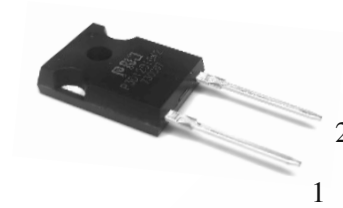


SiC SBD P3D12005K2 1200V SiC Schottky Diode



Features

- Qualified to AEC-Q101
- Ultra-Fast Switching
- Zero Reverse Recovery Current
- High-Frequency Operation
- Positive Temperature Coefficient on V_F
- High Surge Current
- 100% UIS tested

TO-247-2

| | |
|---------|---|
| Cathode | 1 |
| Anode | 2 |



Benefits

- Improve System Efficiency
- Reduction of Heat Sink Requirement
- Essentially No Switching Losses
- Parallel Devices Without Thermal Runaway



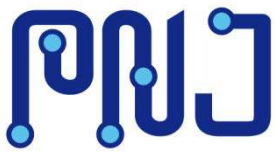
Application

- Consumer SMPS
- Boost Diodes in PFC or DC/DC Stages
- AC/DC Converters



Order Information

| Part Number | Package | Marking |
|-------------|----------|------------|
| P3D12005K2 | TO-247-2 | P3D12005K2 |



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PN Junction Semiconductor

1. Maximum Ratings

At $T_J = 25^\circ\text{C}$, unless specified otherwise

| Parameter | Symbol | Value | Unit | Test condition |
|--|----------------|---------------|------------------|---|
| Repetitive Peak Reverse Voltage | V_{RRM} | 1200 | V | $T_C = 25^\circ\text{C}$ |
| Surge Peak Reverse Voltage | V_{RSM} | 1200 | V | $T_C = 25^\circ\text{C}$ |
| DC Blocking Voltage | V_R | 1200 | V | $T_C = 25^\circ\text{C}$ |
| Forward Current | I_F | 23 10 5 | A | $T_C = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$ $T_C = 160^\circ\text{C}$ |
| Repetitive Peak Forward Surge Current | I_{FRM} | 25 18 | A | $T_C = 25^\circ\text{C}, t_p = 10\text{ms}$ $T_C = 125^\circ\text{C}, t_p = 10\text{ms}$ |
| Non-Repetitive Forward Surge Current | I_{FSM} | 75 61 | A | $T_C = 25^\circ\text{C}, t_p = 10\text{ms}$ $T_C = 125^\circ\text{C}, t_p = 10\text{ms}$ |
| Non-Repetitive Forward Surge Current | $I_{F, MAX}$ | 893 943 | A | $T_C = 25^\circ\text{C}, t_p = 10\mu\text{s}$ $T_C = 125^\circ\text{C}, t_p = 10\mu\text{s}$ |
| Power Dissipation | P_{tot} | 132 | W | $T_C = 25^\circ\text{C}$ |
| Operating Junction and Storage Temperature | T_J, T_{STG} | -55 to +175 | $^\circ\text{C}$ | |
| TO-247 Mounting Torque M3 Screw | T_{Torq} | 1 8.8 | Nm lbf-in | |

2. Thermal Characteristics

| Parameter | Symbol | Values | Unit |
|--|-----------------|--------|---------------------------|
| Thermal Resistance from Junction to Case | $R_{\theta JC}$ | 1.14 | $^\circ\text{C}/\text{W}$ |

3. Electrical Characteristics

At $T_J = 25^\circ\text{C}$, unless specified otherwise

| Parameter | Symbol | Values | | | Unit | Test condition |
|---------------------------|--------|--------|------|------|---------------|---|
| | | Min. | Typ. | Max. | | |
| Forward Voltage | V_F | / | 1.5 | 1.8 | V | $I_F = 5\text{A}, T_J = 25^\circ\text{C}$ |
| | | | 2.1 | / | | $I_F = 5\text{A}, T_J = 175^\circ\text{C}$ |
| Reverse Current | I_R | / | 1.73 | 44 | μA | $V_R = 1200\text{V}, T_J = 25^\circ\text{C}$ |
| | | | 149 | / | | $V_R = 1200\text{V}, T_J = 175^\circ\text{C}$ |
| Total Capacitance | C | / | 304 | / | pF | $V_R = 0\text{V}, T_J = 25^\circ\text{C}$ $f = 1\text{MHz}$ |
| | | | 39 | | | $V_R = 400\text{V}, T_J = 25^\circ\text{C}$ $f = 1\text{MHz}$ |
| | | | 37 | | | $V_R = 800\text{V}, T_J = 25^\circ\text{C}$ $f = 1\text{MHz}$ |
| Total Capacitive Charge | Q_C | / | 36.8 | / | nC | $V_R = 800\text{V}, I_F = 5\text{A}$ $di/dt = 200\text{A}/\mu\text{s}$ $T_J = 25^\circ\text{C}$ |
| Capacitance Stored Energy | E_C | / | 11.9 | / | μJ | $V_R = 800\text{V}$ |

