

/

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	Infineon	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

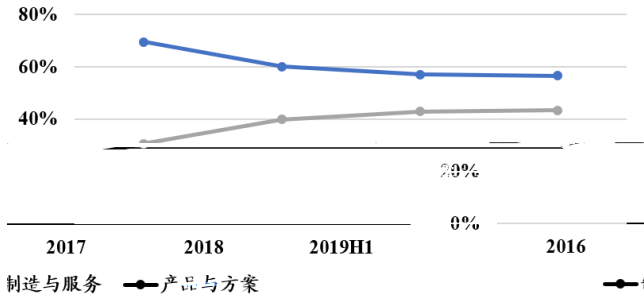
IGBT 3300 V-6500 V

“ ”

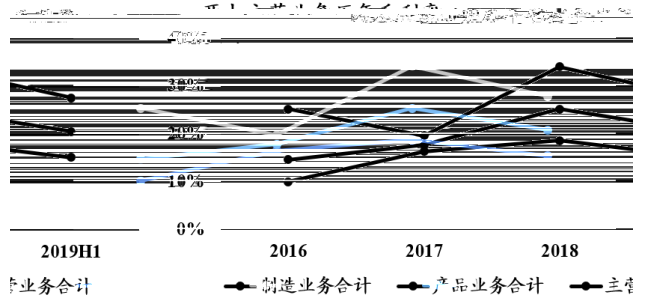
“ ”

10

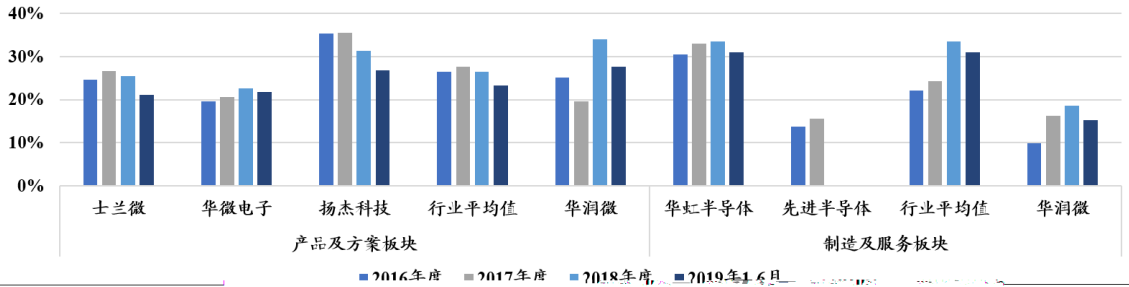
两大主营业务历年占比变化



11



12



“ ”

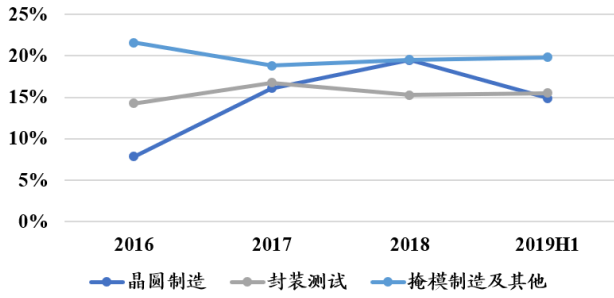
“ ”

“ ”

