3rd Generation thinQ!™ SiC Schottky Diode

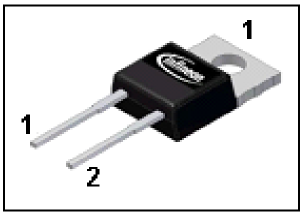
Features

- 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[1)] for target applications
- Breakdown voltage tested at 20mA[2)]
- Optimized for high temperature operation
- Lowest Figure of Merit Q_C/I_F

Product Summary

V_{DC}	600	V
Q_C	4.5	nC
I_F; T_C< 130 °C	4	A

PG-TO220-2



thinQ! 3G Diode designed for fast switching applications like:

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

Type	Package	Marking	Pin 1	Pin 2
IDH04SG60C	PG-TO220-2	D04G60C	C	A

Maximum ratings

Parameter	Symbol	Conditions	Value	Unit
Continuous forward current	I_F	T_C<130 °C	4	A
Surge non-repetitive forward current, sine halfwave	$I_{F,SM}$	T_C=25 °C, t_p=10 ms	18	
		T_C=150 °C, t_p=10 ms	13.5	
Non-repetitive peak forward current	$I_{F,max}$	T_C=25 °C, t_p=10 µs	120	
i^2t value	$\int i^2 dt$	T_C=25 °C, t_p=10 ms	1.8	A^2s
		T_C=150 °C, t_p=10 ms	0.93	
Repetitive peak reverse voltage	V_{RRM}	T_j=25 °C	600	V
Diode dv/dt ruggedness	dv/dt	V_R= 0….480 V	50	V/ns
Power dissipation	P_{tot}	T_C=25 °C	43	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	Ncm

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance, junction - case	R_{thJC}		-	-	3.5	K/W
Thermal resistance, junction - ambient	R_{thJA}	Thermal resistance, junction- ambient, leaded	-	-	62	

Electrical characteristics, at T_j=25 °C, unless otherwise specified

Parameter	Symbol	Conditions	min.	typ.	max.	Unit
Static characteristics						
DC blocking voltage	V_{DC}	I_R=0.05 mA, T_j=25 °C	600	-	-	V
Diode forward voltage	V_F	I_F=4 A, T_j=25 °C	-	2.1	2.3	
		I_F=4 A, T_j=150 °C	-	2.8	-	
Reverse current	I_R	V_R=600 V, T_j=25 °C	-	0.3	25	µA
		V_R=600 V, T_j=150 °C	-	1.3	270	
AC characteristics						
Total capacitive charge	Q_c	V_R=400 V, $I_F \leq I_{F,max}$, di_F/dt=200 A/µs, T_j=150 °C	-	4.5	-	nC
Switching time[3]	t_c		-	-	<10	ns
Total capacitance	C	V_R=1 V, f=1 MHz	-	80	-	pF
		V_R=300 V, f=1 MHz	-	10	-	
		V_R=600 V, f=1 MHz	-	10	-	

[1] J-STD20 and JESD22

[2] All devices tested under avalanche conditions, for a time periode of 10ms, at 20mA.

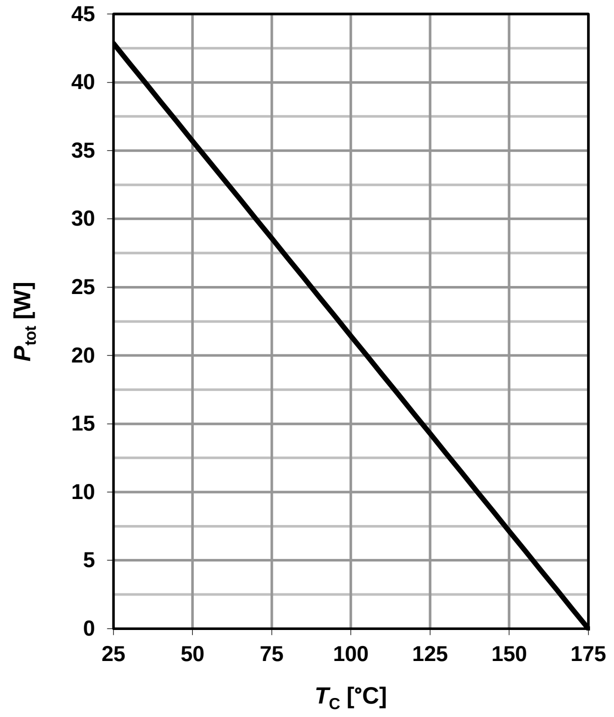
[3] t_c is the time constant for the capacitive displacement current waveform (independent from T_j, I_{LOAD} and di/dt), different from t_{rr} which is dependent on T_j, I_{LOAD} and di/dt. No reverse recovery time constant t_{rr} due to absence of minority carrier injection.

