

P3CD02065A

650V/2A SiC Power Schottky Barrier Diode Product



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

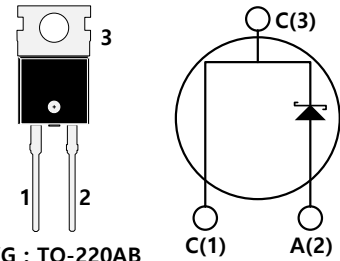
| Key Characteristics | | |
|-----------------------------------|-----|----|
| V_{RRM} | 650 | V |
| $I_F, T_C \leq 160^\circ\text{C}$ | 2 | A |
| Q_C | 8 | nC |

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 | | 650 | V |
| V_{RSM} | Surge Peak Reverse Voltage | | 650 | V |
| V_{DC} | DC Blocking Voltage | | 650 | V |
| I_F | Continuous Forward Current | $T_C=25^\circ\text{C}$ | 9 | A |
| | | $T_C=100^\circ\text{C}$ | 6 | A |
| | | $T_C=160^\circ\text{C}$ | 2 | A |
| I_{FRM} | Repetitive Peak Forward Surge Current | $T_C=25^\circ\text{C}$, $t_p=10\text{ms}$, Half Sine Wave, $D=0.3$ | 10 | A |
| I_{FSM} | Non-repetitive Peak Forward Surge Current | $T_C=25^\circ\text{C}$, $t_p=10\text{ms}$, Half Sine Wave | 30 | A |
| P_{TOT} | Power Dissipation | $T_C=25^\circ\text{C}$ | 42 | W |
| | | $T_C=110^\circ\text{C}$ | 18 | |
| T_j | Operating Junction | | -55 to 175 | $^\circ\text{C}$ |
| T_{stg} | Storage Temperature | | -55 to 175 | $^\circ\text{C}$ |

**Thermal Characteristics**

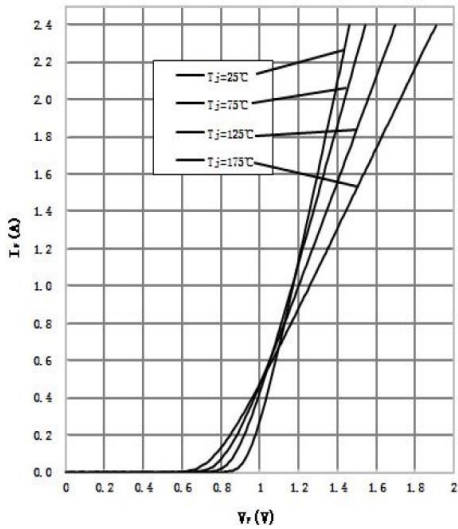
| Symbol | Parameter | Test Condition | Value | Unit |
|------------|--|----------------|-------|------|
| | | | Typ. | |
| R_{thjc} | Thermal resistance from junction to case | | 3.57 | °C/W |

