2^{nd} Generation thinQ!™ SiC Schottky Diode

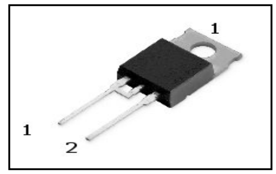
Features

- Revolutionary semiconductor material - Silicon Carbide
- Switching behavior benchmark
- No reverse recovery/ No forward recovery
- No temperature influence on the switching behavior
- High surge current capability
- Pb-free lead plating; RoHS compliant
- Qualified according to JEDEC[1)] for target applications
- Breakdown voltage tested at 5mA[2)]

Product Summary

V_{DC}	600	V
Q_c	30	nC
I_F	12	A

PG-TO220-2-2



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

- CCM PFC
- Motor Drives

Type	Package		Marking	Pin 1	Pin 2
IDT12S60C	PG-TO220-2-2		D12S60C	C	A

Maximum ratings, at T_j=25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Continuous forward current	I_F	T_C<140 °C	12	A
RMS forward current	$I_{F,RMS}$	f=50 Hz	18	
Surge non-repetitive forward current, sine halfwave	$I_{F,SM}$	T_C=25 °C, t_p=10 ms	98	
Repetitive peak forward current	$I_{F,RM}$	T_j=150 °C, T_C=100 °C, D=0.1	49	
Non-repetitive peak forward current	$I_{F,max}$	T_C=25 °C, t_p=10 µs	410	
i²t value	$\int i^2 dt$	T_C=25 °C, t_p=10 ms	48	A^2s
Repetitive peak reverse voltage	V_{RRM}		600	V
Diode ruggedness dv/dt	dv/dt	V_R=0…480V	50	V/ns
Power dissipation	P_{tot}	T_C=25 °C	115	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}		-	-	1.3	K/W
Thermal resistance, junction - ambient	R_{thJA}	leaded	-	-	62	
Soldering temperature, wavesoldering only allowed at leads	T_{sold}	1.6mm(0.063 in.) from case for 10s	-	-	260	°C
Electrical characteristics, at T_j=25 °C, unless otherwise specified						
Static characteristics						
DC blocking voltage	V_{DC}	I_R=0.16 mA	600	-	-	V
Diode forward voltage	V_F	I_F=12 A, T_j=25 °C	-	1.5	1.7	
		I_F=12 A, T_j=150 °C	-	1.7	2.1	
Reverse current	I_R	V_R=600 V, T_j=25 °C	-	1.5	160	µA
		V_R=600 V, T_j=150 °C	-	6	1600	
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	-	30	-	nC
Switching time[3]	t_c		-	-	<10	ns
Total capacitance	C	V_R=1 V, f=1 MHz	-	530	-	pF
		V_R=300 V, f=1 MHz	-	70	-	
		V_R=600 V, f=1 MHz	-	70	-	

[1] J-STD20 and JESD22

[2] All devices tested under avalanche conditions, for a time periode of 5ms, at 5mA.

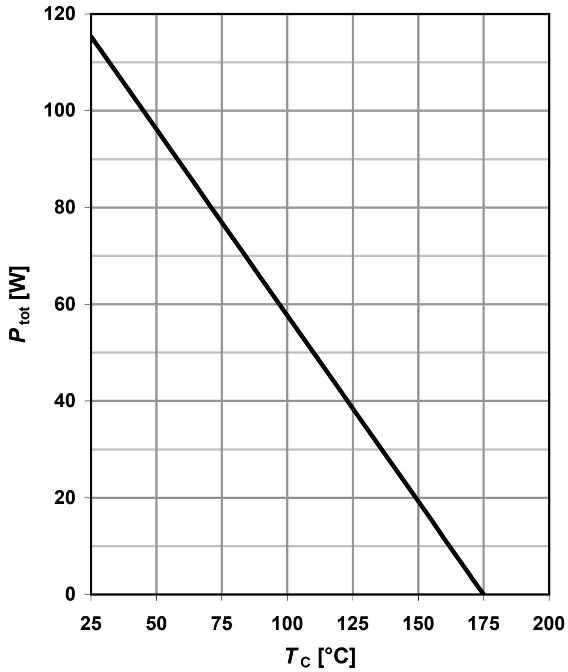
[3] t_c is the time constant for the capacitive displacement current waveform (independent from T_j, I_{LOAD} and di/dt), different from t_{rr}, which is dependent on T_j, I_{LOAD}, di/dt. No reverse recovery time constant t_{rr} due to absence of minority carrier injection.

