

**Powering Innovation: Experts in Power  
Semiconductor Modules & IC Design and Sales**

**Zhuhai Hypersemi Co., Ltd. [2025]**

# CONTENTS

01

## **About Us**

Business Overview · Core Technologies · Packaging Features

02

## **Technologies & Products**

IGBT · MOSFET · Power Modules · Diodes · Protection Devices

03

## **Quality Management System**

Design · Manufacturing · Continual Improvement

04

## **Product Applications**

New Energy · Industrial Control · Power Tools · Consumer Electronics

05

## **Testimonials**

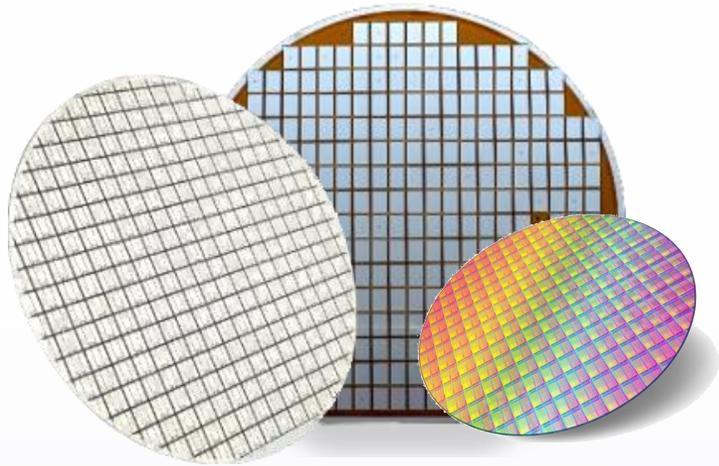
Power Supply · Power Tools · Consumer Products



## About Us

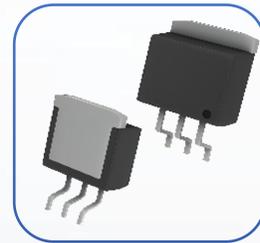
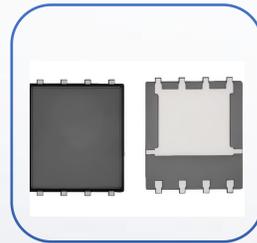
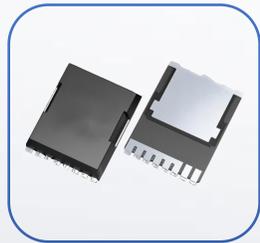


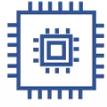
Zhuhai Hypersemi Co., Ltd. is a cutting-edge technology company committed to the design and development of power semiconductor devices and modules. With a strong focus on innovation in power drive and energy management, we aim to provide high-performance solutions and products that empower the future of energy and mobility.



Our core offerings span a comprehensive portfolio, including MOSFETs, IGBTs, SiC power devices, and integrated power modules — along with essential discrete components like diodes, transistors, thyristors, TVS protection devices, and bridge rectifiers. These solutions are trusted across diverse applications, including energy storage systems, power conversion, EV charging, renewable energy (solar and wind), industrial automation, power tools, smart appliances, and security systems.

Backed by extensive experience, technical excellence, and unwavering quality, Hypersemi is dedicated to delivering outstanding products and tailored solutions — building lasting partnerships and trust with clients worldwide.





# Product & Technologies

## IGBT



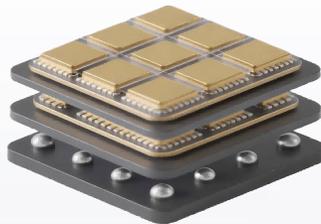
### Design

- Refined Trench Gate Design
- Optimized Carrier Storage Enhancement Layer
- Backside Taiko Thinning with Hydrogen-Implanted Buffer Layer Design
- Ultra-Thin Wafer with Laser Annealing Treatment

### Advantages

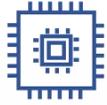
- Low Conduction and Switching Losses
- High Junction Temperature Tolerance
- High reliability

## FRD



- Multi-Layer Epitaxial Technology
- Electron Irradiation Lifetime Control Technology
- Optimized Emitter Doping Profile and Injection Efficiency

