

36.07

|       |             |
|-------|-------------|
| ( )   | 12.16       |
| A ( ) | 2.37        |
| ( )   | 438.58      |
| ( )   | 50.99/35.66 |
| 300   | 3625        |
|       | 2722        |

SAC S1130520010001  
zhengbiyu gjzq.com.cn

SAC S1130519100004  
zhang\_chun gjzq.com.cn

SAC



|    |           |      |        |            |    |
|----|-----------|------|--------|------------|----|
| 18 | 2016-2021 |      |        |            | 12 |
| 19 |           |      |        |            | 12 |
| 20 |           |      |        |            | 13 |
| 21 |           |      |        |            | 13 |
| 22 | MOSFET    | IGBT | BJT    |            | 13 |
| 23 |           |      |        |            | 13 |
| 24 |           |      |        |            | 14 |
| 25 |           | GaN  | SiC    |            | 15 |
| 26 |           |      |        |            | 15 |
| 27 |           |      |        |            | 16 |
| 28 | 2018      |      | IGBTs  |            | 16 |
| 29 | 2018      |      | MOSFET |            | 16 |
| 30 |           |      |        |            | 17 |
| 31 |           |      |        | 2020 2 18  | 18 |
| 32 |           |      |        |            | 18 |
| 33 |           |      |        |            | 19 |
| 34 |           |      |        |            | 19 |
| 35 |           |      |        |            | 19 |
| 36 |           |      | IC     |            | 20 |
| 37 |           |      |        |            | 20 |
| 38 |           |      |        |            | 21 |
| 39 |           |      |        |            | 21 |
| 40 | 2018      |      |        |            | 22 |
| 41 | 2018      |      |        |            | 22 |
| 42 |           |      |        |            | 22 |
| 43 |           |      |        |            | 24 |
| 44 |           |      |        |            | 25 |
| 45 |           |      |        |            | 25 |
| 46 |           |      |        | 2020.03.23 | 25 |
| 47 |           |      |        |            | 26 |



FRD  
 MOSFET  
 MOSFET  
 MOS  
 MOS

MOSFET  
 -100V  
 1500V  
 MOSFET  
 VDMOS

**3 MOSFET**

|  |                                 |            |                               |   |
|--|---------------------------------|------------|-------------------------------|---|
|  | 30V-900V                        | 40V-900V   | -60V-150V                     | -100V-1500V                                 |
|  | MOS<br>MOS<br>MOS<br>MOS<br>MOS | MOS<br>MOS | MOS<br>MOS<br>MOS<br>P<br>MOS | MOS<br>MOS<br>MOS<br>MOS<br>P<br>MOS<br>MOS |

MOSFET

MOS

VDMOS

Salcomp

MOS

MOS

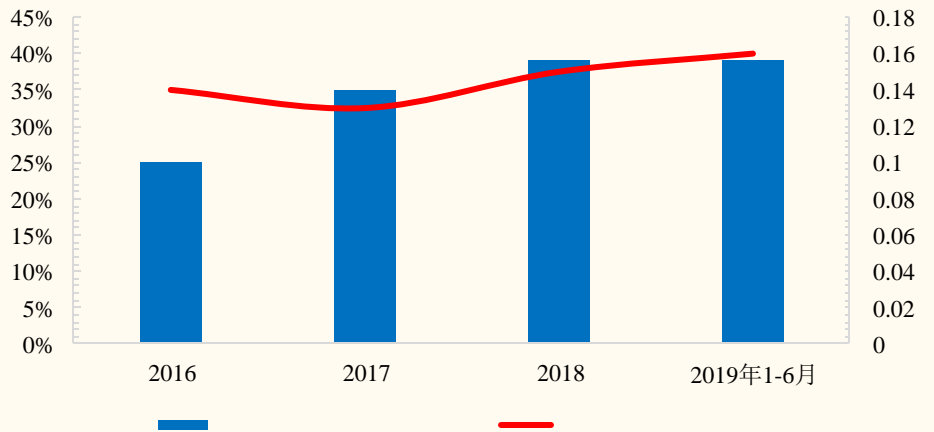


IGBT

600V-6500V IGBT  
600V-1200V

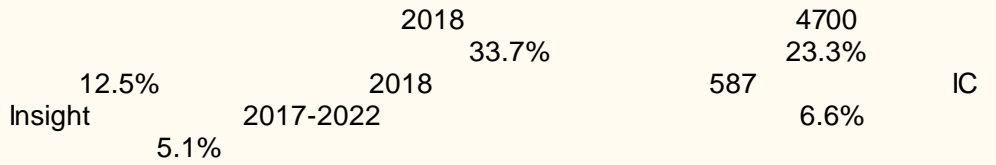
Trench-FS  
IGBT

5

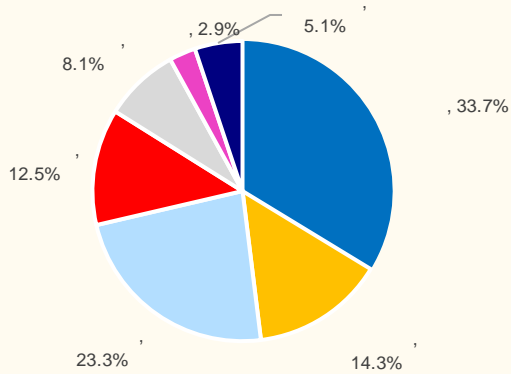


3.

