2020 02 27

˧ Ɏ ʒ Ï ƙ ʒ

N ˨ (688396)

⁄ ɋ Ï Ɏ φ ┼

⁄ ɋ Ï ᴮ ˝ ˊ A E ˨ Ʌ 2003 1 ɷ Ï ț ɷ ҿ 8.79 ˛ Ï ț u ˝ ˊ ҿ 12.16 ˛ ŕ F u ┼ Єr ˨ Ï ɋ Ă ╥ ʓ ҝ ҿ CRH ŕ Micro ЄÏ ˨ 100% ɷ Ï ˡ ┼ ҿ X ˨ r ╥ ˝ ˊ 8 2 ɻ 6 3 ɻ 2 ɻ ɻ ˝ ˊ 3 Ï ҿ ˋY Ɏ φ ƙ ƙ Ï ┼ ˋY r ˝ ˊ ǚ IDM Ï ɶ ƙ Ï I ҿ ˡ Ɏ φ ˝ ț ғ ┼ ǚ U Ï IDM U ˋY ᴮ Ï ⌐ Ʌ ǚ Ï ┼

ˋY MOSFET ˨ Ï ₆ ш

ŕ Ï ₆ ш E ה ˋH Ꞁ Ï MOSFET IGBT ॥ ₆ ҿ I Ï ה 2019 ˜ ॥ ₴ Ï 35% X Ï ҿ ˡ r ˡ Ɏ φ ɟ ƙ Ï ǚ Ʌ Ï æ ҿ ˋY ˨ ₆ ш Ï ˡ ˨ ț r IHS Markit Ï ॥ Ï ˝ ˊ X MOSFET X o ₽ Ï : Ʌ ғ ǚ ƙ Ï X MOSFET ˨ r

IGBT ʒ Ï ᴮ ш

˝ ˊ IGBT ┼ Ⱨ ˡ I ˛ Ï ʒ ⌐ Ⱨ 600V-6500V γ ˜ IGBT Ï ǚ Ï ╥ X ˡ Ꞁ ᴮ ш r ˝ ˊ IGBT ɻ ƙ ┼ ǚ ˡ Ï n ǚ Ʌ ш˝ Ï ˡ ɻ r

SiC ғ GaN ╥ ˜ Ï ˝ ț 1 r Ώ ᴮ ш

SiC ˜ ॥ ┼ ɻ ⱶ MOSFET ɻ IGBT ɻ SBD Ï Ʌ ɻ ƙ r Yole Ï 2017-2023 SiC ˡ Ѽ U ҿ 31% Ï └ 2023 15 ˛ Ѽ Ï ˜ U ˉ ɻ Ѽ ɻ ˉ ɻ Ώ ɻ r ה Ï ғ SiC F n GaN ҿ r Yole ₴ Ï 2022 GaN ҿ 4.5 ˛ Ѽ r ˝ ˊ ˉ Ɛ ⁄ ɋ φ ɋ ᴰ Ï ₽ ш U Ɏ φ Ï ˝ ˊ Ʌ ॥ ғ Ï ₽ ш Ɏ φ Ï ╥ Y GaN ˡ ɻ ˇ

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52 ⁒... ᴍ / ᵤ ᴍ E
ẅ (.)
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(ƅ) 237.14

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ɟ E
E wanghw1@hx168.com.cn
SAC NO E S1120519090003

ӥ ɥ˛ ɋ

ĩ

ɽ SiC ˈ ڷ ƚ ɼ n ˝ ˊ ῷ ɘ ⌐ IDM
ᴮ ש م سˈ ڷ ƚ ⁄ا 650V GaN ڸ
ƚ ɽ SiC JBS ڷ ƚ م SiC MOSFET ¸ ۯ م
ἴ ɟ ɼ

æ 2019~2021 ˝ ˊ ɘ | ҿ 57.45¸ ῷ ɽ 69.60¸
ῷ ɽ 83.52¸ ῷ Ï n -8.39% ɽ 21.15% ɽ 20%Ж
ɲ ˝ ˊ ĸ ‰⌐ 4.01¸ ῷ ɽ 6.35¸ ῷ ɽ 8.16¸ ῷ ɼ ᵆ ẅ
Ï æ ئ `Yˈ ⅟ φ ᶰ ڈ Ï 2021 ش PE ҿ
40 Ṗ ŕ ▀ ἴ 100 Ṗ ᴵᴵ ᶈ ᵆ ẅ ЄÏ ɲ ˝ ˊ س MOSFET
Ὠ غ ᵣ ῦ Ï æ Ǥˈ ᵆ ẅ ᴍ Ï
Ṋ ӵ ῇ ṇ ɼ

س ғ Q ἶ Ж ⅟ φ ƙ س٪.. Ж
ғ ئ ᶰ ڈ س ɼ

⌐ ғ ᵆ Ẅ

ˆ	2017A	2018A	2019E	2020E	2021E
ƙ ῆ(ҍῷ)	5875.59	6270.80	5745.00	6960.00	8352.00
YoY	33.63%	6.73%	-8.38%	21.15%	20.00%
‰⌐ (ҍῷ)	70.28	429.44	400.75	651.91	833.59
YoY	123.22%	511.02%	-6.68%	62.67%	27.87%
⌐	17.62%	25.20%	23.50%	27.00%	28.00%
ѓῷЄ	0.06	0.37	0.34	0.56	0.71
ROE	1.83%	10.35%	4.38%	6.65%	7.84%
	0.00	0.00	0.00	0.00	0.00

Ε Wind Ï ⅟ ‖

1. [illegible] IDM [illegible]

1.1. [illegible]

