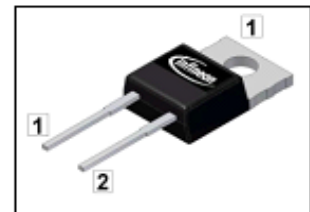


thinQ!™ SiC Schottky Diode
Features

- Revolutionary semiconductor material - Silicon Carbide
- Switching behavior benchmark
- No reverse recovery / No forward recovery
- Temperature independent switching behavior
- High surge current capability
- Pb-free lead plating; RoHS compliant
- Qualified according to JEDEC¹⁾ for target applications
- Optimized for high temperature operation
- Lowest Figure of Merit Q_C/I_F

Product Summary

| | | |
|----------------------------|------|----|
| V_{DC} | 1200 | V |
| Q_C | 36 | nC |
| $I_F; T_C < 130\text{ °C}$ | 10 | A |

PG-TO220-2

thinQ!™ Diode designed for fast switching applications like:

- SMPS e.g.; CCM PFC
- Motor Drives; Solar Applications; UPS

| Type | Package | Marking | Pin 1 | Pin 2 |
|-----------|------------|---------|-------|-------|
| IDH10S120 | PG-TO220-2 | D10S120 | C | A |

Maximum ratings

| Parameter | Symbol | Conditions | Value | Unit |
|--|----------------|---|-------------|------------------|
| Continuous forward current | I_F | $T_C < 130\text{ °C}$ | 10 | A |
| Surge non-repetitive forward current, sine halfwave | $I_{F,SM}$ | $T_C = 25\text{ °C}, t_p = 10\text{ ms}$ | 58 | |
| | | $T_C = 150\text{ °C}, t_p = 10\text{ ms}$ | 50 | |
| Non-repetitive peak forward current | $I_{F,max}$ | $T_C = 25\text{ °C}, t_p = 10\text{ }\mu\text{s}$ | 250 | |
| i^2t value | $\int i^2 dt$ | $T_C = 25\text{ °C}, t_p = 10\text{ ms}$ | 16 | A ² s |
| | | $T_C = 150\text{ °C}, t_p = 10\text{ ms}$ | 12 | |
| Repetitive peak reverse voltage | V_{RRM} | $T_J = 25\text{ °C}$ | 1200 | V |
| Diode dv/dt ruggedness | dv/dt | $V_R = 0 \dots 960\text{ V}$ | 50 | V/ns |
| Power dissipation | P_{tot} | $T_C = 25\text{ °C}$ | 135 | W |
| Operating and storage temperature | T_j, T_{stg} | | -55 ... 175 | °C |
| Soldering temperature, wavesoldering only allowed at leads | T_{sold} | 1.6mm (0.063 in.) from case for 10s | 260 | |
| Mounting torque | | M3 and M3.5 screws | 60 | Mcm |

| Parameter | Symbol | Conditions | Values | | | Unit |
|-----------|--------|------------|--------|------|------|------|
| | | | min. | typ. | max. | |

Thermal characteristics

| | | | | | | |
|--|------------|---|---|---|----|-----|
| Thermal resistance, junction - case | R_{thJC} | | - | - | 1 | K/W |
| Thermal resistance, junction - ambient | R_{thJA} | Thermal resistance, junction- ambient, leaded | - | - | 62 | |

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

| | | | | | | |
|-----------------------|----------|--|------|------|------|---------------|
| DC blocking voltage | V_{DC} | $I_R=0.05\text{ mA}, T_j=25\text{ }^\circ\text{C}$ | 1200 | - | - | V |
| Diode forward voltage | V_F | $I_F=10\text{ A}, T_j=25\text{ }^\circ\text{C}$ | - | 1,65 | 1,8 | |
| | | $I_F=10\text{ A}, T_j=150\text{ }^\circ\text{C}$ | - | 2,55 | - | |
| Reverse current | I_R | $V_R=1200\text{ V}, T_j=25\text{ }^\circ\text{C}$ | - | 10 | 240 | μA |
| | | $V_R=1200\text{ V}, T_j=150\text{ }^\circ\text{C}$ | - | 40 | 1000 | |

