

1200V/5A Silicon Carbide Power Schottky Barrier Diode

Features

- Rated to 1200V at 5 Amps
- Zero reverse recovery current
- Zero forward recovery voltage
- Temperature independent switching behavior
- High temperature operation
- High frequency operation

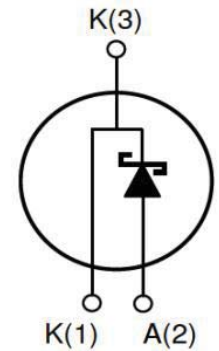
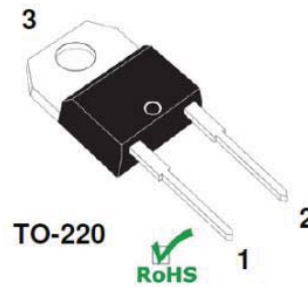
| Key Characteristics | | |
|-----------------------------------|-------------|-----------|
| V_{RRM} | 1200 | V |
| $I_F, T_c \leq 135^\circ\text{C}$ | 8.5 | A |
| Q_c | 36 | nC |

Benefits

- Unipolar rectifier
- Substantially reduced switching losses
- No thermal run-away with parallel devices
- Reduced heat sink requirements

Applications

- SMPS, e.g., CCM PFC;
- Motor drives, Solar application, UPS, Wind turbine, Rail traction, EV/HEV



Internal Schematic

| Part No. | Package Type | Marking |
|------------|--------------|---------|
| SC3S12005A | TO-220-2 pin | 12005 |

2016-11
REV:026

Maximum Ratings

| Parameter | Symbol | Test Condition | Value | Unit |
|---|-----------|--|--|--------------------|
| Repetitive Peak Reverse Voltage | V_{RRM} | $T_j=25^{\circ}\text{C}$ | 1200 | V |
| Surge Peak Reverse Voltage | V_{RSM} | $T_j=25^{\circ}\text{C}$ | 1200 | |
| DC Blocking Voltage | V_{DC} | $T_j=25^{\circ}\text{C}$ | 1200 | |
| Continuous Forward Current | I_F | $T_C=25^{\circ}\text{C}$ $T_C=135^{\circ}\text{C}$ $T_C=150^{\circ}\text{C}$ | 18 8.5 5 | A |
| Repetitive Peak Forward Surge Current | I_{FRM} | $T_C=25^{\circ}\text{C}$, $t_p=10\text{ms}$, Half Sine Wave, $D=0.3$ | 25 | A |
| Non-repetitive Peak Forward Surge Current | I_{FSM} | $T_C=25^{\circ}\text{C}$, $t_p=10\text{ms}$, Half Sine Wave | 35 | A |
| Power Dissipation | P_{TOT} | $T_C=25^{\circ}\text{C}$ | 109.5 | W |
| | | $T_C=110^{\circ}\text{C}$ | 47 | W |
| Operating Junction | T_j | | -55°C to 175°C | $^{\circ}\text{C}$ |
| Storage Temperature | T_{stg} | | -55°C to 175°C | $^{\circ}\text{C}$ |
| Mounting Torque | | M3 Screw | 1 | Nm |
| | | 6-32 Screw | 8.8 | lbf-in |

Thermal Characteristics

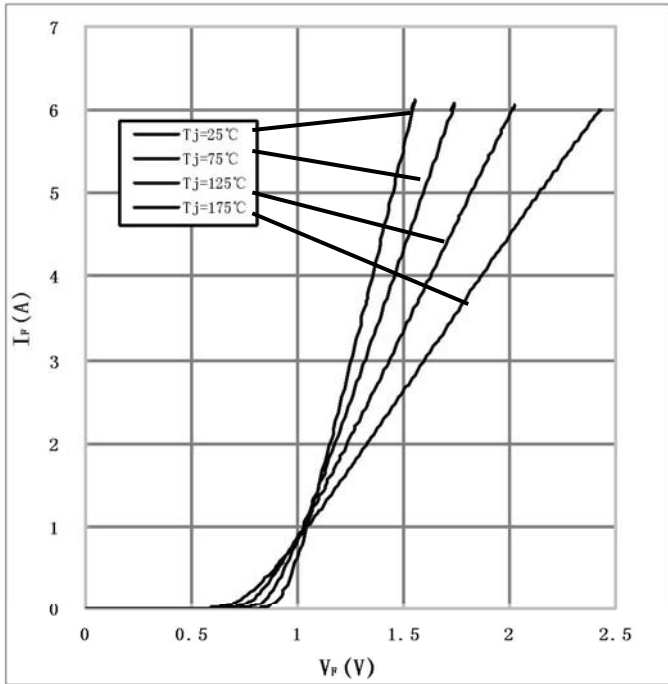
| Parameter | Symbol | Test Condition | Value | Unit |
|--|------------|----------------|-------|-----------------------------|
| | | | Typ. | |
| Thermal resistance from junction to case | R_{thJC} | | 1.37 | $^{\circ}\text{C}/\text{W}$ |

