

# P3CD20120A

1200V/20A SiC Power Schottky Barrier Diode Product



**POWERCUBESEMI, INC.**

Potential · Convergence · Smart

## Features

- Positive temperature coefficient for easy parallel use
- Switching characteristics that are not affected by temperature
- Maximum operating temperature 175 °C
- Zero reverse recovery current
- Zero forward recovery voltage

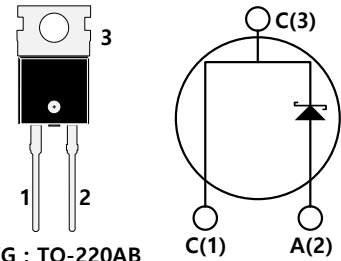
| Key Characteristics               |      |    |
|-----------------------------------|------|----|
| $V_{RRM}$                         | 1200 | V  |
| $I_F, T_C \leq 140^\circ\text{C}$ | 20   | A  |
| $Q_C$                             | 161  | nC |

## Benefits

- Unipolar device
- Greatly reduce switching losses
- No thermal crash in parallel devices
- Reduce system dependence on heat sinks

## Applications

- Switch Mode Power Supply (SMPS), Power Factor Correction (PFC)
- Motor drive, photovoltaic inverter, uninterruptible power supply, Wind turbines, train traction systems, electric vehicles.



PKG : TO-220AB



**Absolute Maximum Ratings**  $T_C = 25^\circ\text{C}$  unless otherwise specified

| Symbol    | Parameter                                 | Test Condition   | Value      | Unit             |
|-----------|---|--|------------|------------------|
| $V_{RRM}$ | Repetitive Peak Reverse Voltage           |  | 1200       | V                |
| $V_{RSM}$ | Surge Peak Reverse Voltage                |  | 1200       | V                |
| $V_{DC}$  | DC Blocking Voltage                       |  | 1200       | V                |
| $I_F$     | Continuous Forward Current                | $T_C=25^\circ\text{C}$   | 47         | A                |
|           |   | $T_C=110^\circ\text{C}$  | 30         | A                |
|           |   | $T_C=140^\circ\text{C}$  | 20         | A                |
| $I_{FRM}$ | Repetitive Peak Forward Surge Current     | $T_C=25^\circ\text{C}$ , $t_p=10\text{ms}$ , Half Sine Wave, $D=0.3$ | 100        | A                |
| $I_{FSM}$ | Non-repetitive Peak Forward Surge Current | $T_C=25^\circ\text{C}$ , $t_p=10\text{ms}$ , Half Sine Wave          | 270        | A                |
| $P_{TOT}$ | Power Dissipation                         | $T_C=25^\circ\text{C}$   | 349        | W                |
|           |   | $T_C=110^\circ\text{C}$  | 151        |                  |
| $T_j$     | Operating Junction                        |  | -55 to 175 | $^\circ\text{C}$ |
| $T_{stg}$ | Storage Temperature                       |  | -55 to 175 | $^\circ\text{C}$ |



**Thermal Characteristics**

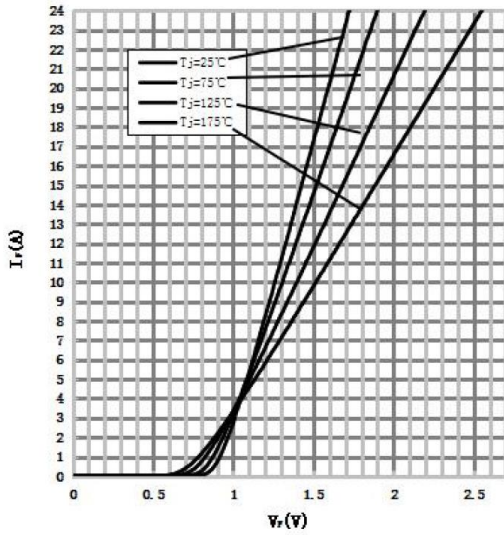
| Symbol     | Parameter                                | Test Condition | Value | Unit |
|------------|--|----------------|-------|------|
|            |  |                | Typ.  |      |
| $R_{thJc}$ | Thermal resistance from junction to case |                | 0.43  | °C/W |

**Electrical Characteristics, Nomination temperature Tj=25°C**

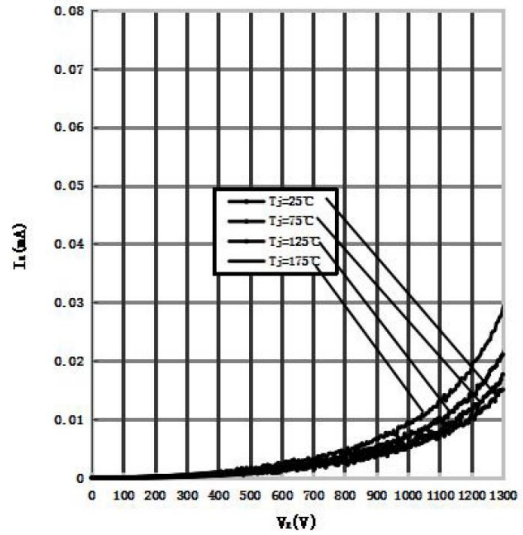
| Symbol | Parameter               | Test Condition   | Numerical |      | Unit    |
|--------|-------------------------|--|-----------|------|---------|
|        |                         |  | Typ.      | Max. |         |
| $V_F$  | Forward Voltage         | $I_F=20A, T_j=25^\circ C$                                  | 1.45      | 1.7  | V       |
|        |                         | $I_F=20A, T_j=175^\circ C$                                 | 2.26      | 2.5  |         |
| $I_R$  | Reverse Current         | $V_R=1200V, T_j=25^\circ C$                                | 15        | 50   | $\mu A$ |
|        |                         | $V_R=1200V, T_j=175^\circ C$                               | 25        | 100  |         |
| $Q_C$  | Total capacitive Charge | $V_R=800V, T_j=150^\circ C$<br>$Q_C = \int_0^{V_R} C(V)dV$ | 161       | -    | nC      |
| C      | Total Capacitance       | $V_R=0V, T_j=25^\circ C, f=1MHZ$                           | 2600      | 2700 | pF      |
|        |                         | $V_R=400V, T_j=25^\circ C, f=1MHZ$                         | 140       | 145  |         |
|        |                         | $V_R=800V, T_j=25^\circ C, f=1MHZ$                         | 137       | 140  |         |

## Performance Graphs

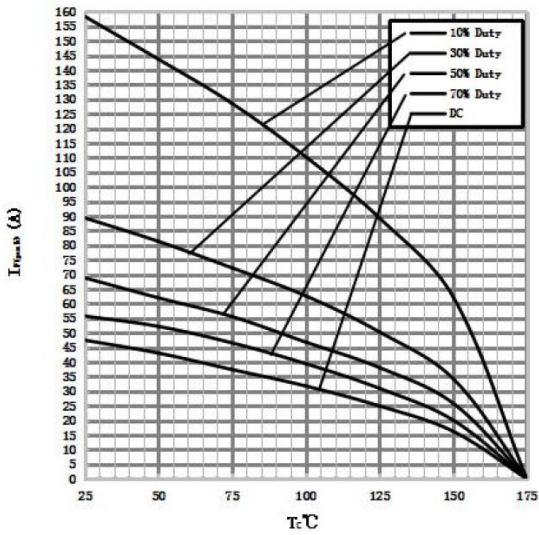
1) Forward IV characteristics as a function of  $T_j$



2) Reverse IV characteristics as a function of  $T_j$



3) Current Derating



4) Capacitance VS. reverse voltage

