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S0880517010002	S0880118090094

SiC GaN

6 SiC

2020-

87.41 0 2021 8.03 PB
81.07

2020.11.09

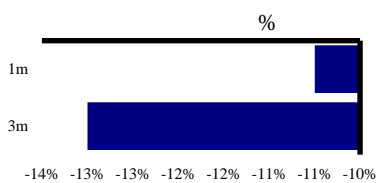
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87.41

81.07

50.20

www.crmicro.com



52

32.38-63.51

61,039

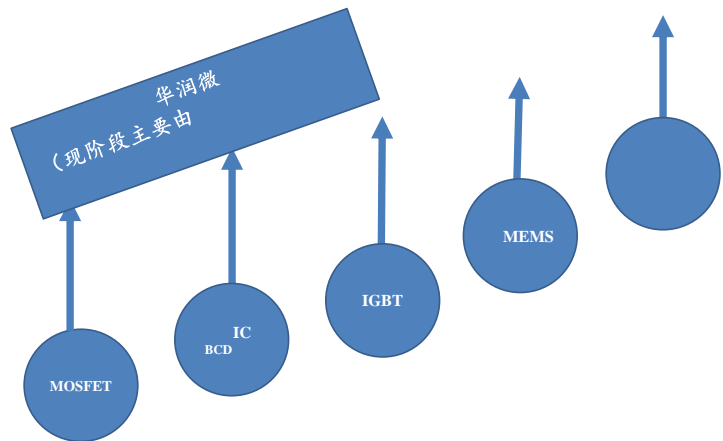
	2018A	2019A	2020E	2021E	2022E
	6,271	5,743	6,719	8,197	10,083
	4,690	4,431	4,752	5,574	6,639
	85	66	77	94	116
	126	112	131	172	219
	374	377	336	410	504
EBIT	546	274	926	1,209	1,646
	0	0	0	0	0
	11	0	0	0	0
	0	31	47	-52	-78
	586	478	1,120	1,564	2,106
	53	-6	116	160	215
	108	112	104	144	193
	429	401	940	1,299	1,738
	1,538	2,438	7,500	8,639	10,176
	27	44	44	44	44
	0	82	82	82	82
	3,898	3,816	3,806	3,796	3,746
	571	557	557	557	557
	9,992	10,095	15,600	17,446	19,834
	4,654	1,979	2,127	2,480	2,936
	318	1,726	1,726	1,726	1,726
	5,020	6,391	11,748	13,241	15,173
(IC)	7,471	7,897	13,254	14,747	16,679
NOPLAT	497	277	833	1,088	1,482
	953	709	510	410	350
	133	-1,192	105	115	144
	-533	-611	-658	-607	-557
	1,050	-816	791	1,006	1,419
	1,482	576	1,497	1,802	2,200
	-575	-41	-658	-607	-557
	-627	-180	4,223	-56	-105
	281	356	5,062	1,139	1,538
EBIT	6.7%	-8.4%	17.0%	22.0%	23.0%
	8150.3%	-49.9%	238.0%	30.6%	36.2%
	511.0%	-6.7%	134.5%	38.3%	33.8%
EBIT	25.2%	22.8%	29.3%	32.0%	34.2%
	8.7%	4.8%	13.8%	14.7%	16.3%
	6.8%	7.0%	14.0%	15.9%	17.2%
(ROE)	10.4%	7.4%	8.8%	10.8%	12.6%
(ROA)	5.4%	5.1%	6.7%	8.3%	9.7%
(ROIC)	6.7%	3.5%	6.3%	7.4%	8.9%
	91.9	86.9	86.9	86.9	86.9
	35.0	51.8	51.8	51.8	51.8
	581.6	641.6	847.5	776.8	718.0
	3.5	1.4	1.6	1.4	1.3
	8.5%	10.6%	9.8%	7.4%	5.5%
	49.8%	36.7%	24.7%	24.1%	23.5%
	99.1%	58.0%	32.8%	31.8%	30.7%
PE	142.14	152.31	64.95	46.97	35.11
PB	11.69	8.44	5.72	5.08	4.44
EV/EBITDA	0.61		36.97	33.61	26.49
P/S	6.64	7.25	8.72	7.45	6.05
	0.0%	0.1%	0.3%	0.4%	0.6%

1.		.....	4
2.			.5
2.1.	SiC GaN		..5
2.2.	SiC	.....	8
2.3.	GaN	.....	12
3.	6 SiC	.....	15
3.1.	6 SiC GaN	.....	15
3.2.	SiC	.....	17
4.		.....	19
5.		.....	19
6.		.....	20

1.