IC



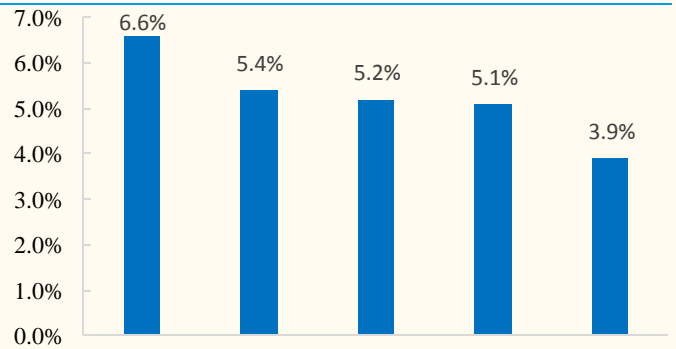
6 2018



WSTS

7

2017-2022E



IC Insight

68 /

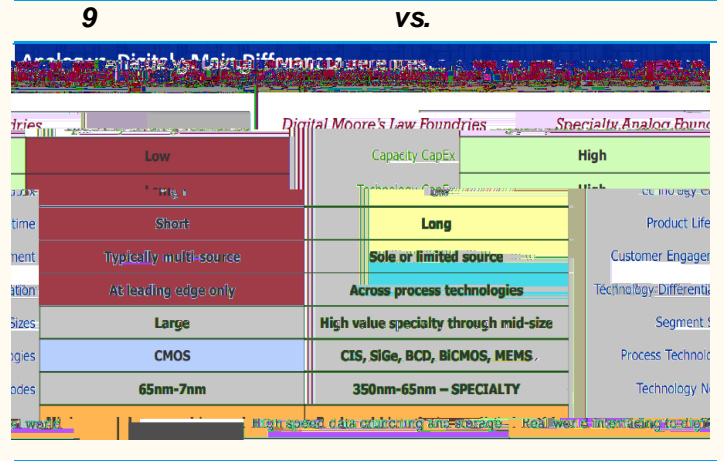
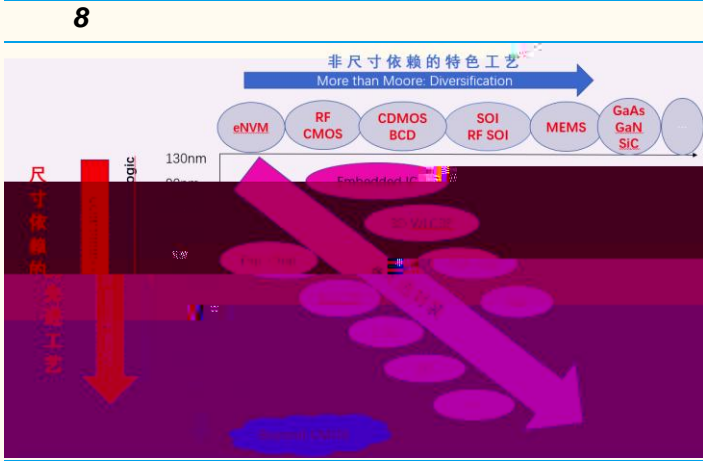
120 /

MEMS SOI BCD/CDMOS MEMS

130nm 5nm ; 3nm EUV IC RF-COMS SOI/RF-

2018

238  
119  
400 / 2019  
90%  
58  
35%  
37 / 68  
8  
50%  
1450 / 75  
38 / 120  
77 ASP



8  
8  
12  
RF-COMS SOI/RF-SOI BCD/CDMOS  
8  
Hynix  
8  
8  
IC IC MOSFET MCU IGBT MOSFET CIS  
2019 8 92.5%  
8  
MOSFET

10 MOSFET

| 技术        | 制造商                          | 目前货期  | 货期趋势 | 目前价格        |
|-----------|------------------------------|-------|------|-------------|
| 低压 Mosfet | Infineon                     | 15-30 | 延长   | 稳定          |
|           | Diodes Inc.                  | 21-25 | 延长   | 稳定          |
|           | ON Semiconductor (Fairchild) | 15-24 | 延长   | 稳定          |
|           | ON Semiconductor             | 13-20 | 延长   | 稳定          |
|           | Nexperia                     | 12-20 | 延长   | 稳定          |
|           | STMicroelectronics           | 17-30 | 延长   | 稳定          |
| 高压 Mosfet | Vishay                       | 17-22 | 延长   | 稳定          |
|           | Infineon                     | 21-26 | 延长   | 稳定          |
|           | ON Semiconductor (Fairchild) | 15-22 | 延长   | 依据市场进行选择性调整 |
|           | KYX                          | 22-30 | 延长   | 稳定          |
|           | STMicroelectronics           | 19-24 | 延长   | 依据市场进行选择性调整 |
|           | ROHM                         | 18-22 | 延长   | 稳定          |
|           | MICROSEM                     | 25-30 | 延长   | 稳定          |
|           | Vishay                       | 15-17 | 延长   | 依据市场进行选择性调整 |

4.

