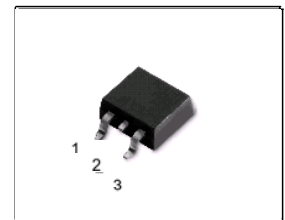


Silicon Carbide Schottky Diode

- Worlds first 600V Schottky diode
- Revolutionary semiconductor material - Silicon Carbide
- Switching behavior benchmark
- No reverse recovery
- No temperature influence on the switching behavior
- Ideal diode for Power Factor Correction up to 1200W¹⁾
- No forward recovery

thinQ!TM SiC Schottky Diode
Product Summary

| | | |
|-----------|-----|----|
| V_{RRM} | 600 | V |
| Q_C | 21 | nC |
| I_F | 6 | A |

D2PAK


| Type | Package | Ordering Code | Marking | Pin 1 | Pin 2 | Pin 3 |
|----------|---------|---------------|---------|-------|-------|-------|
| SDB06S60 | D2PAK | Q67040-S4370 | D06S60 | n.c. | C | A |

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

| Parameter | Symbol | Value | Unit |
|---|----------------|-------------|------------------|
| Continuous forward current, $T_C=100^\circ\text{C}$ | I_F | 6 | A |
| RMS forward current, $f=50\text{Hz}$ | I_{FRMS} | 8.4 | |
| Surge non repetitive forward current, sine halfwave $T_C=25^\circ\text{C}$, $t_p=10\text{ms}$ | I_{FSM} | 21.5 | |
| Repetitive peak forward current $T_j=150^\circ\text{C}$, $T_C=100^\circ\text{C}$, $D=0.1$ | I_{FRM} | 28 | |
| Non repetitive peak forward current $t_p=10\mu\text{s}$, $T_C=25^\circ\text{C}$ | I_{FMAX} | 60 | |
| i^2t value, $T_C=25^\circ\text{C}$, $t_p=10\text{ms}$ | $\int i^2 dt$ | 2.3 | A ² s |
| Repetitive peak reverse voltage | V_{RRM} | 600 | V |
| Surge peak reverse voltage | V_{RSM} | 600 | |
| Power dissipation, $T_C=25^\circ\text{C}$ | P_{tot} | 57.6 | W |
| Operating and storage temperature | T_j, T_{stg} | -55... +175 | $^\circ\text{C}$ |

Thermal Characteristics

| Parameter | Symbol | Values | | | Unit |
|---|------------|--------|------|------|------|
| | | min. | typ. | max. | |
| Characteristics | | | | | |
| Thermal resistance, junction - case | R_{thJC} | - | - | 2.6 | K/W |
| Thermal resistance, junction - ambient, leaded | R_{thJA} | - | - | 62 | |
| SMD version, device on PCB: | R_{thJA} | | | | |
| P-TO263-3-2: @ min. footprint | | - | - | 62 | |
| P-TO263-3-2: @ 6 cm ² cooling area ²⁾ | | - | 35 | - | |
| P-TO252-3-1: @ min. footprint | | - | - | 75 | |
| P-TO252-3-1: @ 6 cm ² cooling area ²⁾ | | - | - | 50 | |

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

| Parameter | Symbol | Values | | | Unit |
|--|--------|--------|------|------|---------------|
| | | min. | typ. | max. | |
| Static Characteristics | | | | | |
| Diode forward voltage | V_F | | | | V |
| $I_F=6\text{A}, T_j=25\text{ }^\circ\text{C}$ | | - | 1.5 | 1.7 | |
| $I_F=6\text{A}, T_j=150\text{ }^\circ\text{C}$ | | - | 1.7 | 2.1 | |
| Reverse current | I_R | | | | μA |
| $V_R=600\text{V}, T_j=25\text{ }^\circ\text{C}$ | | - | 20 | 200 | |
| $V_R=600\text{V}, T_j=150\text{ }^\circ\text{C}$ | | - | 50 | 1000 | |