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

1 Power dissipation

P_{tot}=f(T_C)

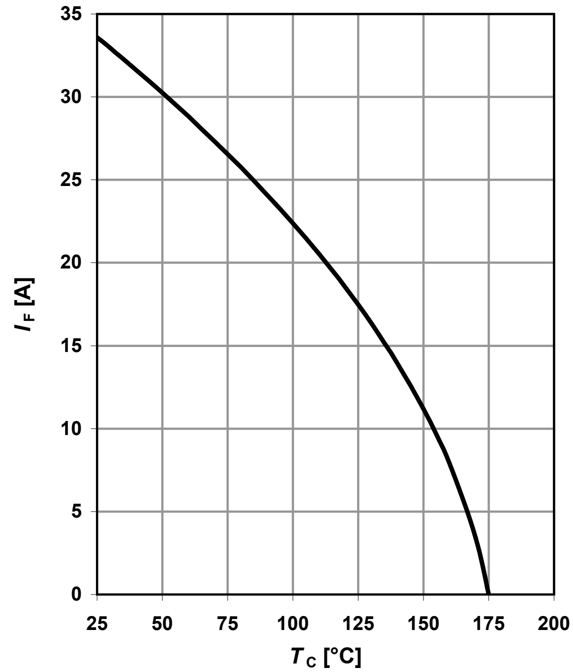
parameter: $R_{thJC(max)}$



2 Diode forward current

I_F=f(T_C); T_j≤175 °C

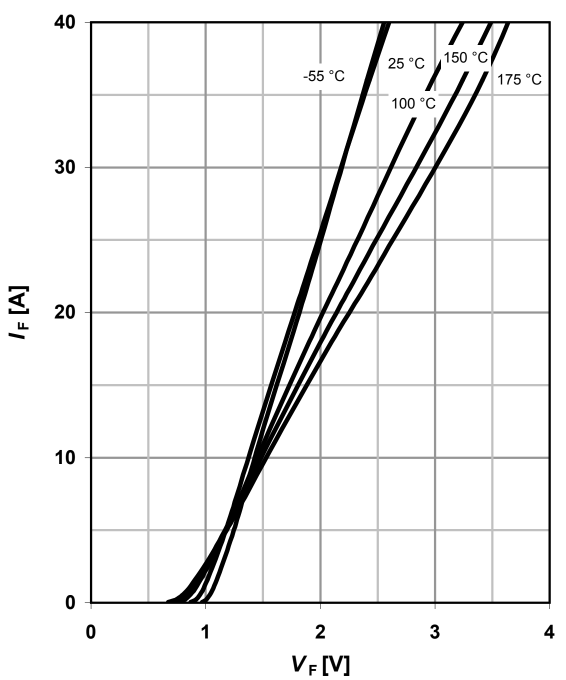
parameter. $R_{thJC(max)}$; $V_{F(max)}$