2016 2018  
44,976 34,559 44,742  
7.86% 7.61% 7.17%

2019 6 30

7937

641  
37%

2290

11

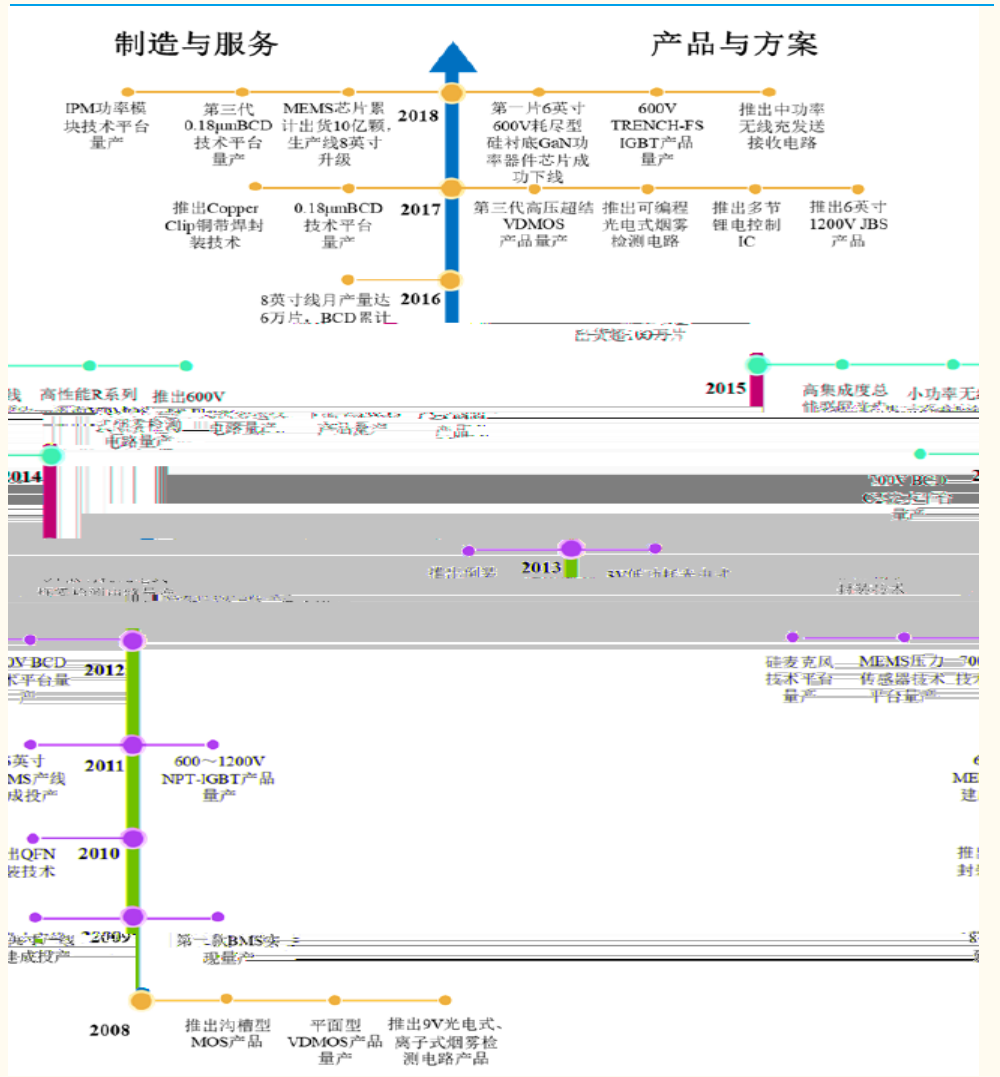
|  |  |  |  |
|--|--|--|--|
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

