

C2D20120D–Silicon Carbide Schottky Diode

ZERO RECOVERY® RECTIFIER

$V_{RRM} = 1200\text{ V}$
 $I_F = 20\text{ A}$
 $Q_c = 122\text{ nC}$

Features

- 1200-Volt Schottky Rectifier
- Zero Reverse Recovery
- Zero Forward Recovery
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Extremely Fast Switching
- Positive Temperature Coefficient on V_F

Benefits

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

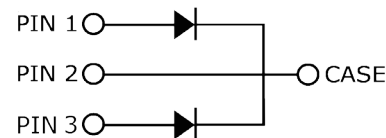
Applications

- Switch Mode Power Supplies
- Power Factor Correction
- Motor Drives

Package



TO-247-3



| Part Number | Package | Marking |
|-------------|----------|----------|
| C2D20120D | TO-247-3 | C2D20120 |

Maximum Ratings

| Symbol | Parameter | Value | Unit | Test Conditions | Note |
|----------------|--|----------------|------------------|---|------|
| V_{RRM} | Repetitive Peak Reverse Voltage | 1200 | V | | |
| V_{RSM} | Surge Peak Reverse Voltage | 1200 | V | | |
| V_{DC} | DC Blocking Voltage | 1200 | V | | |
| $I_{F(AVG)}$ | Average Forward Current (Per Leg/Device) | 10/20 17/34 | A | $T_C = 150^\circ\text{C}$ $T_C = 125^\circ\text{C}$ | |
| $I_{F(PEAK)}$ | Peak Forward Current (Per Leg/Device) | 25/50 | A | $T_C = 125^\circ\text{C}$, $T_{REP} < 1\text{ mS}$, Duty=0.5 | |
| I_{FRM} | Repetitive Peak Forward Surge Current | 50* | A | $T_C = 25^\circ\text{C}$, $t_p = 8.3\text{ ms}$, Half Sine Wave | |
| I_{FSM} | Non-Repetitive Peak Forward Surge Current | 250* | A | $T_C = 25^\circ\text{C}$, $t_p = 10\text{ }\mu\text{s}$, Pulse | |
| P_{tot} | Power Dissipation (Per Leg) | 312* 104* | W | $T_C = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$ | |
| T_J, T_{stg} | Operating Junction and Storage Temperature | -55 to +175 | $^\circ\text{C}$ | | |
| | TO-247 Mounting Torque | 1 8.8 | Nm lbf-in | M3 Screw 6-32 Screw | |

** Per Device, * Per Leg

Subject to change without notice.
www.cree.com/power

Electrical Characteristics (Per Leg)

| Symbol | Parameter | Typ. | Max. | Unit | Test Conditions | Note |
|--------|-------------------------|------------------|-------------|---------------|--|------|
| V_F | Forward Voltage | 1.6 2.5 | 1.8 3.0 | V | $I_F = 10\text{ A}$ $T_J = 25^\circ\text{C}$ $I_F = 10\text{ A}$ $T_J = 175^\circ\text{C}$ | |
| I_R | Reverse Current | 10 20 | 200 1000 | μA | $V_R = 1200\text{ V}$ $T_J = 25^\circ\text{C}$ $V_R = 1200\text{ V}$ $T_J = 175^\circ\text{C}$ | |
| Q_C | Total Capacitive Charge | 61 | | nC | $V_R = 1200\text{ V}$, $I_F = 10\text{ A}$ $di/dt = 500\text{ A}/\mu\text{s}$ $T_J = 25^\circ\text{C}$ | |
| C | Total Capacitance | 1000 80 59 | | pF | $V_R = 0\text{ V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{ MHz}$ $V_R = 200\text{ V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{ MHz}$ $V_R = 400\text{ V}$, $T_J = 25^\circ\text{C}$, $f = 1\text{ MHz}$ | |

Note:

