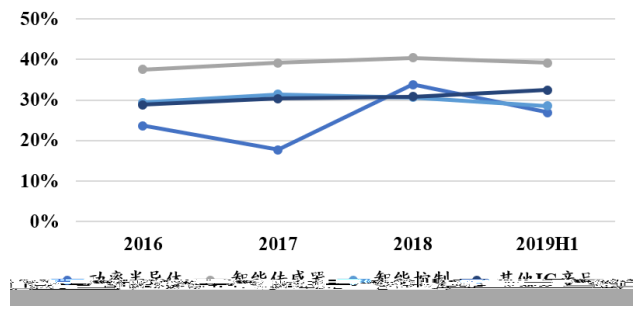
15

制造业务历年毛利率



16

产品业务历年毛利率



8

6

6

8

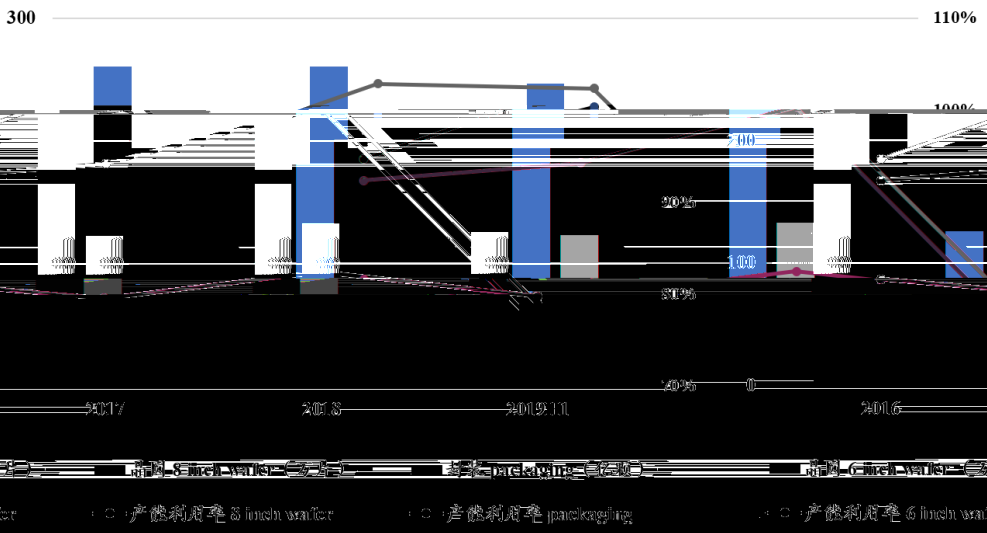
2018

8

6

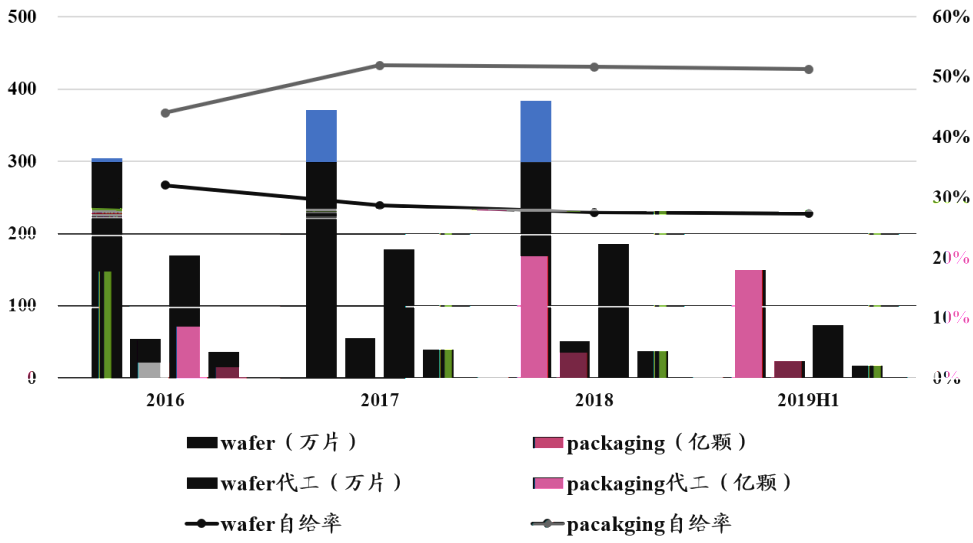
17

公司历年全年产能



18

晶圆封测历年产量与自给率



1.4.

