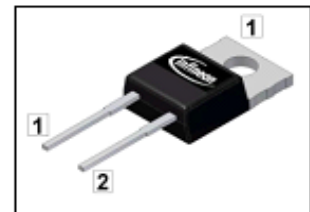


**thinQ!™ SiC Schottky Diode**
**Features**

- 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 JEDEC<sup>1)</sup> for target applications
- Optimized for high temperature operation
- Lowest Figure of Merit  $Q_C/I_F$

**Product Summary**

$V_{DC}$	1200	V
$Q_C$	18	nC
$I_F; T_C < 130\text{ °C}$	5	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
IDH05S120	PG-TO220-2	D05S120	C	A

**Maximum ratings**

Parameter	Symbol	Conditions	Value	Unit
Continuous forward current	$I_F$	$T_C < 130\text{ °C}$	5	A
Surge non-repetitive forward current, sine halfwave	$I_{F,SM}$	$T_C = 25\text{ °C}, t_p = 10\text{ ms}$	29	
		$T_C = 150\text{ °C}, t_p = 10\text{ ms}$	25	
Non-repetitive peak forward current	$I_{F,max}$	$T_C = 25\text{ °C}, t_p = 10\text{ }\mu\text{s}$	110	
$i^2t$ value	$\int i^2 dt$	$T_C = 25\text{ °C}, t_p = 10\text{ ms}$	4	A <sup>2</sup> s
		$T_C = 150\text{ °C}, t_p = 10\text{ ms}$	3	
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	$P_{tot}$	$T_C = 25\text{ °C}$	75	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	$R_{thJC}$		-	-	2	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	$V_F$	$I_F=5\text{ A}, T_j=25\text{ }^\circ\text{C}$	-	1,65	1,8	
		$I_F=5\text{ A}, T_j=150\text{ }^\circ\text{C}$	-	2,55	-	
Reverse current	$I_R$	$V_R=1200\text{ V}, T_j=25\text{ }^\circ\text{C}$	-	5	120	$\mu\text{A}$
		$V_R=1200\text{ V}, T_j=150\text{ }^\circ\text{C}$	-	20	1000	

**AC characteristics**

Total capacitive charge	$Q_c$	$V_R=400\text{ V}, I_F \leq I_{F,max},$ $di_F/dt=200\text{ A}/\mu\text{s},$ $T_j=150\text{ }^\circ\text{C}$	-	18	-	nC
Switching time <sup>2)</sup>	$t_c$		-	-	<10	ns
Total capacitance	C	$V_R=1\text{ V}, f=1\text{ MHz}$	-	250	-	pF
		$V_R=300\text{ V}, f=1\text{ MHz}$	-	20	-	
		$V_R=600\text{ V}, f=1\text{ MHz}$	-	18	-	

<sup>1)</sup> J-STD20 and JESD22

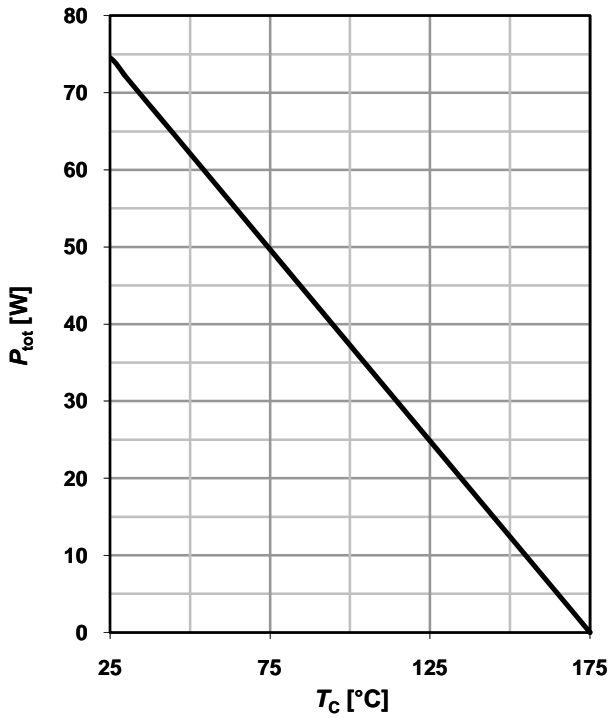
<sup>2)</sup>  $t_c$  is the time constant for the capacitive displacement current waveform (independent from  $T_j$ ,  $I_{LOAD}$  and  $di/dt$ ), different from  $t_{rr}$  which is dependent on  $T_j$ ,  $I_{LOAD}$  and  $di/dt$ . No reverse recovery time constant  $t_{rr}$  due to absence of minority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