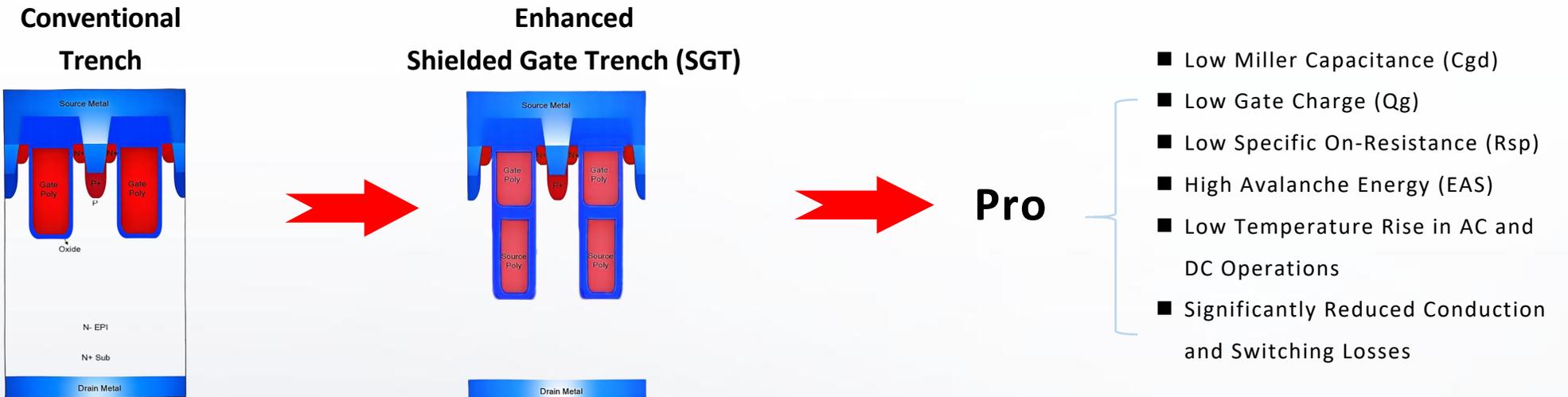
- Diversified application  $\pm$  temperature design
- High junction temperature tolerance
- High reliability



# Product & Technologies

**Trench:** Our Trench MOSFET product portfolio offers broad specification coverage to meet most mainstream market demands and has reached a high level of technical maturity. In lithium battery applications, certain models demonstrate ESD performance up to Class 3A under the HBM standard. Some variants are manufactured on a cutting-edge 12-inch wafer platform, where minimized cell pitch significantly boosts transistor cell density. This optimization not only enhances device performance but also greatly improves cost-efficiency, enabling us to offer more competitive pricing to our customers.

**SGT:** Across our multi-voltage SGT product platforms, we maintain industry-leading RSP (Resistance-Specific Performance), which directly contributes to superior cost control. Our flagship 30V/40V N-channel SGT MOSFETs have consistently delivered outstanding results in key performance benchmarks from various customer applications, particularly excelling in low latency and low power consumption. Extending to the 80V mid-voltage platform, we offer sub-2mΩ high-power MOSFETs that have demonstrated excellent avalanche ruggedness and overcurrent capability in real-world application tests — earning wide industry recognition.



# Core Technologies

## Chip

- EPT and LAC FRD technologies  
6500V/4500V/3300V
- IGBT and FCE FRD technologies  
GT&Trench
- 1700V/1200V/1000V/750V/650  
V
- CSL, FLR and wafer-level  
ultra-thin chip thinning  
Process 1700V/1200V

## Packaging

- Ag sintering technology
- Cu wire bonding technology
- AMB technology
- Ultrasonic welding  
technology
- Low parasitic inductance  
design technology
- Epoxy resin molding  
technology
- Elastic press-fit technology

## Test

- Static Electrical  
Parameter Testing
- Dynamic Performance  
Testing
- Reliability Assessment  
and Testing
- Environmental Stress  
Testing
- Failure Mode and Effect  
Analysis (FMEA)

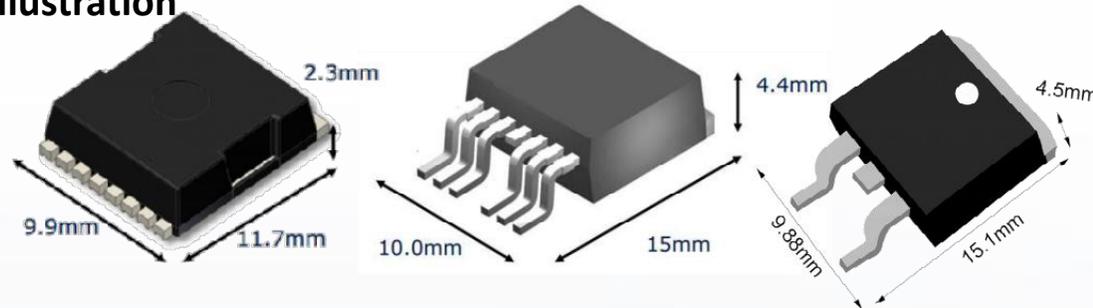
## Digital

- Loss simulation  
technology
- Thermal stress  
simulation technology
- Electro-thermal coupled  
simulation technology
- Pin mechanical  
simulation technology

# Selected Packaging Features

	TOLL	TO-263-7L	TO-263-3L
Die size	47mm <sup>2</sup>	35mm <sup>2</sup>	34mm <sup>2</sup>
Thermal resistance	0.5~1.5°C/W	1~2°C/W	1~3°C/W
Parasitic Inductance	0.5~2nH	2~5 nH	3~10 nH
Package Resistance	0.02~0.2mohm	0.05~0.5mohm	0.1~1mohm