77% 100%

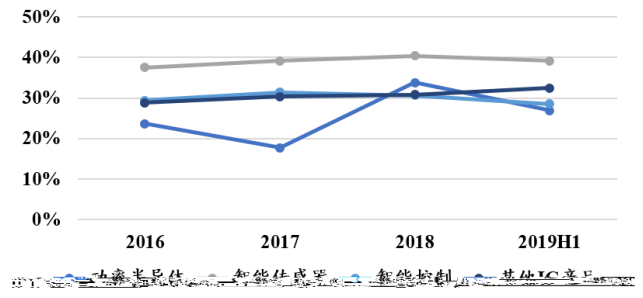
15

制造业务历年毛利率



16

产品业务历年毛利率



8

6

6

8

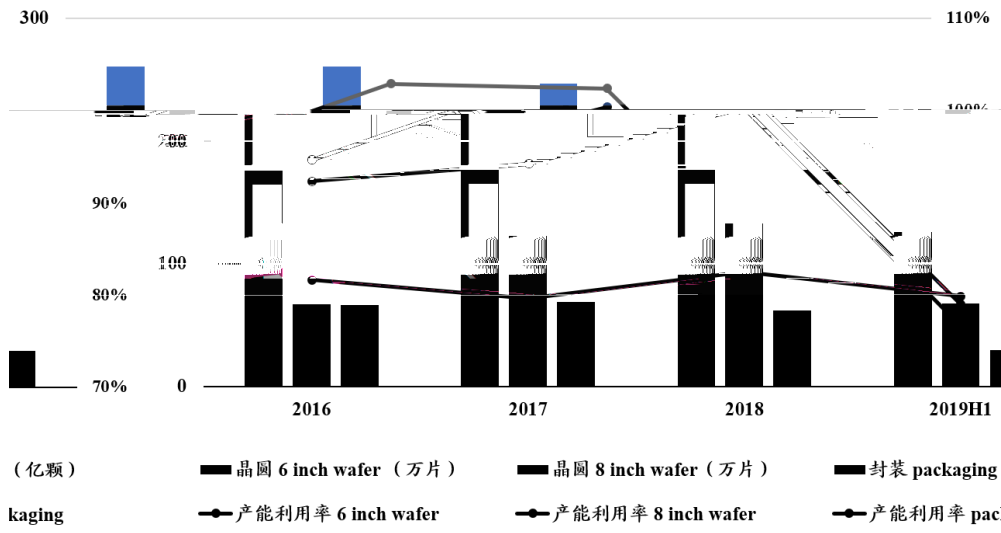
2018

8

6

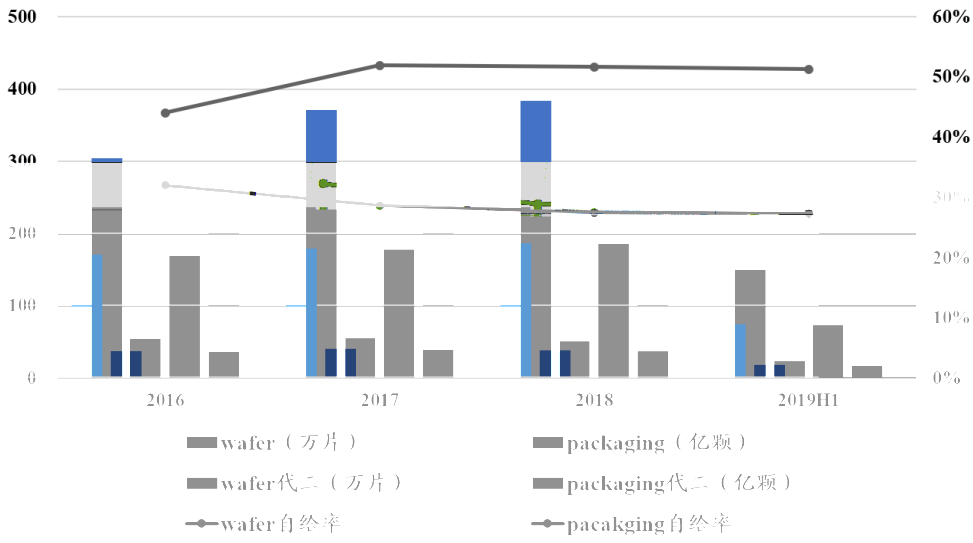
17

公司历年全年产能



18

晶圆封测历年产量与自给率



1.4.

