2nd Generation thinQ!™ SiC Schottky Diode

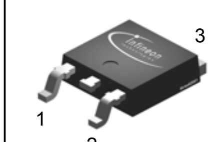
Product Summary

V_{DC}	600	V
Q_c	8	nC
I_F	4	A

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)]

PG-TO252



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

- CCM PFC
- Motor Drives

Type	Package	Marking	Pin 1	Pin 2	Pin 3
IDD04S60C	PG-TO252	D04S60C	n.c.	A	C

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

Parameter	Symbol	Conditions	Value	Unit
Continuous forward current	I_F	T_C<130 °C	4	A
RMS forward current	$I_{F,RMS}$	f=50 Hz	5.6	
Surge non-repetitive forward current, sine halfwave	$I_{F,SM}$	T_C=25 °C, t_p=10 ms	32	
Repetitive peak forward current	$I_{F,RM}$	T_j=150 °C, T_C=100 °C, D=0.1	18	
Non-repetitive peak forward current	$I_{F,max}$	T_C=25 °C, t_p=10 µs	132	
i^2t value	$\int i^2 dt$	T_C=25 °C, t_p=10 ms	5.1	A^2s
Repetitive peak reverse voltage	V_{RRM}		600	V
Diode dv/dt ruggedness	dv/dt	V_R = 0….480V	50	V/ns
Power dissipation	P_{tot}	T_C=25 °C	37	W
Operating and storage temperature	T_j, T_{stg}		-55 ... 175	°C

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance, junction - case	R_{thJC}		-	-	4.1	K/W
Thermal resistance, junction - ambient	R_{thJA}	SMD version, device on PCB, minmal footprint	-	-	75	
		SMD Version, device on PCB, 6 cm^2 cooling[3)]	-	-	50	
Soldering temperature reflowsoldering	T_{sold}	reflow MSL 3	-	-	260	°C

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	600	-	-	V
Diode forward voltage	V_F	I_F=4 A, T_j=25 °C	-	1.7	1.9	
		I_F=4 A, T_j=150 °C	-	2	2.4	
Reverse current	I_R	V_R=600 V, T_j=25 °C	-	0.5	50	µA
		V_R=600 V, T_j=150 °C	-	2	500	
AC characteristics						
Total capacitive charge	Q_c	V_R=400 V, $I_F \le I_{F,max}$, di_F/dt=200 A/µs, T_j=150 °C	-	8	-	nC
Switching time[4)]	t_c		-	-	<10	ns
	C	V_R=1 V, f= MHz	-	130	-	pF
		V_R=300 V, f=1 MHz	-	20	-	
		V_R=600 V, f=1 MHz	-	20	-	

1) J-STD20 and JESD22

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

3) Device on 40mm*40mm*1.5mm epox PCB FR4 with 6cm^2 (one layer, 70µm thick) copper area for drain connection. PCB is vertikal with out blown air.

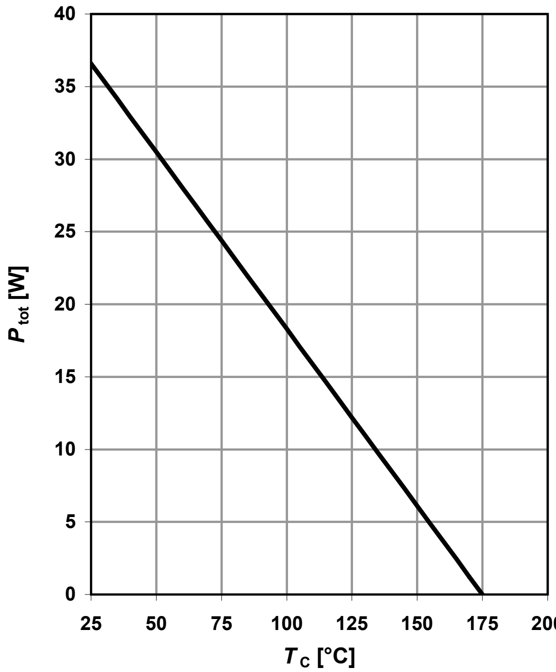
4) t_c is the time constant for the capacitive displacement current waveform (independent from T_j, I_{LOAD} and di/dt), different from t_{rr}, which is dependent on T_j, I_{LOAD}, di/dt. No reverse recovery time constant t_{rr} due to absence of minority carrier injection.

