SCS210KG

SiC Schottky Barrier Diode

Datasheet

V_R	1200V
I_F	10A
Q_C	34nC

●Outline

TO-220AC

(1)

(2) (3)

●Features

1) Shorter recovery time

2) Reduced temperature dependence

3) High-speed switching possible
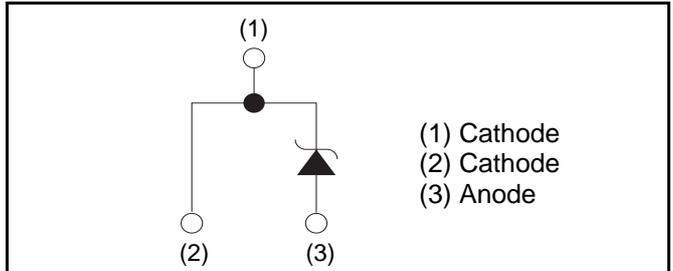
●Inner circuit

(1)

(1) Cathode
(2) Cathode
(3) Anode

(2)   (3)

●Applications

・ PFC Boost Topology

・ Secondary Side Rectification

・ Data Center

・ PV Power Conditioners
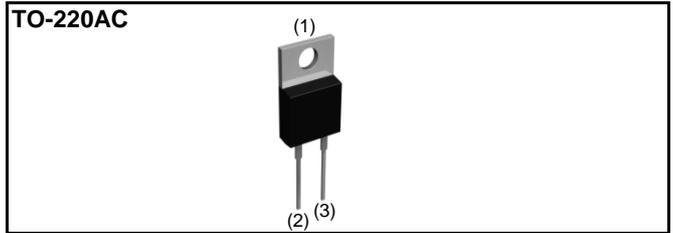
●Packaging specifications

	Packaging	Tube
Type	Reel size (mm)	-
	Tape width (mm)	-
	Basic ordering unit (pcs)	50
	Packing code	C
	Marking	SCS210KG

●Absolute maximum ratings (T_j = 25°C)

Parameter		Symbol	Value	Unit
Reverse voltage (repetitive peak)		V_{RM}	1200	V
Reverse voltage (DC)		V_R	1200	V
Continuous forward current (T_c= 146°C)		I_F	10	A
Surge non-repetitive forward current	PW=10ms sinusoidal, T_j=25°C	I_{FSM}	42	A
	PW=10ms sinusoidal, T_j=150°C		31	A
	PW=10μs square, T_j=25°C		160	A
Repetitive peak forward current		I_{FRM}	50 *1	A
i^2t value	PW=10ms, T_j=25°C	$\int i^2 dt$	9.0	A^2s
	PW=10ms, T_j=150°C		4.8	A^2s
Total power dissipation		P_D	150*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	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	V_{DC}	I_R =0.2mA	1200	-	-	V
Forward voltage	V_F	I_F=10A,T_j=25°C	-	1.4	1.6	V
		I_F=10A,T_j=150°C	-	1.8	-	V
		I_F=10A,T_j=175°C	-	1.9	-	V
Reverse current	I_R	V_R=1200V,T_j=25°C	-	10	200	μA
		V_R=1200V,T_j=150°C	-	80	-	μA
		V_R=1200V,T_j=175°C	-	130	-	μA
Total capacitance	C	V_R=1V,f=1MHz	-	530	-	pF
		V_R=800V,f=1MHz	-	43	-	pF
Total capacitive charge	Q_C	V_R=800V,di/dt=500A/μs	-	34	-	nC
Switching time	t_C	V_R=800V,di/dt=500A/μs	-	15	-	ns

● **Thermal characteristics**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance	$R_{th(j-c)}$	-	-	0.73	0.99	°C/W

