

C2D05120–silicon Carbide Schottky Diode

ZERO RECOVERY[®] RECTIFIER

$$V_{RRM} = 1200 \text{ V}$$

$$I_F = 5 \text{ A}$$

$$Q_c = 28 \text{ nC}$$

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

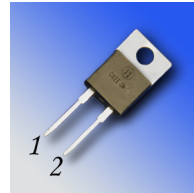
Benefits

- 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
- High Voltage Multipliers

Package



TO-220-2



| Part Number | Package | Marking |
|-------------|----------|----------|
| C2D05120A | TO-220-2 | C2D05120 |

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 | 5 10 | A | $T_C=160^\circ\text{C}$, DC $T_C=125^\circ\text{C}$, DC | |
| $I_{F(PEAK)}$ | Peak Forward Current | 15 | A | $T_C=125^\circ\text{C}$, $T_{REP}<1\text{mS}$, Duty=0.5 | |
| I_{FRM} | Repetitive Peak Forward Surge Current | 30 | A | $T_C=25^\circ\text{C}$, $t_p=8.3 \text{ ms}$, Half Sine Wave | |
| I_{FSM} | Non-Repetitive Peak Forward Surge Current | 100 | A | $T_C=25^\circ\text{C}$, $t_p=10 \mu\text{s}$, Pulse | |
| P_{tot} | Power Dissipation | 136 45 | 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 | $^\circ\text{C}$ | | |

Electrical Characteristics

| Symbol | Parameter | Typ. | Max. | Unit | Test Conditions | Note |
|--------|-------------------------|-----------------|-------------|---------------|--|------|
| V_F | Forward Voltage | 1.6 2.6 | 1.8 3.0 | V | $I_F = 5\text{ A}$ $T_J = 25^\circ\text{C}$ $I_F = 5\text{ A}$ $T_J = 175^\circ\text{C}$ | |
| I_R | Reverse Current | 50 100 | 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 | 28 | | nC | $V_R = 1200\text{ V}$, $I_F = 5\text{ A}$ $di/dt = 500\text{ A}/\mu\text{s}$ $T_J = 25^\circ\text{C}$ | |
| C | Total Capacitance | 455 45 33 | | 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 | 1.1 | | $^\circ\text{C}/\text{W}$ | | |

