

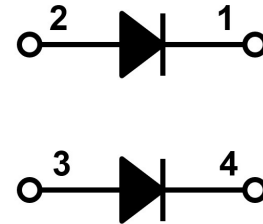
VDC	650 V
I <sub>F</sub>	50 A
T <sub>j,max</sub>	175 °C

## 650V SiC Power Module Dual Diode Pack

### Features

- SiC Schottky Diode
  - Zero reverse recovery
  - Zero forward recovery
  - Temperature independent switching behavior
  - Positive temperature coefficient on V<sub>F</sub>
- Low stray inductance
- High junction temperature operation
- All parts tested to greater than 715V

### Package



Parallel

### Benefits

- Outstanding performance at high frequency operation
- Low loss and low EMI noise
- Very rugged and easy mounting
- Internally isolated package (AIN)
- Low junction to case thermal resistance
- Easy paralleling due to positive T<sub>C</sub> of V<sub>F</sub>
- RoHS compliant

Part #	Package	Marking
GHXS050B065S-D3	SOT-227	GHXS050B065S-D3

### Applications

- Switched-mode power supply
- Induction heater
- Welding equipment
- Charging station



**Maximum Ratings, at T<sub>j</sub>=25 °C, unless otherwise specified (per leg)**

Characteristics	Symbol	Conditions	Values	Unit
Continuous forward current	I <sub>F</sub> *	T <sub>C</sub> =25 °C, T <sub>J</sub> =175 °C	95	A
		T <sub>C</sub> =117 °C, T <sub>J</sub> =175 °C	50	
		T <sub>C</sub> =150 °C, T <sub>J</sub> =175 °C	29	
Surge non-repetitive forward current sine halfwave	I <sub>FSM</sub>	T <sub>C</sub> =25 °C, t <sub>p</sub> =8.3 ms	300	A
		T <sub>C</sub> =110 °C, t <sub>p</sub> =8.3 ms	275	
Non-repetitive peak forward current	I <sub>F,max</sub>	T <sub>C</sub> =25 °C, t <sub>p</sub> =10 μs	2000**	A
i <sup>2</sup> t value	∫i <sup>2</sup> dt	T <sub>C</sub> =25 °C, t <sub>p</sub> =8.3 ms	374	A <sup>2</sup> s
		T <sub>C</sub> =110 °C, t <sub>p</sub> =8.3 ms	314	
Repetitive peak reverse voltage	V <sub>R,RRM</sub>	T <sub>J</sub> =25 °C	650	V
Diode dv/dt ruggedness	dv/dt	Turn-on slew rate, repetitive	200	V/ns
Power dissipation	P <sub>tot</sub> *	T <sub>C</sub> =25 °C	232	W
Operating junction temperature	T <sub>J</sub>		-55... 175	°C
Storage temperature	T <sub>storage</sub>		-55... 150	°C

Notes: \*Typical R<sub>thjC</sub> used

\*\*Limited by testing equipment

# 650V SiC Power Module

# GHXS050B065S-D3

Electrical Characteristics, at  $T_j=25\text{ }^\circ\text{C}$ , unless otherwise specified (per leg)

Characteristics	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
DC blocking voltage	$V_{DC}$	$I_R=125\mu\text{A}$ , $T_j=25\text{ }^\circ\text{C}$	650	-	-	V
Breakdown voltage	$V_{BR}$	$I_R=1.65\text{mA}$ , $T_j=25\text{ }^\circ\text{C}$	715	-	-	V
Diode forward voltage	$V_F$	$I_F=50\text{A}$ , $T_j=25\text{ }^\circ\text{C}$	-	1.45	1.60	V
		$I_F=50\text{A}$ , $T_j=125\text{ }^\circ\text{C}$	-	1.61	-	
		$I_F=50\text{A}$ , $T_j=175\text{ }^\circ\text{C}$	-	1.77	2.00	
Reverse current	$I_R$	$V_R=650\text{V}$ , $T_j=25\text{ }^\circ\text{C}$	-	6	125	$\mu\text{A}$
		$V_R=715\text{V}$ , $T_j=25\text{ }^\circ\text{C}$	-	22	-	
		$V_R=650\text{V}$ , $T_j=125\text{ }^\circ\text{C}$	-	41	-	
		$V_R=650\text{V}$ , $T_j=175\text{ }^\circ\text{C}$	-	147	500	
Total capacitive charge	$Q_C$	$V_R=400\text{V}$ , $T_j=25\text{ }^\circ\text{C}$	-	120	-	nC
Total capacitance	C	$V_R=1\text{V}$ , $f=1\text{ MHz}$	-	1946	-	pF
		$V_R=200\text{V}$ , $f=1\text{ MHz}$	-	228	-	
		$V_R=400\text{V}$ , $f=1\text{ MHz}$	-	189	-	

