芯粤能
AscenPower

AscenPower Semiconductors
芯粤能半导体

AscenPower Semiconductor

The 1st SiC Power Device Foundry authorized by China Central Government

Automotive-grade SiC Power Device R&D and Fabrication

Foundation 2021.5.17

Mission AscenPower! Empower!

Vision To be the trusted partner in SiC power device world!

Investment(RMB)	Capacity (kwfs/year)	Management
7.5 billion	240 (6”) + 240 (8”)	Top 500

AscenPower Milestones

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- 2021.12 — Fab construction
- 2022.5 — Fab topping out
- 2022.11 — Equipment move in
- 2023.3 — 6” Fab operation
- 2023.5 — 1st SiC MOSFET Wafer out
- 2024.11 — AEC-Q101 certified
- 2024.12 — 8” Equipment move in
- 2025. 2 — AQG-324 certified
- 2025. 8 — 8” Fab operation

Clean Room

全自动化碳化硅工厂



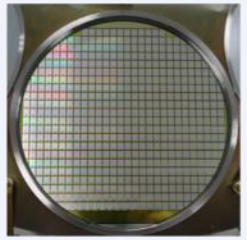
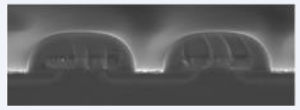
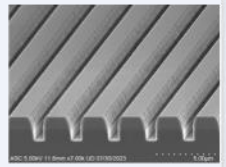

Equipment

一流的碳化硅器件生产设备

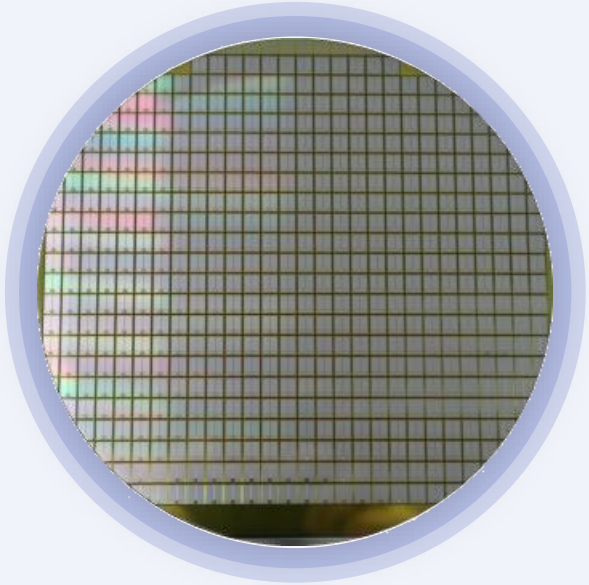



Technology

完善的碳化硅工艺平台

Strategic Partnerships



SiC substrate & epitaxy
Strategic Partners

Automotive-grade
SiC power device manufacturing
AscenPower

Automotive-grade
SiC package & modules
AccoPower

Traction inverter
VREMT

EVs
ZEEKR

Shareholder: 34.9%
Automotive-grade SiC Power Modules Manufacturer
Top-10 SiC power modules suppliers in China

Shareholder: 26.1%
Tier-1 of ZEEKR under Geely holding group

Fully Automated SiC Fab for Mass Production

芯粤能 AscenPower

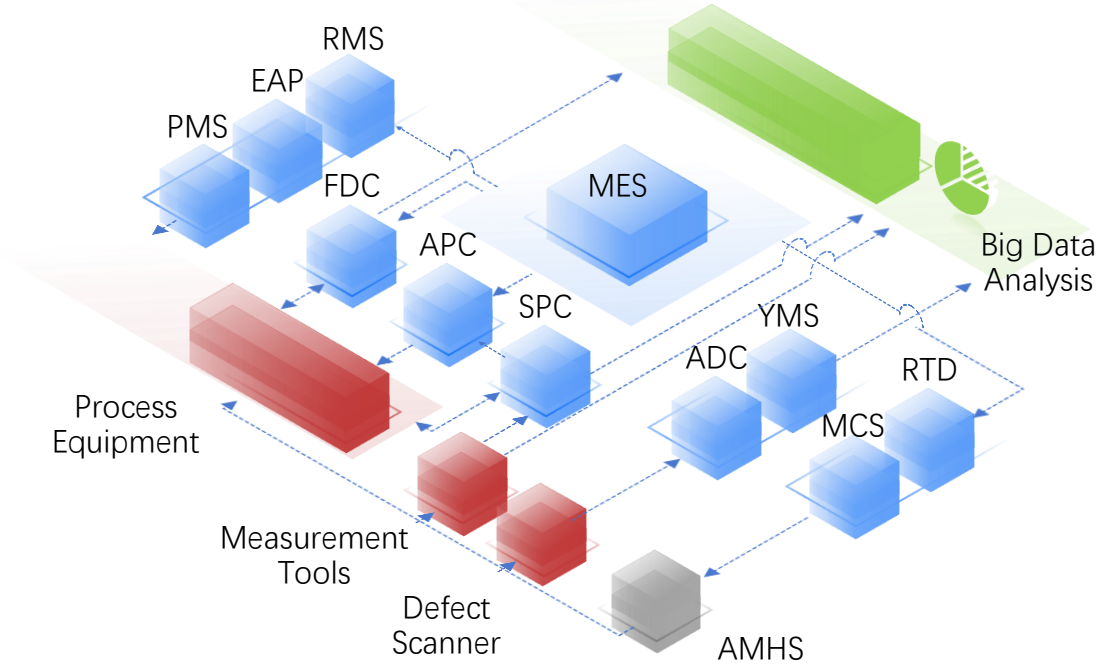
AMHS

AscenPower is the 1st SiC foundry in China that introduced AMHS system

Stratified

Automatic

Intelligent



Efficiency

Stability

Yield

Quality

SiC FAB(6’’) Quality System Certification

bsi.