Typical Performance

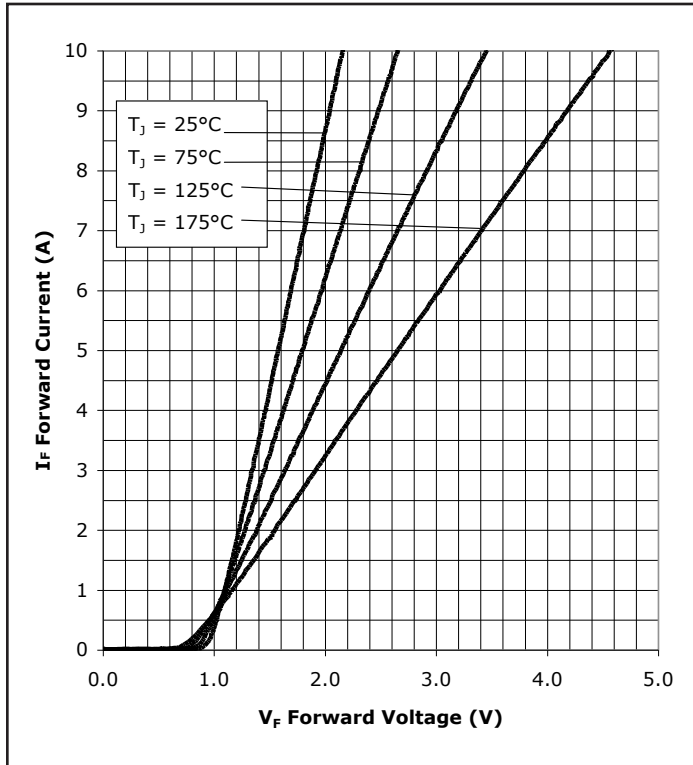


Figure 1. Forward Characteristics

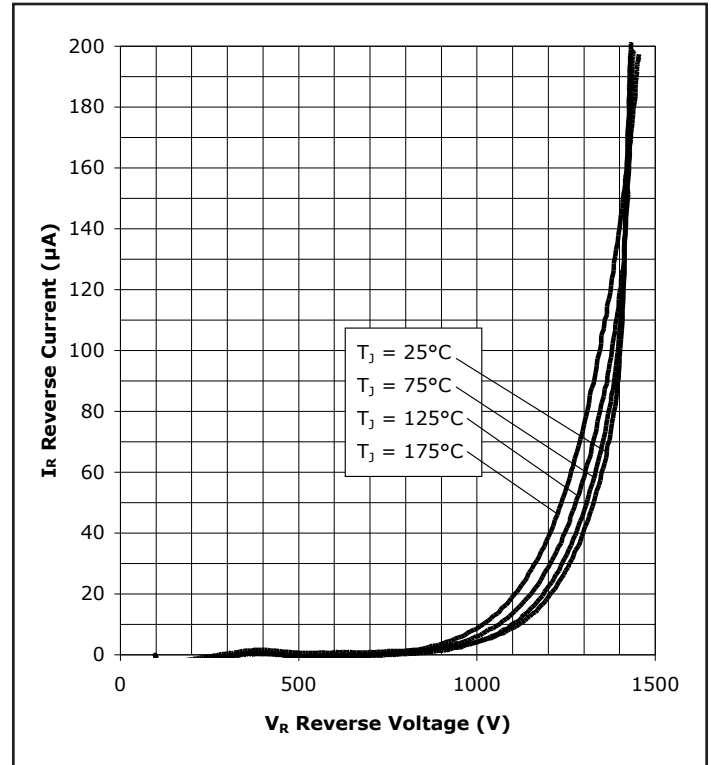


Figure 2. Reverse Characteristics

Typical Performance