3 Typ. forward characteristic

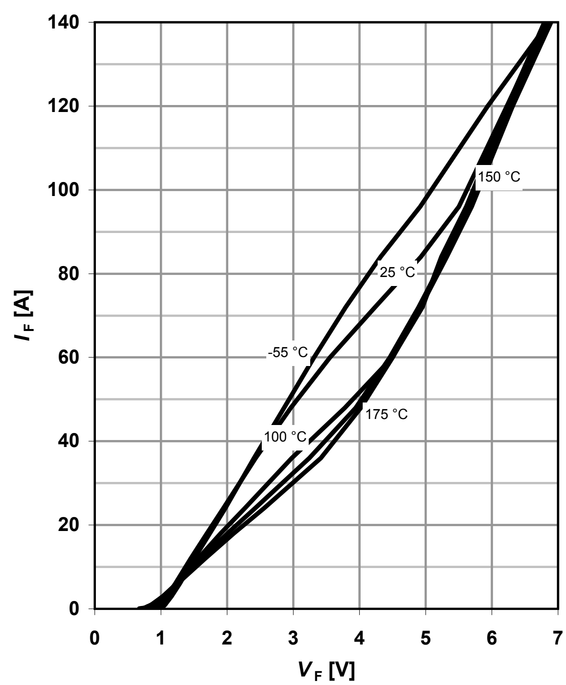
I_F=f(V_F); t_p=400 µs

parameter: T_j



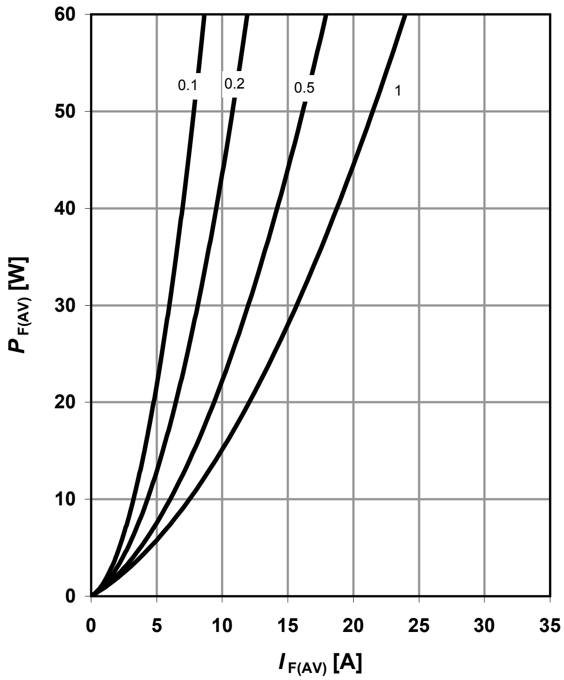
4 Typ. forward characteristic in surge current mode

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



5 Typ. forward power dissipation vs. average forward current

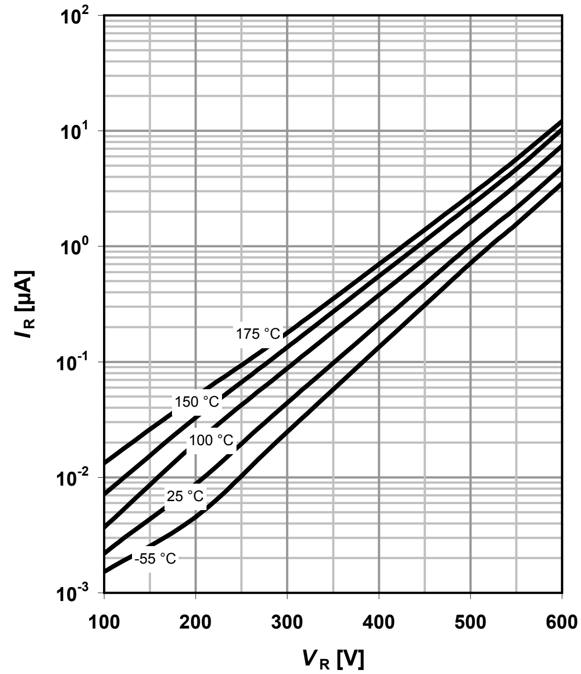
$P_{F,AV}$=f(I_F), T_C=100 °C, parameter: $D=t_p/T$



6 Typ. reverse current vs. reverse voltage

I_R=f(V_R)