## Package Illustration



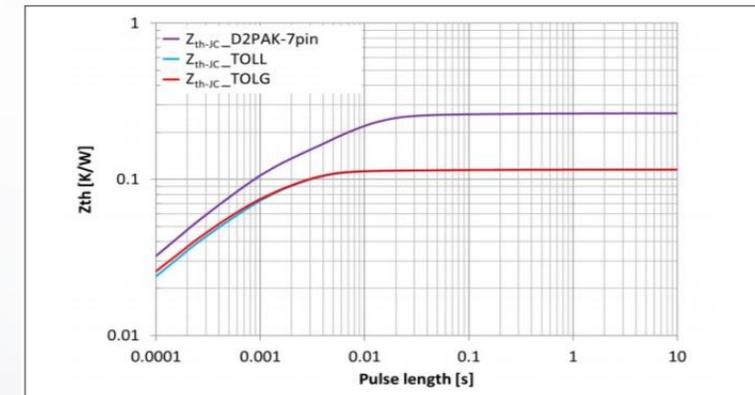
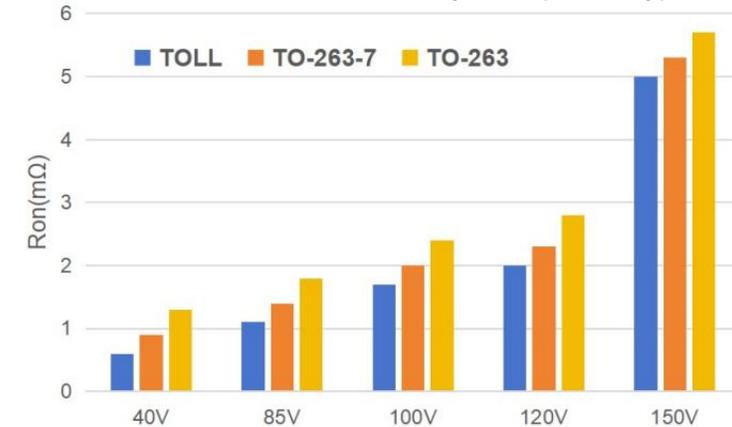
### Package features

- Reduce the Number of Paralleled Devices
- Enhance System Reliability
- Lower System Costs
- Ideal for Compact Applications

### Package advantages

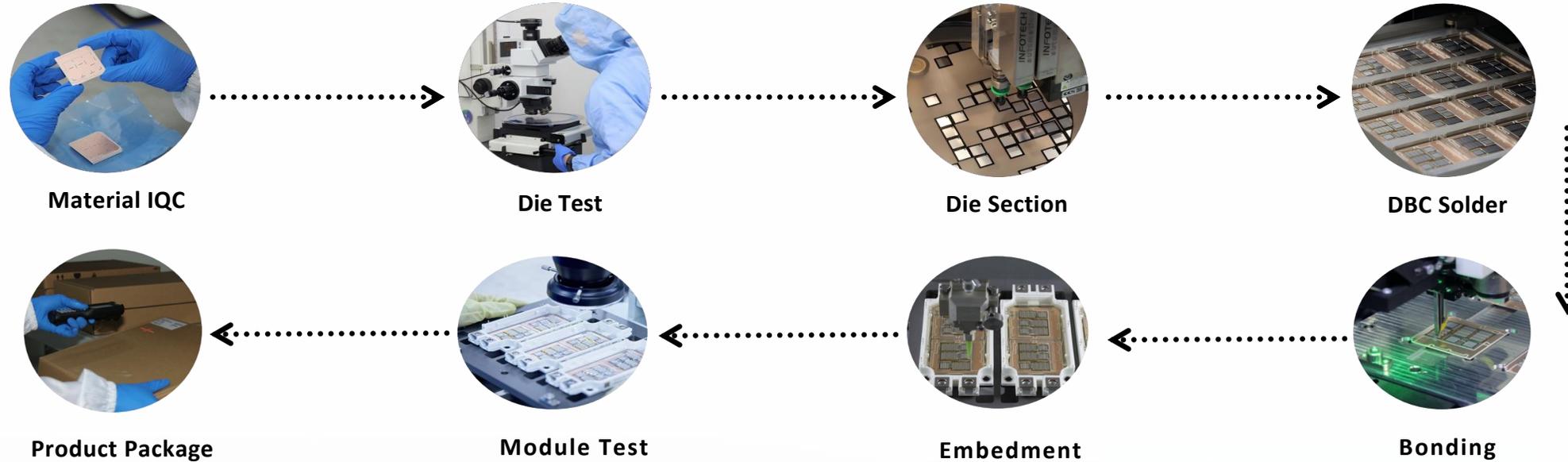
- Extremely Low On-Resistance
- High Current Capability
- Ultra-Low Package Parasitic Inductance
- Low Package Thermal Resistance

TO-263 and TOLL production resistance comparison (same chip)



TOLL thermal resistance characteristics

# Fabrication process

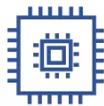


## IGBT Die

- Trench Gate & Field Stop structure
- Low Gate Charge QG
- Low Switching Loss
- Positive Tempera