¹CCM, $V_{IN} = 85\text{VAC}$, $T_j = 150\text{ }^\circ\text{C}$, $T_C = 100\text{ }^\circ\text{C}$, $\eta = 93\%$, $\Delta I_{IN} = 30\%$

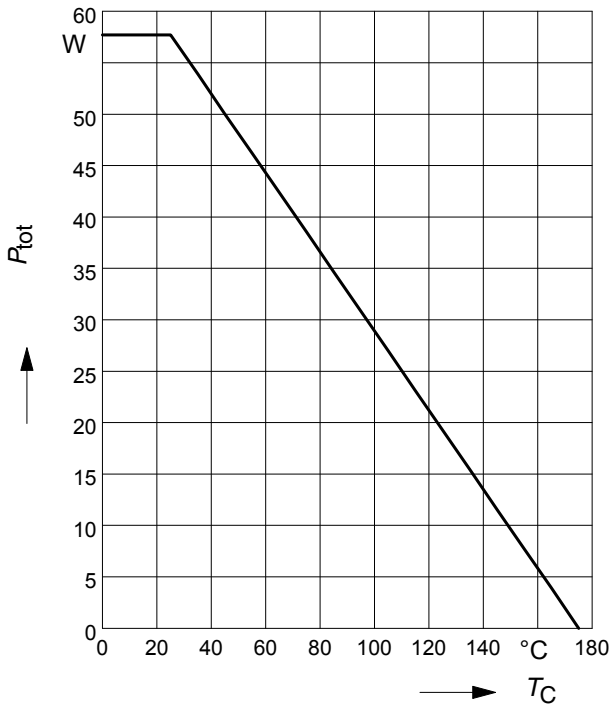
²Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6cm² (one layer, 70 μm thick) copper area for drain connection. PCB is vertical without blown air.

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

| Parameter | Symbol | Values | | | Unit |
|---|----------|--------|-----------------|------|------|
| | | min. | typ. | max. | |
| AC Characteristics | | | | | |
| Total capacitive charge $V_R=400\text{V}$, $I_F=6\text{A}$, $di_F/dt=200\text{A}/\mu\text{s}$, $T_j=150\text{ }^\circ\text{C}$ | Q_C | - | 21 | - | nC |
| Switching time $V_R=400\text{V}$, $I_F=6\text{A}$, $di_F/dt=200\text{A}/\mu\text{s}$, $T_j=150\text{ }^\circ\text{C}$ | t_{rr} | - | n.a. | - | ns |
| Total capacitance $V_R=0\text{V}$, $T_C=25\text{ }^\circ\text{C}$, $f=1\text{MHz}$ $V_R=300\text{V}$, $T_C=25\text{ }^\circ\text{C}$, $f=1\text{MHz}$ $V_R=600\text{V}$, $T_C=25\text{ }^\circ\text{C}$, $f=1\text{MHz}$ | C | - | 300 20 15 | - | pF |

