



# SiC POWER PRODUCTS

## 2022 CATALOG



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SiC MOSFETs

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SiC DIODES

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SiC MODULES

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BARE DIE

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REDUNDANT SiC SUPPLY CHAIN



## **SemiQ is a US-based developer and manufacturer of Silicon Carbide (SiC) Power Semiconductors**

**We design and manufacture Silicon Carbide Power Semiconductors including:**

- ⬡ SiC Power MOSFETs
- ⬡ SiC Power MPS Diodes (650V, 1200V, 1700V)
- ⬡ SiC Bare Die
- ⬡ SiC MOSFET Modules
- ⬡ SiC Diode Modules
- ⬡ SiC Custom Modules

SemiQ is privately held and partially employee owned.

SemiQ began developing Silicon Carbide technologies in 2012 at its headquarters in Southern California where it also grows Epi and designs devices.

SemiQ released its GEN 3 SiC Schottky diodes (merged PiN Schottky type) which include improvements in surge current, moisture resistance, and overall robustness and ruggedness. Accelerated high temperature reliability testing has exceeded over 24 million device hours. SemiQ GEN 3 diodes are 100% Avalanche Tested.

### **Applications**

SemiQ products are deployed in EV charging systems, induction heating, power supplies, fuel cell power generation, and solar inverters around the world.

Additionally, SemiQ offers power conversion application expertise and has extensive experience designing inverters of 3.3kW, 6.6kW and above.

### **Redundant SiC Supply Chain**

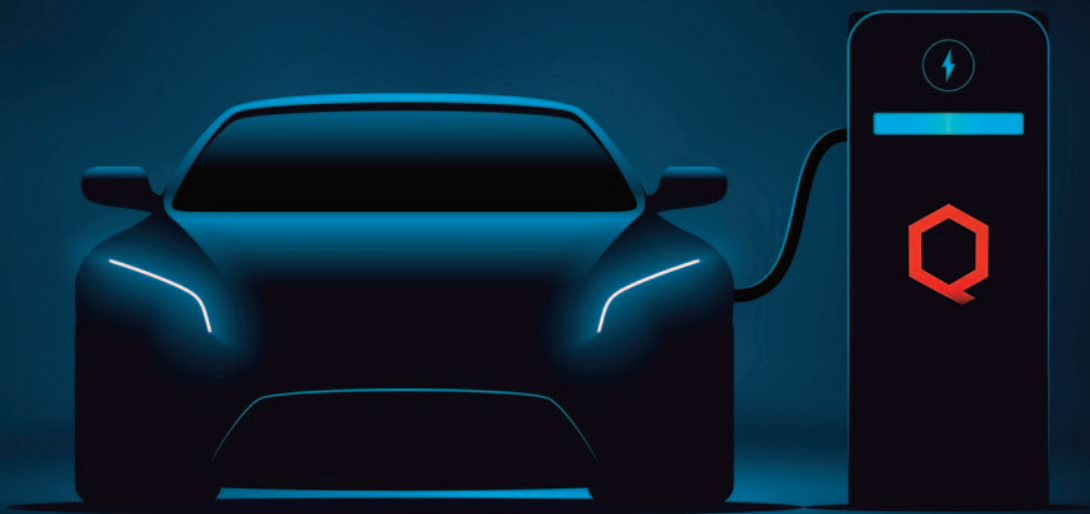
In order to mitigate risk to customers, SemiQ is building a fully redundant supply chain with multiple sources for:

- ⬡ SiC Substrates
- ⬡ SiC Epi Wafers
- ⬡ SiC Wafer Fabrication
- ⬡ Assembly and Test Factories
- ⬡ Warehouses



## Silicon Carbide Diodes and MOSFETs

- ⬡ SemiQ SiC Diodes and MOSFETs represent a huge improvement in reliability, device ruggedness, surge current capability and moisture resistance.
- ⬡ These devices feature two layers of passivation on each chip. Extensive reliability testing includes over 24 million hours of HTRB and H3TRB.
- ⬡ Diodes and MOSFETs are available in standardized packages including TO-220, TO-247, TO-263, SOT-227, Half-Bridge and Full-Bridge Modules, as well as Bare Die wafers.
- ⬡ To improve ruggedness even further, packaged devices are 100% tested for undamped inductive load. To protect customers from risk, SemiQ has established a fully redundant supply chain, including multiple sources for: SiC substrates, SiC epi, SiC wafer fab, assembly and testing.

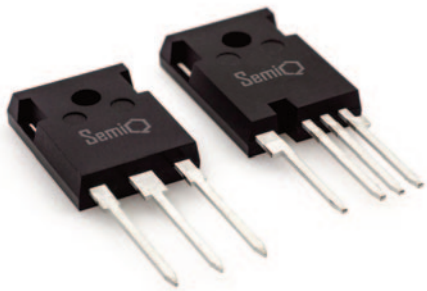


**Contact SemiQ today to benefit from our extensive Silicon Carbide experience, expertise and robust supply chain.**



# SiC MOSFETs – Discrete and Modules

SiC MOSFETs from SemiQ operate with reduced switching losses and reduced heat-sink size, thereby increasing efficiency, power density, and reliability. We provide customized circuit topologies in multiple standardized package platforms, and offer quick sample delivery with low NRE cost.



