Silicon Carbide Schottky Diode

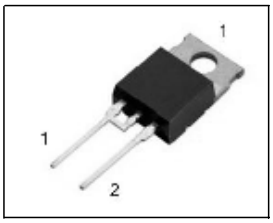
thinQ!™ SiC Schottky Diode

- Worlds first 600V Schottky diode
- Revolutionary semiconductor material - Silicon Carbide
- Switching behavior benchmark
- No reverse recovery
- No temperature influence on the switching behavior
- No forward recovery
- Pb-free lead plating; RoHS compliant
- Qualified according to JEDEC[0)] for target applications

Product Summary

V_{RRM}	600	V
Q_c	14	nC
I_F	5	A

PG-TO220-2-2.



Type	Package	Ordering Code	Marking	Pin 1	Pin 2
SDT05S60	PG-TO220-2-2.	Q67040S4644	D05S60	C	A

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

Parameter	Symbol	Value	Unit
Continuous forward current, T_C=100°C	I_F	5	A
RMS forward current, f=50Hz	I_{FRMS}	7.1	
Surge non repetitive forward current, sine halfwave T_C=25°C, t_p=10ms	I_{FSM}	18.5	
Repetitive peak forward current T_j=150°C, T_C=100°C, D=0.1	I_{FRM}	21	
Non repetitive peak forward current t_p=10µs, T_C=25°C	I_{FMAX}	50	
i^2t value, T_C=25°C, t_p=10ms	$\int i^2dt$	1.7	A²s
Repetitive peak reverse voltage	V_{RRM}	600	V
Surge peak reverse voltage	V_{RSM}	600	
Power dissipation, T_C=25°C	P_{tot}	43	W
Operating and storage temperature	T_j , T_{stg}	-55... +175	°C

[0)] J-STD20 and JESD22

Thermal Characteristics

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

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

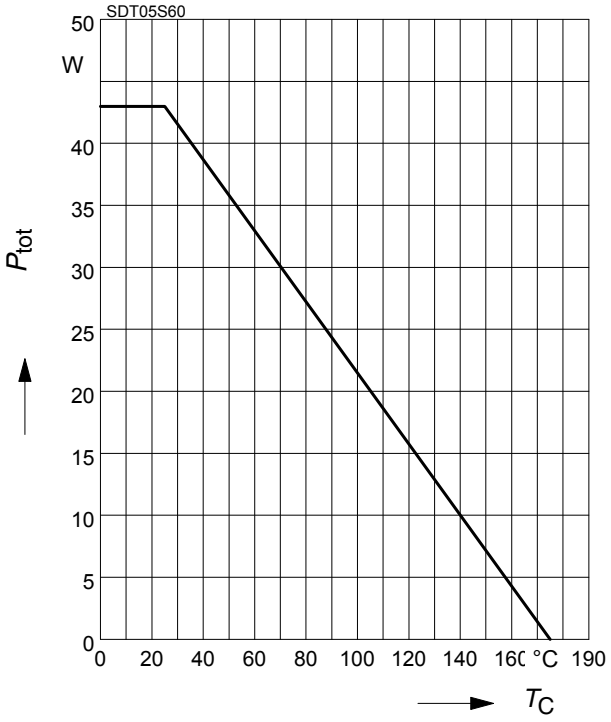
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Diode forward voltage	V_F				V
I_F=5A, T_j=25°C		-	1.5	1.7	
I_F=5A, T_j=150°C		-	1.7	2.1	
Reverse current	I_R				µA
V_R=600V, T_j=25°C		-	19	200	
V_R=600V, T_j=150°C		-	45	1000	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
Total capacitive charge V_R=400V, I_F=5A, di_F/dt=200A/µs, T_j=150°C	Q_c	-	14	-	nC
Switching time V_R=400V, I_F=5A, di_F/dt=200A/µs, T_j=150°C	t_{rr}	-	n.a	-	ns
Total capacitance	C				pF
V_R=1V, T_C=25°C, f=1MHz		-	170	-	
V_R=300V, T_C=25°C, f=1MHz		-	16	-	
V_R=600V, T_C=25°C, f=1MHz		-	12	-	