MOSFET IGBT

1



1

2

9 25

(688396)

MOSFET IGBT 4

IGBT IGBT

GaN SiC SiC MOSFET

2.

SiC GaN
 SiC 2030
 500
 SiC 5G
 GaN

2.1. SiC GaN

/
 /
 (GaAs) (InP) (GaN) (SiC)
 / (Ge) (Si) (Se) (B)
 50

60

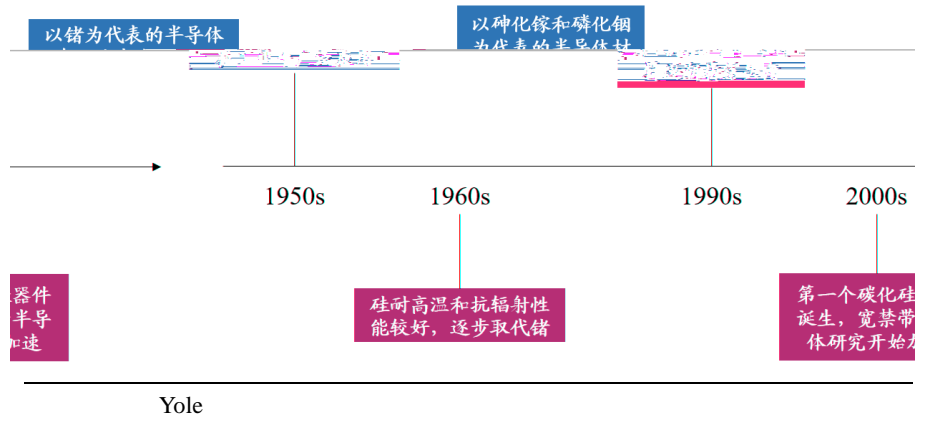
(InSb) (GaN) (SiC) (GaAs) (InP)
(Cds) 20 90
(GaAs) (InP)

1

2

(LED) (LD)

2



(Eg) SiC GaN
2.3 (eV)

3

SiC GaN

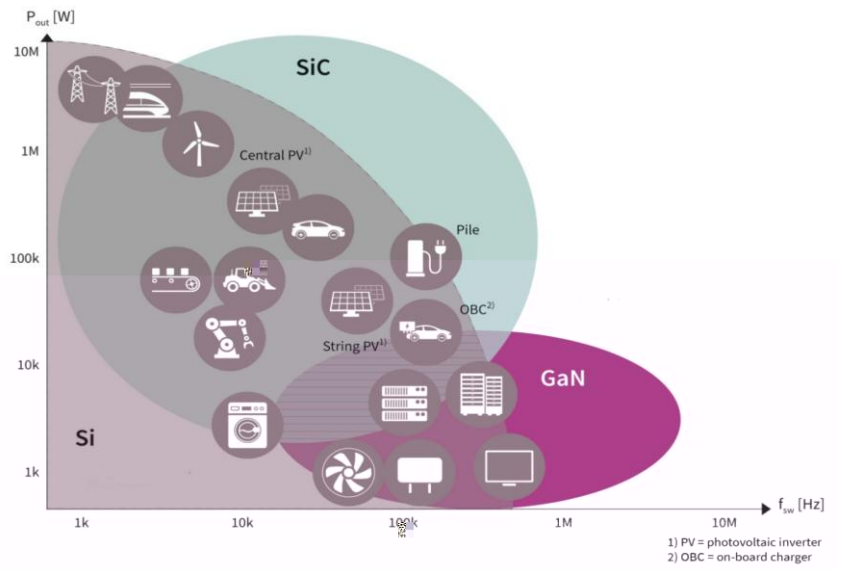
(SiC) (GaN)

1:

	Si	GaAs	GaN
eV	1.1	1.4	3.4
10^{-7} cm/s	1.0	2.1	2.7
W/c K	1.3	0.6	2.0
M/cm	0.3	0.4	5.0
cm ² / V s	1350	8500	900