[illegible] 2003 [illegible] 1 [illegible] 8.79 [illegible] 12.16 [illegible] CRH [illegible] Micro [illegible] 100% [illegible]

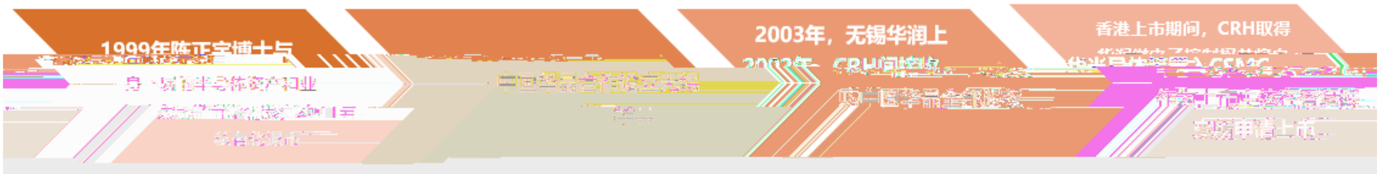
（1）[illegible]

（2）[illegible]

（3）[illegible] 1.00 [illegible]

（4）[illegible] IPO [illegible]

[illegible] 1 [illegible]

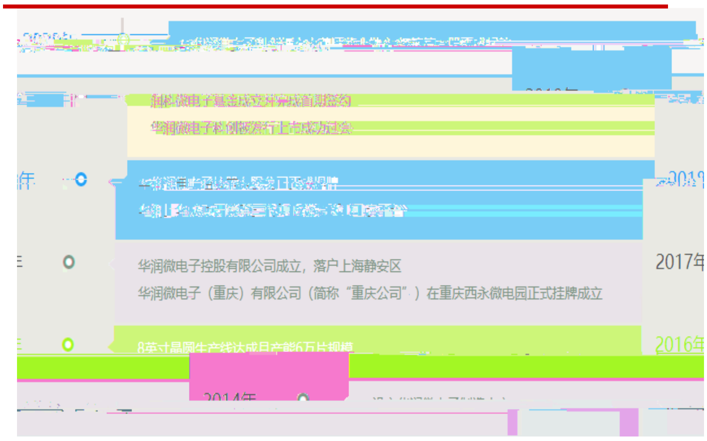


[illegible]

[illegible] 2 2004~2013 [illegible]

[illegible]

[illegible] 3 2014~2020 [illegible]



[illegible]

2 ۂ `Y' ⅂ φ 2018 ۃ o

o ں ƙ		2018 ۃ Ѓ ۏ Є
1	⅂	21.7
2		18.5
3	⅂	17.1
4	ۓ	8.1
5	æ	7.7
6		7.2
7	⅂ φ	6.9
8	ķ	6
9		5.4
10	. ˇ κ	4.9

E ö Ï ⅂ ‖

[redacted]

