到 !

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中

! 1

- MOSFET IGBT SJNFET /
  -100V 1500V MOSFET
  SiC/GaN
- 5
  2025 2019 70%
  /
  /
  13
- 50% 2017
  / MOSFET IGBT
  12
- 6 650V 1200V SiC JBS
  SiC JBS
  MOSFET GaN 650V
  MOCVD
- 2020-2022 0.83 1.07 1.25
  2021 72 PE 77
-

到 ....

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师 到 旧 ....

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务 务 旧 ....

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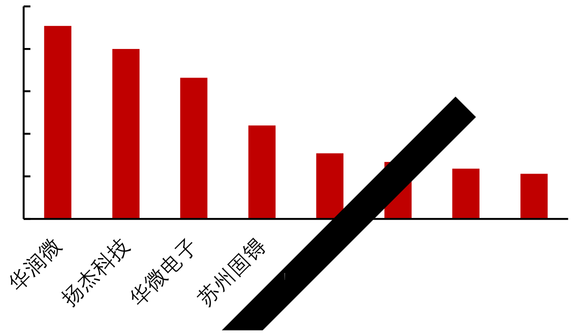
1. 到

1.1 IDM

6-8 5 2 1 20 MOSFET IGBT SJNFET / -100V 1500V MOSFET SiC/GaN

万

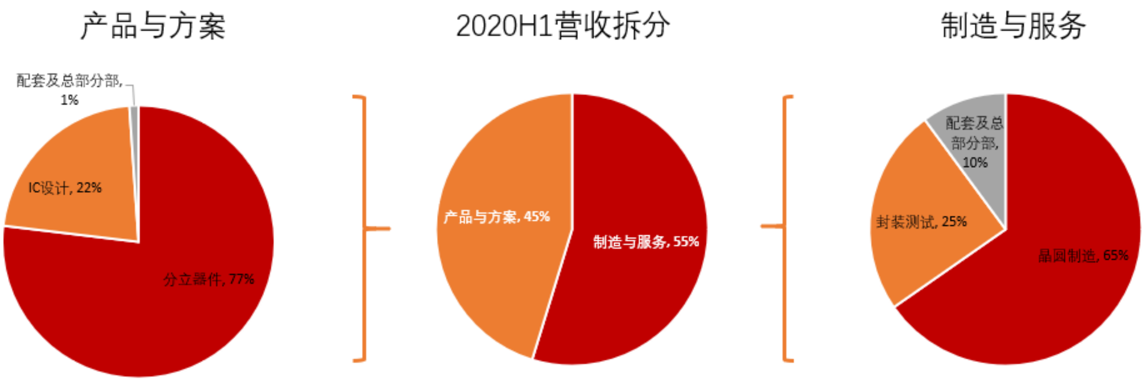


[redacted]

