

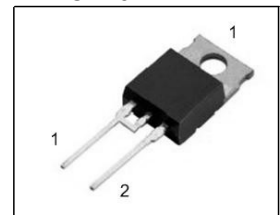
**Silicon Carbide Schottky Diode**

- Worlds first 600V Schottky diode
- Revolutionary semiconductor material - Silicon Carbide
- Switching behavior benchmark
- No reverse recovery
- No temperature influence on the switching behavior
- No forward recovery

**thinQ!™ SiC Schottky Diode**
**Product Summary**

|           |     |    |
|-----------|-----|----|
| $V_{RRM}$ | 600 | V  |
| $Q_C$     | 4.6 | nC |
| $I_F$     | 2   | A  |

P-TO220-2-2.



| Type     | Package      | Ordering Code | Marking | Pin 1 | Pin 2 |
|----------|--------------|---------------|---------|-------|-------|
| SDT02S60 | P-TO220-2-2. | Q67040-S4511  | D02S60  | C     | A     |

**Maximum Ratings, at  $T_j = 25\text{ °C}$ , unless otherwise specified**

| Parameter  | Symbol         | Value       | Unit             |
|--|----------------|-------------|------------------|
| Continuous forward current, $T_C=100\text{ °C}$  | $I_F$          | 2           | A                |
| RMS forward current, $f=50\text{ Hz}$  | $I_{FRMS}$     | 2.8         |                  |
| Surge non repetitive forward current, sine halfwave<br>$T_C=25\text{ °C}$ , $t_p=10\text{ ms}$ | $I_{FSM}$      | 4.1         |                  |
| Repetitive peak forward current<br>$T_j=150\text{ °C}$ , $T_C=100\text{ °C}$ , $D=0.1$         | $I_{FRM}$      | 7.3         |                  |
| Non repetitive peak forward current<br>$t_p=10\text{ }\mu\text{s}$ , $T_C=25\text{ °C}$        | $I_{FMAX}$     | 17          |                  |
| $i^2t$ value, $T_C=25\text{ °C}$ , $t_p=10\text{ ms}$  | $\int i^2 dt$  | 0.08        | A <sup>2</sup> s |
| Repetitive peak reverse voltage  | $V_{RRM}$      | 600         | V                |
| Surge peak reverse voltage   | $V_{RSM}$      | 600         |                  |
| Power dissipation, $T_C=25\text{ °C}$  | $P_{tot}$      | 15          | W                |
| Operating and storage temperature  | $T_j, T_{stg}$ | -55... +175 | °C               |

**Thermal Characteristics**

| Parameter                                      | Symbol     | Values |      |      | Unit |
|--|------------|--------|------|------|------|
|  |            | min.   | typ. | max. |      |
| <b>Characteristics</b>                         |            |        |      |      |      |
| Thermal resistance, junction - case            | $R_{thJC}$ | -      | -    | 10   | K/W  |
| Thermal resistance, junction - ambient, leaded | $R_{thJA}$ | -      | -    | 62   |      |

