Company Profile

Sanan Semiconductor

Q2 2024

Company Profile

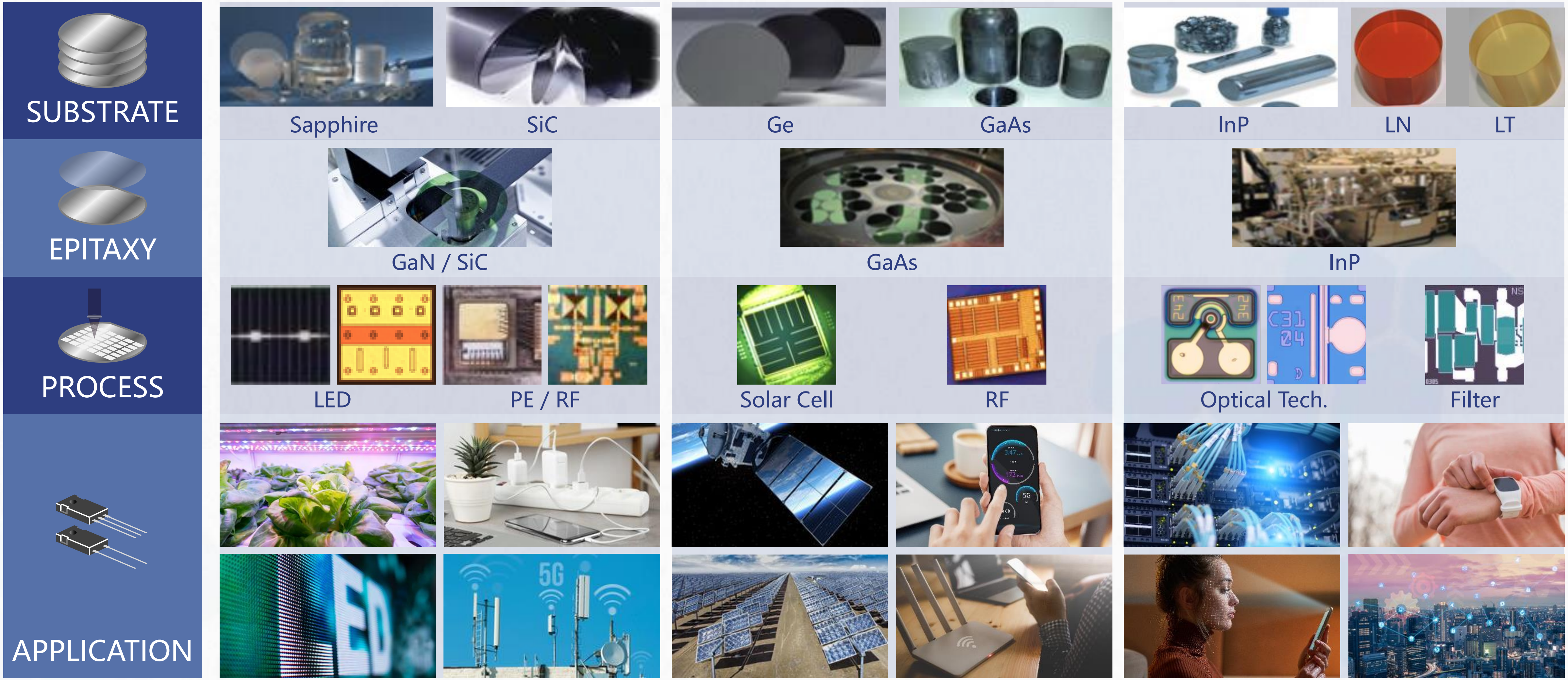
Parent Company: Sanan Optoelectronics (SSE: 600703)

- Established in 2000, Xiamen, China
- $ 1.8B Revenue in 2022
- The largest LED Epitaxial/Chip Wafer Manufacturer in China
- >15,000 Employees
- Scale: >600 MOCVD Reactors
- Capacity: 13M Wafers(Chips)/Year
- Market Focus: Ultra high brightness LED,
  Power Electronic, Radio Frequency, Optical Devices
- IP Portfolio: more than 4,000 patents