1 Power dissipation

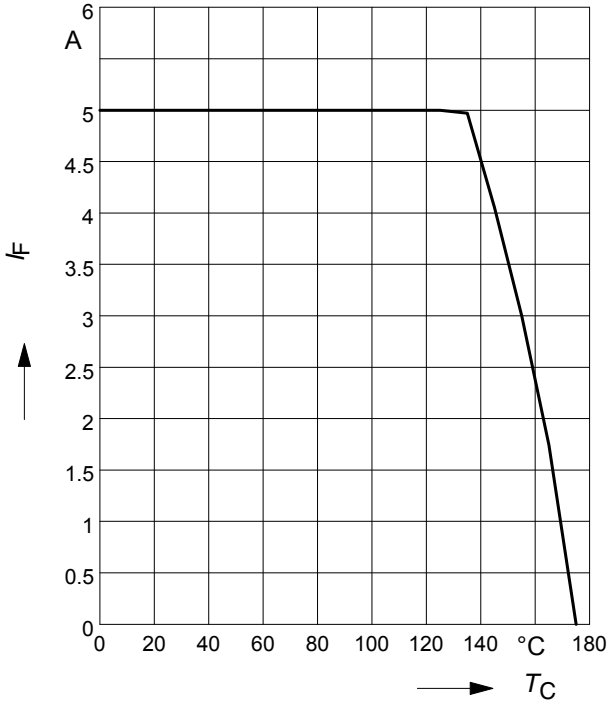
$P_{tot} = f(T_C)$



2 Diode forward current

$I_F = f(T_C)$

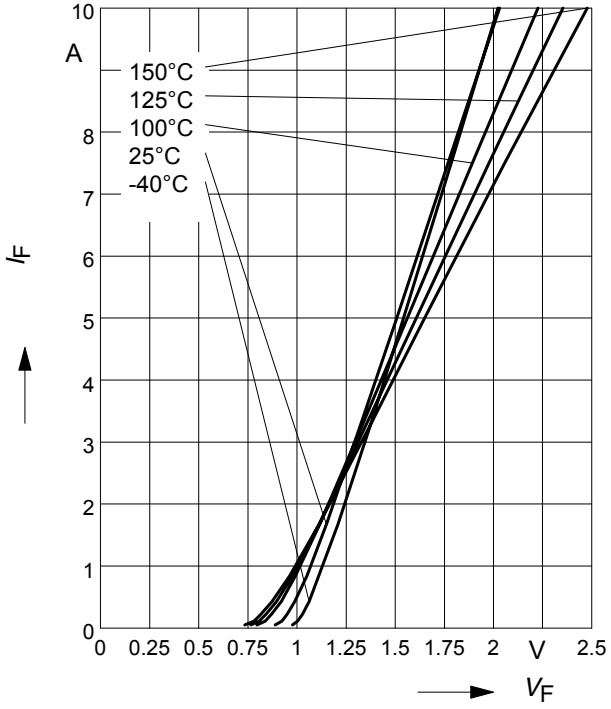
parameter: $T_j \leq 175$ °C



3 Typ. forward characteristic

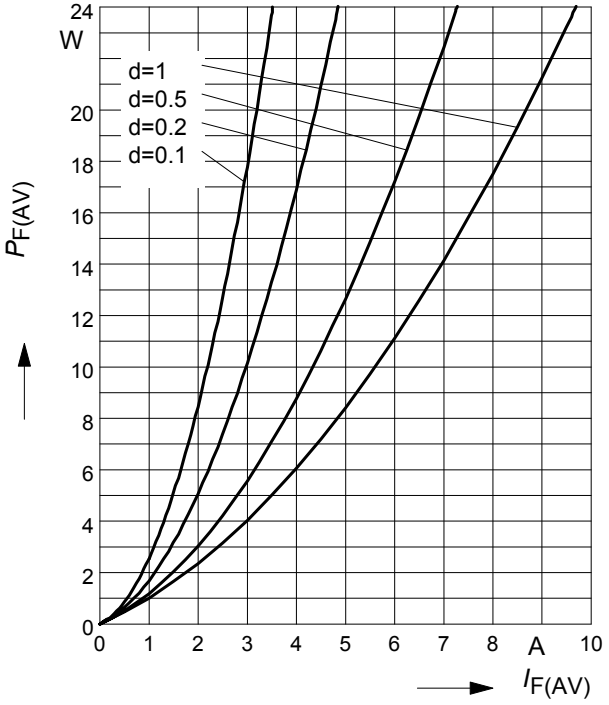
$I_F = f(V_F)$

parameter: T_j , tp = 350 µs



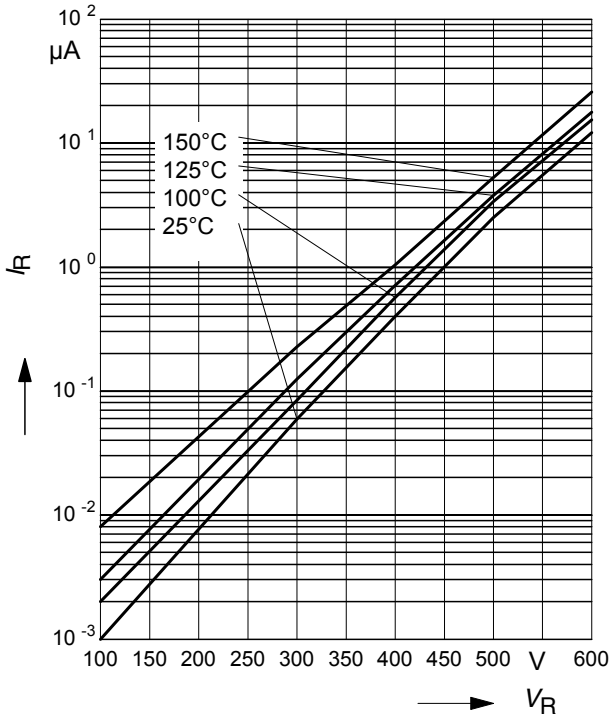
4 Typ. forward power dissipation vs. average forward current

