

**650V/5A Silicon Carbide Power Schottky Barrier Diode**

**Features**

- Rated to 650V at 5 Amps
- Zero reverse recovery current
- Zero forward recovery voltage
- Temperature independent switching behavior
- High temperature operation
- High frequency operation

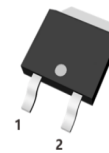
| Key Characteristics               |            |           |
|-----------------------------------|------------|-----------|
| $V_{RRM}$                         | <b>650</b> | <b>V</b>  |
| $I_F, T_c \leq 160^\circ\text{C}$ | <b>5</b>   | <b>A</b>  |
| $Q_C$                             | <b>22</b>  | <b>nC</b> |

**Benefits**

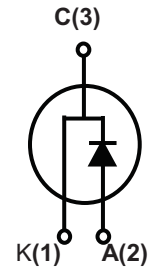
- Unipolar rectifier
- Substantially reduced switching losses
- No thermal run-away with parallel devices
- Reduced heat sink requirements

**Applications**

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



TO-252



| Part No.   | Package Type | Marking |
|------------|--------------|---------|
| SC3S06505C | TO-252       | SC06505 |

## Maximum Ratings

| Parameter                                 | Symbol    | Test Condition   | Value                            | Unit        |
|---|-----------|--|----------------------------------|-------------|
| Repetitive Peak Reverse Voltage           | $V_{RRM}$ |  | 650                              | V           |
| Surge Peak Reverse Voltage                | $V_{RSM}$ |  | 650                              | V           |
| DC Blocking Voltage                       | $V_{DC}$  |  | 650                              |             |
| Continuous Forward Current                | $I_F$     | $T_C=25^{\circ}C$  | 21.4                             | A           |
|   |           | $T_C=135^{\circ}C$                                       | 9.9                              |             |
| Repetitive Peak Forward Surge Current     | $I_{FRM}$ | $T_C=25^{\circ}C$ , $t_p=10ms$ , Half Sine Wave, $D=0.3$ | 30                               | A           |
| Non-repetitive Peak Forward Surge Current | $I_{FSM}$ | $T_C=25^{\circ}C$ , $t_p=10ms$ , Half Sine Wave          | 66                               | A           |
| Power Dissipation                         | $P_{TOT}$ | $T_C=25^{\circ}C$  | 82                               | W           |
|   |           | $T_C=110^{\circ}C$                                       | 35                               | W           |
| Operating Junction                        | $T_j$     |  | $-55^{\circ}C$ to $175^{\circ}C$ | $^{\circ}C$ |
| Storage Temperature                       | $T_{stg}$ |  | $-55^{\circ}C$ to $175^{\circ}C$ | $^{\circ}C$ |
| Mounting Torque                           |           | M3 Screw   | 1                                | Nm          |
|   |           | 6-32 Screw   | 8.8                              | lbf-in      |

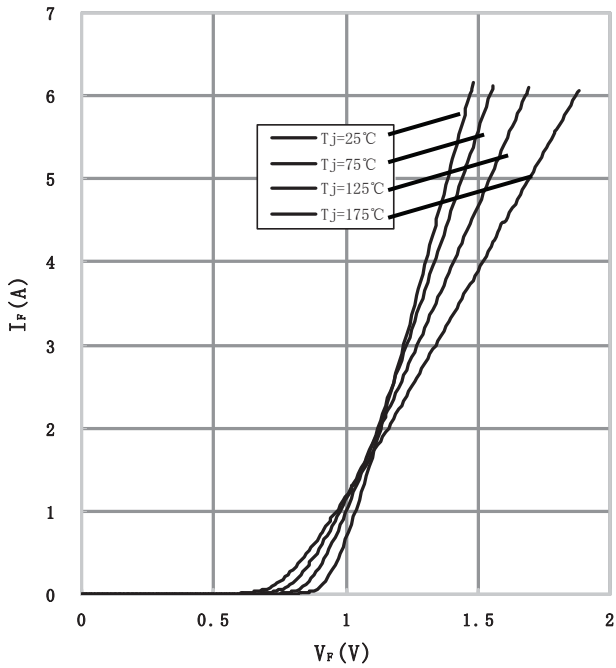
## Thermal Characteristics

| Parameter                                | Symbol     | Test Condition | Value | Unit          |
|--|------------|----------------|-------|---------------|
|  |            |                | Typ.  |               |
| Thermal resistance from junction to case | $R_{thJC}$ |                | 1.84  | $^{\circ}C/W$ |

