

1200V 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_F
- Low stray inductance
- High junction temperature operation
- All parts tested to greater than 1,400V

Benefits

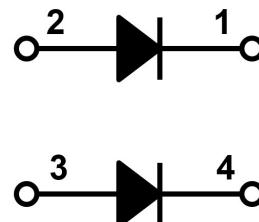
- Outstanding performance at high frequency operation
- Low loss and low EMI noise
- Very rugged and easy mounting
- Internally isolated package (AIN)
- Low junction to case thermal resistance
- Easy paralleling due to positive T_C of V_F
- RoHS compliant

Applications

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

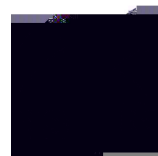
VDC	1200 V
I_F	50 A
$T_{j,max}$	175 °C

Package



Parallel

Part #	Package	Marking
GHXS050B120S-D3	SOT-227	GHXS050B120S-D3



Maximum Ratings, at $T_j=25\text{ °C}$, unless otherwise specified (per leg)

Characteristics	Symbol	Conditions	Values	Unit
Continuous forward current	I_F	$T_C=25\text{ °C}$, $T_j=175\text{ °C}$	101	A
		$T_C=130\text{ °C}$, $T_j=175\text{ °C}$	50	
		$T_C=150\text{ °C}$, $T_j=175\text{ °C}$	34	
Surge non-repetitive forward current sine halfwave	I_{FSM}	$T_C=25\text{ °C}$, $t_p=8.3\text{ ms}$	390	A
		$T_C=110\text{ °C}$, $t_p=8.3\text{ ms}$	340	
Non-repetitive peak forward current	$I_{F,max}$	$T_C=25\text{ °C}$, $t_p=10\text{ }\mu\text{s}$	2000**	A
² value	$\int^2$	$T_C=25\text{ °C}$, $t_p=8.3\text{ ms}$	631	A ² s
		$T_C=110\text{ °C}$, $t_p=8.3\text{ ms}$	480	
Repetitive peak reverse voltage	V_{RRM}	$T_j=25\text{ °C}$	1200	V
Diode ruggedness		Turn-on slew rate, repetitive	200	V/ns
Power dissipation	P_{tot}	$T_C=25\text{ °C}$	349	W
Operating junction temperature	T_j		-55...175	°C
Storage temperature	$T_{storage}$		-55...150	°C

Notes: *Typical R_{thJC} used

**Limited by testing equipment

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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}	$I_R=100\mu\text{A}$, $T_j=25\text{ }^{\circ}\text{C}$	1200	-	-	V
Breakdown voltage	V_{BR}	$I_R=2\text{mA}$, $T_j=25\text{ }^{\circ}\text{C}$	1400	-	-	V
Diode forward voltage	V_F	$I_F=50\text{A}$, $T_j=25\text{ }^{\circ}\text{C}$	-	1.5	1.7	V
		$I_F=50\text{A}$, $T_j=125\text{ }^{\circ}\text{C}$	-	1.8	-	
		$I_F=50\text{A}$, $T_j=175\text{ }^{\circ}\text{C}$	-	2.1	2.7	
Reverse current	I_R	$V_R=1,200\text{V}$, $T_j=25\text{ }^{\circ}\text{C}$	-	6	100	μA
		$V_R=1,400\text{V}$, $T_j=25\text{ }^{\circ}\text{C}$	-	35	-	
		$V_R=1,200\text{V}$, $T_j=125\text{ }^{\circ}\text{C}$	-	49	-	
		$V_R=1,200\text{V}$, $T_j=175\text{ }^{\circ}\text{C}$	-	193	750	
Total capacitive charge	Q_C	$V_R=800\text{V}$, $T_j=25\text{ }^{\circ}\text{C}$	-	269	-	nC
Total capacitance	C	$V_R=1\text{V}$, $f=1\text{ MHz}$	-	3040	-	pF
		$V_R=400\text{V}$, $f=1\text{ MHz}$	-	253	-	
		$V_R=800\text{V}$, $f=1\text{ MHz}$	-	181	-	

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	-	0.43	0.52	$^{\circ}\text{C/W}$
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