## SIC MOSFET - DISCRETE

Part Number	VDC	mΩ	Package
GP2T080A120U	1200	80	TO-247-3L
GP2T080A120H		80	TO-247-4L
GP2T040A120U		40	TO-247-3L
GP2T040A120H		40	TO-247-4L
GP2T020A120U		20	TO-247-3L
GP2T020A120H		20	TO-247-4L



## SIC MOSFET – MODULES

Part Number	VDC	mΩ	Package
GCMX080B120S1-E1	1200	80	SOT-227
GCMX040B120S1-E1		40	SOT-227
GCMX020B120S1-E1		20	SOT-227
GCMX010B120S1-E1		10	SOT-227



## SIC MOSFET – COPACK MODULES

Part Number	VDC	mΩ	Package
GCMS080B120S1-E1	1200	80	SOT-227
GCMS040B120S1-E1		40	SOT-227
GCMS020B120S1-E1		20	SOT-227
GCMS010B120S1-E1		10	SOT-227



## SIC MOSFET – FULL & HALF BRIDGE MODULES\*

Part Number	VDC	mΩ	Package
GCMX020A120B2B1P	1200	20	B2 Half Bridge
GCMX010A120B2B1P		10	B2 Half Bridge
GCMX040A120B3H1P		40	B3 Full Bridge
GCMX020A120B3H1P		20	B3 Full Bridge
GCMX010A120B3B1P		10	B3 Half Bridge
GCMX005A120B3B1P		5	B3 Half Bridge
GCMS005A120S7B1		5	S7 Half Bridge
GCMS003A120S7B1		3	S7 Half Bridge

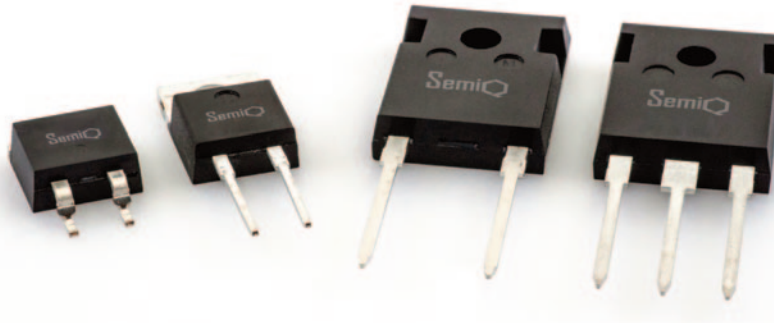


\*IN DEVELOPMENT

## GEN 3 SiC Schottky Diodes – Discrete

SiC Schottky diodes from SemiQ operate with zero switching losses thereby increasing overall efficiency and decreasing heat dissipation.

All GEN 3 Schottky Diodes in discrete packages are 100% Avalanche Energy tested.



### SiC SCHOTTKY DIODES - DISCRETE

Part Number	VDC	I <sub>F</sub>	Package
GP3D006A065A	650	6	TO-220-2L
GP3D006A065D		6	TO-263-2L
GP3D006A065F		6	TO-220-2L FULL PACK
GP3D008A065A		8	TO-220-2L
GP3D008A065D		8	TO-263-2L
GP3D010A065A		10	TO-220-2L
GP3D010A065B		10	TO-247-2L
GP3D010A065D		10	TO-263-2L
GP3D012A065A		12	TO-220-2L
GP3D012A065B		12	TO-247-2L
GP3D016A065U		2x8	TO-247-3L
GP3D020A065A		20	TO-220-2L
GP3D020A065B		20	TO-247-2L
GP3D030A065B		30	TO-247-2L
GP3D050A065B		50	TO-247-2L
GP3D020A065U		2X10	TO-247-3L
GP3D024A065U		2X12	TO-247-3L
GP3D040A065U		2X20	TO-247-3L

Part Number	VDC	I <sub>F</sub>	Package
GP3D010A120A	1200	10	TO-220-2L
GP3D010A120B		10	TO-247-2L
GP3D010A120S		10	SMC
GP3D015A120A		15	TO-220-2L
GP3D015A120B		15	TO-247-2L
GP3D020A120A		20	TO-220-2L
GP3D020A120B		20	TO-247-2L
GP3D030A120B		30	TO-247-2L
GP3D050A120B		50	TO-247-2L
GP3D020A120U		2X10	TO-247-3L
GP3D030A120U		2X15	TO-247-3L
GP3D040A120U		2X20	TO-247-3L
GP3D060A120U		2X30	TO-247-3L
GP3D005A170B	1700	5	TO-247-2L
GP3D010A170B		10	TO-247-2L
GP3D020A170A		20	TO-220-2L
GP3D020A170B		20	TO-247-2L
GP3D050A170B		50	TO-247-2L

# SiC Schottky Diodes – Modules

SiC Schottky Diode Modules offer a cost-effective solution with both ruggedness and low stray inductance. The SOT-227 have built in electrical isolation from the base plate.

