SCS220AJ

SiC Schottky Barrier Diode

Datasheet

V_R	650V
I_F	20A
Q_C	31nC

● **Outline**

LPT(L)
<TO-263AB>

● **Inner circuit**

(1) Cathode
(2) N / C
(3) Cathode
(4) Anode

● **Features**

1) Shorter recovery time

2) Reduced temperature dependence

3) High-speed switching possible

● **Applications**

・ PFC Boost Topology

・ Secondary Side Rectification

・ Data Center

・ PV Power Conditioners

● **Packaging specifications**

Type	Packaging	Embossed tape
	Reel size (mm)	330
	Tape width (mm)	24
	Basic ordering unit (pcs)	1 000
	Packing code	TLL
	Marking	SCS220AJ

● **Absolute maximum ratings** (T_j = 25°C)

Parameter		Symbol	Value	Unit
Reverse voltage (repetitive peak)		V_{RM}	650	V
Reverse voltage (DC)		V_R	650	V
Continuous forward current (T_c= 116°C)		I_F	20	A
Surge non-repetitive forward current	PW=10ms sinusoidal, T_j=25°C	I_{FSM}	68	A
	PW=10ms sinusoidal, T_j=150°C		53	A
	PW=10μs square, T_j=25°C		260	A
Repetitive peak forward current		I_{FRM}	71 [*1]	A
i^2t value	PW=10ms, T_j=25°C	$\int i^2 dt$	23	A^2s
	PW=10ms, T_j=150°C		14	A^2s
Total power dissipation		P_D	100[*2]	W
Junction temperature		T_j	175	°C
Range of storage temperature		T_{stg}	−55 to +175	°C

*1 T_c=100°C, T_j=150°C, Duty cycle=10%　*2 T_c=25°C

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●**Electrical characteristics** (T_j = 25°C)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
DC blocking voltage	V_{DC}	I_R =4.0mA	650	-	-	V
Forward voltage	V_F	I_F=20A,T_j=25°C	-	1.35	1.55	V
		I_F=20A,T_j=150°C	-	1.55	-	V
		I_F=20A,T_j=175°C	-	1.63	-	V
Reverse current	I_R	V_R=600V,T_j=25°C	-	4	400	μA
		V_R=600V,T_j=150°C	-	60	-	μA
		V_R=600V,T_j=175°C	-	140	-	μA
Total capacitance	C	V_R=1V,f=1MHz	-	730	-	pF
		V_R=600V,f=1MHz	-	74	-	pF
Total capacitive charge	Q_C	V_R=400V,di/dt=350A/μs	-	31	-	nC
Switching time	t_C	V_R=400V,di/dt=350A/μs	-	19	-	ns

●**Thermal characteristics**

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Thermal resistance	$R_{th(j-c)}$	-	-	1.1	1.4	°C/W

●**Typical Transient Thermal Characteristics**

Symbol	Value	Unit
R_{th1}	2.43E-02	
R_{th2}	7.53E-01	K/W
R_{th3}	3.23E-01	

Symbol	Value	Unit
C_{th1}	3.11E-03	
C_{th2}	1.03E-03	Ws/K
C_{th3}	1.55E-01	
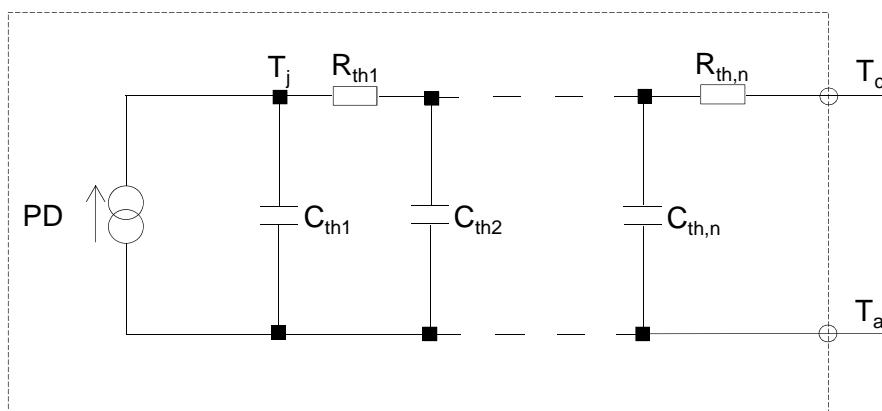
●**Electrical characteristic curves**