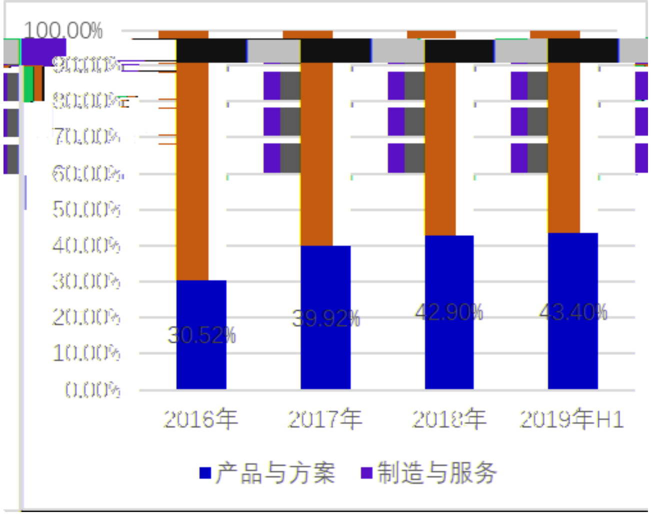
4

MOSFET	MOS MOS MOS MOS -100V-1500V	
IGBT	600V-1200V	
SBD	SBD SBD 45V-150V 200mA-	
FRD	200V-6500V	

5 IC IC

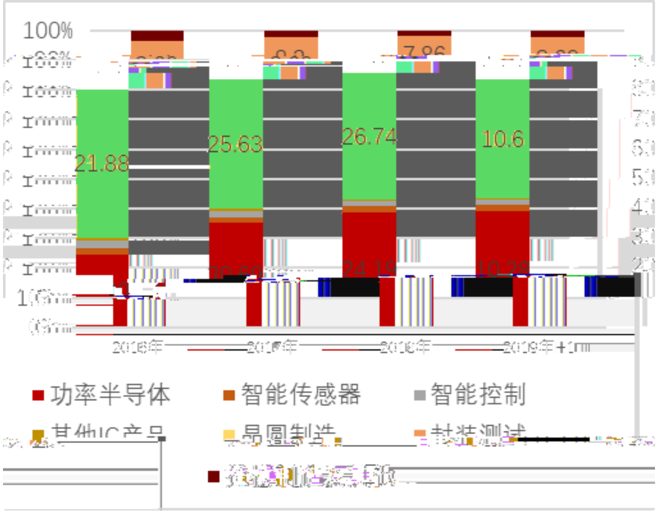
AC-DC	AC-DC	
LED IC	LED	
BMS IEMC/31D7		

بم 6 2016~2019H1 ɷ ꝁ˭ Ꞥ Ӷ%Є



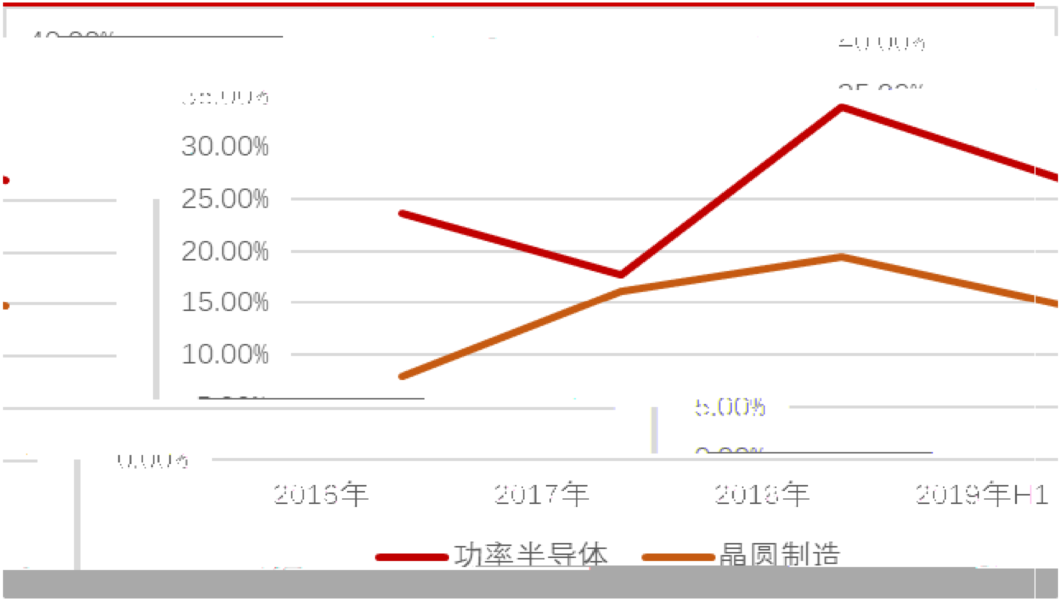
Є Wind Ї Ꞥ ‖

بم 7 2016~2019H1 ¸ ર Ӷ˛ ῲЄ



Є Wind Ї Ꞥ ‖

بم 8 ˈ Ꞥ φ Ŏ ﻣﺶ┼ ⌐ Ӷ%Є

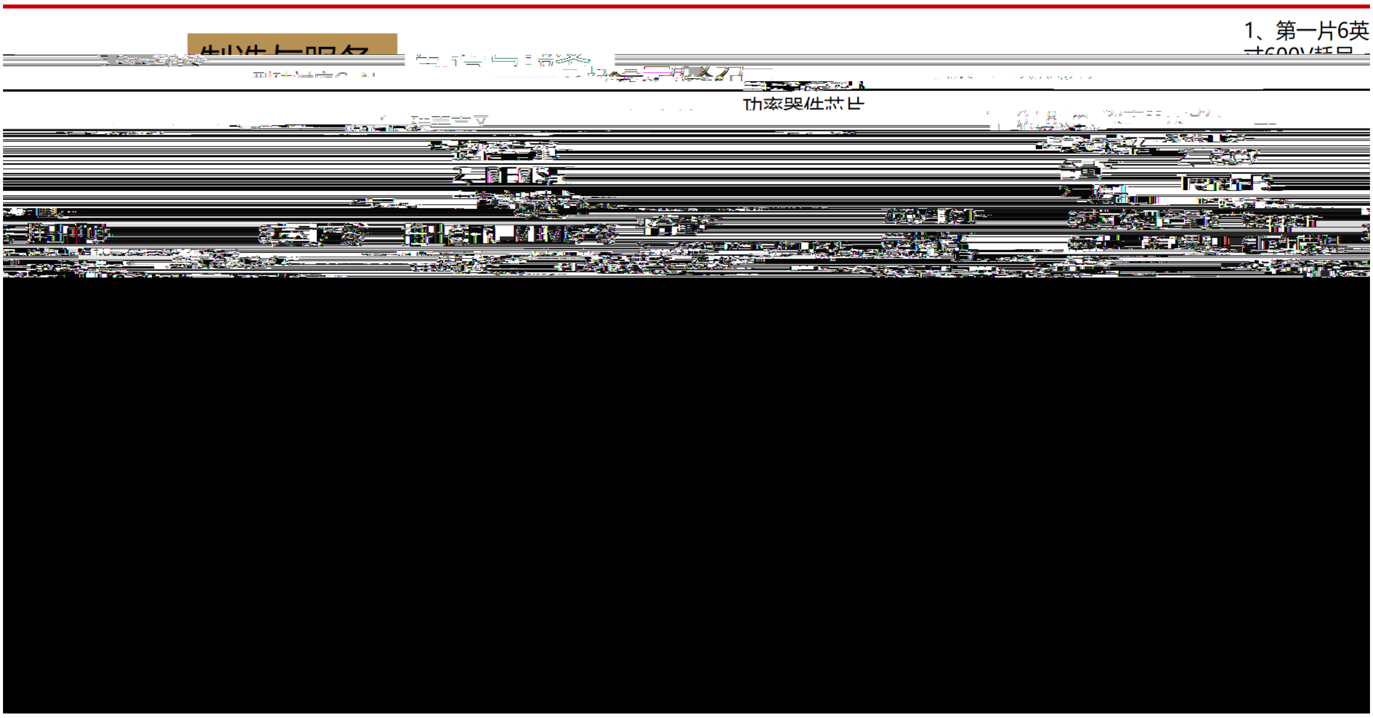


Є ӫ Ї Ꞥ ‖

1.3. ﭗ ﭗ

ˈ Ꞥ φ ᾸŁ Є ε Ŭ Ŭ MOSFET Ŭ IGBT ɼˈ ε ῐ ɲ 20 ĸ 50 ש Ї √ ɲ ꝁ ᵱ ⊦ ɼ 60-70 ש Ї ‖ Ꞥ ﻼ ֿ ש ˈ ᾸŁ ῐ Ї φ ɬ ˈ ɼ 80 ש Ї 6000 Ї Ӌ 6500 ᴥЖ80 ש ῐ MOSFET ꞙ └ῲ Ї n ˈ ᾸŁ ῃ ש ɼ IGBT ₴ ҥˈ ᾸŁ n ˈl ˈ . Ӷ 6500VЄ ꞙ . Ӷ 10-100kHzЄ ɼ ε Ꞥˊ ĸ ╦u Ї ˈ ᾸŁ ꞙ Ҳﺱn ˊ ɣ ҲЇˈ ᾸŁ . ҿᾸŁˈ ɲ ɼ

