

# BCS65S04D3

## Silicon Carbide Schottky Diode

650V, 4A



### Description

BCS65S04D3 utilizes Bestirpower's advanced silicon carbide diode technology. This technology combines the benefits of excellent low forward voltage and robustness. Consequently, the family is suitable for application requiring high power efficiency

### Benefits

- High frequency
- Low heat dissipation requirements
- Reduce size and cost of the system
- Reduced EMI
- High-reliability

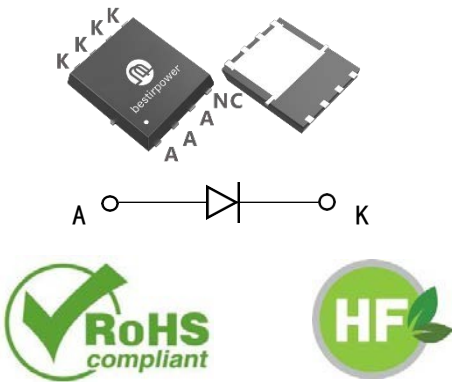
### Applications

- Power factor correction
- Solar inverter
- Data Center
- Uninterruptible power supply

### Features

| $V_{RRM}$ | $I_F$ | $T_C$  | $Q_C$  |
|-----------|-------|--------|--------|
| 650 V     | 4 A   | 155 °C | 9.5 nC |

- Benchmark switching behavior
- No reverse recovery
- Positive Temperature Coefficient
- Easy to paralleling
- RoHS compliant / Halogen-free



### Absolute Maximum Ratings ( $T_C = 25^{\circ}C$ unless otherwise noted)

| Symbol         | Parameter                                  |                                          | Value       | Unit             |
|----------------|--------------------------------------------|------------------------------------------|-------------|------------------|
| $V_{RRM}$      | Repetitive Peak Reverse Voltage            |                                          | 650         | V                |
| $I_F$          | Forward Current                            | $T_C = 25^{\circ}C$                      | 14          | A                |
|                |                                            | $T_C = 135^{\circ}C$                     | 7           | A                |
|                |                                            | $T_C = 155^{\circ}C$                     | 4           | A                |
| $I_{F,SM}$     | Non-Repetitive Forward Surge Current       | $T_C = 25^{\circ}C, t_p = 10\text{ ms}$  | 42          | A                |
|                |                                            | $T_C = 110^{\circ}C, t_p = 10\text{ ms}$ | 33          | A                |
| $I_{F,RM}$     | Repetitive Peak Forward Surge Current      | $T_C = 25^{\circ}C, t_p = 10\text{ ms}$  | 37          | A                |
| $I^2dt$ value  | $\int I^2 dt$                              | $T_C = 25^{\circ}C, t_p = 10\text{ ms}$  | 8           | A <sup>2</sup> s |
|                |                                            | $T_C = 110^{\circ}C, t_p = 10\text{ ms}$ | 5           | A <sup>2</sup> s |
| $P_{tot}$      | Power Dissipation                          | $T_C = 25^{\circ}C$                      | 69          | W                |
|                |                                            | $T_C = 110^{\circ}C$                     | 30          | W                |
|                |                                            | $T_C = 150^{\circ}C$                     | 12          | W                |
| $T_J, T_{STG}$ | Operating Junction and Storage Temperature |                                          | -55 to +175 | $^{\circ}C$      |

Thermal Characteristics

| Symbol          | Parameter                                  | Value | Unit          |
|-----------------|--------------------------------------------|-------|---------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case, Typ. | 2.17  | $^{\circ}C/W$ |