## FRD Die

- Short Reverse Recovery Time
- Better Reverse Recovery Softness
- Wide Safe Working Area
- Good Consistency of Parameters



# Product and Technology



## IGBT Module

IC:15A-950A | VCES: 650V-1700V



IHM



EconoPIM3



Easy 2B



EconoDUAL3



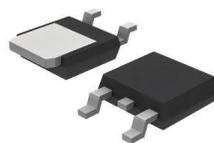
62mm

## Single IGBT

IC:5A-200A | CES:650V-1350V



TO-3PN



TO-252



TO-220



TO-247



TO-263

## SiC Series

ID:17A-152A | VDSS:650V-1900V



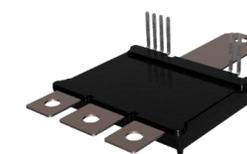
TO-247



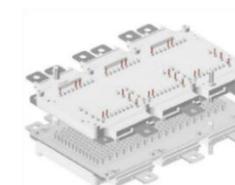
TO-263



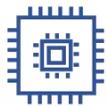
TOLL



Molding



HPD



## Thyristor Module

$I_F$ :25A-1200A |  $V_{RRM}$ :800V-3600V



M01G



M56



M06



M90



M14

## Rectifier Module

$I_F$ :30A-1000A |  $V_{RRM}$ :800V-2500V



M95



M15



M07



M51



M27

## FRD/SBD Module

$I_F$ :60A-800A |  $V_{RRM}$ :100V-1200V



M01G



M69G



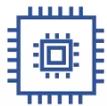
M58



M45



M31H



# Product and Technology



## MOSFET

ID:300mA-400A | VDSS:18V-1800V



PDFN5x6-8L



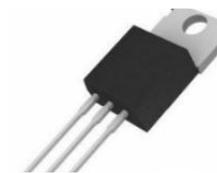
SOP-8



TO-263



TO-247



TO-220

## TSS

Is:10mA-100mA | V<sub>drm</sub>:6V-400V



SMA



SMB



SOD-123FL



SOP-8



DO series

## Bridge Rectifier

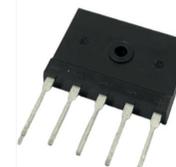
IO:800mA-75A | VRRM:50V-1600V



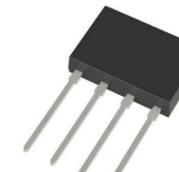
BR



MT-W



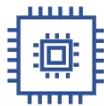
SGBJ



KBP



ABS



# Product and Technology



## ESD

VRRM:2.5V-48V | Ipp:1.5A-300A



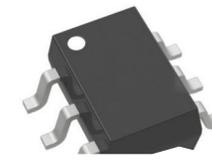
DFN1608-2L



SOD-123



SOT-363



SOT-23-6L



SOP-8

## TVS

VRWN:5V-510V | Ppk:200W-15000W



SMA



SMB



SOD-123FL



SMAF



DO series

## Diodes & transistors

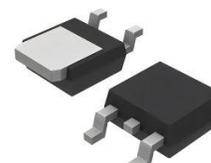
IO:5mA-60A | VRRM:1.8V-20KV



ITO-220AB



SOD-323



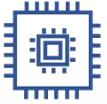
TO-252



SMA



SOT-23



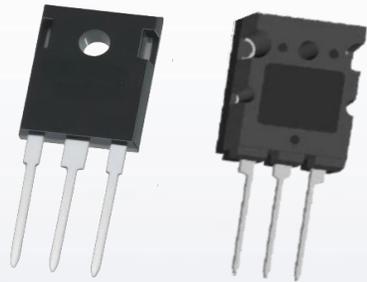
## Applications Power supplies and Motor driver



### Si/SiC-based TO-247/264 series

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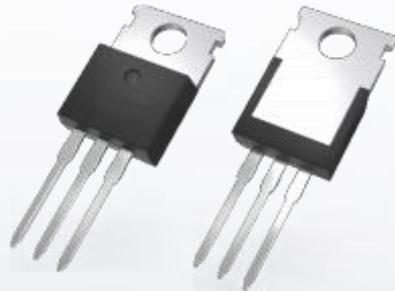
Supporting voltage levels from 650V to 1500V, with both IGBT and SiC devices available. Applicable to a wide range of industrial applications, including UPS systems, welding equipment, solar energy, industrial drives, as well as inverters for drivetrain systems.



### Si-based TO-220 series

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N-channel power MOSFETs ranging from 12V to 600V and P-channel devices from 12V to 150V are available. Widely used in load switching, open-frame power supplies, telecommunications, and consumer electronics applications.



### Si-based TO263/252 series

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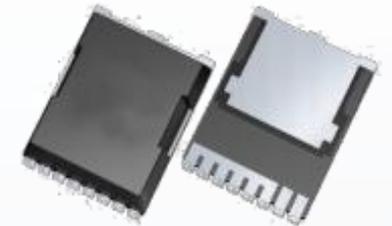
N-channel power MOSFETs ranging from 12V to 600V and P-channel devices from 12V to 150V. Widely used in motor drives, battery management systems (BMS), load switches, telecommunications, and consumer electronics applications.