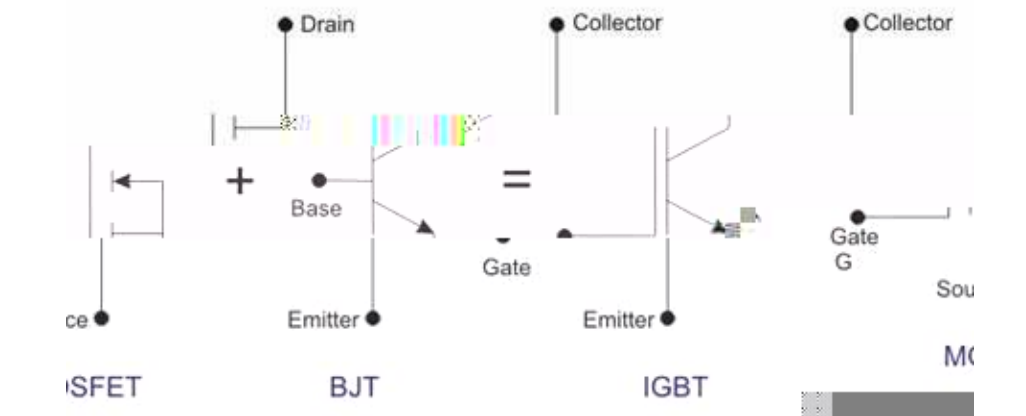
4.47 4.50 4.83 2016 2019 3.46

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

22

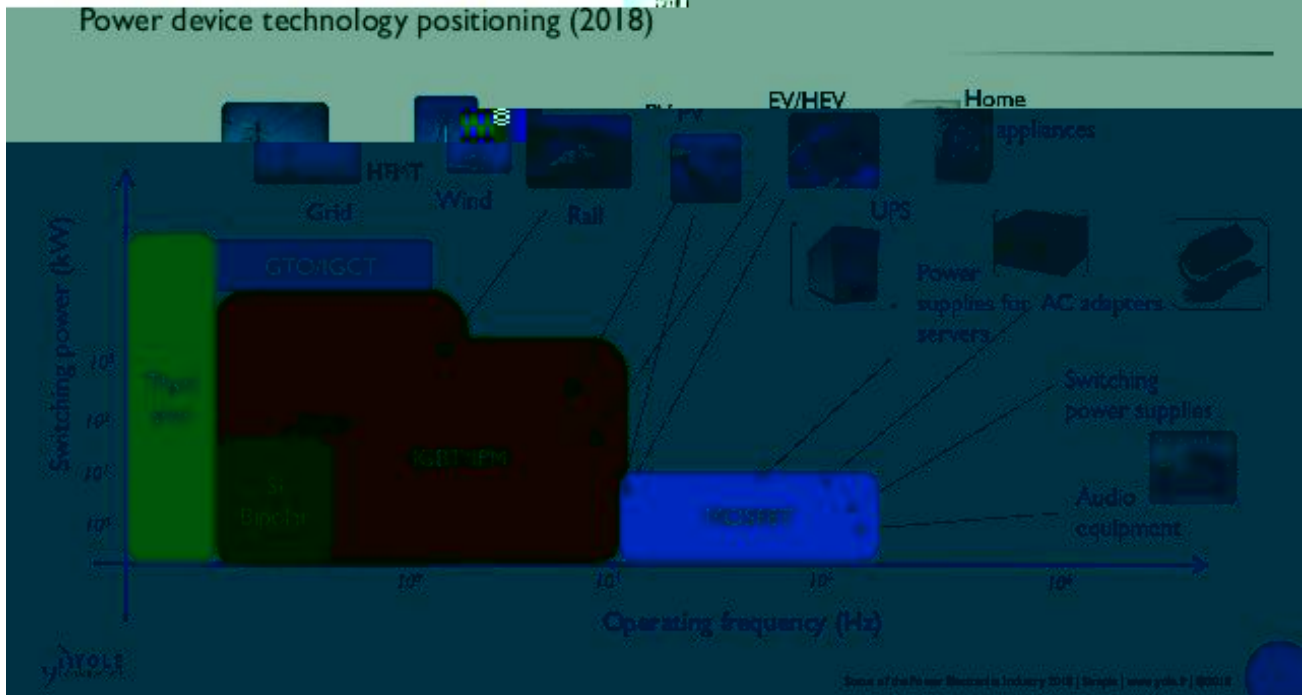
器件特性	BJT	MOSFET	IGBT
> 1kV	电压	< 1kV	< 1kV
> 500 A	电流	< 500 A	< 200 A
中压驱动	输入驱动方式	中流驱动	中压驱动
高	高	输入阻抗	低
中	低	输出阻抗	低
快 (ns)	中	开关速度	慢 (us)
中	高	成本	低

23 IGBT MOSFET BJT



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

POWER VS FREQUENCY ON ELECTRONICS



Yole

2.2. MOSFET

2.2.1.

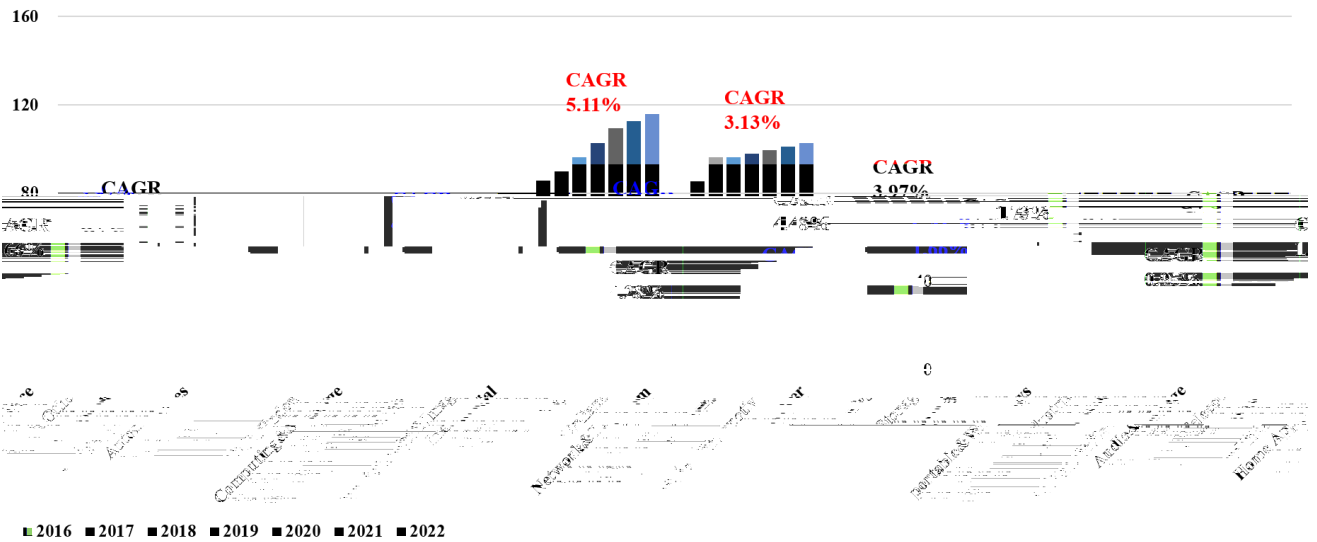
		IGBT	MOSFET
		3.56% 2018	2070
2022	2381	PMIC	IGBT
	7.62%	13.67%	MOSFET
	22%		
	“ ”	“ ”	MOSFET MOSFET
2018	470.7		2022 523.5

全球功率器件市场规模 (内环, 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)

300mm Wafers			200mm Wafers			≤150mm Wafers		
WW Share	Top 10 Relative	Top 10 in Capacity	WW Share	Top 10 Relative	Top 10 in Capacity	WW Share	Top 10 Relative	Top 10 in Capacity
22%	[Bar]	Samsung	11%	[Bar]	TSMC*	12%	[Bar]	STMicro
14%	[Bar]	Micron*	7%	[Bar]	TI	11%	[Bar]	ON Semi
13%	[Bar]	SK Hynix	6%	[Bar]	STMicro	7%	[Bar]	Panasonic
13%	[Bar]	TSMC	6%	[Bar]	UMC	6%	[Bar]	CR Micro
11%	[Bar]	Toshiba/WD	5%	[Bar]	Infineon	5%	[Bar]	Silan
7%	[Bar]	Intel*	4%	[Bar]	NXP	4%	[Bar]	Renesas
6%	[Bar]	GlobalFoundries	4%	[Bar]	Toshiba	3%	[Bar]	TI
3%	[Bar]	UMC	4%	[Bar]	SMIC	3%	[Bar]	TSMC
2%	[Bar]	Powerchip	4%	[Bar]	Samsung	3%	[Bar]	Rohm/Las
2%	[Bar]	SMIC	3%	[Bar]	HHGrace	3%	[Bar]	Toshiba