Electrical Characteristics

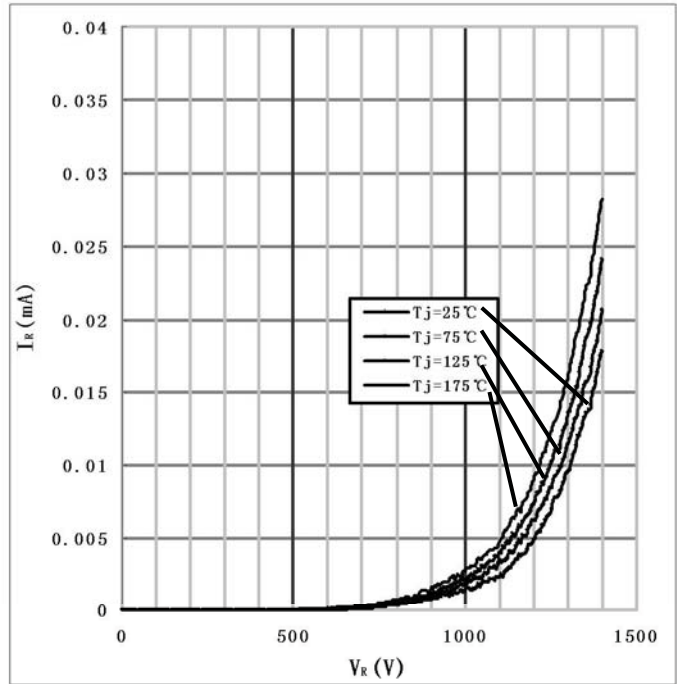
| Parameter | Symbol | Test Conditions | Numerical | | Unit |
|-------------------------|--------|--|-----------|------|---------------|
| | | | Typ. | Max. | |
| Forward Voltage | V_F | $I_F=5\text{A}$, $T_j=25^{\circ}\text{C}$ | 1.45 | 1.7 | V |
| | | $I_F=5\text{A}$, $T_j=175^{\circ}\text{C}$ | 2.05 | 2.5 | |
| Reverse Current | I_R | $V_R=1200\text{V}$, $T_j=25^{\circ}\text{C}$ | 20 | 100 | μA |
| | | $V_R=1200\text{V}$, $T_j=175^{\circ}\text{C}$ | 50 | 200 | |
| Total Capacitive Charge | Q_C | $V_R=800\text{V}$, $T_j=150^{\circ}\text{C}$ $Q_C = \int_0^{V_R} C(V)dV$ | 36 | - | nC |
| Total Capacitance | C | $V_R=0\text{V}$, $T_j=25^{\circ}\text{C}$, $f=1\text{MHZ}$ | 475 | 510 | pF |
| | | $V_R=400\text{V}$, $T_j=25^{\circ}\text{C}$, $f=1\text{MHZ}$ | 34 | 44 | |
| | | $V_R=800\text{V}$, $T_j=25^{\circ}\text{C}$, $f=1\text{MHZ}$ | 33 | 40 | |

RATING AND CHARACTERISTICS CURVES(SC3S12005A)

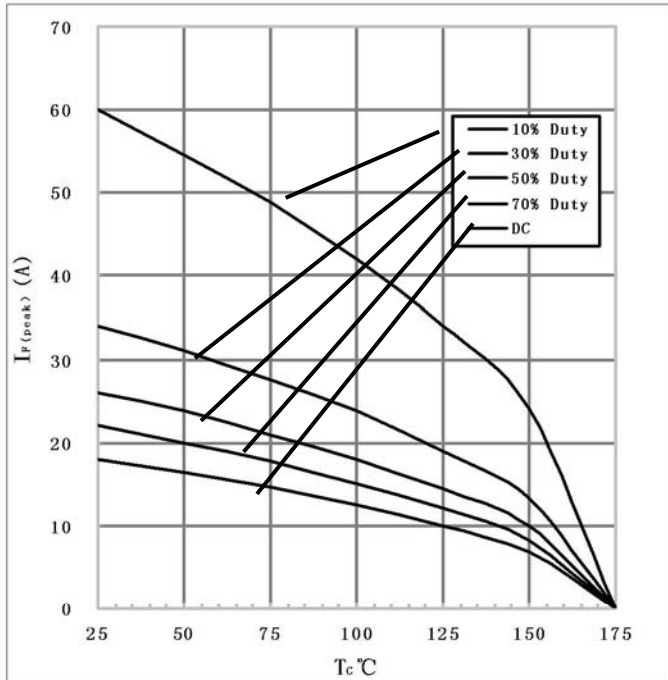
1) Forward IV characteristics as a function of T_j :