Fig.1 V_F - I_F Characteristics
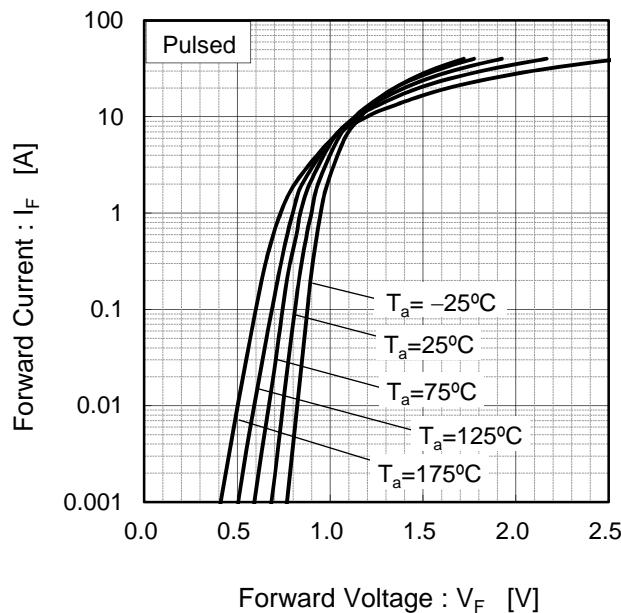
Fig.2 V_F - I_F Characteristics
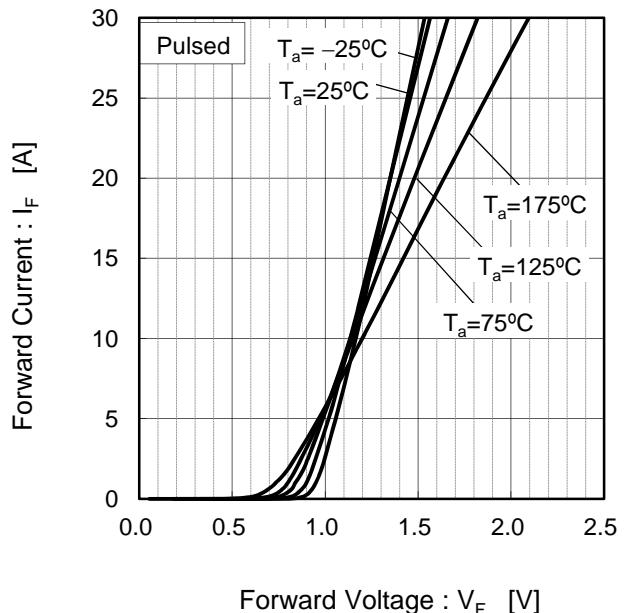
Fig.3 V_R - I_R Characteristics
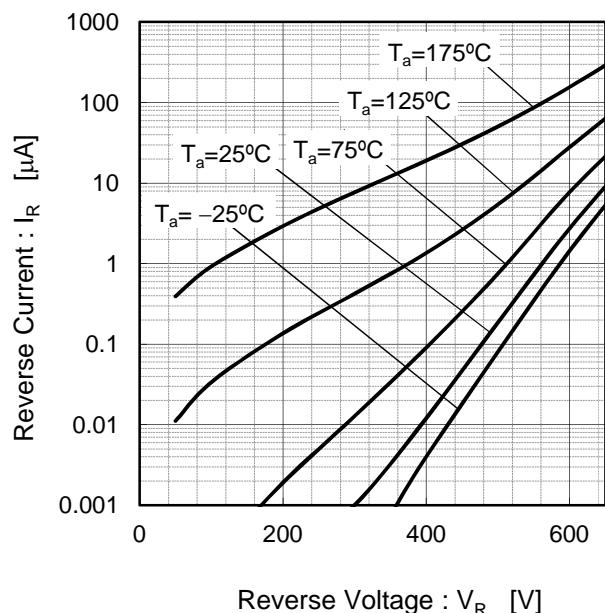
Fig.4 V_R - C_t Characteristics
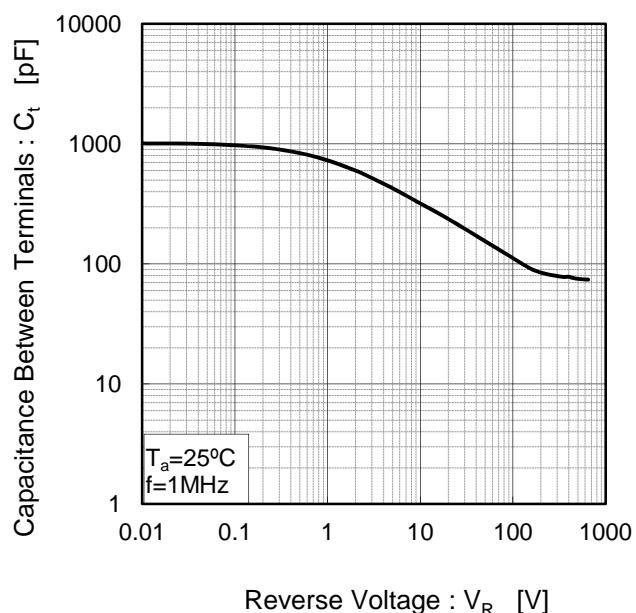
● **Electrical characteristic curves**