Certificate of Registration

质量管理体系 – IATF 16949:2016

兹证明：

广东芯粤能半导体有限公司
91440101MA9XTDPE0G
中国
广东省
广州市
南沙区
正翔路10号
邮编：511464

AscenPower Semiconductors Co., Ltd.
No. 10, Zhengxiang Road
Nansha District
Guangzhou
Guangdong
511464
China

USI: L6NESS

并运行符合 IATF 16949:2016 要求的质量管理体系，认证范围如下：

半导体芯片的生产。
允许删减：产品设计。
The manufacture of semiconductor wafers.
Permitted Exclusions: Product design.

BSI代表：

Michael Lam – Managing Director Assurance, APAC

BSI证书号码： 812976
IATF Number: 0541409

Page: 1 of 1

...making excellence a habit.™

认证日期： 2024-08-28　　最新发证日期： 2024-08-28　　有效期至： 2027-08-27

bsi.

Certificate of Registration

质量管理体系 – ISO 9001:2015

兹证明：

广东芯粤能半导体有限公司
91440101MA9XTDPE0G
中国
广东省
广州市
南沙区
正翔路10号
邮编：511464

AscenPower Semiconductors Co., Ltd.
No. 10, Zhengxiang Road
Nansha District
Guangzhou
Guangdong
511464
China

持有证书： **FM 813059**

并运行符合 ISO 9001:2015 要求的质量管理体系，认证范围如下：

半导体芯片的生产。
The manufacture of semiconductor wafers.

BSI代表：

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首次发证日期： 2024-08-28　　生效日期： 2024-08-28
最新发证日期： 2024-08-28　　有效期至： 2027-08-27

SiC MOSFET Technology Road Map

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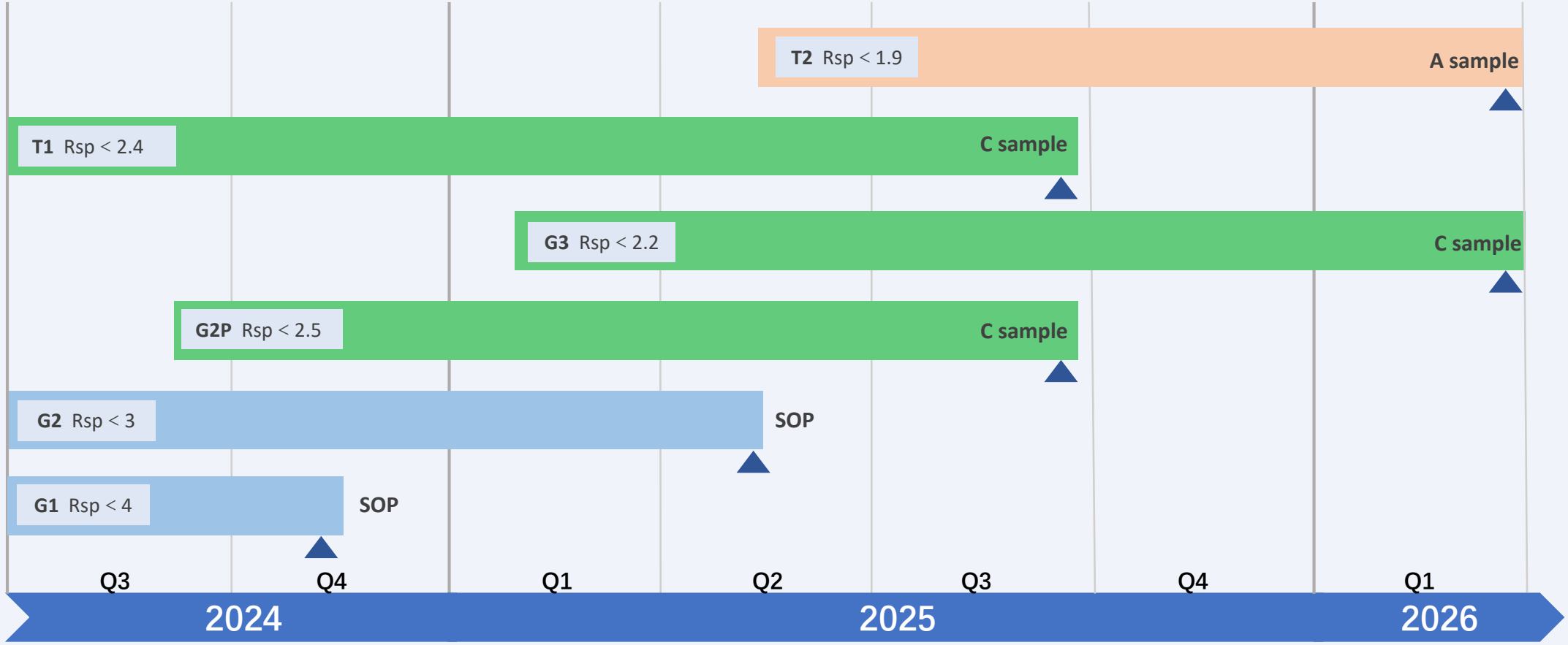

