

SiC Schottky Barrier Diode

VOLTAGE RANGE: 650V

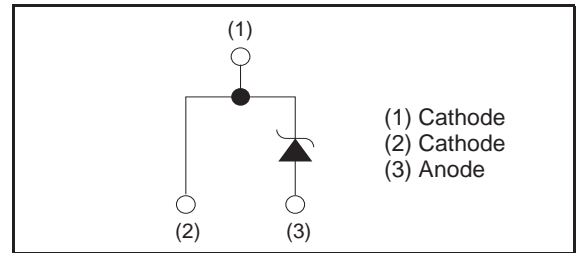
Features

- Shorter recove time
- Reduced tperature dependence
- High-speeditching possible
- High surge current capabili

MECHANICAL DATA

- Case style:TO-220 molded plastic
- Mounting position:any
- Silicon carbide epitaxial planar type

●Inner Circuit



●Packaging Specifications

Type	Packaging	Tube
	Reel size (mm)	-
	Tape width (mm)	-
	Basic ordering unit (pcs)	50
	Packing code	C9
	Marking	SCS306AH

MAXIMUM RATINGS AND CHARACTERISTICS

@ 25°C Ambient Temperature (unless otherwise noted)

Parameter		Symbol	Value	Unit
Reverse voltage (repetitive peak)		V_{RM}	650	V
Reverse voltage (DC)		V_R	650	V
Continuous forward current ($T_c=135^\circ\text{C}$)		I_F	6	A
Surge non-repetitive forward current	PW=10ms sinusoidal, $T_j=25^\circ\text{C}$	I_{FSM}	47	A
	PW=10ms sinusoidal, $T_j=150^\circ\text{C}$		40	A
	PW=10 μs square, $T_j=25^\circ\text{C}$		170	A
Repetitive peak forward current		I_{FRM}	28 ^{*1}	A
i^2t value	$1 \leq PW \leq 10\text{ms}$, $T_j=25^\circ\text{C}$	$\int i^2 dt$	11	A^2s
	$1 \leq PW \leq 10\text{ms}$, $T_j=150^\circ\text{C}$		8	A^2s
Total power dissipation		P_D	46 ^{*2}	W
Junction temperature		T_j	175	$^\circ\text{C}$
Range of storage temperature		T_{stg}	-55 to +175	$^\circ\text{C}$

*1 $T_c=100^\circ\text{C}$, $T_j=150^\circ\text{C}$, Duty cycle=10% *2 $T_c=25^\circ\text{C}$

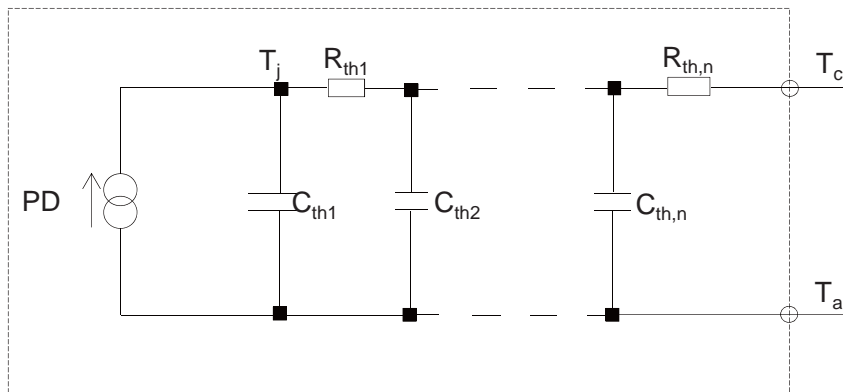
RATINGS AND CHARACTERISTIC CURVES

Electrical Specification ($T_A=25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	V_{DC}	$I_R=30\mu\text{A}$	650	-	-	V
Forward voltage	V_F	$I_F=6\text{A}, T_j=25^{\circ}\text{C}$	-	1.35	1.50	V
		$I_F=6\text{A}, T_j=150^{\circ}\text{C}$	-	1.44	1.71	V
		$I_F=6\text{A}, T_j=175^{\circ}\text{C}$	-	1.50	-	V
Reverse current	I_R	$V_R=650\text{V}, T_j=25^{\circ}\text{C}$	-	0.018	30	μA
		$V_R=650\text{V}, T_j=150^{\circ}\text{C}$	-	1.2	120	μA
		$V_R=650\text{V}, T_j=175^{\circ}\text{C}$	-	3.6	-	μA
Total capacitance	C	$V_R=1\text{V}, f=1\text{MHz}$	-	300	-	pF
		$V_R=650\text{V}, f=1\text{MHz}$	-	27	-	pF
Total capacitive charge	Q_C	$V_R=400\text{V}, di/dt=350\text{A}/\mu\text{s}$	-	19	-	nC
Switching time	t_C	$V_R=400\text{V}, di/dt=350\text{A}/\mu\text{s}$	-	15	-	ns
Non-repetitive Avaranche Energy	E_{ava}	$L=1\text{mH}$	-	71	-	mJ
Thermal resistance	$R_{th(j-c)}$	-	-	2.2	3.2	$^{\circ}\text{C}/\text{W}$

