

|                    |        |
|--------------------|--------|
| VDC                | 1200 V |
| I <sub>F</sub>     | 50 A   |
| T <sub>j,max</sub> | 175 °C |

## 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<sub>F</sub>
- Low stray inductance
- High junction temperature operation
- All parts tested to greater than 1,400V

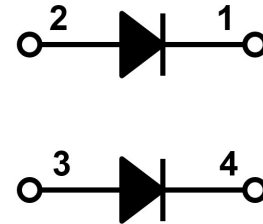
### Benefits

- 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<sub>C</sub> of V<sub>F</sub>
- RoHS compliant

### Applications

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

### Package



Parallel

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



### 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  | 101        | A                |
|  |                      | T <sub>C</sub> =130 °C, T <sub>J</sub> =175 °C | 50         |                  |
|  |                      | T <sub>C</sub> =150 °C, T <sub>J</sub> =175 °C | 34         |                  |
| Surge non-repetitive forward current sine halfwave | I <sub>FSM</sub>     | T <sub>C</sub> =25 °C, t <sub>p</sub> =8.3 ms  | 390        | A                |
|  |                      | T <sub>C</sub> =110 °C, t <sub>p</sub> =8.3 ms | 340        |                  |
| 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  | 631        | A <sup>2</sup> s |
|  |                      | T <sub>C</sub> =110 °C, t <sub>p</sub> =8.3 ms | 480        |                  |
| Repetitive peak reverse voltage                    | V <sub>RRM</sub>     | T <sub>J</sub> =25 °C                          | 1200       | 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                          | 349        | 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

# 1200V SiC Power Module

# GHXS050B120S-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     | $V_{DC}$ | $I_R=100\mu\text{A}$ , $T_j=25\text{ }^\circ\text{C}$ | 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  | $\mu\text{A}$ |
|                         |          | $V_R=1,400\text{V}$ , $T_j=25\text{ }^\circ\text{C}$  | -      | 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                 | $V_{ISOL}$ | $I_{ISOL} < 1\text{mA}$ ,<br>50/60 Hz, 1 min | 2500   | -    | -    | V                  |

## Typical Performance Per Leg

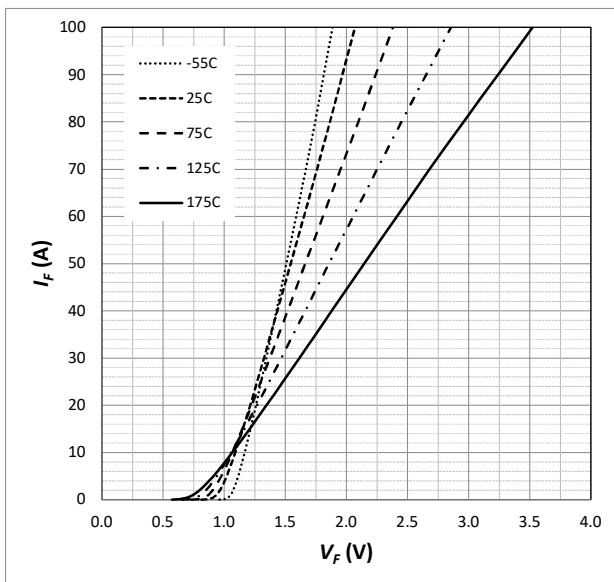


Fig. 1 Forward Characteristics (parameterized on  $T_j$ )

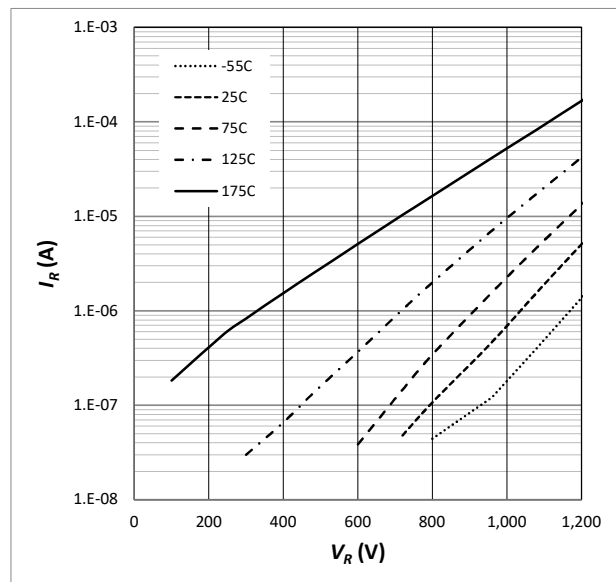


Fig. 2 Reverse Characteristics (parameterized on  $T_j$ )