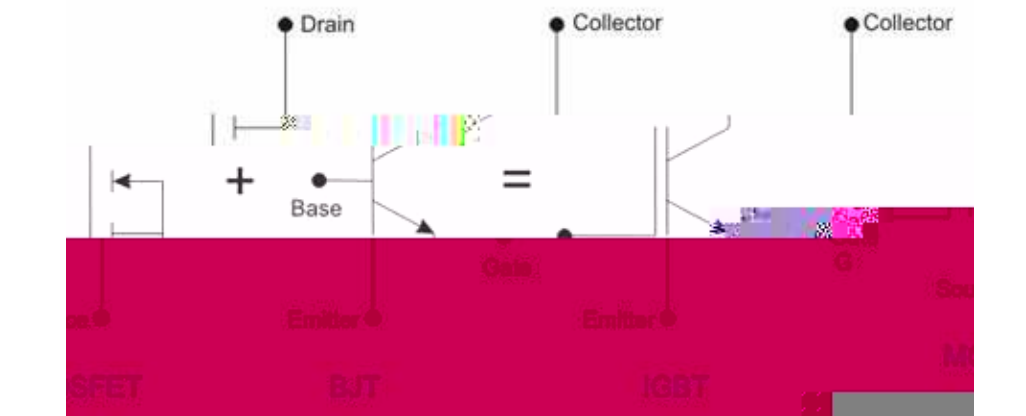
4.47 4.50 4.83 2016 2019 3.46

BJT < 1 kV < 500 A
 MOSFET
 < 200 A ns IGBT
 MOSFET GJT
 IGBT > 1 kV > 500 A

22

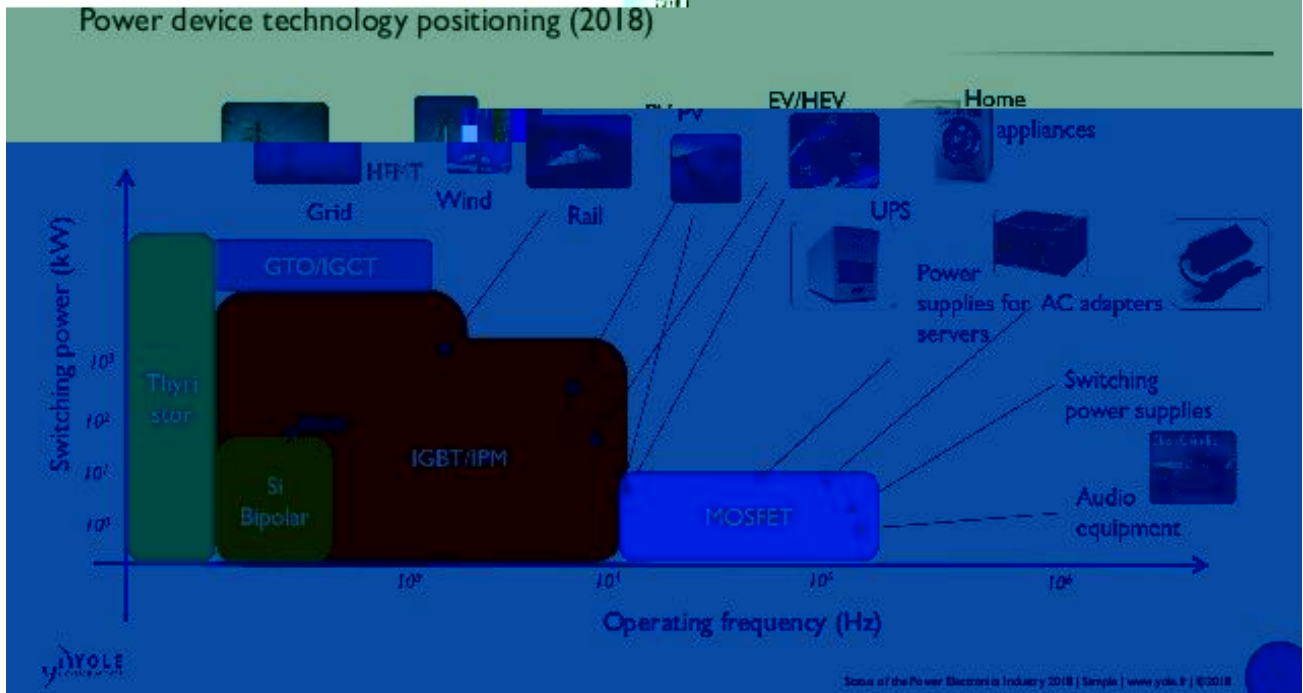
器件特性	BJT	MOSFET	IGBT
> 1kV	电压	< 1kV	< 1kV
> 500 A	电流	< 500 A	< 200 A
由栅驱动	输入驱动要求	由栅驱动	由栅驱动
高	高	输入阻抗	低
中	低	输出阻抗	低
快 (ns)	中	开关速度	慢 (μs)
中	高	成本	低

23 IGBT MOSFET BJT



ns IGBT / MOSFET MOSFET
 10 kHz IGBT 10-10k
 Hz UPS BJT
 Thyristor

POWER VS FREQUENCY ON ELECTRONICS



Yole

2.2. MOSFET

2.2.1.

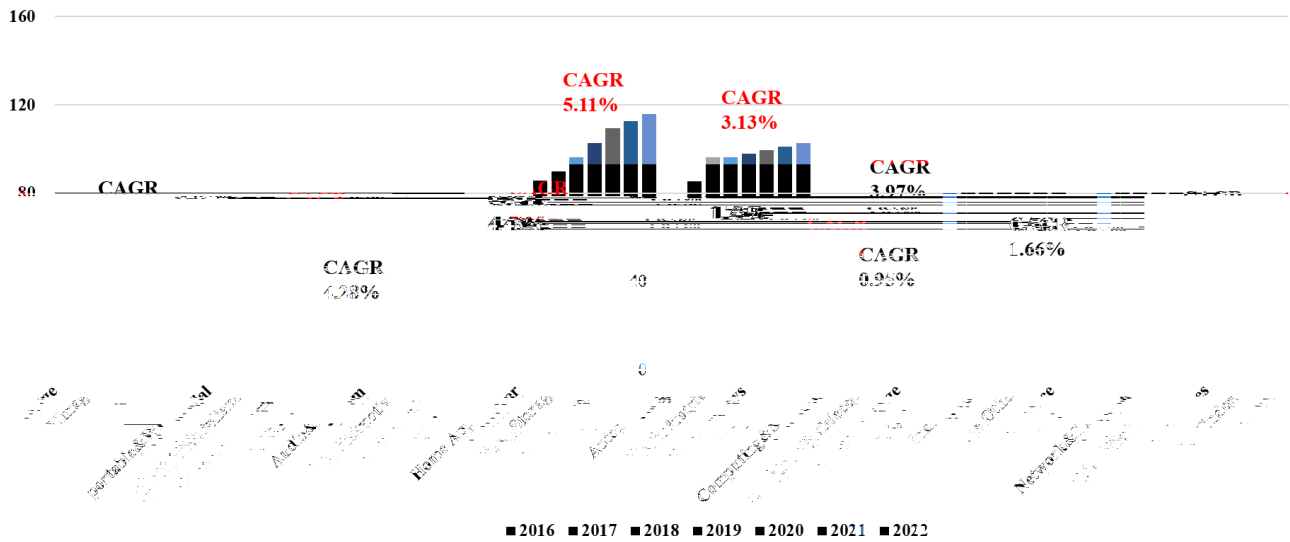
		IGBT	MOSFET
		3.56% 2018	2070
2022	2381	PMIC	IGBT
	7.62%	13.67%	MOSFET
	22%		
	“ ”	“ ”	MOSFET
2018	470.7		MOSFET
		2022	523.5