5-10

wind

2020 45% 55% 77% 65%



1.2 9

1983 4 1999

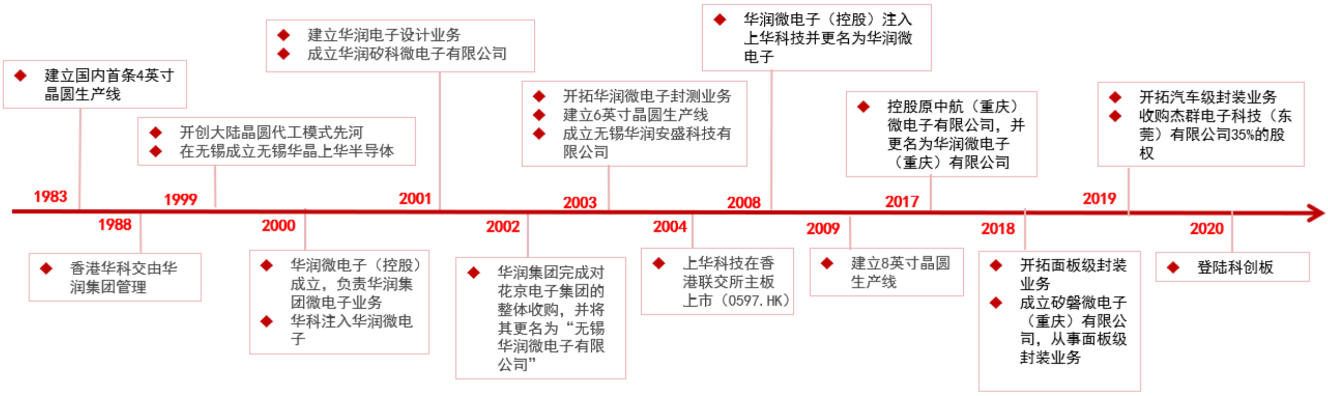
2001 2003 6

2004 0597.HK 2008

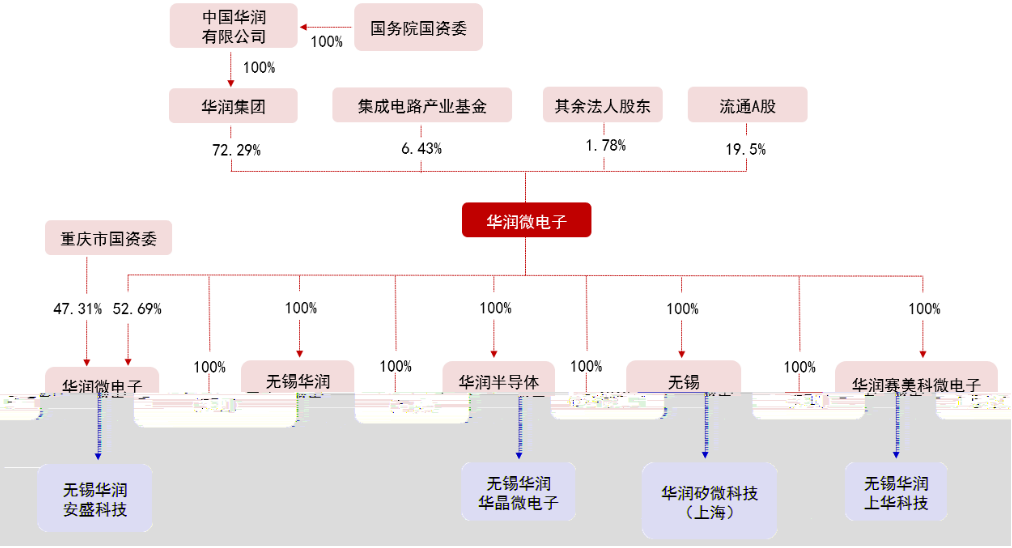
2009 8 2011 2017

2018 2019

2020



100%



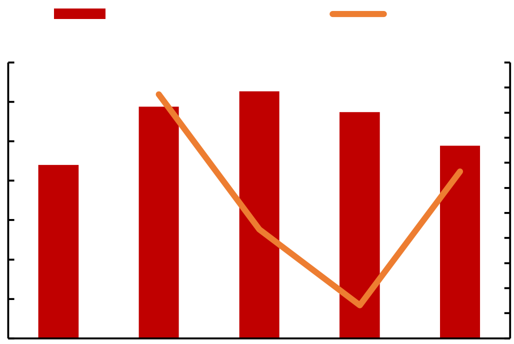
wind

1.3 师 到 旧

2020 48.9 18.3%

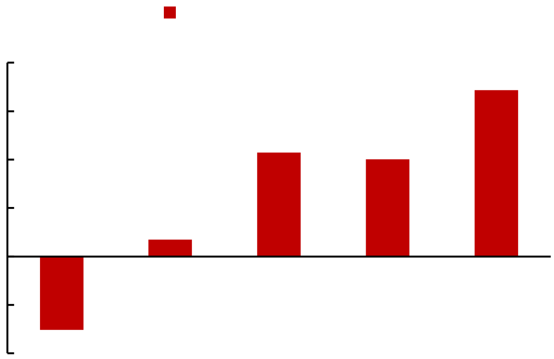
2019 2020

6.9 155%



wind

息

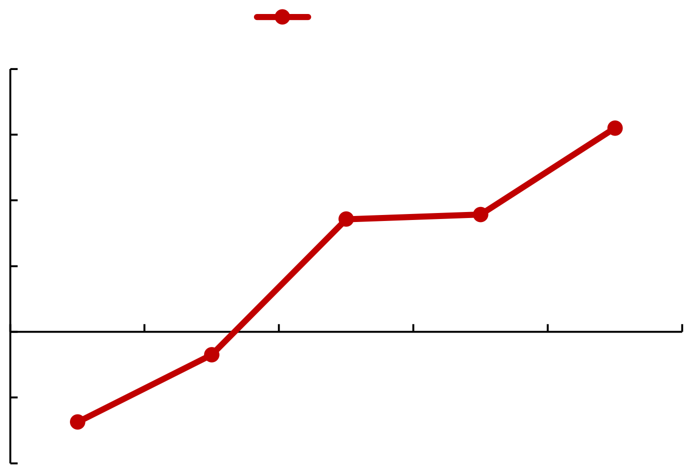


