

E4D02120E

4th Generation 1200 V, 2 A Silicon Carbide Schottky Diode

Description

With the performance advantages of a Silicon Carbide (SiC) Schottky Barrier diode, power electronics systems can expect to meet higher efficiency standards than Si-based solutions, while also reaching higher frequencies and power densities. SiC diodes can be easily paralleled to meet various application demands, without concern of thermal runaway. In combination with the reduced cooling requirements and improved thermal performance of SiC products, SiC diodes are able to provide lower overall system costs in a variety of diverse applications.



Package Type: TO-252-2
Marking: E4D02120

Features

- Low Forward Voltage (V_f) Drop with Positive Temperature Coefficient
- Zero Reverse Recovery Current / Forward Recovery Voltage
- Temperature-Independent Switching Behavior
- AEC-Q101 + HV-H3TRB Qualified, PPAP Capable

Applications

- Bootstrap Diode
- Boost Diodes in PFC
- Automotive Power Conversion
- PV Inverters
- Outdoor Power Conversion

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

| Parameter | Symbol | Value | Unit | Test Conditions | Note |
|---------------------------------------|-----------|-------|------|---|--------|
| Repetitive Peak Reverse Voltage | V_{RRM} | 1200 | V | | |
| DC Blocking Voltage | V_{DC} | 1200 | | | |
| Continuous Forward Current | I_F | 8 | A | $T_J = 25^\circ\text{C}$ | Fig. 3 |
| | | 4 | | $T_J = 135^\circ\text{C}$ | |
| | | 2 | | $T_J = 160^\circ\text{C}$ | |
| Repetitive Peak Forward Surge Current | I_{FRM} | 11 | | $T_c = 25^\circ\text{C}$, $t_p = 10$ ms, Half Sine Wave | |
| | | 7 | | $T_c = 110^\circ\text{C}$, $t_p = 10$ ms, Half Sine Wave | |
| Power Dissipation | P_{tot} | 50 | W | $T_c = 25^\circ\text{C}$ | Fig. 4 |
| | | 21 | | $T_c = 110^\circ\text{C}$ | |



Electrical Characteristics

| Parameter | Symbol | Typ. | Max. | Units | Test Conditions | Note |
|---------------------------|--------|------|------|---------------|---|--------|
| Forward Voltage | V_F | 1.4 | 1.8 | V | $I_F = 2 \text{ A}, T_J = 25 \text{ }^\circ\text{C}$ | Fig. 1 |
| | | 1.9 | | | $I_F = 2 \text{ A}, T_J = 175 \text{ }^\circ\text{C}$ | |
| Reverse Current | I_R | 10 | 50 | μA | $V_R = 1200 \text{ V}, T_J = 25 \text{ }^\circ\text{C}$ | Fig. 2 |
| | | 40 | | | $V_R = 1200 \text{ V}, T_J = 175 \text{ }^\circ\text{C}$ | |
| Total Capacitive Charge | Q_C | 16 | | nC | $V_R = 800 \text{ V}, T_J = 25 \text{ }^\circ\text{C}$ | Fig. 5 |
| Total Capacitance | C | 153 | | pF | $V_R = 0 \text{ V}, T_J = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$ | Fig. 6 |
| | | 17 | | | $V_R = 400 \text{ V}, T_J = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$ | |
| | | 14 | | | $V_R = 800 \text{ V}, T_J = 25 \text{ }^\circ\text{C}, f = 1 \text{ MHz}$ | |
| Capacitance Stored Energy | E_C | 5.6 | | μJ | $V_R = 800 \text{ V}$ | Fig. 7 |

Note:

SiC Schottky Diodes are majority carrier devices, so there is no reverse recovery charge.