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

Thermal Characteristics

| Symbol | Parameter | Typ. | Max. | Unit | Test Conditions | Note |
|-----------------|--|-----------------|------|---------------------------|-----------------|------|
| $R_{\theta JC}$ | Thermal Resistance from Junction to Case | 0.48** 0.24* | | $^\circ\text{C}/\text{W}$ | | |

** Per Leg, * Both Legs

Typical Performance (Per Leg)

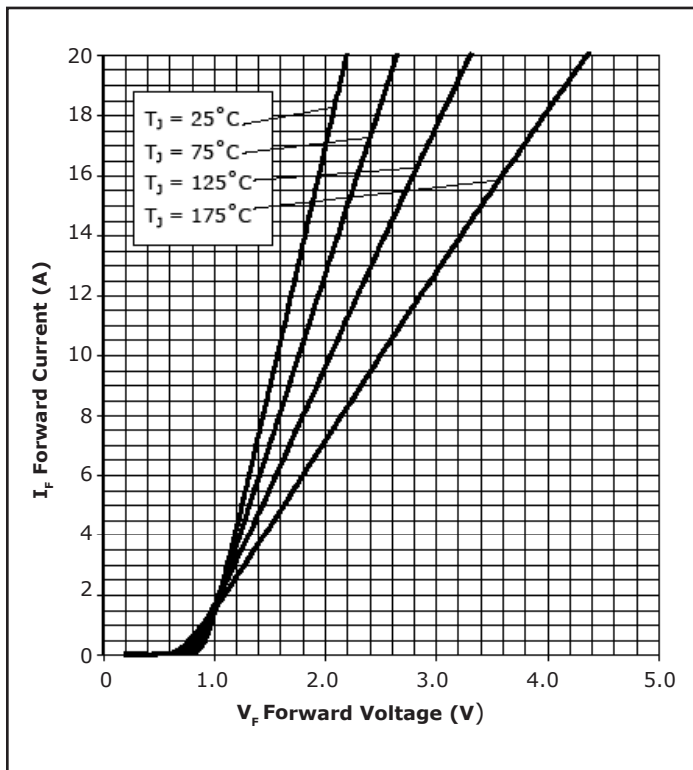


Figure 1. Forward Characteristics

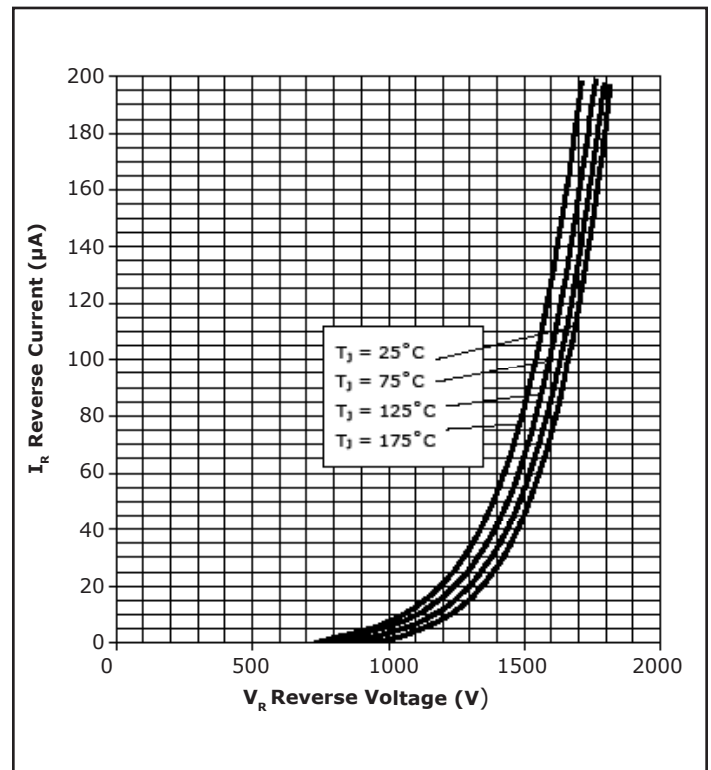


Figure 2. Reverse Characteristics

Typical Performance (Per Leg)