— WW Share is each company's share of total industry capacity for that wafer size.
Blue bars indicate the relative amount of capacity held by each company among the top 10 leaders.
*Includes shares of capacity from joint ventures.
Source: IC Insights

IC Insights

12

8

12 300 mm wafer

Micron SK Hynix Toshiba

TSMC Intel Global Foundry UMC SMIC

6 150

mm wafer

6 IDM

STMicro

35% 2018 8

TSMC SMIC

12

8

IDM Infineon OnSemi Renesas 12

IDM CRM Silan 8

12 8 2.5

12

8

28

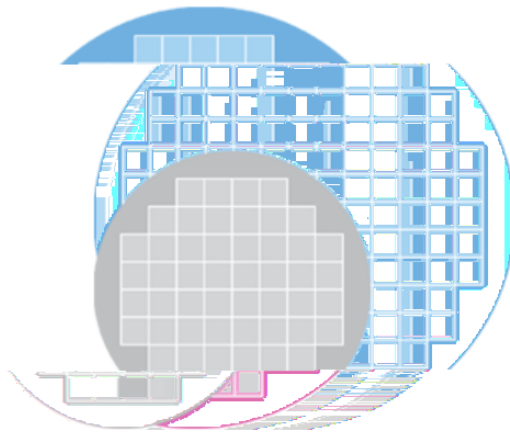
wafer

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
PowerChip	PMIC	8-inch	0.35 um - 0.11 um
UMC	BCD	6-inch	0.35 um - 0.11 um

TSMC SMIC PowerChip UMC

29 12

Larger Die Sizes More Efficiently Utilize 300mm Wafer Area

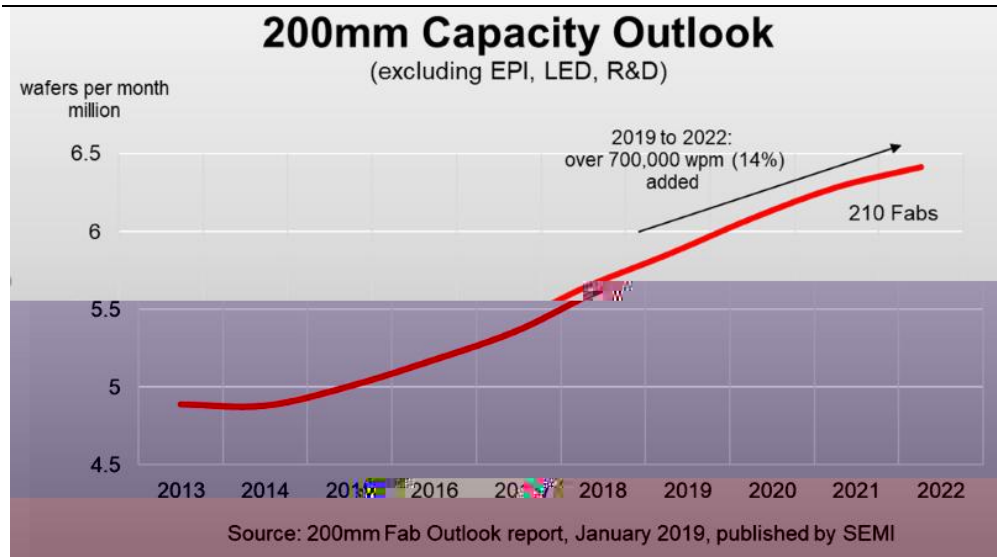


Die size: 20x20 mm²
 $\frac{300\text{mm GDPW: } 142}{200\text{mm GDPW: } 57} = 2.5$