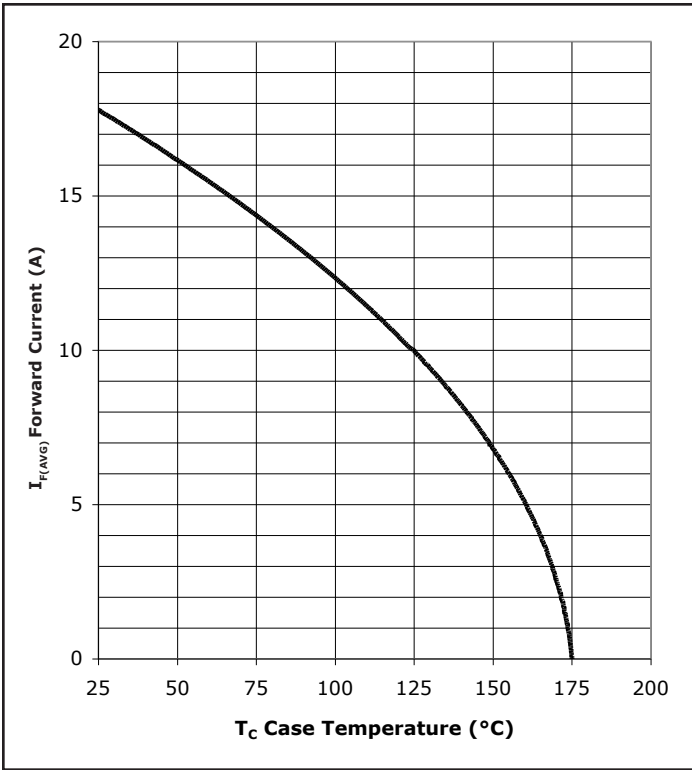


Figure 3. Current Derating

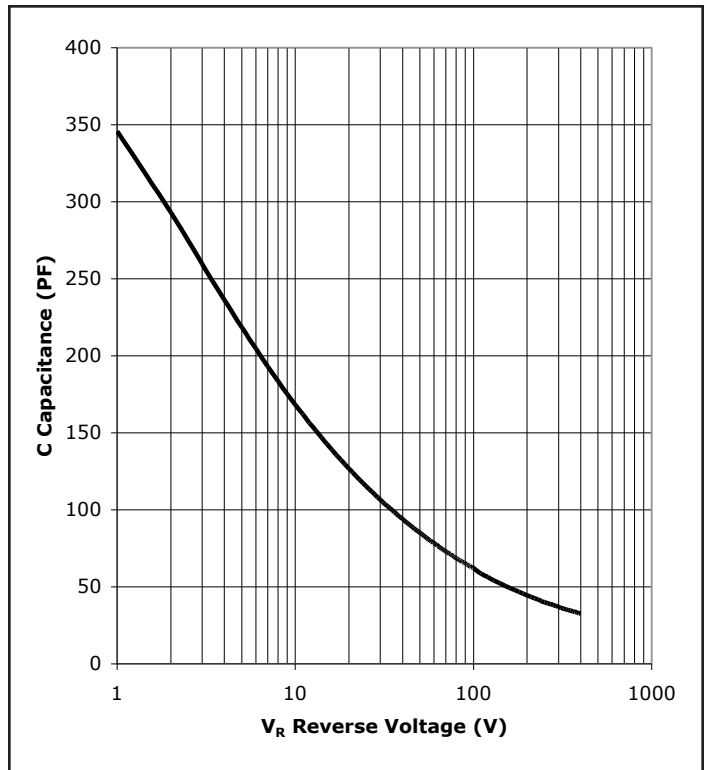


Figure 4. Capacitance vs. Reverse Voltage

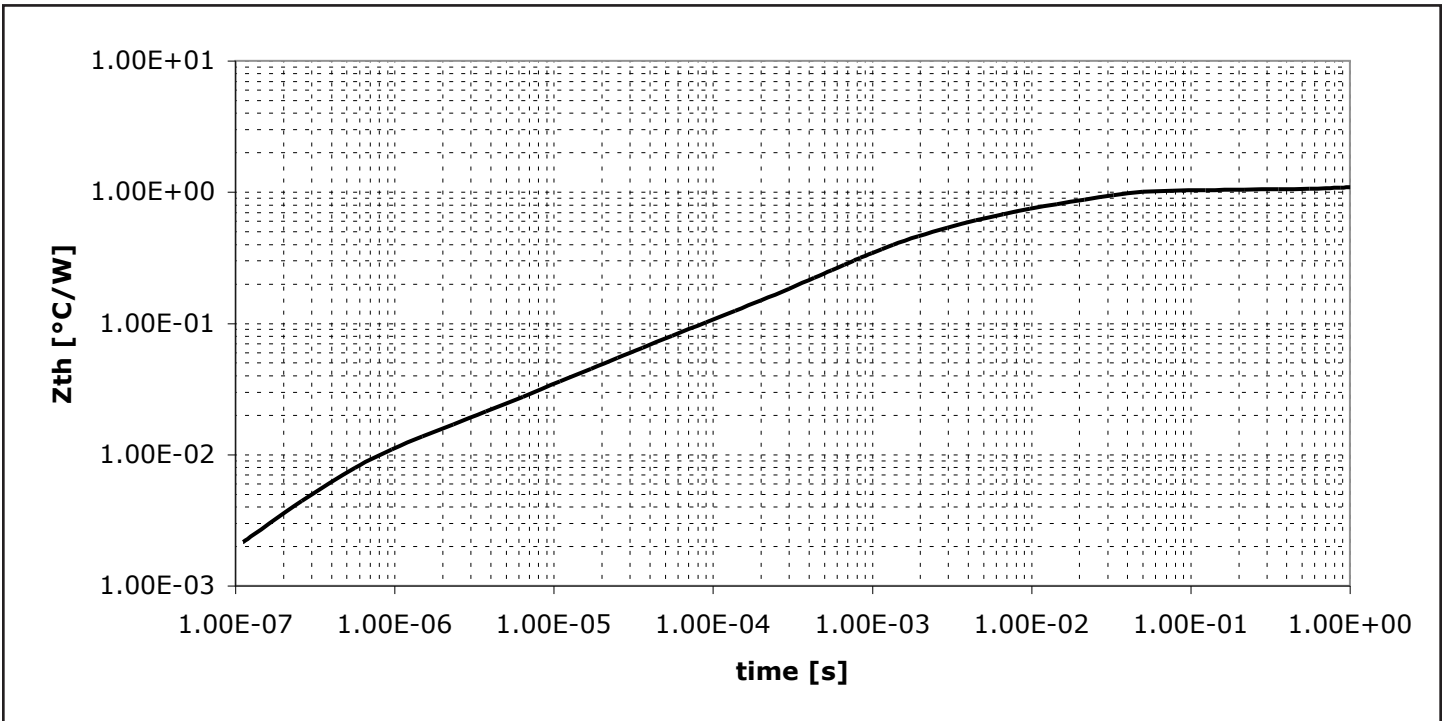
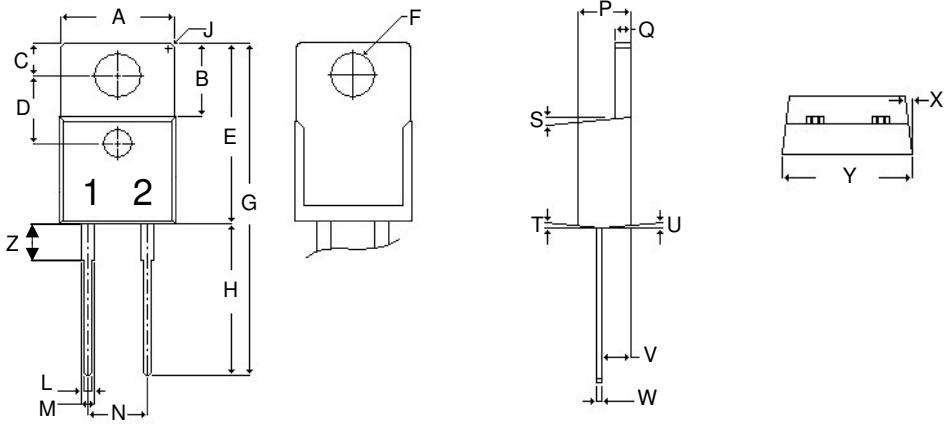