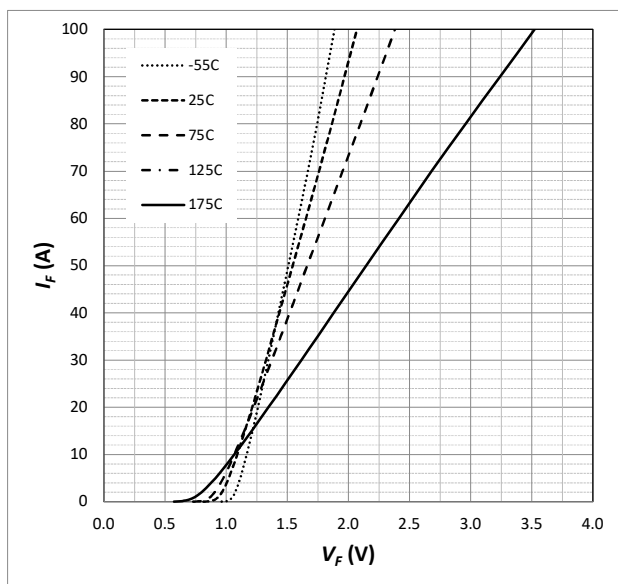


Fig. 1 Forward Characteristics (parameterized on T_j)

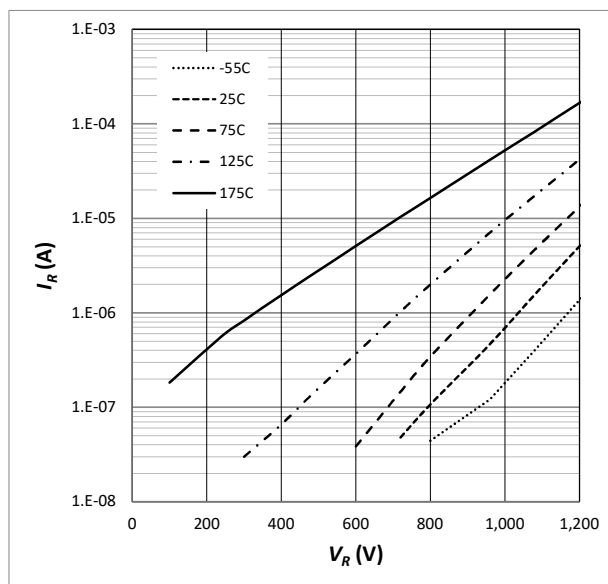


Fig. 2 Reverse Characteristics (parameterized on T_j)

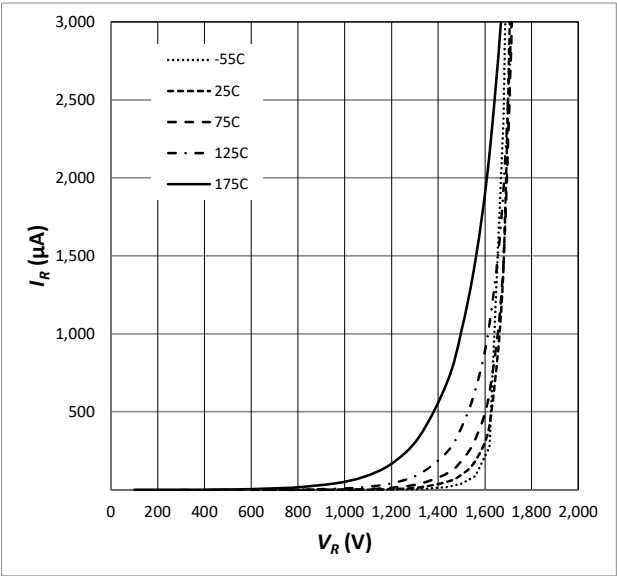


Fig. 3 Reverse Characteristics (parameterized on T_j)