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



5 Typ. reverse current vs. reverse voltage

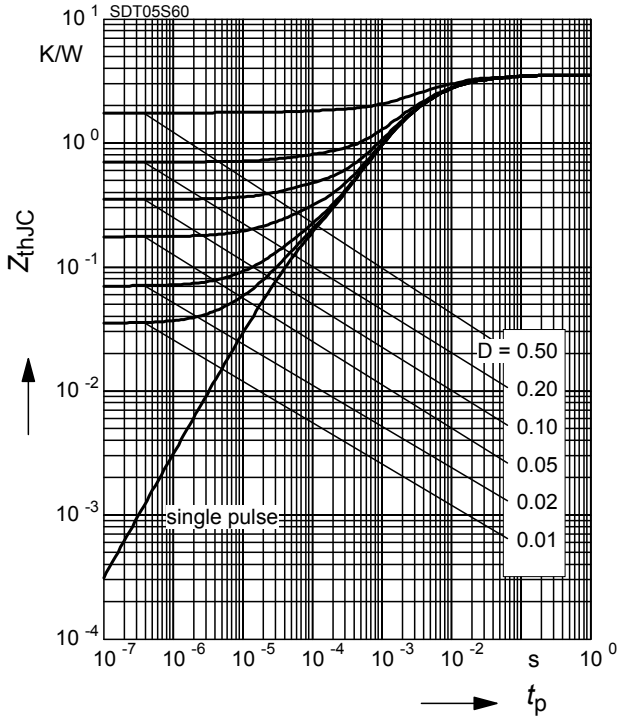
$I_R=f(V_R)$



6 Transient thermal impedance

$Z_{thJC} = f(t_p)$

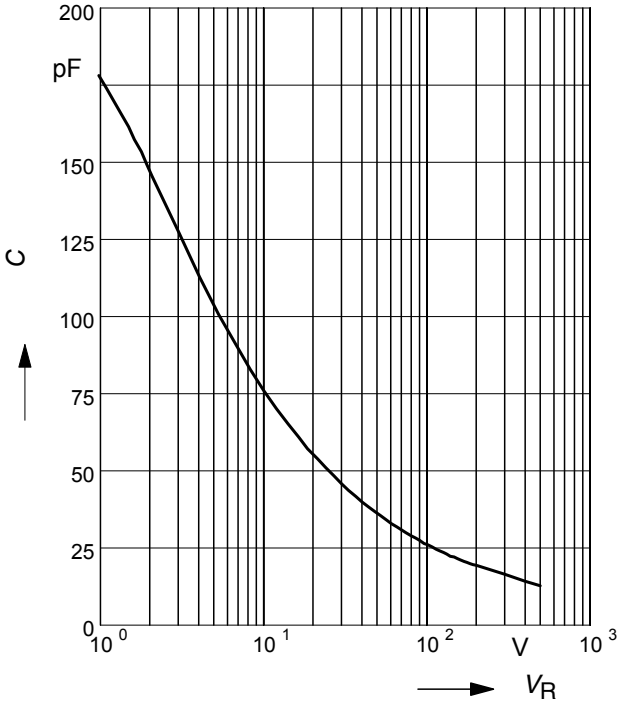