Thermal and Package Characteristics, at  $T_j=25\text{ }^\circ\text{C}$ , unless otherwise specified

Characteristics	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal resistance, junction-case	$R_{thJC}$	Per leg	-	0.65	0.81	$^\circ\text{C/W}$
Mounting torque	$M_d$	M4-0.7 screws	1.1	-	1.5	N-m
Terminal connection torque	$M_{dt}$	M4-0.7 screws	-	1.1	1.3	N-m
Package weight	$W_t$		-	32	-	g
Isolation voltage	$V_{ISOL}$	$I_{ISOL} < 1\text{mA}$ , 50/60 Hz, 1 min	2500	-	-	V

## Typical Performance Per Leg

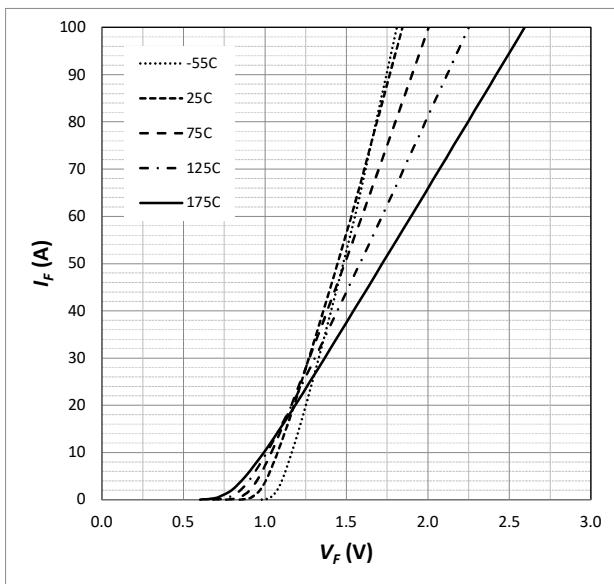


Fig. 1 Forward Characteristics (parameterized on  $T_j$ )

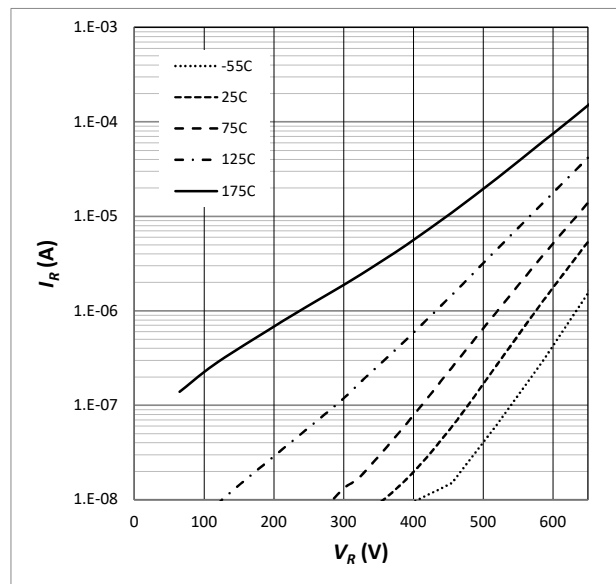


Fig. 2 Reverse Characteristics (parameterized on  $T_j$ )

