



# Q-SSC0865-T

## 650V Silicon Carbide Schottky Diode

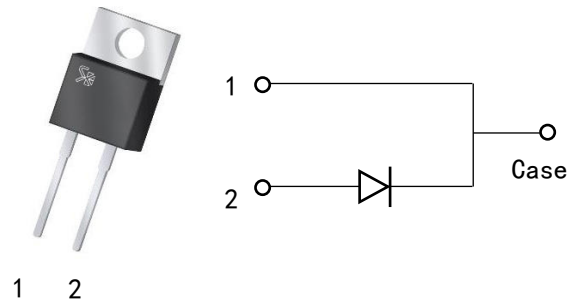
### Features

- Negligible reverse recovery
- High-speed switching
- Positive Temperature Coefficient
- Temperature-Independent Switching
- Pb-free / RoHS compliant

|           |                      |
|-----------|----------------------|
| $V_{RRM}$ | <b>650V</b>          |
| $I_F$     | <b>8A (TC=154°C)</b> |
| $Q_C$     | <b>23nC</b>          |

### Benefits

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



### Applications

- Switch mode power supply
- Solar inverter
- Data Center
- Uninterruptible power supply

| Marking     | Package  |
|-------------|----------|
| Q-SSC0865-T | TO-220-2 |

### Thermal Characteristics

| Symbol        | Parameter                             | Value |      | Unit | Note     |
|---------------|---------------------------------------|-------|------|------|----------|
|               |                                       | Typ.  | Max. |      |          |
| $R_{th(j-c)}$ | Thermal resistance (Junction to case) | 1.495 | -    | °C/W | Figure 8 |



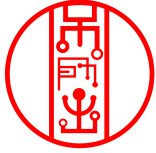
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## Maximum Ratings (Tc=25°C unless otherwise noted)

| Symbol         | Parameter                             |                                        | Value       | Unit             | Note     |
|----------------|---------------------------------------|----------------------------------------|-------------|------------------|----------|
| $V_{RRM}$      | Repetitive peak reverse voltage       |                                        | 650         | V                |          |
| $I_F$          | Continuous forward current            | Tc=25°C                                | 25          | A                | Figure 3 |
|                |                                       | Tc=135°C                               | 11          | A                |          |
|                |                                       | Tc=154°C                               | 8           | A                |          |
| $I_{FSM}$      | Non-repetitive forward surge current  | Tc=25°C, $t_p=10ms$ , Half sine pulse  | 76          | A                |          |
|                |                                       | Tc=110°C, $t_p=10ms$ , Half sine pulse | 68          | A                |          |
| $I_{FRM}$      | Repetitive Peak Forward Surge Current | Tc=25°C, $t_p=10ms$ , Half sine pulse  | 67          | A                |          |
| $\int i^2 dt$  | $i^2t$ value                          | Tc=25°C, $t_p=10ms$                    | 32          | A <sup>2</sup> S |          |
|                |                                       | Tc=110°C, $t_p=10ms$                   | 28          | A <sup>2</sup> S |          |
| $P_{tot}$      | Power Dissipation                     | Tc=25°C                                | 100         | W                | Figure 4 |
|                |                                       | Tc=110°C                               | 43          | W                |          |
|                |                                       | Tc=150°C                               | 16          | W                |          |
| $T_j, T_{stg}$ | Operating and Storage Temperature     |                                        | -55 to +175 | °C               |          |

## Electrical Characteristics (Tc=25°C unless otherwise noted)

| Symbol   | Parameter                 | Test Conditions             | Value |      |      | Unit | Note     |
|----------|---------------------------|-----------------------------|-------|------|------|------|----------|
|          |                           |                             | Min.  | Typ. | Max. |      |          |
| $V_{DC}$ | DC blocking voltage       |                             | 650   | -    | -    | V    |          |
| $V_F$    | Forward voltage           | $I_F=4A$                    | -     | 1.18 | -    | V    | Figure 1 |
|          |                           | $I_F=8A, T_c=25^\circ C$    | -     | 1.39 | 1.6  | V    |          |
|          |                           | $I_F=8A, T_c=175^\circ C$   | -     | 1.74 | -    | V    |          |
| $I_R$    | Reverse current           | $V_R=650V, T_c=25^\circ C$  | -     | 6    | 60   | uA   | Figure 2 |
|          |                           | $V_R=650V, T_c=175^\circ C$ | -     | 12   | -    | uA   |          |
| $Q_C$    | Total capacitive charge   | $V_R=400V$                  | -     | 23   | -    | nC   | Figure 6 |
| $C$      | Total capacitance         | $V_R=1V, f=1MHZ$            | -     | 338  | -    | pF   | Figure 5 |
|          |                           | $V_R=200V, f=1MHZ$          | -     | 44   | -    | pF   |          |
|          |                           | $V_R=400V, f=1MHZ$          | -     | 43   | -    | pF   |          |
| $E_C$    | Capacitance Stored Energy | $V_R=400V$                  | -     | 3.7  | -    | uJ   | Figure 7 |