●Typical Transient Thermal Characteristics

Symbol	Value	Unit	Symbol	Value	Unit
R_{th1}	3.09E-02	K/W	C_{th1}	1.81E-04	Ws/K
R_{th2}	3.09E-01		C_{th2}	6.65E-04	
R_{th3}	1.83E+00		C_{th3}	1.58E-03	



RATINGS AND CHARACTERISTIC CURVES

Fig.1 $V_F - I_F$ Characteristics

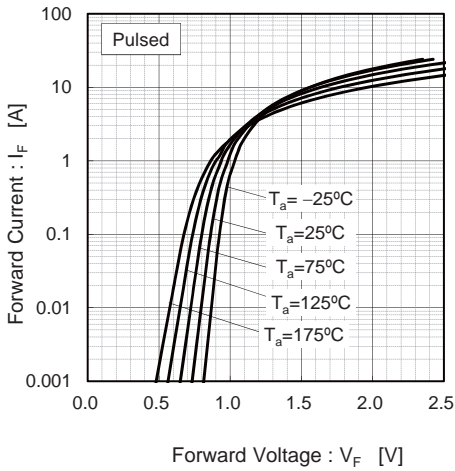


Fig.2 $V_F - I_F$ Characteristics

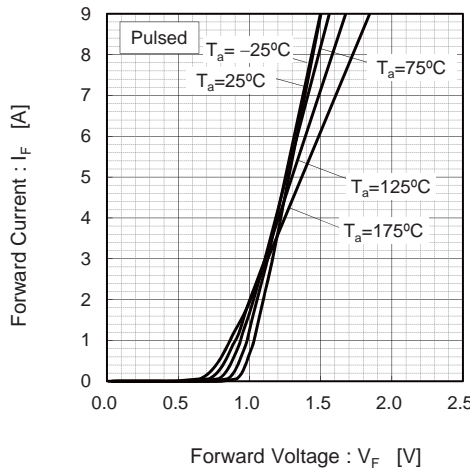


Fig.3 $V_R - I_R$ Characteristics

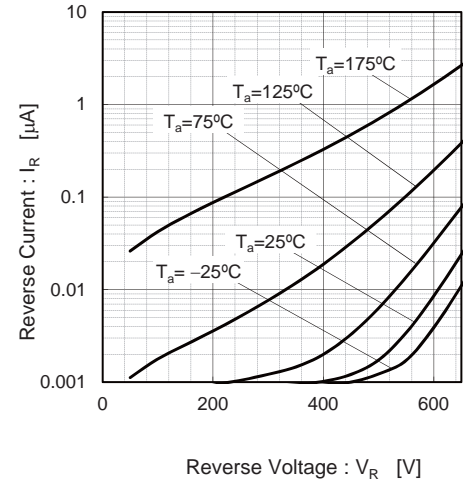


Fig.4 $V_R - C_i$ Characteristics

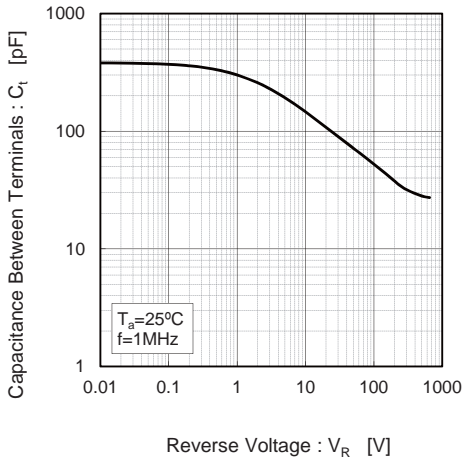


Fig.5 Typical Transient Thermal Resistance vs. Pulse Width

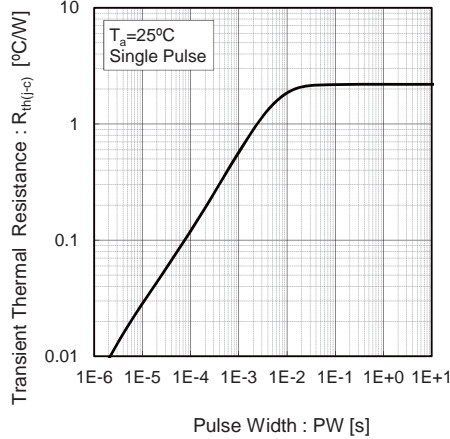


Fig.6 Power Dissipation

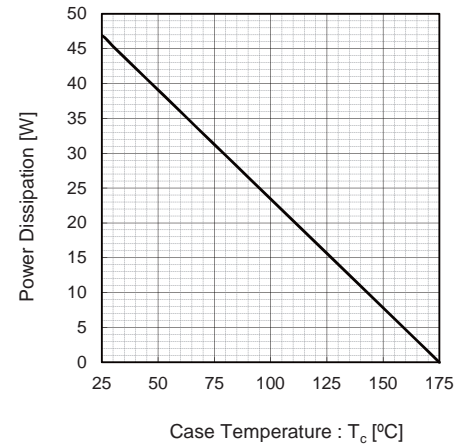
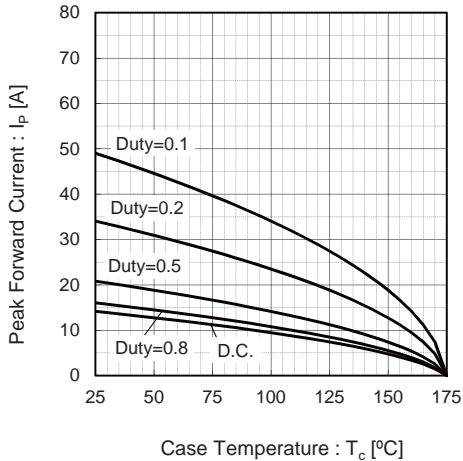
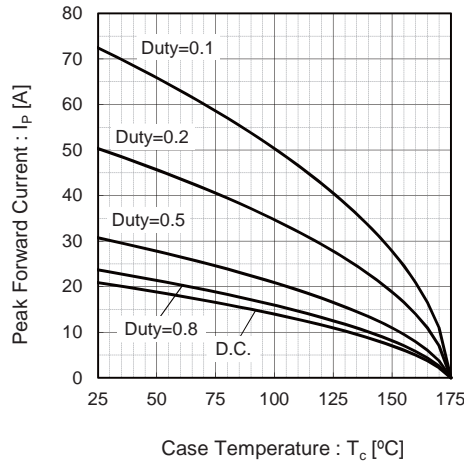


Fig.7*3 Maximum peak forward current derating curve $I_P - T_c$



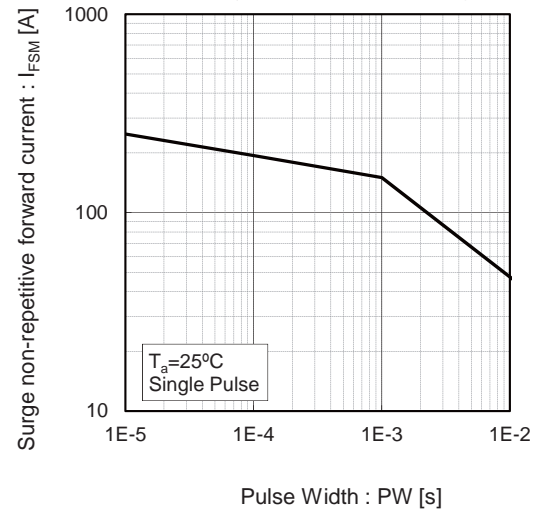