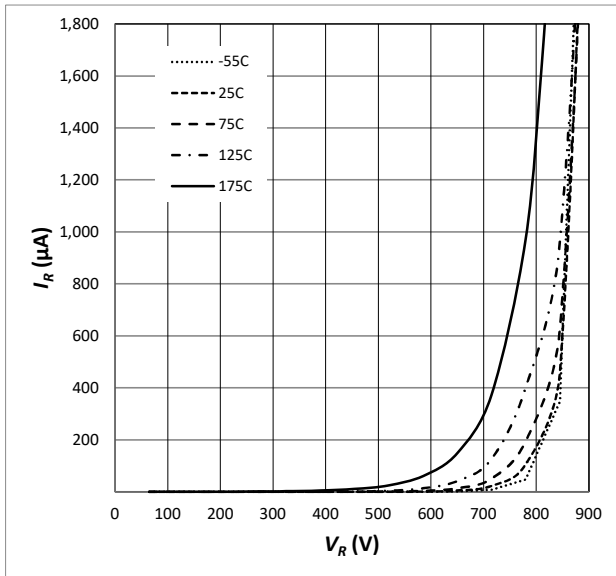


Fig. 3 Reverse Characteristics (parameterized on  $T_j$ )

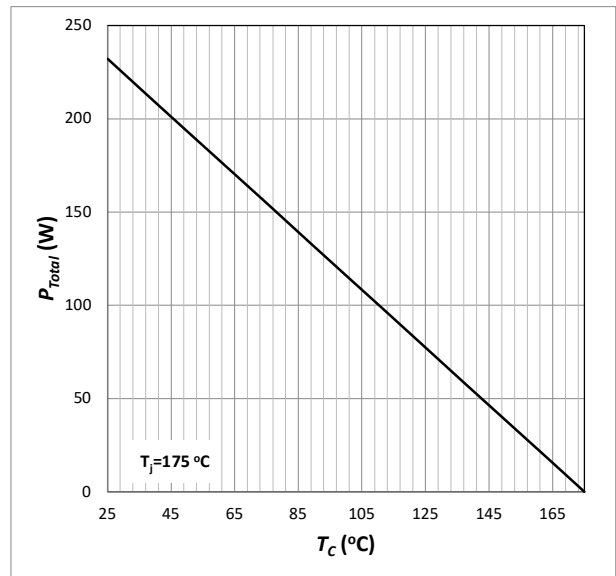


Fig. 4 Power Derating

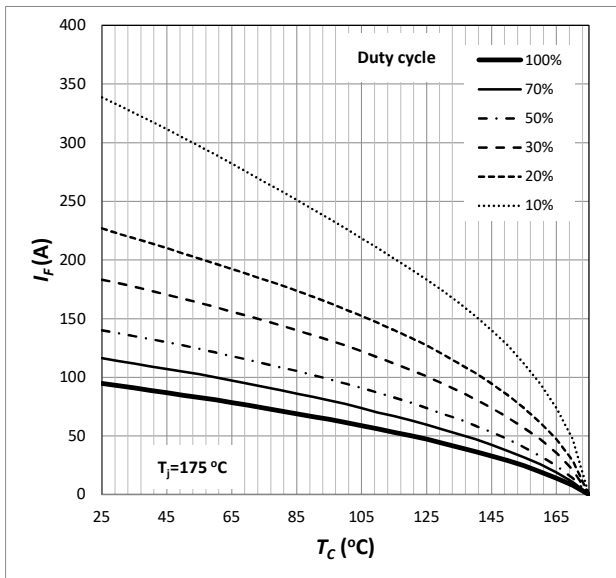


Fig. 5 Current Derating

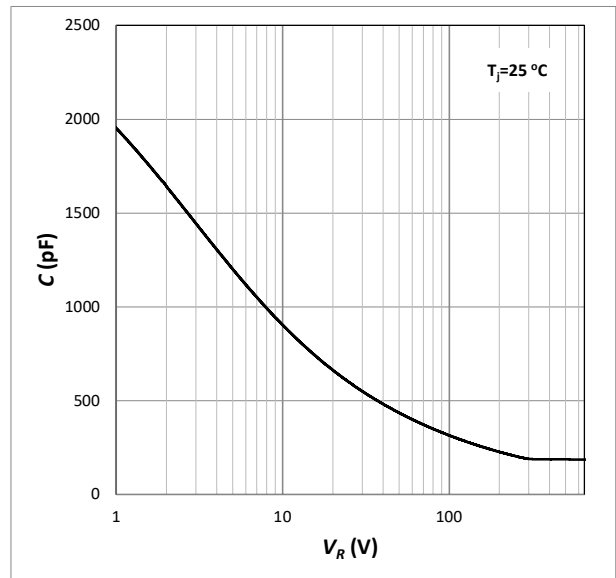


Fig. 6 Capacitance

# 650V SiC Power Module

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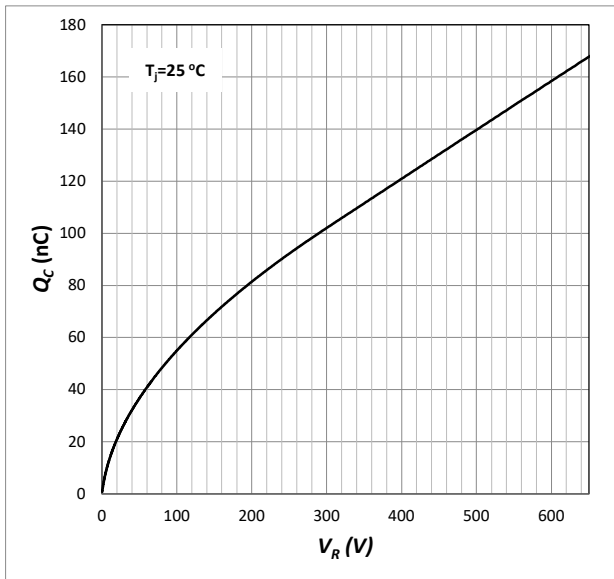