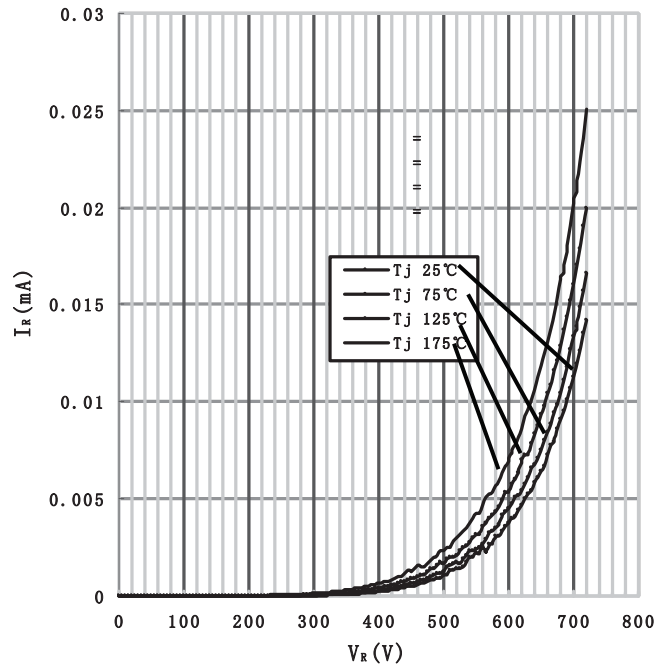
## Electrical Characteristics

| Parameter               | Symbol | Test Conditions  | Numerical |      | Unit    |
|-------------------------|--------|--|-----------|------|---------|
|                         |        |  | Typ.      | Max. |         |
| Forward Voltage         | $V_F$  | $I_F=6A, T_j=25^{\circ}C$                                  | 1.36      | 1.7  | V       |
|                         |        | $I_F=6A, T_j=175^{\circ}C$                                 | 1.64      | 2    |         |
| Reverse Current         | $I_R$  | $V_R=650V, T_j=25^{\circ}C$                                | 0.12      | 50   | $\mu A$ |
|                         |        | $V_R=650V, T_j=175^{\circ}C$                               | 0.91      | 100  |         |
| Total Capacitive Charge | $Q_C$  | $V_R=400V, T_j=25^{\circ}C$<br>$Q_C = \int_0^{V_R} C(V)dV$ | 22        | -    | nC      |
| Total Capacitance       | C      | $V_R=0V, T_j=25^{\circ}C, f=1MHz$                          | 440       | -    | pF      |
|                         |        | $V_R=200V, T_j=25^{\circ}C, f=1MHz$                        | 42        | -    |         |
|                         |        | $V_R=400V, T_j=25^{\circ}C, f=1MHz$                        | 41        | -    |         |

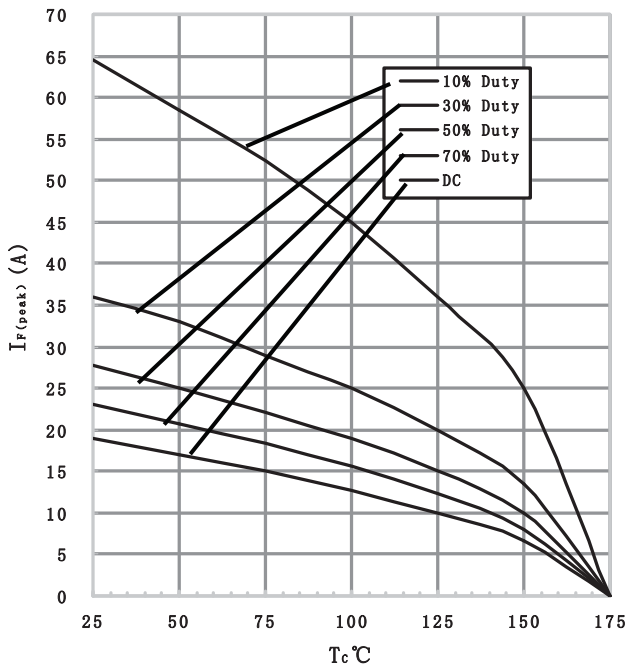
## RATING AND CHARACTERISTICS CURVES (SC3S06505C)