<sup>3)</sup> Under worst case  $Z_{th}$  conditions.

<sup>4)</sup> Only capacitive charge occurring, guaranteed by design

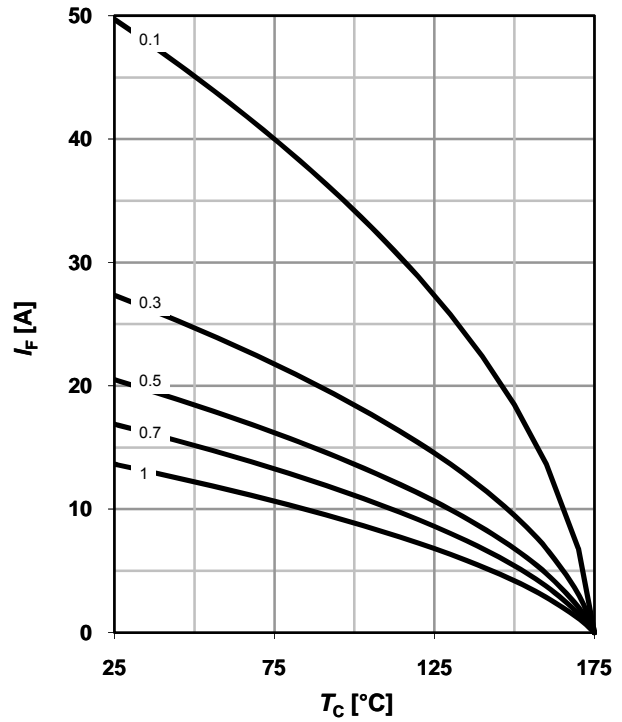
**1 Power dissipation**

$P_{tot}=f(T_C)$



**2 Diode forward current**

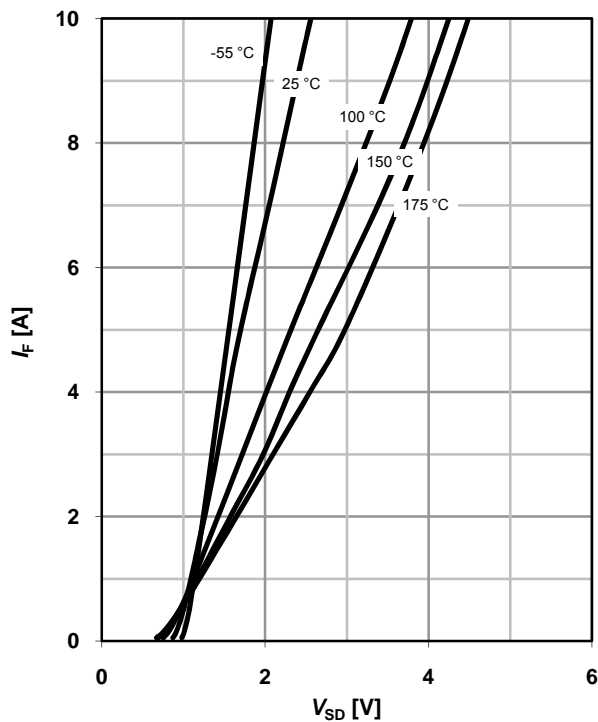
$I_F=f(T_C)^3$ ;  $T_j \leq 175\text{ °C}$ ; parameter:  $D = t_p/T$