AEC-Q101: G1_1200V/16mohm SiC MOSFET

GRGTEST

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AEC-Q101
可靠性试验报告

校验码：547776

报告编号：R202407087688-01

委托单位：	广东芯粤能半导体有限公司
单位地址：	中国广东省广州市南沙区正翔路 10 号
样品名称：	AM16H120B1N（M000101C）
型号规格：	TO247 1200V 16mOhm
样品信息：	详见第 2 部分
收样日期：	2024/07/06
试验依据：	AEC-Q101-Rev-E March 1, 2021
试验日期：	2024/07/06 ~ 2024/11/22
试验结果：	详见正文

编制：任家辉　审核：邹国锋　批准：李汝冠

广电计量检测集团股份有限公司

签发日期：2024/12/3

检验检测专用章 (16)

广电计量检测集团股份有限公司

工业和信息化部集成电路芯片应用验证平台

地址：广东省广州市番禺区创远路 8 号

电话（Tel）：（+86）400-602-0999　传真（FAX）：（+86）020-38698685　网页：http://www.grgtest.com

R202407087688-01

- **TO247-4**

Test Description	Stress Condition	Duration	Results
HTGB+ (High Temperature Gate Positive Bias)	Ta=175℃, Vgs=+22V Per JESD22-A108	1000hrs	PASS
HTGB- (High Temperature Gate Negative Bias)	Ta=175℃, Vgs=-20V Per JESD22-A108	1000hrs	PASS
HTRB (High Temperature Reverse Bias)	Ta=175℃, Vds=1200V Per JESD22-A108	2000hrs	PASS
HV-H3TRB (High Voltage High Temperature High Humidity Reverse Bias)	85℃, 85%RH, Vds=960V Per JESD22-A101	1000hrs	PASS
TC (Temperature Cycling)	-55℃-150℃ Per JESD22-A104	1500cycs	PASS

- **HPD-Module**

Test Description	Stress Condition	Duration	Results
HTGB+ (High Temperature Gate Positive Bias)	Ta=175℃, Vgs=+22V Per JESD22-A108	1000hrs	PASS
HTGB- (High Temperature Gate Negative Bias)	Ta=175℃, Vgs=-10V Per JESD22-A108	1000hrs	PASS
HTRB (High Temperature Reverse Bias)	Ta=175℃, Vds=960V Per JESD22-A108	1000hrs	PASS
HV-H3TRB (High Voltage High Temperature High Humidity Reverse Bias)	85℃, 85%RH, Vds=960V Per JESD22-A101	1000hrs	PASS

AQG-324: G1_1200V/16mohm SiC MOSFET + V2P Module

检 测 报 告

单位地址:	广州市南沙区万顷沙正翔路 6 号
样品名称:	ACCO PACK DRIVE B
样品型号:	ACN03FT12V2PK
检测依据:	AQG 324 03.1.2021
检测日期:	2024.11-2025.1
检测结论:	符合要求
报告编号:	RE2024040
发布日期:	2025.03.15

广东芯聚能半导体有限公司 AccoPower Semiconductor Co., Ltd. 文件编号：AP-PRF-95 REV6 报告编号：RE2024040

可靠性验证结果

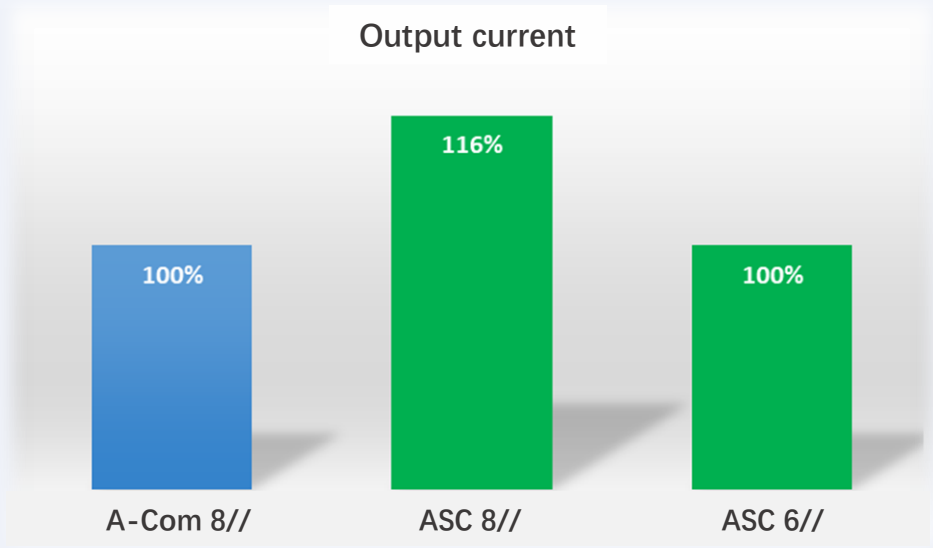
项目	描述	应力条件	应力时间	样本量	接收准则	结果
High Temp Storage (AQG324)	HTS	Tstg=125℃	1000h	6 module	0 Fail Accept, 1 Fail Reject.	PASS
Low Temp Storage (AQG324)	LTS	Tstg=-40℃	1000h	6 module	0 Fail Accept, 1 Fail Reject.	PASS
High Temp Reverse Bias (AQG324)	HTRB	Ta=175℃, VDS=1200V, VGS=0V	1000h	6 module	0 Fail Accept, 1Fail Reject.	PASS
High Temp Gate Bias (AQG324)	HTGB	Ta=175℃, 3 module VGS=+22V,VDS=0V, 3 module VGS=-10V,VDS=0V	1000h	6 module	0 Fail Accept, 1Fail Reject.	PASS
High Temperature and Humidity Reverse Bias (AQG324)	H3TRB	Ta=85℃, RH=85%, VDS=960V, VGS=0V	1000h	6 module	0 Fail Accept, 1Fail Reject.	PASS