EDA

MOSFET IGBT

BCD MEMS BMS GaN

12 2008

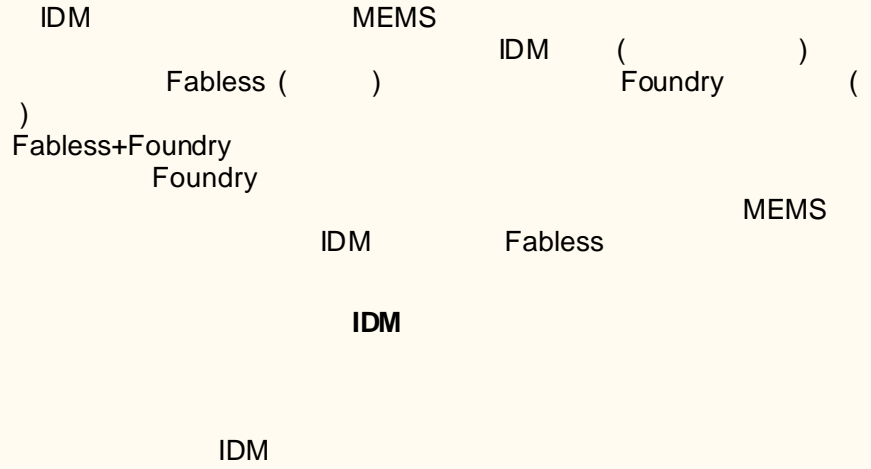


MOSFET IGBT FRD SBD MEMS  
BCD

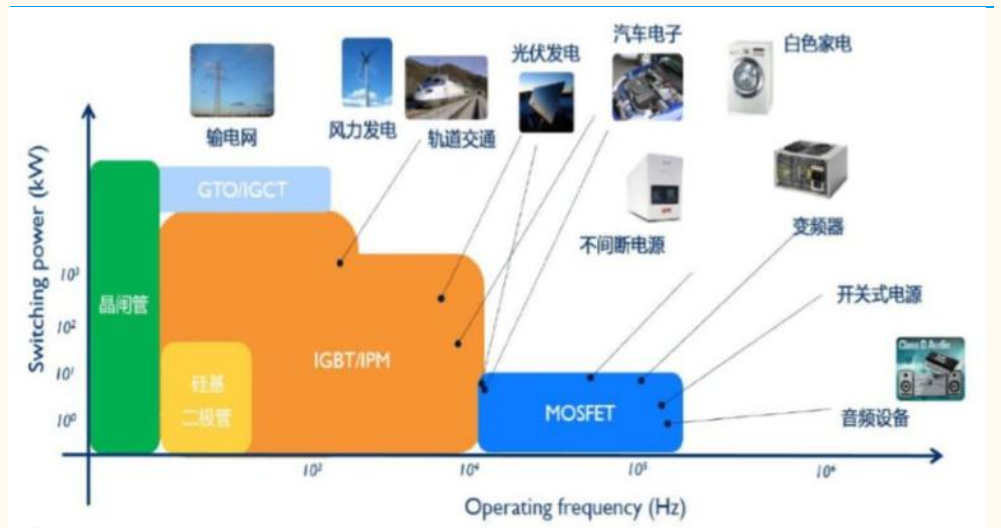
13

|      |                 |            |         |              |     |                   |
|------|-----------------|------------|---------|--------------|-----|-------------------|
| BCD  | 1<br>2<br>3     | 1.0-0.18μm | 5V 700V | 200 600V SOI | BCD | BCD<br>SOI<br>BCD |
| MEMS | 1<br>2<br>3     | MEMS       |         | MEMS         |     | MEMS              |
|      | 220 TO-3P TO247 | IPM        | IPM     | PDFN PQFN    | TO- | MOSFET IPM        |

1. IDM

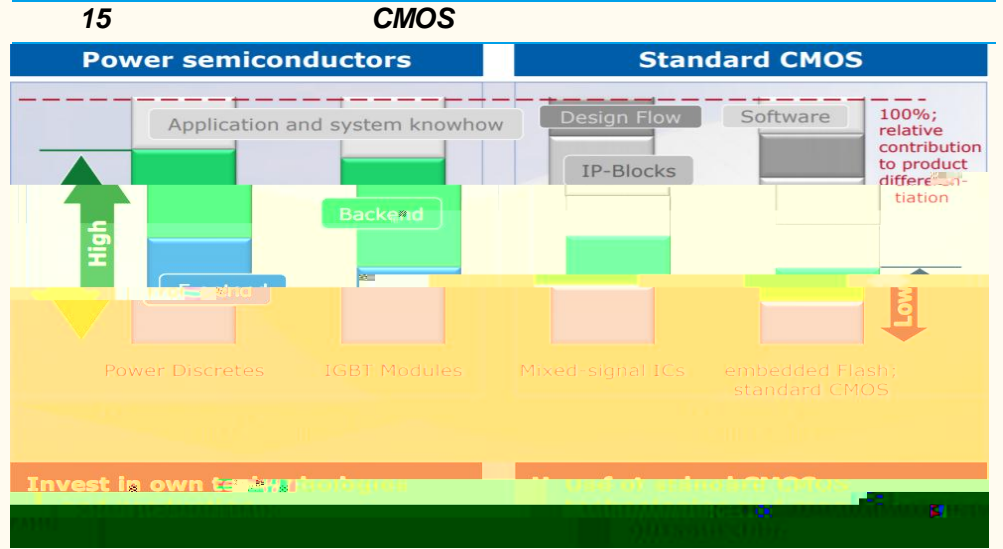


14



Yole

IP



IDM

IP  
MOSFET  
700V BCD G2  
IPM

Fabless

IDM  
VDMOS  
600V TRENCH FS IGBT

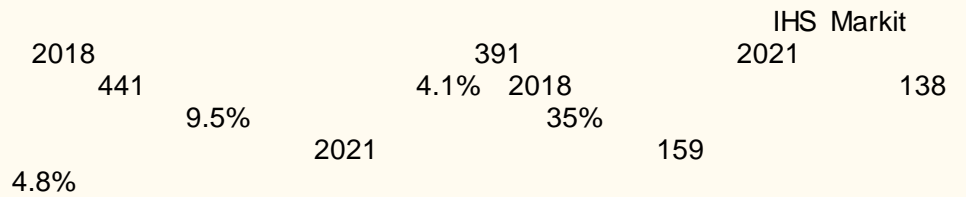
2008  
NPT-IGBT  
VDMOS  
600V TRENCH FS IGBT