AC characteristics

| | | | | | | |
|------------------------------|-------|---|---|-----|-----|----|
| Total capacitive charge | Q_c | $V_R=400\text{ V}, I_F \leq I_{F,max},$ $di_F/dt=200\text{ A}/\mu\text{s},$ $T_j=150\text{ }^\circ\text{C}$ | - | 36 | - | nC |
| Switching time ²⁾ | t_c | | - | - | <10 | ns |
| Total capacitance | C | $V_R=1\text{ V}, f=1\text{ MHz}$ | - | 500 | - | pF |
| | | $V_R=300\text{ V}, f=1\text{ MHz}$ | - | 40 | - | |
| | | $V_R=600\text{ V}, f=1\text{ MHz}$ | - | 36 | - | |

¹⁾ J-STD20 and JESD22

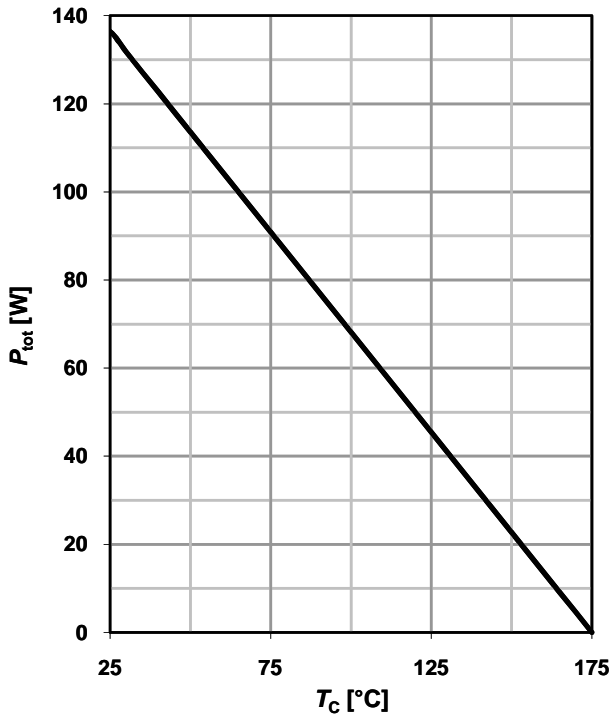
²⁾ t_c is the time constant for the capacitive displacement current waveform (independent from T_j , I_{LOAD} and di/dt), different from t_{rr} which is dependent on T_j , I_{LOAD} and di/dt . No reverse recovery time constant t_{rr} due to absence of minority carrier injection

³⁾ Under worst case Z_{th} conditions.