Electrical Characteristics ( $T_C = 25^{\circ}C$  unless otherwise noted)

| Symbol   | Parameter                 | Test Conditions                  | Min | Typ  | Max | Unit    |
|----------|---------------------------|----------------------------------|-----|------|-----|---------|
| $V_{DC}$ | DC blocking voltage       |                                  | 650 |      |     | V       |
| $V_F$    | Forward Voltage           | $I_F = 4A, T_J = 25^{\circ}C$    | -   | 1.35 | 1.7 | V       |
|          |                           | $I_F = 4A, T_J = 175^{\circ}C$   | -   | 1.7  | 1.9 |         |
| $I_R$    | Reverse Current           | $V_R = 650V, T_J = 25^{\circ}C$  | -   | 1    | 20  | $\mu A$ |
|          |                           | $V_R = 650V, T_J = 175^{\circ}C$ | -   | 12   | 100 |         |
| $Q_C$    | Total Capacitive Charge   | $V_R = 400V, T_J = 25^{\circ}C$  | -   | 9.5  | -   | nC      |
| C        | Total Capacitance         | $V_R = 0V, f = 1MHz$             | -   | 185  | -   | pF      |
|          |                           | $V_R = 200V, f = 1MHz$           | -   | 19   | -   |         |
|          |                           | $V_R = 400V, f = 1MHz$           | -   | 16.7 | -   |         |
| $E_C$    | Capacitance Stored Energy | $V_R = 400V, T_C = 25^{\circ}C$  | -   | 2.4  | -   | $\mu J$ |