Fig.5 Typical Transient Thermal Resistance vs. Pulse Width

$T_a=25°C$
Single Pulse

Transient Thermal Resistance : $R_{th(j-c)}$ [°C/W]

Pulse Width : PW [s]

Fig.6 Power Dissipation
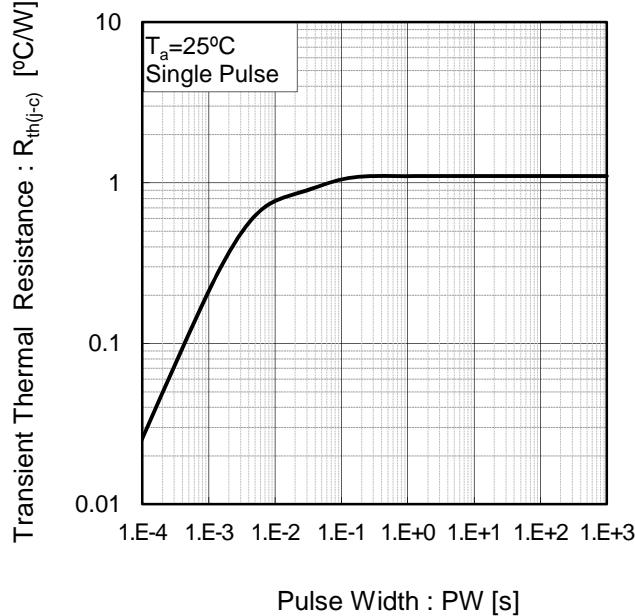
Power Dissipation [W]

Case Temperature : T_c [°C]
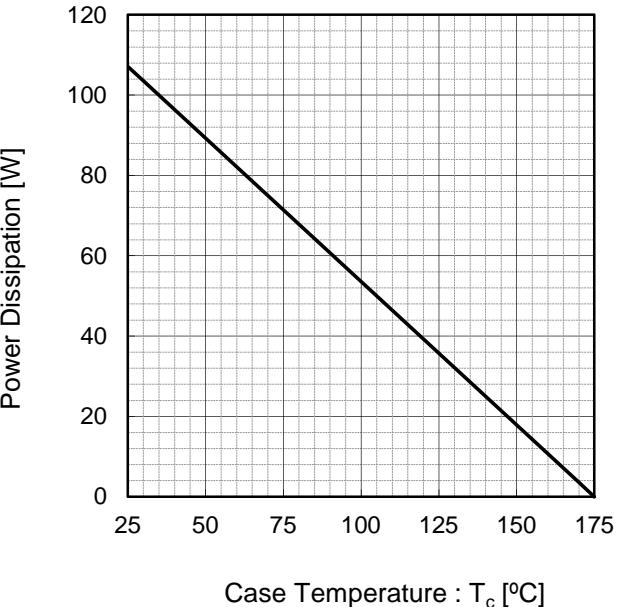
Fig.7*3 Maximum peak forward current derating curve I_P - T_c