1 Power dissipation

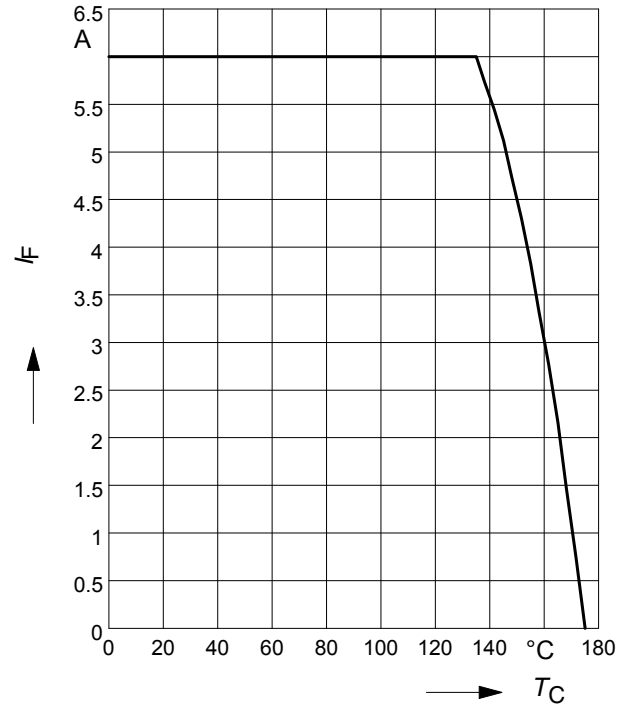
$$P_{\text{tot}} = f(T_C)$$



2 Diode forward current

$$I_F = f(T_C)$$

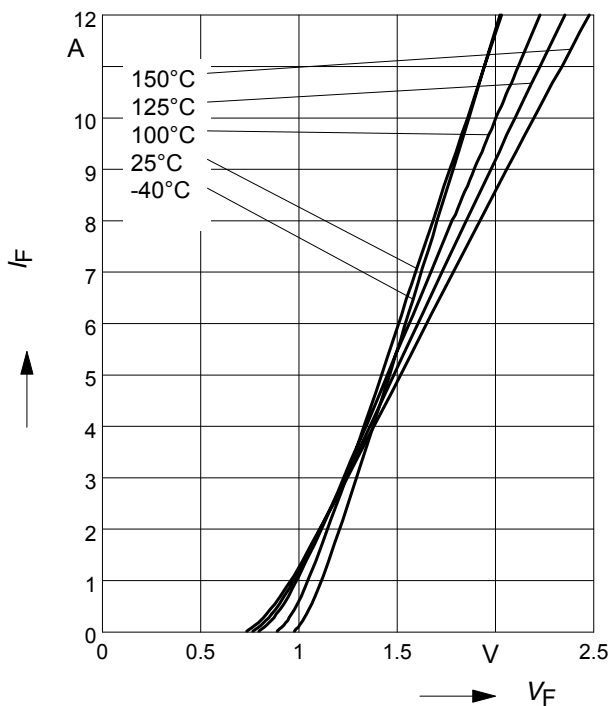
parameter: $T_j \leq 175^{\circ}\text{C}$