⁴⁾ Only capacitive charge occurring, guaranteed by design

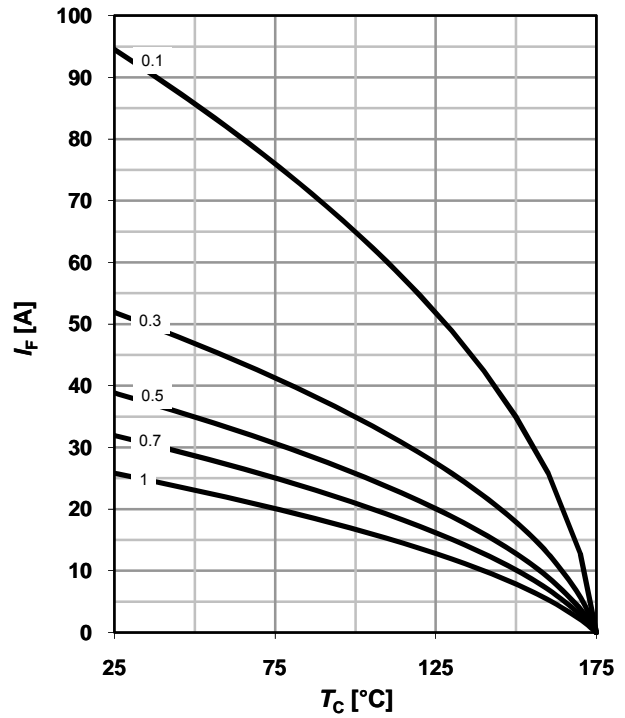
1 Power dissipation

$P_{tot}=f(T_C)$



2 Diode forward current

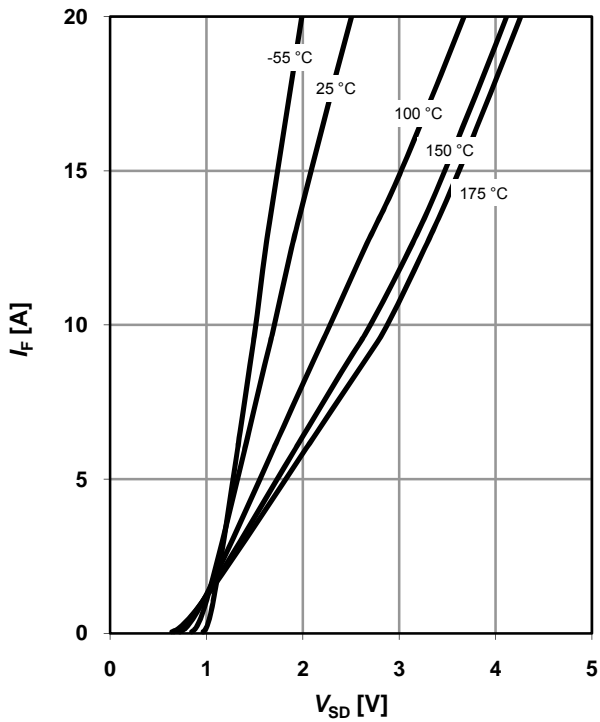
$I_F=f(T_C)^3; T_j \leq 175 \text{ °C}; \text{ parameter: } D = t_p/T$



3 Typ. forward characteristic

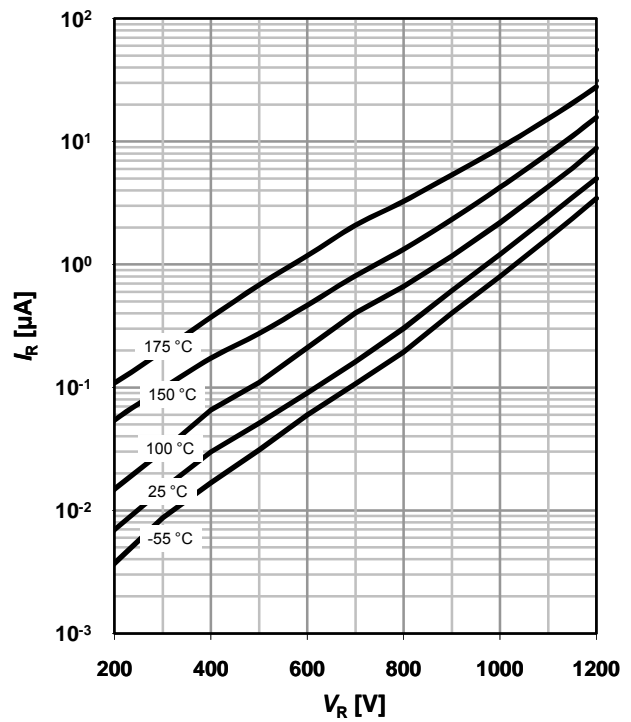
$I_F=f(V_F); t_p=400 \text{ }\mu\text{s}$

parameter: T_j



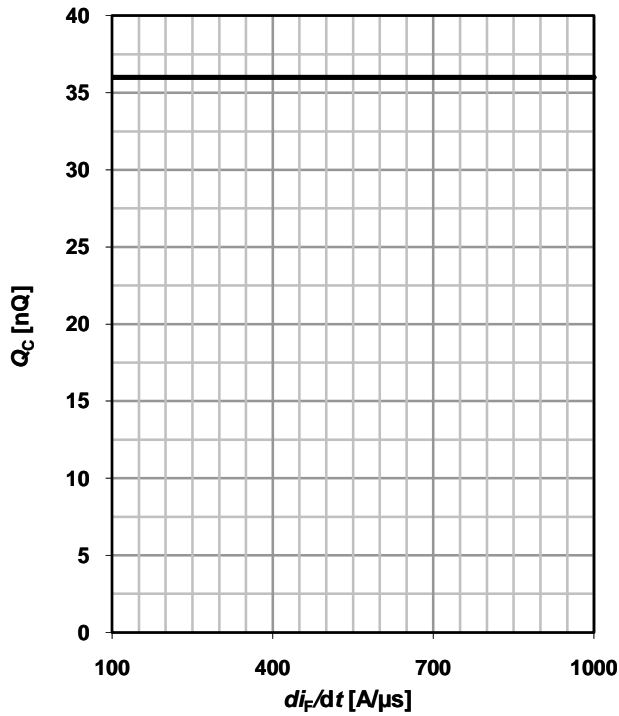
4 Typ. Reverse current vs. reverse voltage