9 2008~2018



[illegible]


电子照明
绿色电源
MOS型产品
电动车充电器/电动车控制器
LED照明/电子镇流器
计算机电源/充电器/适配器/逆变器
双极型产品
电子节能灯/LED照明/电子镇流器
电子变压器/计算机电源
充电器/适配器/电视机
特种二极管
计算机电源/充电器/适配器/LED

[illegible]

[illegible]

[illegible]	[illegible]
[illegible]	[illegible] TCL [illegible]
[illegible]	[illegible]
[illegible]	[illegible] TTi [illegible]

[illegible]

90nm-0.13um MCU ɭ MCU ɭ ɭ DSP ɭ FPGA

8

9 2016~2019H1 ˝ ˊ ﻤﻴ ¸ ű ȉ ٩ ‟ Ѓ ῳ Є

11 ﳀ `Ƴ ﳁ ˈ ﳂ Ⱡ Ỵ

Ⱶ ﳁ	ﳀ Ⱶ Ṫ ꜝ Ï Ï ꭥ ᴥ ﬦ ꝁ ﬦ Ï ˈ ᛉ φ ﳂ Ⱡ ꞁ ﬦ Ⱶ
ﳁ	م ῲ ˏ ˝ Ï ﳁ –
ˇ ﳁ	ﳃ IGBT ꭤ ә Ï ﳁ
ﳁ	ΰ ﬦ ש Ỵ ﳁ
Ç ﳁ	ᛦ ɟ Ɽ Ï ῲ ﳂ م ﳂ ﳁ

E Ҳ ﳀ ‼ Ï ﬦ ‖

ﬣ ﳂ Ⱡ Ï MOSFET م IGBT ˏ ɿ ﳀ ˈ ᛉ φ ⅎ ﳂ Ⱡ ﳁ ꞁ Ⱶ Ï ˋ ꞁ Ҳ IGBT ꞃ / ΰ Ỵ ﺶ ꞃ ˋ ꞁ ᑲ ˈ ﳂ Ⱡ ꞅ

2.2.MOSFET ﳀ `Ƴ ꭥ Ï IDMﮧ Ⱶ ⌐

IHS Markit Ï 2018 ﳀ MOSFET ﳁ ꬹ 27.92 ῲ Ï 2016 -2018 Ս ﺶ ꬹ 15.03% Ï ꞃ ˈ ᛉ φ ꝁ ﺶ ꞅ س Ɽ ˆ

[illegible] MOSFET [illegible] IDM [illegible] -100V [illegible] 1500V [illegible] MOSFET [illegible] MOSFET [illegible] MOS [illegible] VDMOS [illegible] MOS [illegible] MOSFET [illegible]

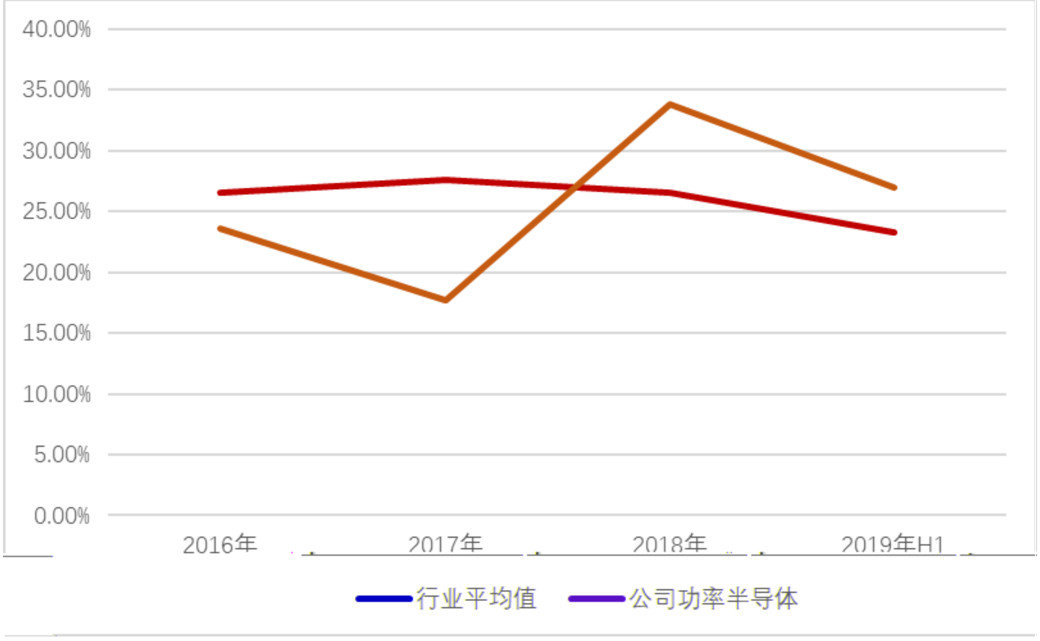
12 [illegible] MOS [illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	30V-900V	40V-900V	-60V-150V	-100V-1500V
	MOS	MOS	MOS	MOS
	MOS	MOS	MOS	MOS
[illegible]	MOS		MOS	MOS
	MOS		P MOS	MOS
	[illegible] MOS			[illegible] MOS
				P MOS