8	CAGR	2.89%
SEMI	8	200 mm Wafer
	IDM	8
/	2.89%	
3.56%	8	

30

8



SEMI

IDM

Infineon

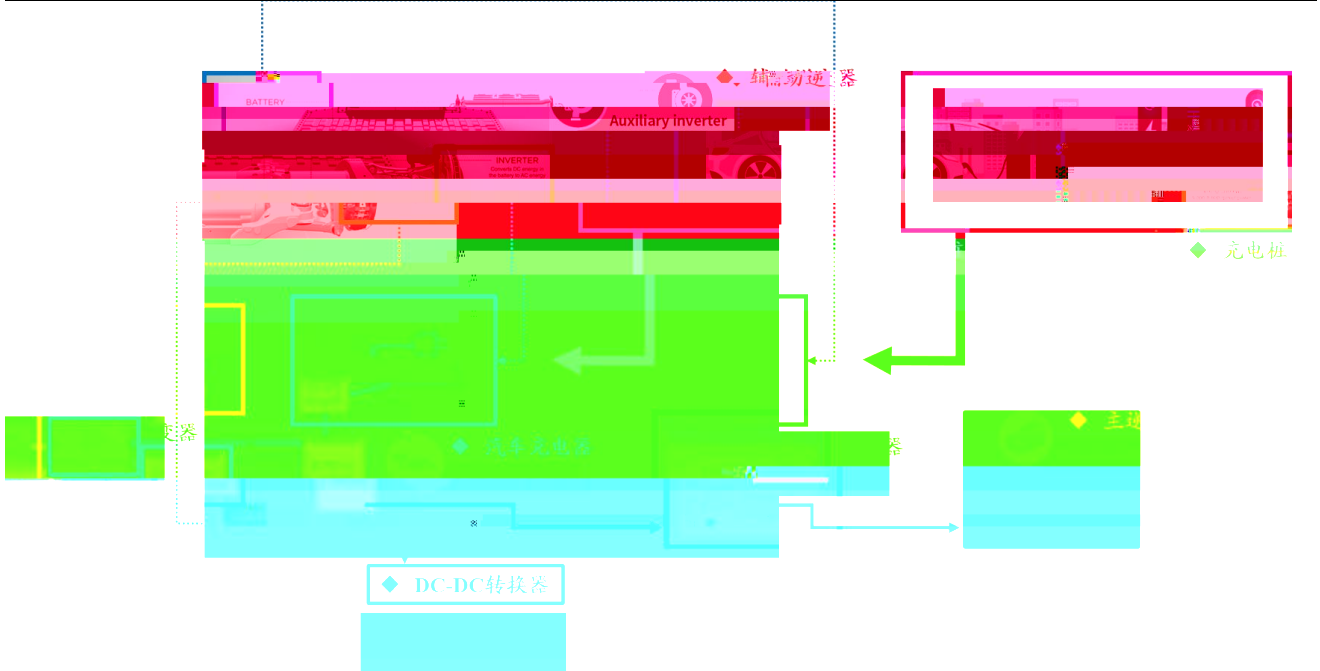
2019

22%

30%

15%

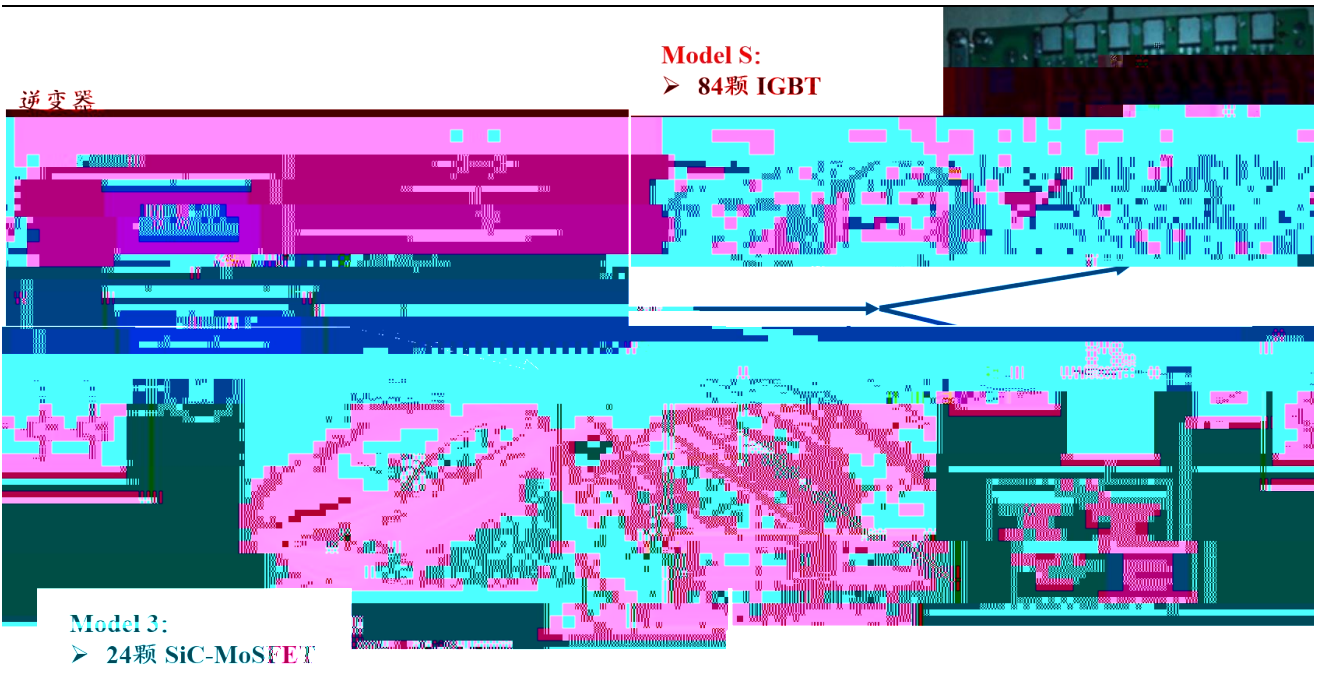
33



Infineon Toshiba

		DC-AC	Inverter	
SiC MOSFET			Model S	IGBT
IGBT	Model 3	24	SiC MOSFET	84

34 DC-AC



Infineon

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

