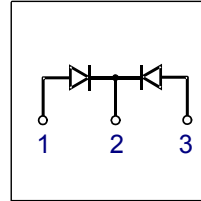


Silicon Carbide Schottky Diode

- Revolutionary semiconductor material - Silicon Carbide
- Switching behavior benchmark
- No reverse recovery
- No temperature influence on the switching behavior
- No forward recovery

thinQ!™ SiC Schottky Diode

Product Summary

V_{RRM}	300	V
Q_C	23	nC
I_F	2x10	A



Type	Package	Ordering Code	Marking
SDB20S30	PG-TO263	Q67040-S4374	D20S30

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

Parameter	Symbol	Value	Unit
Continuous forward current, $T_C=100^\circ\text{C}$	I_F	10	A
RMS forward current, $f=50\text{Hz}$	I_{FRMS}	14	
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}	45	
Non repetitive peak forward current $t_p=10\mu\text{s}$, $T_C=25^\circ\text{C}$	I_{FMAX}	100	
i^2t value, $T_C=25^\circ\text{C}$, $t_p=10\text{ms}$	$\int i^2 dt$	6.5	A^2s
Repetitive peak reverse voltage	V_{RRM}	300	V
Surge peak reverse voltage	V_{RSM}	300	
Power dissipation, single diode mode, $T_C=25^\circ\text{C}$	P_{tot}	65	W
Operating and storage temperature	T_j, T_{stg}	-55... +175	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Characteristics					
Thermal resistance, junction - case (per leg)	R_{thJC}	-	-	2.3	K/W
SMD version, device on PCB: @ min. footprint	R_{thJA}	-	-	62	
P-TO263-3-2: @ 6 cm ² cooling area ¹⁾		-	35	-	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Diode forward voltage $I_F=10\text{A}$, $T_j=25\text{ }^\circ\text{C}$ $I_F=10\text{A}$, $T_j=150\text{ }^\circ\text{C}$	V_F	-	1.5	1.7	V
		-	1.5	1.9	
Reverse current $V_R=300\text{V}$, $T_j=25\text{ }^\circ\text{C}$ $V_R=300\text{V}$, $T_j=150\text{ }^\circ\text{C}$	I_R	-	15	200	μA
		-	20	1000	

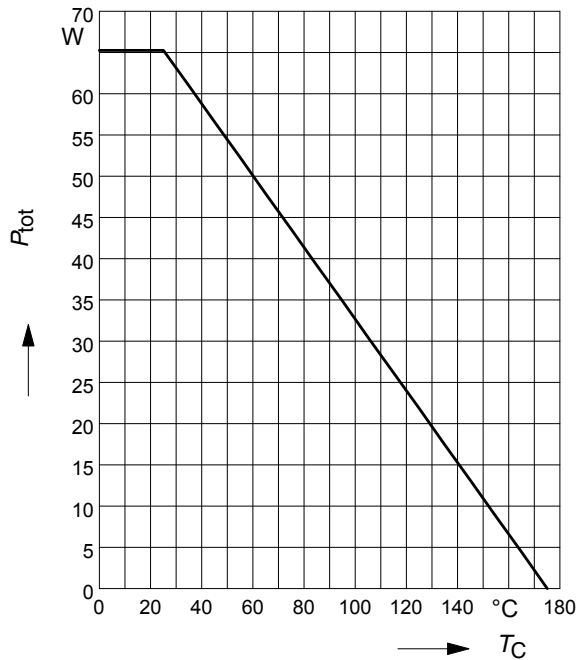
¹⁾Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6cm² (one layer, 70 μm thick) copper area for drain connection. PCB is vertical without blown air.

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
Total capacitive charge ¹⁾ $V_R=200\text{V}$, $I_F=10\text{A}$, $di_F/dt=-200\text{A}/\mu\text{s}$, $T_j=150\text{ }^\circ\text{C}$	Q_C	-	23	-	nC
Switching time ²⁾ $V_R=200\text{V}$, $I_F=10\text{A}$, $di_F/dt=-200\text{A}/\mu\text{s}$, $T_j=150\text{ }^\circ\text{C}$	t_{rr}	-	n.a.	-	ns
Total capacitance $V_R=0\text{V}$, $T_C=25\text{ }^\circ\text{C}$, $f=1\text{MHz}$ $V_R=150\text{V}$, $T_C=25\text{ }^\circ\text{C}$, $f=1\text{MHz}$ $V_R=300\text{V}$, $T_C=25\text{ }^\circ\text{C}$, $f=1\text{MHz}$	C	-	600 55 40	-	pF