**Electrical Characteristics, at  $T_j = 25^\circ\text{C}$ , unless otherwise specified**

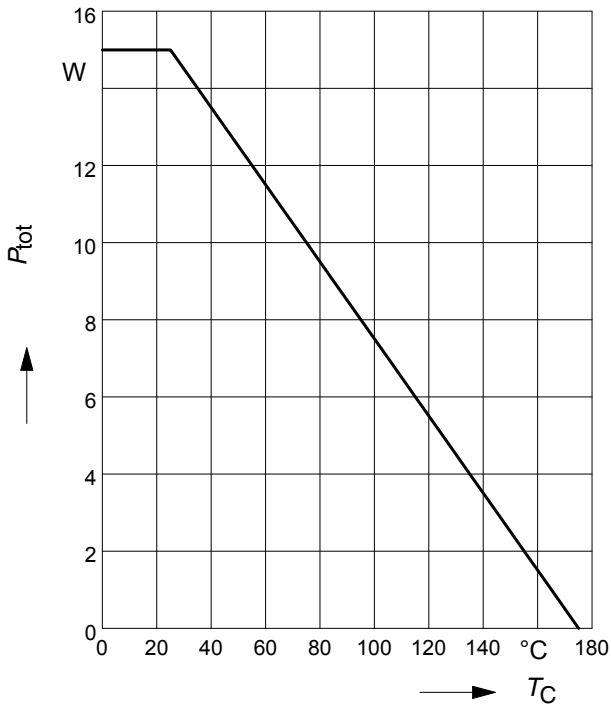
| Parameter                                | Symbol | Values |      |      | Unit          |
|--|--------|--------|------|------|---------------|
|  |        | min.   | typ. | max. |               |
| <b>Static Characteristics</b>            |        |        |      |      |               |
| Diode forward voltage                    | $V_F$  |        |      |      | V             |
| $I_F=2\text{A}, T_j=25^\circ\text{C}$    |        | -      | 1.75 | 2    |               |
| $I_F=2\text{A}, T_j=150^\circ\text{C}$   |        | -      | 2.2  | 2.6  |               |
| Reverse current                          | $I_R$  |        |      |      | $\mu\text{A}$ |
| $V_R=600\text{V}, T_j=25^\circ\text{C}$  |        | -      | 7    | 100  |               |
| $V_R=600\text{V}, T_j=150^\circ\text{C}$ |        | -      | 30   | 500  |               |

**Electrical Characteristics, at  $T_j = 25\text{ °C}$ , unless otherwise specified**

| Parameter  | Symbol   | Values |                  |      | Unit |
|--|----------|--------|------------------|------|------|
|  |          | min.   | typ.             | max. |      |
| <b>AC Characteristics</b>  |          |        |                  |      |      |
| Total capacitive charge<br>$V_R=400\text{V}$ , $I_F=2\text{A}$ , $di_F/dt=200\text{A}/\mu\text{s}$ , $T_j=150\text{°C}$  | $Q_C$    | -      | 4.6              | -    | nC   |
| Switching time<br>$V_R=400\text{V}$ , $I_F=2\text{A}$ , $di_F/dt=200\text{A}/\mu\text{s}$ , $T_j=150\text{°C}$   | $t_{rr}$ | -      | n.a.             | -    | ns   |
| Total capacitance<br>$V_R=1\text{V}$ , $T_C=25\text{°C}$ , $f=1\text{MHz}$<br>$V_R=300\text{V}$ , $T_C=25\text{°C}$ , $f=1\text{MHz}$<br>$V_R=600\text{V}$ , $T_C=25\text{°C}$ , $f=1\text{MHz}$ | $C$      | -      | 50<br>5.2<br>5.0 | -    | pF   |