Figure 5. Transient Thermal Impedance

Package Dimensions

Package TO-220-2



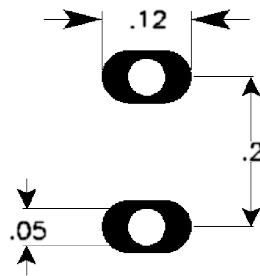
| POS | Inches | | Millimeters | |
|-----|---------|-------|-------------|--------|
| | Min | Max | Min | Max |
| A | .381 | .410 | 9.677 | 10.414 |
| B | .235 | .255 | 5.969 | 6.477 |
| C | .100 | .120 | 2.540 | 3.048 |
| D | .223 | .337 | 5.664 | 8.560 |
| E | .590 | .615 | 14.986 | 15.621 |
| F | .143 | .153 | 3.632 | 3.886 |
| G | 1.105 | 1.147 | 28.067 | 29.134 |
| H | .500 | .550 | 12.700 | 13.970 |
| J | R 0.197 | | R 0.197 | |
| L | .025 | .036 | .635 | .914 |
| M | .045 | .055 | 1.143 | 1.397 |
| N | .195 | .205 | 4.953 | 5.207 |
| P | .165 | .185 | 4.191 | 4.699 |
| Q | .048 | .054 | 1.219 | 1.372 |
| S | 3° | 6° | 3° | 6° |
| T | 3° | 6° | 3° | 6° |
| U | 3° | 6° | 3° | 6° |
| V | .094 | .110 | 2.388 | 2.794 |
| W | .014 | .025 | .356 | .635 |
| X | 3° | 5.5° | 3° | 5.5° |
| Y | .385 | .410 | 9.779 | 10.414 |
| z | .130 | .150 | 3.302 | 3.810 |

NOTE:

1. Dimension L, M, W apply for Solder Dip Finish



Recommended Solder Pad Layout



TO-220-2

| Part Number | Package | Marking |
|-------------|----------|----------|
| C2D05120A | TO-220-2 | C2D05120 |

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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