Highlights

- 3rd in the world and 1st in China for SiC vertical manufacturing platform
- 1st in China as SAW Filter Vertical manufacturer
- Largest shipments in APAC of GaN RF foundry manufacturer
- Largest-scale of in-house developed GaAs wafer foundry manufacturer
- Leading full-range, full-rate IR LASER LED manufacturer

Semiconductor R&D and manufacturing vertical platform



SUBSTRATE	Sapphire SiC	Ge GaAs	InP LN LT
EPITAXY	GaN / SiC	GaAs	InP
PROCESS	LED PE / RF	Solar Cell RF	Optical Tech. Filter
APPLICATION			

Empowering xEVs: “Electric, Intelligent, Connected”

DMU
SiC MOS 1200V 16/13mΩ

LiDAR
High power VCSEL、PD

Face ID / DMS
VCSEL、PD chip

Charging Pile
SiC MOS 1200V 75/32mΩ
SiC SBD 1200V 40/20A

E-compressor
SiC MOS 1200V 75mΩ

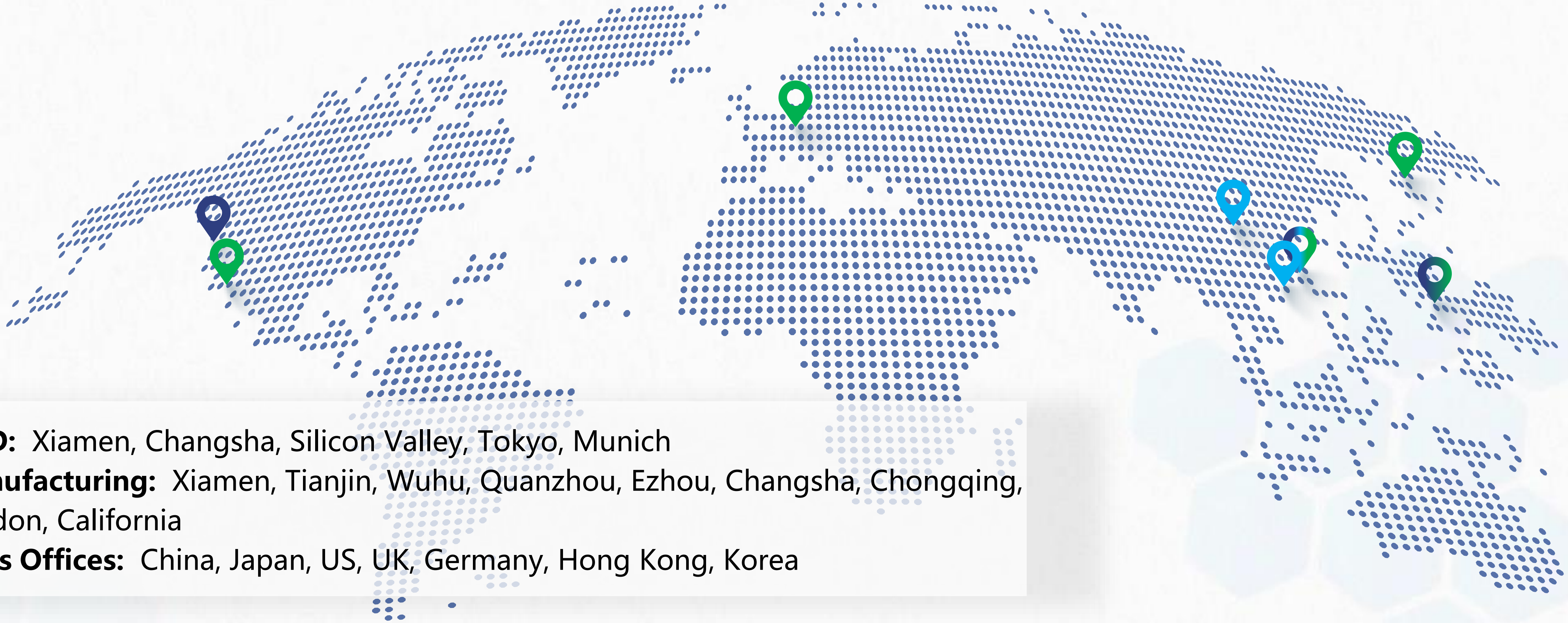
5G-V2X
GaAs RF, Filter

Mini-LED
High performance LED chip

DC-DC/OBC
SiC MOS 650V 60mΩ
SiC SBD 650V 20A

🟥 Mini-LED
🟨 OD Chip
🟦 RF Chip
🟩 Power Electric Chip

Global Vision



R&D: Xiamen, Changsha, Silicon Valley, Tokyo, Munich

Manufacturing: Xiamen, Tianjin, Wuhu, Quanzhou, Ezhou, Changsha, Chongqing, London, California

Sales Offices: China, Japan, US, UK, Germany, Hong Kong, Korea

Sanan IC | Xiamen
R&D center
RF / Filters / OD

Sanan Semi | Quanzhou
RF / Filters / OD

Sanan Semi | Changsha
SiC / GaN

Hunan Sanan Semiconductor Megafab

SiC Crystal Growth

- In-house SiC powder composition
- Self-develop PVT

SiC Substrate

- Mechanical and laser cutting
- Advanced physical and chemical polishing