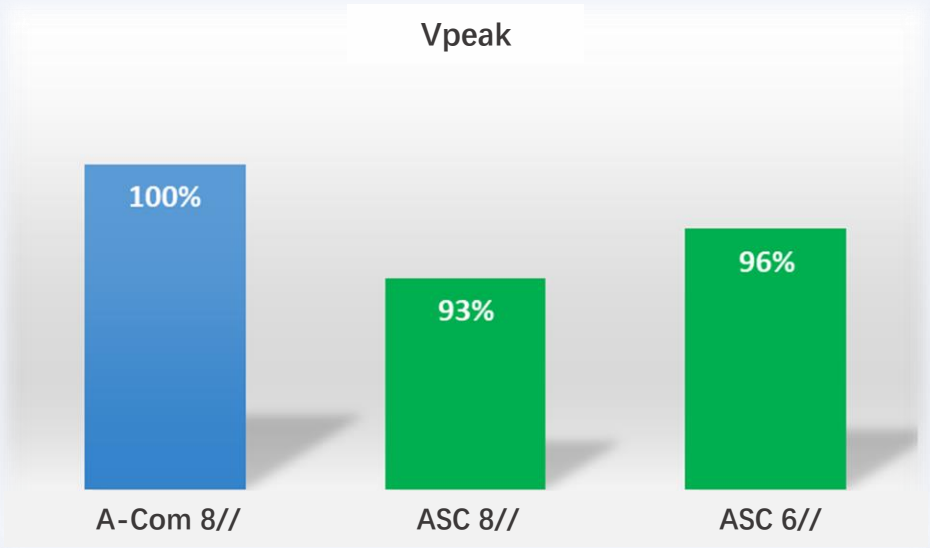
广东芯聚能半导体有限公司 AccoPower Semiconductor Co., Ltd. 文件编号：AP-PRF-95 REV6 报告编号：RE2024040

可靠性验证结果

项目	描述	应力条件	应力时间	样本量	接收准则	结果
Thermal Shock Test (AQG324)	TST	-40°C to +125°C, Tchange < 30s, TDUT dwell > 15min	1000cyc	6 module	0 Fail Accept, 1 Fail Reject.	PASS
Vibration (AQG324)	V	X/Y/Z 3 direction, 22h per direction, 1 octave/min, 对数扫频: 频率(Hz) / 加速度振幅(m/s²): 100 / 30; 200 / 60; 440 / 60. X/Y/Z 3 direction, 22h per direction: 振动方式: 宽频随机振动; 每方向上持续时间: 22h; 加速度均方根: 96.6m/s³; 振动曲线: 频率(Hz) / 功率谱密度 (m/s³)²/Hz: 10 / 10; 100 / 10; 300 / 0.51; 500 / 5; 2000 / 5	22h each direction	6 module	0 Fail Accept, 1 Fail Reject.	PASS
Mechanical Shock (AQG324)	MS	10 times shock in ±x、±y、±z 6 direction each, Shock form: half-sine, Peak acceleration: 500m/s², Shock duration: 6ms.	10 times shock in each direction	6 module	0 Fail Accept, 1 Fail Reject.	PASS
Power Cycling(sec) (AQG324)	PCsec	PCsec Iload=const, ton=const and<5s, ILoad≥0.85I_{CN}, Tvjmax=175°C, △Tvj=100K	Nf≥50000cyc	6 module	0 Fail Accept, 1 Fail Reject.	PASS
Power Cycling(min) (AQG324)	PCmin	PCmin Iload=const, ton=const and>15s, ILoad≥0.85I_{CN}, Tvjmax=175°C, △Tvj=100K	Nf≥20000cyc	6 module	0 Fail Accept, 1 Fail Reject.	PASS

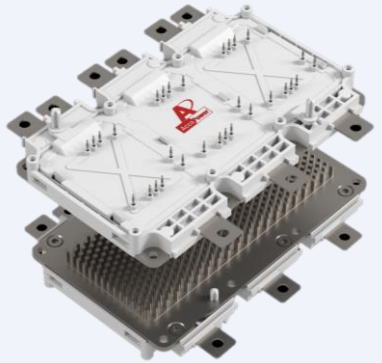
G1_1200V/16mohm SiC MOSFET + AccoPower V2P Module





ASC vs A-com:

- ✓ Same chip quantity in parallel(8//), Higher output current(Id) level +16%
- ✓ Same output current level，Less SiC MOSFET chips in V2P module –25%
- ✓ In term of peak Vds，voltage stress is lower.