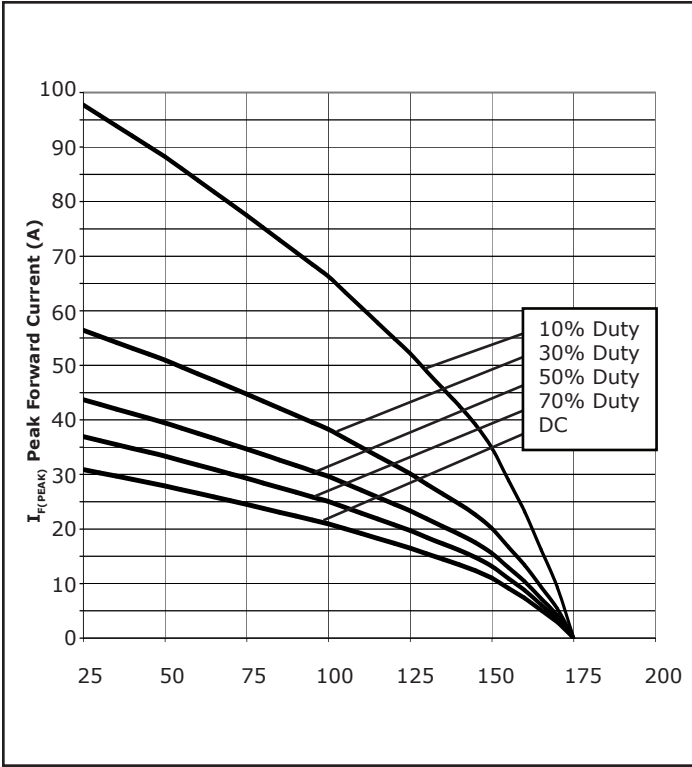


Figure 3. Current Derating

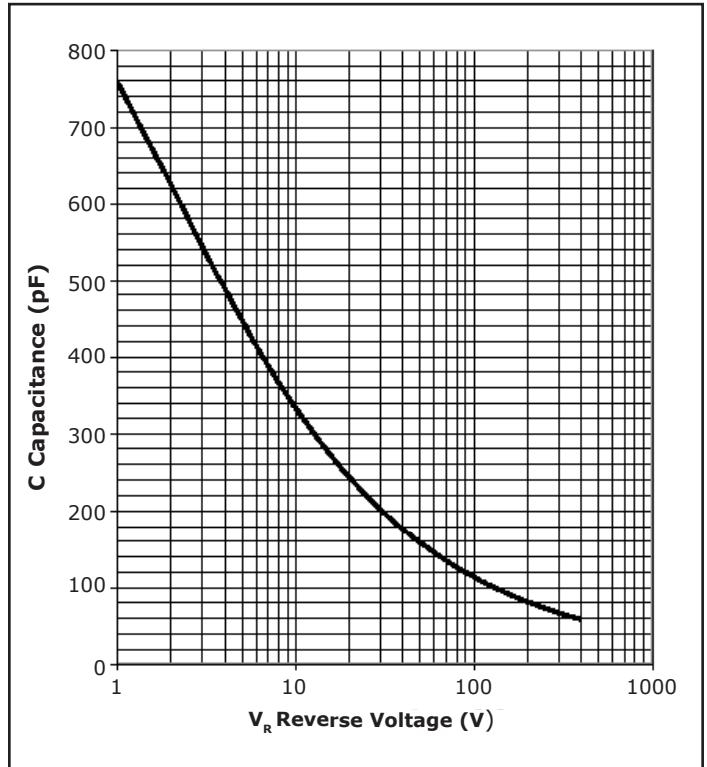


Figure 4. Capacitance vs. Reverse Voltage

