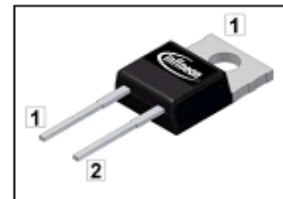


thinQ!™ SiC Schottky Diode
Features

- 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	54	nC
$I_F; T_C < 130\text{ °C}$	15	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
IDH15S120	PG-TO220-2	D15S120	C	A

Maximum ratings

Parameter	Symbol	Conditions	Value	Unit
Continuous forward current	I_F	$T_C < 130\text{ °C}$	15	A
Surge non-repetitive forward current, sine halfwave	$I_{F,SM}$	$T_C = 25\text{ °C}, t_p = 10\text{ ms}$	78	
		$T_C = 150\text{ °C}, t_p = 10\text{ ms}$	66	
Non-repetitive peak forward current	$I_{F,max}$	$T_C = 25\text{ °C}, t_p = 10\text{ }\mu\text{s}$	300	
i^2t value	$\int i^2 dt$	$T_C = 25\text{ °C}, t_p = 10\text{ ms}$	30	A^2s
		$T_C = 150\text{ °C}, t_p = 10\text{ ms}$	20	
Repetitive peak reverse voltage	V_{RRM}	$T_j = 25\text{ °C}$	1200	V
Diode dv/dt ruggedness	dv/dt	$V_R = 0 \dots 480\text{ V}$	50	V/ns
Power dissipation	P_{tot}	$T_C = 25\text{ °C}$	187.5	W
Operating and storage temperature	T_j, T_{stg}		-55 ... 175	°C
Mounting torque		M3 and M3.5 screws	60	Ncm

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Thermal characteristics

Thermal resistance, junction - case	R_{thJC}		-	-	0.8	K/W
Thermal resistance, junction - ambient	R_{thJA}	Thermal resistance, junction- ambient, leaded	-	-	62	
Soldering temperature, wavesoldering only allowed at leads	T_{sold}	1.6 mm (0.063 in.) from case for 10 s	-	-	260	°C

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

Diode forward voltage	V_F	$I_F=15\text{ A}$, $T_j=25\text{ °C}$	-	1.65	1.8	V
		$I_F=15\text{ A}$, $T_j=150\text{ °C}$	-	2.55	-	
Reverse current	I_R	$V_R=1200\text{ V}$, $T_j=25\text{ °C}$	-	15	360	μA
		$V_R=1200\text{ V}$, $T_j=150\text{ °C}$	-	60	1500	

AC characteristics

Total capacitive charge	Q_c	$V_R=400\text{ V}$, $I_F \leq I_{F,max}$, $di_F/dt=200\text{ A}/\mu\text{s}$,	-	54	-	nC
Switching time ²⁾	t_c	$T_j=150\text{ °C}$	-	-	<10	ns
Total capacitance	C	$V_R=1\text{ V}$, $f=1\text{ MHz}$	-	750	-	pF
		$V_R=300\text{ V}$, $f=1\text{ MHz}$	-	60	-	
		$V_R=600\text{ V}$, $f=1\text{ MHz}$	-	54	-	

¹⁾ J-STD20 and JESD22

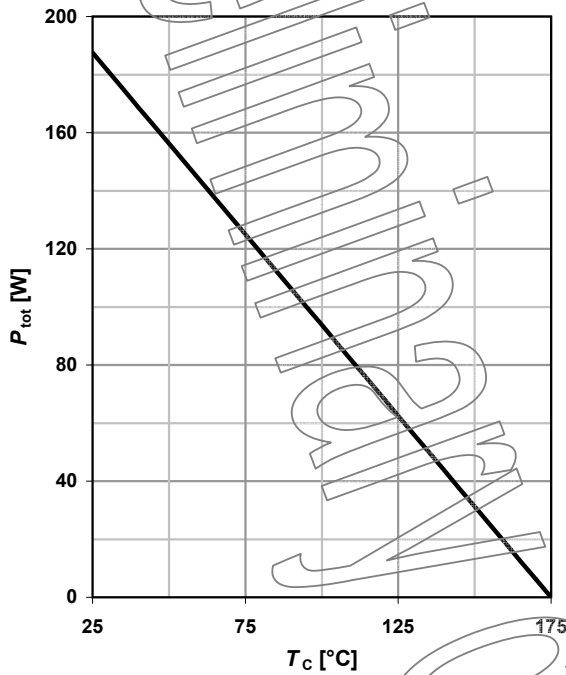
²⁾ t_c is the time constant for the capacitive displacement current waveform (independent from T_j , I_{LOAD} and di/dt), different from t_{rr} which is dependent on T_j , I_{LOAD} and di/dt . No reverse recovery time constant t_{rr} due to absence of minority carrier inje

³⁾ Under worst case Z_{th} conditions.

