

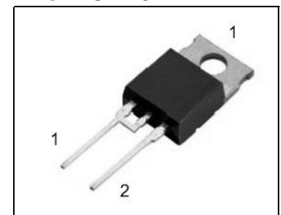
Silicon Carbide Schottky Diode

- 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 JEDEC⁰⁾ for target applications

thinQ!TM SiC Schottky Diode
Product Summary

V_{RRM}	600	V
Q_C	30	nC
I_F	12	A

PG-TO220-2-2.



Type	Package	Ordering Code	Marking	Pin 1	Pin 2
SDT12S60	PG-TO220-2-2.	Q67040-S4470	D12S60	C	A

Maximum Ratings, at $T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Value	Unit
Continuous forward current, $T_C=100^\circ\text{C}$	I_F	12	A
RMS forward current, $f=50\text{Hz}$	I_{FRMS}	17	
Surge non repetitive forward current, sine halfwave $T_C=25^\circ\text{C}$, $t_p=10\text{ms}$	I_{FSM}	36	
Repetitive peak forward current $T_j=150^\circ\text{C}$, $T_C=100^\circ\text{C}$, $D=0.1$	I_{FRM}	49	
Non repetitive peak forward current $t_p=10\mu\text{s}$, $T_C=25^\circ\text{C}$	I_{FMAX}	120	
i^2t value, $T_C=25^\circ\text{C}$, $t_p=10\text{ms}$	$\int i^2 dt$	6.48	A ² s
Repetitive peak reverse voltage	V_{RRM}	600	V
Surge peak reverse voltage	V_{RSM}	600	
Power dissipation, $T_C=25^\circ\text{C}$	P_{tot}	88.2	W
Operating and storage temperature	T_j, T_{stg}	-55... +175	$^\circ\text{C}$

⁰⁾J-STD20 and JESD22

Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Characteristics					
Thermal resistance, junction - case	R_{thJC}	-	-	1.7	K/W
Thermal resistance, junction - ambient, leaded	R_{thJA}	-	-	62	

Electrical Characteristics, at $T_j = 25^\circ\text{C}$, unless otherwise specified

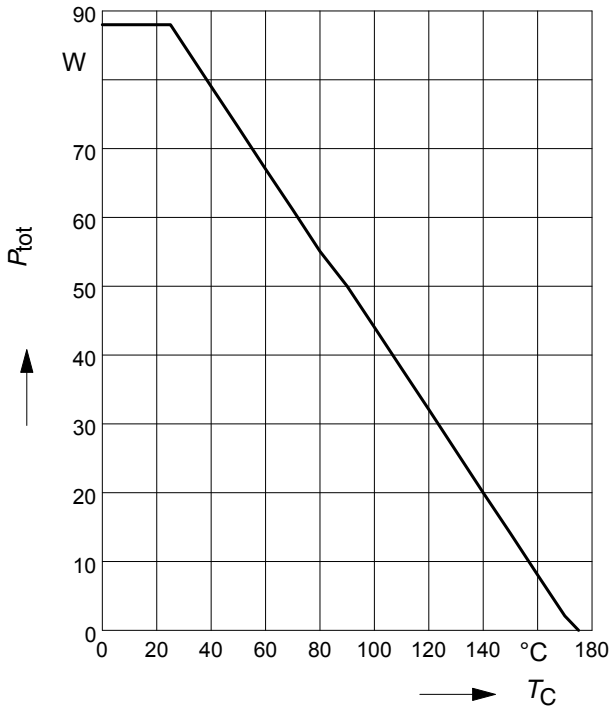
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Diode forward voltage	V_F				V
$I_F=12\text{A}, T_j=25^\circ\text{C}$		-	1.5	1.7	
$I_F=12\text{A}, T_j=150^\circ\text{C}$		-	1.7	2.1	
Reverse current	I_R				μA
$V_R=600\text{V}, T_j=25^\circ\text{C}$		-	40	400	
$V_R=600\text{V}, T_j=150^\circ\text{C}$		-	100	2000	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
Total capacitive charge $V_R=400\text{V}$, $I_F=12\text{A}$, $di_F/dt=200\text{A}/\mu\text{s}$, $T_j=150\text{°C}$	Q_C	-	30	-	nC
Switching time $V_R=400\text{V}$, $I_F=12\text{A}$, $di_F/dt=200\text{A}/\mu\text{s}$, $T_j=150\text{°C}$	t_{rr}	-	n.a.	-	ns
Total capacitance $V_R=1\text{V}$, $T_C=25\text{°C}$, $f=1\text{MHz}$ $V_R=300\text{V}$, $T_C=25\text{°C}$, $f=1\text{MHz}$ $V_R=600\text{V}$, $T_C=25\text{°C}$, $f=1\text{MHz}$	C	-	450 45 43	-	pF