Electrical Characteristics, Nomination temperature $T_j=25^{\circ}\text{C}$

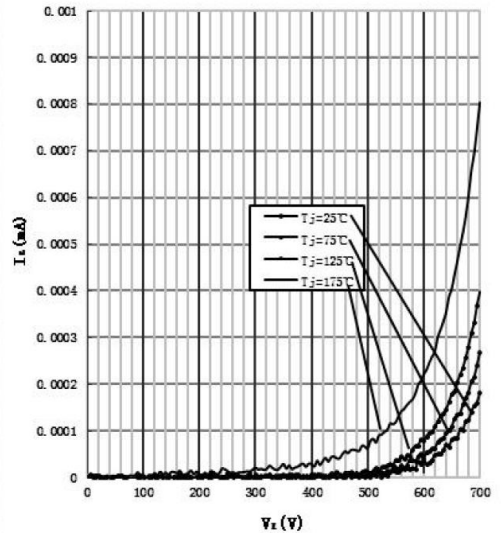
| Symbol | Parameter | Test Condition | Numerical | | Unit |
|--------|-------------------------|---|-----------|------|---------------|
| | | | Typ. | Max. | |
| V_F | Forward Voltage | $I_F=2\text{A}, T_j=25^{\circ}\text{C}$ | 1.38 | 1.7 | V |
| | | $I_F=2\text{A}, T_j=175^{\circ}\text{C}$ | 1.72 | 2.5 | |
| I_R | Reverse Current | $V_R=650\text{V}, T_j=25^{\circ}\text{C}$ | 10 | 50 | μA |
| | | $V_R=650\text{V}, T_j=175^{\circ}\text{C}$ | 20 | 100 | |
| Q_C | Total capacitive Charge | $V_R=400\text{V}, T_j=150^{\circ}\text{C}$ $Q_C = \int_0^{V_R} C(V)dV$ | 8 | - | nC |
| C | Total Capacitance | $V_R=0\text{V}, T_j=25^{\circ}\text{C}, f=1\text{MHz}$ | 123 | 150 | pF |
| | | $V_R=200\text{V}, T_j=25^{\circ}\text{C}, f=1\text{MHz}$ | 12 | 20 | |
| | | $V_R=400\text{V}, T_j=25^{\circ}\text{C}, f=1\text{MHz}$ | 13 | 30 | |

Performance Graphs

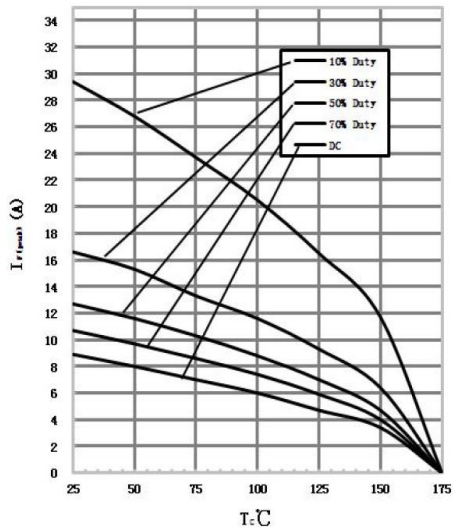
1) Forward IV characteristics as a function of T_j



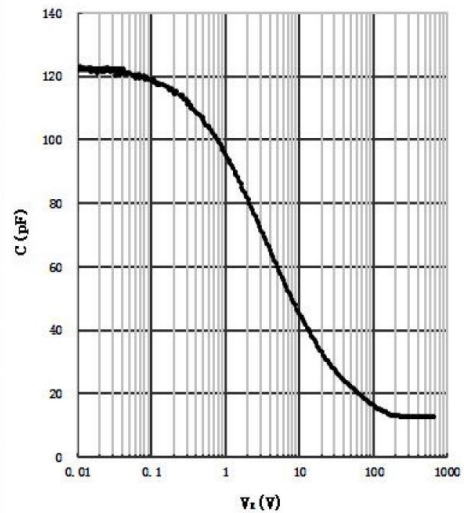
2) Reverse IV characteristics as a function of T_j