5) Only capacitive charge occuring, guaranteed by design.

1 Power dissipation

P_{tot}=f(T_C)

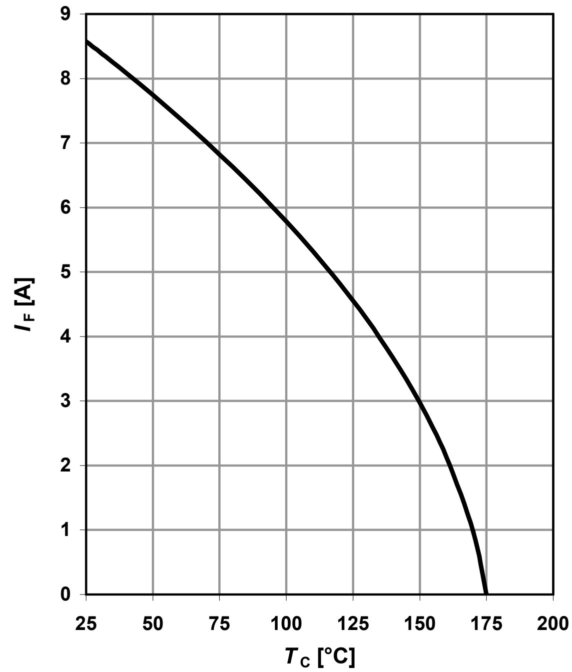
parameter: $R_{thJC(max)}$



2 Diode forward current

I_F=f(T_C); T_j≤175 °C

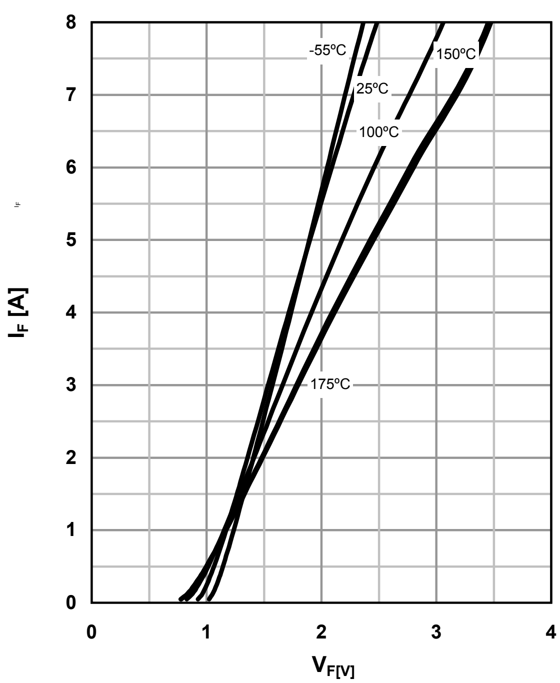
parameter: $R_{thJC(max)}$; $V_{F(max)}$