3 Typ. forward characteristic

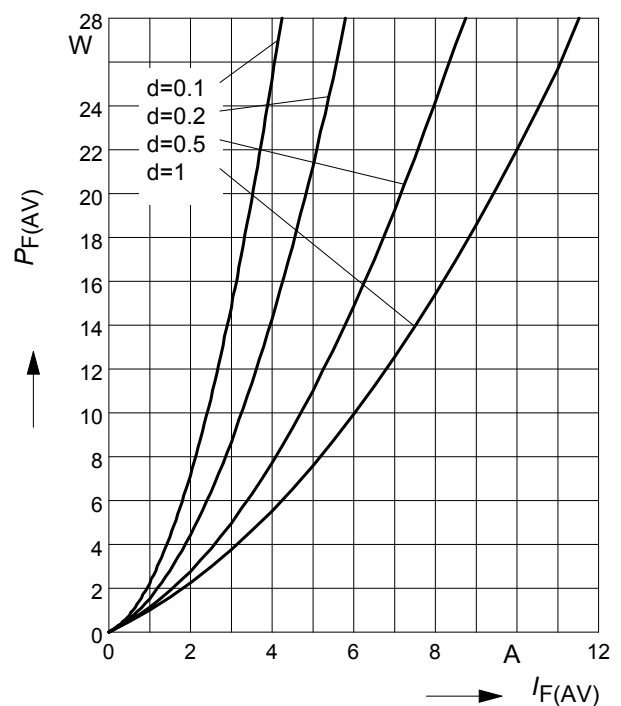
$$I_F = f(V_F)$$

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



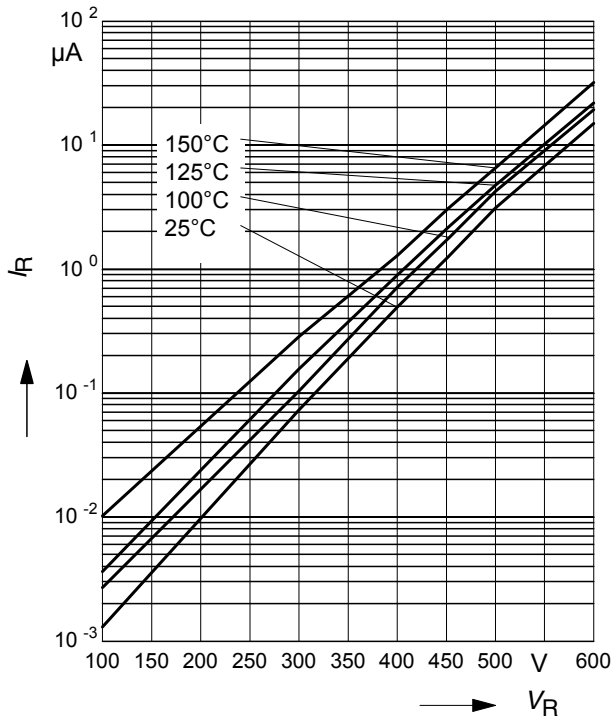
4 Typ. forward power dissipation vs. average forward current