全球功率器件封装措施 (由环, 2019 外环, 2022 单位, 亿元)

Yole

26 MOSFET

2016-2022功率MoSFET细分应用市场规模预测 (亿元)



Yole

MOSFET

MOSFET

MOSFET

2016-2022

5.11%

MOSFET

MOSFET

2022

116

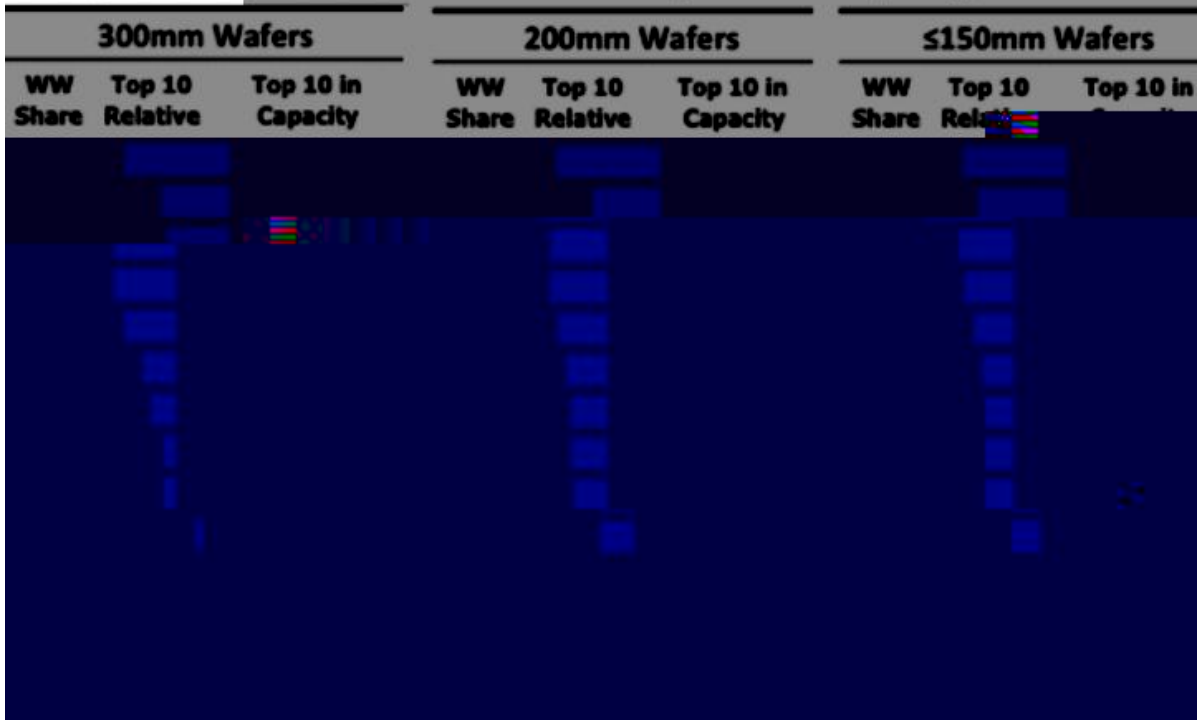
MOSFET

22.2% MOSFET

2.2.2.

27

Installed Capacity Leaders at Dec-2016 – by Wafer Size
(Ranked by Share of Total WW Monthly Installed Capacity)



IC Insights

12
 8
 12 300 mm wafer
 Micron SK Hynix Toshiba
 TSMC Intel Global Foundry UMC SMIC 6 150
 mm wafer
 6 IDM STMico
 35% 2018 8
 TSMC SMIC
 12 8
 IDM Infineon OnSemi Renesas 12
 IDM CRM Silan 8
 12 2.5
 12
 8

28

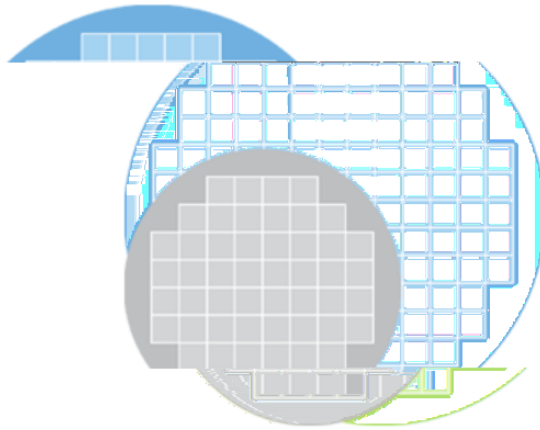
wafer

Foundry	Application	Wafer size	Process node
TSMC	BCD	12-inch、8-inch	0.6 um – 40 nm
SMIC	PMIC	8-inch	0.35 um - 0.14 um
UMC	BCD	6-inch、8-inch	0.35 um – 0.11 um