*3 Based on max V_f , max $R_{\theta(j-c)}$
Valid for switching of above 10kHz,
excluding D.C. curve.

Fig.8*4 Typical peak forward current derating curve $I_P - T_c$ (Not guaranteed)



*4 Based on typ V_f , typ $R_{\theta(j-c)}$
Typical value, not guaranteed
Valid for switching of above 10kHz,
excluding D.C. curve

Fig.9 Surge non-repetitive forward current vs. Pulse width (Sinusoidal waveform)



RATINGS AND CHARACTERISTIC CURVES

Fig.10 Typical capacitance store energy

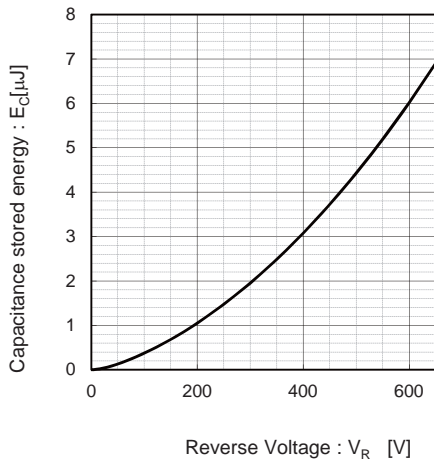
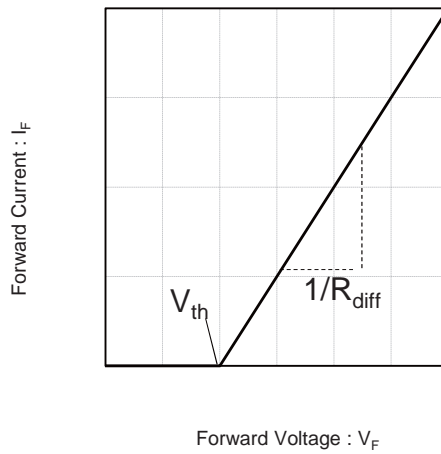


Fig.11 Equivalent forward current curve



$$V_F = V_{th} + R_{diff} I_F$$

$$V_{th}(T_j) = a_0 + a_1 T_j$$

$$R_{diff}(T_j) = b_0 + b_1 T_j + b_2 T_j^2$$

Symbol	Typical Value	Unit
a_0	9.66E-01	V
a_1	- 1.10E-03	V/°C
b_0	5.87E-02	Ω
b_1	1.24E-04	$\Omega/°C$
b_2	1.28E-06	$\Omega/°C^2$

T_j in °C; $-55\text{ °C} < T_j < 175\text{ °C}$; $I_F < 12\text{ A}$