parameter : $D = t_p/T$



7 Typ. capacitance vs. reverse voltage

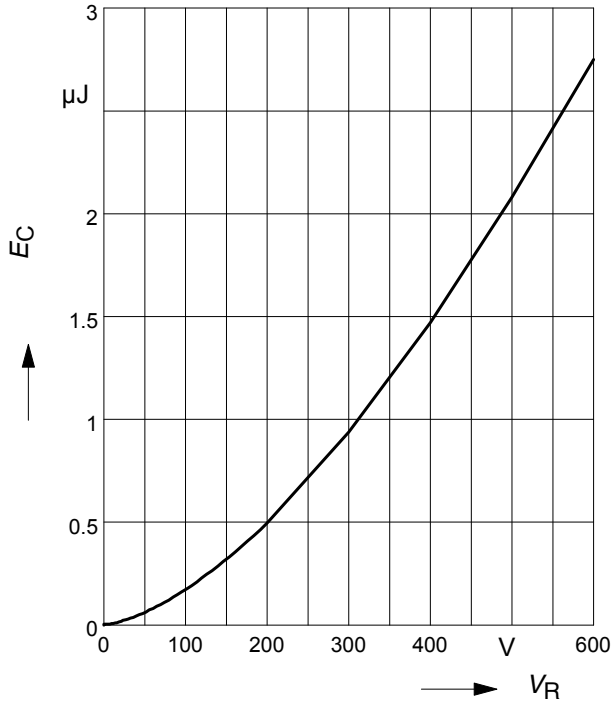
$C= f(V_R)$

parameter: T_C = 25 °C, f = 1 MHz



8 Typ. C stored energy

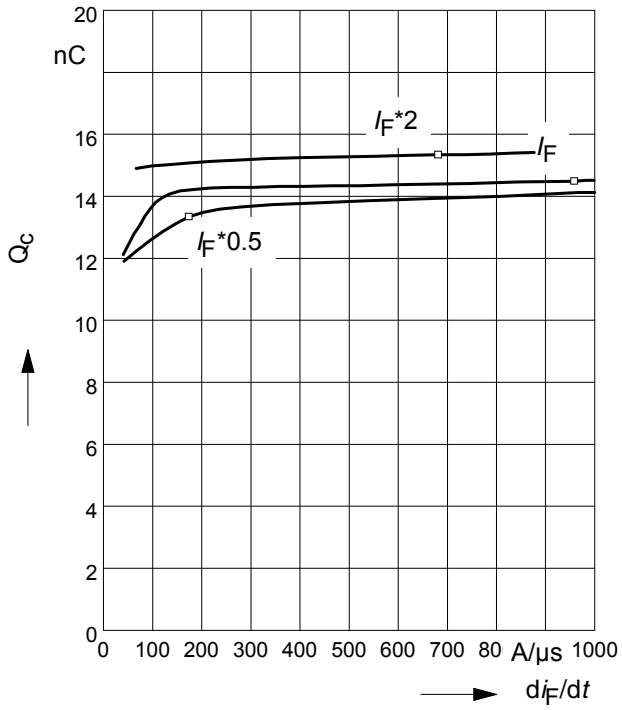
$E_C=f(V_R)$