1st Main Inverter with G1 SiC MOSFET

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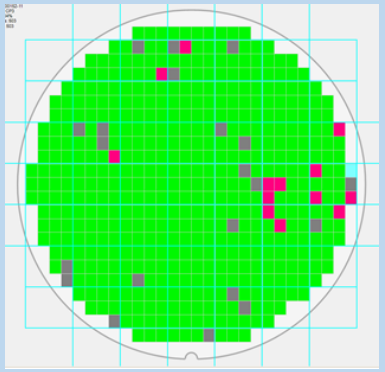
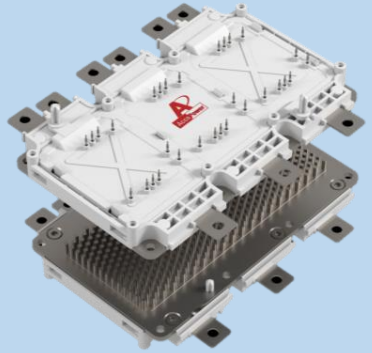
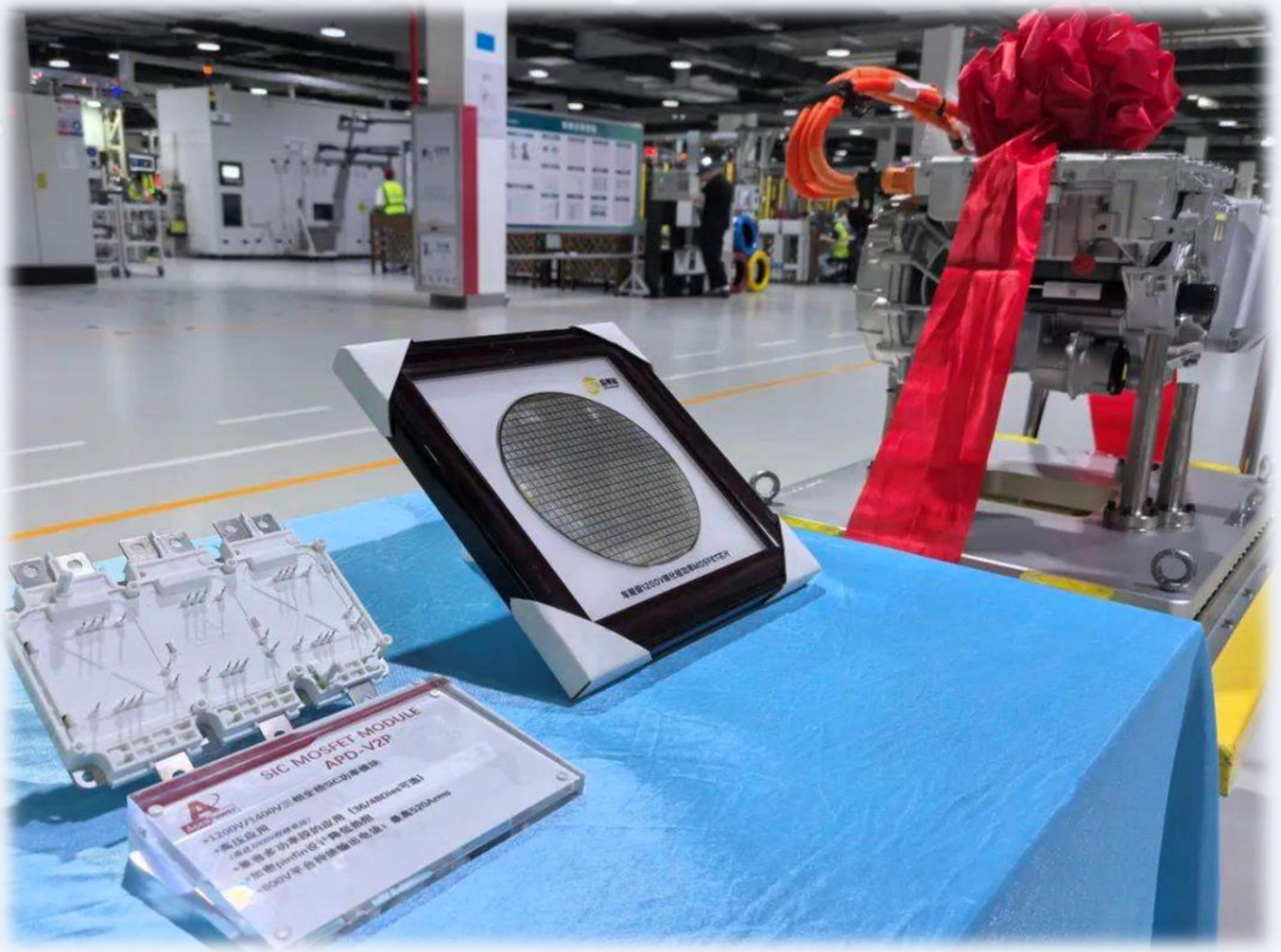