wind

2016 2020

-6.9% 15.5%

旧



wind

1 **IDM** IDM

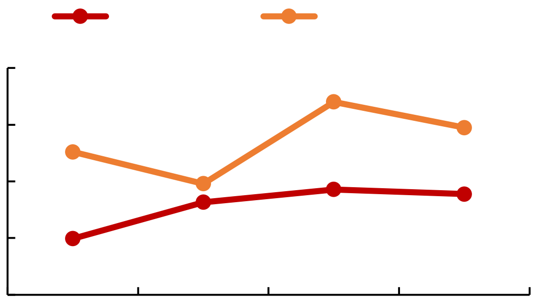
30% 20% 10

IDM

2016 2020 IDM 30% 45%

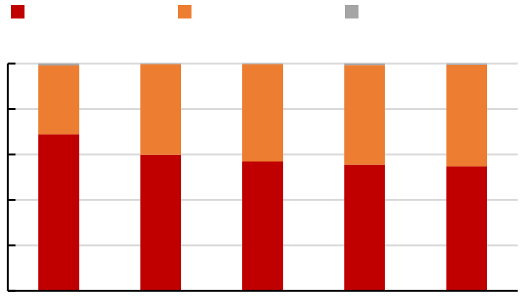
IDM

万 息

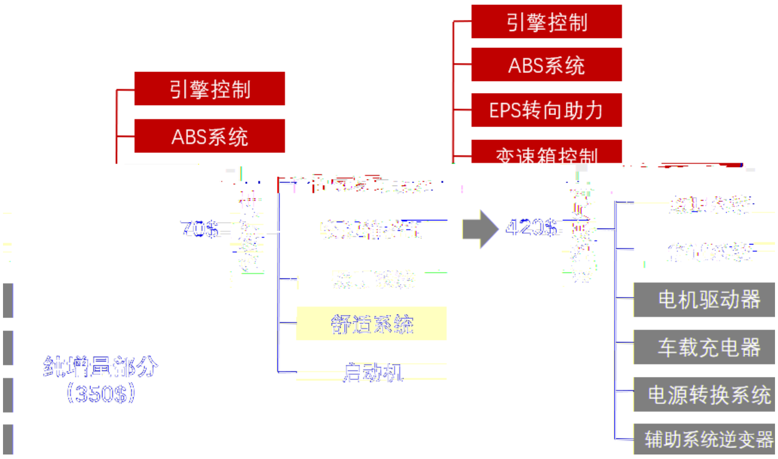


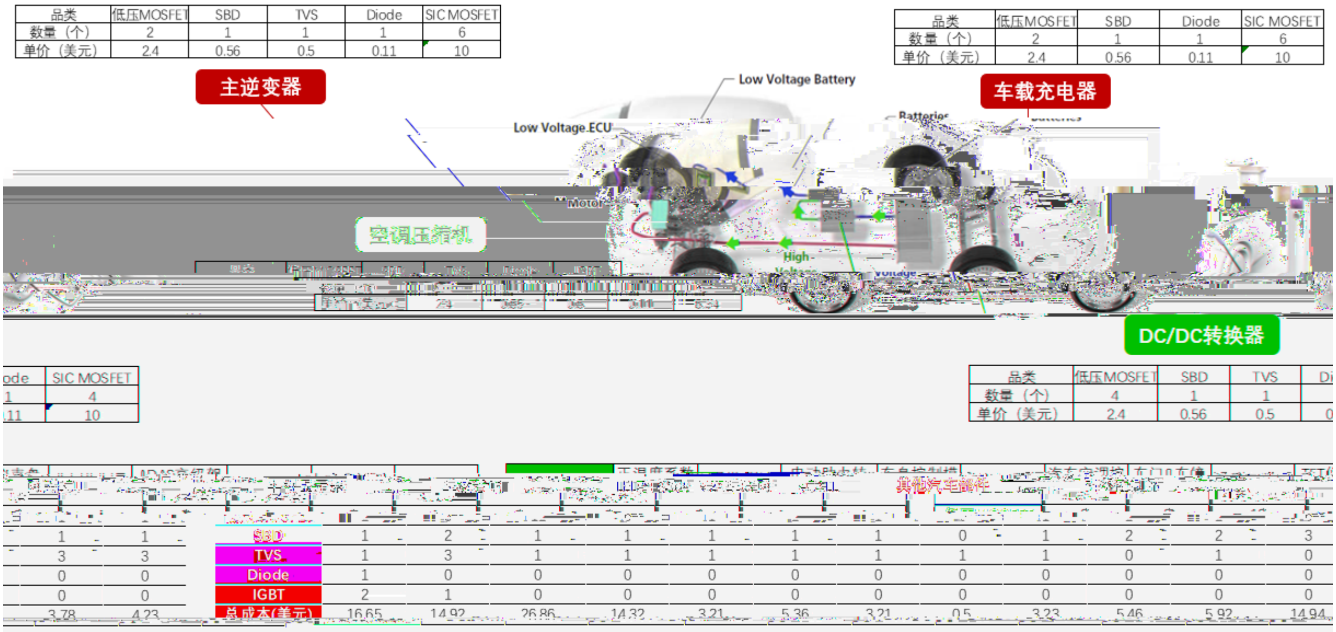
wind

步息



wind





品类	低压MOSFET	SBD	TVS	Diode	SIC MOSFET
数量（个）	2	1	1	1	6
单价（美元）	2.4	0.56	0.5	0.11	10

品类	低压MOSFET	SBD	Diode	SIC MOSFET
数量（个）	2	1	1	6
单价（美元）	2.4	0.56	0.11	10

ode	SIC MOSFET
1	4
.11	10

品类	低压MOSFET	SBD	TVS	Di
数量（个）	4	1	1	
单价（美元）	2.4	0.56	0.5	0

1	1	SBD	1	2	1	1	1	1	1	0	1	2	2	3
3	3	TVS	1	3	1	1	1	1	1	1	1	0	1	0
0	0	Diode	1	0	0	0	0	0	0	0	0	0	0	0
0	0	IGBT	2	1	0	0	0	0	0	0	0	0	0	0
3.78	4.23	总成本(美元)	16.65	14.92	26.86	14.32	3.21	5.36	3.21	0.5	3.23	5.46	5.92	14.94