35 DC-DC

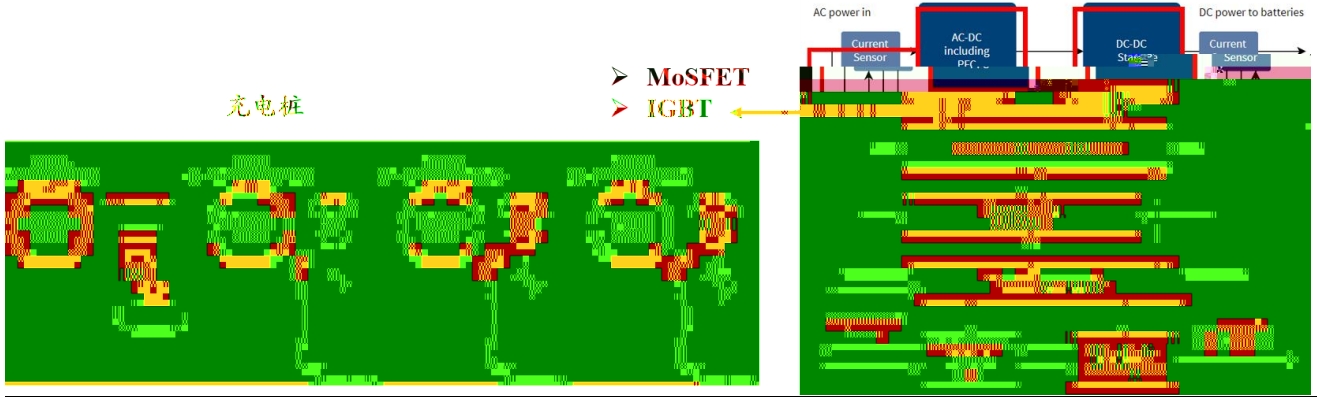


Infineon

AC-DC DC-DC

AC-DC DC-DC
MOSFET IGBT

36

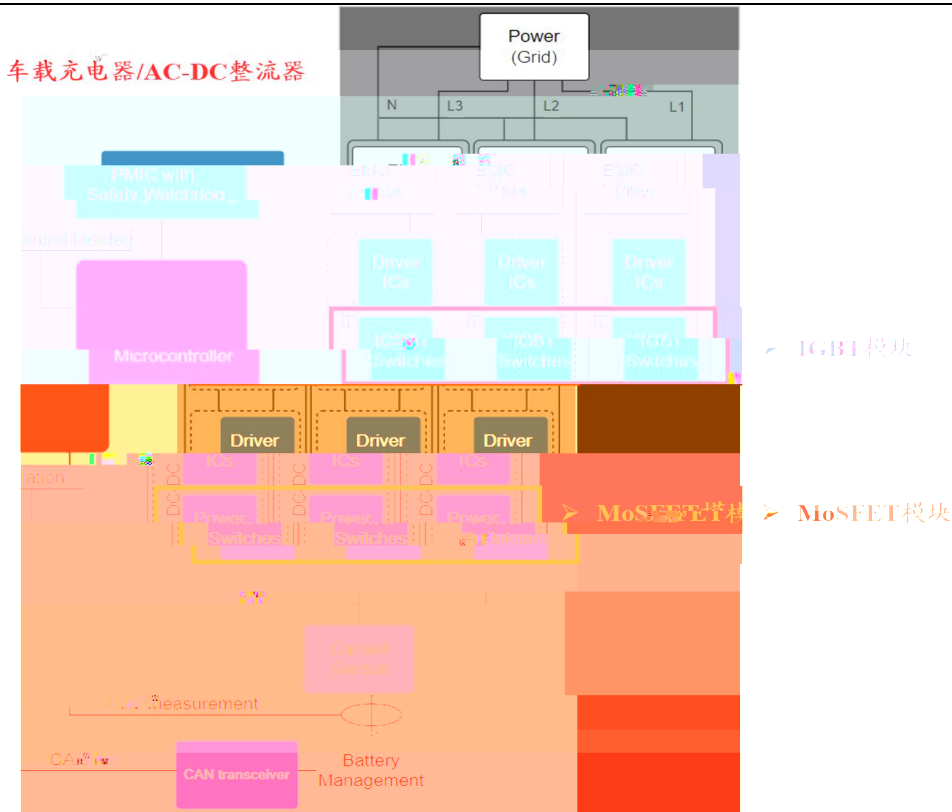


Infineon

OBC On-Board Charger IGBT MOSFET

IGBT MOSFET

37



Infineon

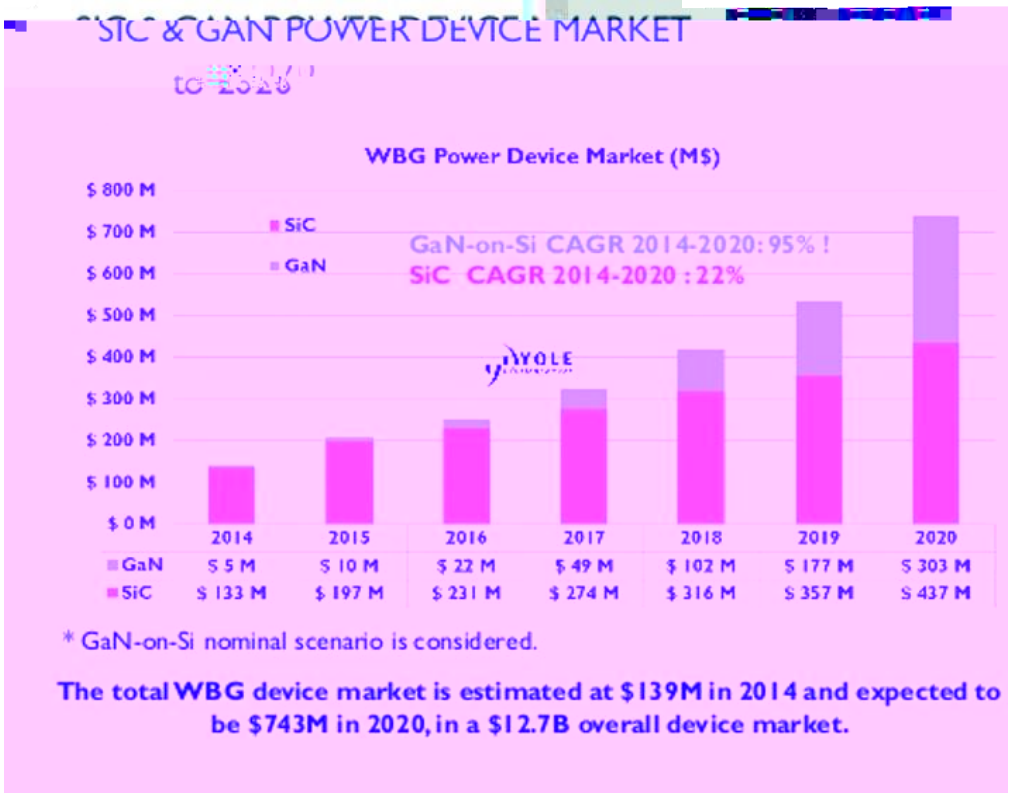
3.

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	