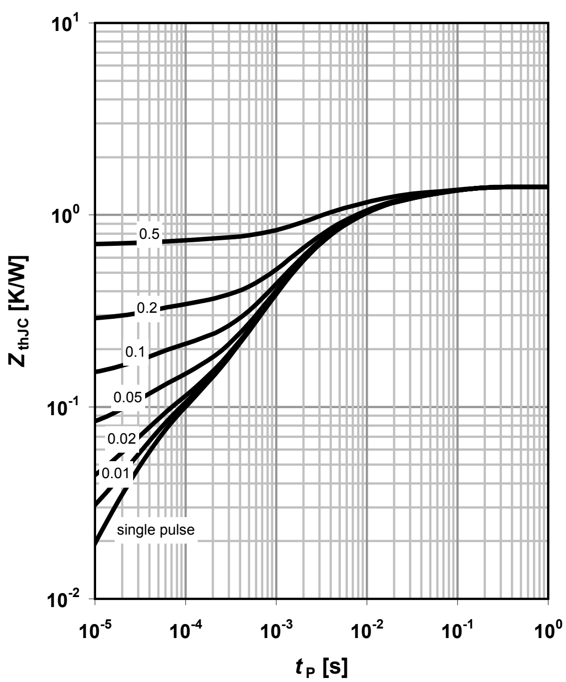
parameter: T_j



7 Transient thermal impedance

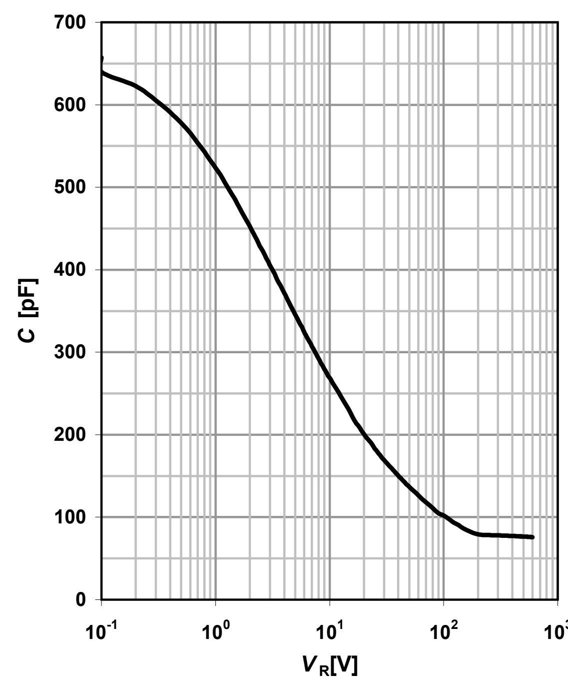
Z_{thJC}=f(t_p)

parameter: $D=t_p/T$



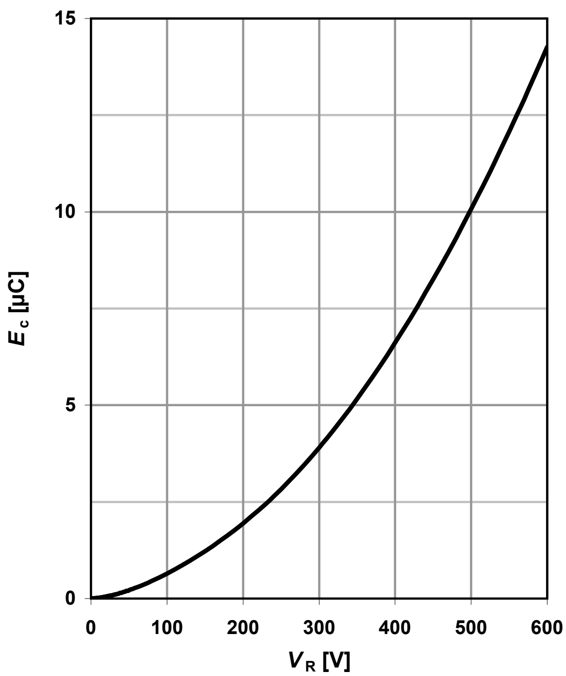
8 Typ. capacitance vs. reverse voltage

C=f(V_R); T_C=25 °C, f=1 MHz



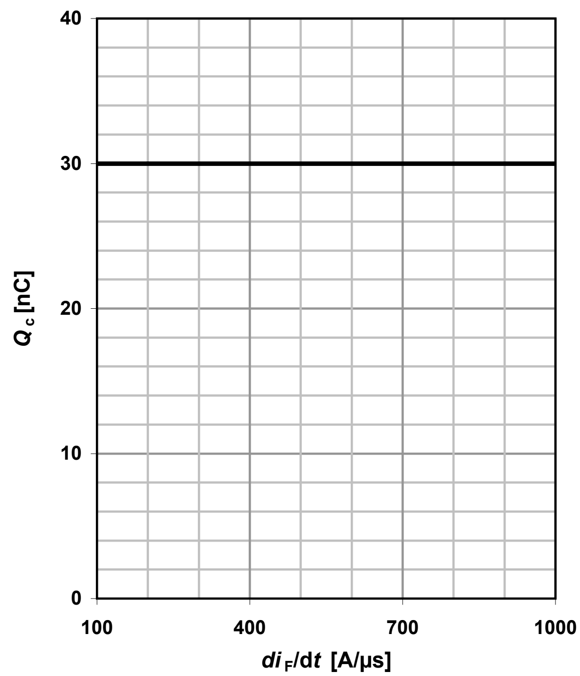
9 Typ. C stored energy

E_C=f(V_R)