1 Power dissipation

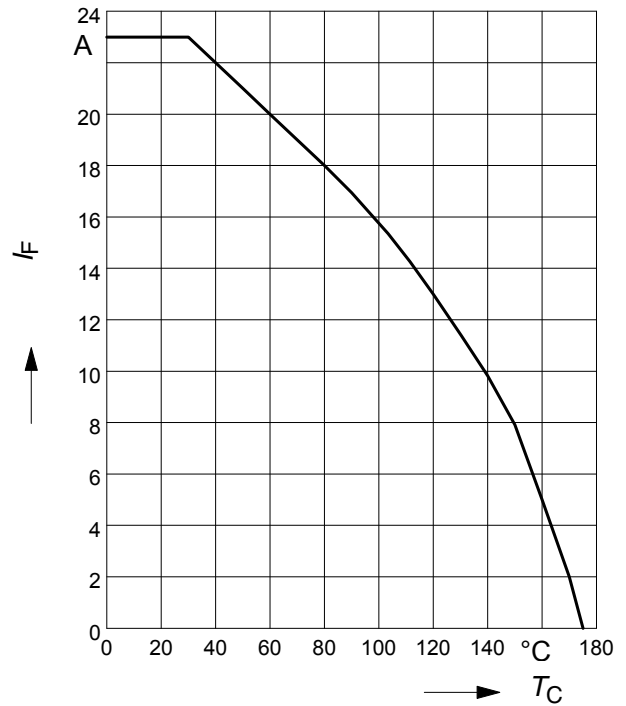
$P_{tot} = f(T_C)$



2 Diode forward current

$I_F = f(T_C)$

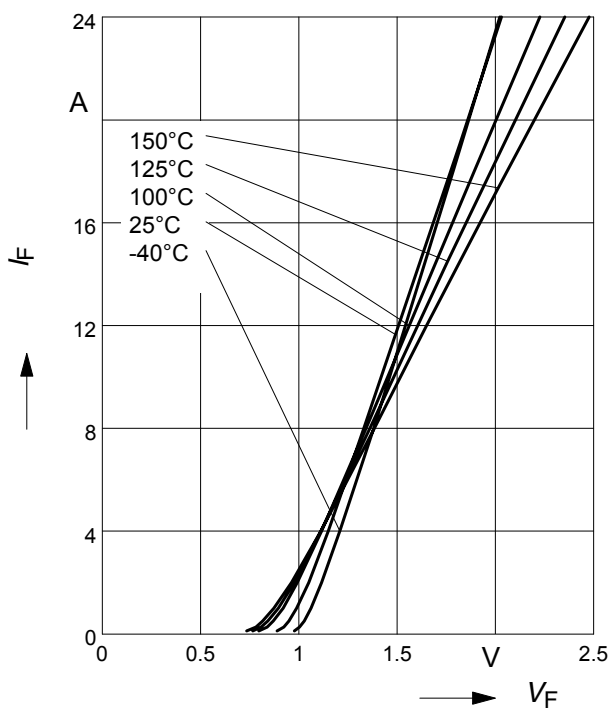
parameter: $T_j \leq 175^\circ\text{C}$



3 Typ. forward characteristic

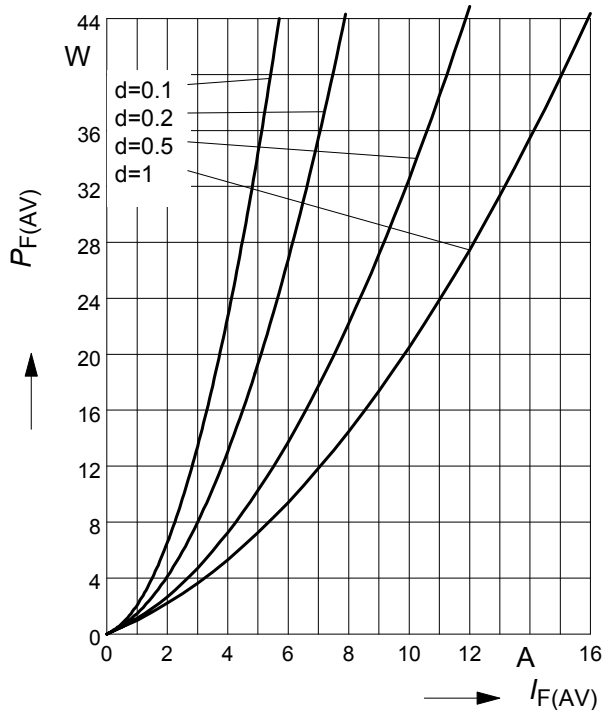
$I_F = f(V_F)$

parameter: $T_j, t_p = 350 \mu\text{s}$



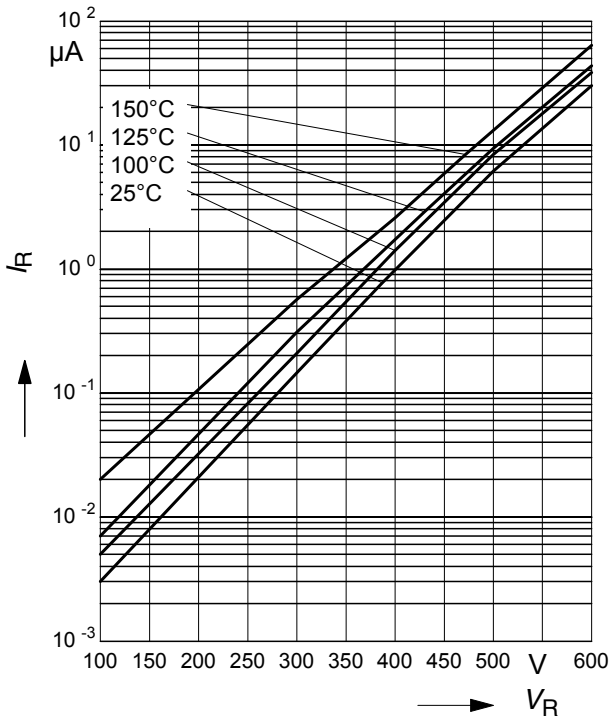
4 Typ. forward power dissipation vs. average forward current

