

Silicon Carbide Schottky Diode

| | | |
|---------------------------------------|---|-------|
| V_{RRM} | = | 650 V |
| $I_F (T_c=150\text{ }^\circ\text{C})$ | = | 6 A |
| Q_C | = | 22 nC |

Features

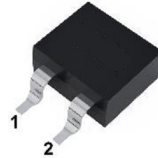
- 650 V Schottky Rectifier
- Zero Reverse Recovery Current
- High-Frequency Operation
- Temperature-Independent Switching
- Extremely Fast Switching

Benefits

- Replace Bipolar with Unipolar Rectifiers
- Essentially No Switching Losses
- High Efficiency
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

Applications

- Switching Mode Power Supply
- Boost Diodes in PFC
- DC/DC Converters
- AC/DC Converters
- Free Wheeling Diodes in Inverter

Package


TO-252-2


Maximum Ratings ($T_c = 25\text{ }^\circ\text{C}$ unless otherwise specified)

| Symbol | Parameter | Value | Unit | Test Conditions | Note |
|-----------|--------------------------------------|----------------|------------------|--|--------|
| V_{RRM} | Repetitive Peak Reverse Voltage | 650 | V | | |
| V_{RSM} | Surge Peak Reverse Voltage | 650 | V | | |
| V_R | DC Peak Reverse Voltage | 650 | V | | |
| I_F | Continuous Forward Current | 18 8 6 | A | $T_c=25\text{ }^\circ\text{C}$ $T_c=135\text{ }^\circ\text{C}$ $T_c=150\text{ }^\circ\text{C}$ | Fig. 3 |
| I_{FSM} | Non-Repetitive Forward Surge Current | 48 | A | $T_c=25\text{ }^\circ\text{C}$, $t_p=10\text{ ms}$, Half Sine Pulse | |
| P_{tot} | Power Dissipation | 65 28 | W | $T_c=25\text{ }^\circ\text{C}$ $T_c=110\text{ }^\circ\text{C}$ | Fig. 4 |
| T_J | Operating Junction Range | -55 to +175 | $^\circ\text{C}$ | | |
| T_{stg} | Storage Temperature Range | -55 to +175 | $^\circ\text{C}$ | | |

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Electrical Characteristics

| Symbol | Parameter | Typ. | Max. | Unit | Test Conditions | Note |
|--------|---------------------------|-----------------|-------------|---------------|--|--------|
| V_F | Forward Voltage | 1.38 1.8 | 1.65 2.4 | V | $I_F = 6\text{ A}, T_J = 25\text{ }^\circ\text{C}$ $I_F = 6\text{ A}, T_J = 175\text{ }^\circ\text{C}$ | Fig. 1 |
| I_R | Reverse Current | 2 15 | 50 180 | μA | $V_R = 650\text{ V}, T_J = 25\text{ }^\circ\text{C}$ $V_R = 650\text{ V}, T_J = 175\text{ }^\circ\text{C}$ | Fig. 2 |
| Q_C | Total Capacitive Charge | 22 | | nC | $V_R = 400\text{ V}, I_F = 6\text{ A},$ $T_J = 25\text{ }^\circ\text{C}$ | Fig. 6 |
| C | Total Capacitance | 398 43 33 | | pF | $V_R = 0\text{ V}, T_J = 25\text{ }^\circ\text{C}, f = 1\text{ MHz}$ $V_R = 200\text{ V}, T_J = 25\text{ }^\circ\text{C}, f = 1\text{ MHz}$ $V_R = 400\text{ V}, T_J = 25\text{ }^\circ\text{C}, f = 1\text{ MHz}$ | Fig. 5 |
| E_C | Capacitance Stored Energy | 2.8 | | μJ | $V_R = 400\text{ V}$ | Fig. 7 |

Note: This is a majority carrier diode, so there is no reverse recovery charge.