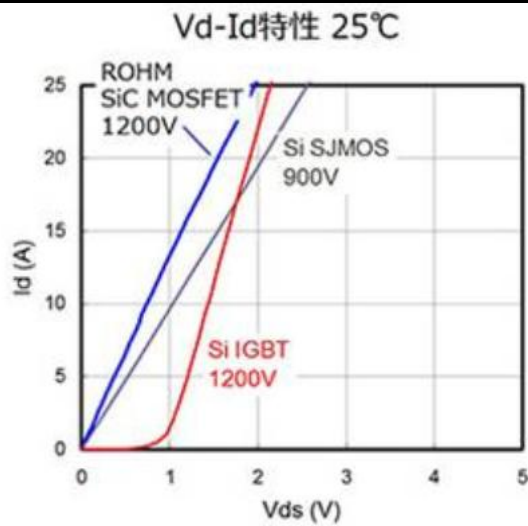
40

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

SiC-MOSFET

Model S

IGBT

Model 3

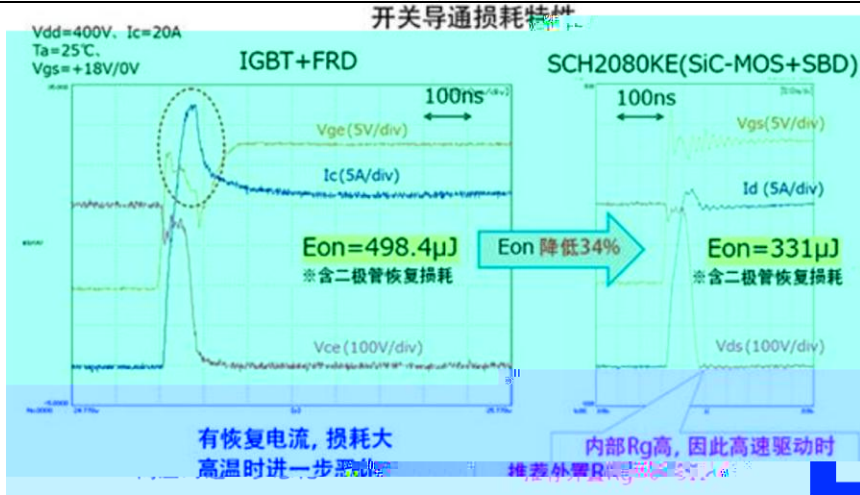
SiC-MOSFET

600-1200 V

SiC-MOSFET

IGBT

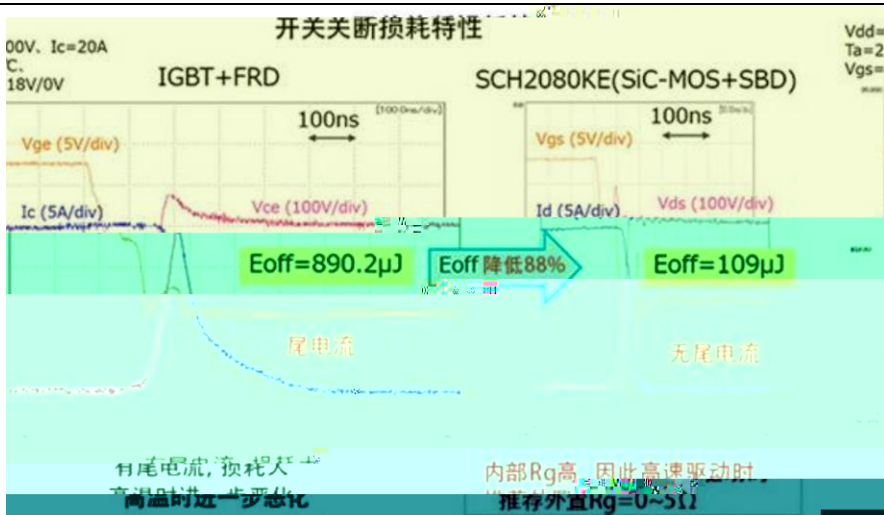
43 Si-IGBT SiC-MOSFET



Si-IGBT

SiC-MOSFET

44 Si-IGBT SiC-MOSFET



SiC-MOSFET

Si-IGBT

4.