⁴⁾ Only capacitive charge occurring, guaranteed by design

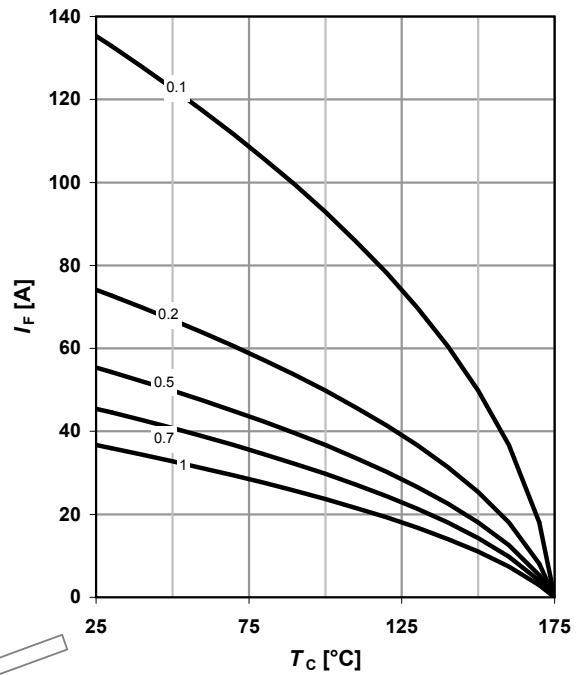
1 Power dissipation

$P_{tot}=f(T_C)$



2 Diode forward current

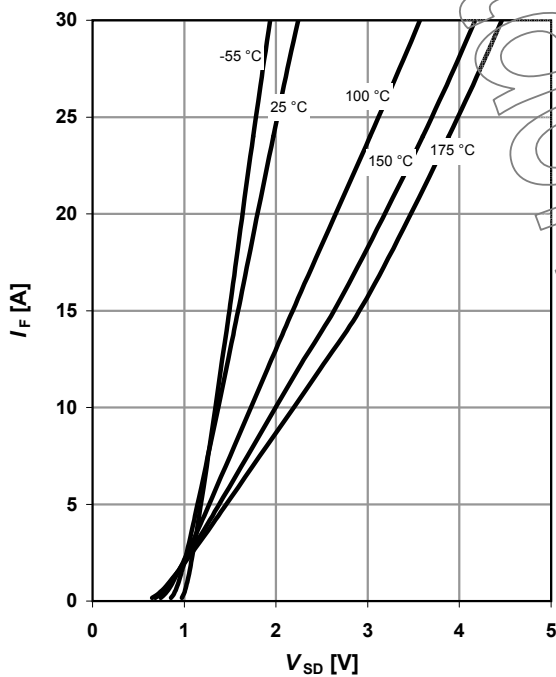
$I_F=f(T_C); T_j \leq 175\text{ °C}$



3 Typ. forward characteristic

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