TSMC SMIC PowerChip UMC

29 12

Larger Die Sizes More Efficiently Utilize 300mm Wafer Area



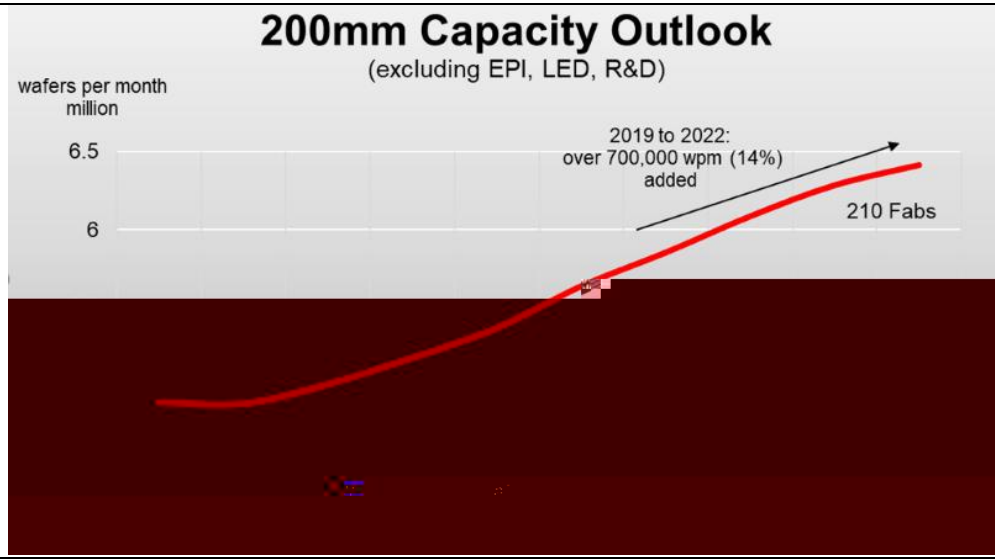
-2.5

Die size: 20x20 mm²
 300mm GDPW: 142
 200mm GDPW: 57

8	CAGR	2.89%			
SEMI	8	200 mm Wafer	2019	580	/
	IDM	8	2022	650	
/		2.89%			
3.56%	8				

30

8



SEMI

IDM

Infineon

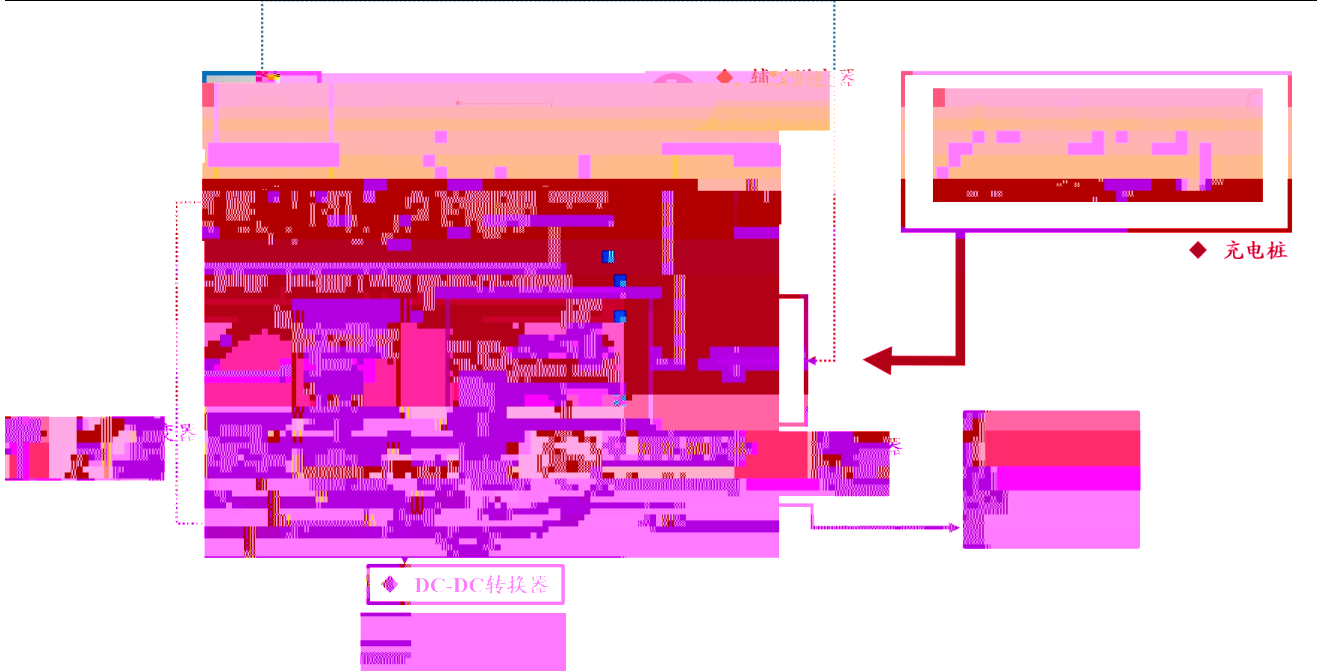
2019