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



5 Typ. reverse current vs. reverse voltage

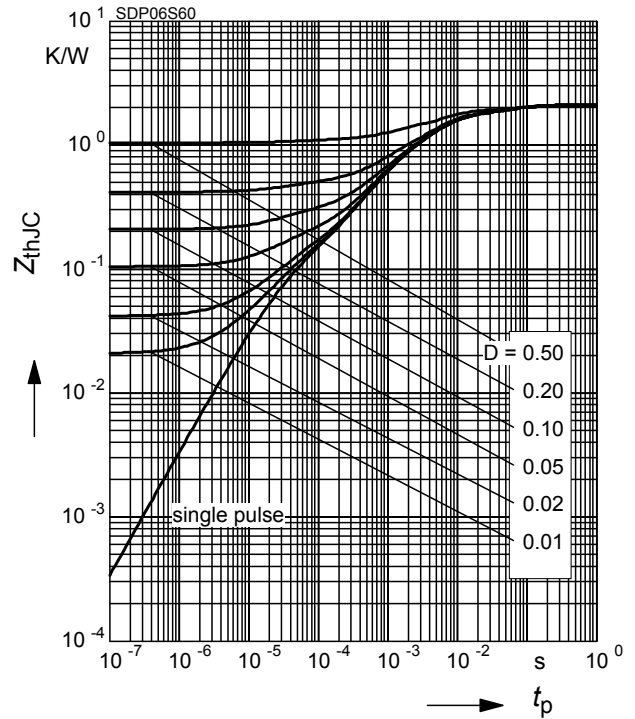
$$I_R = f(V_R)$$



6 Transient thermal impedance

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

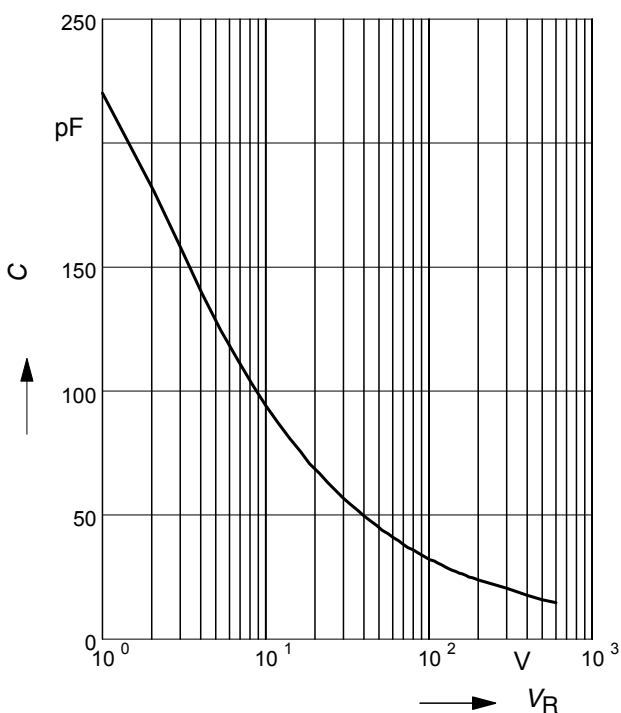
parameter : $D = t_p/T$



7 Typ. capacitance vs. reverse voltage

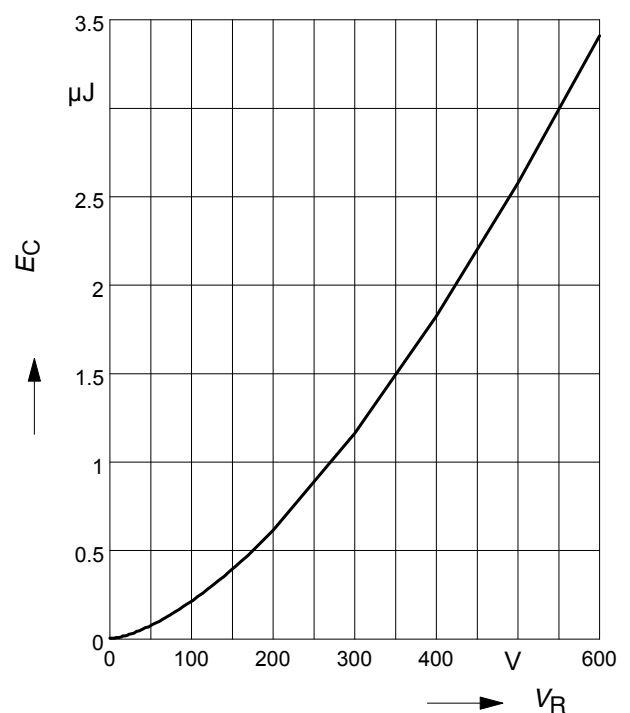
$$C = f(V_R)$$