Thermal Characteristics

| Symbol | Parameter | Min. | Typ. | Max. | Unit | Note |
|-----------------|--|------|------|------|--------------------|-------|
| $R_{\theta JC}$ | Thermal Resistance from Junction to Case | | 2.3 | | $^\circ\text{C/W}$ | Fig.8 |

Typical Performance

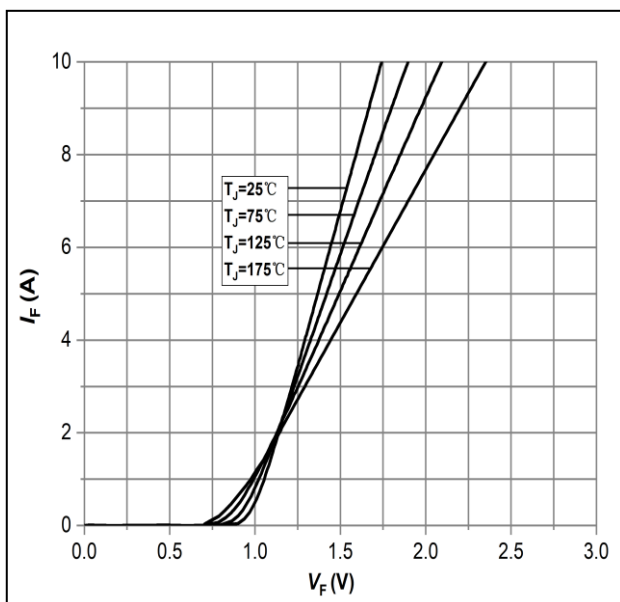


Figure 1: Forward Characteristics

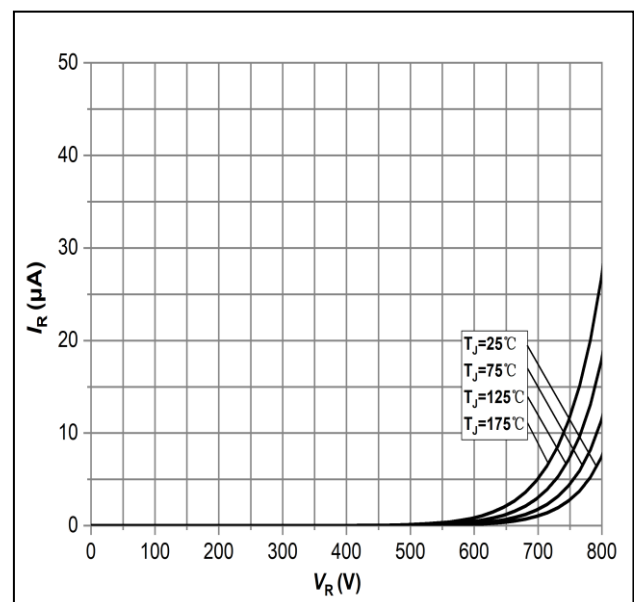


Figure 2: Reverse Characteristics

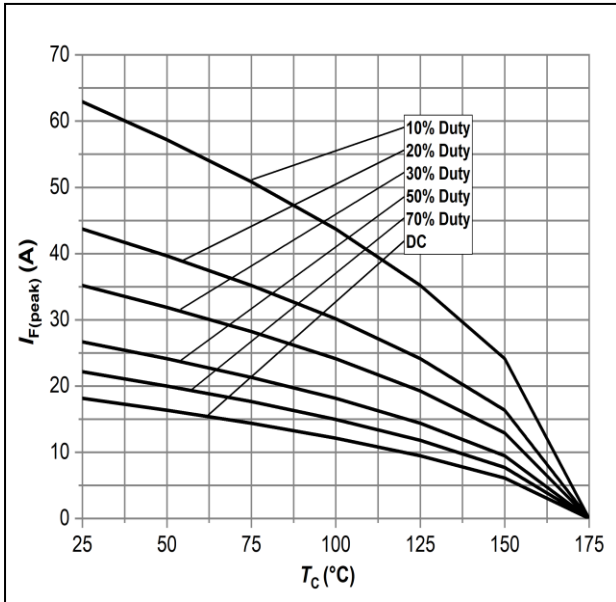
Silicon Carbide Schottky Diode
Typical Performance