* SiC MOSFET IGBT

ROHM

5 Strategy Analytics

70 48V/MHEV-

90 HEV/PHEV- / 305 BEV- 350 5

受

数据来源：英飞凌

2019-2025 **70%** 2025 288

/ 2900 500 2025 271 2020 2025 CAGR 13%

- /

2 1/2
3

2021

24

EVTank

25 2021

MOSFET EVTank
2022 500
30% 50% 70% MOSFET 1.13 1.38 1.63
2019 2.7 3.1 3.5

26 MOSFET 券

* EVTank MOSFET EVTank

EVTank

2018 5

GB 17761-2018 2019 4 15

2018 2.5

90%

2.25 50% 2022-2024

4,000 7000 2019

55kg

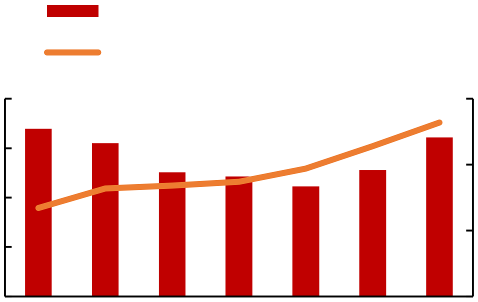
ZDC

2013 6.7% 2019 13.2%

MOSFET MOSFET

27

28 息



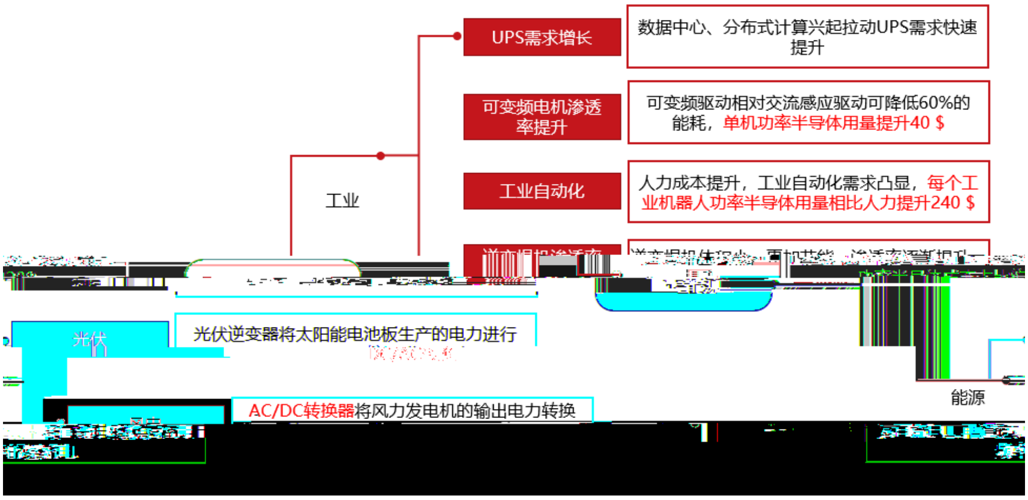
ZDC

➢ /

40

/ 240 / AC/DC DC/AC

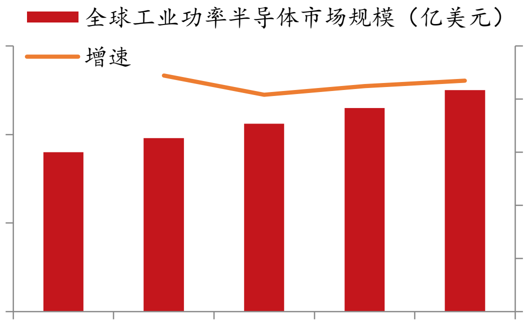
到

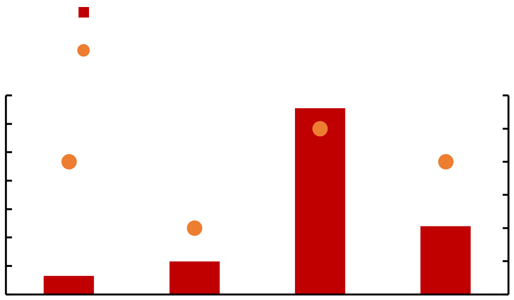


数据来源：

20-22 CAGR 8% 2019 115 2020 125 9% UPS 13 23 131 48 215

3 20-22 CAGR 8%



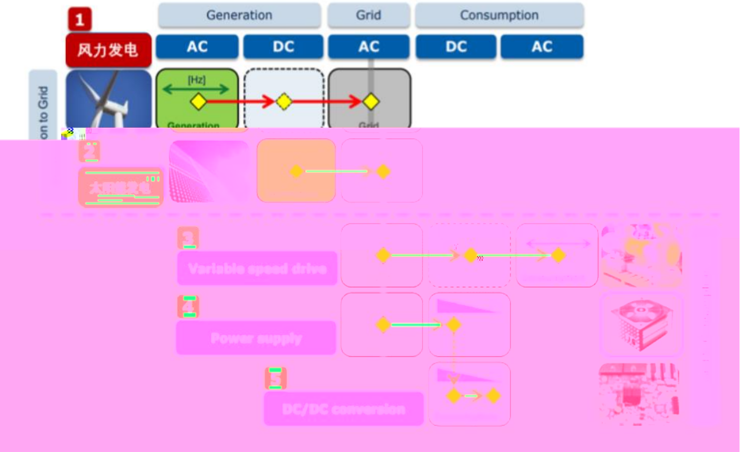


* UPS 20% 20%