700V BCD  
1200V JBS

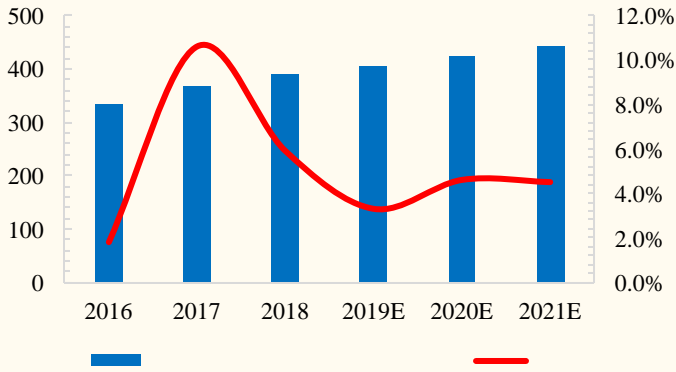
16

|  |             |               |
|--|-------------|---------------|
|  |             |               |
|  |             | IDM           |
|  |             | IDM           |
|  | IC          | IC<br>IDM     |
|  | MOSFET      | IGBT<br>IDM   |
|  |             | IDM           |
|  | (NXP)       | MOSFET<br>IDM |
|  | MOSFET IGBT | IC SiC<br>IDM |

2.

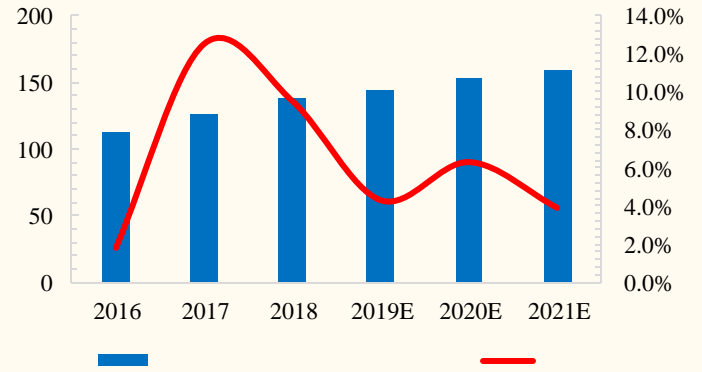


17 2016-2021



IHS Markit

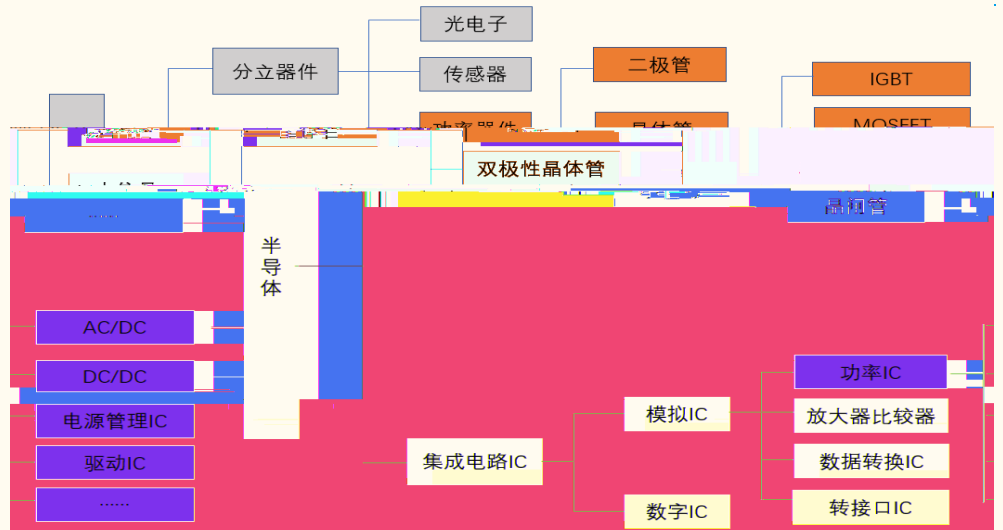
18 2016-2021



IHS Markit

IC  
IGBT/MOSFET/BJT  
Yole Development 2018  
/ / IC 32.7% 13.3% 54.0%

19



|        | MOSFET | IGBT | SIC |     |
|--------|--------|------|-----|-----|
|        |        |      |     | 23% |
|        | 20%    |      | 20% | 15% |
| MOSFET |        | IGBT |     |     |
| MOSFET |        |      | 41% | 23% |
| IGBT   | 7%     |      | 21% |     |

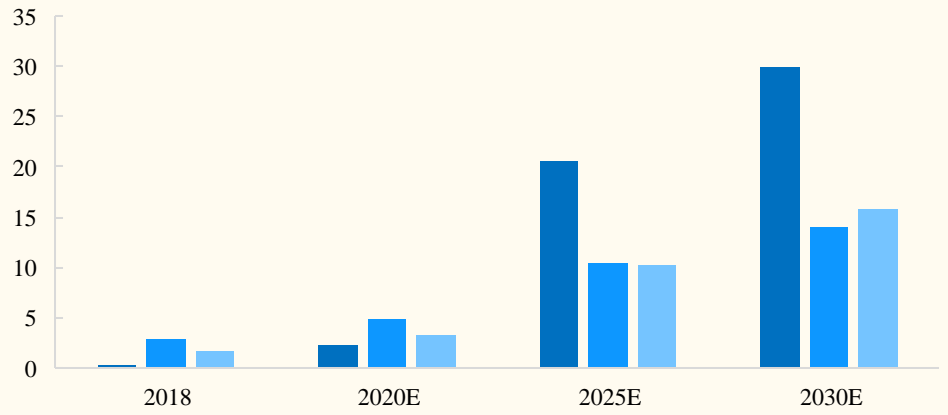
20

21

1050

1020

24



Infineon

|      |          |        |      |      |
|------|----------|--------|------|------|
| 300  | Infineon | 100 kW | 2030 | 200- |
| 2000 | 2019     | IEA    | 1900 | 47.5 |