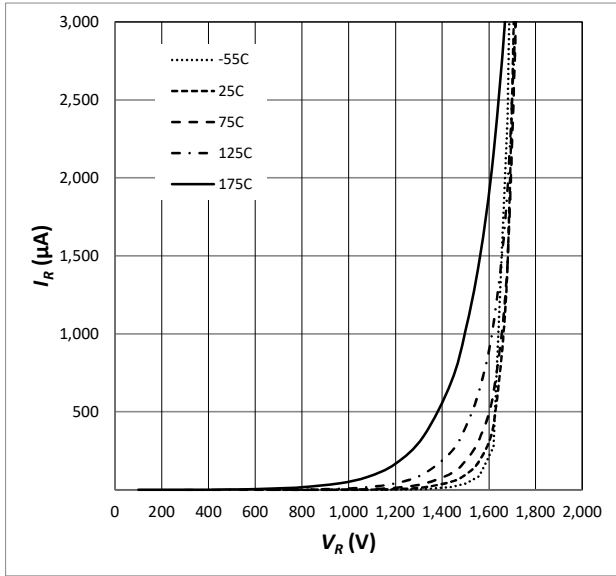


Fig. 3 Reverse Characteristics (parameterized on  $T_j$ )

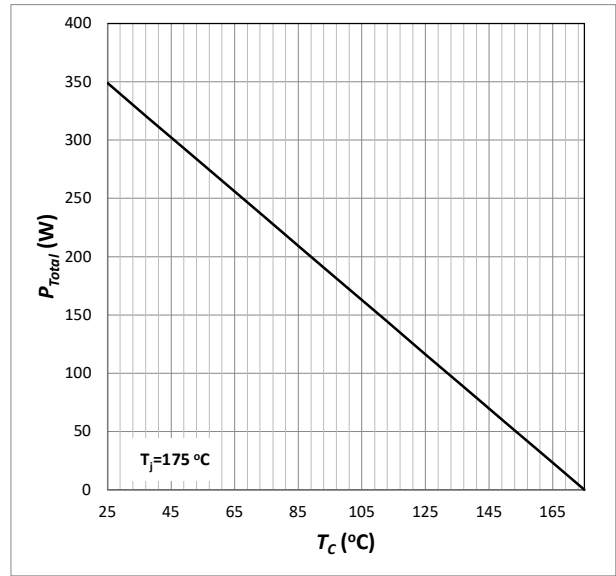


Fig. 4 Power Derating

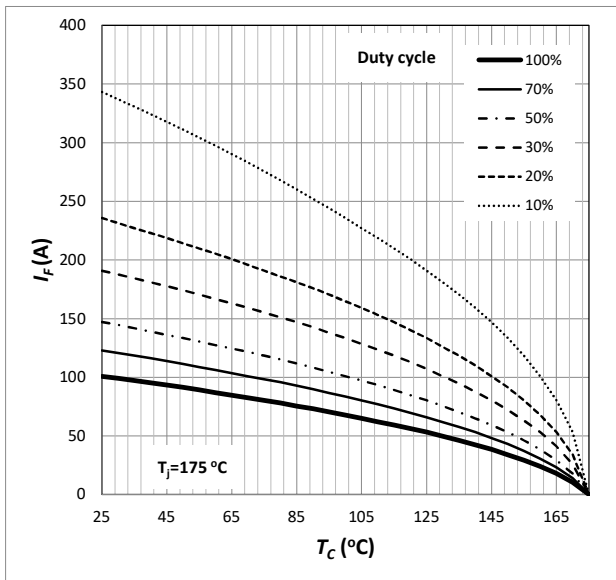


Fig. 5 Current Derating

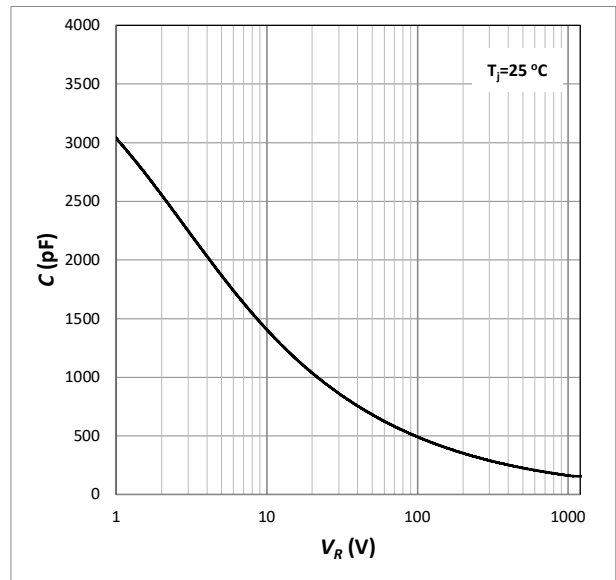


Fig. 6 Capacitance

# 1200V SiC Power Module

# GHXS050B120S-D3

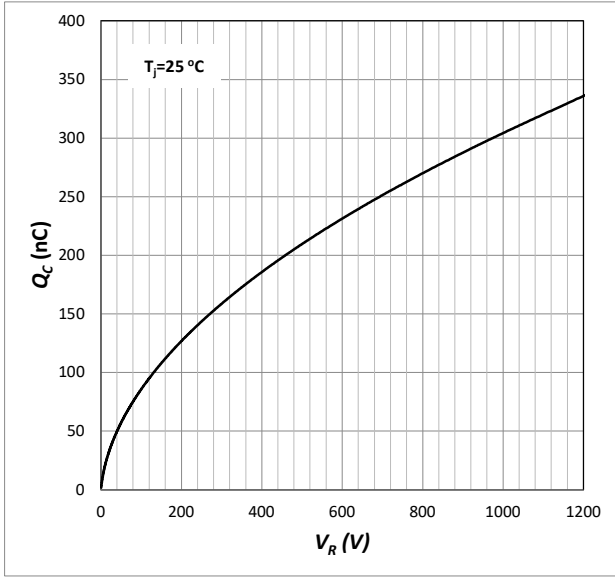