**1 Power dissipation**

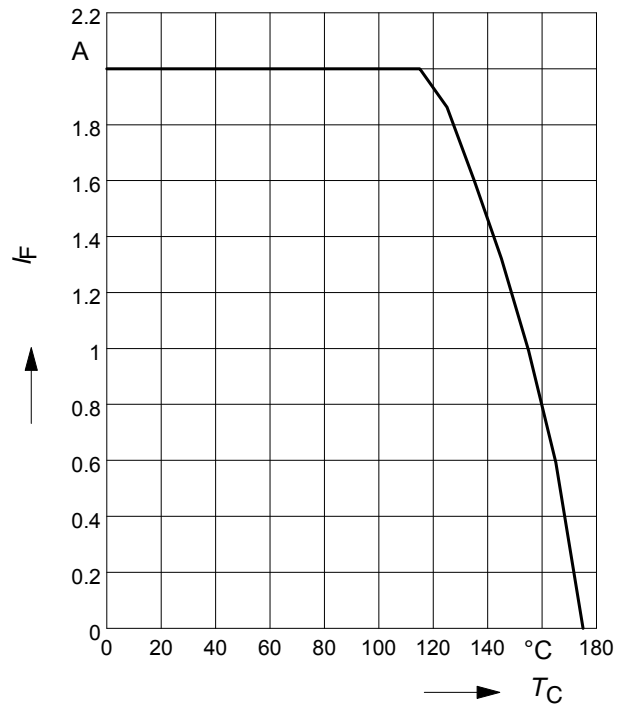
$P_{tot} = f(T_C)$



**2 Diode forward current**

$I_F = f(T_C)$

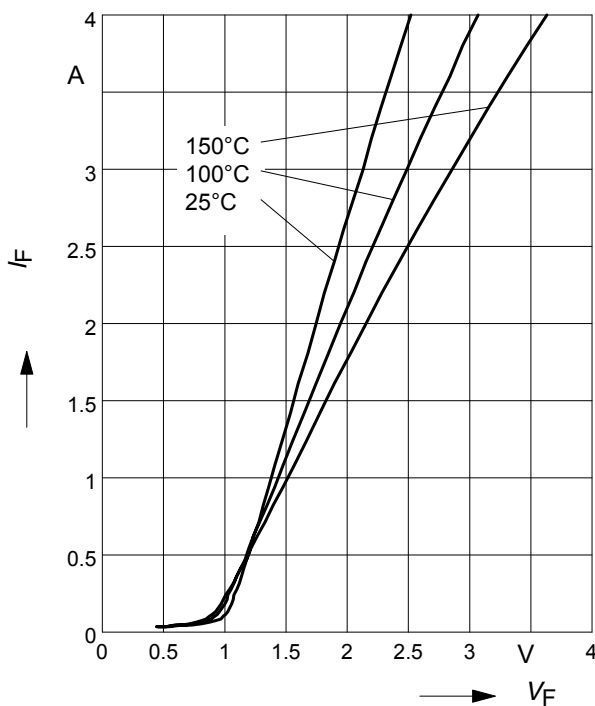
parameter:  $T_j \leq 175^\circ\text{C}$