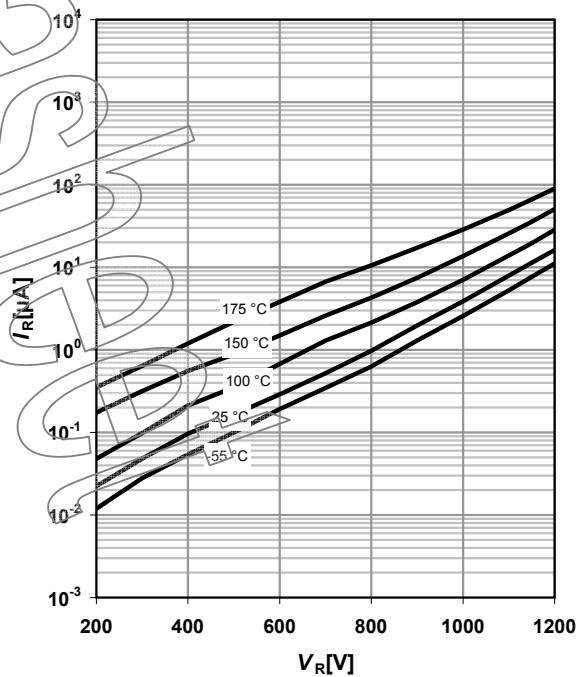
parameter: T_j



5 Typ. reverse current vs. reverse voltage

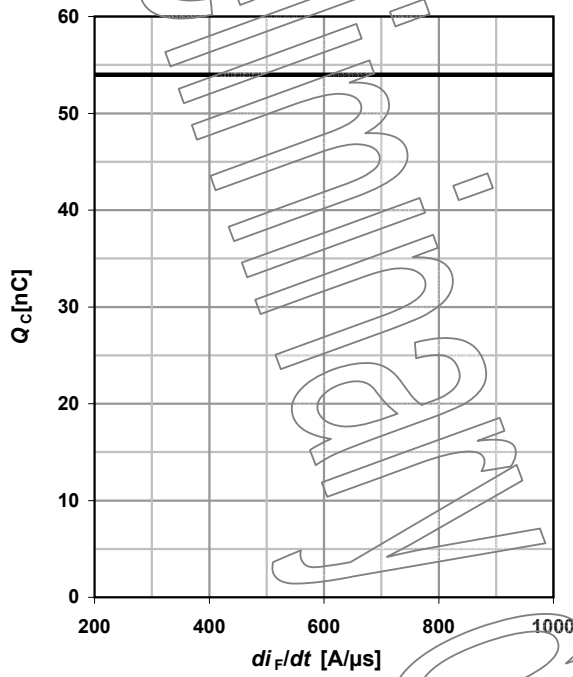
$I_R=f(V_R)$

parameter: T_j



5 Typ. capacitance charge vs. current slope

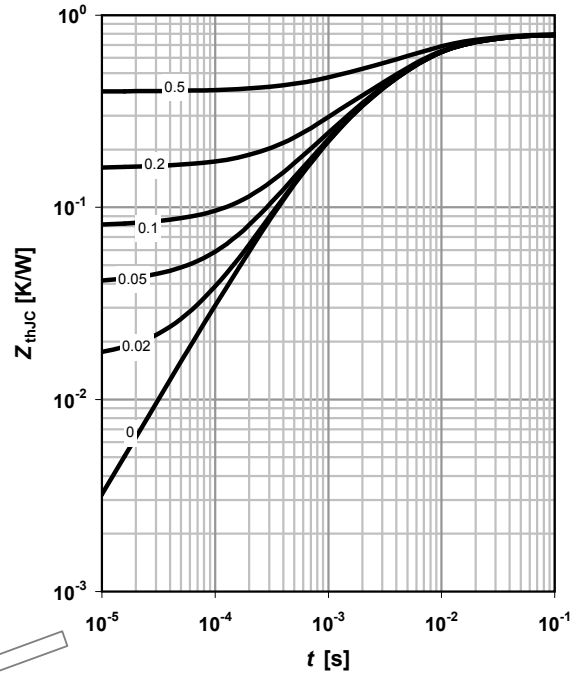
$Q_C = f(di_F/dt)^2; T_J = 150^\circ\text{C}$