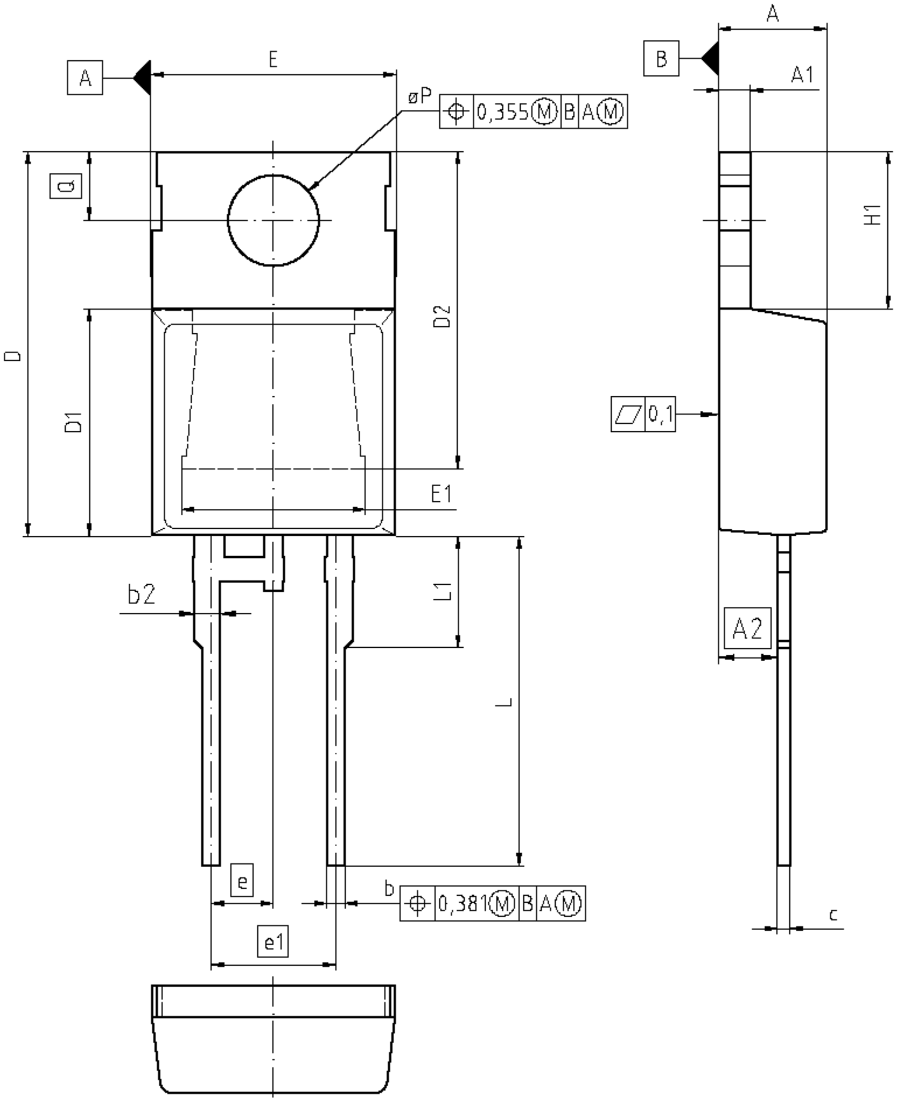


10 Typ. capacitance charge vs. current slope

Q_C=f(di_F/dt)[4]; T_j=150 °C; $I_F \leq I_{F,max}$



PG-TO220-2-2: Outline



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.191	4.699	0.165	0.185
A1	1.170	1.400	0.046	0.055
A2	2.215	2.718	0.087	0.107
b	0.635	0.889	0.025	0.035
b2	0.950	1.651	0.037	0.065
c	0.330	0.635	0.013	0.025
D	14.808	15.950	0.583	0.628
D1	8.509	9.450	0.335	0.372
D2	12.850	14.245	0.506	0.561
E	9.677	10.363	0.381	0.408
E1	6.500	8.788	0.256	0.346
e	2.540		0.100	
e1	5.080		0.200	
N	2		2	
H1	5.900	6.900	0.232	0.272
L	12.700	14.000	0.500	0.551
L1	3.048	4.800	0.120	0.189
øP	3.550	3.886	0.140	0.153
Q	2.540	3.048	0.100	0.120

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