$P_{F(AV)} = f(I_F) \quad T_C = 100^\circ\text{C}, d = t_p/T$



5 Typ. reverse current vs. reverse voltage

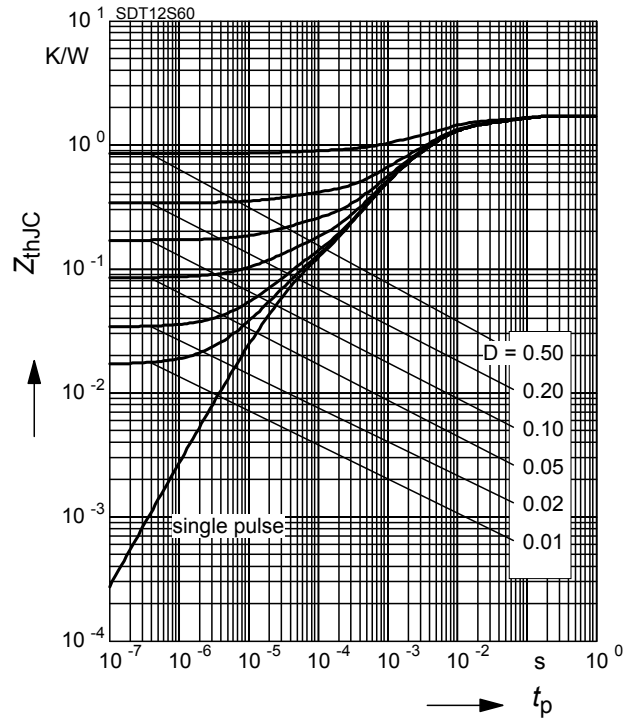
$$I_R = f(V_R)$$



6 Transient thermal impedance

$$Z_{thJC} = f(t_p)$$

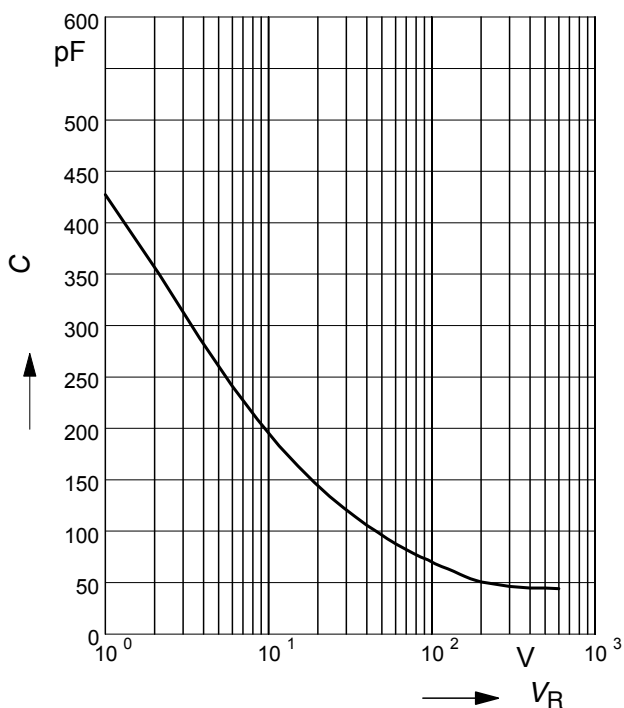
parameter : $D = t_p/T$