CAGR 5.9%  
CAGR 8.8%  
30

IGBT  
2015-2025  
15-25 CAGR 16.4%  
1MW

IGBT

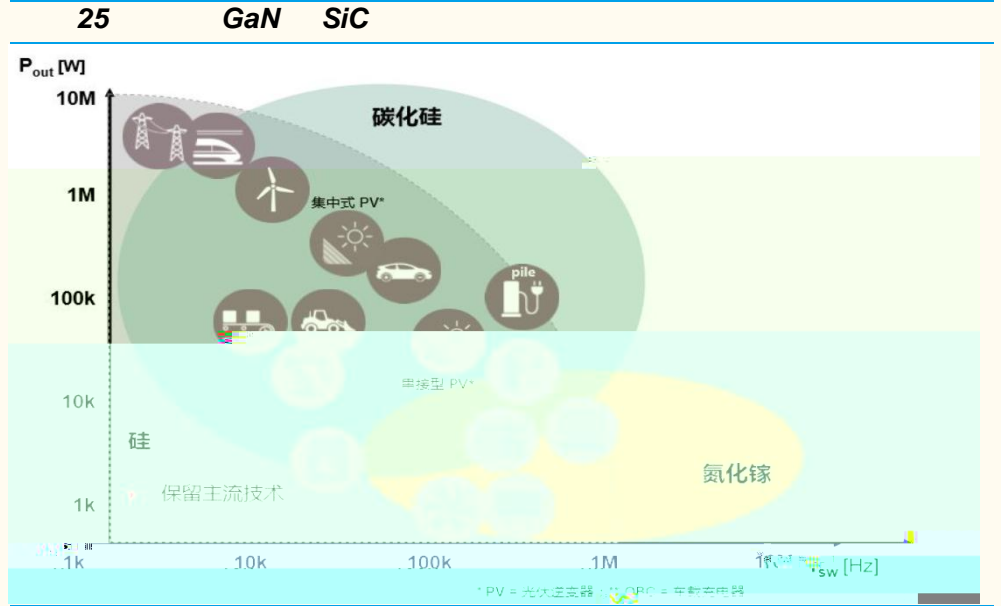
SiC GaN

SiC GaN  
(>600V)