Fig. 7 Capacitive Charge

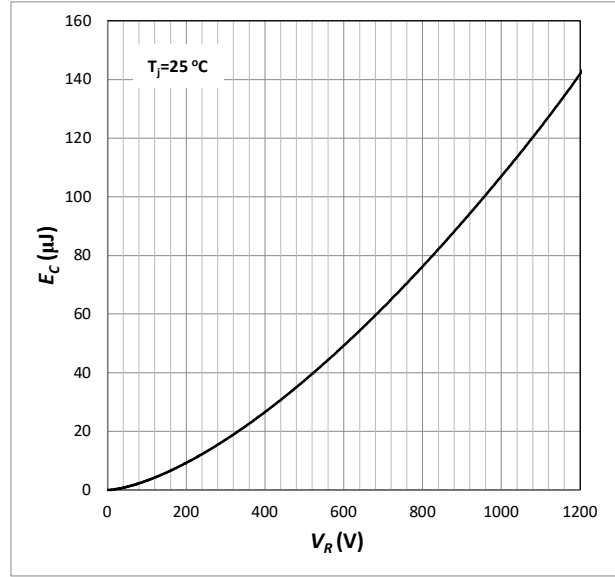


Fig. 8 Typical Capacitance Stored Energy

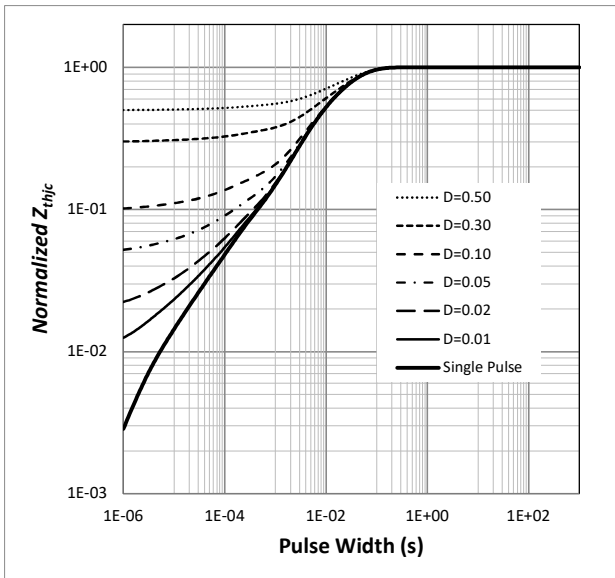
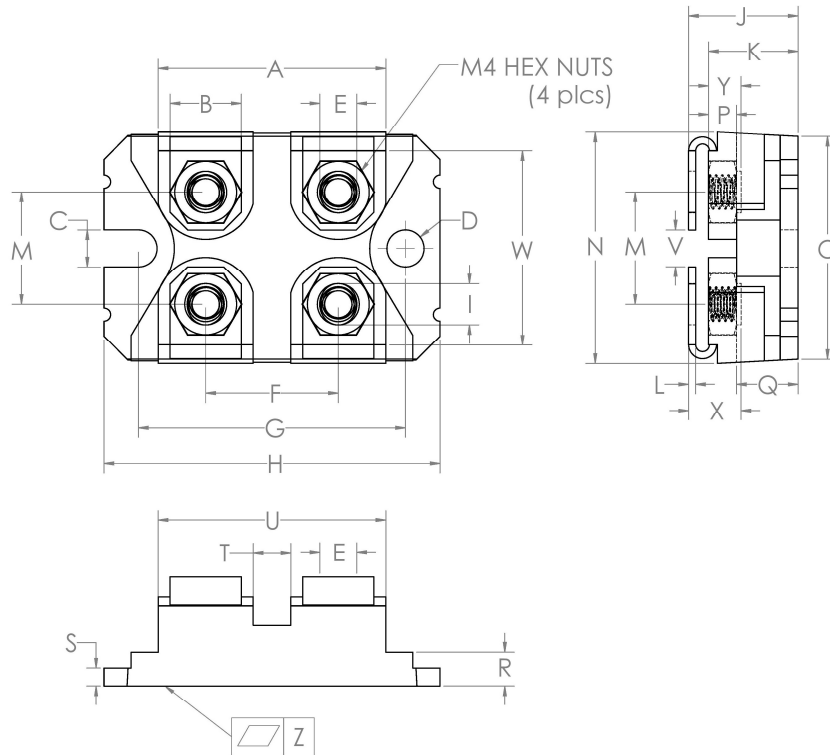


Fig. 9 Transient Thermal Impedance

# 1200V SiC Power Module

# GHXS050B120S-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 |