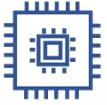


### Si/SiC-based TOLL series

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N-channel power MOSFETs ranging from 12V to 600V and P-channel devices from 12V to 150V. Well-suited for automotive electronic control systems, including BMS and DC-DC converters.





# Applications Wind & Solar Energy Storage



## Si/SiC-based H2 series

Designed for power levels above 200kW, covering the two mainstream voltage platforms of 1200V and 1700V. Widely used in main drive systems of commercial vehicles, as well as in photovoltaic and energy storage applications.



ED3 compatible

## Si/SiC-based H4 series

Designed for power ratings above 100kW, covering mainstream voltage platforms of 950V, 1000V, and 1200V. Widely used in servo inverters, photovoltaic systems, energy storage, and other applications.



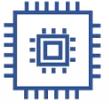
EASY compatible

## Si-based H5 series

Designed for power ranges from 30kW to 315kW, covering three mainstream voltage platforms: 650V, 1200V, and 1700V. Widely applied in wind power, photovoltaics, energy storage, servo inverters, UPS systems, electric welding machines, induction heating, and other fields.



62mm compatible



## Si/SiC-based H1 series

Designed for power ranges from 60kW to 300kW, covering two mainstream voltage platforms: 750V and 1200V. Widely used in the main and auxiliary drives of motors and other related applications.

## Si -based H3 series

Designed for power ratings of 60kW and below, featuring chips based on the 750V voltage platform. Widely used in the main drive systems of E-bike and fast charging station and other low-power applications.

## SiC-based M1 series

Designed for power ranges from 300kW to 400kW, compatible with the 1200V voltage platform. Modules are tailored to meet application requirements, providing an optimized design solution that fulfills system-level specifications for equipment control system or power station or equipment.

## Si/SiC-based M2 series

Designed for a power range of 40kW to 50kW, the flexible parallel configuration allows end applications to cover power levels from 40kW up to 400kW. Supporting both 750V and 1200V mainstream voltage platforms, the products are widely used in equipment control system.

## SiC-based M3 series

Designed for power ranges from 150kW to 350kW, compatible with the 1200V voltage platform. Modules are customizable to meet application-specific requirements, offering an optimized design solution that fulfills system-level specifications.



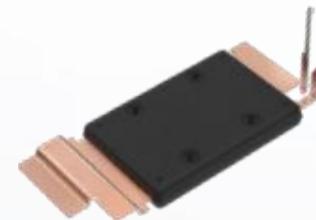
HPD compatible



HP1 compatible



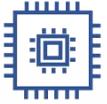
Half-Bridge Molding  
Compatibility



TPAK compatible



Half-Bridge Molding  
Compatibility

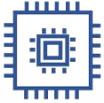


# SiC MOSFET 1200V-1900V



Applicable for power supplies, wind power systems, photovoltaic inverters, frequency converters, charging stations, and the switching sections of motor drives.

Category	TO-247-3L	TO-247-4L	TO-263-7L	VDS max (V)	Current (A)	Ron typ (mΩ)	Ron max(mΩ)	Vth (V)
SiC Mosfet	CM72N120LX100	CM72N120L4X100		1200	72	40	45	3.2
SiC Mosfet	CM77N120LX100	CM77N120L4X100		1200	76	35	45	2.5
SiC Mosfet		CM35N120L4AX100		1200	35	80	130	3.7
SiC Mosfet	CM38N120LX100	CM38N120L4X100	CM38N120SEX100	1200	38	80	100	3.5
SiC Mosfet		CM35N120L4X100		1200	35	100	120	3.2
SiC Mosfet	CM35N120LX100	CM35N120L4X100	CM35N120SEX100	1200	35	80	100	2.8
SiC Mosfet		CM68N120L4X100		1200	68	40	45	2.7
SiC Mosfet		CM29N170L4X100		1700	29	100	130	2.7
SiC Mosfet		CM40N170L4X100		1700	40	55	70	2.7
SiC Mosfet		CM35N190L4X100		1900	35	65	80	2.7

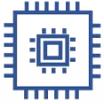


# MOSFET Dual chips 2 in 1



Bridge-type MOSFETs are mainly used in the switching sections of motor drives, such as water pumps and electric motors.