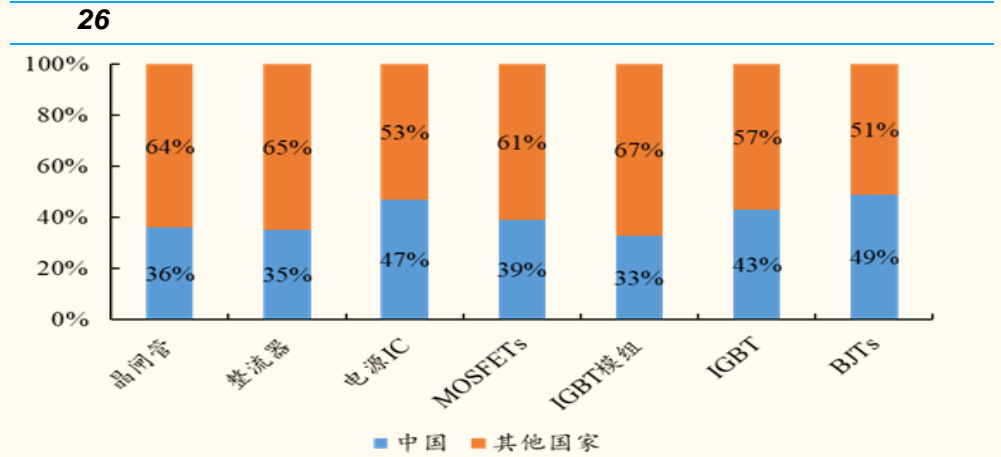
SiC GaN

GaN

SiC

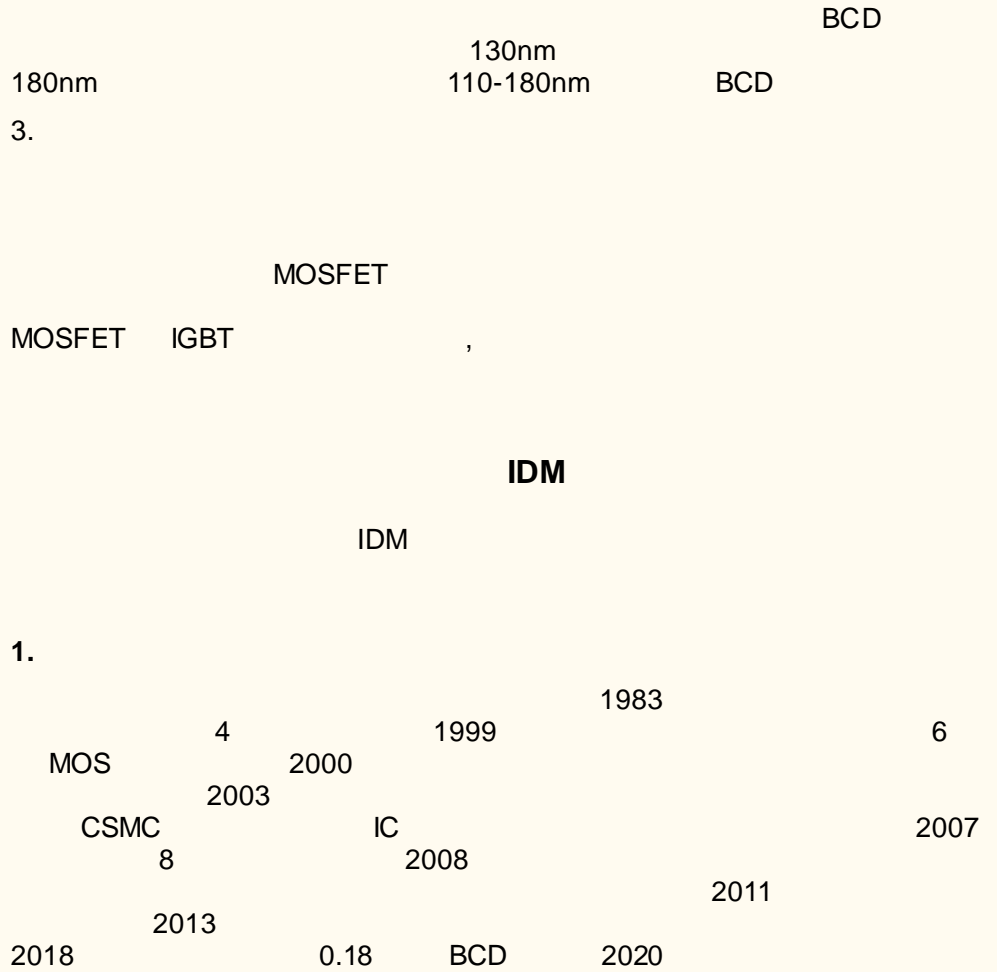


|     |           |      |      |            |         |
|-----|-----------|------|------|------------|---------|
| SiC | GaN       | IGBT | 100  | SiC        | GaN     |
| 7   |           | IHS  | 2018 | SiC        | GaN     |
|     |           |      | 2025 | 100        |         |
| 3.  |           |      |      | IHS Markit | 2018    |
|     |           |      | 35%  | 39% IGBT   | 43% BJT |
| 49% | MOSFET IC | 47%  |      | IGBT       |         |
|     | 40%       |      |      |            |         |

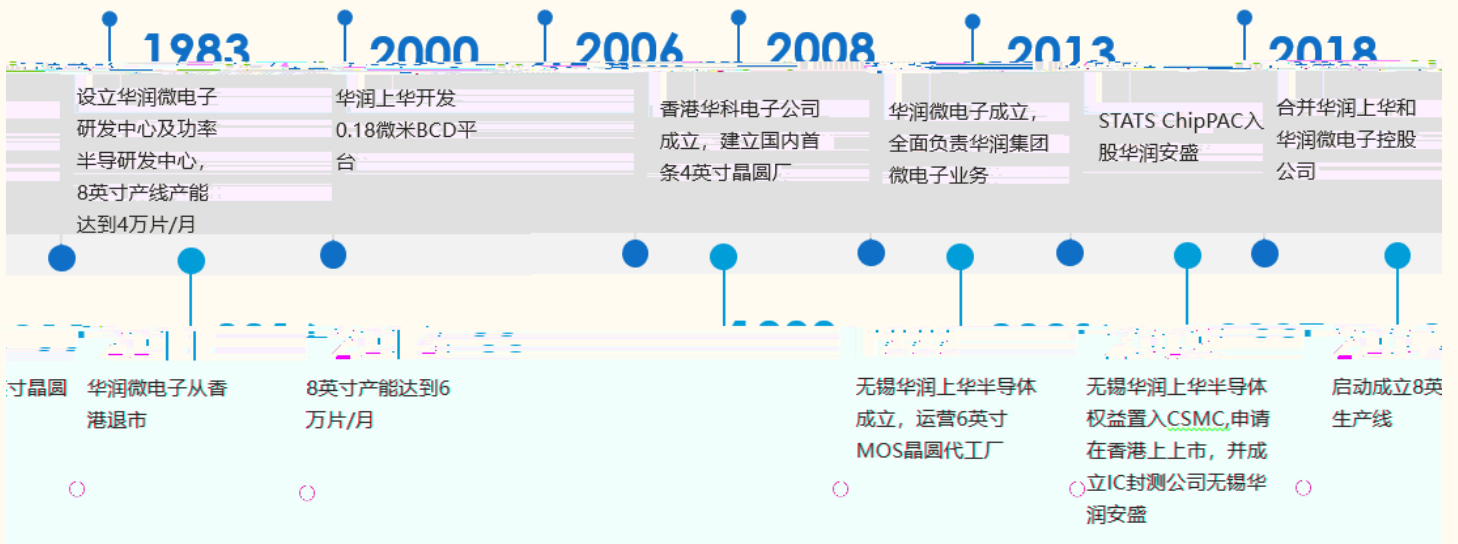


|  |       |       |
|--|-------|-------|
|  |       | 19%   |
|  | 58.9% | 10.0% |
|  |       | 7.0%  |