22%

30%

15%

33



Infineon Toshiba

DC-AC

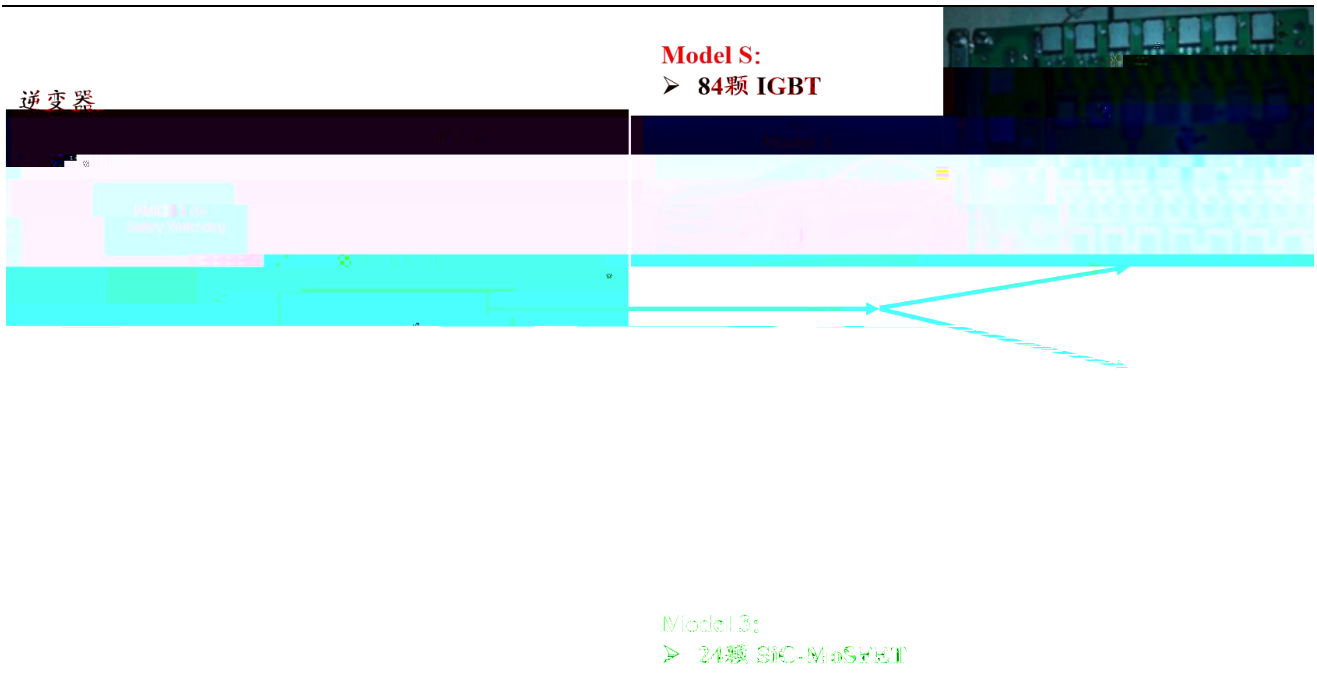
Inverter

SiC MOSFET
IGBT Model 3

Model S
24 SiC MOSFET

IGBT
84

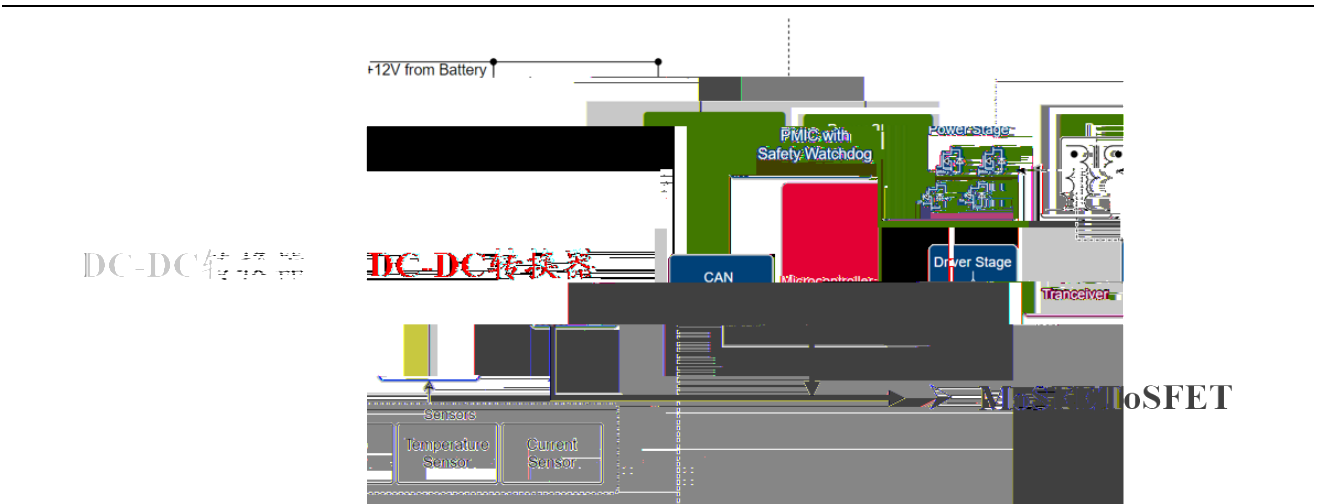
34 DC-AC



Infineon

converter	DC-DC	LV-HV	DC-DC
voltage		HV-LV	low voltage to high
Model S	400 V	400 V	650 V
	LV-HV	DC-DC	650 V
		HV-LV	DC-DC
	MOSFET	DC-DC	400 V