7 Typ. capacitance vs. reverse voltage

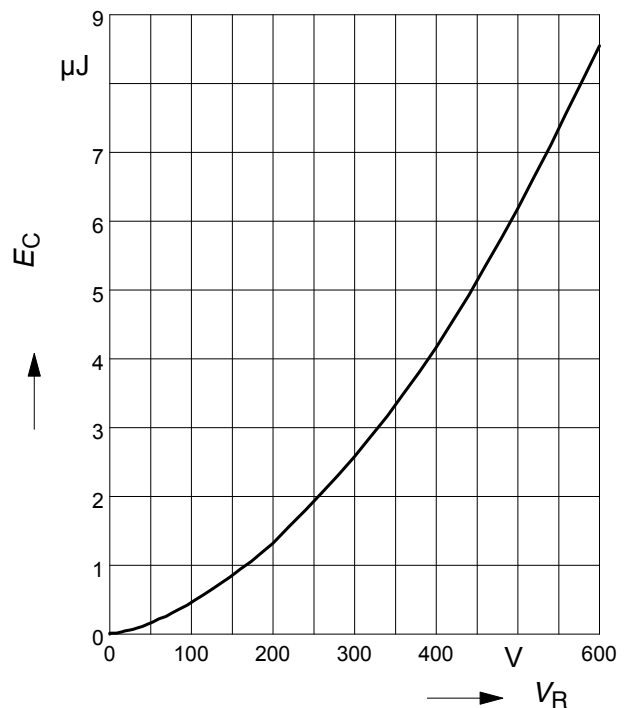
$$C = f(V_R)$$

parameter: $T_C = 25^\circ C, f = 1 MHz$



8 Typ. C stored energy

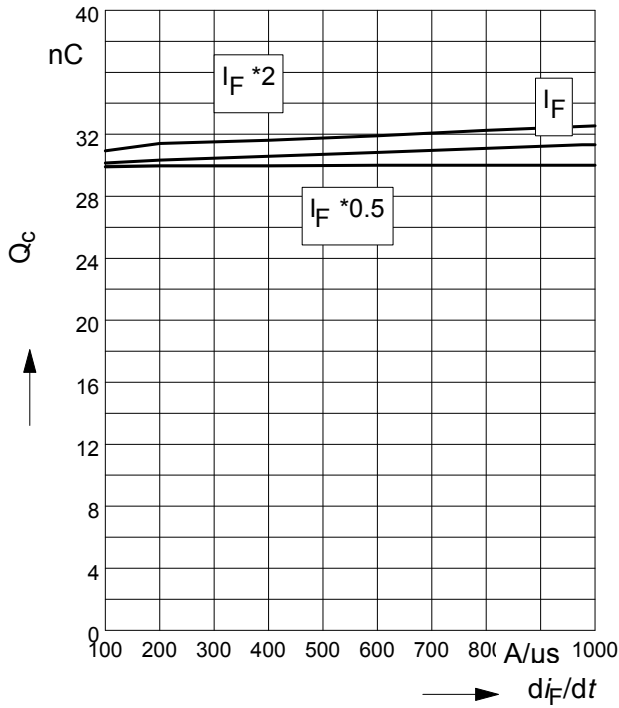
$$E_C = f(V_R)$$



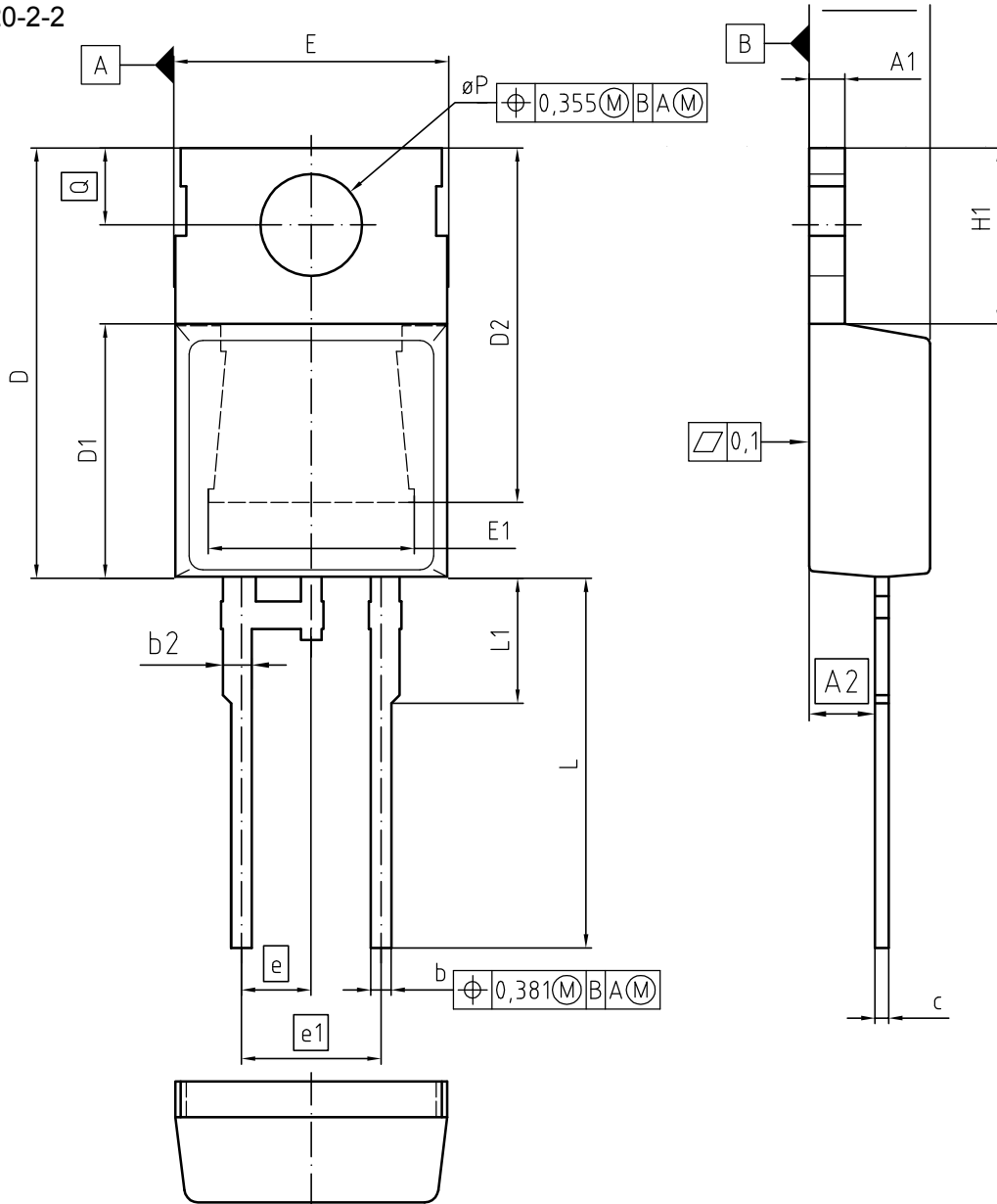
9 Typ. capacitive charge vs. current slope

$$Q_C = f(dI_F/dt)$$

parameter: $T_j = 150\text{ }^\circ\text{C}$



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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02

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