Category	Part No.	Package	VDSS (V)	ID (A)	RDSON & Vgs =10V		Replace reference	Features and applications
					TYP (mΩ)	Max (mΩ)		
N+N	HM8N03NAX100	DFN2x2-6L	30	7.6	17	20		Dual N MOS, Universal Small-signal model
N+N	HM50N04PDX100	PDFN5x6-8L	40	50	8.5	11.5		Dual N MOS
N+N	HM60N04PDX100	PDFN5x6-8L	40	60	4	5	PJQ5844-AU	Dual N MOS
N+N	HM4822P8X100	SOP-8	30	8.5	11	16	IRF7351	Dual N MOS
N+N	HM4828P8X100	SOP-8	60	4.5	40	56	BSO615CG	Dual N MOS
N+N	HM20N06PDX100	PDFN5x6-8L	60	20	26	38	IPG20N06S2L	Dual N MOS
P+N	HM4606P8X100	SOP-8	30	7.2	18.7	28	CJQ4606	P+N half-bridge
			-30	-6.8	42	52		
P+N	HM30D04PDX100	PDFN5x6-8L	40	30	8	11.5	SQJ500AEP	P+N half-bridge Solenoid valve drive, high-frequency switch
			-40	-30	27	33		
P+N	HM4559P8X100	SOP-8	60	4.5	40	58	FDS4559	P+N half-bridge push-pull structure MOSFET
			-60	-3.5	60	80		
P+N	HM4606P8X100	SOP-8	-30	-6.8	42	52		P+N MOS, Universal Small-signal model
			30	7.2	18.7	28		

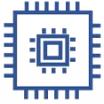


## MOSFET Low voltage less 100V



Low-voltage MOSFETs are mainly used in the power supplies, energy storage and switching sections of motor drives, such as water pumps and electric motors.

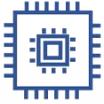
Category	Part No.	Package	VDSS (V)	ID (A)	RDSON & Vgs =10V		Replace reference	Features and applications
					TYP(mΩ)	Max(mΩ)		
N	HM60N10FX100	TO-252	100	60	15	18		
N	HM60N10PDX100	PDFN5x6-8L	100	60	12	15		
N	HM80N10FX100	TO-252	100	80	6.5	8		
N	HM100N10TX100	TO-220	100	100	6.8	8	IRFS4410Z	Power supplies, energy storage, etc.
N	HM100N10FX100	TO-252	100	100	5	6	IRFS4410Z	Power supplies, energy storage, etc.
N	HM120N10SX100	TO-263	100	120	4.8	5.6		
N	HM120N10TX100	TO-220	100	120	4.8	5.6		
N	HM130N10SX100	TO-263	100	130	3.4	4.5		
N	HM130N10TX100	TO-220	100	130	3.4	4.5		
N	HM160N10SX100	TO-263	100	160	3.5	4	IRFP4110PBF	Power supplies, energy storage, etc.
N	HM180N10LX100	TO-247	100	180	3.5	4.5	IRFP4110PBF	Power supplies, energy storage, etc.



## MOSFET Low voltage less 60V

Low-voltage MOSFETs are primarily used in the switching sections of motor drives, such as water pumps and electric motors.

Category	Part No.	Package	VDSS (V)	ID (A)	RDS(on) & Vgs =10V TYP(mΩ) Max(mΩ)		Replace reference	Features and applications
P	HM15P06FX100	TO-252	-60	-15	60	80	NTD2955	
N	HM20N06PBX100	PDFN3.3*3.3-8L	60	20	26	35	IPG20N06S2L	Vehicle lighting
N	HM50N06PDX100	PDFN5x6-8L	60	50	7.5	10	DMTH6016LPSQ	Automotive electronics
N	HM50N06FX100	TO-252	60	50	7.5	10		
N	HM100N06PDX100	PDFN5x6-8L	60	100	2.6	4.8	BUK7Y4R8-60E	High-power drive
N	HM100N06SX100	TO-263	60	100	2.8	4.8		

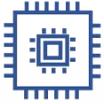


## MOSFET Low voltage less 40V



Low-voltage MOSFETs are primarily used in the switching sections of motor drives, such as water pumps and electric motors.

Category	Part No.	Package	VDSS (V)	ID (A)	RDSON & Vgs =10V		Replace reference	Features and applications
					TYP(mΩ)	Max(mΩ)		
P	HM40P04FX100	TO-252-2L	-40	-40	11	17		
N	HM90N04FX100	TO-252	40	90	3.6	4.5	IPD90N04S4L-04	Motor drive
N	HM90N04FY100	TO-252	40	90	2.5	3	IPD90N04S4L-04	
N	HM200N04PDX100	PDFN5x6-8L	40	200	0.85	1	IAUC120N04S6N010	High-power drive
N	HM200N04UY100	DFN7*8 N-TOLL	40	200	0.85	1	IAUA180N04S5N012	Electric water pump, EPS
N	HM100N04PDX100	PDFN5x6-8L	40	100	2.7	3		
P	HM100P04PDX100	PDFN5x6-8L	-40	-100	5	7		
N	HM110N04SX100	TO-263	40	110	3.5	4.5	NTD5C446N	IPB power MOSFET
N	HM130N04PDX100	PDFN5x6-8L	40	130	1.6	2	IAUA120N04S5N014	High-power drive; including high & low Vth value
N	HM160N04SX100	TO-263	40	160	1.8	2.2	IPB120N04S4-02	High-power drive; including high & low Vth value
N	HM70N04PDY100	PDFN5x6-8L	40	70	3.3	4.5	BUK7Y3R5-40E	Slow switching speed; reverse polarity protection for motor power supply
N	HM70N04PDX100	PDFN5x6-8L	40	70	3.5	4	JMTQ055N04A	Fast switching speed; automotive seatbelt
N	HM90N04FX100	TO-252	40	90	1.8	2.5	TK1R4S04PB	High-power drive; including high & low Vth value

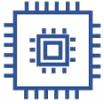


## MOSFET Small signal



High input impedance, low noise, and fast switching — widely applicable in consumer electronics, medical devices, industrial control, and other product applications.