/

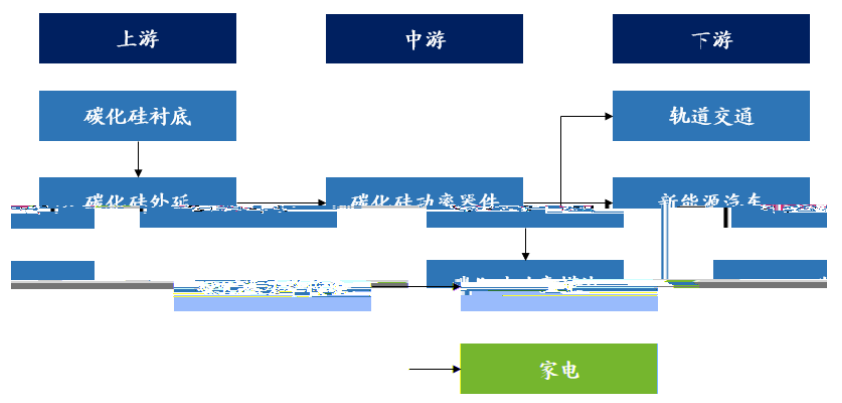
4



2.2. SiC

4H SiC(4H-SiC)

5 SiC



1 /

2010 Cree 6
2015 2015 Cree II-VI

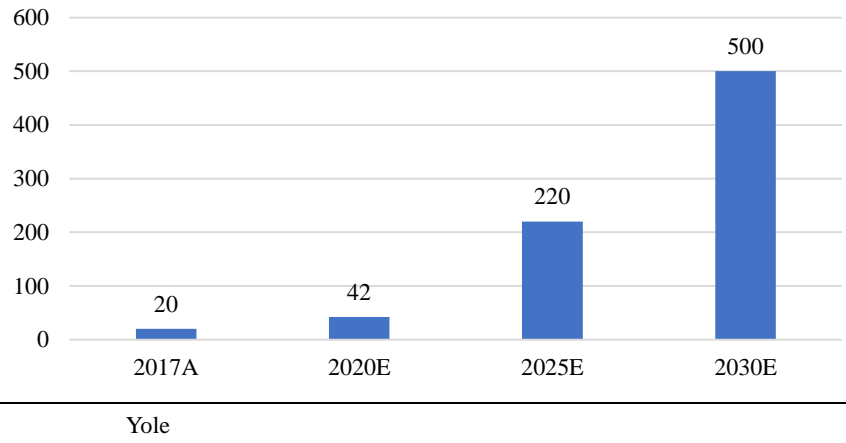
8

6 2030 6 SiC
40 Yole 2017 4
10 6 1.5 2020 4
10 6

8

		SBD	
		PiN	PiN
	SiC	JBS	
		PiN	MPS
		MOSFET	
	SiC	BJT	
		JFET	
		IGBT	

21	SiC	JBS
(	) MOSFET	2001
	(Infineon)	
	Cree	



1

2

3

4

99 %

50 %

5
2001 600 V

SiC MOSFET JBS
SiC MOSFET
SiC JBS

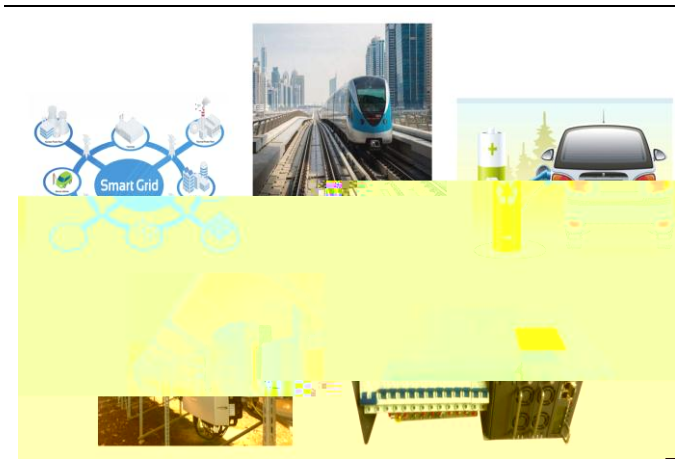