[illegible]

MOSFET [illegible] IDM [illegible] MOSFET [illegible] MOSFET [illegible] 2018 [illegible] MOSFET [illegible] MOSFET [illegible] MOSFET [illegible] IHS Markit [illegible] MOSFET [illegible] MOSFET [illegible]

16 2016~2019H1 [illegible]



[illegible]

13 2018 Ҳ ئه MOSFET ڦ ғ ᛋ ڒ خي ᴓ Ґ%Є

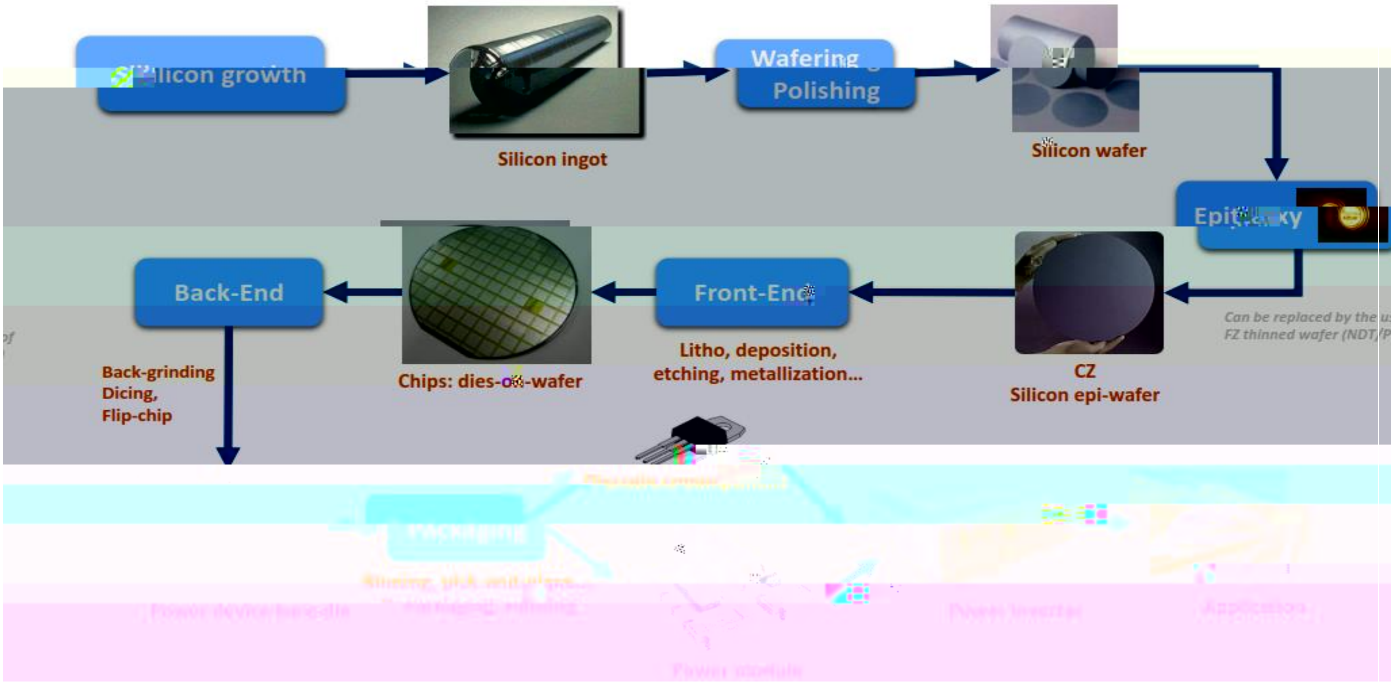
2018 MOS ڵ ŧ Ҳ ئه ڦ Ґ ῷЄ		خي ᴓ ᛋ
Ĩ	52	28.40%
	31	16.90%
ᛋ	**16**	**8.70%**
	12	6.60%
ĸ	12	6.60%
ᛗ φ	9	4.90%
ˋl ج ٮ ƙ	51	27.90%
U	183	100%

E ö Ï ᛋ ‖

2.3.IGBT ჳ Ï B ש

IGBT Insulated Gate Bipolar Transistor Ï ᛋ ű φ ɼ BJT م MOSFET U ᛗ φ ڵ ŧ Ï MOSFET ĩ ɬ ῆ ɬ ┼ ɬ ˉ ᛋ ɬ ĩ B Ï ĭ BJT ᛋ u ɬ ɬ B Ï س ᛋ ɬ ɬ ˋl ج ڵ ŧ Ƒ Ï ɬ ⊦ ҿ ĩ ڵ ŧ Ï ĩ l ٩ ɼ ŋ ĺ ᵽ B Ï IGBT 20 ĸ 80 ש ķ ॥ ĩ Ï Ƒ : س ƙ Ҳ ű ש Ⴙ MOSFET م GTR Ï └ SCR ű GTO ᛋ B ש Ï س Ҳ ű ש Ⴙ BJT

20 [illegible]



[illegible] Yole [illegible]

[illegible] IGBT [illegible] Trench-FS [illegible] IGBT [illegible] IGBT [illegible] 600V [illegible] 1200V FS [illegible] Field-Stop [illegible] IGBT [illegible]

[illegible] IGBT [illegible] 600V-6500V [illegible] IGBT [illegible] IGBT [illegible] IGBT [illegible]