3 Typ. forward characteristic

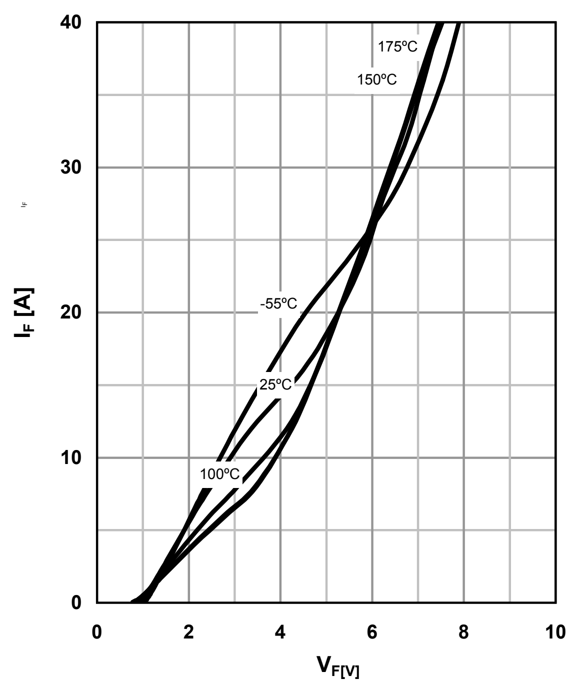
I_F=f(V_F); t_p=400 µs

parameter: T_j



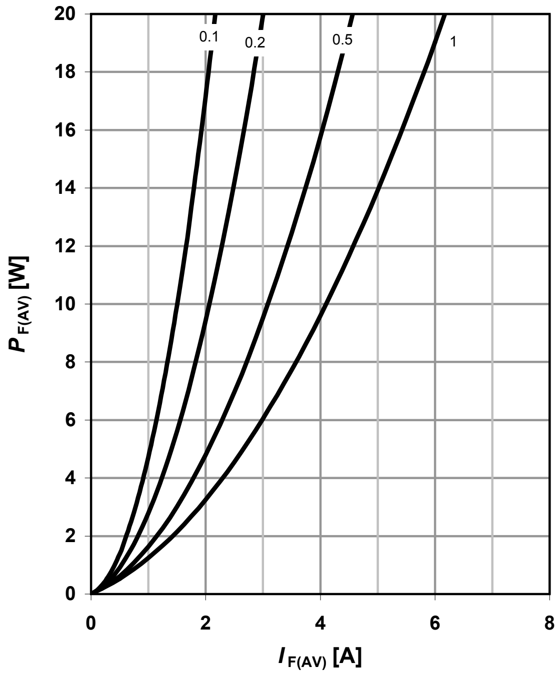
4 Typ. forward characteristic in surge current mode

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



5 Typ. forward power dissipation vs. average forward current

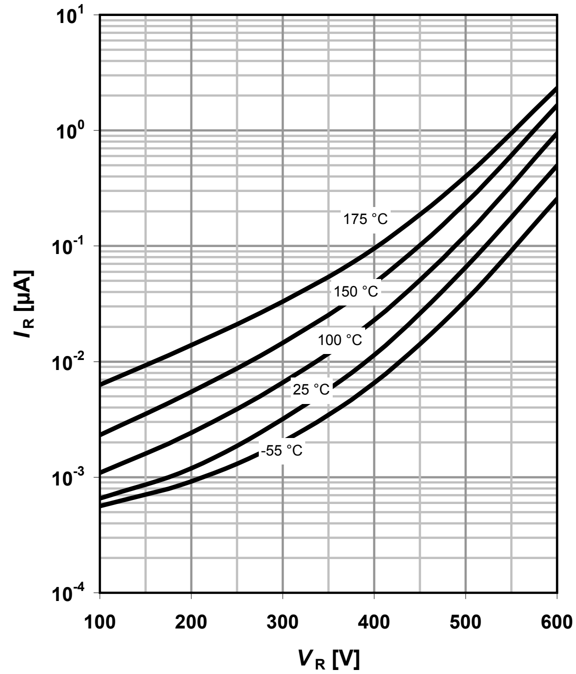
$P_{F,AV}$=f(I_F), T_C=100 °C, parameter: $D = t_p/T$



6 Typ. reverse current vs. reverse voltage

I_R=f(V_R)

