

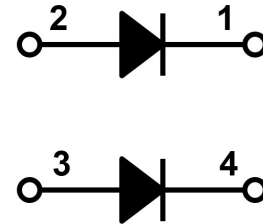
| | |
|--------------------|--------|
| VDC | 650 V |
| I _F | 50 A |
| T _{j,max} | 175 °C |

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_F
- 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_C of V_F
- 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_j=25 °C, unless otherwise specified (per leg)

| Characteristics | Symbol | Conditions | Values | Unit |
|--|----------------------|--|------------|------------------|
| Continuous forward current | I _F * | T _C =25 °C, T _J =175 °C | 95 | A |
| | | T _C =117 °C, T _J =175 °C | 50 | |
| | | T _C =150 °C, T _J =175 °C | 29 | |
| Surge non-repetitive forward current sine halfwave | I _{FSM} | T _C =25 °C, t _p =8.3 ms | 300 | A |
| | | T _C =110 °C, t _p =8.3 ms | 275 | |
| Non-repetitive peak forward current | I _{F,max} | T _C =25 °C, t _p =10 μs | 2000** | A |
| i ² t value | ∫i ² dt | T _C =25 °C, t _p =8.3 ms | 374 | A ² s |
| | | T _C =110 °C, t _p =8.3 ms | 314 | |
| Repetitive peak reverse voltage | V _{R,RRM} | T _J =25 °C | 650 | V |
| Diode dv/dt ruggedness | dv/dt | Turn-on slew rate, repetitive | 200 | V/ns |
| Power dissipation | P _{tot} * | T _C =25 °C | 232 | 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} | $I_R=125\mu\text{A}$, $T_j=25\text{ }^\circ\text{C}$ | 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 | μA |
| | | $V_R=715\text{V}$, $T_j=25\text{ }^\circ\text{C}$ | - | 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

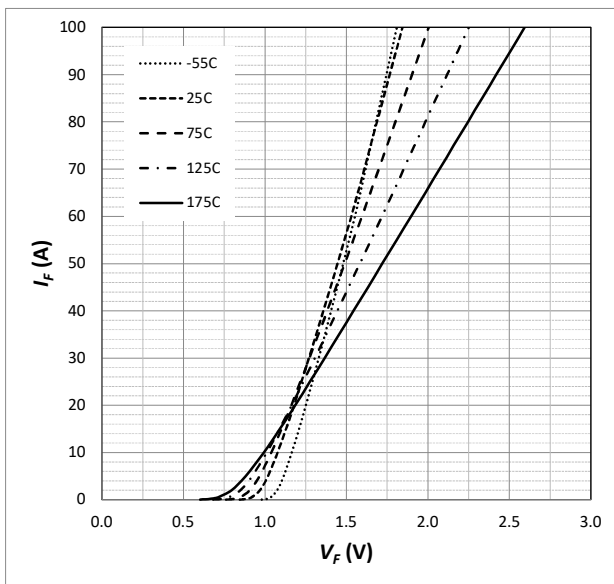


Fig. 1 Forward Characteristics (parameterized on T_j)

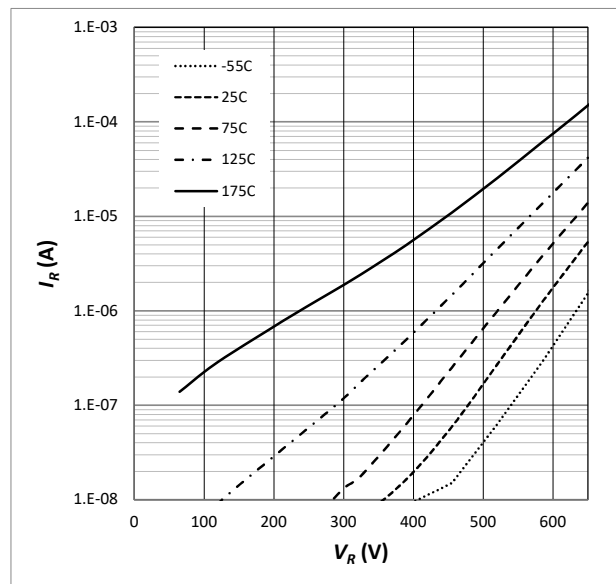


Fig. 2 Reverse Characteristics (parameterized on T_j)

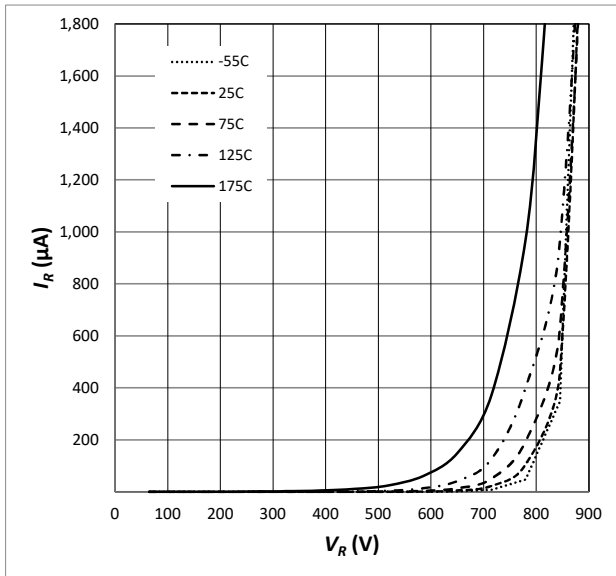


Fig. 3 Reverse Characteristics (parameterized on T_j)