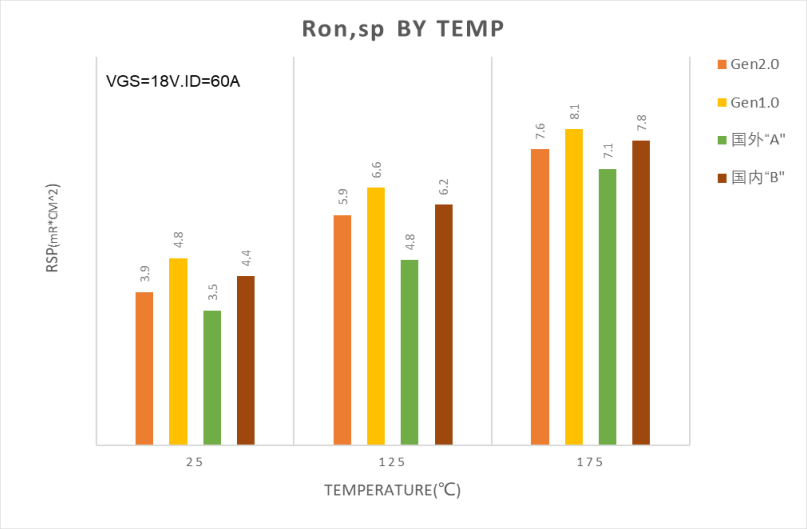
AscenPower SiC MOSFET

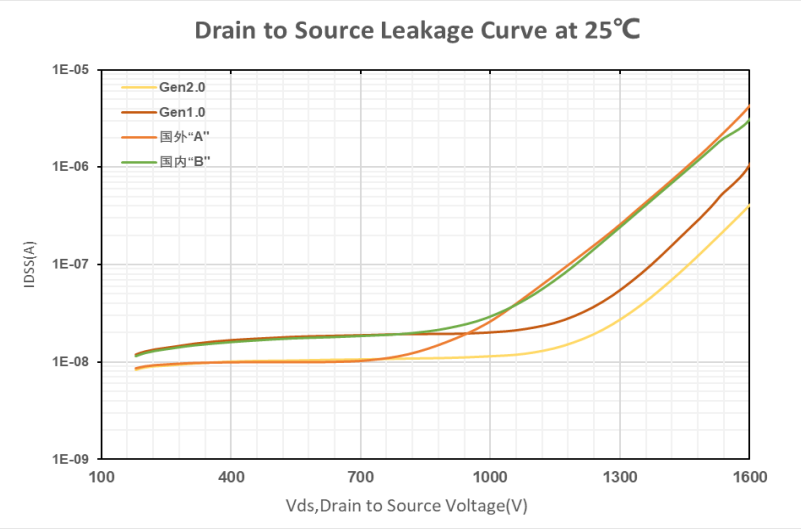


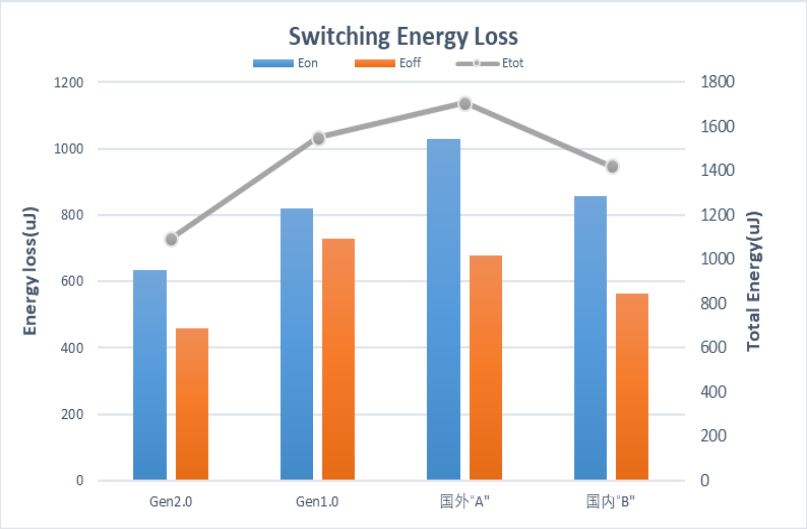
AccoPower V2P Module

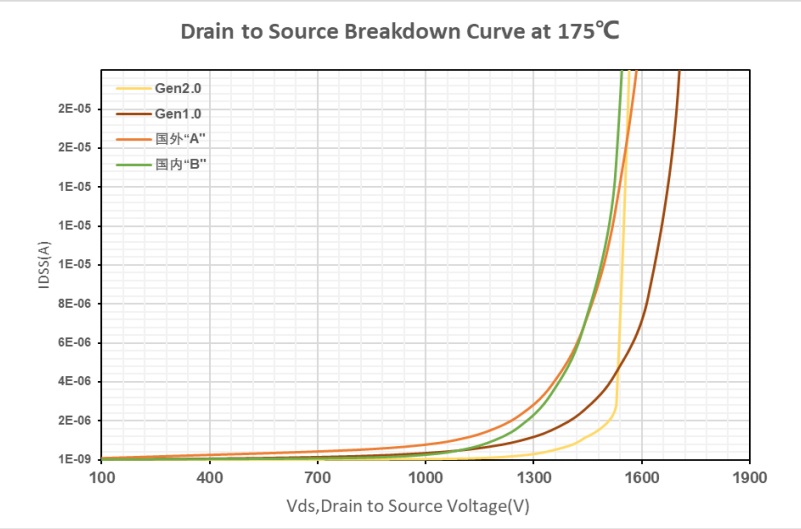


G2 SiC MOSFET Performance







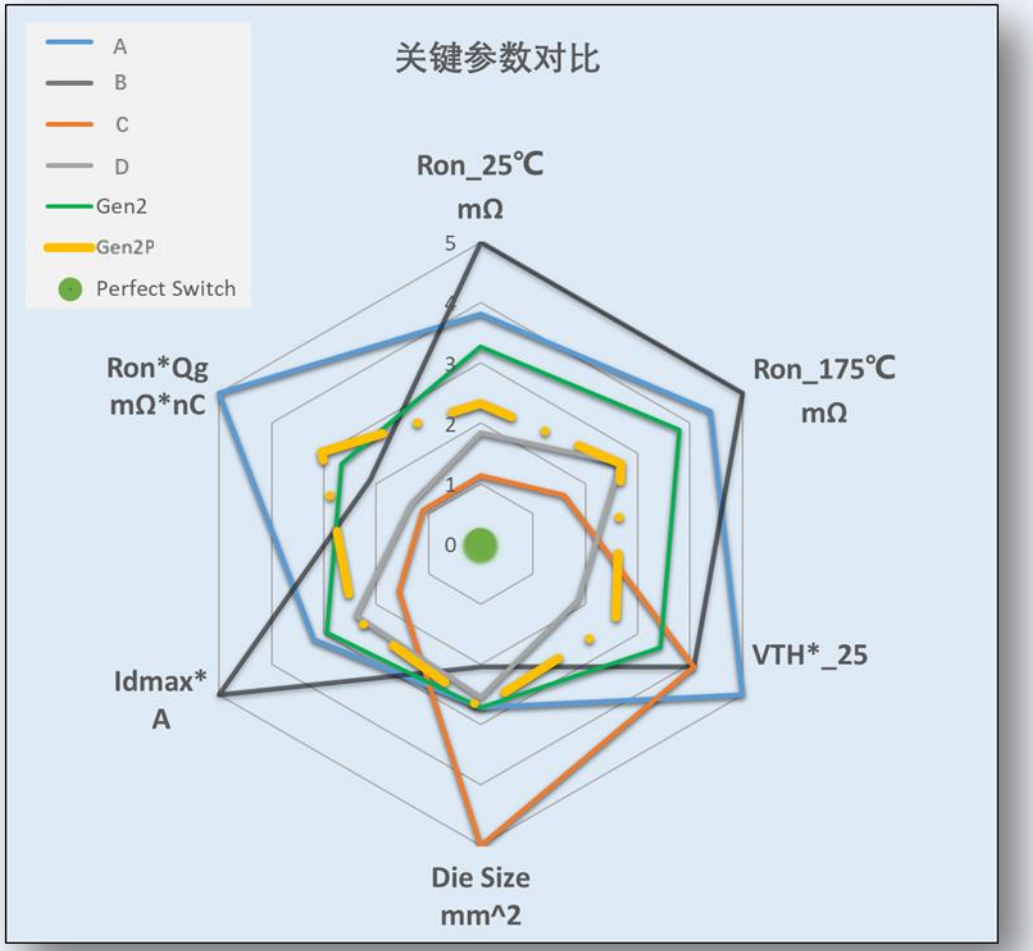


G2: 1200V/30mohm SiC MOSFET Reliability

3 lots samples passed all AEC-Q101 items + HV H3TRB

Test item	Test plan	Lot1	Lot2	Lot3
HV H3TRB	Ta = 85°C, 85% RH, Vds=960V Vgs=0V, 1000hrs	Pass (0/77)	Pass (0/77)	Pass (0/77)
UHAST	130°C, 85% RH ,18.8 psig, 96hrs	Pass (0/77)	Pass (0/77)	Pass (0/77)
TC	-55°C to 150°C, 1000cycles	Pass (0/77)	Pass (0/77)	Pass (0/77)
