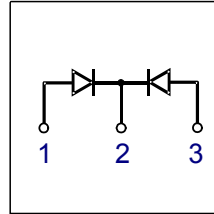
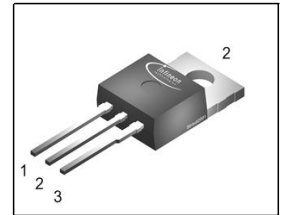


**Silicon Carbide Schottky Diode**

- Revolutionary semiconductor material - Silicon Carbide
- Switching behavior benchmark
- No reverse recovery
- No temperature influence on the switching behavior
- No forward recovery
- Pb-free lead plating; RoHS compliant
- Qualified according to JEDEC<sup>0)</sup> for target applications

**thinQ!<sup>TM</sup> SiC Schottky Diode**

**Product Summary**

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

**P-TO220**


Type	Package	Ordering Code	Marking
SDP20S30	P-TO220-3	Q67040-S4419	D20S30

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

Parameter	Symbol	Value	Unit
Continuous forward current, $T_C=100\text{ }^\circ\text{C}$	$I_F$	10	A
RMS forward current, $f=50\text{Hz}$	$I_{FRMS}$	14	
Surge non repetitive forward current, sine halfwave $T_C=25\text{ }^\circ\text{C}$ , $t_p=10\text{ms}$	$I_{FSM}$	36	
Repetitive peak forward current $T_j=150\text{ }^\circ\text{C}$ , $T_C=100\text{ }^\circ\text{C}$ , $D=0.1$	$I_{FRM}$	45	
Non repetitive peak forward current $t_p=10\mu\text{s}$ , $T_C=25\text{ }^\circ\text{C}$	$I_{FMAX}$	100	
$i^2t$ value, $T_C=25\text{ }^\circ\text{C}$ , $t_p=10\text{ms}$	$\int i^2 dt$	6.5	A <sup>2</sup> s
Repetitive peak reverse voltage	$V_{RRM}$	300	V
Surge peak reverse voltage	$V_{RSM}$	300	
Power dissipation, single diode mode, $T_C=25\text{ }^\circ\text{C}$	$P_{tot}$	65	W
Operating and storage temperature	$T_j, T_{stg}$	-55... +175	$^\circ\text{C}$

**Thermal Characteristics**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Characteristics</b>					
Thermal resistance, junction - case (per leg)	$R_{thJC}$	-	-	2.3	K/W

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

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

<sup>0</sup>J-STD20 and JESD22

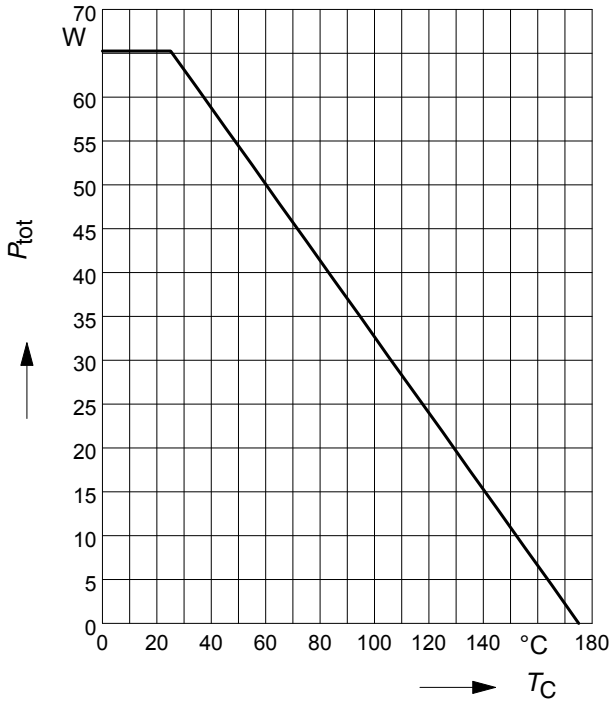
<sup>1</sup>Device on 40mm\*40mm\*1.5mm epoxy PCB FR4 with 6cm<sup>2</sup> (one layer, 70  $\mu\text{m}$  thick) copper area for drain connection. PCB is vertical without blown air.