$E_C=f(V_R)$



5 Typ. capacitance charge vs. current slope

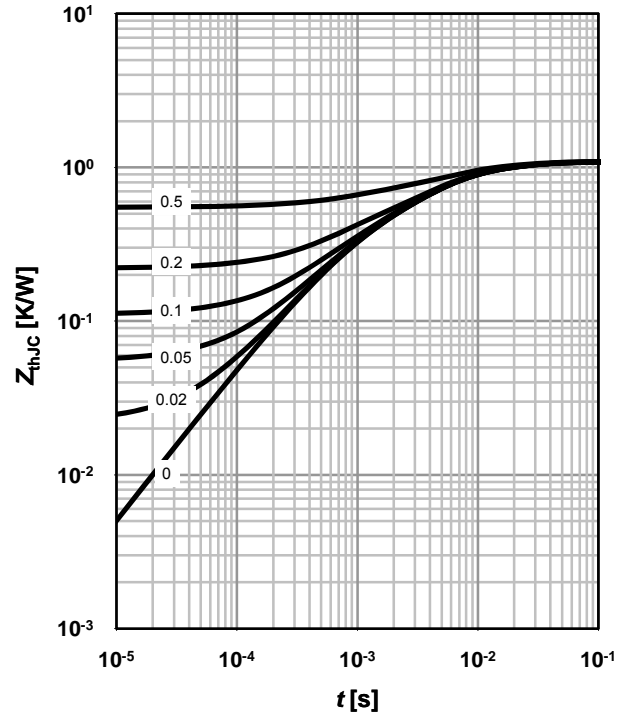
$Q_C=f(di_F/dt)^4$; $T_j=150\text{ }^\circ\text{C}$; $I_F \leq I_{F,max}$