[4] Under worst case Z_{th} conditions.

[5] Only capacitive charge occuring, guaranteed by design.

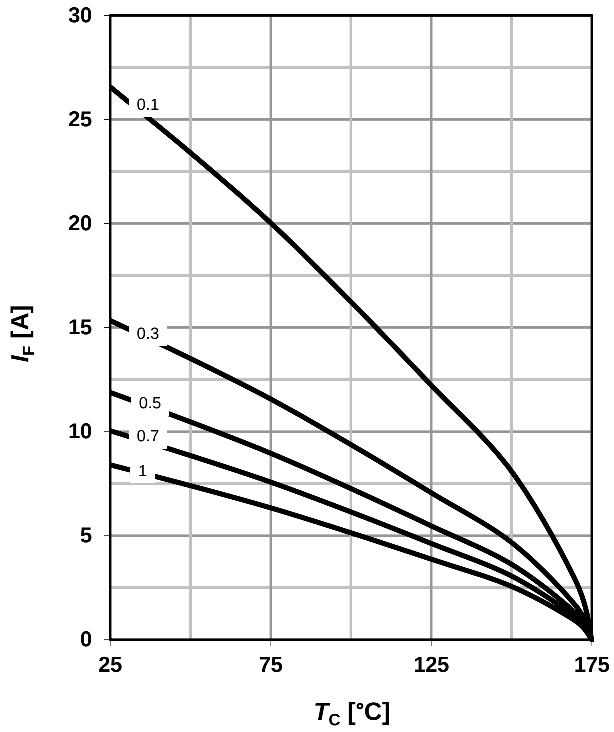
1 Power dissipation

P_{tot}=f(T_C); parameter: $R_{thJC(max)}$



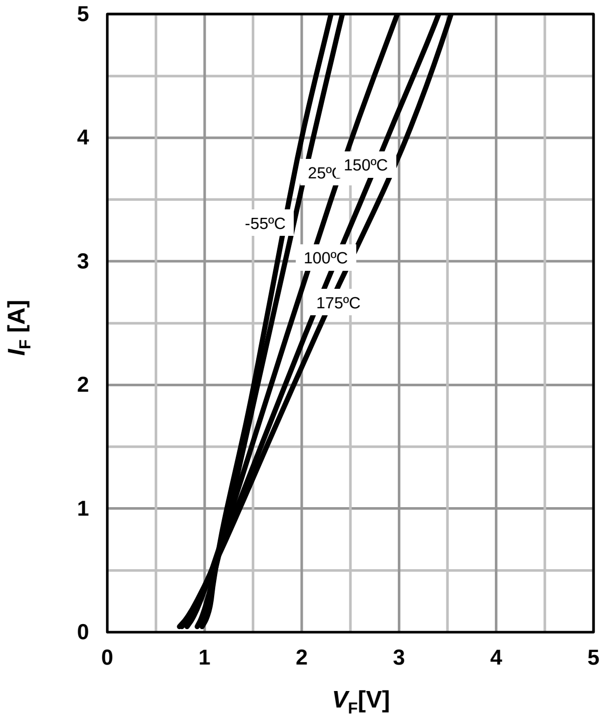
2 Diode forward current

I_F=f(T_C)[4]; T_j≤175 °C; parameter: $D = t_p/T$