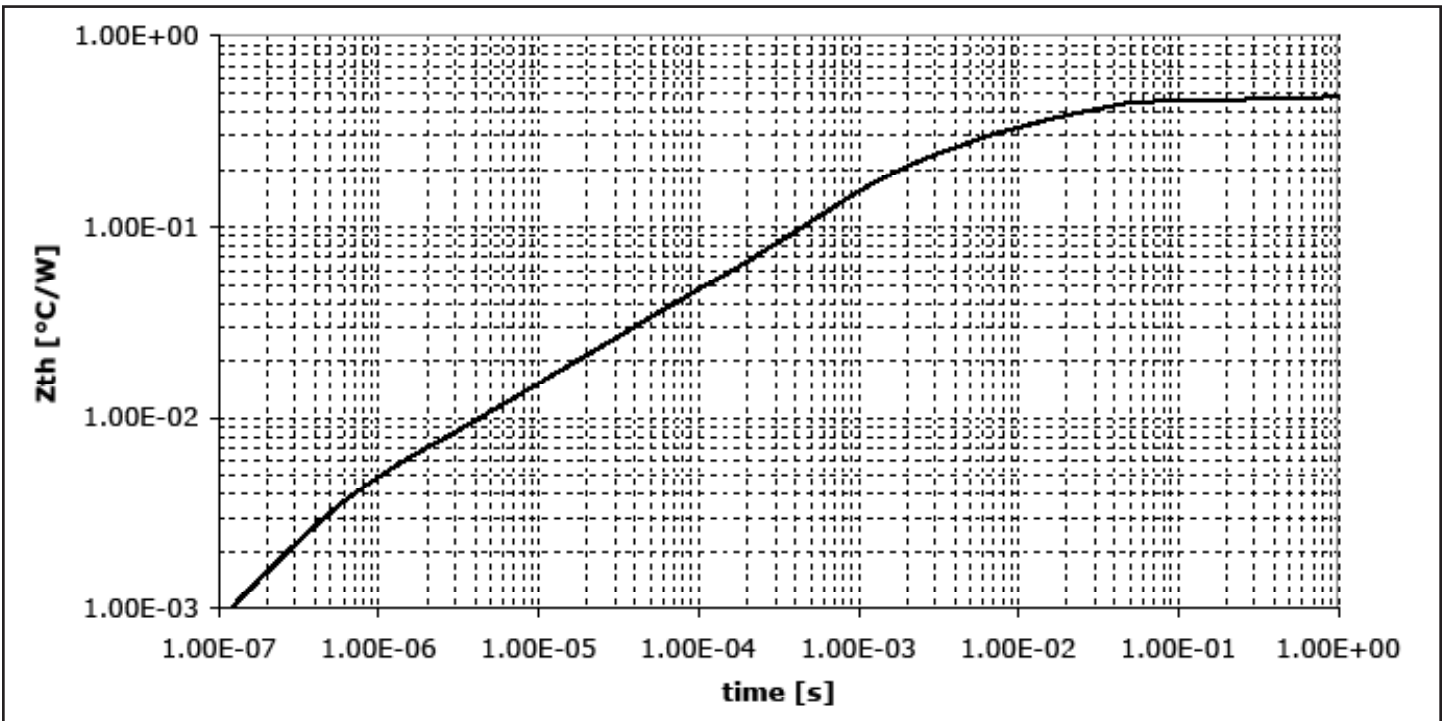
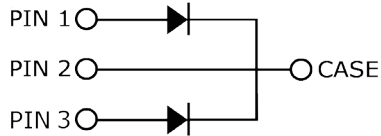
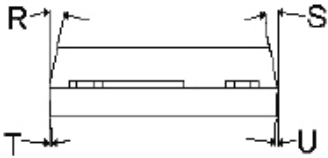
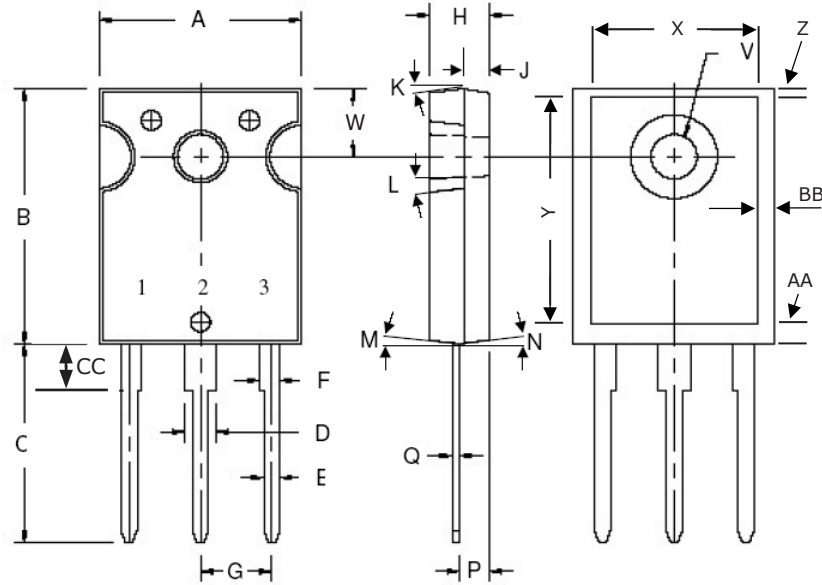