Figure 3: Current Derating

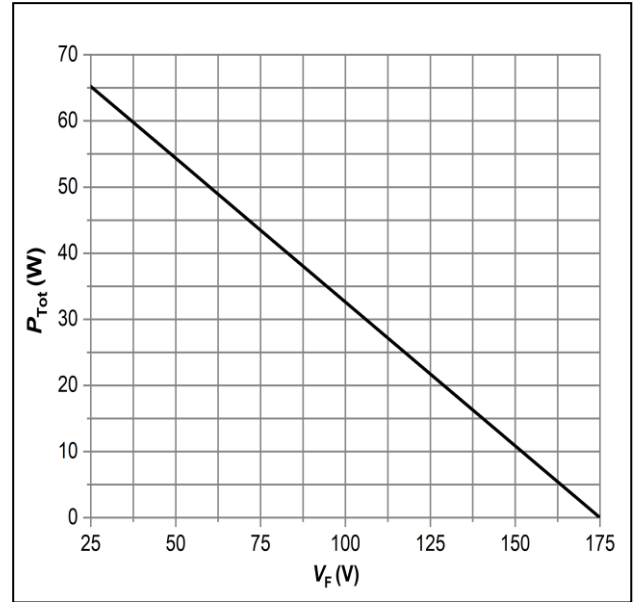


Figure 4: Power Derating

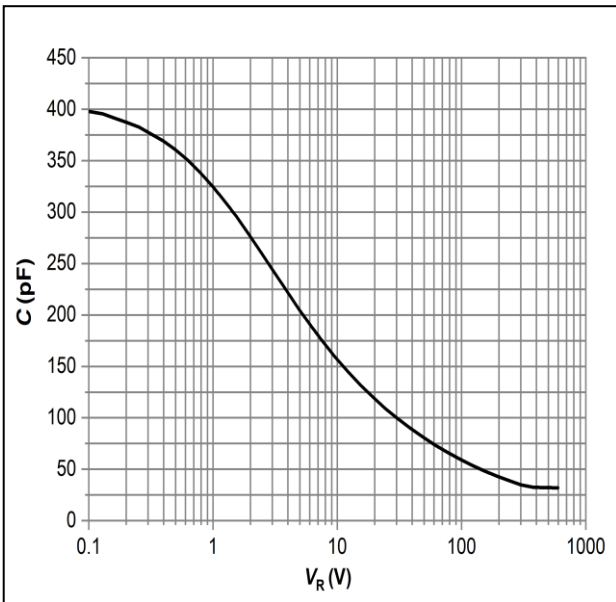


Figure 5: Capacitance vs. Reverse Voltage

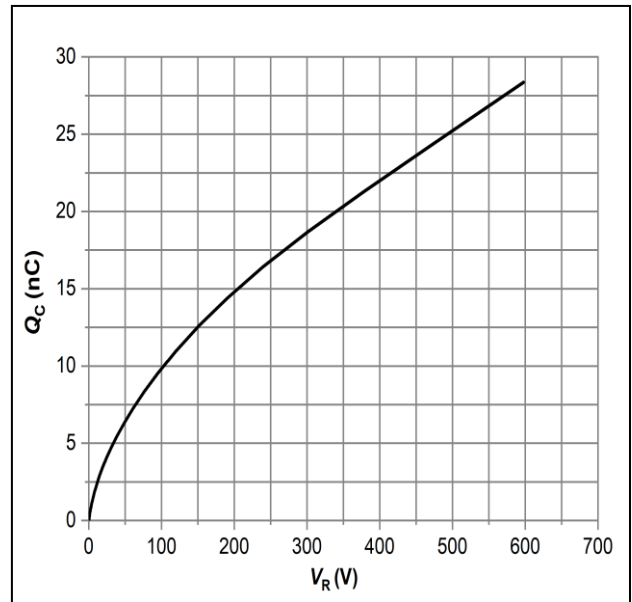


Figure 6: Total Capacitance Charge vs. Reverse Voltage

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Typical Performance

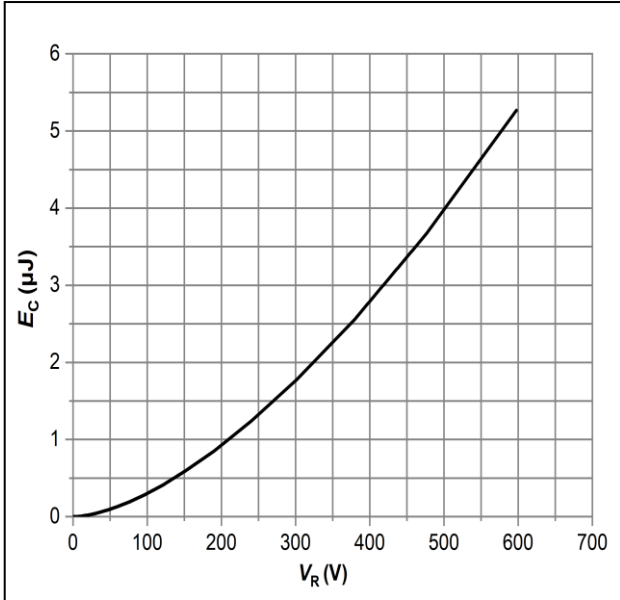


Figure 7: Typical Capacitance Stored Energy

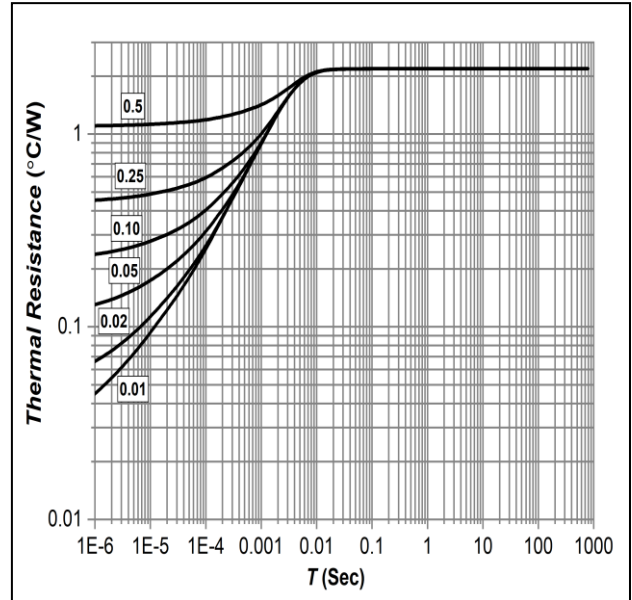
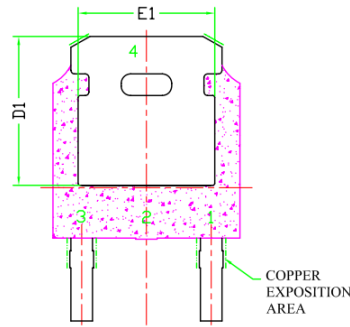
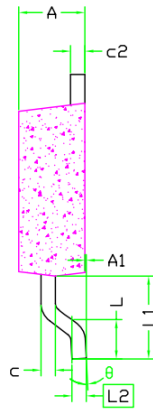
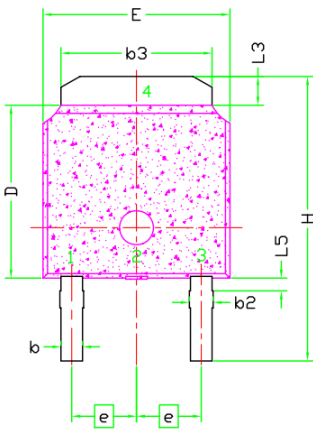


Figure 8: Transient Thermal Impedance

Silicon Carbide Schottky Diode
Package Dimensions

Package: TO-252-2



| SYMBOL | DIMENSIONAL REQMTS | | |
|--------|--------------------|-------|-------|
| | MIN | NOM | MAX |
| E | 6.40 | 6.60 | 6.731 |
| L | 1.40 | 1.52 | 1.77 |
| L1 | 2.743 REF | | |
| L2 | 0.508 BSC | | |
| L3 | 0.89 | -- | 1.27 |
| L5 | -- | -- | -- |
| D | 6.00 | 6.10 | 6.223 |
| H | 9.40 | 10.00 | 10.40 |
| b | 0.64 | 0.76 | 0.88 |
| b2 | 0.77 | 0.84 | 1.14 |
| b3 | 5.21 | 5.34 | 5.46 |
| e | 2.286 BSC | | |
| A | 2.20 | 2.30 | 2.38 |
| A1 | 0 | -- | 0.127 |
| c | 0.46 | 0.50 | 0.60 |
| c2 | 0.46 | 0.50 | 0.58 |
| D1 | 5.21 | -- | -- |
| E1 | 4.40 | -- | -- |
| θ | 0° | -- | 10° |