**3 Typ. forward characteristic**

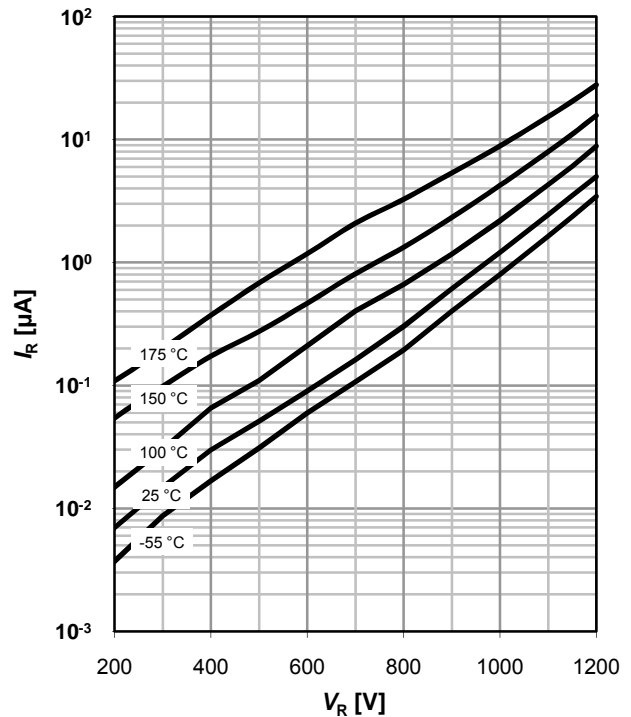
$I_F=f(V_F)$ ;  $t_p=400\text{ }\mu\text{s}$

parameter:  $T_j$



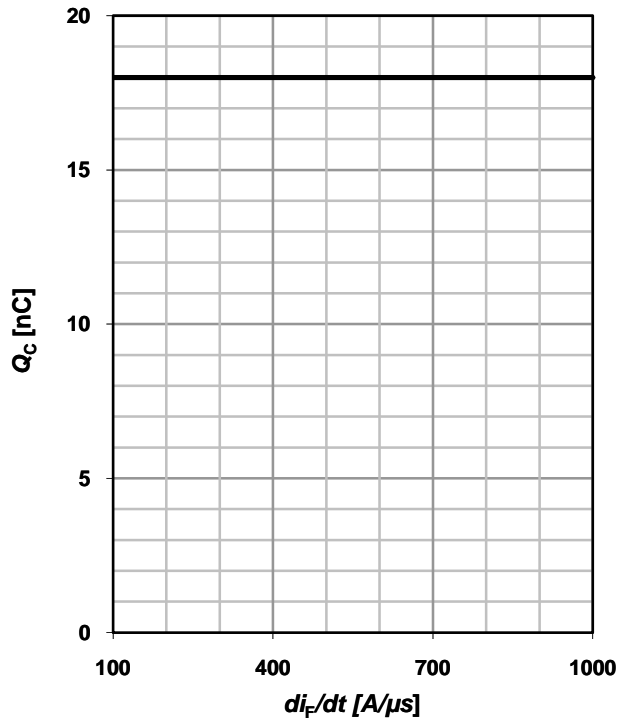
**4 Typ. Reverse current vs. reverse voltage**

$E_C=f(V_R)$



**5 Typ. capacitance charge vs. current slope**

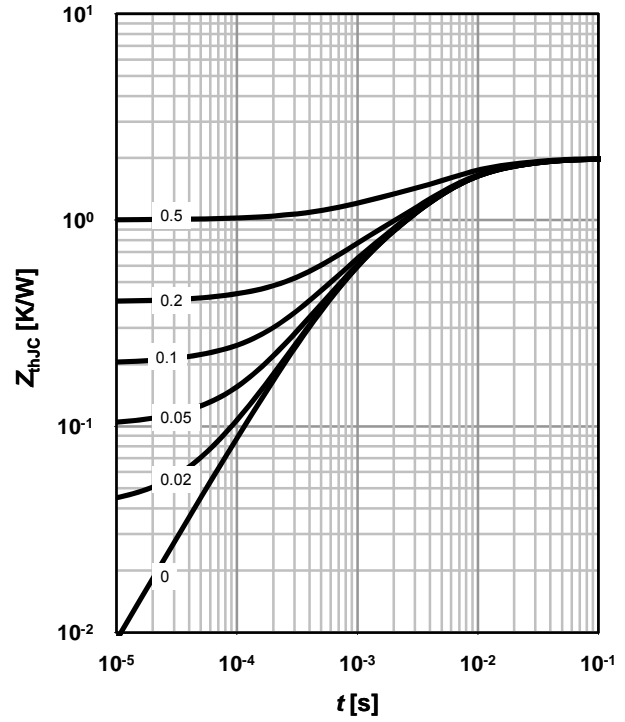
$Q_C=f(di_F/dt)^4$ ;  $T_j=150\text{ }^\circ\text{C}$ ;  $I_F \leq I_{F,max}$