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

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

**1 Power dissipation (per leg)**

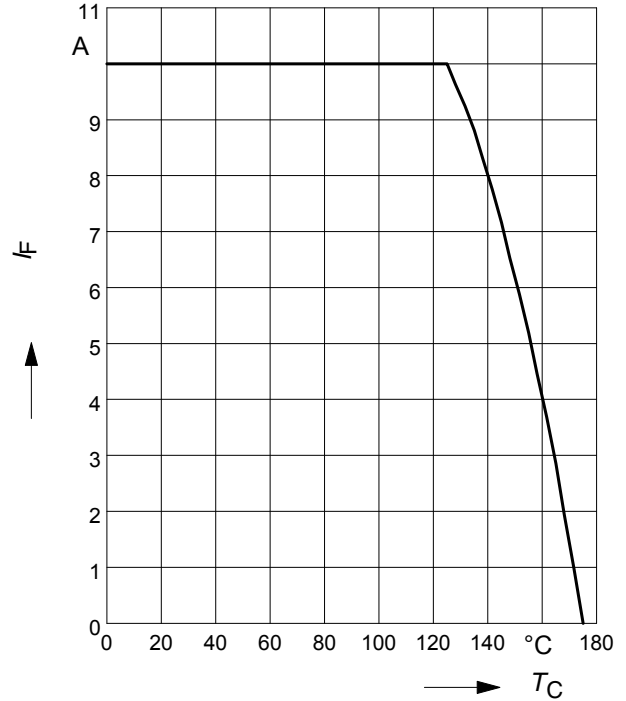
$P_{tot} = f(T_C)$



**2 Diode forward current (per leg)**

$I_F = f(T_C)$

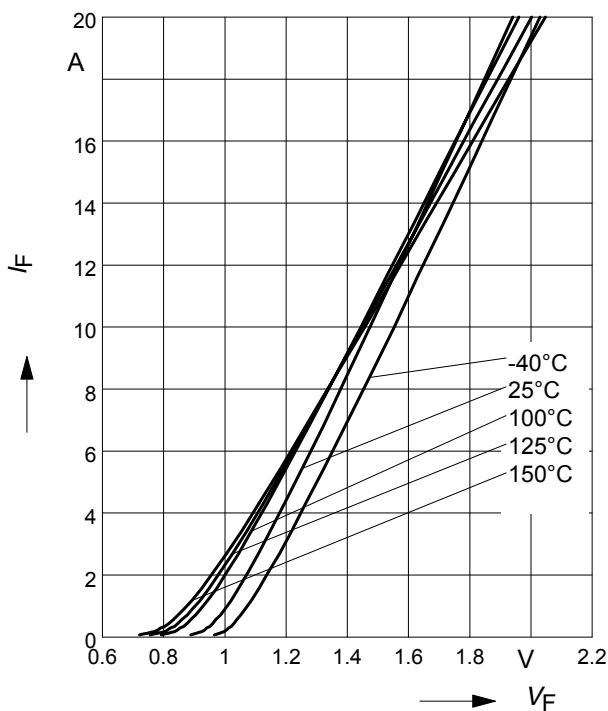
parameter:  $T_j \leq 175$  °C



**3 Typ. forward characteristic (per leg)**

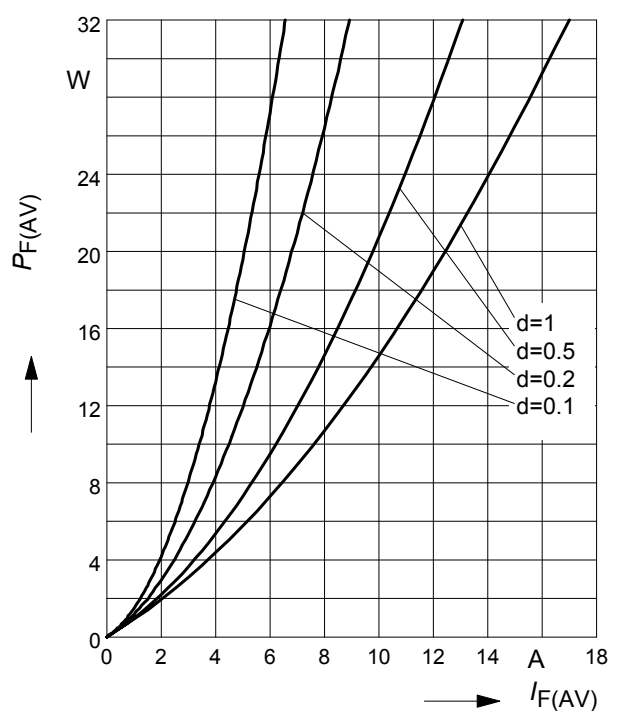