Part No.	Package	VDSS (V)	ID (A)	RDSON & Vgs =4.5V TYP(mΩ) Max(mΩ)		Replace reference	Features and applications
HM2301T2X100	SOT-23	-20	-3	85	110	2301	Universal Small-signal model
HM2302T2X100	SOT-23	20	3	35	45	2302	Universal Small-signal model
HM2310T2X100	SOT-23	60	3	70	-	2310	Universal Small-signal model
HM2309T2X100	SOT-23	-60	-1.6	120	-	2309	Universal Small-signal model
HM3400T2X100	SOT-23	30	5.2	22	35	3400	Universal Small-signal model
HM3401T2X100	SOT-23	-30	-4.2	45	50	3401	Universal Small-signal model
HM3415T2X100	SOT-23	-20	-5	30	40	3415	Universal Small-signal model
HM8810T8X100	SOT-23	20	7	14	17	8810	Universal Small-signal model
HM2N7002KT2X100	SOT-23	60	0.3	1900	3000	2N7002	Universal Small-signal model
HM90N03FX100	TO-252	30	90	3.3	4		Universal Small-signal model
HMBSS138T2X100	SOT-23	50	0.3	1300	-	BSS138	Universal Small-signal model
HMBSS84T2X100	SOT-23	-50	-0.18	2600	-	BSS84	Universal Small-signal model



## TVS High power products



Focused on the development of high-level power protection devices, specializing in high-power TVS products. Providing comprehensive support and services for a full range of high-power TVS devices.

Category	Package	Peak power Ppp	Reverse voltage Vrwm	Operating junction temperature	Features and applications
SMF series	SOD-123FL	200W	5 ~170V	-55 ~175°C	Power Supplies, Motor Drive Controllers, Industrial Power Supplies, Mining Machines, Electronic tools and more.
SMAJ series	SMA	400W,600W	5 ~440V	-55 ~175°C	
SMBJ series	SMB	600W,1500W	5 ~513V	-55 ~175°C	
SMC/SMD series	SMC	1500W,3000W,5000W	5 ~440V	-55 ~175°C	

# Quality Management System

A quality-centered design and manufacturing assurance supported by a closed-loop quality management system throughout the entire process.

- Design standards ensured through a systematic framework
- Linked optimization of SPICE simulations and WAT test parameters
- Review of critical checkpoints
- Continuous Improvement Process
- Supply Chain Quality Management
- Customer Feedback Analysis and Integration
- Risk Management Strategy

**Design stage**

**Fabrication stage**

**Industry benchmark**

- Raw Material Inspection
- Process Control and Monitoring
- Finished Product Testing and Analysis
- Change Control
- Shipment Assurance



## Quality Performance and Continuous Improvement

### Quality Performance Index QPI

Monitor quality stability through a dynamic quality dashboard that tracks key performance indicators (KPIs) such as yield rate and defect rate.



### Customer feedback Analysis

Collect customer feedback, analyze product defects, and promptly adjust production processes to improve customer satisfaction.

质量绩效与  
持续改进

### Quality Management System Certification

Obtain international quality management system certifications such as ISO 9001 to ensure compliance with global standards and enhance market competitiveness.



### Continuous improvement process

Implement lean manufacturing and other methodologies to continuously optimize production processes. Data-driven quarterly quality meetings drive cross-departmental improvements.

# Quality Management System



A full-process quality inspection equipment solution that detects and identifies process control risk points, ensuring stable product quality throughout the manufacturing chain.

## Solder Paste Quality Control



Solder paste inspection (SPI)

## Silver Sintering /Molding Quality Control



Delamination inspection for silver sintering and encapsulation

## Soldering quality control



Automated Optical Inspection (AOI)