Peak Forward Current : I_P [A]

Duty=0.1
Duty=0.2
Duty=0.5
Duty=0.8
D.C.
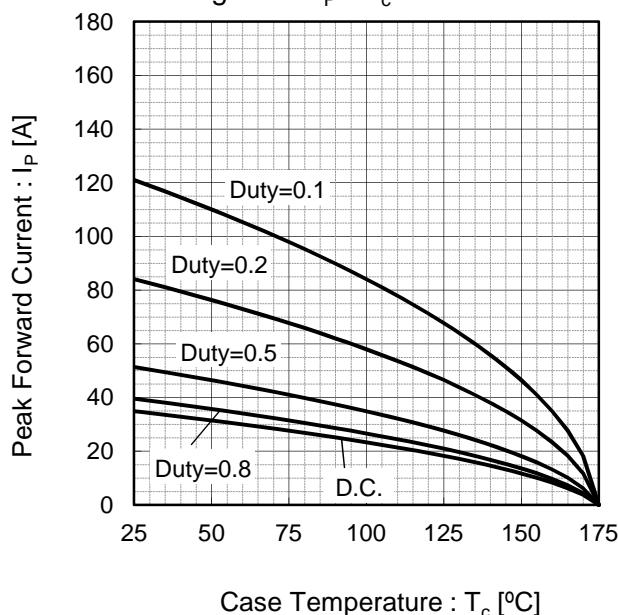
Case Temperature : T_c [°C]
*3 Based on max Vf, max $R_{th(j-c)}$
Valid for switching of above 10kHz,
excluding D.C. curve.

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

Peak Forward Current : I_P [A]

Duty=0.1
Duty=0.2
Duty=0.5
Duty=0.8
D.C.
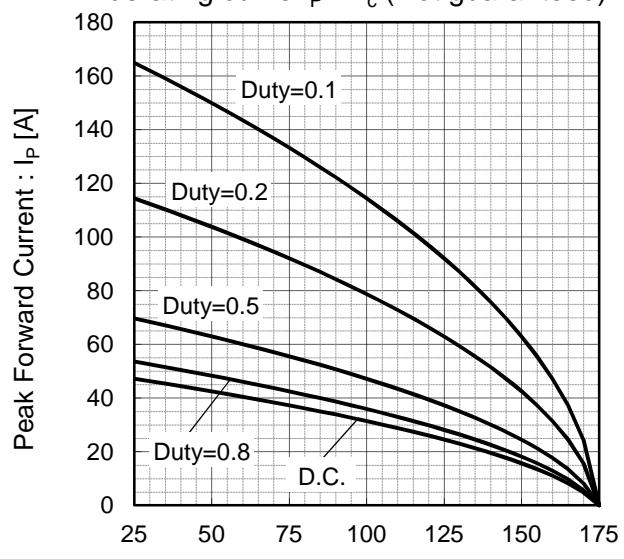
Case Temperature : T_c [°C]
*4 Based on typ Vf, typ $R_{th(j-c)}$
Typical value, not guaranteed
Valid for switching of above 10kHz,
excluding D.C. curve

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● **Electrical characteristic curves**