IOL	Delta Tj 100C, Ton&Toff 3min,1000hrs	Pass (0/77)	Pass (0/77)	Pass (0/77)
HTRB	Ta= 175°C , Vgs=0,Vds = 1200V,1000hrs	Pass (0/77)	Pass (0/77)	Pass (0/77)
HTPGB	Ta= 175°C , Bias = Positive max Vgs 22V,1000hrs	Pass (0/77)	Pass (0/77)	Pass (0/77)
HTNGB	Ta= 175°C , Bias = Negative max Vgs -10V,1000hrs	Pass (0/77)	Pass (0/77)	Pass (0/77)

G2P 1200V 13mohm SiC MOSFET



Device	Ron_25℃ mΩ	Ron_175℃ mΩ	VTH_25℃ V	Die Size mm^2	Idmax A
A	14	25	2.5	25	149
B	16.0	26.4	2.7	25	125
C	9.5	18.5	2.7	30	180
D	10.7	21	3.3	25	163
Gen2	15.1	27.6	2.9	25	153
Gen2P	**12.5**	**22.0**	**3.1**	**25**	**162**

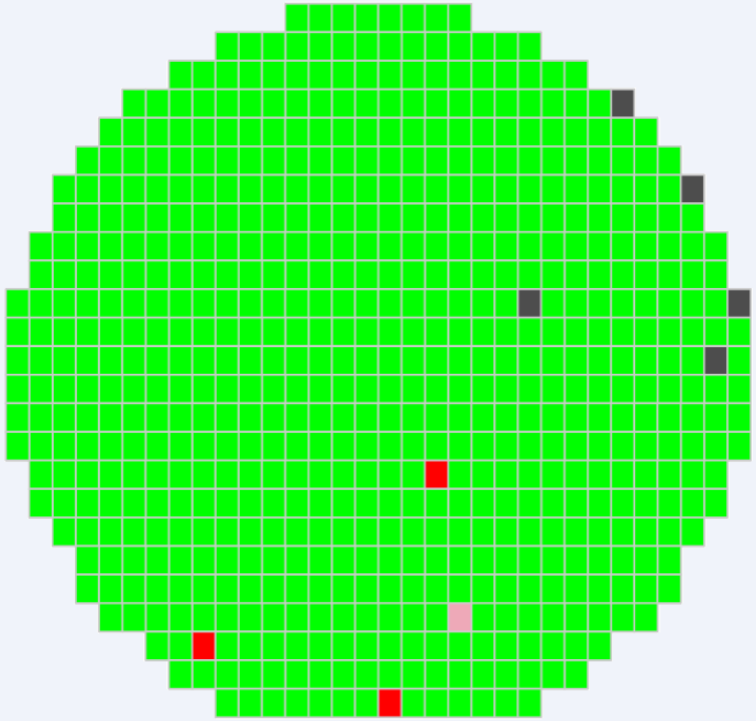
1200V Gen2P highlights:

- More balanced performacne
- Flexible customized Ron
  - ~13mohm 25mm^2 chip size
  - ~10mohm 30mm^2 chip size
- Faster development for 750V grade

T1 SiC MOSFET(trench) Platform (Launched @2025 Mar)

1200V T1 SiC MOSFET Ron,sp(mΩ·cm²)			
R-Com	I-Com	B-Com	ASC
2.25	2.38	2.31	2.30

		T1 1200V/13mohm	
Test Description	Stress Condition	Duration	Results
HTPGB	Ta=175℃, Vgs=+22V	1000hrs	PASS
HTNGB	Ta=175℃, Vgs=-10V	1500hrs	PASS
HTRB	Ta=175℃, Vds=1200V	1500hrs	PASS
HV-H3TRB	85℃, 85%RH, Vds=960V	1500hrs	PASS
TC	-55℃-150℃	1500cycs	PASS

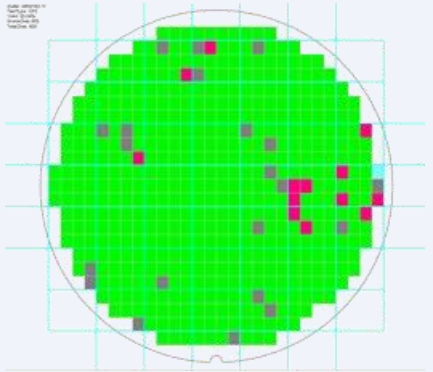


Wafer CP yield map：98.58%

Cooperative business scenarios

➢ Turn key service

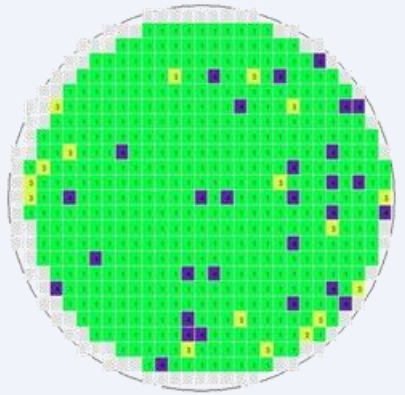
- Self-IP/Customized design & process platforms for SiC product
- Covering 650V~2000V rating
- MOSFET cell pitch size from 6.2um to 3.9um
- Latest Ron,sp < 3mΩ.cm^2
- AEC-Q101 certified at 2024. Nov



CP yield：93.04%
1200V/16mR

➢ Pure foundry service

- Customized process availability based on customer designs
- 80 tape-outs for 50+ customers
- Covering 650V~1700V rating
- Mass production since 2024 Q1



CP yield：90.91%
900V/11mR

Turn key portfolio: SiC MOSFET

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Key Features

(G2 1200V 14mohm as example)

- Rsp < 3mΩ·cm²
- Excellent FOM(Rdson*Qg)
- Low Rdson shift from 25℃ to 175℃
- Max Vgs,op -10V/22V
- Vth ~ 2.8V@25℃
- Over 2us Short circuit capability
- Gate drive voltage 18V/15V
- Automotive grade

AscenPower SiC Mosfet

VDS（V）	Rdson（mΩ）	ID（A）	Gen	Bare Die	TO247-4L	TO263-7L
750	9	130	G2P	2026-Q1	2026-Q1	2026-Q2
	15	110	G2P	2026-Q1	2026-Q1	2026-Q2
	20	80	G2P	2026-Q1	2026-Q1	2026-Q2
	25	75	G2P	2025-Q3	2025-Q3	2025-Q4
	40	46	G2P	2026-Q1	2026-Q1	2026-Q2
	60	30	G2P	2026-Q1	2026-Q1	2026-Q2
1200	9	185	G3	2026-Q2	2026-Q2	
	11	165	G3	2026-Q1	2026-Q1	
	13	155	G2P	2025-Q2	2025-Q2	
	25	75	G2P	2026-Q1	2026-Q1	2026-Q2
	30	65	G2P	2026-Q1	2026-Q1	2026-Q2
	40	50	G2P	2026-Q1	2026-Q1	2026-Q2
	60	40	G2P	2026-Q1	2026-Q1	2026-Q2
	70	35	G2P	2026-Q1	2026-Q1	2026-Q2
	14	111	G2E	●	●	
	16	113	G1	●	●	
	30	59	G2	●	●	●
	32	62	G2	●	●	●
	60	34	G2	●	●	●
	120	20	G2	●	●	●
> 2000	25	92	G2P	2026-Q2		

Note：Rdson（Typ）@Vgs=18V Tc=25℃，ID@Tc=25℃

Turn key portfolio: SiC SBD

AscenPower SiC SBD

VDS (V)	IF（A)	VF（V)	Gen	Bare Die	TO247-2L	TO247-3L	TO-220	TO252	TO263-2L
650	10	1.3	2	2025-Q3			2025-Q3	2025-Q3	
1200	20	1.45	1	●	●	2025-Q2			
	30	1.42	1	●	●				
	100	1.45	1	●	2025-Q1				
	30	1.4	2	2025-Q3	2025-Q3				2025-Q3

Note：VF@IF（Typ） Tc=25℃

Key Features

- Ultra low VF < 1.42@1200V
- High IFSM （forward surge Current） capability
- No reverse recovery current
- Low forward voltage at high temperature
- High switching performance

Key Benefits

- Higher reliability thanks to a low leakage current
- Reduction of system complexity and cost
- Efficiency improvement
- Enabling higher frequency
- Improved efficiency over all load conditions


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