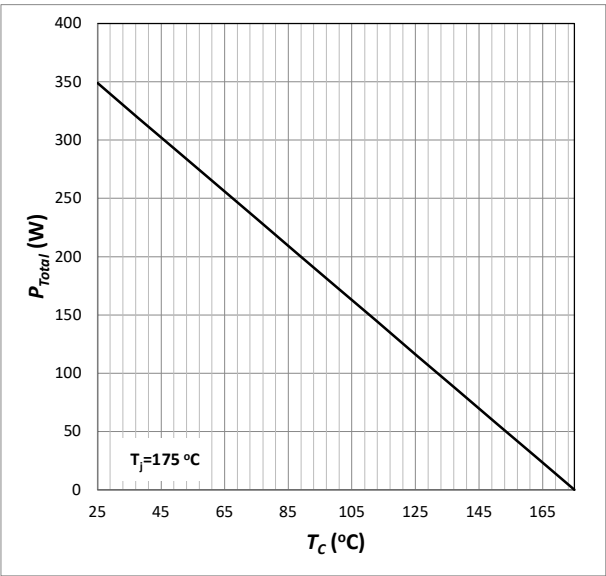


Fig. 4 Power Derating

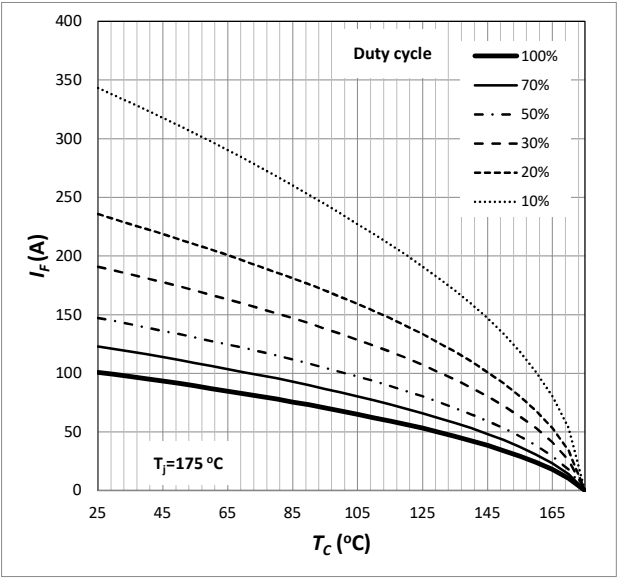


Fig. 5 Current Derating

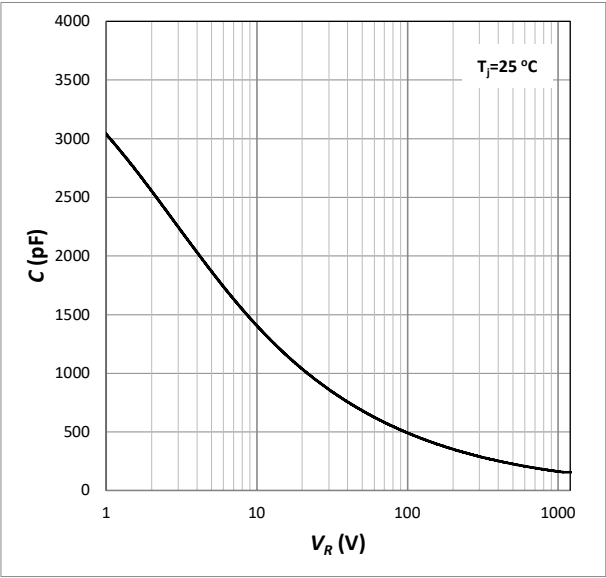


Fig. 6 Capacitance

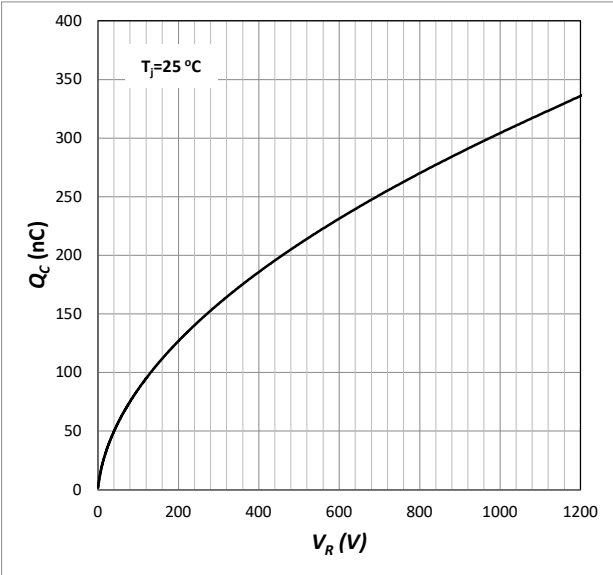


Fig. 7 Capacitive Charge

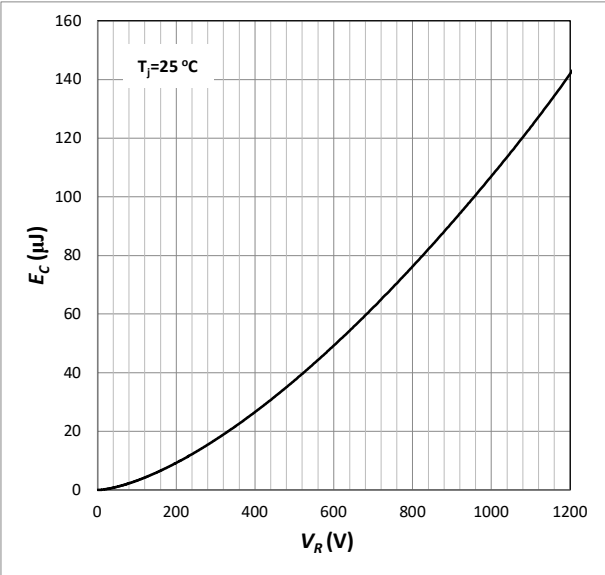


Fig. 8 Typical Capacitance Stored Energy

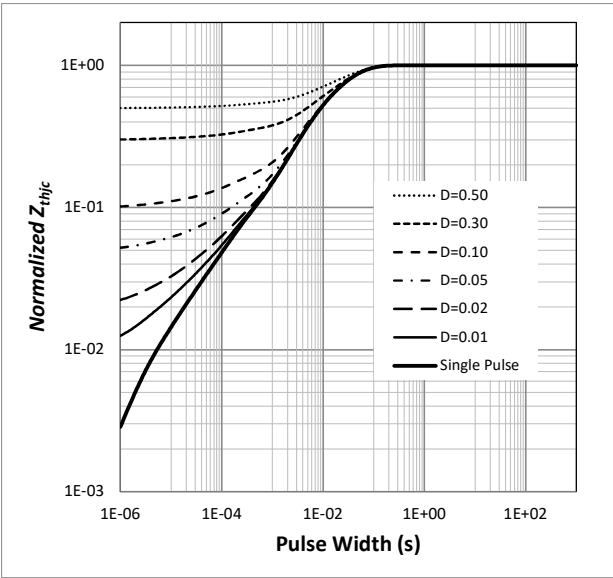