- 8-inch wafers start in 2024

SiC Epitaxy

- Top1 Scaling MOCVD reactors
- Self-developed low defect growth technology

SiC Device Fab

- State-of-the-art tools and metrology
- CMOS FAB with all SiC process

SiC Package Assembly & Test

- Leading packaging technology
- Automotive qualification

SiC Mega Factory

- Phase I Completed, ramping to 200k wfr/yr(150mm)
- Phase II takes up 667,000 m^2 (165 Acres) in total
- Total investment: 2.3 billion USD (16 billion CNY)

Hunan Sanan Semiconductor

Sanan Mega Fab in Hunan

Sanan enabling New Energy

We succeed in Automotive, Photovoltaics & Energy storage, DC EV chargers, Telecom/Datacom Power supply, UPS, Industrial Motors, Home Appliances, Consumer Electronics.

800+	**Global Customers and Partners**
200M+	**SiC Chip/Device Shipments**

Win-win cooperation

life.augmented

SANAN and STMicroelectronics SiC Cooperation

- 2023/6/7，SANAN and STMicroelectronics sign agreement to establish 8inch SiC device joint venture FAB in Chongqing, China
- Total investment: $3.2 billion
- MP date: 2025Q4
- 8inch SiC substrate capacity: achieve 480K/Y in 2028

Win-win cooperation

SANAN and Li Auto SiC Cooperation

- 2022/3/23, Chehejia (Li Auto's parent company) and Hunan Sanan Semiconductor form a joint venture company
- Focusing on in-house R&D and production of automotive-grade silicon carbide power modules
- MP date: 2024
- Planned capacity: Silicon carbide half-bridge power modules 2.4 million/year