7 4 SiC
SiC

5G 2020 5G
SiC

SiC

10 SiC

11 SiC

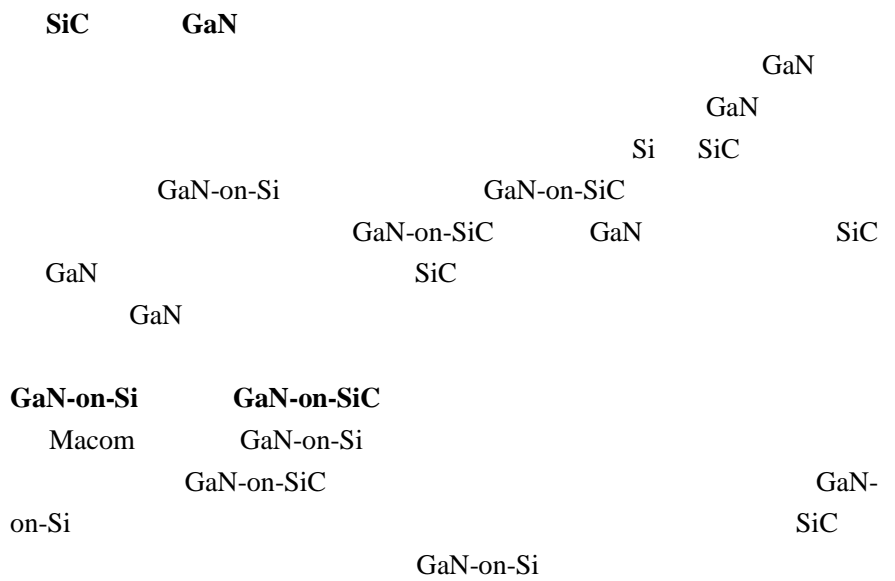
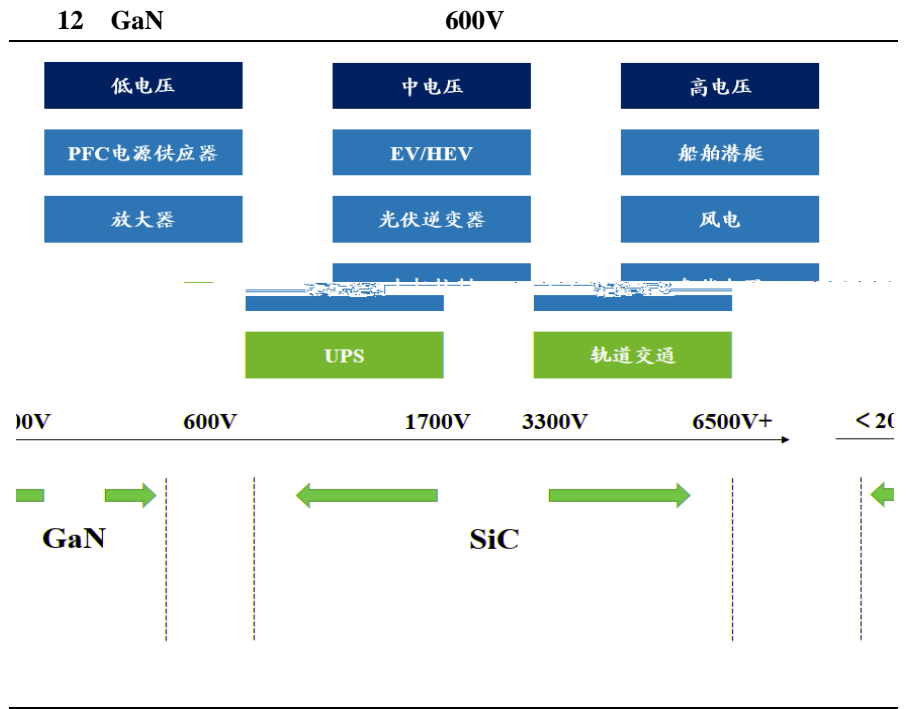


行业	新基建投资金额
5G ✓	2020年投资规模近3000亿元
特高压	2020年投资规模超600亿元
轨道交通	2020年投资规模在5000亿元左右
充电桩 ✓	2020年投资规模约100亿元
数据中心 ✓	2020年投资规模约1000亿元
人工智能	2020年投资规模约350亿元
工业互联网	2020年投资规模或达百亿级别

SiC

2.3. GaN

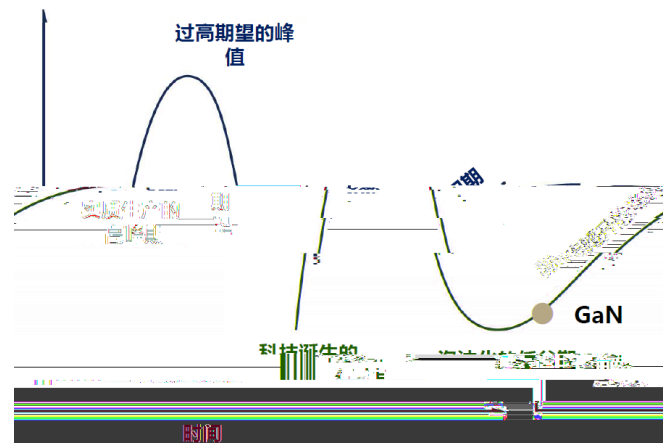
GaN 600V GaN 1700
GaN GaN
Si 600V SiC 300V~600V GaN
0~300V GaN