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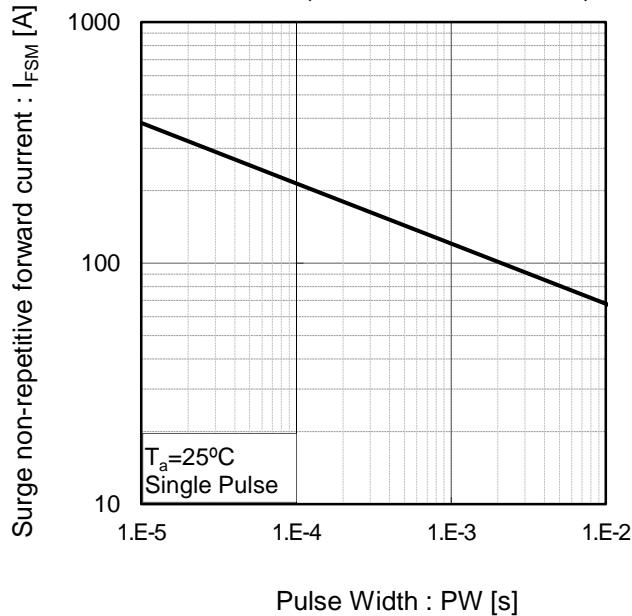

Fig.10 Typical capacitance store energy
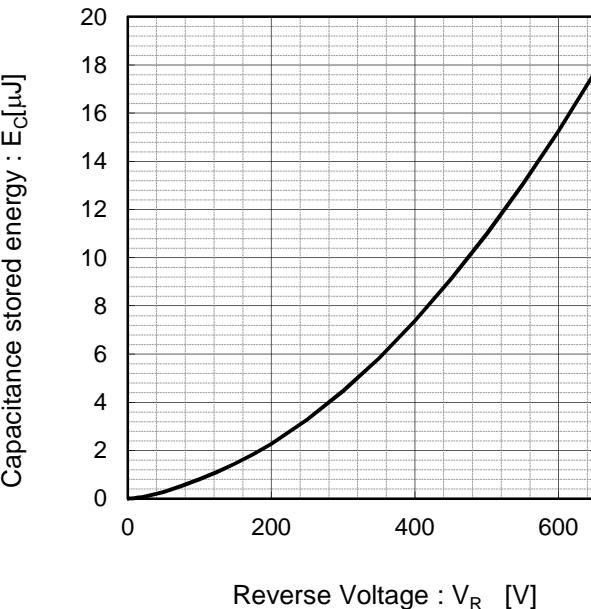
● **Symplified forward characteristic model**

Fig.11 Equivalent forward current curve
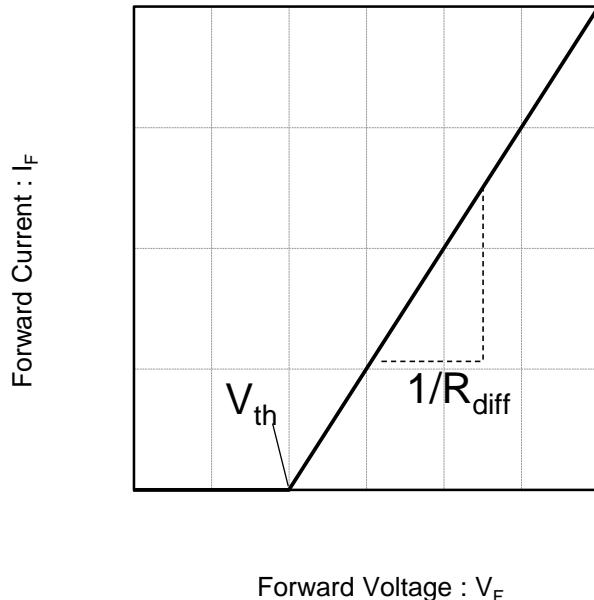
$$V_F = V_{th} + R_{diff} I_F$$

$$V_{th}(T_j) = a_0 + a_1 T_j$$
$$R_{diff}(T_j) = b_0 + b_1 T_j + b_2 T_j^2$$

Symbol	Typical Value	Unit
a_0	9.35E-01	V
a_1	-1.12E-03	V/°C
b_0	1.99E-02	Ω
b_1	5.10E-05	Ω/°C
b_2	5.40E-07	Ω/°C²

T_j in °C; -55 °C < T_j < °C ; I_F < 40 A

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