Diode Device Nomenclature Guide

S D S 0 6 5 J 0 0 2 D 3

S=Sanan
A=Automotive

D=Diode
M=Mosfet
L=Module

S=SiC
G=GaN

065=650V
120=1200V
170=1700V

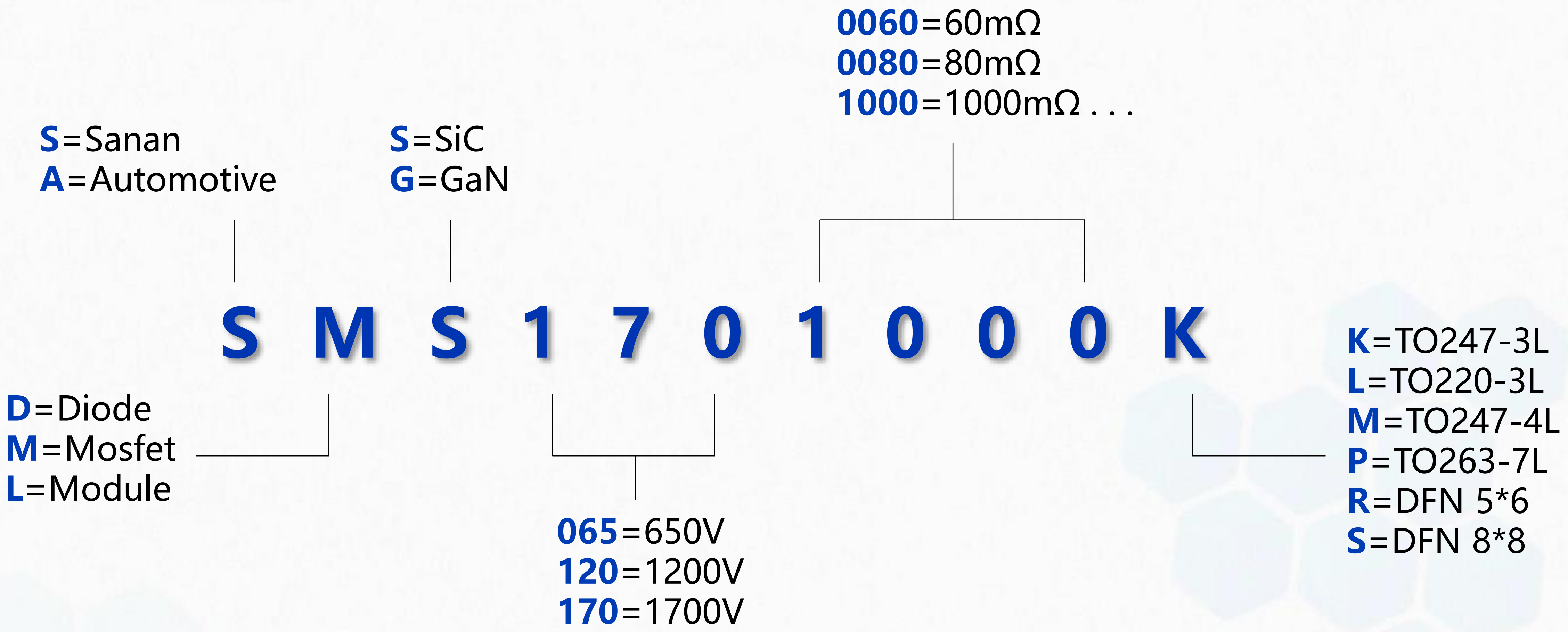
J=JBS
S=SBD
D=D-mode
E=E-mode

002=2A
004=4A
006=6A . . .

A=SOT227
B=Baredie
C=TO220-2L
D=TO252-2L
E=TO263-2L
F=TO220F-2L
G=TO247-3L
H=TO247-2L
I=TO251-3L
J=TO263-2L
K=TO247-3L
L=TO220-3L
M=TO247-4L
N=TO220N-2L
P=TO263-7L
Q=TO247-3L Plus
R=DFN 5*6
S=DFN 8*8
T=SMB
W=TO3PF

3=Gen-3
4=Gen-4
5=Gen-5 . . .

MOSFET Device Nomenclature Guide



S=Sanan
A=Automotive

S=SiC
G=GaN

0060=60mΩ
0080=80mΩ
1000=1000mΩ . . .

S M S 1 7 0 1 0 0 0 K

D=Diode
M=Mosfet
L=Module

065=650V
120=1200V
170=1700V

K=TO247-3L
L=TO220-3L
M=TO247-4L
P=TO263-7L
R=DFN 5*6
S=DFN 8*8

Quality Management System Certification Progress

IATF16949

CERTIFICATE

证 书

湖南三安半导体有限责任公司

IATF 16949:2016

ISO9001

CERTIFICATE

证 书

湖南三安半导体有限责任公司

ISO 9001 : 2015

ISO14001

CERTIFICATE

环境管理体系认证证书

湖南三安半导体有限责任公司

ISO45001

CERTIFICATE

职业健康安全管理体系认证证书

湖南三安半导体有限责任公司

QC080000

IECQ QUALITY ASSESSMENT SYSTEM (IECQ)

IECQ 符合性证书

有害物质过程管理

湖南三安半导体有限责任公司

ISO27001

湖南三安半导体有限责任公司

ANSI/ESD S 20.20

BUREAU VERITAS Certification

湖南三安半导体有限责任公司

ISO22301

BUREAU VERITAS Certification

证书

湖南三安半导体有限责任公司

ISO 22301:2019

SA8000

Bureau Veritas Certification

Bureau Veritas Certification Holding SAS

Hunan Sanan Semiconductor Co., Ltd.