35 DC-DC



Infineon

AC-DC DC-DC

AC-DC DC-DC
MOSFET IGBT

36

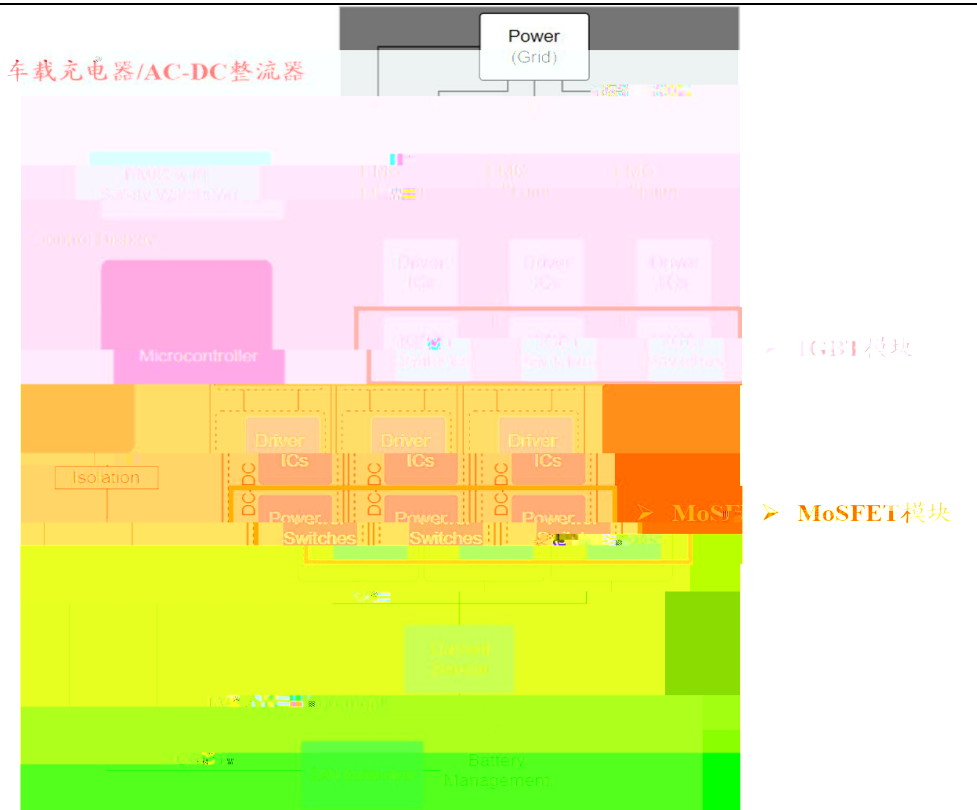


Infineon

OBC On-Board Charger IGBT MOSFET

IGBT MOSFET

37



Infineon

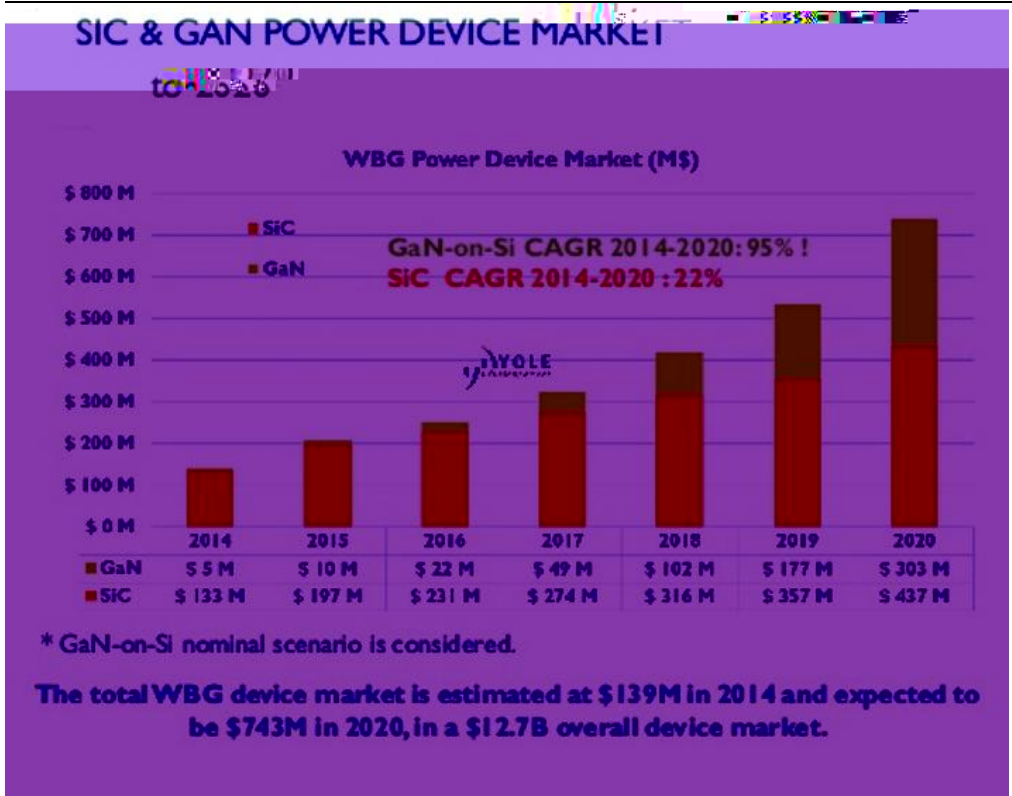
3.