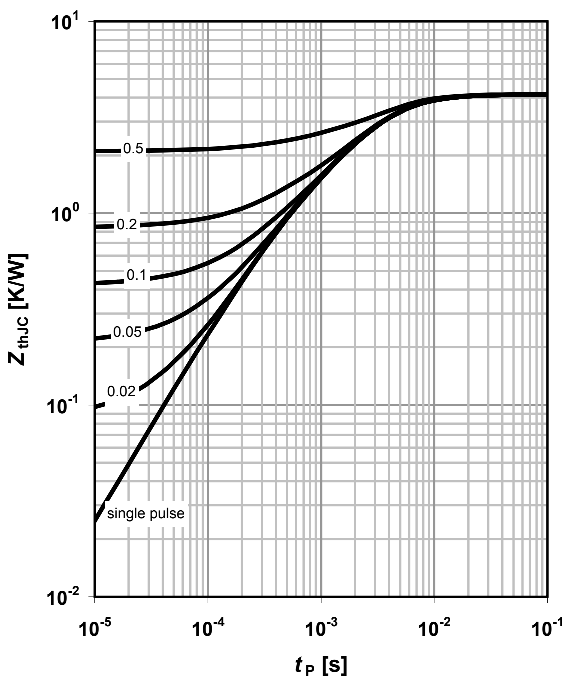
parameter: T_j



7 Transient thermal impedance

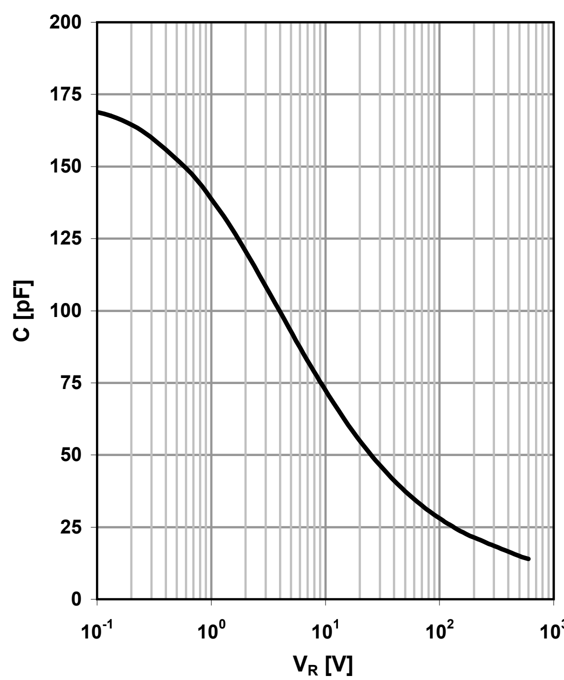
Z_{thJC}=f(t_p)

parameter: $D = t_p/T$



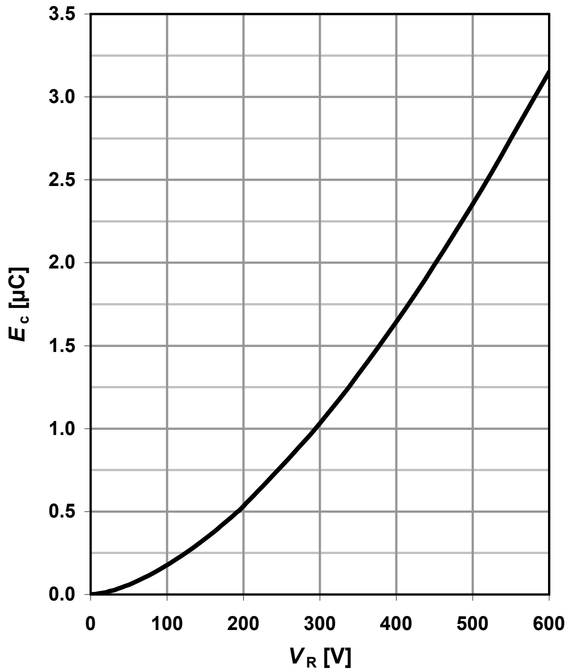
8 Typ. capacitance vs. reverse voltage

C=f(V_R); T_C=25 °C, f=1 MHz



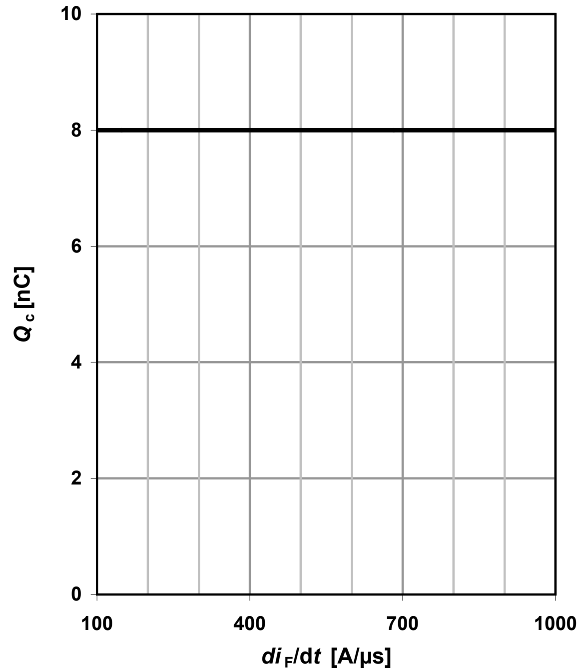
9 Typ. C stored energy

E_C=f(V_R)