Thermal & Mechanical Characteristics

| Parameter | Symbol | Value | Units | Note |
|---|-----------------|-------------|-----------------------------|--------|
| Thermal Resistance, Junction to Case (Typ.) | $R_{\theta,JC}$ | 2.99 | $^\circ\text{C} / \text{W}$ | |
| Operating Junction & Storage Temperature | T_J, T_{stg} | -55 to +175 | $^\circ\text{C}$ | Fig. 8 |
| Maximum Processing Temperature | T_{PROC} | 325 | | |
| Moisture Sensitivity Level | MSL | MSL 3 | | |

Electrostatic Discharge (ESD) Classifications

| Parameter | Symbol | Value |
|---------------------|--------|------------------------------------|
| Human Body Model | HBM | Class 3B ($\geq 8000 \text{ V}$) |
| Charge Device Model | CDM | Class C3 ($\geq 1000 \text{ V}$) |



Typical Performance

Figure 1. Forward Characteristics

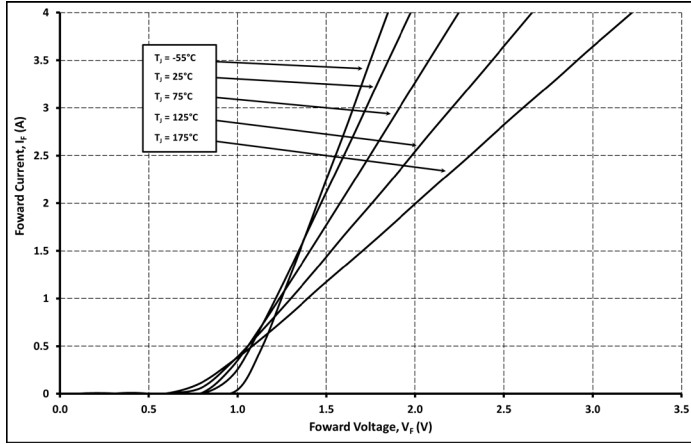


Figure 2. Reverse Characteristics

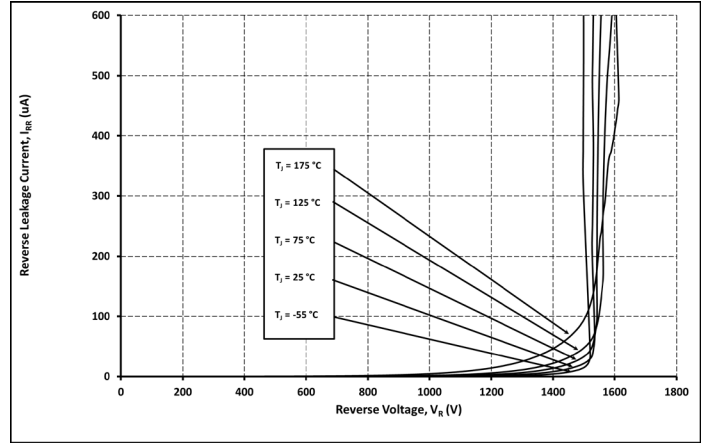


Figure 3. Current Derating

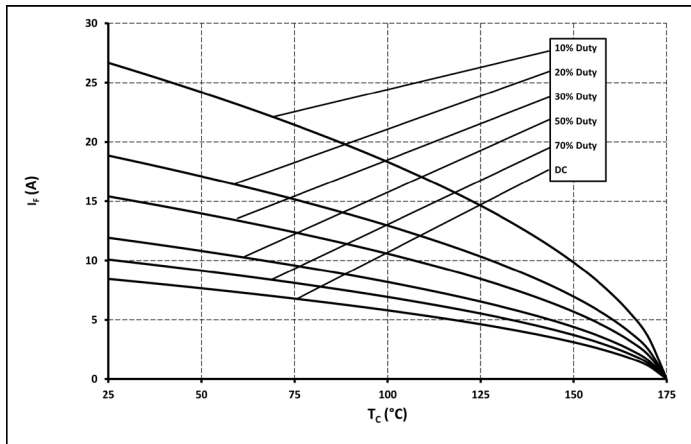


Figure 4. Power Derating

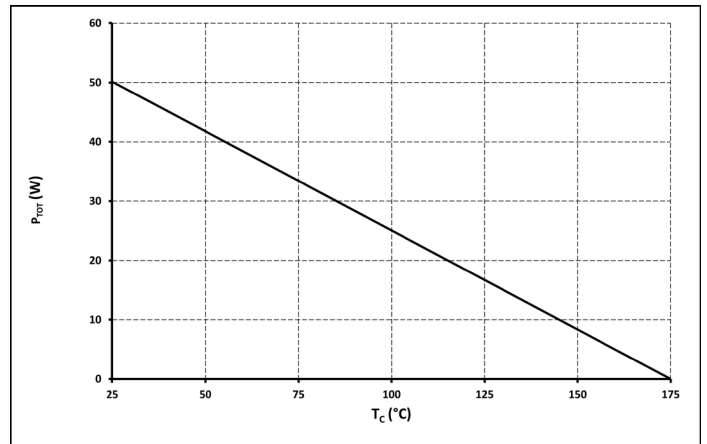


Figure 5. Total Capacitance Charge vs. Reverse Voltage

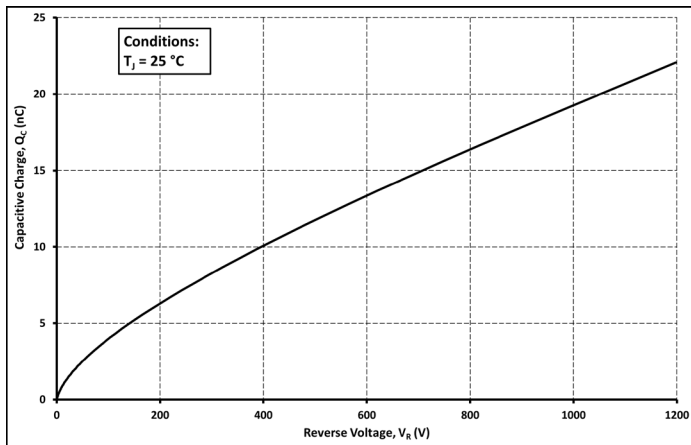
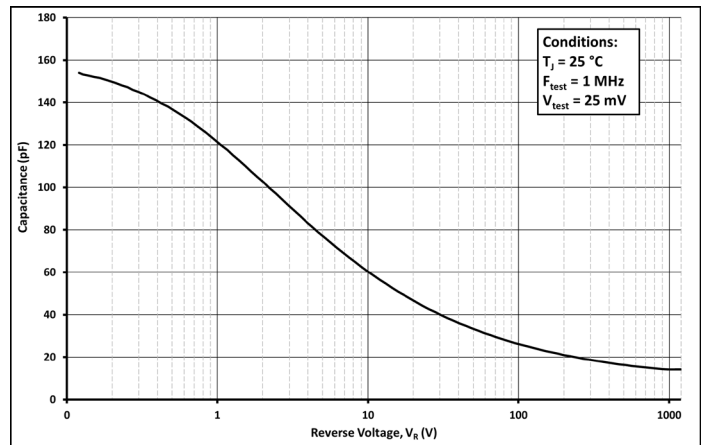


Figure 6. Capacitance vs. Reverse Voltage





Typical Performance

Figure 7. Capacitance Stored Energy

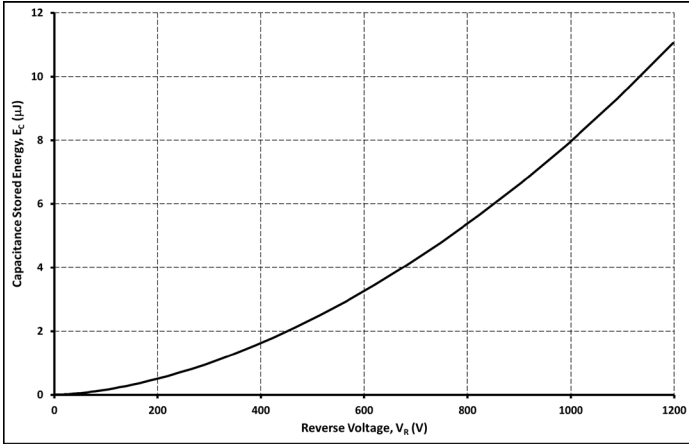


Figure 8. Transient Thermal Impedance