3.1. 15

15	8	30	15
8			
8	BCD		8 MEMS
			BCD
MEMS	16,000		2.75
	15	12	6
2018 9		2020 11	

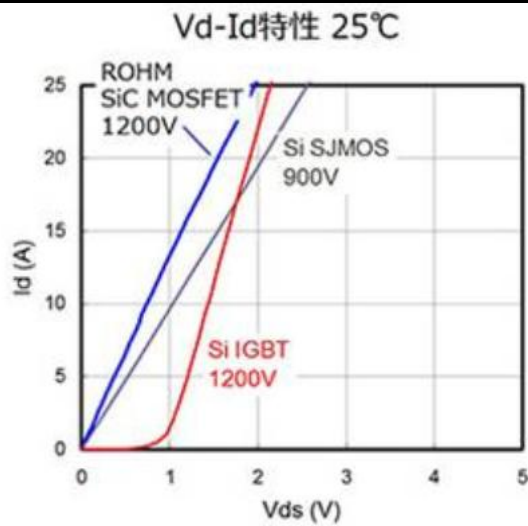
40

41 SiC GaN



Yole

42 SiC MOSFET Si IGBT

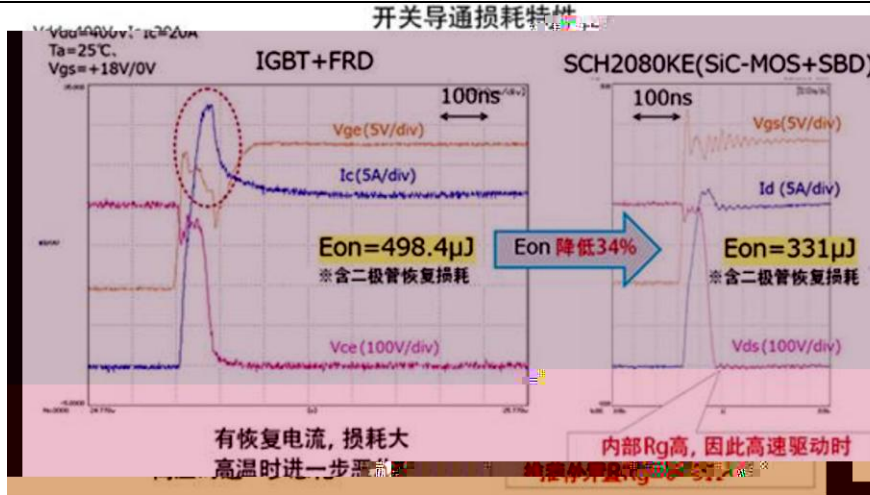


SiC-MOSFET		IGBT	600-1200 V	SiC
MOSFET	Si	IGBT		
SiC	Si		MOSFET	IGBT
			IGBT	
SiC-MOSFET		IGBT		

SiC-MOSFET

	Model S	IGBT
Model 3	SiC-MOSFET	600-1200 V
	SiC-MOSFET	IGBT

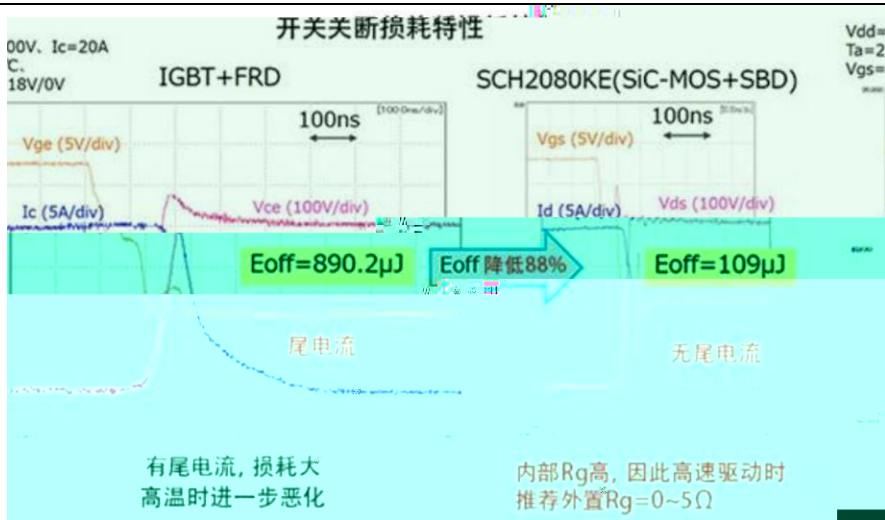
43 Si-IGBT SiC-MOSFET



Si-IGBT

SiC-MOSFET

44 Si-IGBT SiC-MOSFET



IGBT

SiC-MOSFET

Si-IGBT

4.