4. Typical Performance

At $T_J = 25^\circ\text{C}$, unless specified otherwise

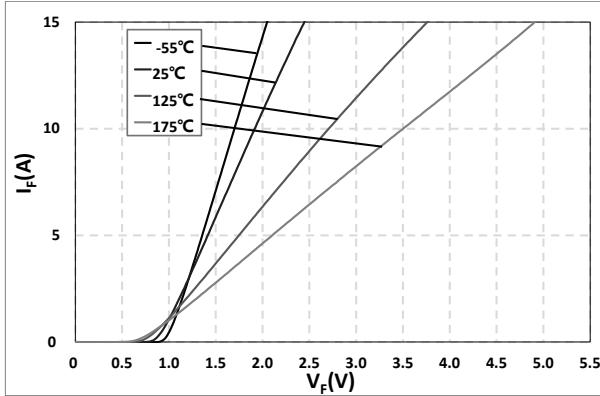


Fig. 1 Typical Forward Characteristics
 $I_F = f(V_F)$; $T_J = -55^\circ\text{C}, 25^\circ\text{C}, 125^\circ\text{C}, 175^\circ\text{C}$

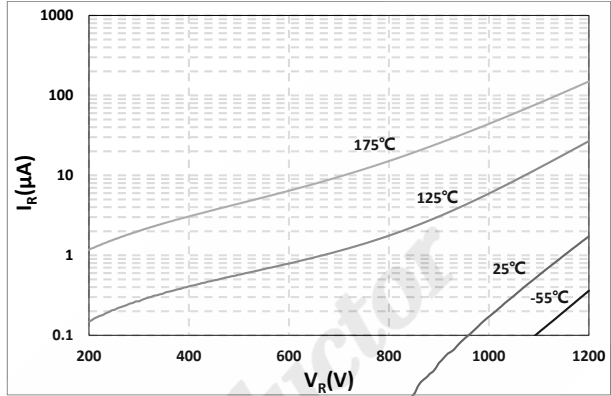


Fig. 2 Reverse Characteristics
 $I_R = f(V_R)$; $T_J = -55^\circ\text{C}, 25^\circ\text{C}, 125^\circ\text{C}, 175^\circ\text{C}$