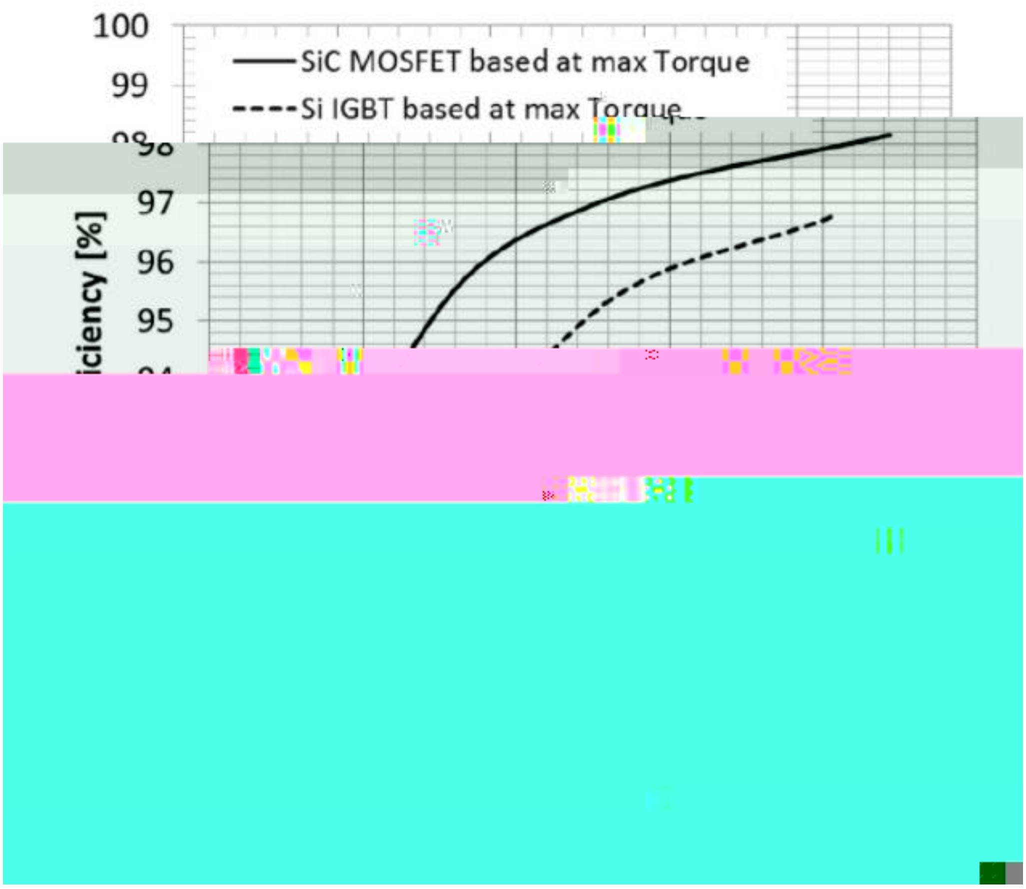
2.4.SiC [illegible] GaN [illegible]

[illegible] SiC [illegible] GaN [illegible]

. ݣ ƚ ғ ᴶ ݣ ƚ س ƥ ō م ᴶ Ï ᴶ ݣ ƚ
ᴮ ݜ ɼ Ѓ 1 Є ռ Ï . ݣ ƚ م ݣ ƚ ˩ Ғ Ж Ѓ 2 Є ռ ┼
Ï . ݣ ƚ ғ ݣ ƚ س ┼ ƥ ō Ж Ѓ 3 Є ռ Ï . ݣ
ƚ ғ ݣ ƚ س ƥ ɼ ق Ï س ᴶ ˀ Ⴁ φ ݣ ƚ
ں ƙ Ï س ῐ . ݣ ƚ ƥ ΄l ᴮ ݜ ɼ

ǁ . (SiC) ҿ ש Ᵽ ש Ⴁ φ ҿ Ⴙ ˀ ݣ ƚ Ι ῐ
 զ ɼ . س ռ ݟ φ Ï ɫ 3C-SiC Ï 4H-SiC Ï 6H-SiC Ï ˋl Ӿ 4H-SiC
ꞃ ┼ ғ ˀ ݣ ƚ ɼ ғ Ï . 10 Ṗ կ ₵ خ Ï 3 Ṗ
Ï 3 Ṗ م 2 Ṗ م ɼ م ᴶ Ⴁ φ Ï ڼ
س ɻ ܩ ғ ῑ Ѓ ɼ SiC ΄l կ خ ɻ
م ғ Ï ǝ ˋl ݣ ƚ ꞃ خ Ï ꞃ
ݣ ƚ Ï˜ ǁ u ῑ ɼ ق Ï SiC ˜ ǁ ┼ ܩ ɻ ˀ Ⱶ ݣ ƚ
MOSFET ɻ IGBT ɻ SBD Ï ꞃ ɻ ƙ ɼ