$I_F = f(V_F)$

parameter:  $T_j$ ,  $t_p = 350$   $\mu$ s

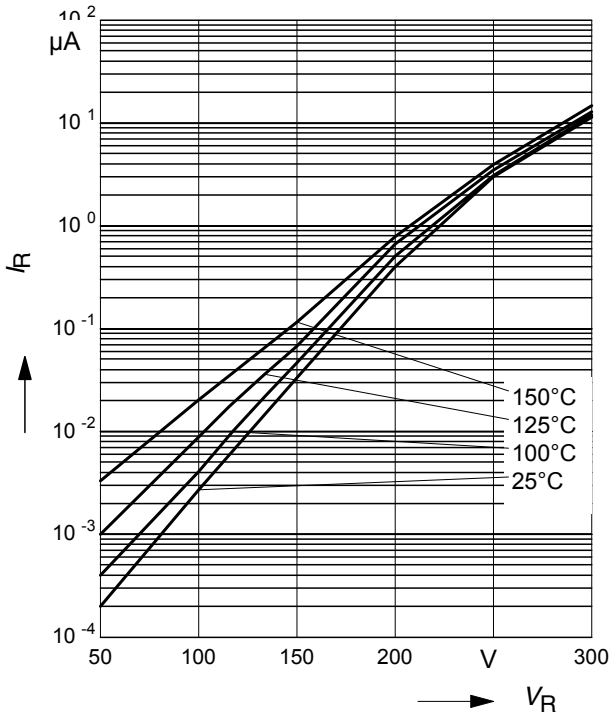


**4 Typ. forward power dissipation vs. average forward current (per leg)**

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



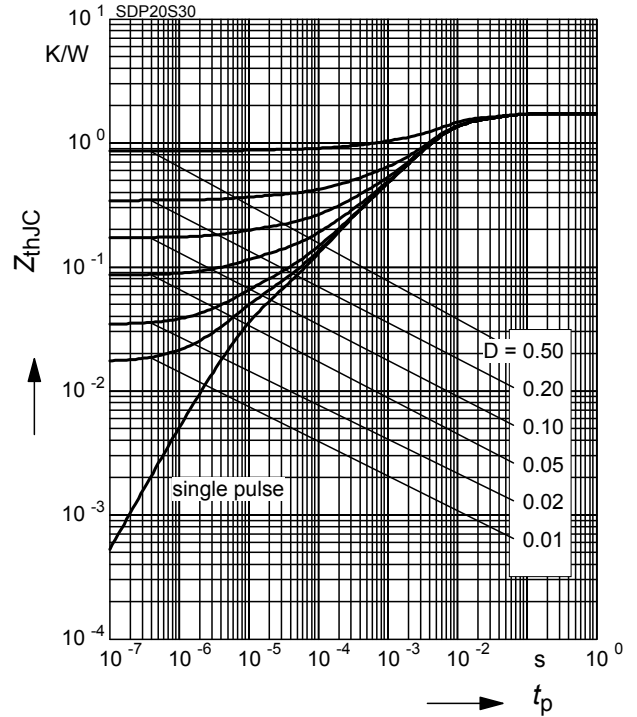
**5 Typ. reverse current vs. reverse voltage**  
(per leg)  $I_R = f(V_R)$