1 Power dissipation (per leg)

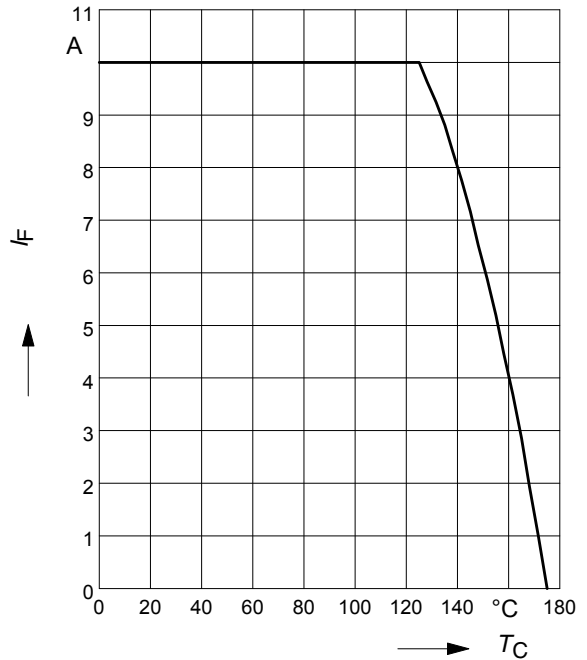
$P_{tot} = f(T_C)$



2 Diode forward current (per leg)

$I_F = f(T_C)$

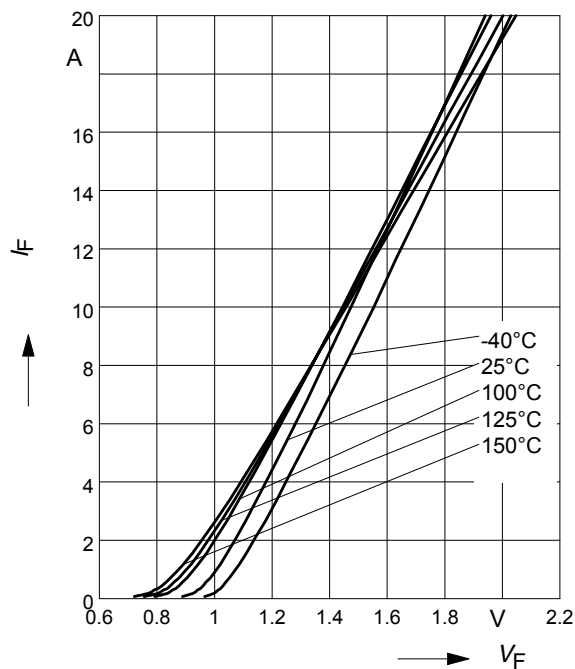
parameter: $T_j \leq 175$ °C



3 Typ. forward characteristic (per leg)

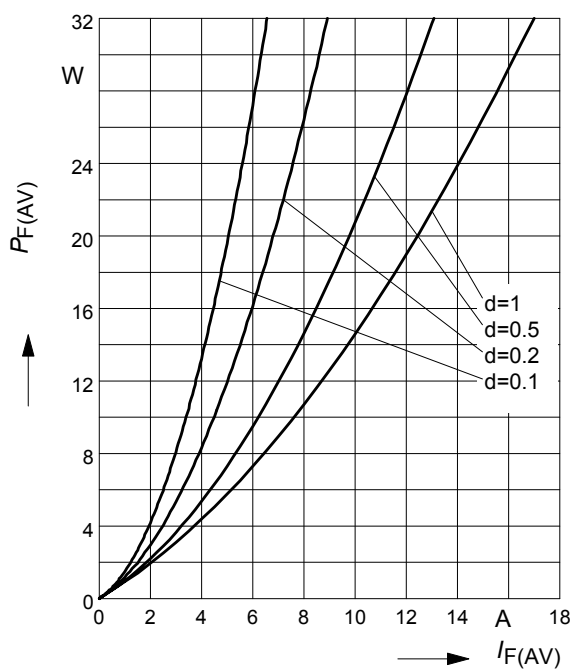
$I_F = f(V_F)$

parameter: $T_j, t_p = 350$ μs

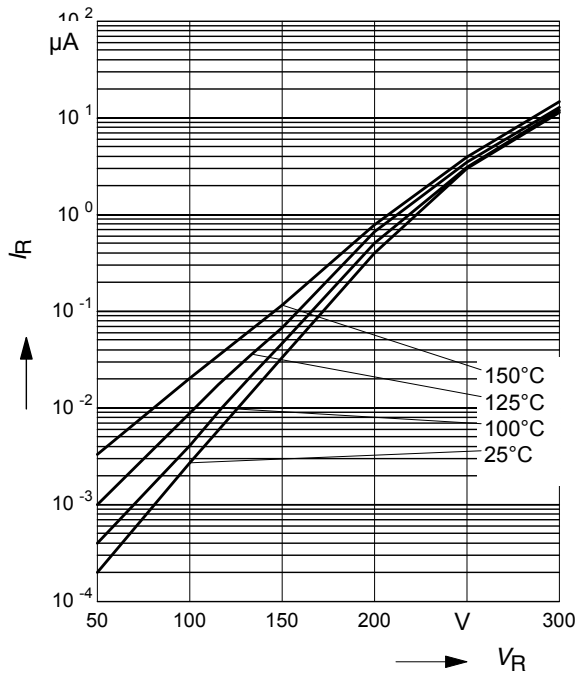


4 Typ. forward power dissipation vs. average forward current (per leg)

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

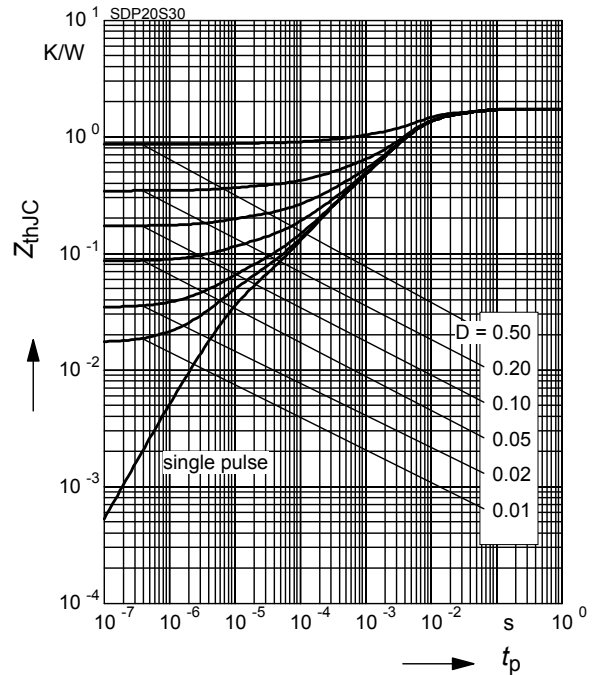


5 Typ. reverse current vs. reverse voltage
(per leg) $I_R = f(V_R)$

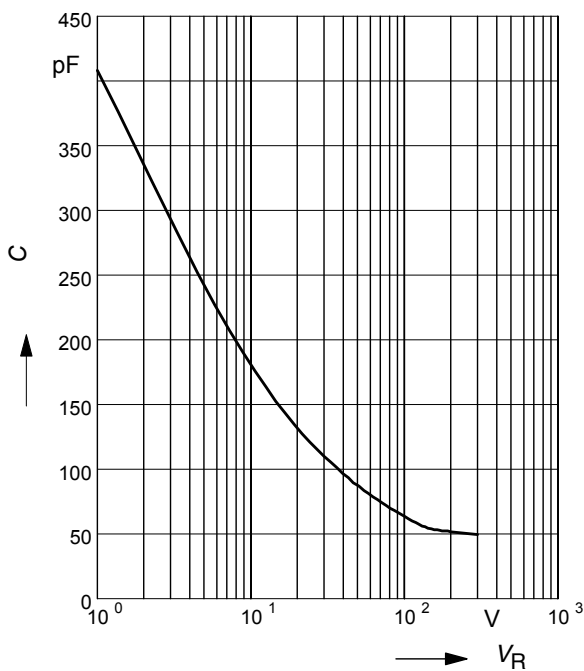