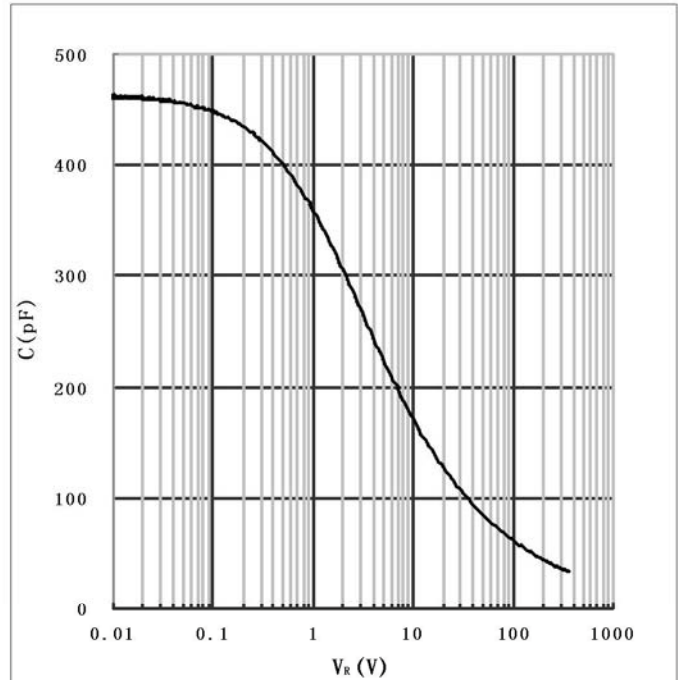
2) Reverse IV characteristics as a function of T_j :



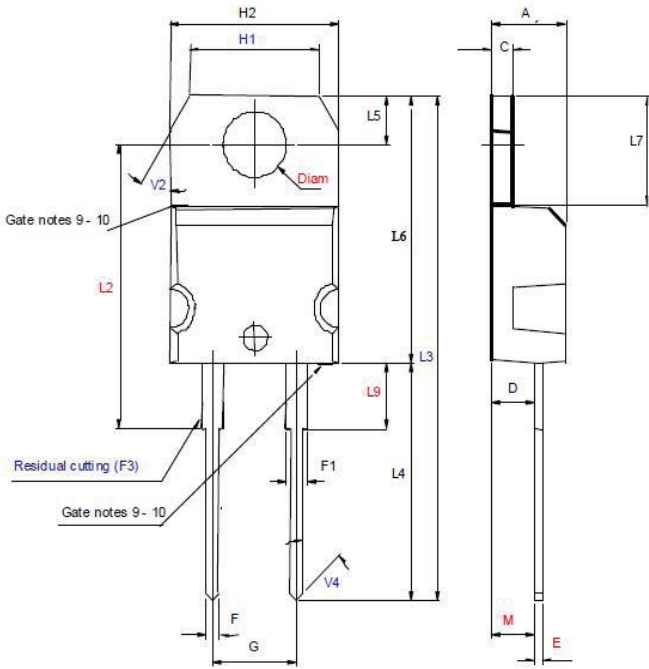
3) Current Derating



4) Capacitance vs. reverse voltage :



Package TO-220



| DIM | Millimeters | | Inches | |
|------|-------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.4 | 4.6 | 0.173 | 0.181 |
| C | 1.23 | 1.32 | 0.048 | 0.052 |
| D | 2.4 | 2.72 | 0.094 | 0.107 |
| E | 0.49 | 0.7 | 0.019 | 0.028 |
| F | 0.61 | 0.88 | 0.024 | 0.035 |
| F1 | 1.14 | 1.7 | 0.045 | 0.067 |
| F3 | | 1 | | 0.039 |
| G | 4.95 | 5.15 | 0.195 | 0.203 |
| H1 | 7.7 | 7.9 | 0.303 | 0.311 |
| H2 | 10 | 10.4 | 0.394 | 0.409 |
| L2 | 16.4 | | 0.646 | |
| L3 | 28.9 | | 1.138 | |
| L4 | 13 | 14 | 0.512 | 0.551 |
| L5 | 2.65 | 2.95 | 0.104 | 0.116 |
| L6 | 15.25 | 15.75 | 0.600 | 0.620 |
| L7 | 6.2 | 6.6 | 0.244 | 0.260 |
| L9 | 3.5 | 3.93 | 0.138 | 0.155 |
| M | 2.6 | | | |
| V | 5° | | | |
| V2 | 30° | | | |
| V4 | 45° | | | |
| diam | 3.75 | 3.85 | 0.148 | 0.152 |



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