



## 650V/4A 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

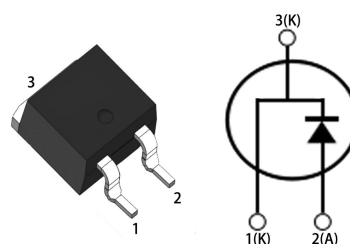
|                                   |     |    |
|-----------------------------------|-----|----|
| $V_{RRM}$                         | 650 | V  |
| $I_F, T_c \leq 157^\circ\text{C}$ | 4   | A  |
| $Q_c$                             | 11  | nC |

### 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   |
|-----------|--------------|-----------|
| G3S06504D | TO-263       | G3S06504D |

**Maximum Ratings**

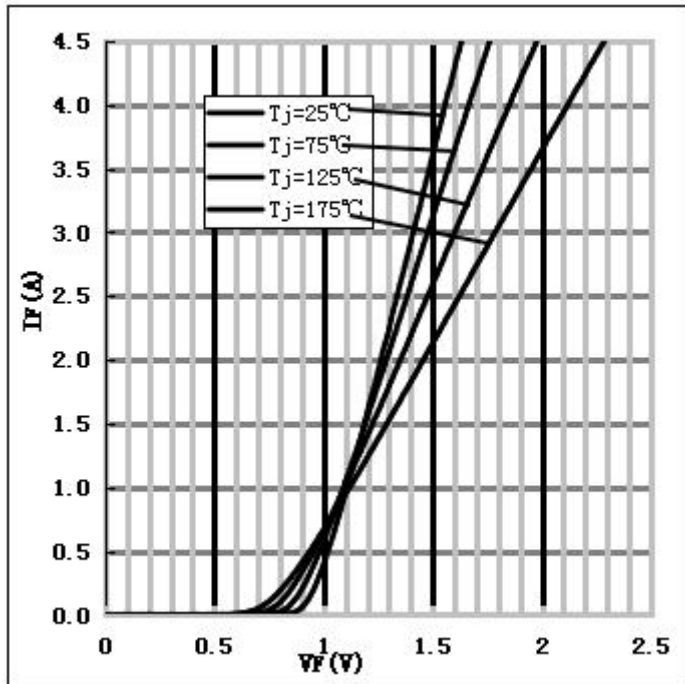
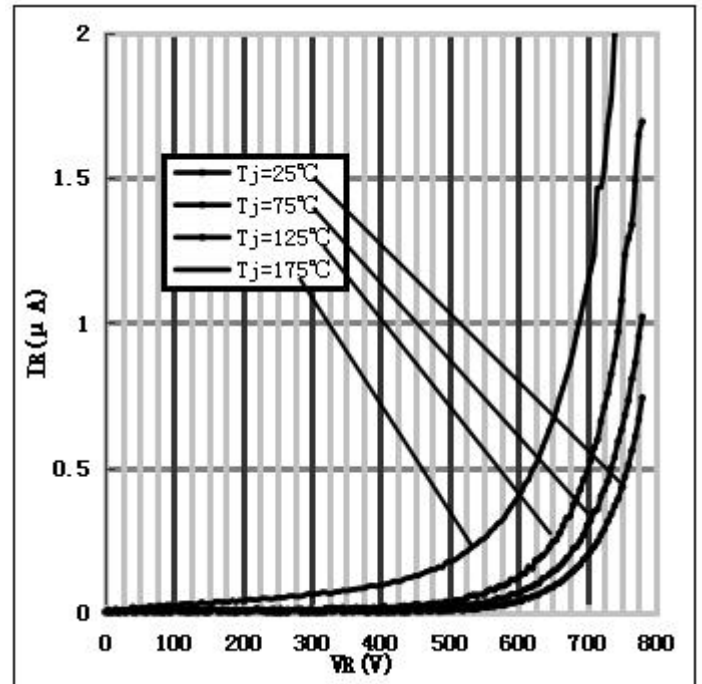
| Parameter                                 | Symbol    | Test Condition                                                                     | Value                                          | Unit               |
|-------------------------------------------|-----------|------------------------------------------------------------------------------------|------------------------------------------------|--------------------|
| 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>$T_C=157^{\circ}\text{C}$ | 15.3<br>8.4<br>4                               | A                  |
| Repetitive Peak Forward Surge Current     | $I_{FRM}$ | $T_C=25^{\circ}\text{C}$ , $t_p=10\text{ms}$ , Half Sine Wave, $D=0.3$             | 20                                             | 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                         | $P_{TOT}$ | $T_C=25^{\circ}\text{C}$                                                           | 82                                             | W                  |
|                                           |           | $T_C=110^{\circ}\text{C}$                                                          | 36                                             | 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**