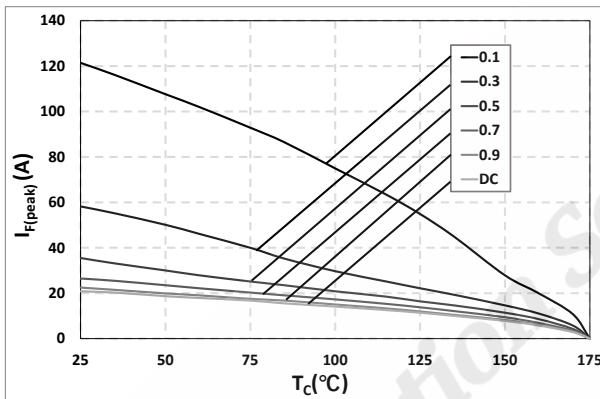


Fig. 3 Current Derating

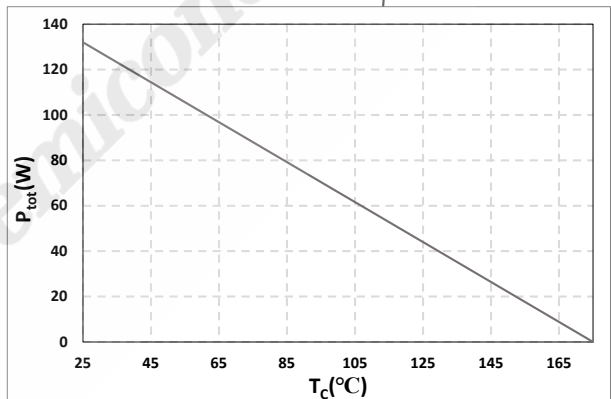


Fig. 4 Typical Power Derating
 $P_{\text{tot}} = f(T_C)$

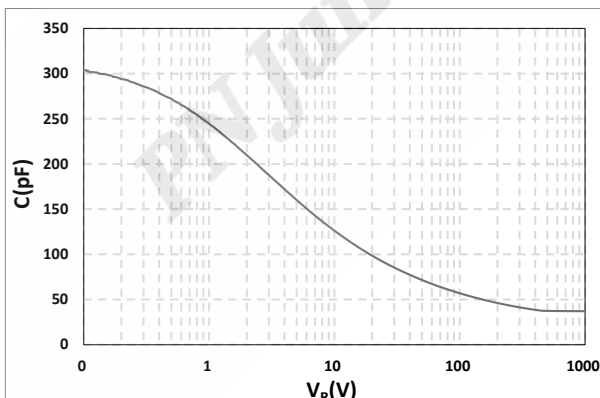


Fig. 5 Typical Total Capacitance
 $C = f(V_R)$

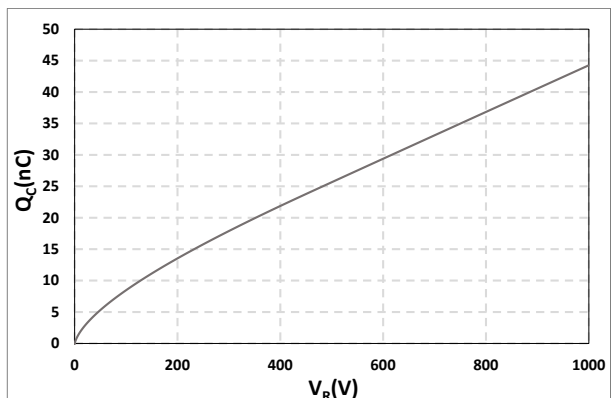


Fig. 6 Typical Total Capacitive Charge
 $Q_C = f(V_R)$

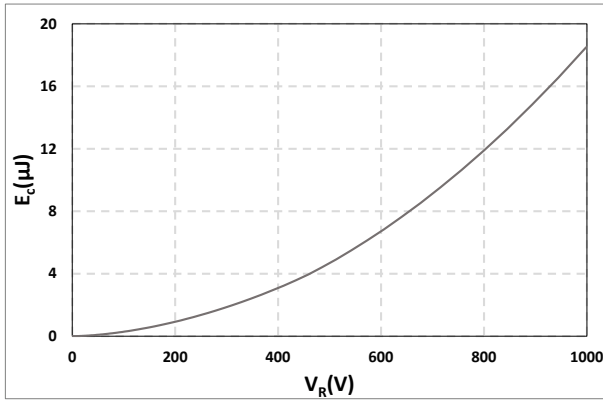


Fig. 7 Capacitance Stored Energy
 $E_C = f(V_R)$

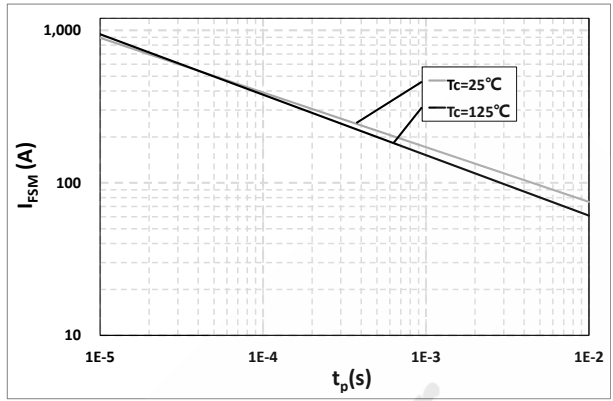


Fig. 8 Non-repetitive peak forward surge current versus pulse duration (sinusoidal waveform)