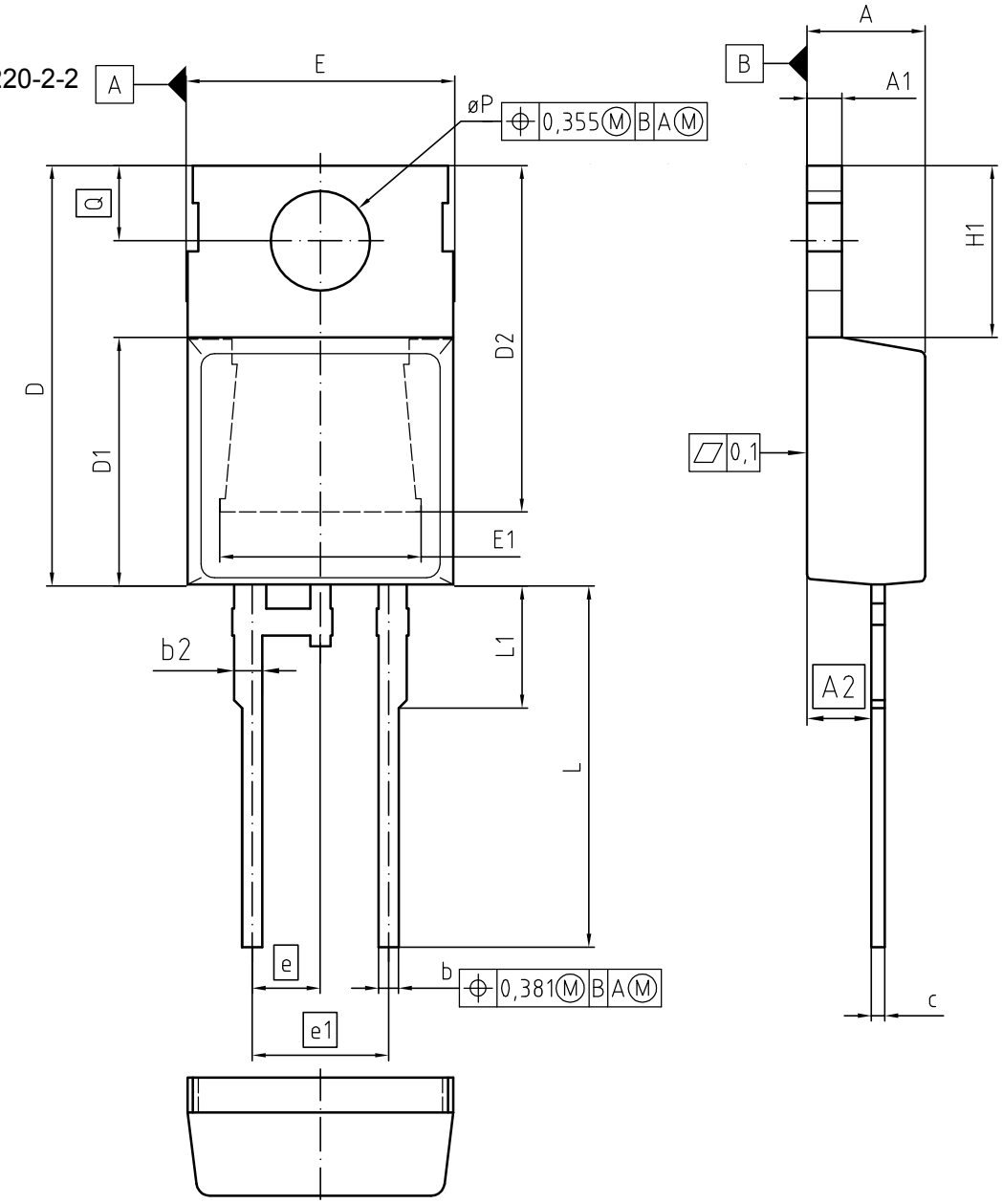
9 Typ. capacitive charge vs. current slope

$Q_c = f(di_F/dt)$

parameter: T_j = 150 °C



PG-TO-220-2-2



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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