بم 21 SiC MOSFET ғ Si IGBT ˀ ғ بم

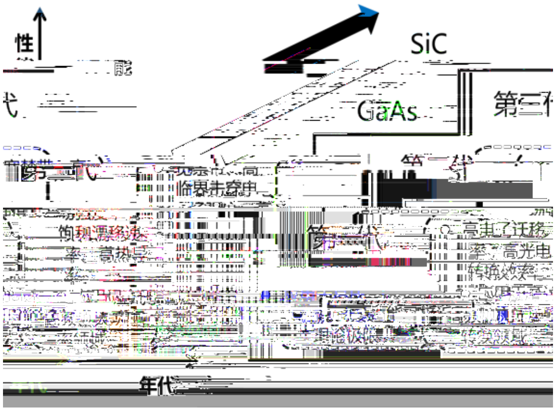


E ȝ Ï ꟷ ‖

بم 22 ᐟ ᛘ φ

E ʃ ⊦ ᛘ φ ج ŧ /ı ғ ʃ Ï ง ‖

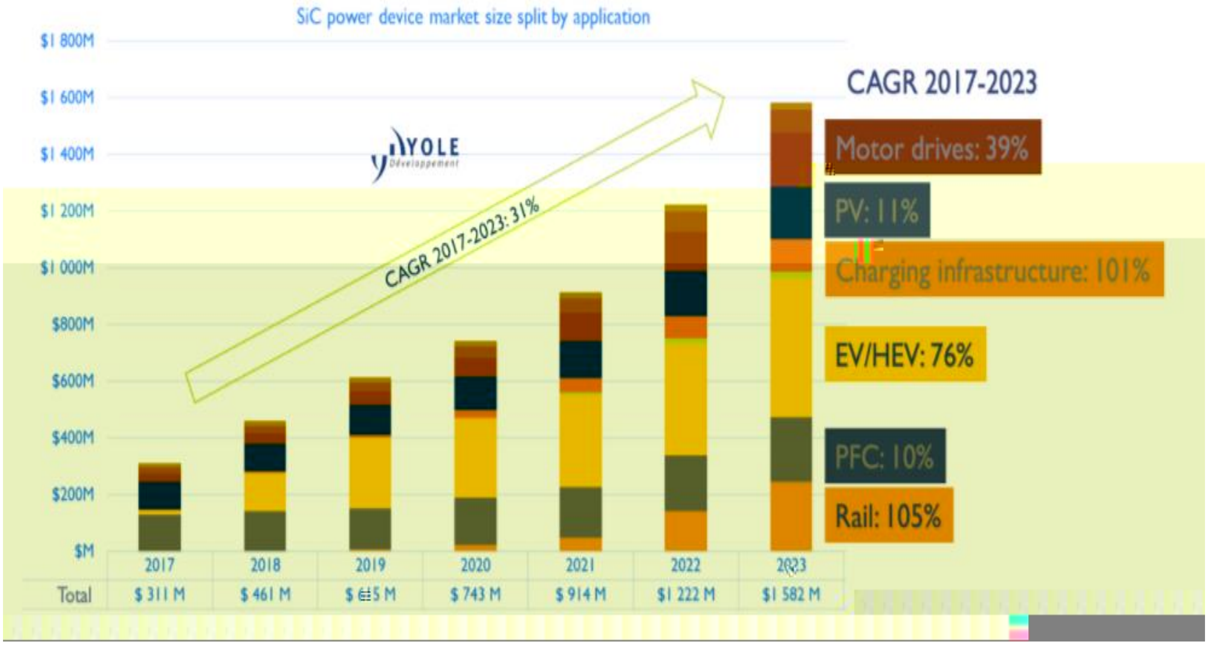
بم 23 ᛘ φ ש .



E Google Ï ง ‖

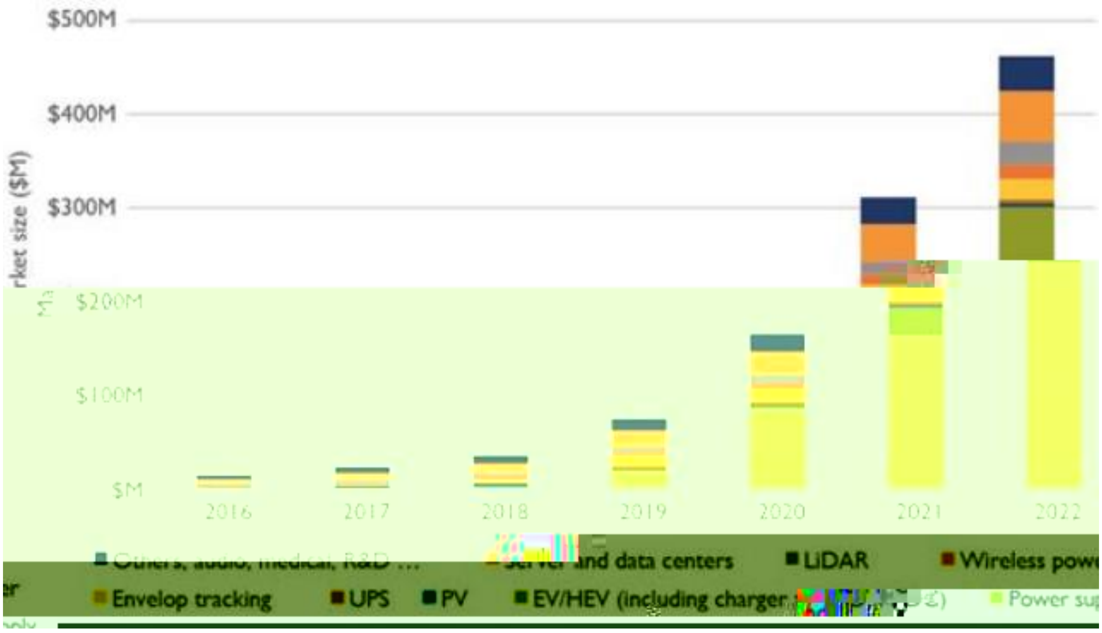
Yole Ï 2017-2023 SiC ᐟ ῲ ج ŧ خي U ҿ 31% Ï └ 2023 15 . ῲ Ï ˜ U ˉ ج ɭ ῲ ɭ ˉ ɭ Ώ ᴥ ɭ غي ɼ ˋl Ҳ Ï ῲ م ˉ ĩ خي CAGR ⅎ ⌋ 101% م 76% Ï ˊl خي ɼ