**3 Typ. forward characteristic**

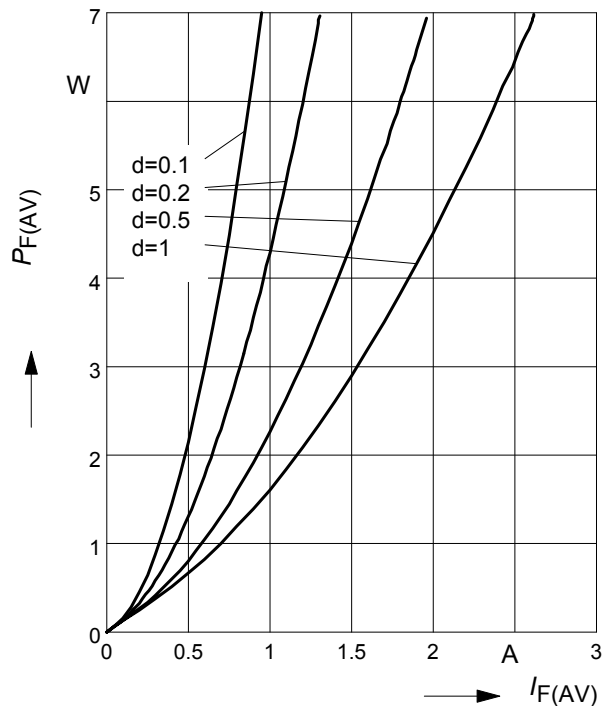
$I_F = f(V_F)$

parameter:  $T_j$ ,  $t_p = 350 \mu\text{s}$



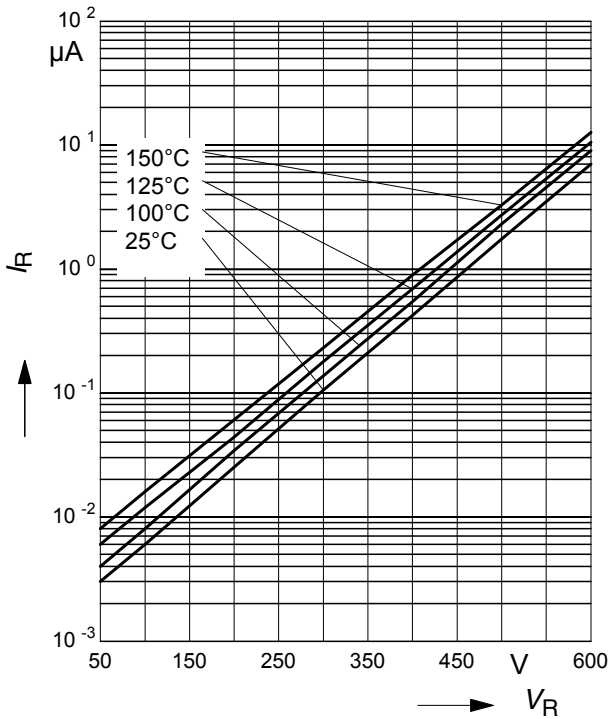
**4 Typ. forward power dissipation vs. average forward current**