2D/3D X-RAY solder void inspection

## Bond pull and shear test quality control

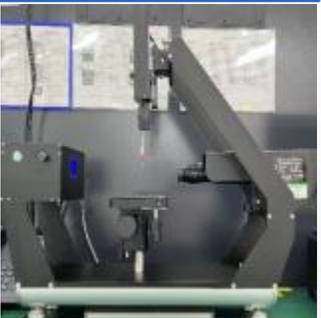


Dage pull and shear bond testing



High-magnification microscope bond wire loop inspection

## Cleaning quality control



Water Contact Angle  
Plasma Cleaning Test

## Encapsulation quality control



Penetration Hardness  
Silicone Gel Hardness Testing

## positional accuracy quality control



Vision Measuring Machine (VMM) Pin Positional Accuracy Inspection

## Product test quality control

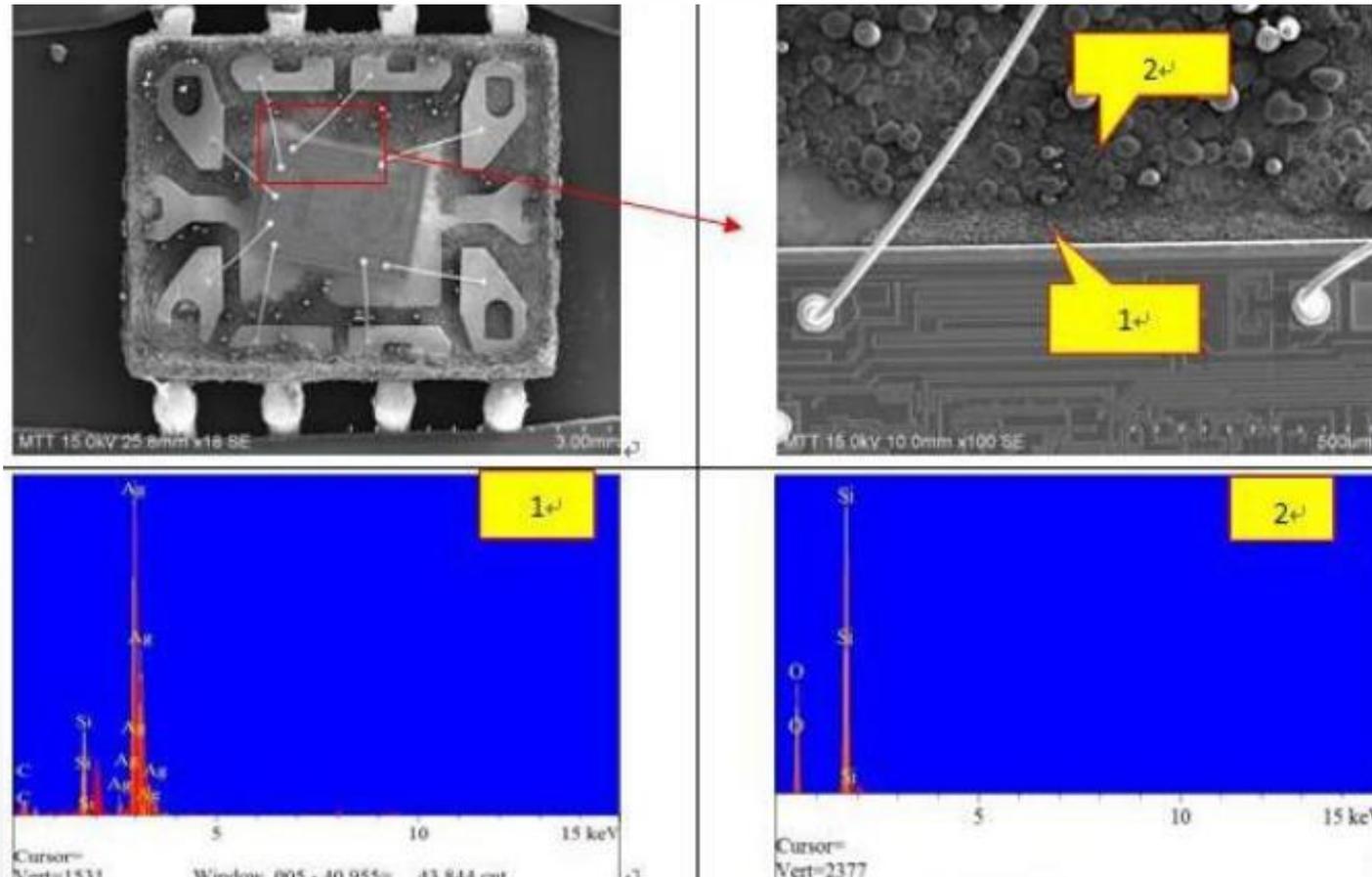


Substrate Testing  
Room Temperature Static Testing  
High Temperature Dynamic Testing



Insulation Testing  
Room Temperature Static | High Temperature Dynamic  
High Temperature Static | Aging Testing  
Insulation Testing and Arc Detection Equipment

## Customer Support – After-sales failure analysis



### Advantages:

- Application-Level Analysis
- Expert in Failure Analysis
- Years of Experience in Failure Analysis
- Independent Failure Analysis Solutions
- Comprehensive Failure Analysis Equipment & Resources
- Assisting Clients in Analyzing Failures of Other Products

**Customers**

				
				
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# THANK YOU FOR TIME

Integrity | Professionalism | Innovation | Efficiency

Zhuhai Hypersemi Co., Ltd.

E-mail: [info@hypersemi.com.cn](mailto:info@hypersemi.com.cn)

Website: [www.hypersemi.com.cn](http://www.hypersemi.com.cn)

Add: No. 163 Xingye Road Xiangzhou District Zhuhai PRC