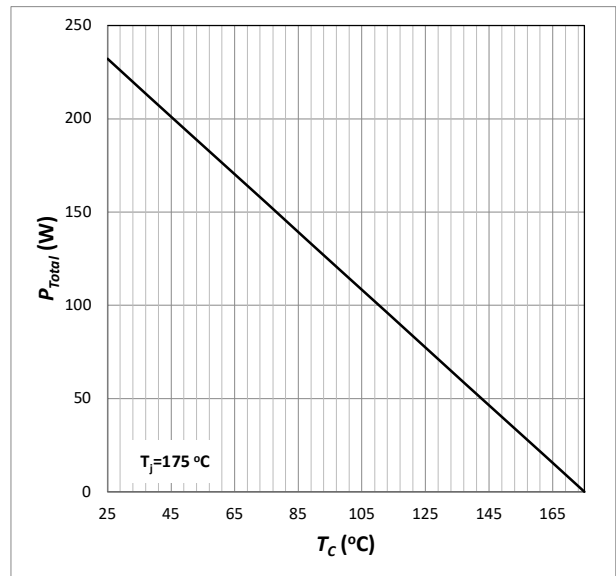


Fig. 4 Power Derating

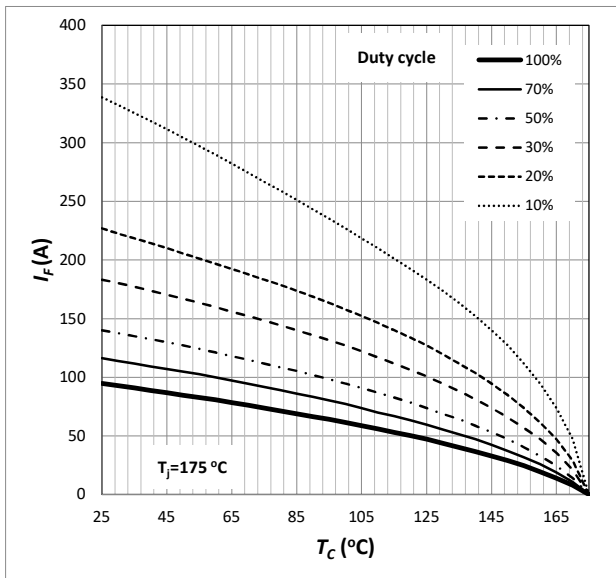


Fig. 5 Current Derating

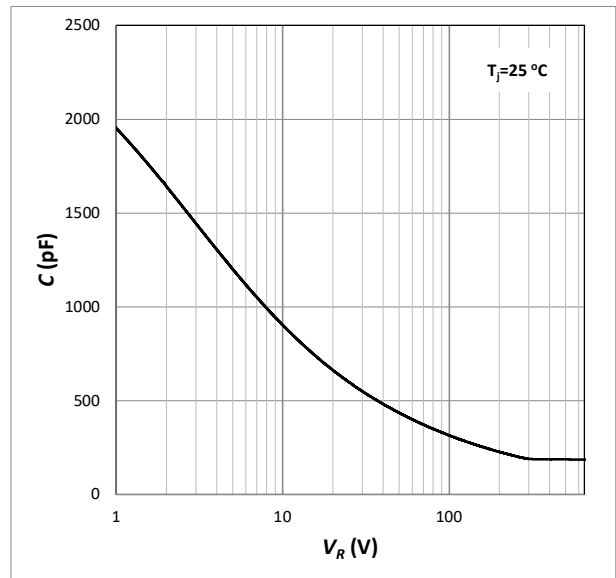


Fig. 6 Capacitance

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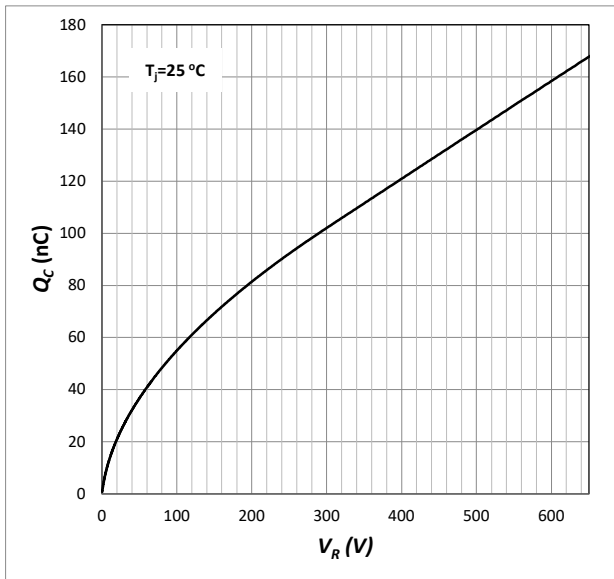