**6 Transient thermal impedance (per leg)**

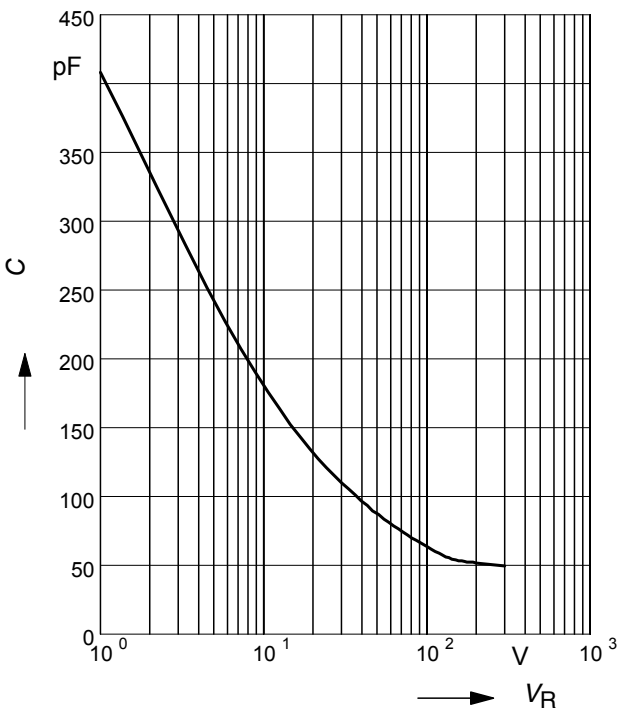
$Z_{thJC} = f(t_p)$

parameter :  $D = t_p/T$



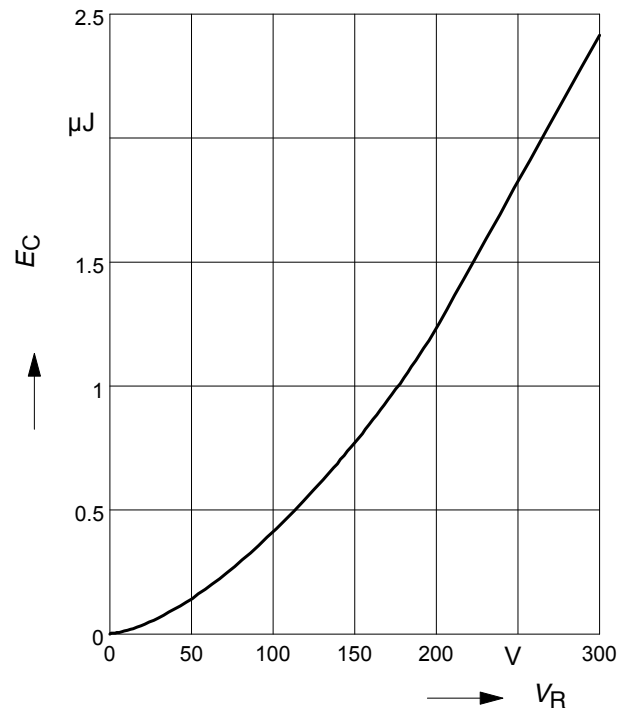
**7 Typ. capacitance vs. reverse voltage**  
(per leg)  $C = f(V_R)$