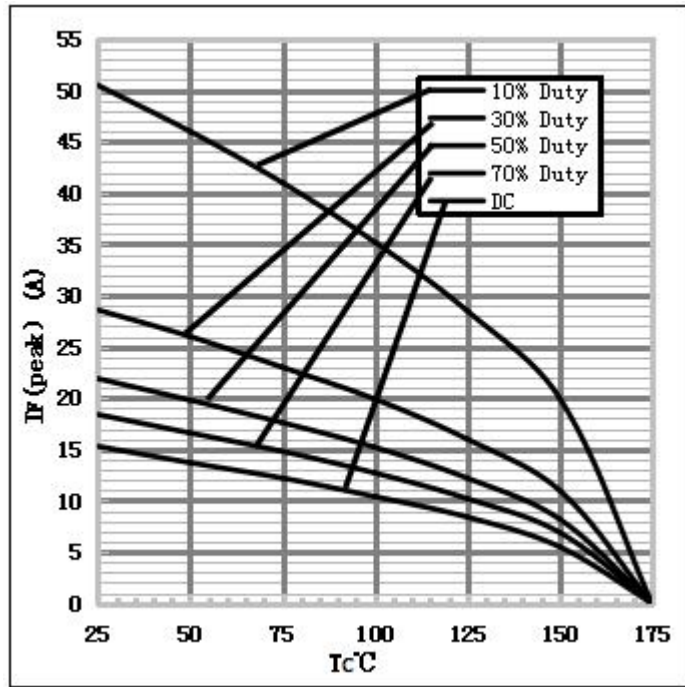
| Parameter                                | Symbol     | Test Condition | Value | Unit                        |
|------------------------------------------|------------|----------------|-------|-----------------------------|
|                                          |            |                | Typ.  |                             |
| Thermal resistance from junction to case | $R_{thJC}$ |                | 1.83  | $^{\circ}\text{C}/\text{W}$ |

**Electrical Characteristics**

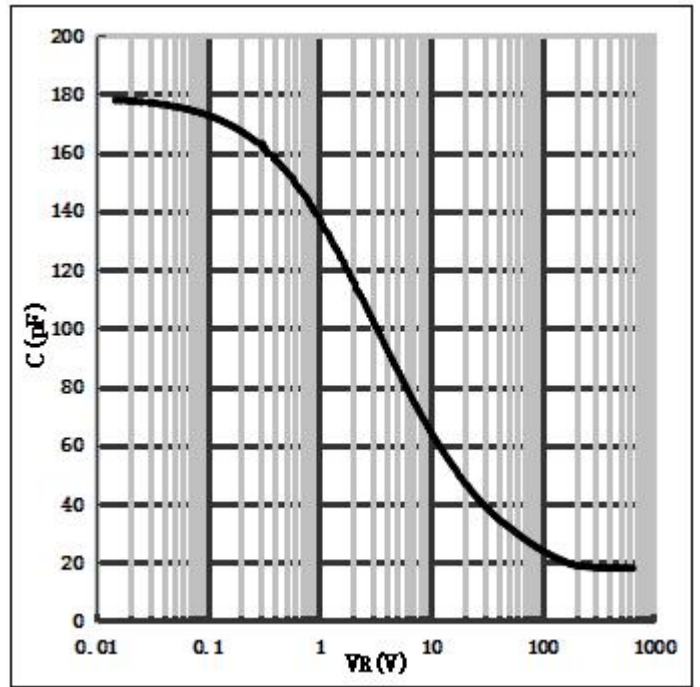
| Parameter               | Symbol | Test Conditions                                             | Numerical |      | Unit    |
|-------------------------|--------|-------------------------------------------------------------|-----------|------|---------|
|                         |        |                                                             | Typ.      | Max. |         |
| Forward Voltage         | $V_F$  | $I_F=4A, T_j=25^{\circ}C$                                   | 1.53      | 1.7  | V       |
|                         |        | $I_F=4A, T_j=175^{\circ}C$                                  | 2.1       | 2.5  |         |
| Reverse Current         | $I_R$  | $V_R=650V, T_j=25^{\circ}C$                                 | 0.07      | 50   | $\mu A$ |
|                         |        | $V_R=650V, T_j=175^{\circ}C$                                | 0.65      | 100  |         |
| Total Capacitive Charge | $Q_C$  | $V_R=400V, T_j=150^{\circ}C$<br>$Q_C = \int_0^{V_R} C(V)dV$ | 11        | -    | nC      |
| Total Capacitance       | C      | $V_R=0V, T_j=25^{\circ}C, f=1MHz$                           | 181       | 220  | pF      |
|                         |        | $V_R=200V, T_j=25^{\circ}C, f=1MHz$                         | 22.5      | 25   |         |
|                         |        | $V_R=400V, T_j=25^{\circ}C, f=1MHz$                         | 20.5      | 21   |         |