**6 Transient thermal impedance**

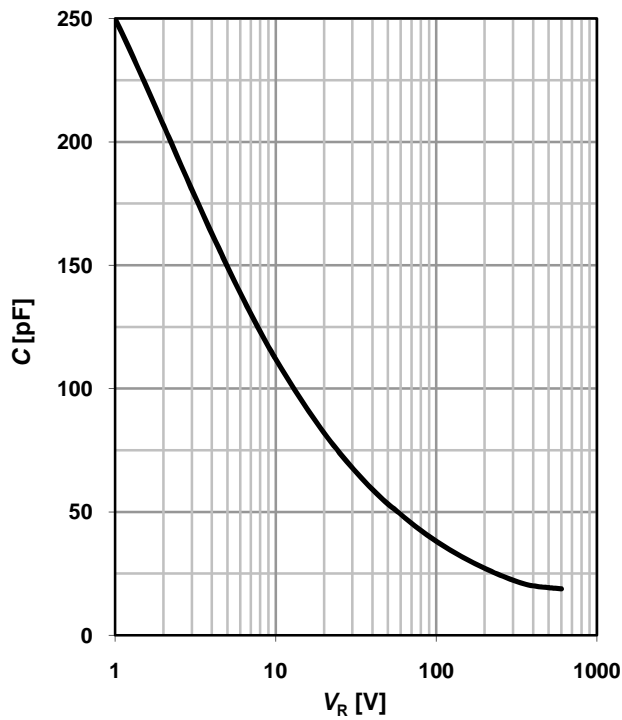
$Z_{thJC}=f(t_p)$

parameter:  $D=t_p/T$



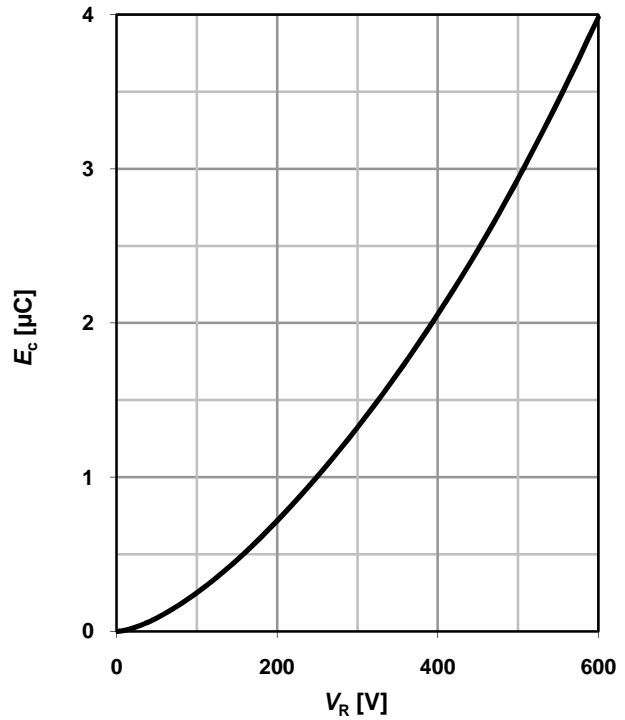
**7 Typ. capacitance vs. reverse voltage**