NO	Item	Time
1	ISO9001	2022.4
2	IATF16949	2022.9
3	QC080000	2022.10
4	ISO14001	2022.5
5	ISO45001	2022.5
6	ISO27001	2022.12
7	ISO22301	2023.2
8	ANSI/ESD S 20.20	2023.4
9	SA8000	2023.11
10	CNAS/ISO17025	2024.3

- ✓ As an automotive component supplier, the company has implemented the VDA 6.3 process audit methodology.

Reliability Lab

- ✓ The lab is qualified with JEDEC & AEC-Q101 reliability test capabilities
- ✓ CNAS certification is under preparation

HV-HAST

HTRB

HV-H3TRB

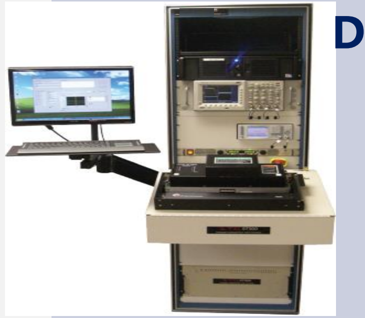
T/C

RA LAB

Rth

Surge

IOL



Dynamic

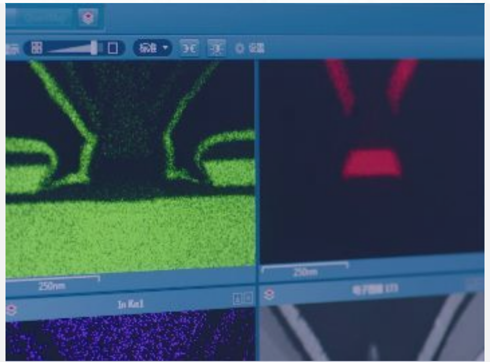
Failure Analysis Lab

PFA

- FIB
- SEM
- TEM / EDS
- Decap
- IM

EFA

- EMMI / InGaAs
- B1500



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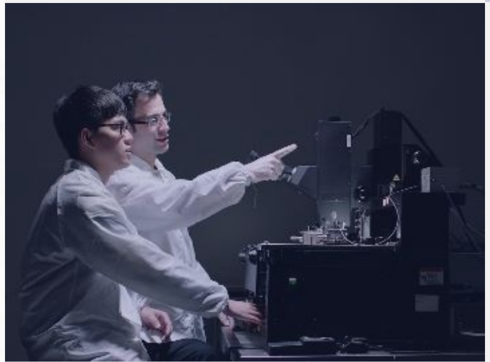
Advanced analysis systems in FA lab



Surface Analysis

- EDX

NDE Analysis

- X-ray
- SAM

2

Provide high quality analysis results

Competitive Engineering Analysis

FIB Circuit Repair Analysis

3

To be an excellent partner with OEMs

Sanan Core Competency

Focus

We focus on R&D and volume manufacturing of SiC and GaN power semiconductor products.

Vertical Integration

Our complete vertical integration of the whole value chain from raw material to packaging, and comprehensive control over production capacity, cost and quality.

Large Scale

Our planned production capacity ranks first in the world. Through large-scale manufacturing, the cost of components is reduced, and the industrialization of SiC and GaN power semiconductors is accelerated.

Flexible Solutions

Having catered to over 800 clients globally, the delivery of silicon carbide chips/devices has surpassed 200 million units/yr. Our business collaboration approach is versatile and varied, contributing to the success of our customers in delivering value to their supply chains.

THANKS

Committed to being a world-class
compound semiconductor R & D, manufacturing and service company