4.1.

8
5

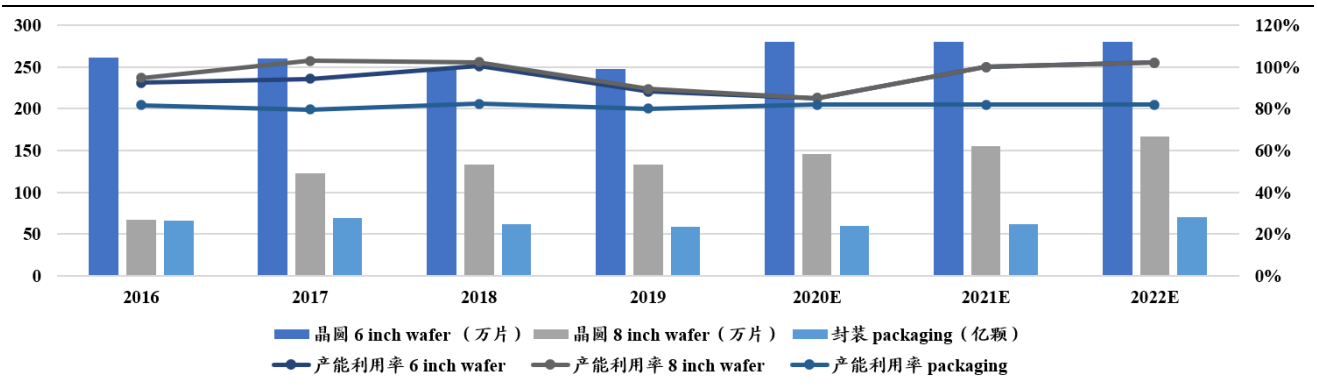
8

-

8

4 C1Tc963A0E2A#TJETCID 126B2 /P /MCID 119BD>BDC 45.8 563.75 3BT1 0 0

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	2020	2022	

IDM

IDM

	2016	2017	2018	2019*	2020E	2021E	2022E
毛利率	19.00%	7.85%	16.06%	19.49%	18.00%	15.00%	20.00%
YoY	8.68%		17.16%	4.33%	-12.31%	11.20%	19.00%
封装测试	973.24	729.37	820.11	785.68	732.62	854.40	860.00
毛利率	16.00%	17.00%	14.27%	16.75%	15.28%	16.52%	15.50%
掩模制造及其他	136.35	111.96	105.81	130.38	155.75	169.28	114.42
毛利率	18.79%	19.53%	21.00%	20.00%	22.00%	23.00%	21.56%
YoY	19.17%	-17.89%	-5.49%	11.20%	19.46%	8.68%	
制造业务合计	3519.76	3571.91	3183.52	3592.51	4132.79	4528.03	3031.56
毛利率	16.33%	18.57%	17.76%	15.30%	19.24%	18.72%	9.91%
YoY	16.10%	1.48%	-10.87%	12.44%	15.04%	9.56%	
功率半导体	2068.58	2418.86	2269.11	2493.49	2898.77	3235.35	1081.18
毛利率	17.41%	31.92%	29.42%	21.00%	23.00%	22.00%	22.51%
YoY	6.25%	11.61%		91.33%	16.93%	-6.19%	9.70%
其他IC产品	107.50	137.18	154.58	1050.00	106.59	107.50	89.00
毛利率	29.00%	31.00%	30.00%	29.38%	31.43%	30.67%	30.00%
YoY	12.24%		13.57%	41.99%	0.86%	36.45%	17.00%
其他IC产品	23.80	28.35	32.35	48.81	46.03	27.61	17.50
毛利率	30.00%	32.00%	32.00%	28.70%	30.24%	30.86%	47.00%
YoY	-40.02%	-35.15%	44.76%	19.14%	14.12%		-5.68%
主营业务合计	7423.78	8212.52	4363.29	5858.81	6255.40	5699.18	6400.00
毛利率	33.48%	32.49%	25.19%	19.60%	34.02%	29.48%	31.00%
YoY	16.54%	11.96%		75.64%	14.73%	-6.25%	11.00%
主营业务合计	16.38	7423.78	8212.52	4363.29	5858.81	6255.40	5699.18
毛利率	24.90%	14.49%	17.62%	25.20%	22.95%	22.44%	25.56%
YoY	10.62%		33.63%	6.73%	-8.75%	11.95%	15.70%
非主营业务	23.00	19.31	22.34	24.71	33.47	16.77	15.40
毛利率	26.00%	27.00%	27.00%	27.00%	3.10%	14.31%	29.26%
YoY	49.31%	-16.04%	15.70%	10.62%		-49.89%	-8.19%
营业总收入	5722.19	6425.60	7446.11	8237.23	4396.76	5875.50	6270.00

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	14.23	0.37	37.67	0.62	37.41
斯达半导	132.00	1.13	143.8	-	-
中芯国际	61.75	4.16	14.82	-	-
华虹半导体	20.08	1.34	15.06	-	-
华润微	99.55	0.48	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			