30



A 100% 16 7 100%

20 3





LED AC-DC LED IC BMS IC  
 LED LED IC  
 IC IC IC  
 WPC QI IC IC BCD  
 CMOS IC

| 36     |         | IC    |          |
|--------|---------|-------|----------|
| AC-DC  |         | AC-DC |          |
| LED IC |         | LED   |          |
| BMS IC |         |       |          |
| IC     | 78 1117 |       | 100mA-1A |
| IC     | 100W    |       |          |
| IC     |         |       |          |
| IC     |         | AB D  | 5mW-50W  |

MEMS MEMS

| 37   |  |  |  |
|------|--|--|--|
| MEMS |  |  |  |
|      |  |  |  |
|      |  |  |  |

4 8 16 32 CPU MCU MCU MCU

| 38  |     |     |    |       |
|-----|-----|-----|----|-------|
| MCU |     | MCU | PC | MCU   |
| MCU |     | MCU |    | MCU   |
| MCU | CPU |     | 8  | 16 32 |

2)

0.1-1  
 IGBT MEMS CMOS GaN SiC CMOS Bipolar BiCMOS SOI BCD  
 IC 60 BCD 1 8 MEMS  
 2.4 62 27% 2018

39

|   |   |        |     |      |      |                | 2018 |
|---|---|--------|-----|------|------|----------------|------|
| 3 | 6 | Analog | BCD | MEMS | DMOS | Power Discrete | 247  |
| 1 | 8 | Analog | BCD | MEMS | DMOS |                | 73   |
| 8 |   |        | MOS |      | MOS  | MOS SBD        | 60   |
|   |   |        |     |      |      |                | 199  |

MPS International

2018

Diodes Incorporated

Diodes  
CIRRUS Logic

1984

BOSE

| 40 2018 |        |        | 41 2018 |  |  |
|---------|--------|--------|---------|--|--|
|         | 12,112 | 4.51%  |         |  |  |
|         | 8,940  | 3.33%  |         |  |  |
|         | 8,649  | 3.22%  |         |  |  |
|         | 7,987  | 2.98%  |         |  |  |
|         | 7,638  | 2.85%  |         |  |  |
|         | 45,326 | 16.89% |         |  |  |

42

|  |  |  |  |  |     |
|--|--|--|--|--|-----|
|  |  |  |  |  |     |
|  |  |  |  |  | TCL |
|  |  |  |  |  |     |
|  |  |  |  |  | TTi |
|  |  |  |  |  |     |

1.

2016 2017 2018 2019H1  
0.13 / 0.15 / 0.16 /

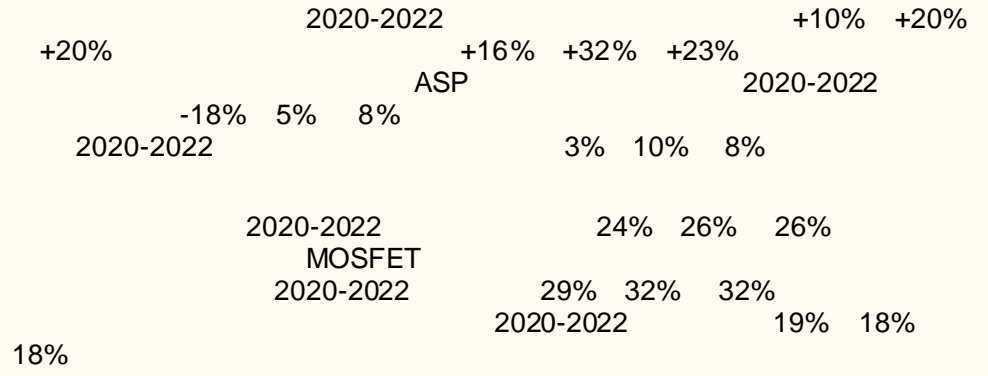
0.14 /

2022 +5% +10% +5%

2020-

2020-2022

2020-2022



43

2019

2020E







---

|             |             |             |             |             |
|-------------|-------------|-------------|-------------|-------------|
| 0           | 0           | 0           | 0           | 0           |
| 0           | 0           | 0           | 0           | 0           |
| 0           | 0           | 0           | 0           | 0           |
| 0           | 0           | 0           | 0           | 0           |
| <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> | <b>0.00</b> |

---

|           |           |  |           |   |
|-----------|-----------|--|-----------|---|
|           |           |  | 1         |   |
|           | 2         |  | 3         | 4 |
| 1.00 =    | 1.01~2.0= |  | 2.01~3.0= |   |
| 3.01~4.0= |           |  |           |   |

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7GH