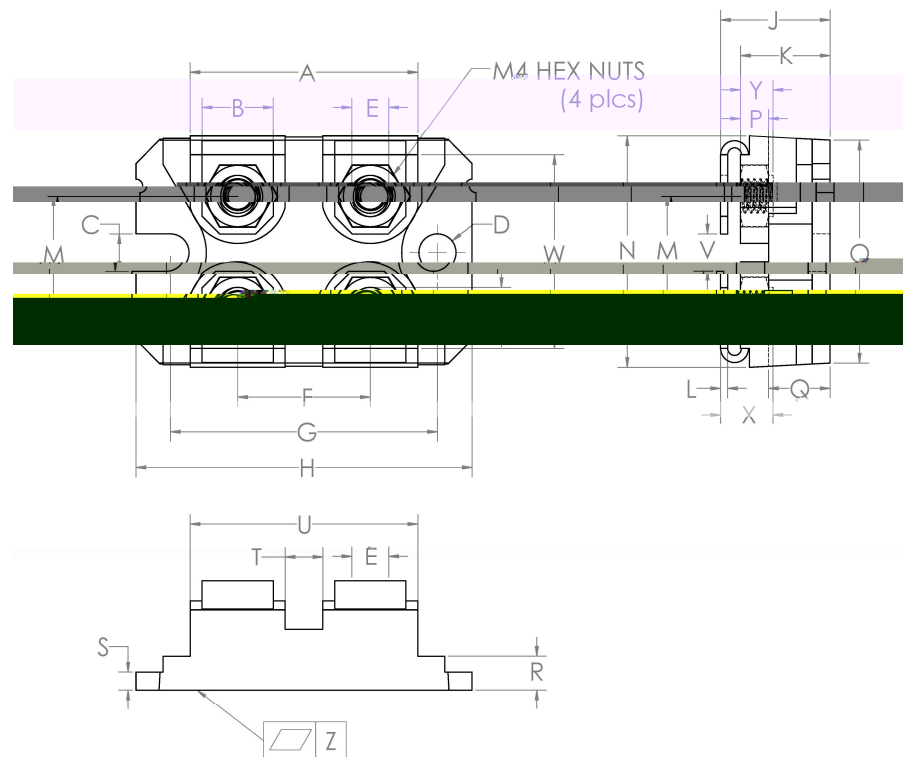


Fig. 9 Transient Thermal Impedance

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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

1200V SiC Power Module

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Revision History

Date	Revision	Notes
9/4/2020	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.

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