13 CoolGaN



14 GaN



15 GaN-on-Si

	LDMOS	MACOM GaN	GaN on SiC	Benefits
Power Amp Efficiency ">2GHz"		>10% Improvement	Improvement	Lower Operating Expense
Higher Frequency Bands	1.8 GHz	Up to >3.8 GHz	Up to >3.8 GHz	New Spectrum Deployments
Wider Bandwidths	100 MHz	200 MHz	200 MHz	Higher Capacity per Basestation
Power Density	1-1.5 W/mm	4-6 W/mm	4-8 W/mm	Smaller Antenna, Lower CapEx
Linearity	DPD Friendly	DPD Friendly	Charge Trapping	Higher Order Modulation Schemes
Supply Chain	8"	Up to 8"	4" → 6"	Capacity and Surge Capability
Cost	Silicon	Silicon	SiC	LDMOS Like Cost Structure

GaN		GaN		GaN	
(PA)		(LNA)		(SBD)	
				(FET)	
2020	18W	2020	30W	2018	66
2020	2	2020	13	2018	10
2020	65W	2020	100W	2018	10
2023	1000	2023	2033	2017	4.3
2023	CAGR	2023	87%	2017-	2017-

16 10

65W



3. 6 SiC

SiC 2020 7 SiC
6 SiC
SiC JBS GaN
SiC

3.1. 6 SiC GaN

2020

1 2020 2

2020 2

SiC MOSFET 650V GaN IDM SiC JBS

2 2020 7

7 SiC 6 SiC
2020 7

4 SiC
1200V 650V SiC
6 SiC GaN

3 2020 8

SiC JBS GaN
2020 6 650V 1200V SiC JBS
SiC JBS
650V
MOCVD

4 2020 9

6 SiC
2020 8 2020 9
6 SiC 1000
SiC

1200V					650V		
电流等级 (A)	T0220 R2L	T0247 Dual Die	T0247 R2L	DPAK R2L	电流等级 (A)	T0220 R2L	
2A	CRXI02D120G1			CRXL02D120G1	4A	CRXI04D065G1	
	CRXL05D120G1	6A	GRXI06D065G1	5A	CRXI05D120G1		
		CRXU20D120G1		10A	CRXI10D065G1	15A	CRXI15D065G1
		CRXQ30D120G1			16A	CRXI16D065G1	30A
		CRXQ40D120G1					40A

SiC

SiC GaN

IDM

3.2.

SiC

3.24%

SiC

1

2011

2012

3

4

SiC

2014

6

SiC

2011

3

Aixtron

2012 3 9

3

4

2014 4

6

6

2

32.64%

JIANHUI ZHAO

1988

4.

					2020-2022
	9.75%	17.31%	10.70%		9.75% 13.46%
9.80%				IDM	2020-2022
	28.20%	27.08%	35.30%		28.20% 22.92%
34.20%					
				2020/2021/2022	17%/22%/23%
2020/2021/2022				29.28%/32.00% /34.15%	
				2020-2022	9.40 12.99 17.38
	135%	38%	34%	EPS	0.77 1.07 1.43
	0.68	0.91	1.23		

4

		2017	2018	2019	2020E	2021E	2022E
		3519.76	3571.91	3183.52	3493.91	4098.62	4537.17
	%	59.90%	56.96%	55.44%	52.00%	50.00%	45.00%
	%		1.48%	-10.87%	9.75%	17.31%	10.70%
	%	16.33%	18.57%	17.76%	24.00%	27.00%	27.00%
		2339.06	2683.49	2515.66	3225.15	4098.62	5545.44
	%	39.81%	42.79%	43.80%	48.00%	50.00%	55.00%
	%		14.73%				

			IGBT	IDM		
					15%	
	PB	2021	PB	6.98	2021	
8.03	PB	87.41				
	PS	2021	PS	11.55	2021	13.28
	PS	89.55				
87.41						

5 2020 11 5

			P/S				PB		
			2021E)	2020E	2021E	2022E	2020E	2021E	2022E
300623.SZ		41.58	16.86	4.81	5.26	5.83	8.64	7.90	7.13
300373.SZ		41.69	6.23	6.04	6.89	7.93	6.90	6.05	5.26
			11.55	-			7.77	6.98	6.19
688396.SH		49.92	7.45	8.78	9.89	11.32	5.69	5.05	4.41

wind

wind

6.

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