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S0880517010002	S0880118090094

SiC GaN

6 SiC

2020.11.09

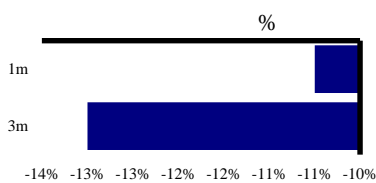
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87.41

81.07

50.20

www.crmicro.com



52

32.38-63.51

61,039

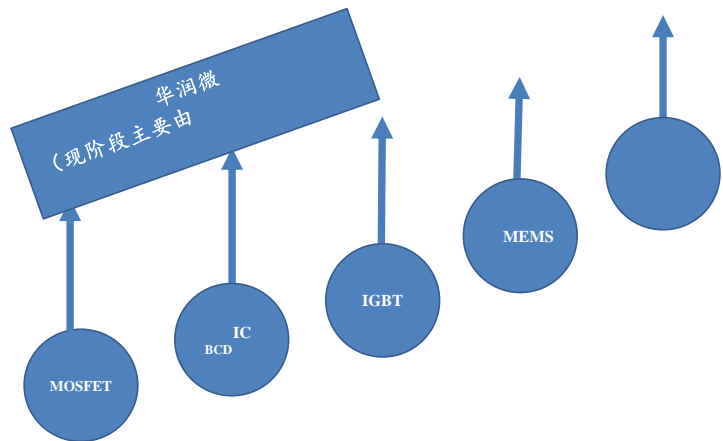
	2018A	2019A	2020E	2021E	2022E
	6,271	5,743	6,719	8,197	10,083
	4,690	4,431	4,752	5,574	6,639
	85	66	77	94	116
	126	112	131	172	219
	374	377	336	410	504
EBIT	546	274	926	1,209	1,646
	0	0	0	0	0
	11	0	0	0	0
	0	31	47	-52	-78
	586	478	1,120	1,564	2,106
	53	-6	116	160	215
	108	112	104	144	193
	429	401	940	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

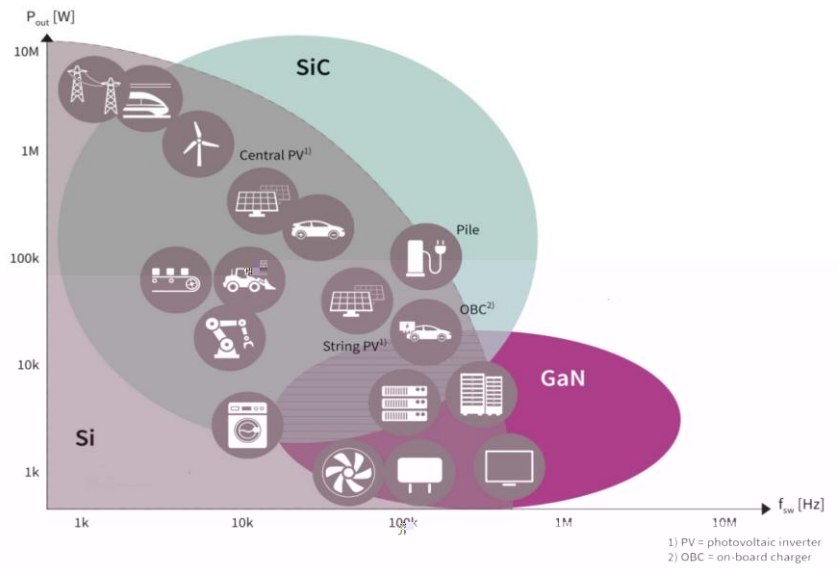
60

(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
			/

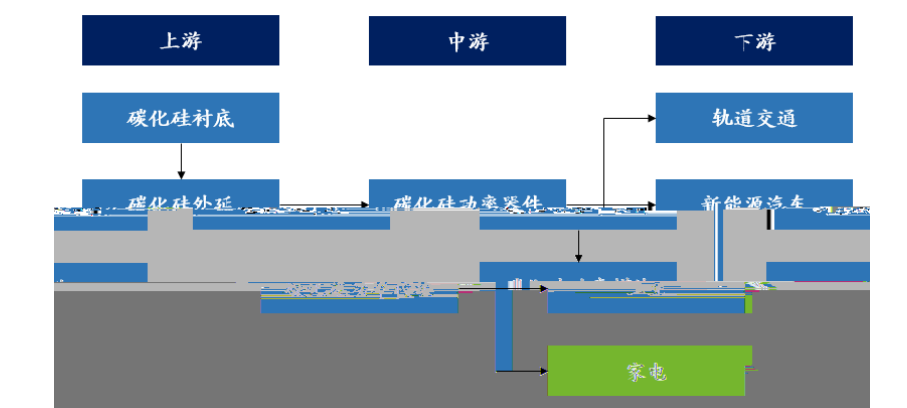
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2.2. SiC