Typical Performance Characteristics

Figure 1. Forward Characteristics

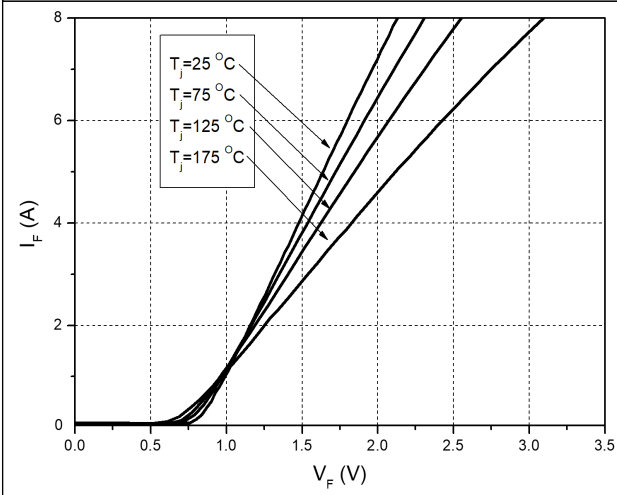


Figure 2. Reverse Characteristics

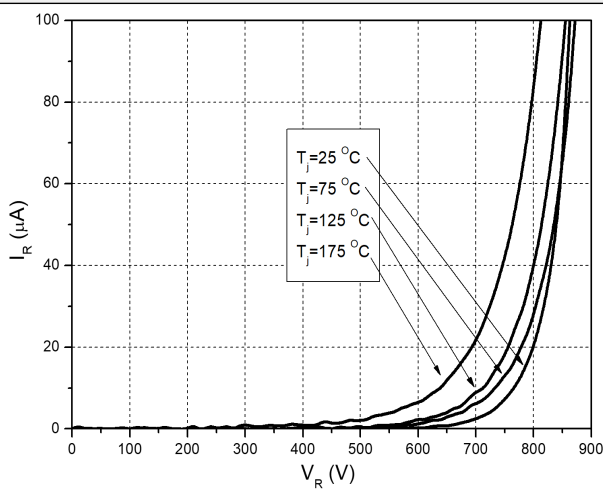


Figure 3. Peak Forward Current Derating

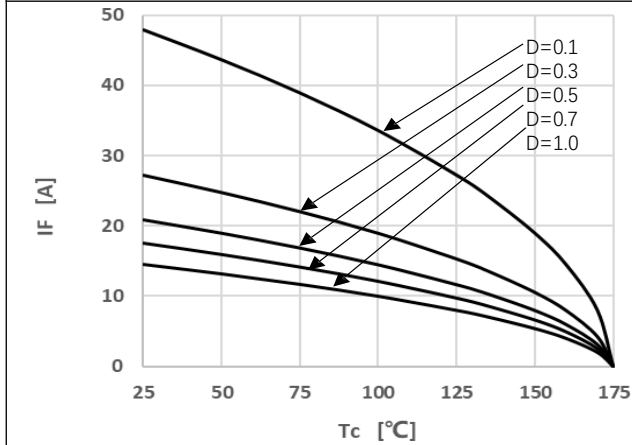


Figure 4. Power Dissipation

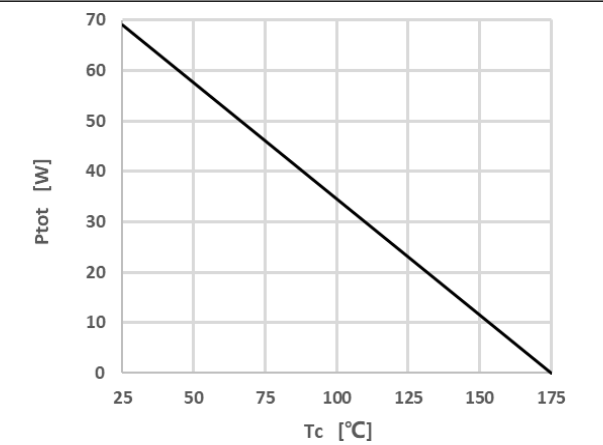


Figure 5. Capacitance vs. Reverse Voltage

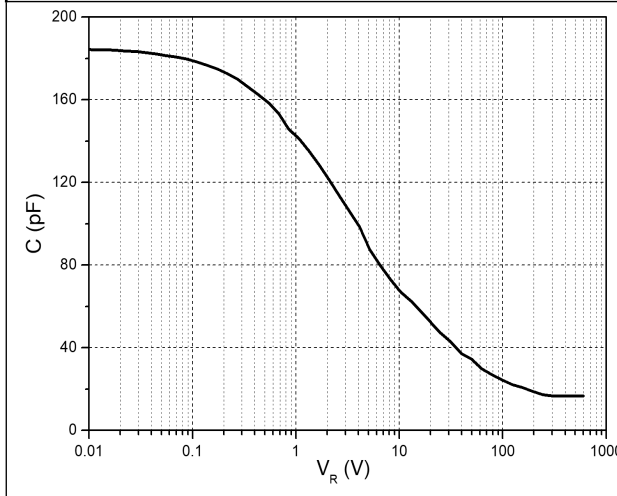
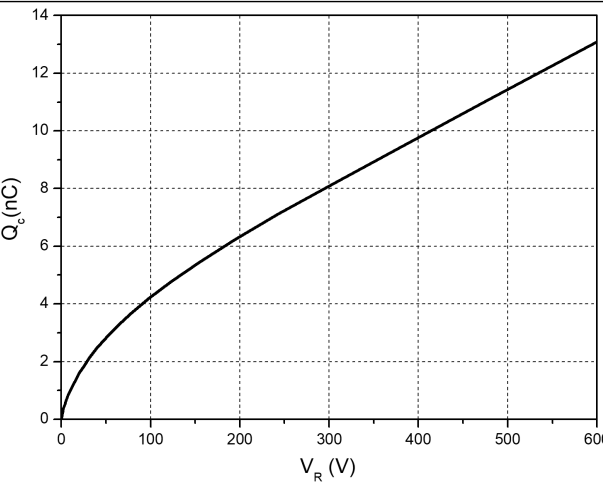
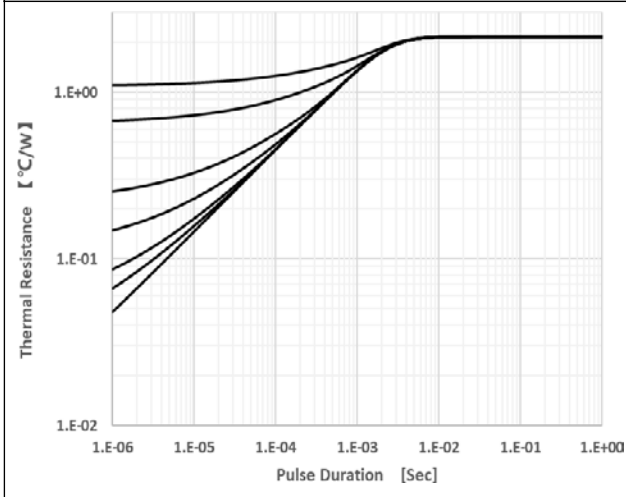