Power modules utilizing SemiQ's GEN 3 SiC Diodes feature:

- ⬡ Merged PiN Schottky (MPS) device structure
- ⬡ Enhanced two-layer chip passivation for improved moisture resistance
- ⬡ Over 24 million device hours of HTRB and H3TRB
- ⬡ Improved surge current and ruggedness



## SiC SCHOTTKY DIODES - MODULES

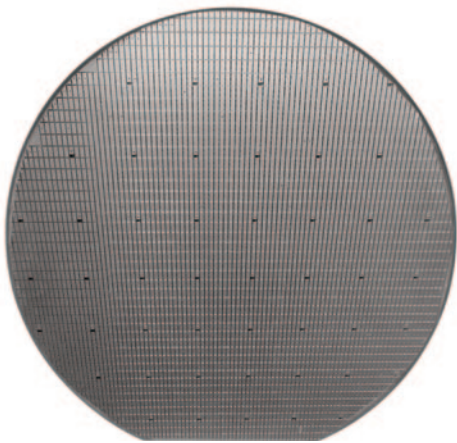
Part Number	VDC	Idav	Package
GHXS010A060S-D3	600	10	SOT-227
GHXS020A060S-D3		20	SOT-227
GHXS030A060S-D3		30	SOT-227
GHXS030A060S-D1E		30	SOT-227
GHXS050A060S-D3		50	SOT-227
GHXS050B065S-D3	650	50	SOT-227
GHXS100B065S-D3		100	SOT-227
GHXS015A120S-D1	1200	15	SOT-227
GHXS015A120S-D3		15	SOT-227
GHXS030A120S-D3		30	SOT-227
GHXS030A120S-D1E		30	SOT-227
GHXS045A120S-D3		45	SOT-227
GHXS050B120S-D3		50	SOT-227
GHXS060A120S-D3		60	SOT-227
GHXS060B120S-D3		60	SOT-227
GHXS100B120S-D3		100	SOT-227
GHXS300A120S7D5		300	S7
GHXS400A120S7D5		400	S7
GHXS050A170S-D3	1700	50	SOT-227
GHXS050B170S-D3		50	SOT-227
GHXS100B170S-D3		100	SOT-227

# SiC Diodes and MOSFETs – Bare Die

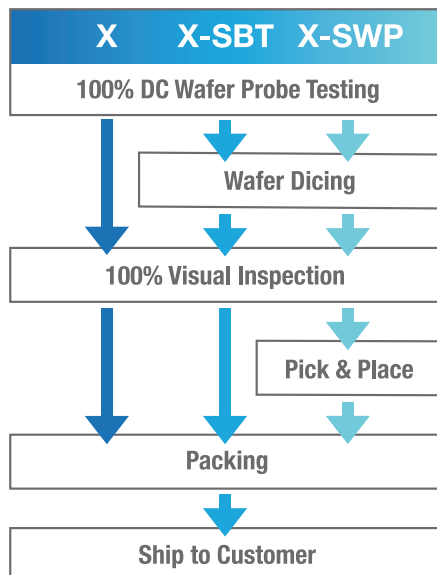
Bare Die from SemiQ offers performance advantages such as near-constant junction capacitance, low insertion loss, and high isolation required for high-frequency applications.

SiC Diode Bare Die is fabricated on 150mm wafers with robust characteristics including:

- Improved moisture resistance
- Over 24 million hours (HTRB & H3TRB)
- Improved surge currents
- Low defect density



## TYPICAL PROCESS FLOW



## SiC SCHOTTKY DIODES - BARE DIE

Part Number	VDC	I <sub>F</sub>	Size (mm)
GP3D006A065X	650	6	1.37 x 1.37
GP3D008A065X		8	1.54 x 1.54
GP3D010A065X		10	1.78 x 1.78
GP3D012A065X		12	1.50 x 2.90
GP3D020A065X		20	2.39 x 2.39
GP3D030A065X		30	2.86 x 2.86
GP3D050A065X		50	3.50 x 3.50
GP3D010A120X	1200	10	2.40 x 2.40
GP3D015A120X		15	2.12 x 4.10
GP3D020A120X		20	3.25 x3.25
GP3D030A120X		30	3.90 x 3.90
GP3D050A120X		50	4.93 x 4.93
GP3D010A170X	1700	10	2.91 x 2.91
GP3D020A170X		20	3.95 x 3.95

## SiC MOSFET - BARE DIE

Part Number	VDC	mΩ	Size (mm)
GP2T080A120X	1200	80	2.83 x 2.83
GP2T040A120X		40	2.89 x 5.48
GP2T020A120X		20	4.53 x 6.65



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