**Performance Graphs**1) Forward IV characteristics as a function of  $T_j$  :2) Reverse IV characteristics as a function of  $T_j$  :

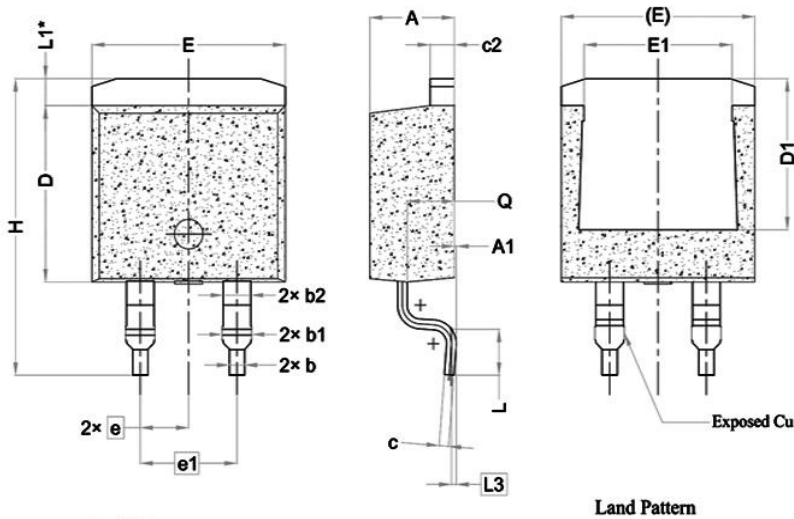
## 3) Current Derating:



## 4) Capacitance vs. reverse voltage:



## Package TO-263



## Note:

1. All Dimensions Are In mm.
2. Dimension D & E Do Not Include Mold Flash. Mold Flash Shall Not Exceed 0.127mm Per Side. These Dimensions Are Measured At The Outermost Extreme Of The Plastic Body.
3. Thermal Pad Contour Optional Within Dimensions E, L1, D1 & E1.
4. Dimension D1 & E1 Establish A Minimum Mounting Surface for The Thermal Pad.
5. "\*" is reference .

単位 : mm

| SYMBOL | DIMENSIONS |       |       |
|--------|------------|-------|-------|
|        | MIN.       | NOM.  | MAX.  |
| A      | 4.24       | 4.44  | 4.64  |
| A1     | 0.00       | 0.10  | 0.25  |
| 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  |
| c2     | 1.15       | 1.27  | 1.40  |
| D      | 8.82       | 8.92  | 9.02  |
| D1     | 6.86       | 7.65  | ---   |
| E      | 9.96       | 10.16 | 10.36 |
| E1     | 6.89       | 7.77  | 7.89  |
| e      | 2.54 BSC   |       |       |
| e1     | 5.08 BSC   |       |       |
| H      | 14.61      | 15.00 | 15.88 |
| L      | 1.78       | 2.32  | 2.79  |
| L1     | 1.36 REF.  |       |       |
| L3     | 0.25 BSC   |       |       |
| Q      | 2.30       | 2.48  | 2.70  |

**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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