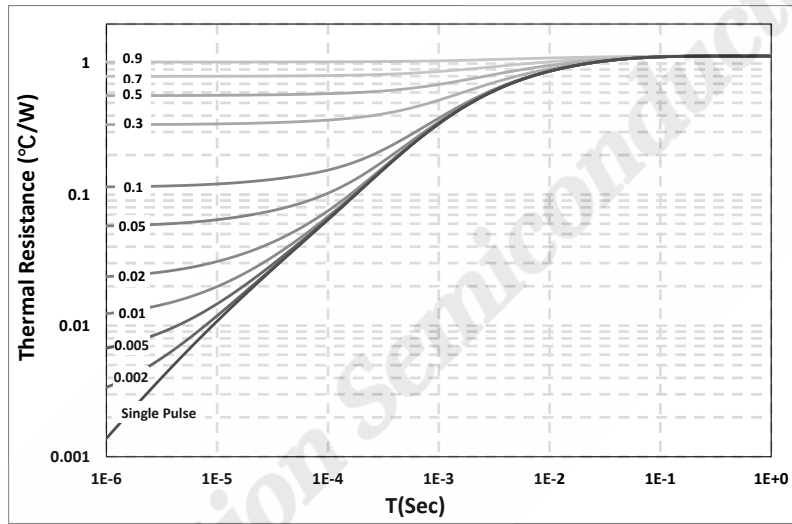
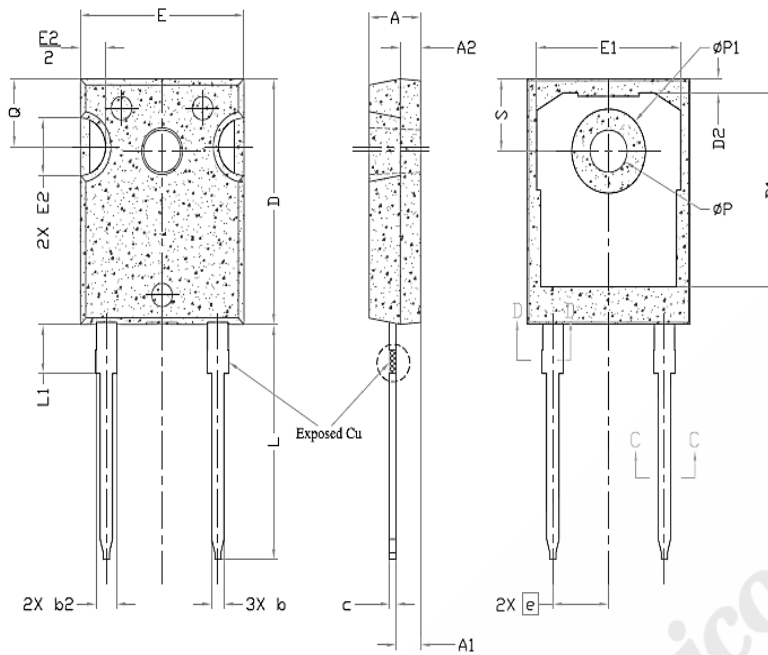


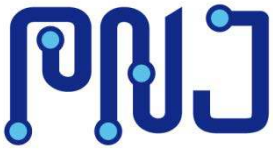
Fig. 9 Transient Thermal Impedance

5. Package Outlines



| SYMBOL | DIMENSIONS | | | NOTES |
|--------|------------|-------|-------|-------|
| | MIN. | NOM. | MAX. | |
| A | 4.83 | 5.02 | 5.21 | |
| A1 | 2.29 | 2.41 | 2.55 | |
| A2 | 1.50 | 2.00 | 2.49 | |
| b | 1.12 | 1.20 | 1.33 | |
| b1 | 1.12 | 1.20 | 1.28 | |
| b2 | 1.91 | 2.00 | 2.39 | 6 |
| b3 | 1.91 | 2.00 | 2.34 | |
| c | 0.55 | 0.80 | 0.69 | 6 |
| c1 | 0.55 | 0.80 | 0.65 | |
| D | 20.80 | 20.95 | 21.10 | 4 |
| D1 | 16.25 | 16.55 | 17.65 | 5 |
| D2 | 0.51 | 1.19 | 1.35 | |
| E | 15.75 | 15.94 | 16.13 | 4 |
| E1 | 13.46 | 14.02 | 14.16 | 5 |
| E2 | 4.32 | 4.91 | 5.49 | 3 |
| e | 5.41BSC | | | |
| L | 19.81 | 20.07 | 20.32 | |
| L1 | 4.10 | 4.19 | 4.40 | 6 |
| ØP | 3.56 | 3.61 | 3.65 | 7 |
| ØP1 | 7.19REF. | | | |
| Q | 5.39 | 5.79 | 6.20 | |
| S | 6.04 | 6.17 | 6.30 | |

Drawing and Dimensions



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