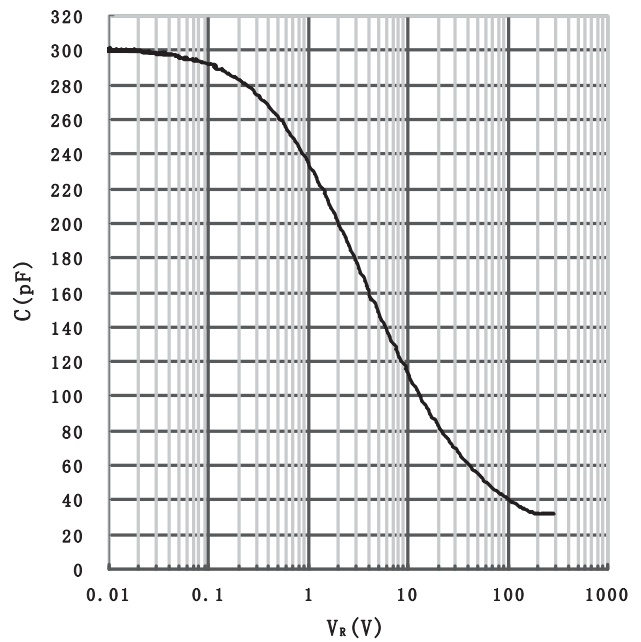
1) Forward IV characteristics as a function of  $T_j$  :



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

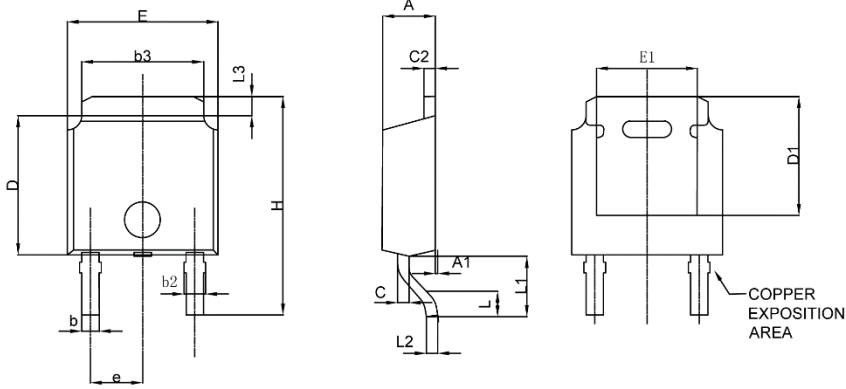


3) Current Derating



4) Capacitance vs. reverse voltage :

# Package TO-252



| Symbol | DIMENSIONAL REQMTS |       |       |
|--------|--------------------|-------|-------|
|        | Min                | Nom   | Max   |
| E      | 6.35               | 6.60  | 6.73  |
| L      | 1.40               | 1.52  | 1.78  |
| L1     | 2.743REF           |       |       |
| L2     | 0.508BSC           |       |       |
| L3     | 0.89               | ---   | 1.27  |
| D      | 5.97               | 6.10  | 6.22  |
| H      | 9.40               | 10.00 | 10.40 |
| b      | 0.64               | 0.76  | 0.89  |
| b2     | 0.76               | 0.84  | 1.14  |
| b3     | 4.95               | 5.34  | 5.46  |
| e      | 2.286BSC           |       |       |
| A      | 2.18               | 2.30  | 2.39  |
| A1     | 0.00               | ---   | 0.13  |
| c      | 0.46               | 0.50  | 0.61  |
| c2     | 0.46               | 0.50  | 0.60  |
| D1     | 5.21               | ---   | ---   |
| E1     | 4.32               | ---   | ---   |

Note:  
1. All Dimension Are In mm

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