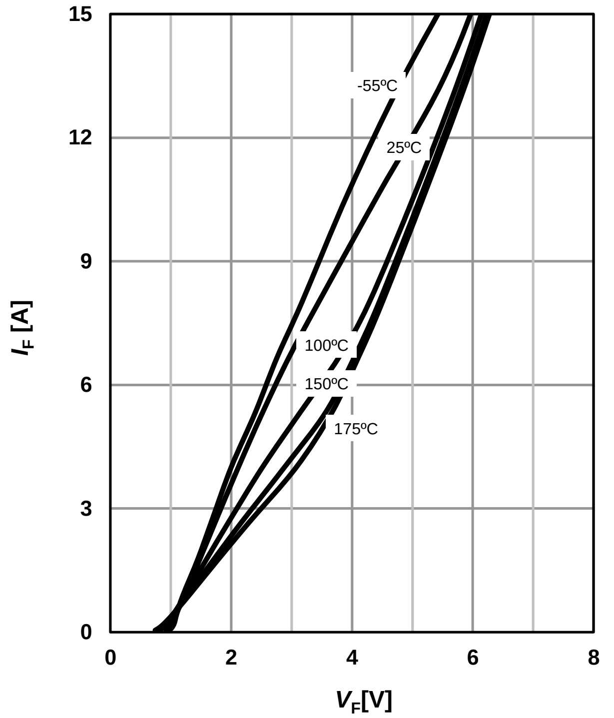
3 Typ. forward characteristic

I_F=f(V_F); t_p=400 µs; parameter: T_j



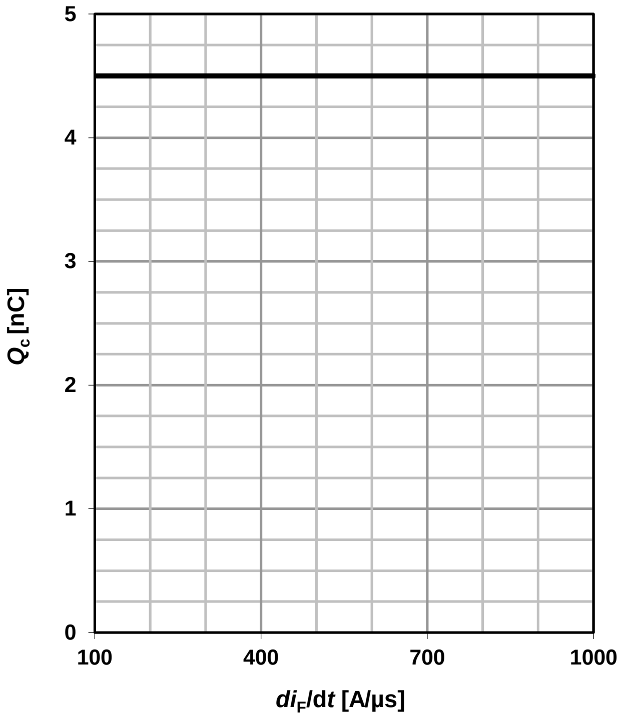
4 Typ. forward characteristic in surge current mode

I_F=f(V_F); t_p=400 µs; parameter: T_j



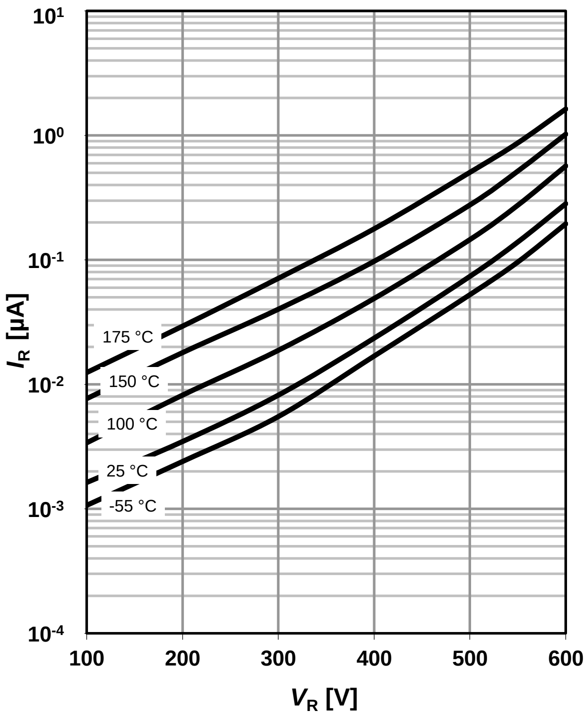
5 Typ. capacitance charge vs. current slope