Fig. 7 Capacitive Charge

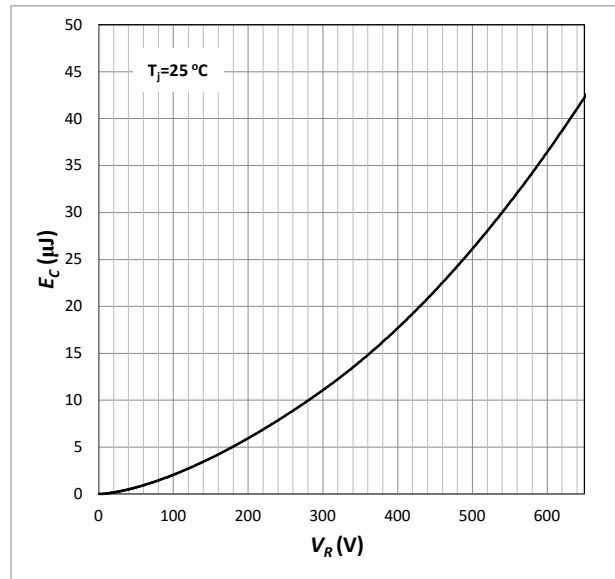


Fig. 8 Typical Capacitance Stored Energy

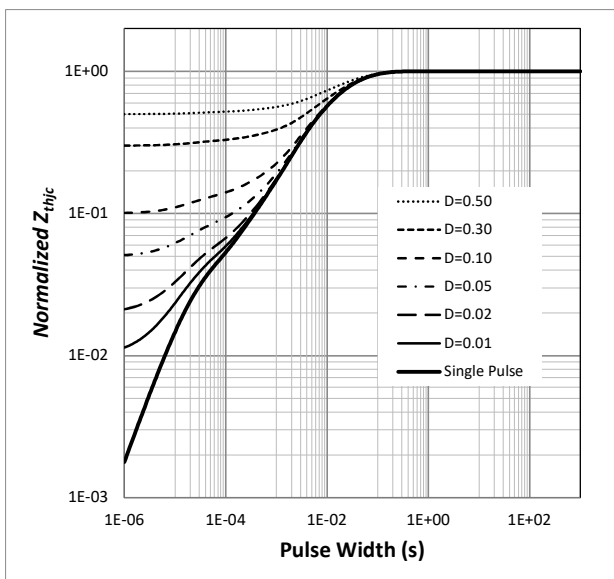
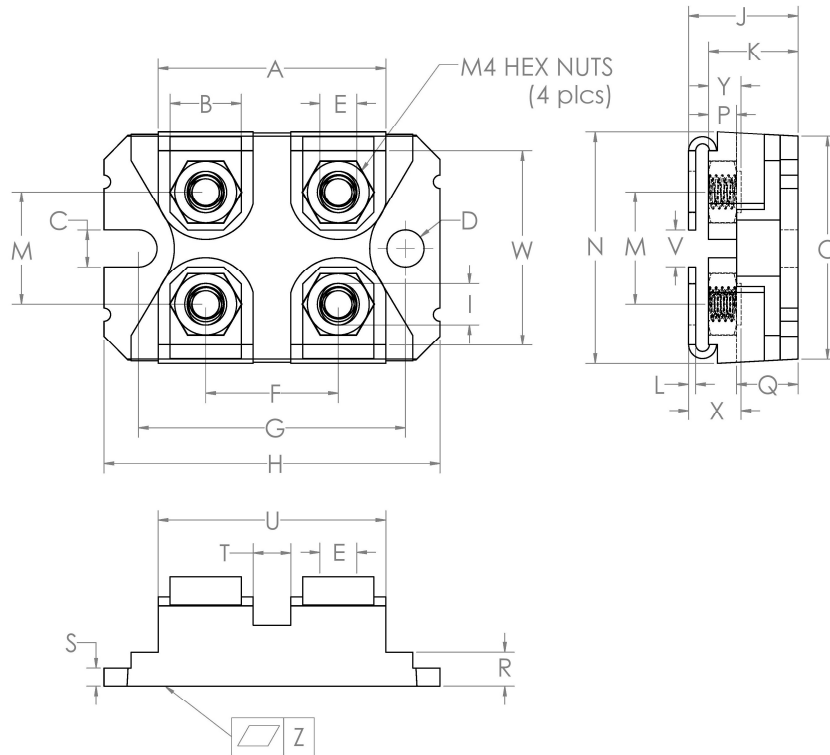


Fig. 9 Transient Thermal Impedance

# 650V SiC Power Module

**GHXS050B065S-D3**

## Package Dimensions SOT-227



Sym	Millimeters		Inches	
	Min	Max	Min	Max
A	31.67	31.90	1.247	1.256
B	7.95	8.18	0.313	0.322
C	4.14	4.24	0.163	0.167
D	4.14	4.24	0.163	0.167
E	4.14	4.24	0.163	0.167
F	14.94	15.09	0.588	0.594
G	30.15	30.25	1.187	1.191
H	38.00	38.10	1.496	1.500
I	4.75	4.83	0.187	0.190
J	11.68	12.19	0.460	0.480
K	9.45	9.60	0.372	0.378
L	0.76	0.84	0.030	0.033
M	12.62	12.88	0.497	0.507
N	25.15	25.30	0.990	0.996
O	24.79	25.04	0.976	0.986
P	3.02	3.15	0.119	0.124
Q	6.71	6.96	0.264	0.274
R	4.17	4.42	0.164	0.174
S	2.08	2.13	0.082	0.084
T	3.28	3.63	0.129	0.143
U	26.75	26.90	1.053	1.059
V	3.86	4.24	0.152	0.167
W	20.55	26.90	0.809	0.814
X	5.45	5.85	0.215	0.230
Y	3.15	3.66	0.124	0.144
Z	0.00	0.13	0.000	0.005

# 650V SiC Power Module

***GHXS050B065S-D3***

## Revision History

Date	Revision	Notes
8/28/2020	1.0	Initial release

## Notes

### **RoHS Compliance**

The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/EC (RoHS2), as implemented March, 2013. RoHS Declarations for this product can be obtained from the Product Documentation sections of [www.SemiQ.com](http://www.SemiQ.com).

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REACH substances of high concern (SVHC) information is available for this product. Since the European Chemicals Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact our office at SemiQ Headquarters in Lake Forest, California to insure you get the most up-to-date REACH SVHC Declaration. REACH banned substance information (REACH Article 67) is also available upon request.

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[25.640.5053.0](#)