Fig. 7 Capacitive Charge

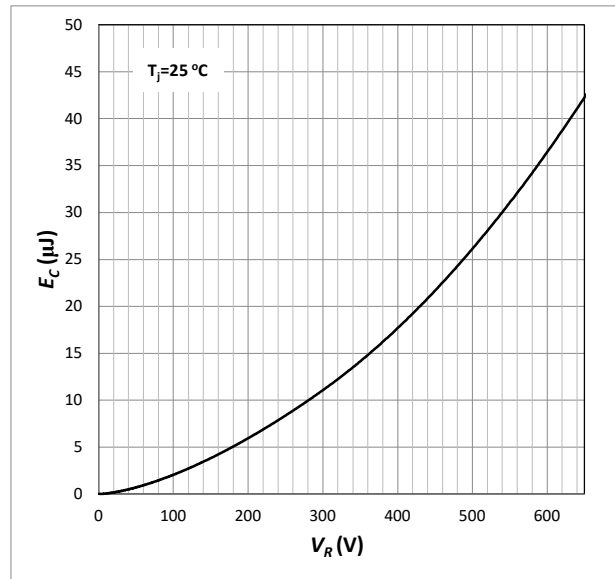


Fig. 8 Typical Capacitance Stored Energy

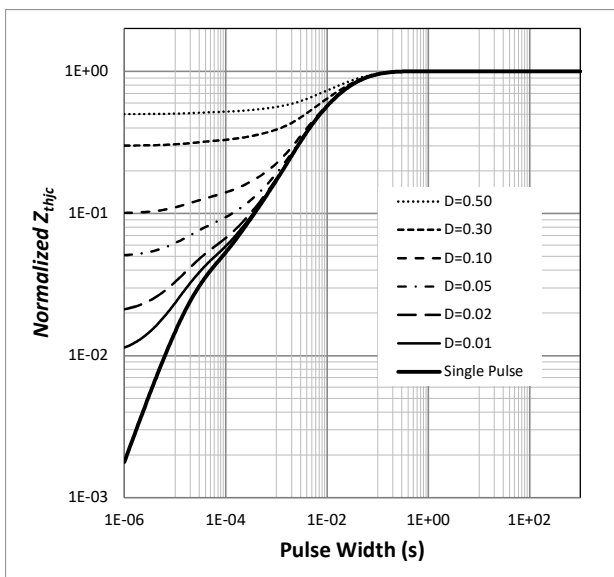
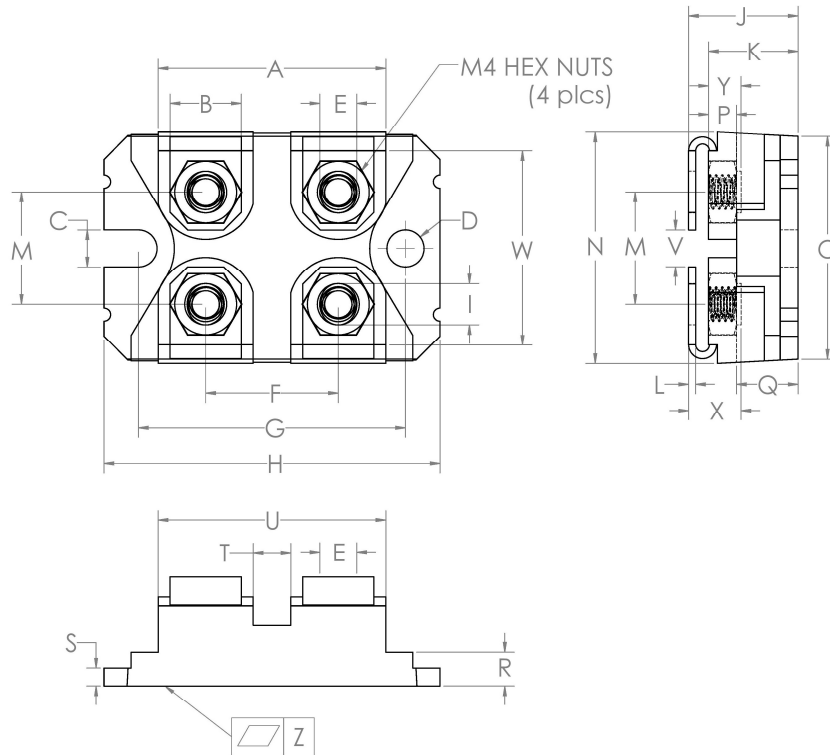


Fig. 9 Transient Thermal Impedance

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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 |

650V SiC Power Module

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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.

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