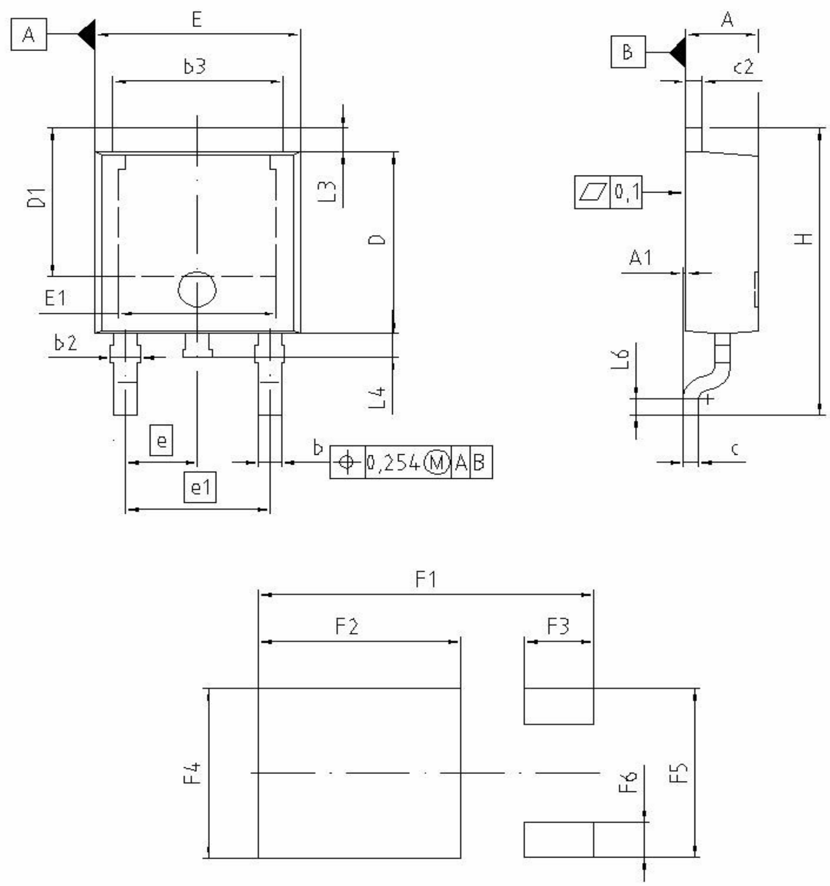


10 Typ. capacitance charge vs. current slope

Q_C=f(di_F/dt)[5)]; T_j=150 °C; $I_F \leq I_{F,max}$



Package Outline:PG-TO252-3-1/TO252-3-11/TO252-3-21



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.159	2.413	0.085	0.095
A1	0.000	0.150	0.000	0.006
b	0.635	0.889	0.025	0.035
b2	0.650	1.150	0.026	0.045
b3	5.004	5.500	0.197	0.217
c	0.457	0.580	0.018	0.023
c2	0.460	0.980	0.018	0.039
D	5.969	6.223	0.235	0.245
D1	5.020	5.842	0.198	0.230
E	6.400	6.731	0.252	0.265
E1	4.850	5.207	0.191	0.205
e	2.286		0.090	
e1	4.572		0.180	
N	3		3	
H	9.400	10.480	0.370	0.413
L3	0.900	1.143	0.035	0.045
L4	0.584	0.950	0.023	0.037
L6	0.510	0.686	0.020	0.027
F1	10.500	10.700	0.413	0.421
F2	6.300	6.500	0.248	0.256
F3	2.100	2.300	0.083	0.091
F4	5.700	5.900	0.224	0.232
F5	5.660	5.860	0.222	0.231
F6	1.100	1.300	0.043	0.051

REFERENCE
JEDEC TO252

SCALE
0 2.0 4mm

EUROPEAN PROJECTION

ISSUE DATE
21-09-2005

FILE
TO252_1

Dimensions in mm/inches:

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