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



**8 Typ. C stored energy (per leg)**

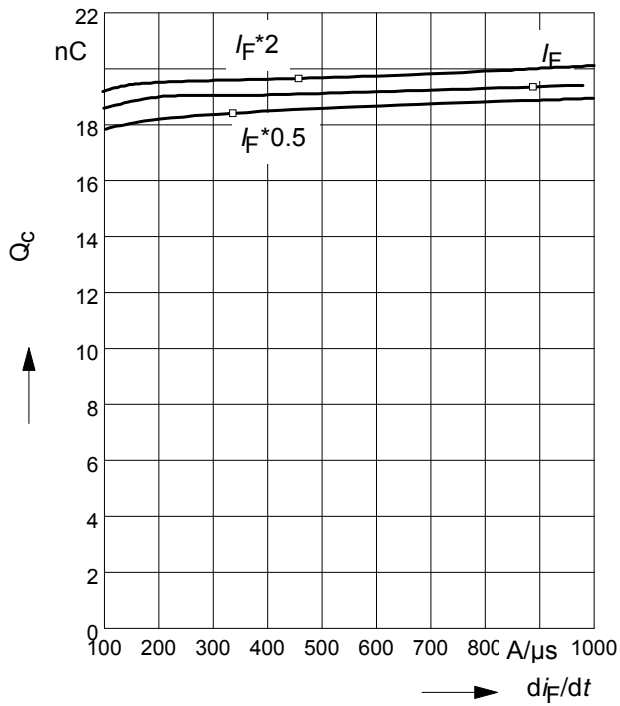
$E_C = f(V_R)$



**9 Typ. capacitive charge vs. current slope**

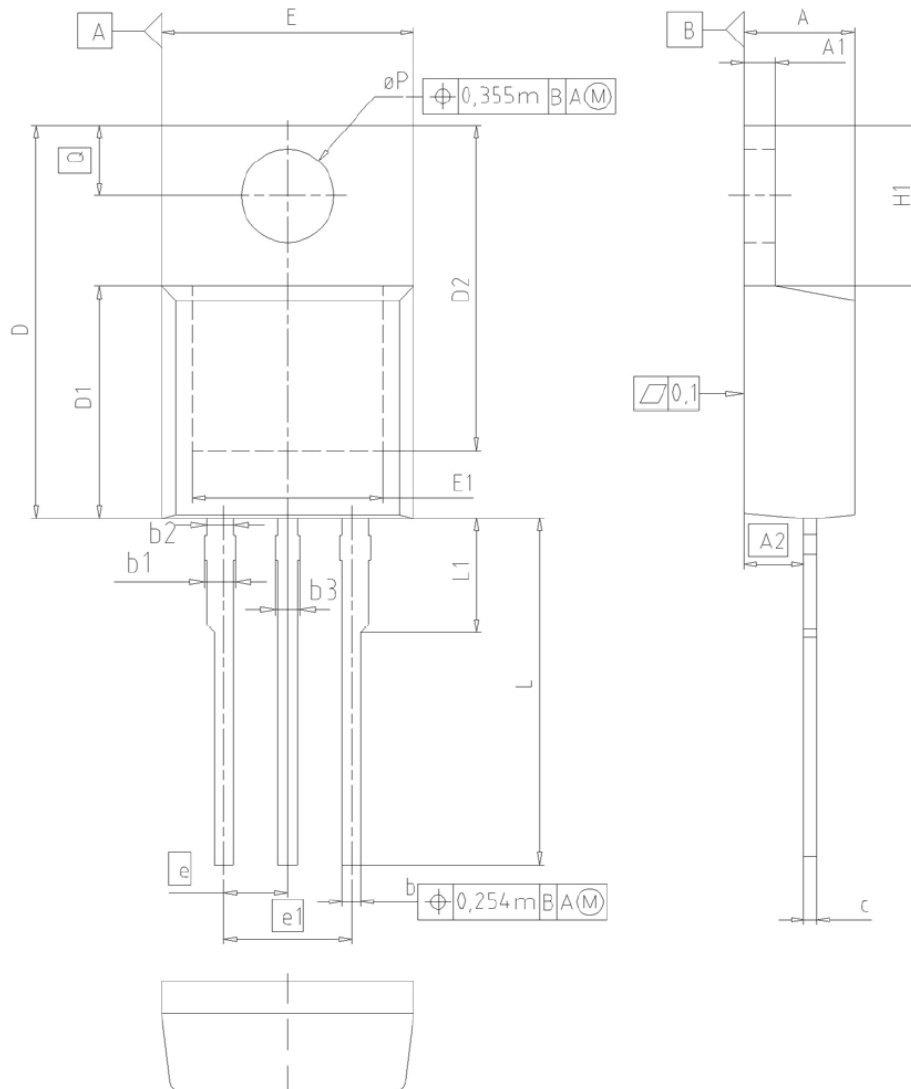
(per leg)  $Q_c = f(di_F/dt)$

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





P-TO220-3-1, P-TO220-3-21



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.57	0.169	0.180
A1	1.17	1.40	0.046	0.055
A2	2.15	2.72	0.085	0.107
b	0.65	0.86	0.026	0.034
b1	0.95	1.40	0.037	0.055
b2	0.95	1.15	0.037	0.045
b3	0.65	1.15	0.026	0.045
c	0.33	0.60	0.013	0.024
D	14.81	15.95	0.583	0.628
D1	8.51	9.45	0.335	0.372
D2	12.19	13.10	0.480	0.516
E	9.70	10.36	0.382	0.408
E1	6.50	8.60	0.256	0.339
e	2.54		0.100	
e1	5.08		0.200	
N	3		3	
H1	5.90	6.90	0.232	0.272
L	13.00	14.00	0.512	0.551
L1	-	4.80	-	0.189
øP	3.60	3.89	0.142	0.153
Q	2.60	3.00	0.102	0.118

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