6 Transient thermal impedance (per leg)

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

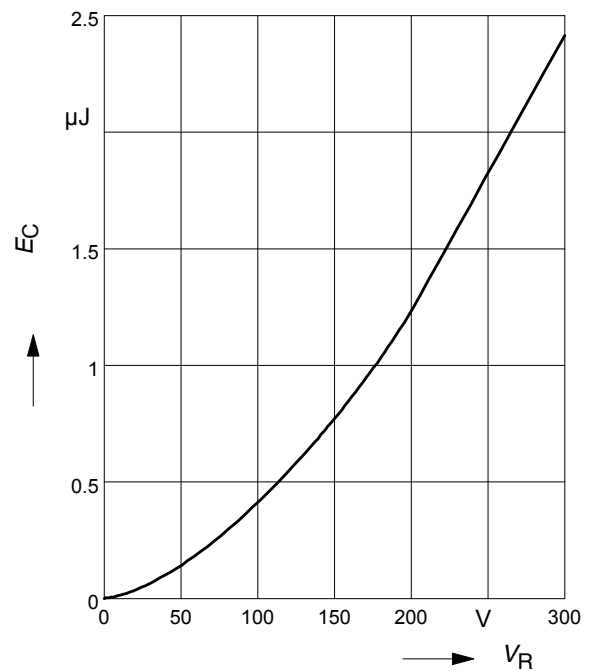


7 Typ. capacitance vs. reverse voltage
(per leg) $C = f(V_R)$
parameter: $T_C = 25^\circ C, f = 1 MHz$



8 Typ. C stored energy (per leg)

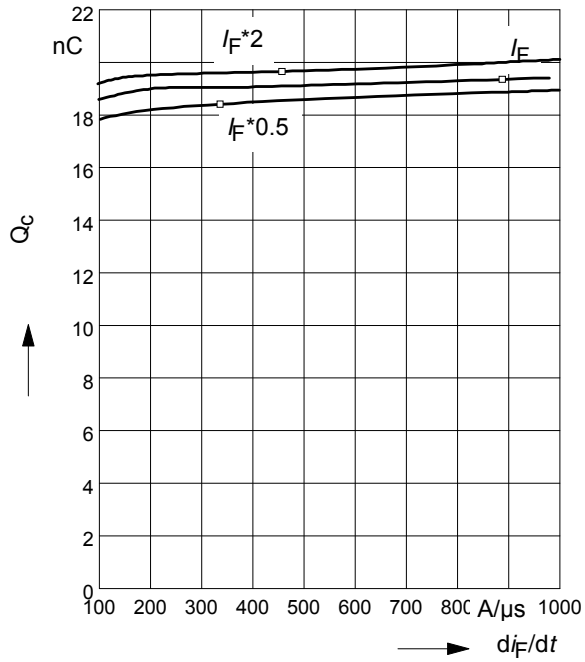
$E_C = f(V_R)$



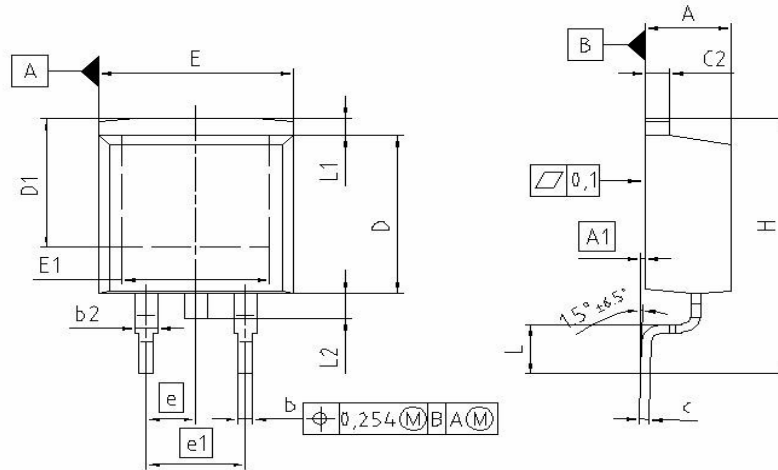
9 Typ. capacitive charge vs. current slope

(per leg) $Q_c = f(di_F/dt)$

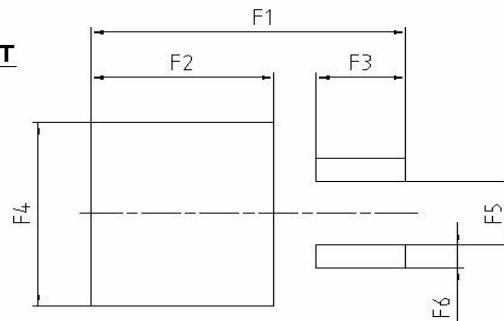
parameter: $T_j = 150\text{ °C}$



TO263-3-2 / TO263-3-5 / TO263-3-22



FOOTPRINT



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.300	4.572	0.169	0.180
A1	0.000	0.254	0.000	0.010
b	0.650	0.850	0.026	0.033
b2	0.950	1.321	0.037	0.052
c	0.330	0.650	0.013	0.026
c2	0.170	1.400	0.046	0.055
D	8.509	9.450	0.335	0.372
D1	7.100	-	0.280	-
E	9.800	10.312	0.386	0.406
E1	6.500	-	0.256	-
e	2.540		0.100	
e1	5.080		0.200	
N	2		2	
H	14.605	15.875	0.575	0.625
L	2.200	3.000	0.087	0.118
L1	-	1.600	-	0.063
L2	1.000	1.778	0.039	0.070
F1	16.050	16.250	0.632	0.640
F2	9.300	9.500	0.366	0.374
F3	4.500	4.700	0.177	0.185
F4	10.700	10.900	0.421	0.429
F5	3.630	3.830	0.143	0.151
F6	1.100	1.300	0.043	0.051

<p>REFERENCE JEDEC TO263</p>
<p>SCALE</p>
<p>EUROPEAN PROJECTION</p>
<p>ISSUE DATE 12-02-2006</p>
<p>FILE TO263_2</p>

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