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

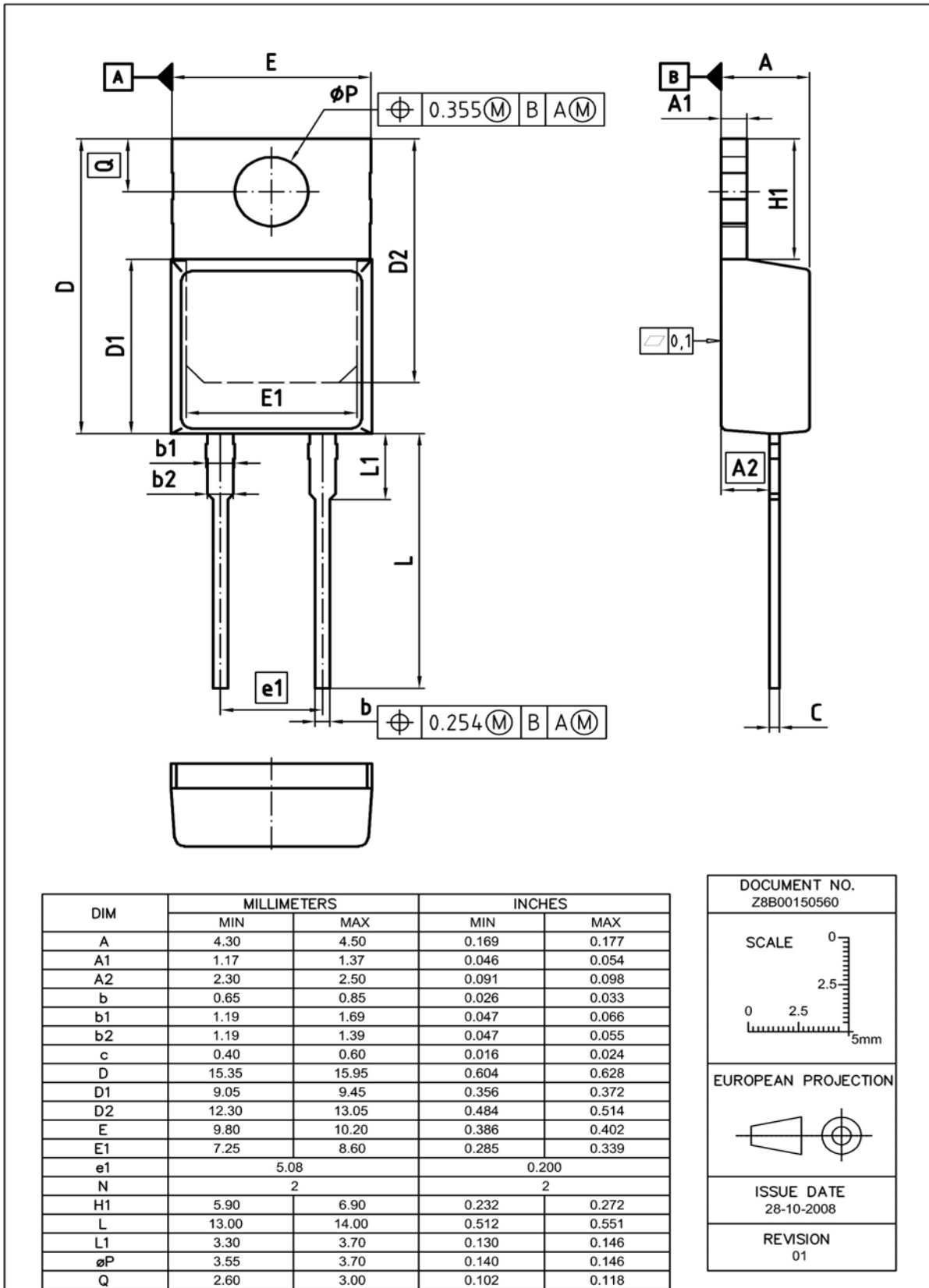


**8 Typ. C stored energy**

$E_C=f(V_R)$



PG-TO220-2: Outline



Dimensions in mm/inches

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