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



8 Typ. C stored energy

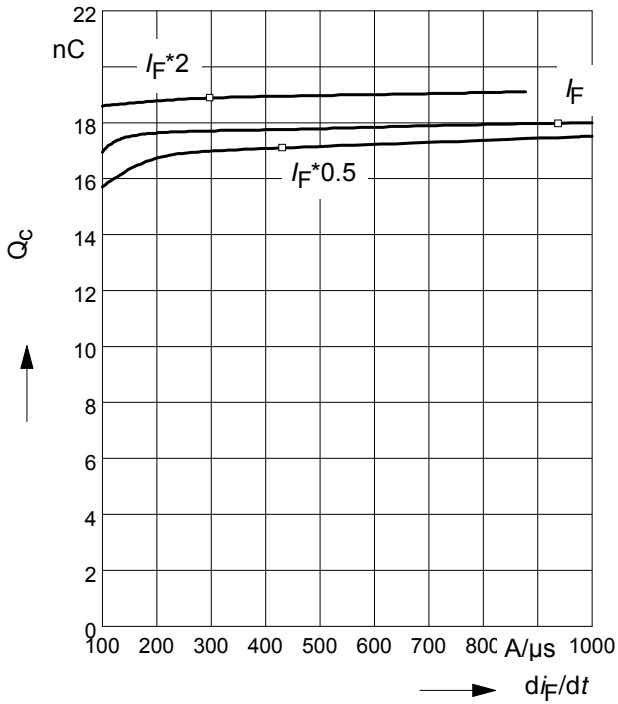
$$E_C = f(V_R)$$



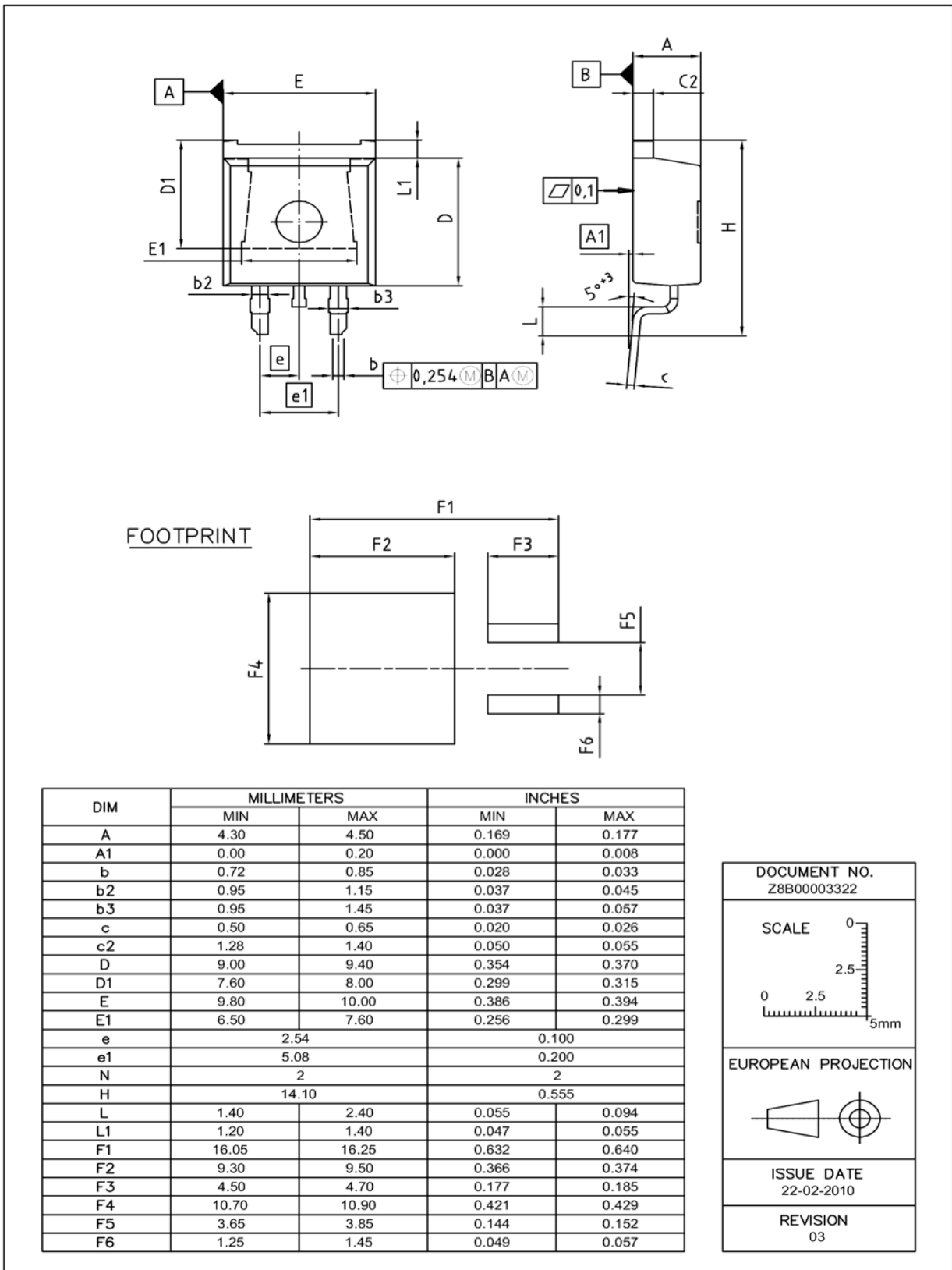
9 Typ. capacitive charge vs. current slope

$$Q_C = f(di_F/dt)$$

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



PG-TO220-3-45 (D2Pak): Outline



Dimensions in mm/inches

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