



## 650V/10A Silicon Carbide Power Schottky Barrier Diode

### Features

- Zero reverse recovery current
- Zero forward recovery voltage
- Temperature independent switching behavior
- High temperature operation
- High frequency operation

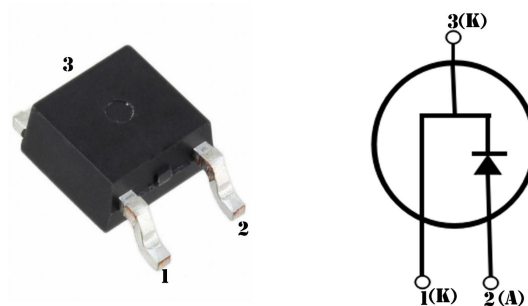
| Key Characteristics               |     |    |
|-----------------------------------|-----|----|
| $V_{RRM}$                         | 650 | V  |
| $I_F, T_c \leq 155^\circ\text{C}$ | 10  | A  |
| $Q_c$                             | 36  | nC |

### 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



| Part No.  | Package Type | Marking   |
|-----------|--------------|-----------|
| G3S06510C | TO-252       | G3S06510C |

**Maximum Ratings**

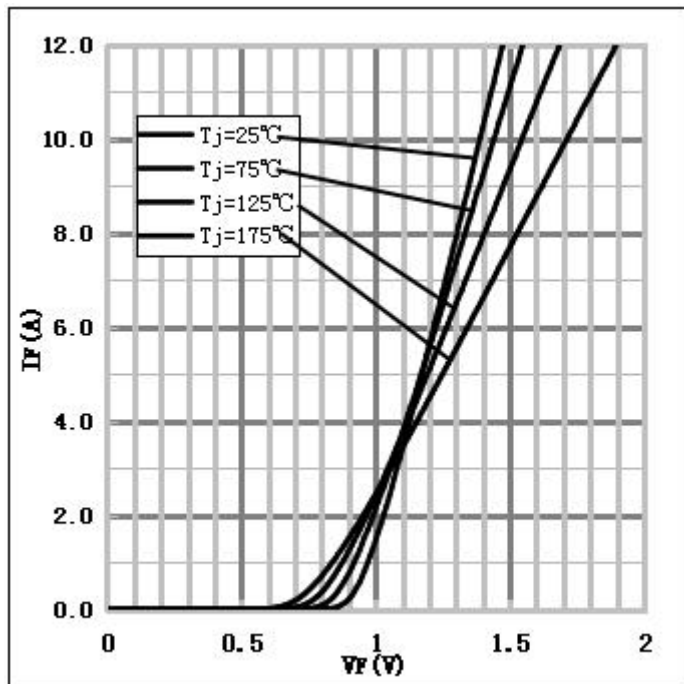
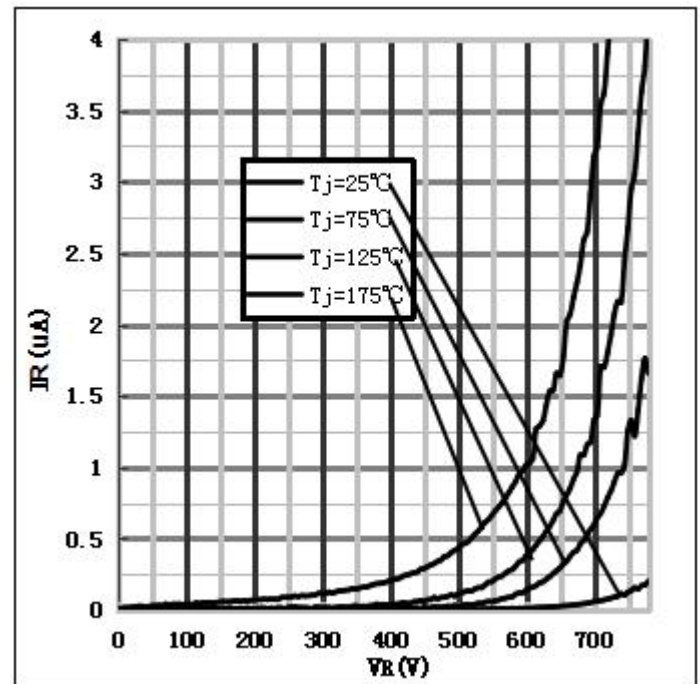
| Parameter                                 | Symbol    | Test Condition                                                                     | Value                                          | Unit               |
|-------------------------------------------|-----------|------------------------------------------------------------------------------------|------------------------------------------------|--------------------|
| Repetitive Peak Reverse Voltage           | $V_{RRM}$ |                                                                                    | 650                                            | V                  |
| Surge Peak Reverse Voltage                | $V_{RSM}$ |                                                                                    | 650                                            |                    |
| DC Blocking Voltage                       | $V_{DC}$  |                                                                                    | 650                                            |                    |
| Continuous Forward Current                | $I_F$     | $T_C=25^{\circ}\text{C}$<br>$T_C=125^{\circ}\text{C}$<br>$T_C=155^{\circ}\text{C}$ | 33.5<br>17.9<br>10                             | A                  |
| Repetitive Peak Forward Surge Current     | $I_{FRM}$ | $T_C=25^{\circ}\text{C}$ , $t_p=10\text{ms}$ , Half Sine Wave, $D=0.3$             | 50                                             | A                  |
| Non-repetitive Peak Forward Surge Current | $I_{FSM}$ | $T_C=25^{\circ}\text{C}$ , $t_p=10\text{ms}$ , Half Sine Wave                      | 120                                            | A                  |
| Power Dissipation                         | $P_{TOT}$ | $T_C=25^{\circ}\text{C}$                                                           | 122                                            | W                  |
|                                           |           | $T_C=110^{\circ}\text{C}$                                                          | 53                                             | W                  |
| Operating Junction                        | $T_j$     |                                                                                    | $-55^{\circ}\text{C}$ to $175^{\circ}\text{C}$ | $^{\circ}\text{C}$ |
| Storage Temperature                       | $T_{stg}$ |                                                                                    | $-55^{\circ}\text{C}$ to $175^{\circ}\text{C}$ | $^{\circ}\text{C}$ |