## Electrical Characteristic Curves

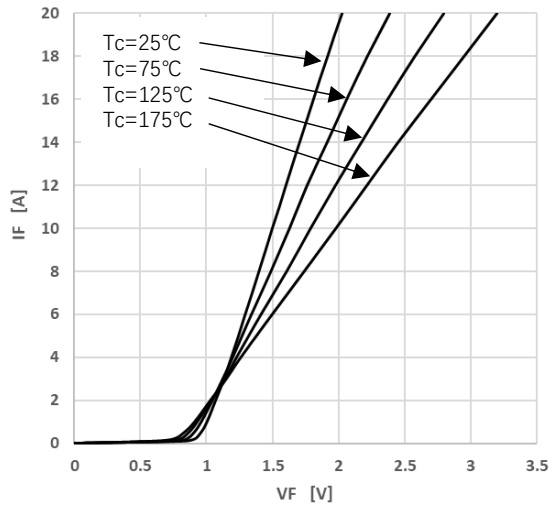


Figure 1 Forward Characteristics

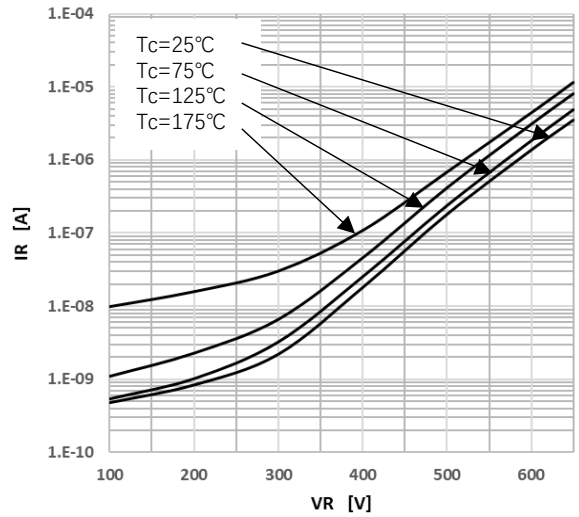


Figure 2 Reverse Characteristics

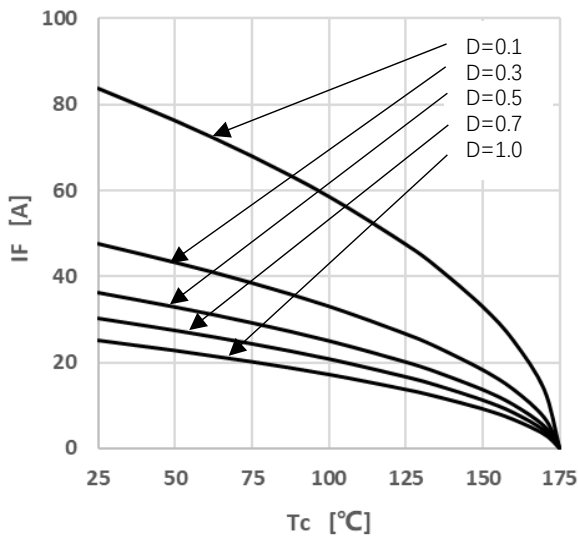


Figure 3 Peak Forward Current Derating

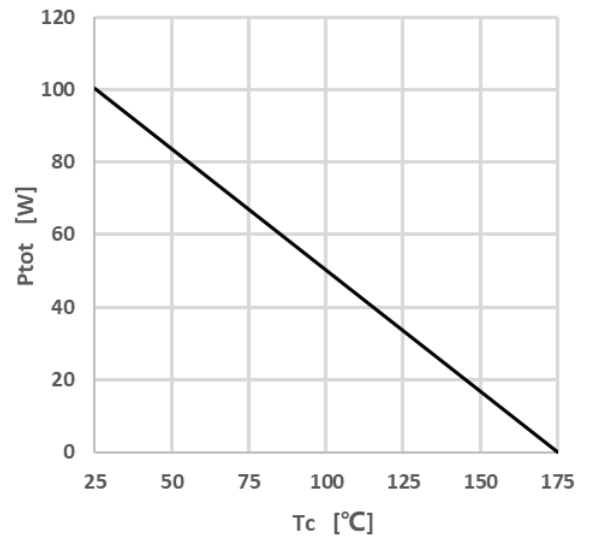
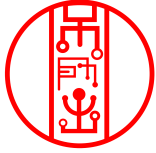