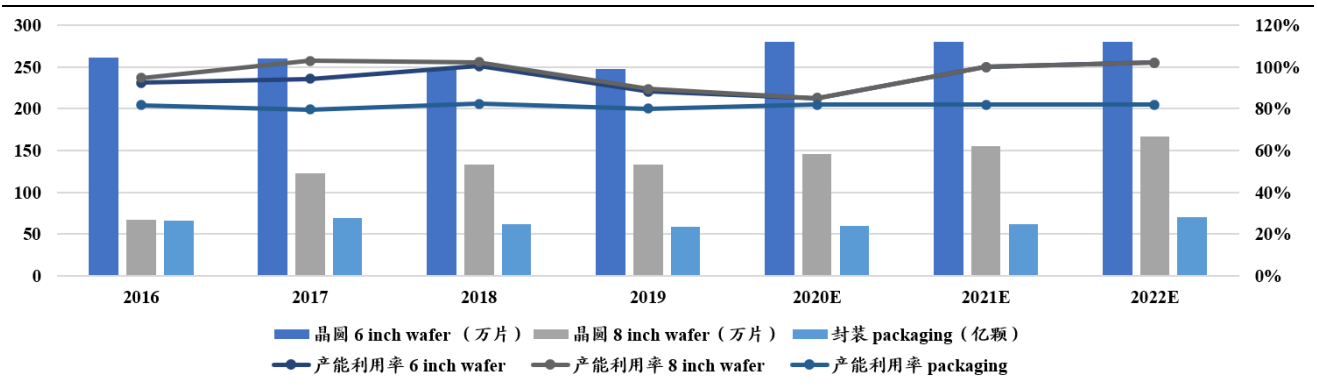
4.1.

8

8

8

46



2020	2022	64.4	74.5	82.4	2020	2022
	35.9	41.3	45.3	2020	2022	
	28.2	32.9	36.8			

IDM

IDM

	2016	2017	2018	2019*	2020E	2021E	2022E
毛利率	19.00%	7.85%	16.06%	19.49%	18.00%	15.00%	
YoY	8.68%	17.16%	4.33%	-12.31%	11.20%		
毛利率	16.52%	15.50%	16.00%	17.00%	14.27%	16.75%	15.28%
毛利率	21.56%	18.79%	19.53%	21.00%	20.00%	22.00%	23.00%
YoY	19.17%	-17.89%	-5.49%	11.20%	19.46%	8.68%	
制造业务合计	3031.56	3519.76	3571.91	3183.52	3592.51	4132.79	4528.03
毛利率	9.91%	16.33%	18.57%	17.76%	15.30%	19.24%	18.72%
YoY	16.10%	1.48%	-10.87%	12.44%	15.04%	9.56%	
功率半导体	1081.18	2068.58	2418.86	2269.11	2493.49	2898.77	3235.35
毛利率	23.61%	17.71%	22.82%	28.16%	21.00%	23.00%	22.00%
YoY	16.93%	-6.19%	9.71%	16.25%	11.61%		91.33%
毛利率	37.40%	40.18%	40.39%	42.42%	40.00%	41.00%	40.00%
YoY		13.57%	41.99%	0.86%	36.45%	17.46%	12.24%
毛利率	31.00%	30.00%	29.38%	31.43%	30.67%	30.22%	29.00%
YoY	20.95%	18.68%		9.55%	-22.06%	-9.62%	12.33%
其他IC产品	28.35	32.35	48.81	46.03	27.61	17.91	23.80
毛利率	33.00%	32.00%	28.70%	20.24%	20.86%	17.58%	20.00%
YoY	44.76%	19.14%	14.12%		-5.68%	40.02%	35.15%
毛利率	25.19%	19.60%	34.02%	29.48%	31.50%	33.48%	32.49%
YoY		75.64%	14.73%	-6.25%	11.58%	16.54%	11.96%
主营业务合计	4363.29	5858.81	6255.40	5699.18	6416.38	7423.78	8212.52
毛利率	14.59%	17.62%	25.10%	22.02%	22.42%	25.55%	24.00%
YoY	10.62%		34.28%	6.77%	-8.89%	12.06%	15.70%
非主营业务	24.71	33.47	16.77	15.40	23.00	19.31	22.34
毛利率	27.00%	3.16%	14.31%	29.26%	26.60%	27.00%	27.00%
YoY	10.62%		-49.89%	-8.19%	49.31%	-16.04%	15.70%
营业总收入	9327.23	4306.76	5875.59	6370.80	5722.18	6425.60	7416.11
毛利率	14.49%	17.62%	25.20%	22.95%	22.44%	25.56%	24.90%
YoY		33.63%	6.73%	-8.75%	11.95%	15.70%	10.62%

Wind

* 2019

4.2.

74.5	82.4	EPS	0.38	0.50	0.60	PE	90.6	69.0	57.7
				2020	2022		64.4		

IDM

IDM

Fabless

A	IDM	PE
107.51	Fabless	PE
142.56		
120	PE	2020
		45.6

48 PE

截至2020.04.30收盘		EPS	PE	EPS	PE (TTM)
	收盘价	2019	2019	2020E	对应2019EPS
士兰微	14.18	0.01	1396.75	-	1280
扬杰科技	26.36	0.48	36.07	0.62	42.62
捷捷微电	37.41	0.88	47.23	0.62	76.63
斯达半导	-	1.09	132.11	143.8	1.13
中芯国际	-	0.24	61.75	14.82	
华虹半导体	-	0.75	20.08	15.06	
华润微	-	0.38	99.55	37.83	0.48

Wind

49 IDM PE Band



Wind

	2018A	2019E	2020E	2021E		2018A	2019E	2020E	2021E
	1,931	2,775	3,998	5,290		512	516	676	809
	508	508	508	508		6	0	0	0
	1,006	1,171	1,332	1,477		709	681	654	610
	1,055	1,154	1,344	1,465		0	0	0	0
	594	1,214	1,200	1,207		69	30	30	30
	5,092	6,822	8,381	9,946		0	-4	-4	-5
	0	0	0	0		-715	-632	-36	-46
	82	82	82	82		-5			