26.5% 19%

AC/DC

DC/AC

亿



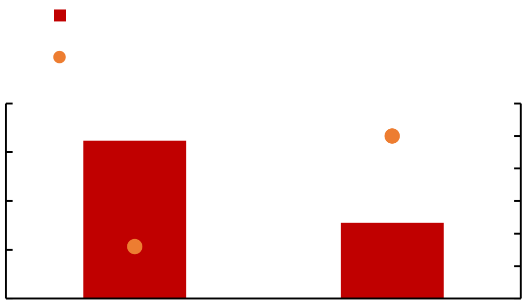
数据来源：英飞凌、

50

2018 36%

2019-2023 124GW 20GW 30 2018 25%

2022 385GW 2022 20 19-22 CAGR 10%



* 0.13 /W 0.2 /W 1 /MW 2.45 /MW

15%-30%

10 20 20%

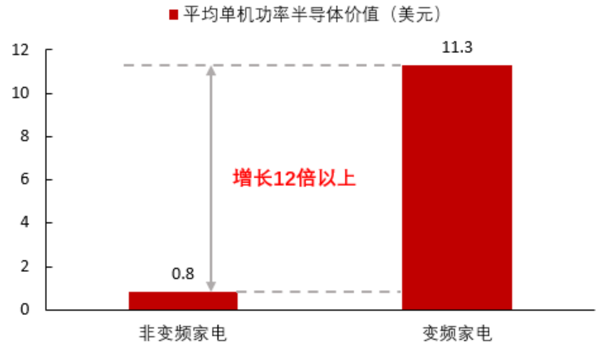
2019 57% 2023 88% IPM MOSFET

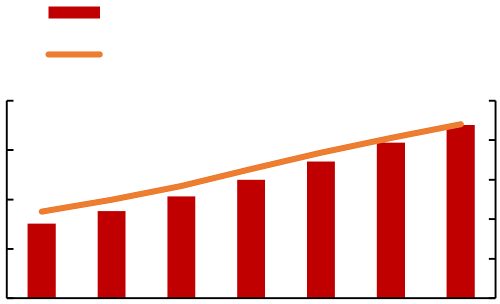
IGBT 12

2019 41 2023 70 4

CAGR 14%

明





2.3 息券

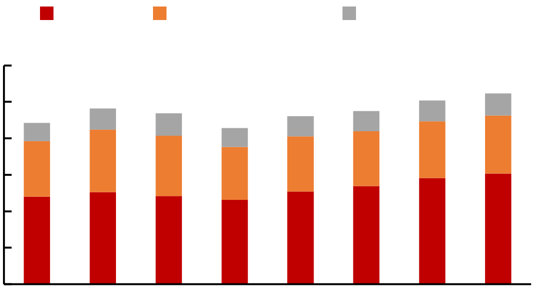
50% Omida 2019

468 36% IHS

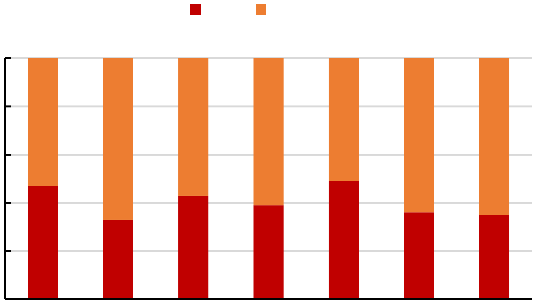
2017 50%

IGBT MOSFET 30%

亿 务 息



Omdia

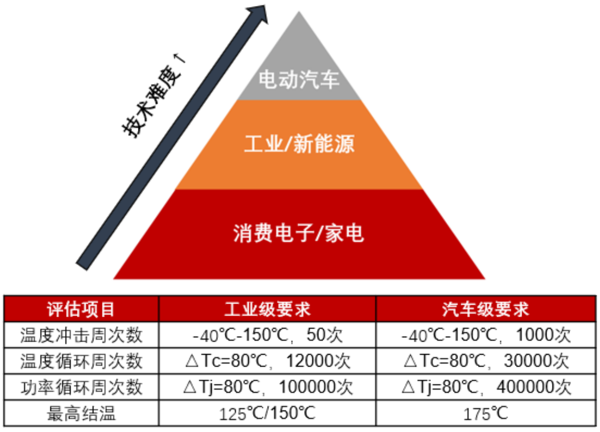


Yole

10

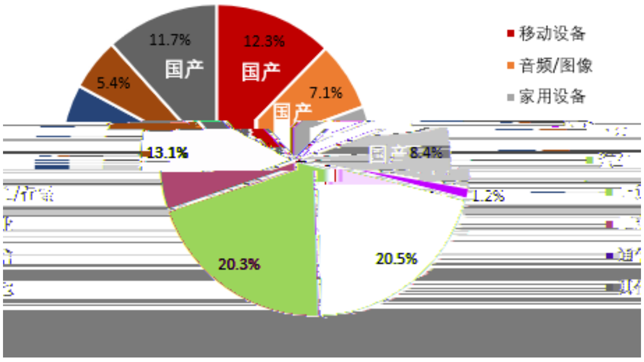
MOSFET 2016

/



评估项目	工业级要求	汽车级要求
温度冲击周次数	-40℃-150℃，50次	-40℃-150℃，1000次
温度循环周次数	△Tc=80℃，12000次	△Tc=80℃，30000次
功率循环周次数	△Tj=80℃，100000次	△Tj=80℃，400000次
最高结温	125℃/150℃	175℃

务息



3.