Figure 4 Power Dissipation



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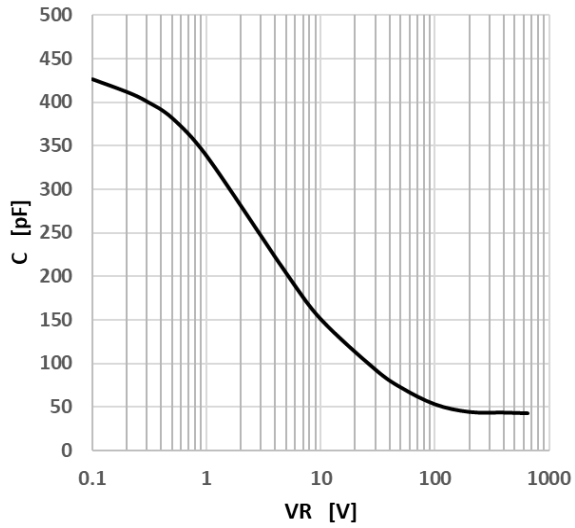


Figure 5 Capacitance vs. Reverse Voltage

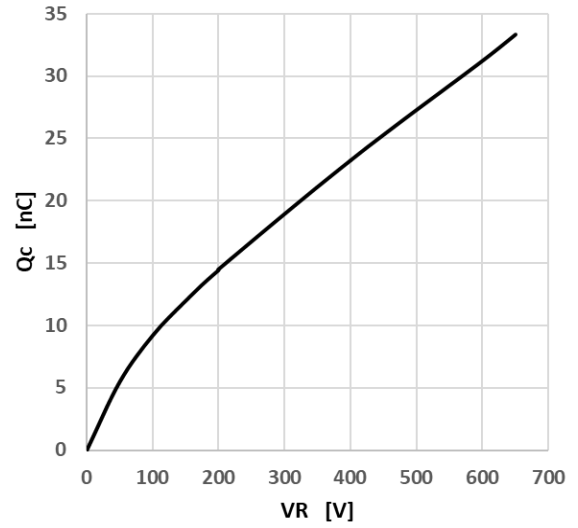


Figure 6 Capacitance Charge vs. Reverse Voltage

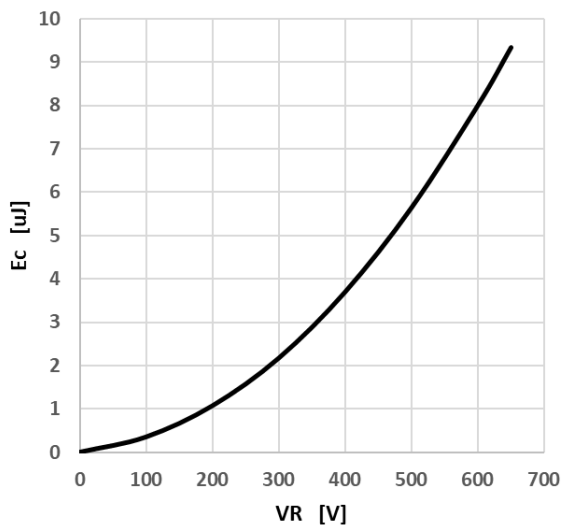


Figure 7 Capacitance Stored Energy

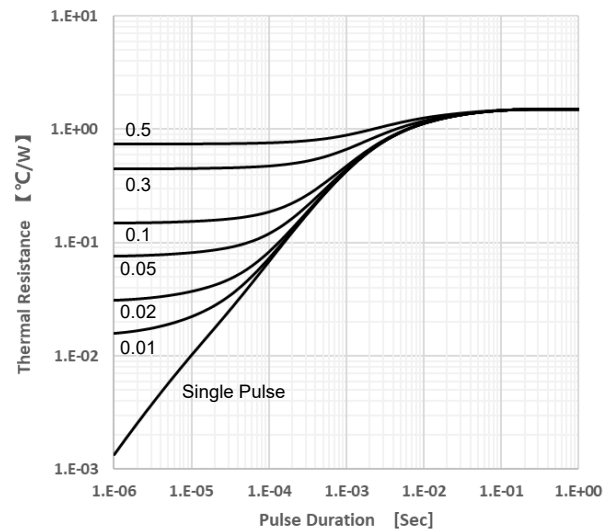
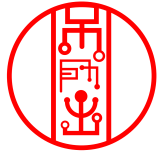