4H SiC(4H-SiC)

5 SiC



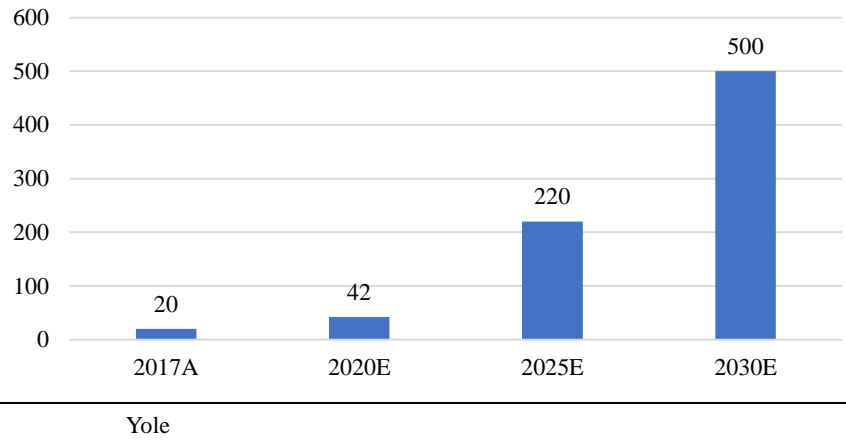
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2010 Cree 6
2015 2015 Cree II-VI

8

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

8



1

2

3

4

99 %

50 %

15 GaN-on-Si

	LDMOS	MACOM GaN	GaN on SiC	Benefits
Power Amp Efficiency ">2GHz"		>20%		Lower Operating Expense
Higher Frequency Bands	1.8 GHz	Up to ~2.8 GHz	Up to ~2.8 GHz	New Spectrum Deployments
Wider Bandwidths	100 MHz	300 MHz	300 MHz	Higher Capacity per Basestation
Power Density	1.15 W/mm	~2 W/mm	~2 W/mm	Smaller Antenna, Lower CapEx
Linearity	High Linearity	High Linearity	Charge Trapping	Higher Order Modulation Schemes
Supply Chain	5"	6"	4" ~ 6"	Capacity and Surge Capability
Cost	High	High	SiC	LDMOS Like Cost Structure

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

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

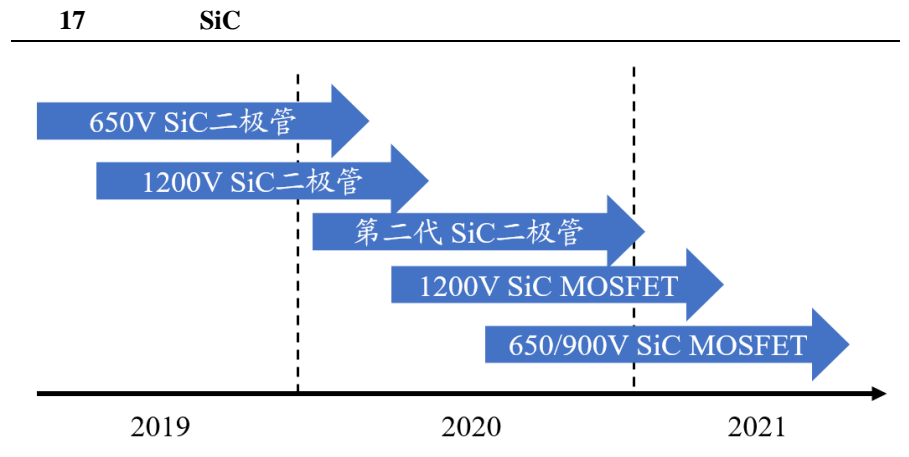
3 2020 8

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

UPS



SiC

Year	Component	Power	Current	Package
2020	SiC	8		
	SiC			1
	SiC	2		
	SiC	3	6	
	SiC	1		
	SiC	2		
	650V	4-50A	TO220/TO252	1200V
	TO220/TO247/TO252	4		3
	SiC			6
	SiC			
	SiC	8		
	5-15A TO220			1200V
	DPAK R2L	650V		TO247 dual die
	1200V SiC			4-16A
	650V SiC			TO247 R2L
	650V			TO220
	1200V			UPS
	SiC			SiC MOSFET

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
	6A	CRXI06D065G1	5A	CRXI05D120G1		
			10A	CRXI10D065G1	15A	CRXI15D120G1
	CRXQ30D120G1			16A	CRXI16D065G1	30A
	CRXQ40D120G1					40A

SiC

SiC GaN

IDM

3.2.

SiC

3.24%

SiC

1

2011
2014

2012
6

SiC

3

4

SiC

2011

3

Aixtron

2012 3 9

3

4

2014 4

6

6

2

32.64%

JIANHUI ZHAO

1988