بم 24 2017~2023 SiC ᐟ ج ŧ



E Yole Ï ง ‖

图 25 GaN ꜛ ߛ ŧ Ґ Ђ ῳ Є



Ε ༽ ‖

ғ ῳ ߛ ŧ Ï GaN ʹl ߺ ﺨ ɻ م ғ Ï ߛ ŧ ʃ Ï ԓ 5G Ḫ ɻ ɼ ꞁ ₴ CoolGaN Ս ɻ Γ ĩ Ï˜ ॥ ɣ ᵤ Ï˜ ॥ Ȁ ᒪ ɻꜛ Ï ə ﻏ ɼ ה Ï ғ SiC Ғ n GaN ҿ ɼ Yole ₴ Ï 2022 GaN ﺨ ҿ 4.5 ῳ ɼ ╥ س ᕈ ש Ս ߇ φ Ï ˝ ˊ Ỵ GaN ꜛ ߛ ŧ ɻ˝ م ɻ SiC ꜛ ߛ ŧ ɼ n ˝ ˊ ῳ ⅎ ⌐

3. ⌐

IHS Markit Ï 2018 ﳖ MOSFET ﳜ ҿ 27.92 ˛ ὢ Ï 2016 -2018 U ﲿ ҿ 15.03% Ï ӆ ˈ Ⴏ φ ƙ ﲿ ɼ ﺱ Ґ Ҳ Ï ɻ Ң ɻ ƙ ┼ ɻ Ⴏ Ӈ l ﳜ ⴰ Ï ˋl Ҳ ғ Ⴏ ɼ ﺱ Ï l ɻ Ⴏ Ⴏ ա ɻ ὢ ɻ Type-C ₆ ˉ MOSFET ﳜ Ï ﺱ Ï MOSFET ﺱ ˉ ˉ ɻ ˉ ˍ ⊢ ҩ ǚ ┼ˉ ˉ ⊢ ┼ Ï װ ǚ ˈ ǚ ﲓ ﲿ ᵼ ғ Ï ﳜ ǚ ᵼ ╥ ɼ

Ẑ ˝ ˊ ⌐ Ï ˝ ˊ ὢ ˈ 8 ┼ ˛ Ï ⁄ ∑ Ґ æ Ẑ ˝ ˊ 2019~2021 ɘ ⌡ ҿ -8.39% ɻ 21.15% ɻ 20% Ґ ˋl Ҳ 2019 ˗ ҿ ˝ ˊ ƙ Ï l 2019 ꝑ Ⴏ Ⴏ φ ƙ ˝ ˊ ˛ ⌐ Ґ Є Ж ⌐ Ï ӆ ˝ ˊ ˛ Ґ Ï Ⴏ φ 5G ٪… ﲑ Ⴏ ˛ ⌐ ﲑ Ⴏ˜ ɼ Ґ 2018 ˝ ˊ 6 /8 ˛ ⌐ ɘ ⌡ ҿ 100.32%/102.32% Є Ï æ Ẑ 2019~2021 ˝ ˊ ﭬ ⌐ ɘ ⌡ ҿ 23.5% ɻ 27% ɻ 28% ɼ

æ 2019~2021 ˝ ˊ ɘ ⌡ ҿ 57.45 ˛ ὢ ɻ 69.60 ˛ ὢ ɻ 83.52 ˛ ὢ Ï n -8.39% ɻ 21.15% ɻ 20% Ж ӆ ˝ ˊ ĸ ‰ ⌐ 4.01 ˛ ὢ ɻ 6.35 ˛ ὢ ɻ 8.16 ˛ ὢ ɼ ᵆ ẅ Ï æ ﳖ `Y' Ⴏ φ Ⴏ ﲜ Ï 2021 ﲿ PE ҿ 40 Ṗ Ґ ■ ỉ 100 Ṗ װ ꝑ ᵆ ẅ Є Ï ӆ ˝ ˊ ﺱ MOSFET Ώ ﻐ ɼ ǚ Ï æ ɢˈ ᵆ ẅ ᴍ Ï Ņ ӵ ῆ ṇ ɼ

17 ﳖ `Y' Ⴏ φ˜ ˝ ˊ

	ẅ Ґ ˛ ὢ Є	2020 ⌐ Ґ ˛ ὢ Є	‰	2021 ⌐ Ґ ˛ ὢ Є	‰	PE(21 Є	PE(20 Є
300046.SZ ˜ ⴰ	56.37	1.48		1.87		30.12	37.97
300373.SZ	145.32	3.04		3.88		37.45	47.76
300623.SZ	122.22	2.37		2.93		41.67	51.52
600460.SH ỉ	247.72	1.54		1.85		134.16	160.49
600745.SH	1,753.49	31.47		40.56		43.23	55.72
603290.SH Ⴏ	134.98	1.75		2.41		55.99	76.95

Є Wind Ï Ⴏ ‖ Ґ ẅ 2020 2 26 Є

4.

1 ҈ 2 ﺱ ғ Q ĩ Ε ˝ ˊ ﺱ Q l ӆ Ⴏ˜ ꝑ ˝ ˊ Ð Ṅ

ـ ﻡ / ـ

⌐ ɾ́ ѣῴЄ	2018A	2019E	2020E	2021E
ƙ ῇ	6270.80	5745.00	6960.00	8352.00
Y(%)	6.73%	-8.38%	21.15%	20.00%
ƙ	4690.26	4394.93	5080.80	6013.44

ɾ́ ѣῴЄ	2018A	2019E	2020E	2021E
‰⌐	537.56	512.43	869.21	1111.46
ﻡ	953.19	868.90	908.90	948.90
Ű̎	-95.14	-39.31	-233.97	-140.00

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]