**Thermal Characteristics**

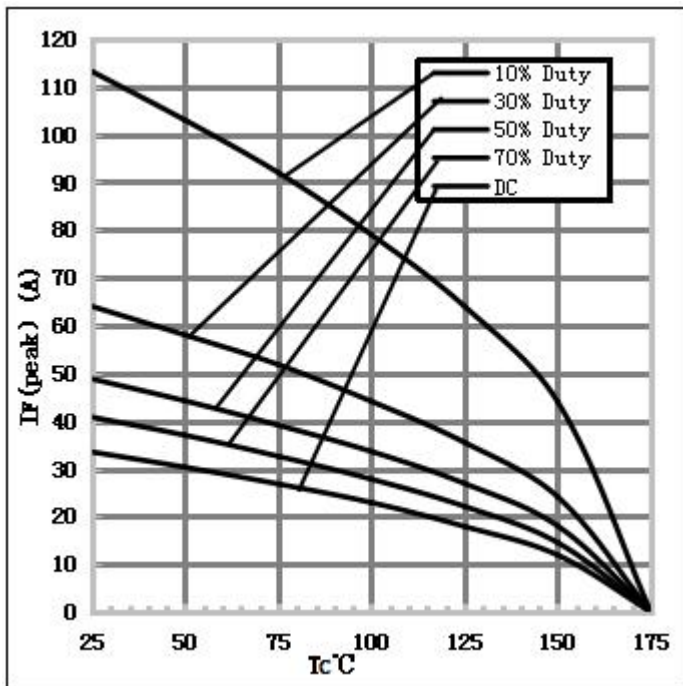
| Parameter                                | Symbol     | Test Condition | Value | Unit                        |
|------------------------------------------|------------|----------------|-------|-----------------------------|
|                                          |            |                | Typ.  |                             |
| Thermal resistance from junction to case | $R_{thJC}$ |                | 1.23  | $^{\circ}\text{C}/\text{W}$ |