Figure 5. Transient Thermal Impedance

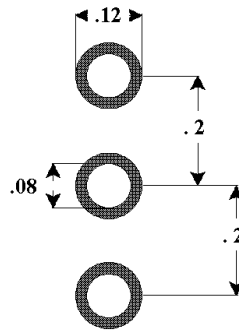
Package Dimensions

Package TO-247-3



| POS | Inches | | Millimeters | |
|-----|----------|------|-------------|--------|
| | Min | Max | Min | Max |
| A | .605 | .631 | 15.367 | 16.027 |
| B | .800 | .830 | 20.320 | 21.082 |
| C | .789 | .800 | 20.05 | 20.31 |
| D | .095 | .126 | 2.413 | 3.200 |
| E | .046 | .052 | 1.168 | 1.321 |
| F | .060 | .084 | 1.524 | 2.134 |
| G | .215 TYP | | .215 TYP | |
| H | .180 | .203 | 4.572 | 5.156 |
| J | .078 | .081 | 1.982 | 2.057 |
| K | 6° | 21° | 6° | 21° |
| L | 4° | 6° | 4° | 6° |
| M | 2° | 4° | 2° | 4° |
| N | 2° | 4° | 2° | 4° |
| P | .090 | .097 | 2.286 | 2.464 |
| Q | .020 | .030 | .508 | .762 |
| R | 9° | 11° | 9° | 11° |
| S | 9° | 11° | 9° | 11° |
| T | 2° | 8° | 2° | 8° |
| U | 2° | 8° | 2° | 8° |
| V | .138 | .144 | 3.505 | 3.658 |
| W | .210 | .220 | 5.334 | 5.588 |
| X | .502 | .557 | 12.751 | 14.148 |
| Y | .637 | .695 | 16.180 | 17.653 |
| Z | .040 | .052 | 1.016 | 1.321 |
| AA | .032 | .046 | .813 | 1.168 |
| BB | .110 | .140 | 2.794 | 3.556 |
| CC | .164 | .176 | 4.168 | 4.472 |

Recommended Solder Pad Layout



TO-247-3

| Part Number | Package | Marking |
|-------------|----------|----------|
| C2D20120D | TO-247-3 | C2D20120 |

"The levels of environmentally sensitive, persistent biologically toxic (PBT), persistent organic pollutants (POP), or otherwise 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 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS), as amended through April 21, 2006."

This product has not been designed or tested for use in, and is not intended for use in, applications implanted into the human body nor in applications in which failure of the product could lead to death, personal injury or property damage, including but not limited to equipment used in the operation of nuclear facilities, life-support machines, cardiac defibrillators or similar emergency medical equipment, aircraft navigation or communication or control systems, air traffic control systems, or weapons systems.

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