6 Transient thermal impedance

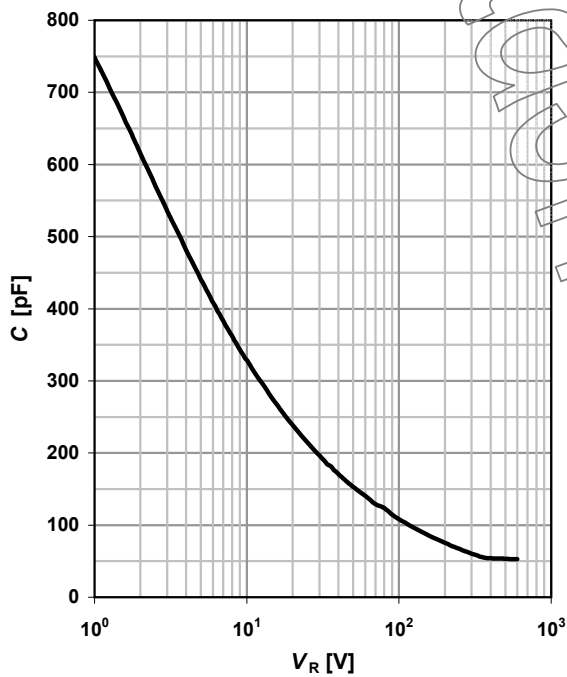
$Z_{thJC} = f(t_p)$

parameter: $D = t_p/T$



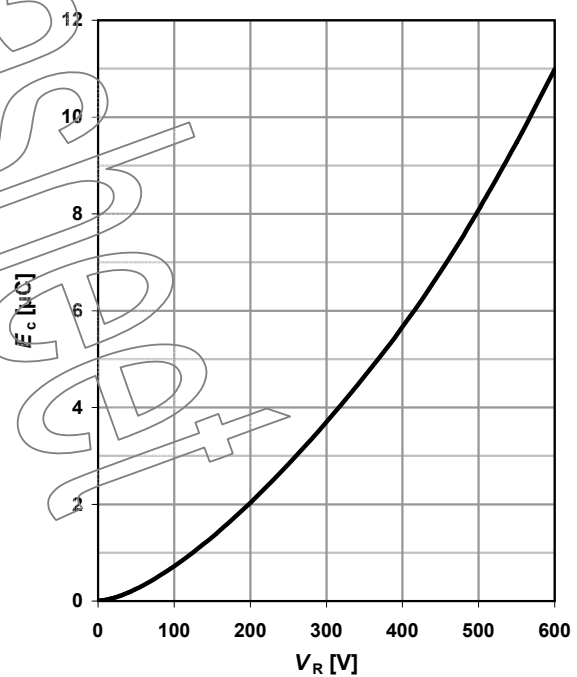
7 Typ. capacitance vs. reverse voltage

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

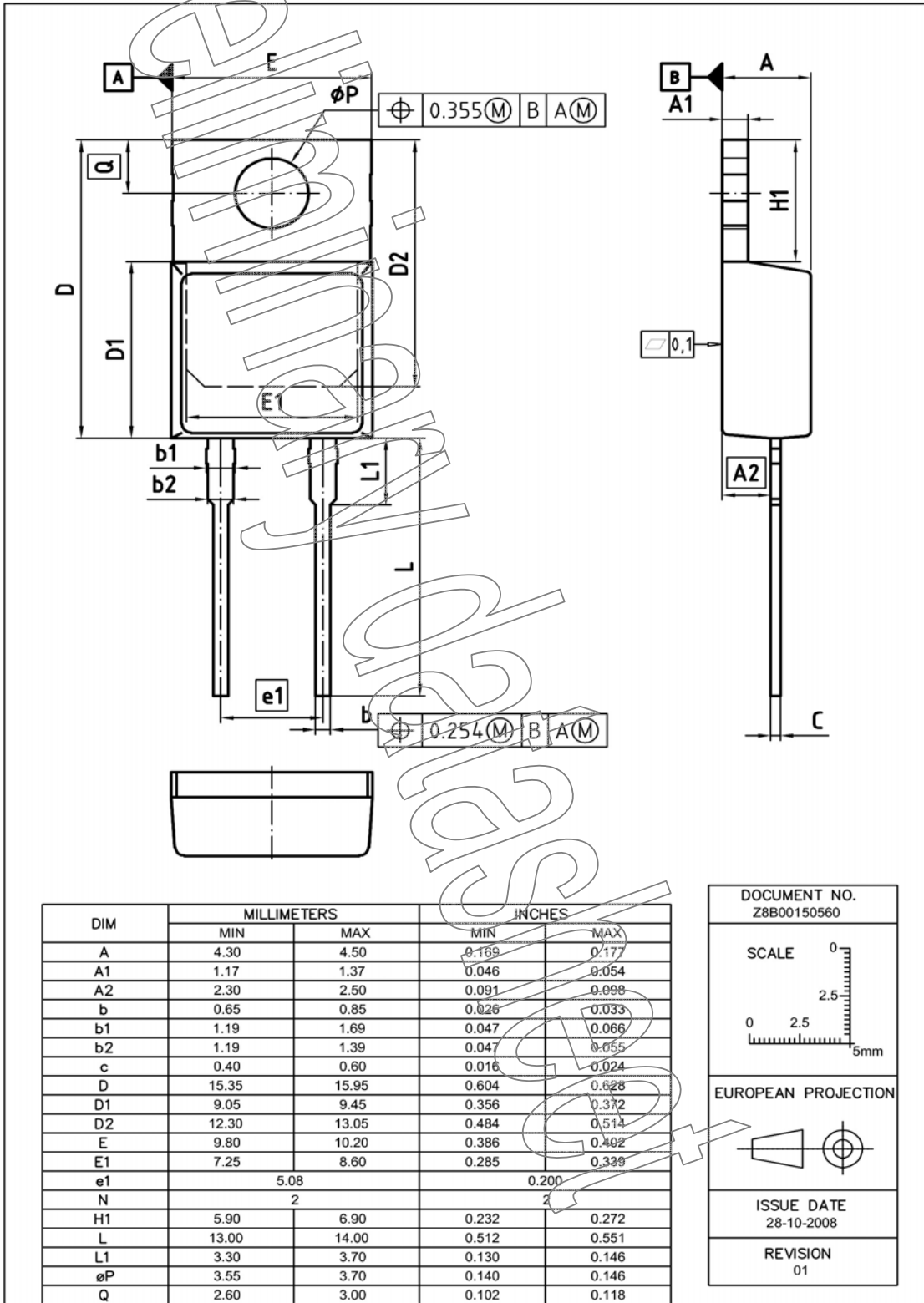


8 Typ. C stored energy

$E_C = f(V_R)$



PG-TO220-2: Outline



Dimensions in mm

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