Figure 6. Capacitance Charge vs. Reverse Voltage



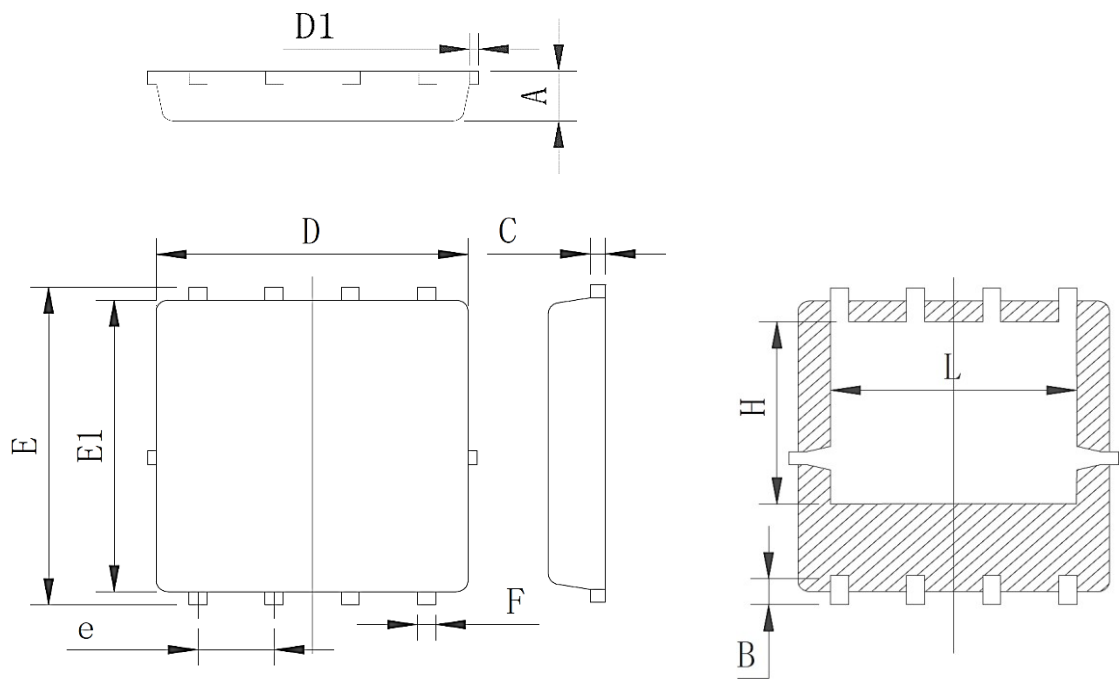
Typical Performance Characteristics

Figure 7. Transient Thermal Impedance



Package Outlines

DFN 5\*6



| Symbol | Min  | Typ   | Max  |
|--------|------|-------|------|
| A      | 0.90 | 0.95  | 1.00 |
| B      | 0.48 | 0.58  | 0.68 |
| C      | 0.20 | 0.254 | 0.30 |
| D      | 5.00 | 5.20  | 5.40 |
| D1     |      |       | 0.15 |
| E      | 5.90 | 6.05  | 6.20 |
| E1     | 5.40 | 5.55  | 5.70 |
| e      | 1.22 | 1.27  | 1.32 |
| F      | 0.25 | 0.30  | 0.35 |
| H      | 3.27 | 3.47  | 3.67 |
| L      | 3.80 | 4.00  | 4.20 |

Package Marking and Ordering Information

| Part Number | Top Marking | Package | Packing Method | Quantity   |
|-------------|-------------|---------|----------------|------------|
| BCS65S04D3  | BCS65S04D3  | DFN5*6  | Tape & Reel    | 5000 units |

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