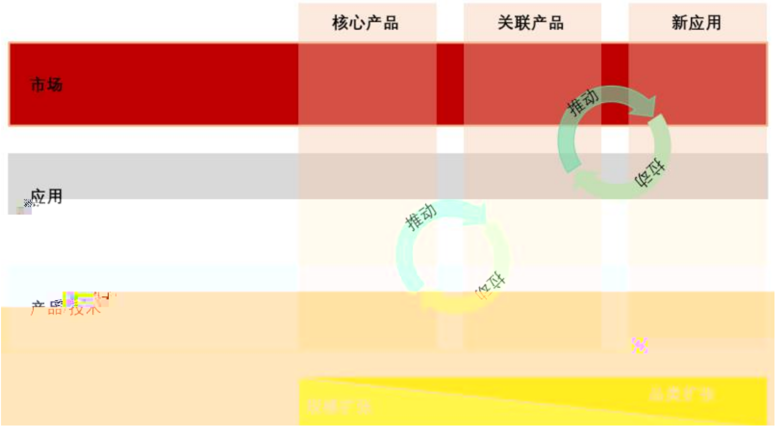
3.1 方旧

MOSFET IGBT SJNFET /

MOSFET -100V 1500V MOSFET MOSFET MOS VDMOS MOS MOSFET

IGBT 20 80 IGBT 6 PT FS-Trench 600V 6500V IGBT IGBT

IC MOSFET IGBT
8 Trench
FRD
IC BCD
IC IC IC
IC LED IC IC



1 2

3

➢

MOS MOS MOS

2.2 5000 OBC/

亿

/ IGBT IGBT 2020

50% 6000 IGBT

2020 7 4 1200V

650V SiC 6 SiC

➢

GaN **IC** 2.44

650V

650V MOCVD

GaN IP

GaN GaN

IC IC

整 毛

56.2%
2019 IPM
500V 5A IPM 600V 15A

IPM

7 10 PT6007B PT6010

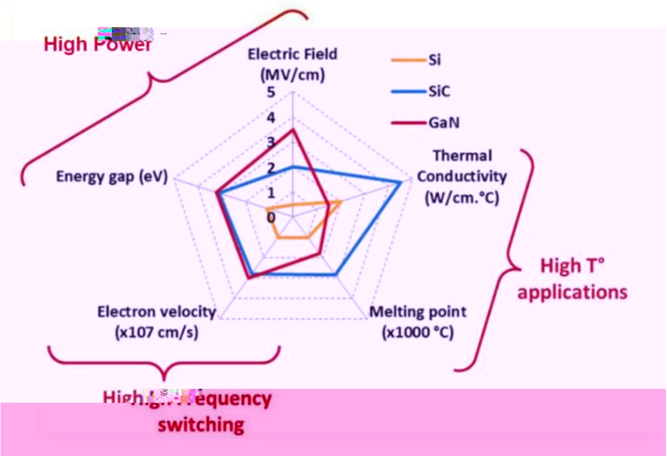
3.3

BCD MEMS

技术	BCD	HV CMOS	Mixed-Signal	Logic/RF	e-NVM
0.13um/0.11um	○			●	○
0.18um/0.153um	●	●	●	●	●
0.25um			●		
0.35pm			●		
0.5um	●	●	●	●	●
>0.5um	●	●	●	●	
>1.0um		●	●	●	
MEMS	压力传感器。有 MIGrophone 传感器和 Photoele MEMS。 陀螺仪和加速度计正在开发中。				
Power Discrete	包括平面 DMOS、Trench DMOS、IGBT、FRD、双极晶体管。IGBT 3300V 6500V 正在开发中。				