$P_{F(AV)} = f(I_F)$   $T_C = 100^\circ\text{C}$ ,  $d = t_p/T$



**5 Typ. reverse current vs. reverse voltage**

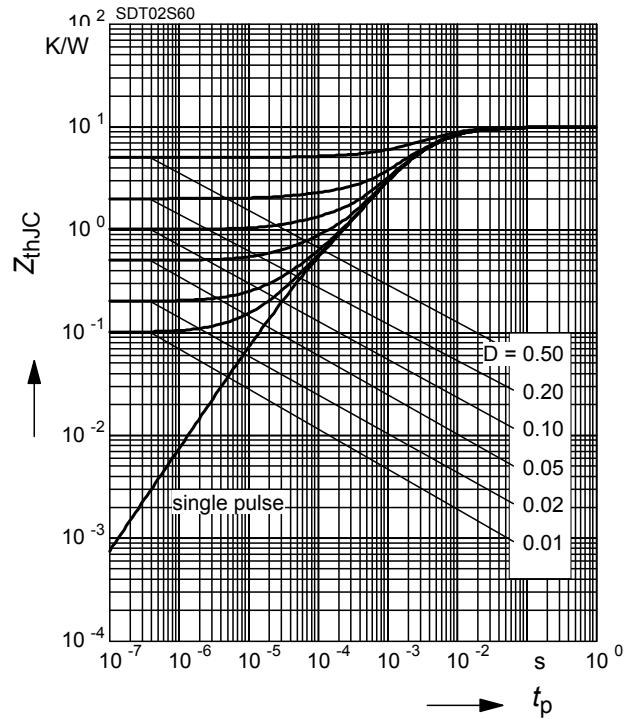
$$I_R = f(V_R)$$



**6 Transient thermal impedance**

$$Z_{thJC} = f(t_p)$$

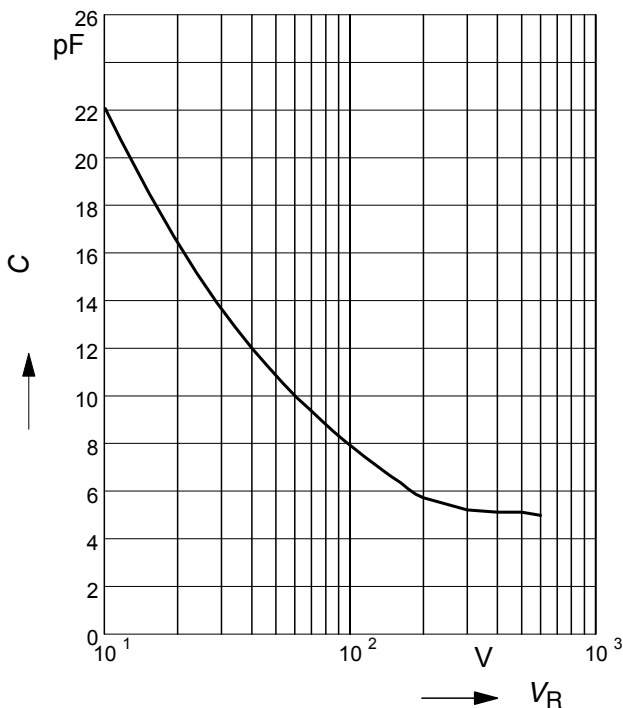
parameter :  $D = t_p/T$



**7 Typ. capacitance vs. reverse voltage**

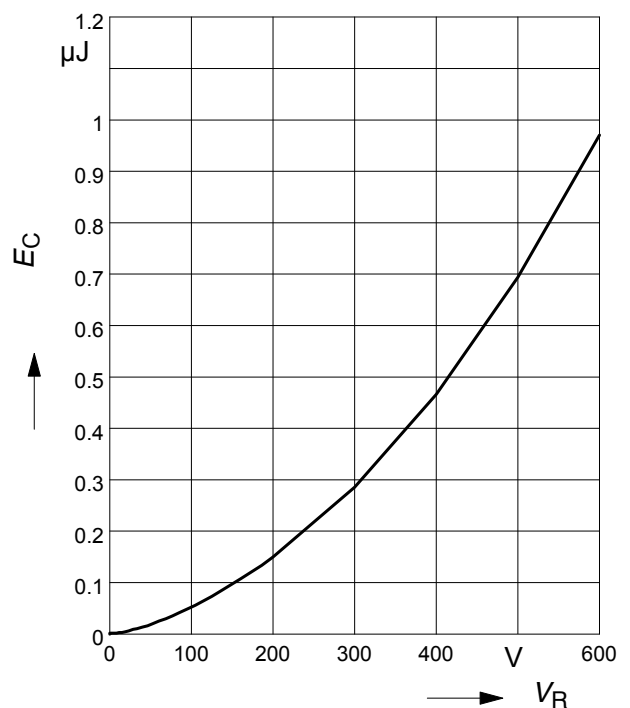
$$C = f(V_R)$$

parameter:  $T_C = 25^\circ\text{C}$ ,  $f = 1\text{ MHz}$