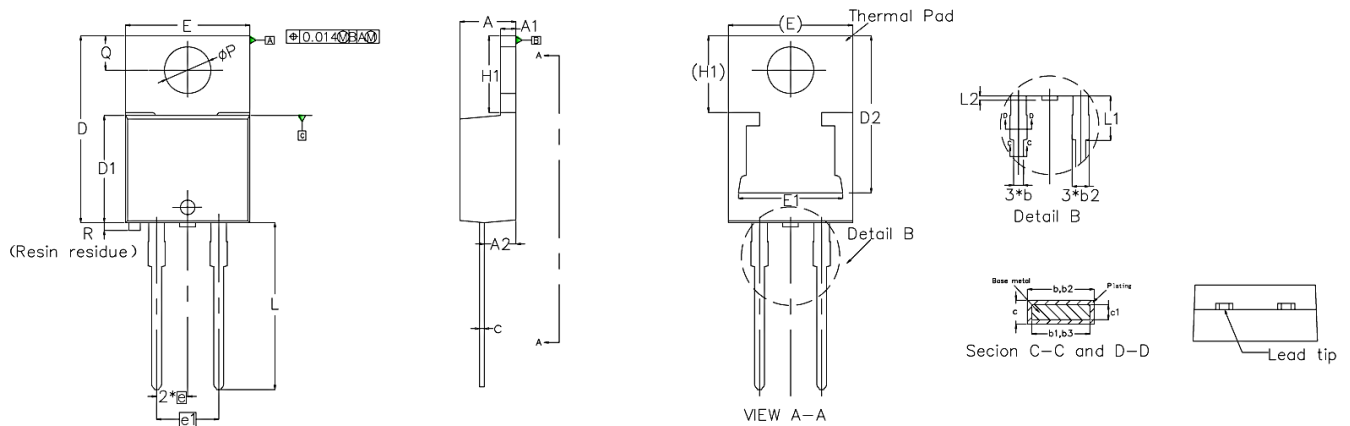
Figure 8 Transient Thermal Impedance



# Q-SSC0865-T

## Package Dimensions

### To-220-2



| SYMBOL | MILLIMETERS |       |       | NOTES |  | SYMBOL   | MILLIMETERS |       |       | NOTES |
|--------|-------------|-------|-------|-------|--|----------|-------------|-------|-------|-------|
|        | Normal      | MIN.  | MAX.  |       |  |          | Normal      | MIN.  | MAX.  |       |
| A      | 4.55        | 4.44  | 4.65  |       |  | E1       | 8.57        | 8.25  | 8.89  |       |
| A1     | 1.27        | 1.14  | 1.39  |       |  | e        | 2.54        | 2.41  | 2.67  |       |
| A2     | 2.60        | 2.54  | 2.79  |       |  | e1       | 5.08        | 4.95  | 5.20  |       |
| b      | 0.85        | 0.69  | 0.94  |       |  | H1       | 6.20        | 6.09  | 6.40  |       |
| b1     | 0.83        | 0.38  | 0.97  |       |  | L        | 13.60       | 13.52 | 14.00 |       |
| b2     | 1.33        | 1.20  | 1.45  |       |  | L1       | 3.60        | 3.56  | 3.80  |       |
| b3     | 1.33        | 1.20  | 1.45  |       |  | L2       | —           | 0     | 0.35  |       |
| c      | 0.50        | 0.36  | 0.56  |       |  | $\phi P$ | 3.80        | 3.70  | 3.91  |       |
| c1     | 0.48        | 0.36  | 0.56  |       |  | Q        | 2.80        | 2.62  | 2.87  |       |
| D      | 15.25       | 14.95 | 15.32 |       |  | R        |             |       | 0.2   |       |
| D1     | 8.75        | 8.50  | 8.89  |       |  |          |             |       |       |       |
| D2     | 12.85       | 12.20 | 13.30 |       |  |          |             |       |       |       |
| E      | 10.18       | 10.11 | 10.40 |       |  |          |             |       |       |       |