6 Transient thermal impedance

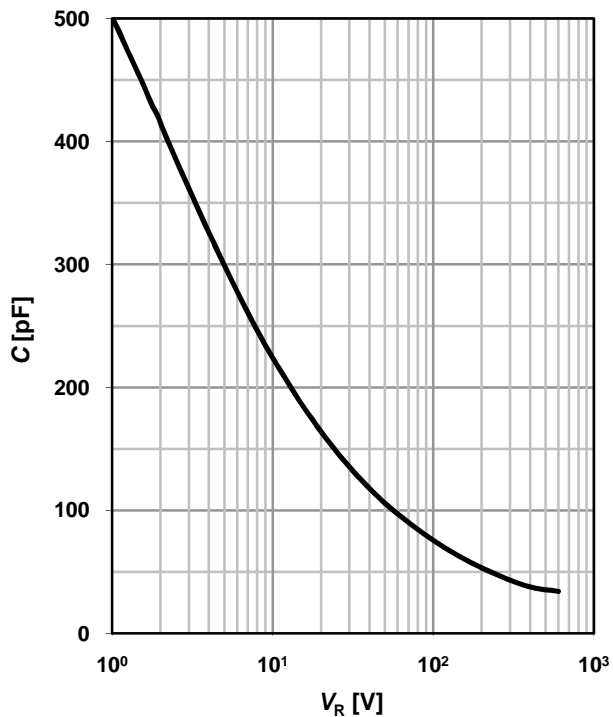
$Z_{thJC}=f(t_p)$

parameter: $D=t_p/T$



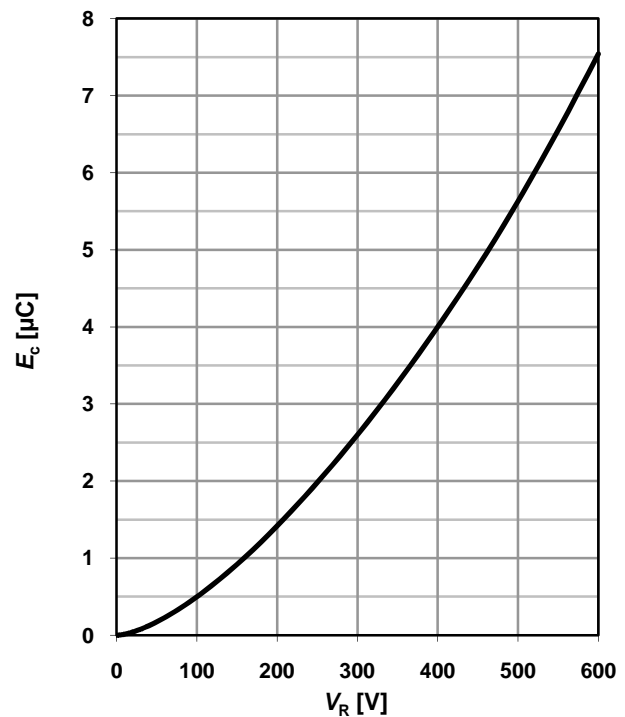
7 Typ. capacitance vs. reverse voltage

$C=f(V_R)$; $T_C=25\text{ }^\circ\text{C}$, $f=1\text{ MHz}$

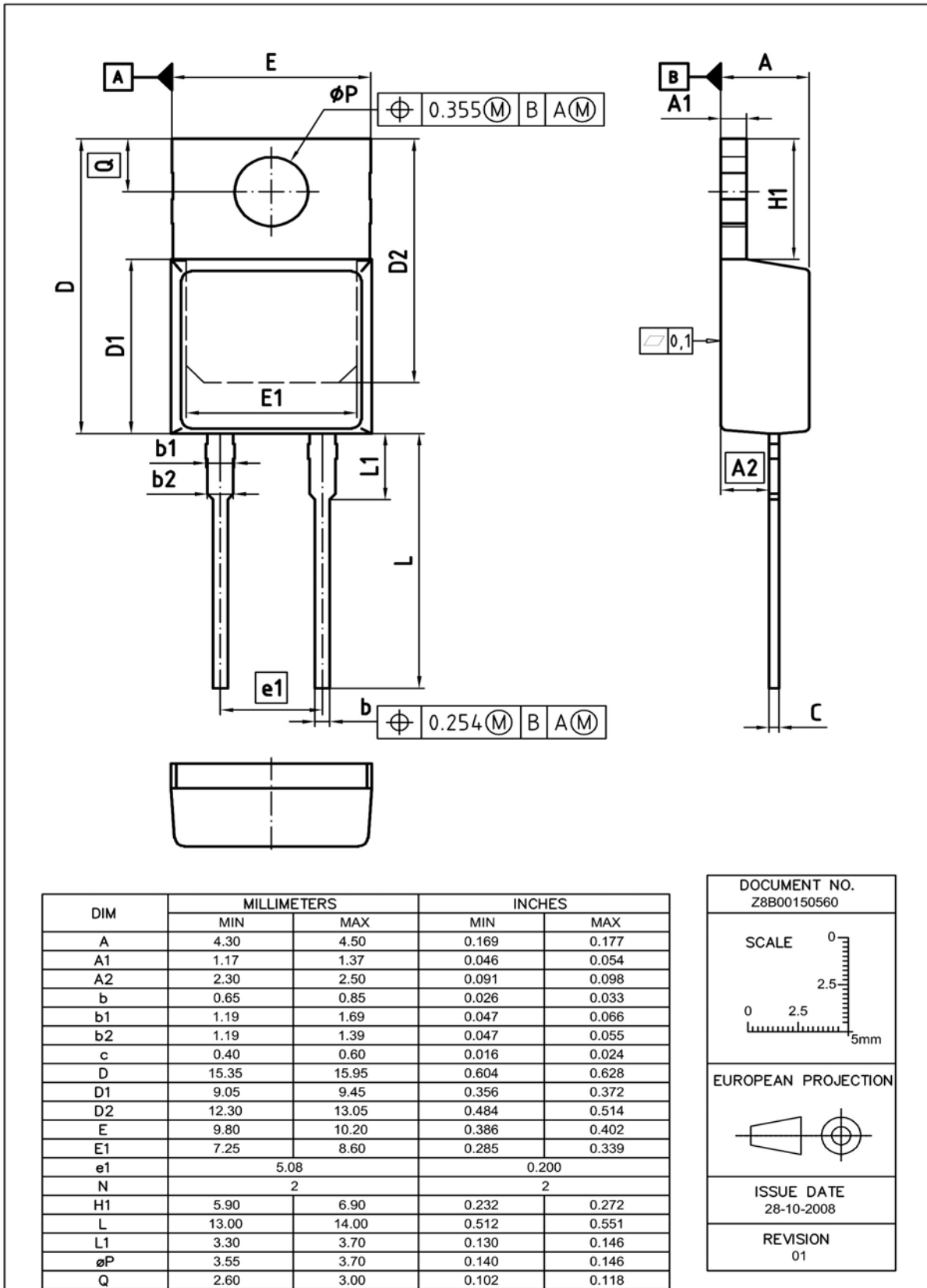


8 Typ. C stored energy

$E_C=f(V_R)$



PG-TO220-2: Outline



Dimensions in mm/inches

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thinQ!™ 2G Diode designed for fast switching applications like:

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