**8 Typ. C stored energy**

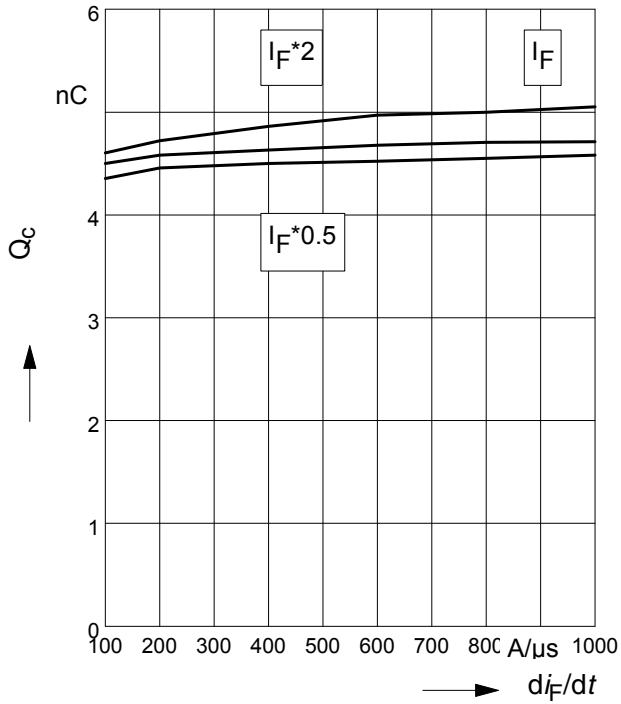
$$E_C = f(V_R)$$

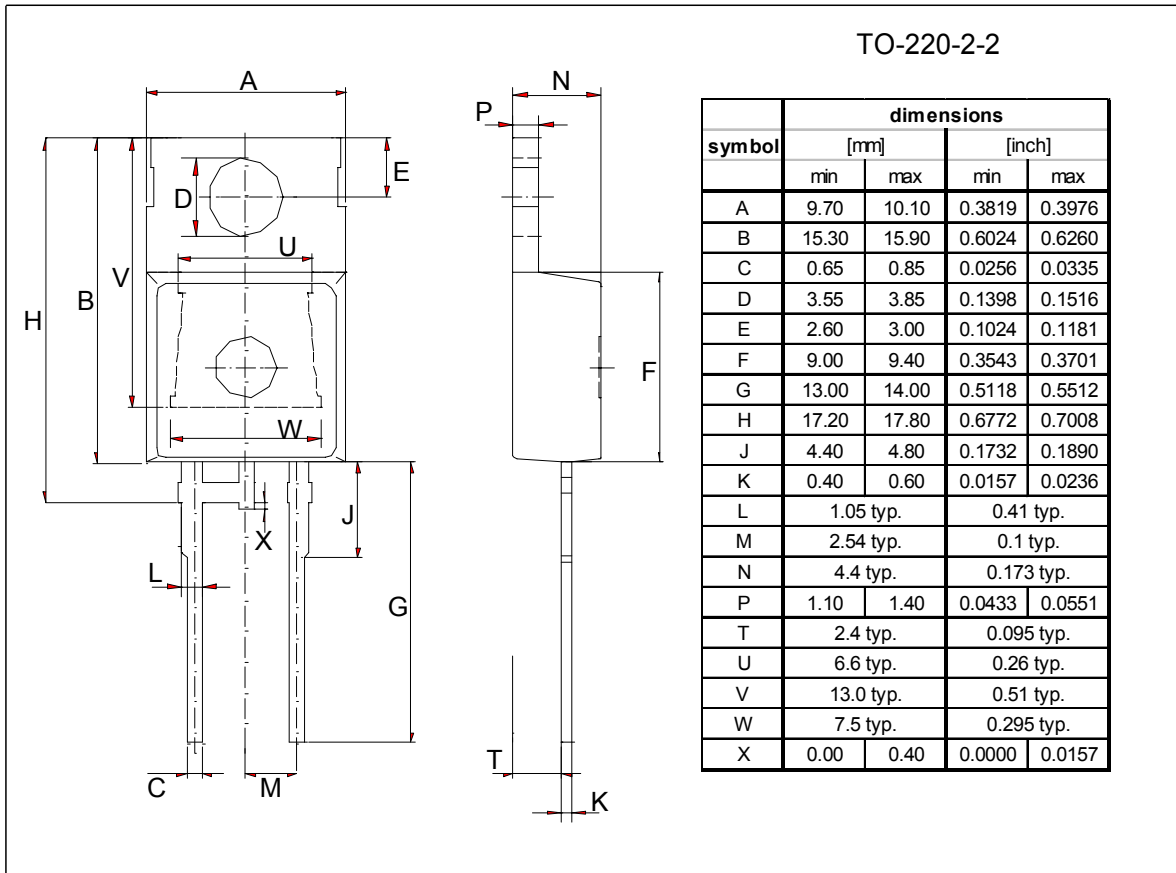


9 Typ. capacitive charge vs. current slope

$$Q_c = f(dI_F/dt)$$

parameter:  $T_j = 150\text{ }^\circ\text{C}$





**Published by**  
**Infineon Technologies AG,**  
**Bereichs Kommunikation**  
**St.-Martin-Strasse 53,**  
**D-81541 München**  
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