$Q_C = f(di_F/dt)^{5)}$; $I_F \leq I_{F,max}$



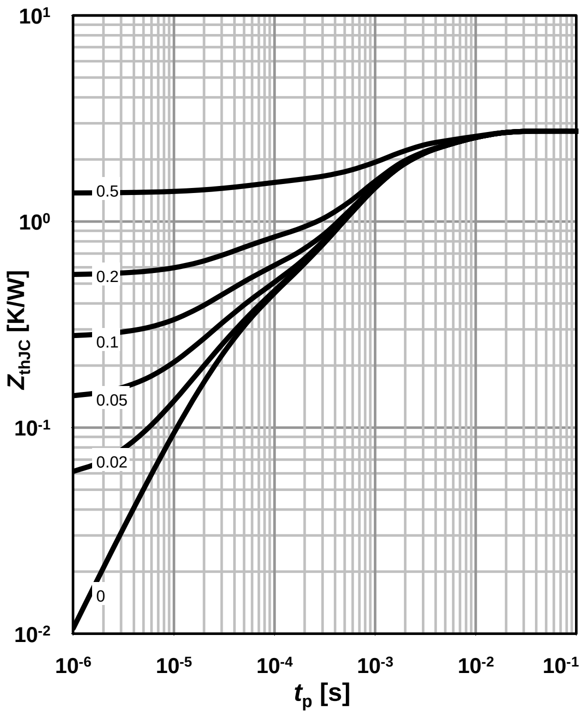
6 Typ. reverse current vs. reverse voltage