●表示可获得 ○表示开发中

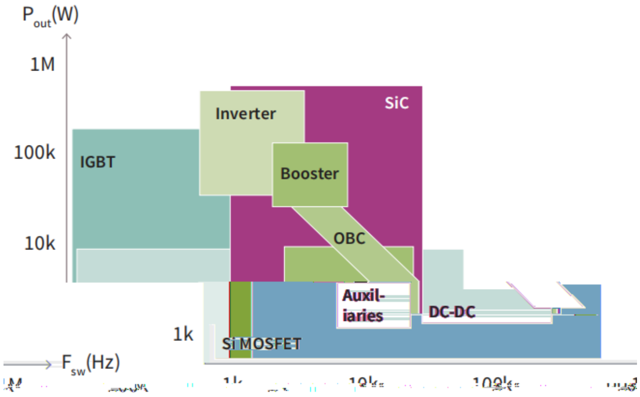
务发 华 优

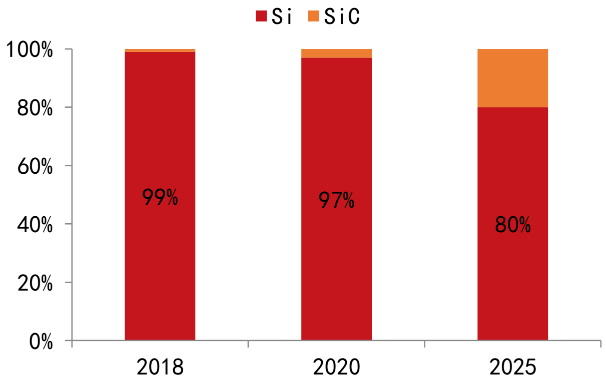


数据来源：

SiC **Si** SiC
DC/AC DC/DC OBC DC/AC
SiC Si
SiC 6kg 43%
75% SiC 3% 2025
20% 6

亿 亿

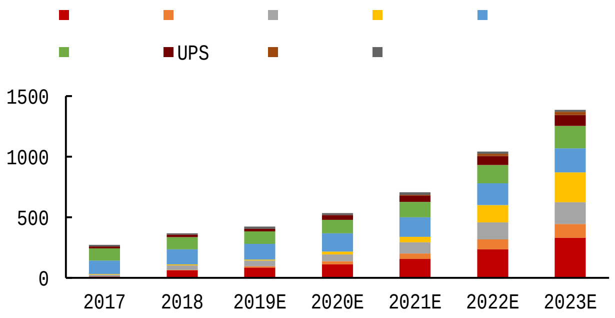




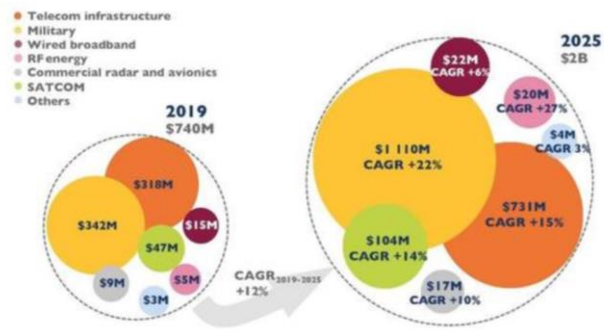
GaN
GaN IC
SiC **GaN** Yole
SiC 2018 3.7 2023 14 CAGR

30% GaN 2019 7.4 2025 20 CAGR

12%



Yole



Yole

SiC GaN SiC GaN 1.42 2.44 6 650V 1200V SiC JBS SiC JBS MOSFET GaN 650V MOCVD SiC GaN

亿 旧

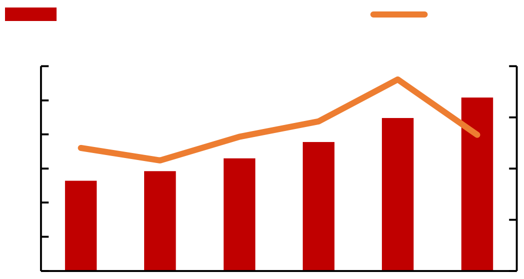
4.2 情

Yole 2019 MEMS 165 10%

2019 90 50%

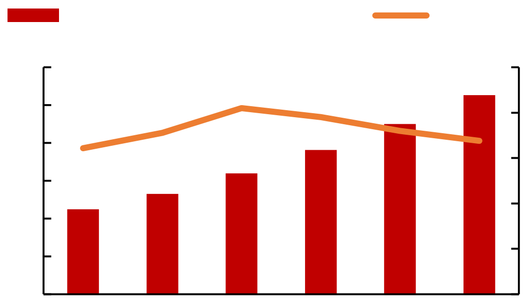
MEMS 40%

情 券



Yole

情



MEMS

MEMS 8

6

MEMS 6 8

2019

万 情 普

4.3 积

62

PEP INNOVATION

5.5

万 情 普

2020H1 1.27 35%

50

38 42

5G

AIOT

2020-2022

1)

2) 5G

20-22

22.7% 23.3% 23.7%

20-22 35.1% 35.7%

35.8%

20-22 28.3% 29.4% 30.2%

3) 20-22 1.64% 1.63% 1.58%

5.34% 5.3% 5.2% 20-22

7.36% 7.31% 7.26%.

4) 20-22 3%

信 ！

	2018A	2019A	2020E	2021E	2022E
	6,270.8	5,742.8	6,887.9	7,935.6	8,892.8

2020-2022 0.83 1.07 1.25

IDM MOSFET IGBT

\+ IGBT IDM MOSFET

2021 72 PE 77

步 保

1

MOSFET MOSFET IGBT

2

3

4

10%

步

:	2018A	2019A	2020E	2021E	2022E
	1,538	1,931	8,353	9,295	10,022

:	2018A	2019A	2020E	2021E	2022E
	6,271	**5,743**	**6,888**	**7,936**	**8,893**

方

12 /

15%

5% 15%

-5% +5%

-5%

5%

-5% +5%

-5%

方

因

因