**Electrical Characteristics**

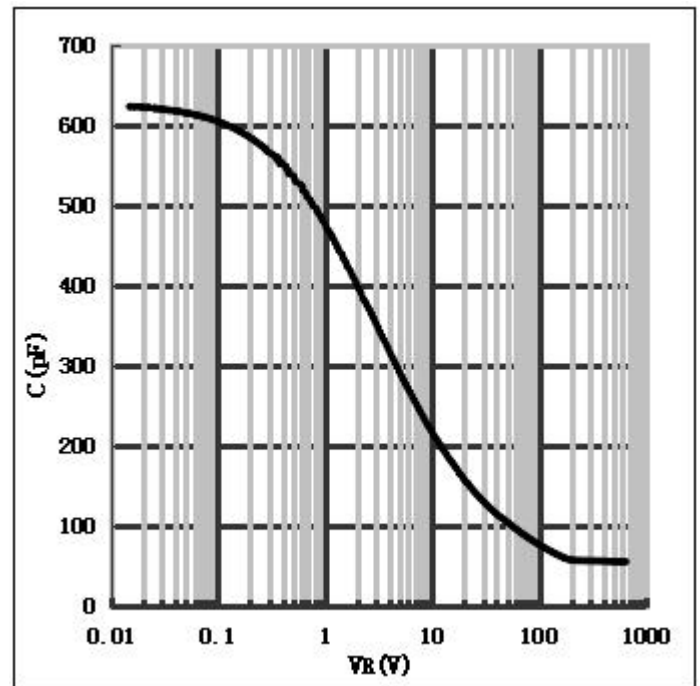
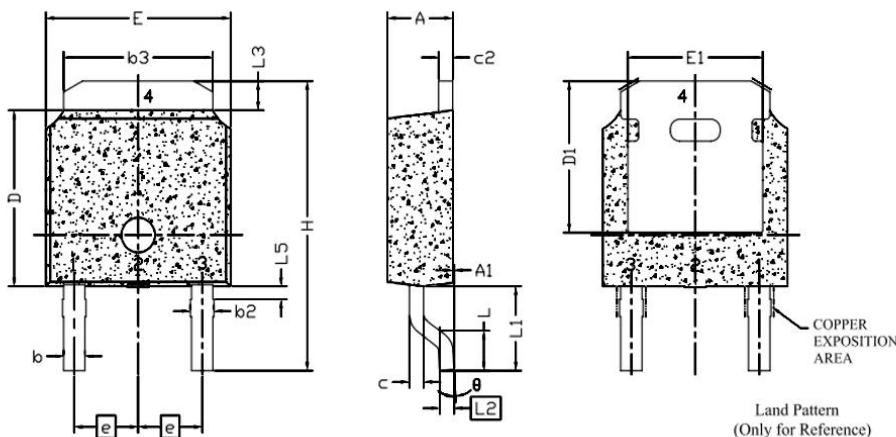
| Parameter               | Symbol | Test Conditions                                             | Numerical |      | Unit    |
|-------------------------|--------|-------------------------------------------------------------|-----------|------|---------|
|                         |        |                                                             | Typ.      | Max. |         |
| Forward Voltage         | $V_F$  | $I_F=10A, T_j=25^{\circ}C$                                  | 1.43      | 1.7  | V       |
|                         |        | $I_F=10A, T_j=175^{\circ}C$                                 | 1.64      | 2    |         |
| Reverse Current         | $I_R$  | $V_R=650V, T_j=25^{\circ}C$                                 | 0.5       | 50   | $\mu A$ |
|                         |        | $V_R=650V, T_j=175^{\circ}C$                                | 1.4       | 100  |         |
| Total Capacitive Charge | $Q_C$  | $V_R=400V, T_j=150^{\circ}C$<br>$Q_C = \int_0^{V_R} C(V)dV$ | 36        | -    | nC      |
| Total Capacitance       | C      | $V_R=0V, T_j=25^{\circ}C, f=1MHz$                           | 690       | 730  | pF      |
|                         |        | $V_R=200V, T_j=25^{\circ}C, f=1MHz$                         | 72        | 75   |         |
|                         |        | $V_R=400V, T_j=25^{\circ}C, f=1MHz$                         | 71        | 74   |         |

**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:



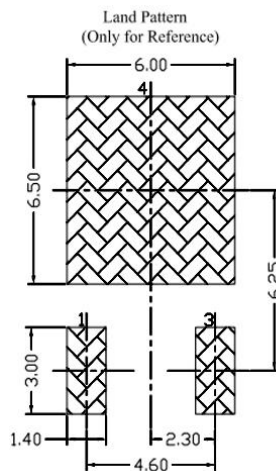
## 4) Capacitance vs. reverse voltage:

Package TO-252

| SYMBDL | DIMENSIONAL REQMTS |       |       |
|--------|--------------------|-------|-------|
|        | MIN                | NOM   | MAX   |
| E      | 6.40               | 6.60  | 6.731 |
| L      | 1.40               | 1.52  | 1.77  |
| L1     | 2.743 REF          |       |       |
| L2     | 0.508 BSC          |       |       |
| L3     | 0.89               | --    | 1.27  |
| L5     | --                 | --    | --    |
| D      | 6.00               | 6.10  | 6.22  |
| H      | 9.40               | 10.00 | 10.40 |
| b      | 0.64               | 0.76  | 0.88  |
| b2     | 0.77               | 0.84  | 1.14  |
| b3     | 5.21               | 5.34  | 5.46  |
| e      | 2.286 BSC          |       |       |
| A      | 2.20               | 2.30  | 2.38  |
| A1     | 0                  | --    | 0.127 |
| C      | 0.46               | 0.50  | 0.60  |
| C2     | 0.46               | 0.50  | 0.58  |
| D1     | 5.21               | --    | --    |
| E1     | 4.40               | --    | --    |
| θ      | 0°                 | --    | 10°   |

## Note:

1. All Dimension Are In mm.
2. Package Body Sizes Exclude Mold Flash, Protrusion Or Gate Burrs. Mold Flash, Protrusion Or Gate Burrs Shall Not Exceed 0.10 mm Per Side.
3. Package Body Sizes Determined At The Outmost Extremes Of The Plastic Body Exclusive Of Mold Flash, Gate Burrs And Interlead Flash, But Including Any Mismatch Between The Top And Bottom Of The Plastic Body.
4. The Package Top May Be Smaller Than The Package Bottom.
5. Dimension "b" Does Not Include Dambar Protrusion. Allowable Dambar Protrusion Shall Be 0.10 mm Total In Excess Of "b" Dimension At Maximum Material Condition. The Dambar Cannot Be Located On The Lower Radius Of The Foot.



**Note:** The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/EC(RoHS2). RoHS Certification and other certifications can be obtained from GPT sales representatives or GPT website: <http://globalpowertech.cn/English/index.asp>

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