$I_R = f(V_R)$; parameter: T_j



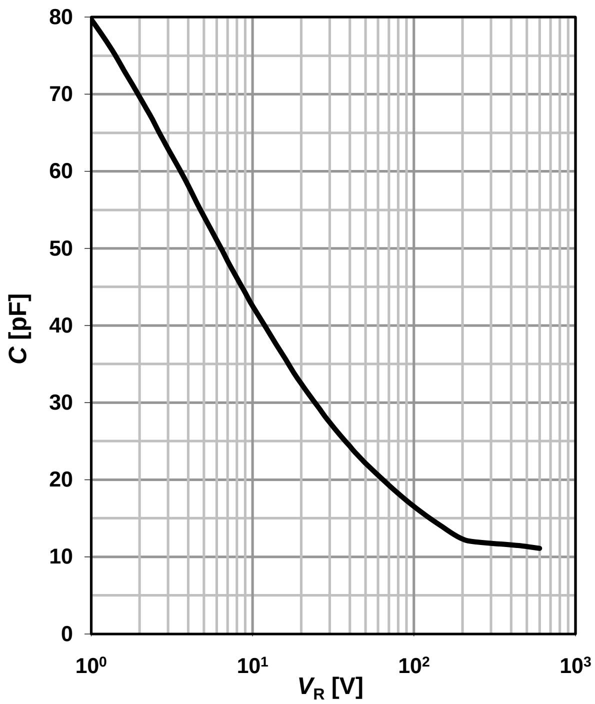
7 Transient thermal impedance

$Z_{thJC} = f(t_p)$; parameter: $D = t_P/T$



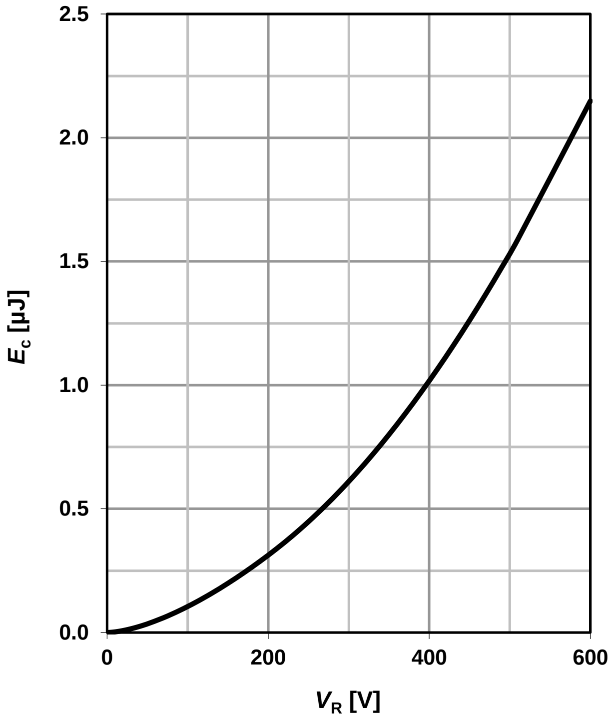
8 Typ. capacitance vs. reverse voltage

$C = f(V_R)$; $T_C = 25$ °C, $f = 1$ MHz

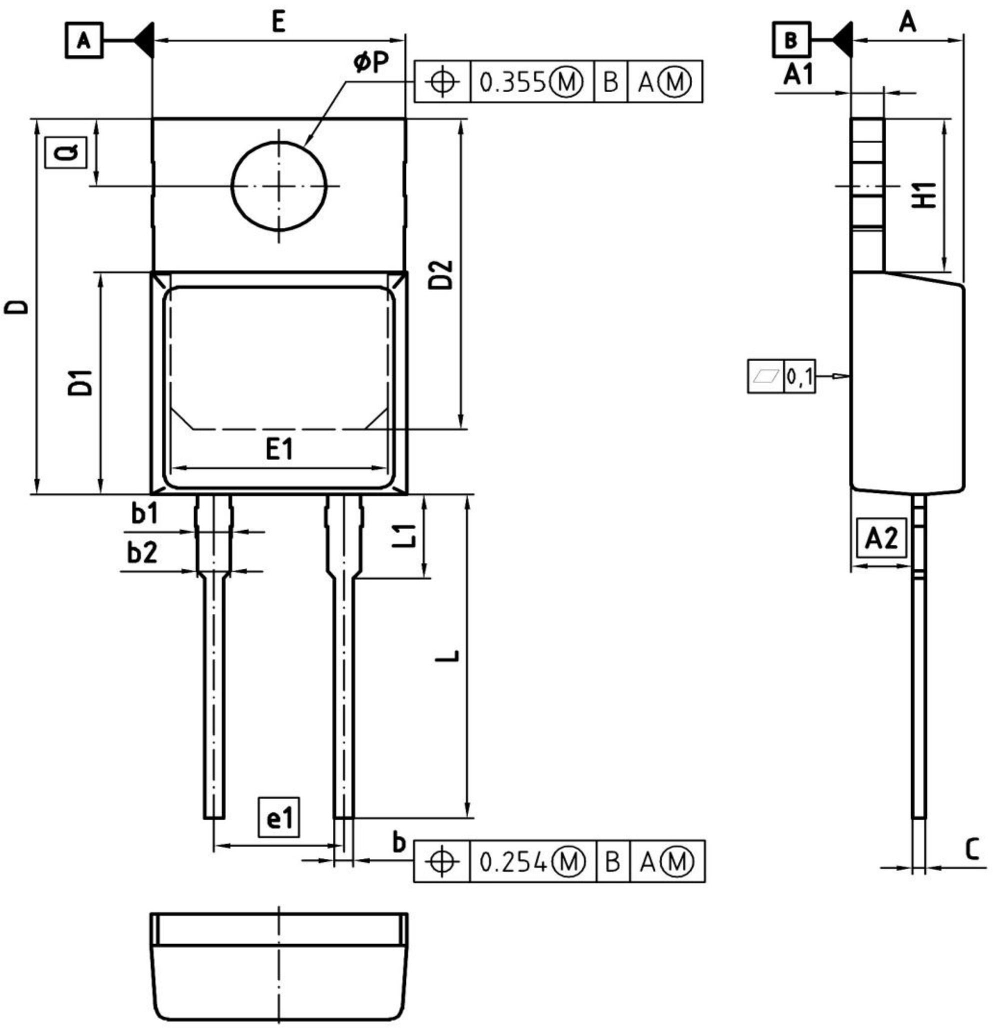


9 Typ. C stored energy

E_C=f(V_R)



PG-TO220-2: Outline



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.50	0.169	0.177
A1	1.17	1.37	0.046	0.054
A2	2.30	2.50	0.091	0.098
b	0.65	0.85	0.026	0.033
b1	1.19	1.69	0.047	0.066
b2	1.19	1.39	0.047	0.055
c	0.40	0.60	0.016	0.024
D	15.35	15.95	0.604	0.628
D1	9.05	9.45	0.356	0.372
D2	12.30	13.05	0.484	0.514
E	9.80	10.20	0.386	0.402
E1	7.25	8.60	0.285	0.339
e1	5.08		0.200	
N	2		2	
H1	5.90	6.90	0.232	0.272
L	13.00	14.00	0.512	0.551
L1	3.30	3.70	0.130	0.146
øP	3.55	3.70	0.140	0.146
Q	2.60	3.00	0.102	0.118

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01

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