3) Current Derating

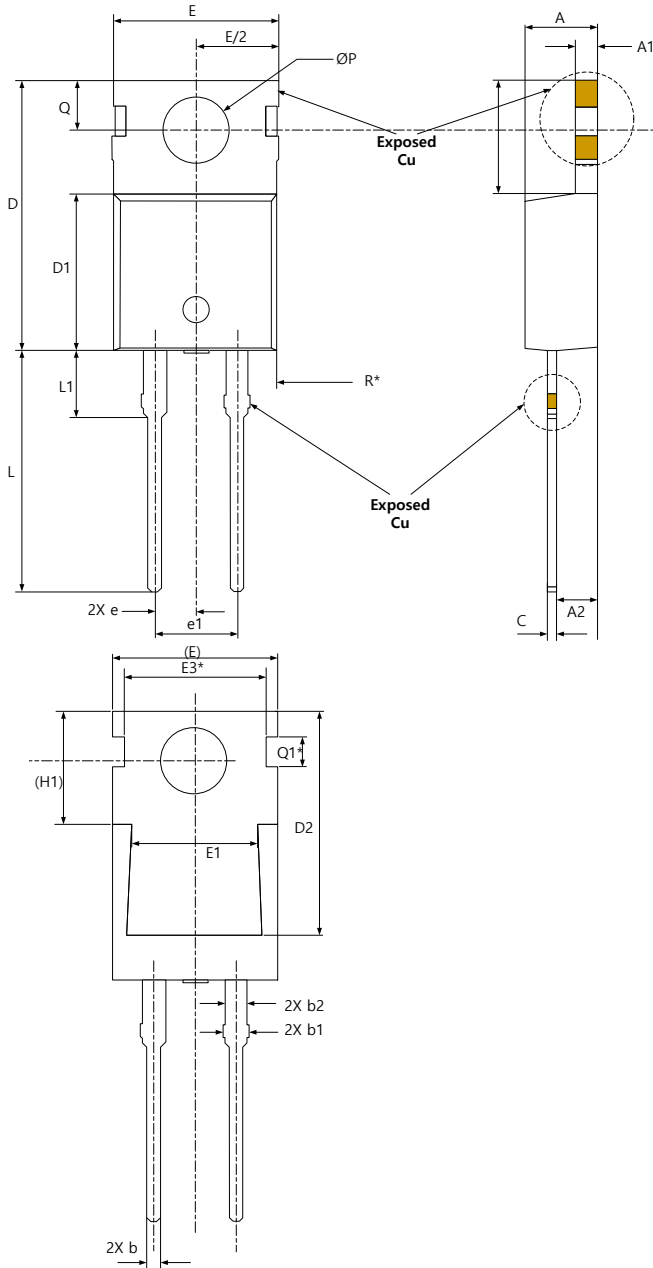


4) Capacitance VS. reverse voltage





Package Outline



| SYMBOL | DIMENSIONS | | | NOTES |
|----------------------------|------------|-------|-------|-------|
| | MIN | NOM | MAX | |
| A | 4.24 | 4.44 | 4.64 | |
| A1 | 1.15 | 1.27 | 1.40 | |
| A2 | 2.30 | 2.48 | 2.70 | |
| b | 0.70 | 0.80 | 0.90 | |
| b1 | 1.20 | 1.55 | 1.75 | |
| b2 | 1.20 | 1.45 | 1.70 | |
| c | 0.40 | 0.50 | 0.60 | |
| D | 14.70 | 15.37 | 16.00 | 4 |
| D1 | 8.82 | 8.92 | 9.02 | |
| D2 | 12.63 | 12.73 | 12.83 | 5 |
| E | 9.96 | 10.16 | 10.36 | 4, 5 |
| E1 | 6.86 | 7.77 | 8.89 | 5 |
| E3* | 8.70 REF | | | |
| e | 2.54 BSC | | | |
| e1 | 5.08 BSC | | | |
| H1 | 6.30 | 6.45 | 6.60 | 5.6 |
| L | 13.47 | 13.72 | 13.97 | |
| L1 | 3.60 | 3.80 | 4.00 | |
| ϕP | 3.75 | 3.84 | 3.93 | |
| Q | 2.60 | 2.80 | 3.00 | |
| Q1* | 1.73 REF | | | |
| R* | 1.82 REF | | | |

| Symbol | Parameter | Test Condition | Numerical | | Unit |
|--------|-----------------|------------------------------------|-----------|------|------------|
| | | | Typ. | Max. | |
| M_d | Mounting torque | TO-220AC M3 Screw 6-32 Screw | 1/8.8 | - | Nm/lbf.in. |