● **Typical Transient Thermal Characteristics**

Symbol	Value	Unit
R_{th1}	1.92E-01	
R_{th2}	5.39E-01	K/W
R_{th3}	3.91E-05	

Symbol	Value	Unit
C_{th1}	3.18E-03	
C_{th2}	6.56E-03	Ws/K
C_{th3}	1.40E+02	

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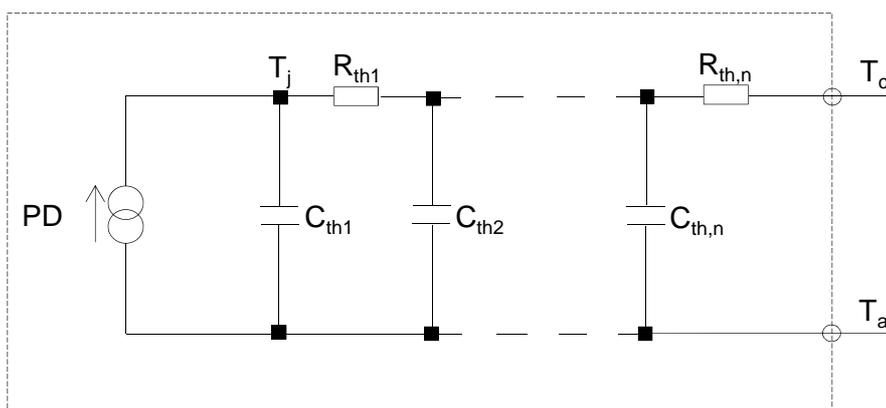
●**Electrical characteristic curves**
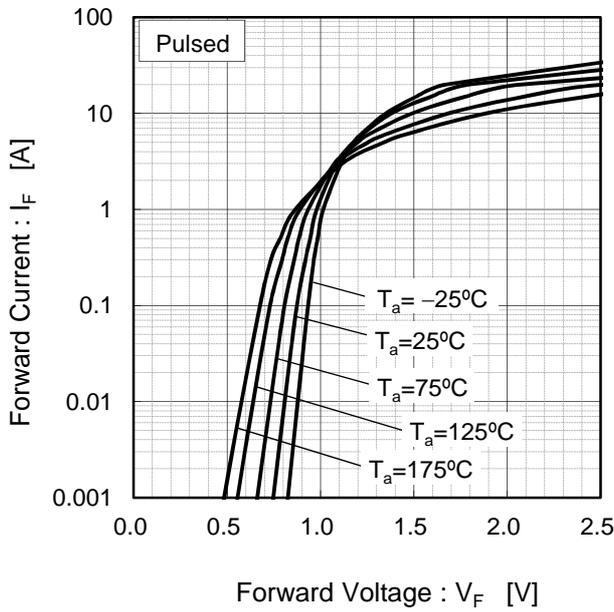
Fig.1 V_F - I_F Characteristics

Fig.2 V_F - I_F Characteristics
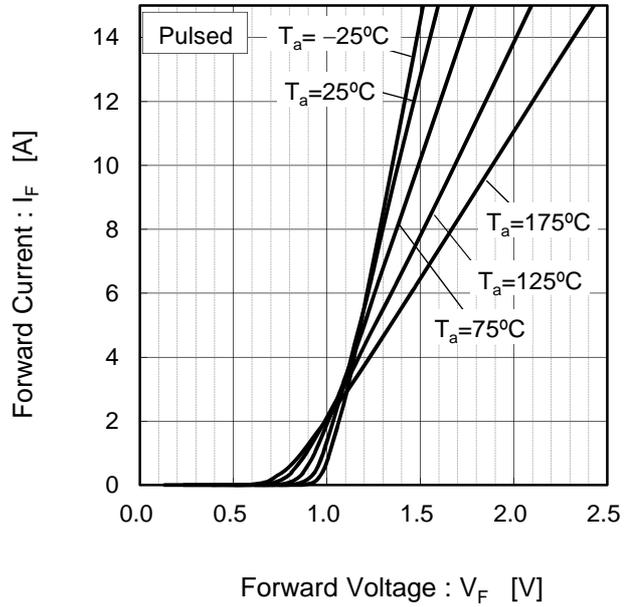
Fig.3 V_R - I_R Characteristics
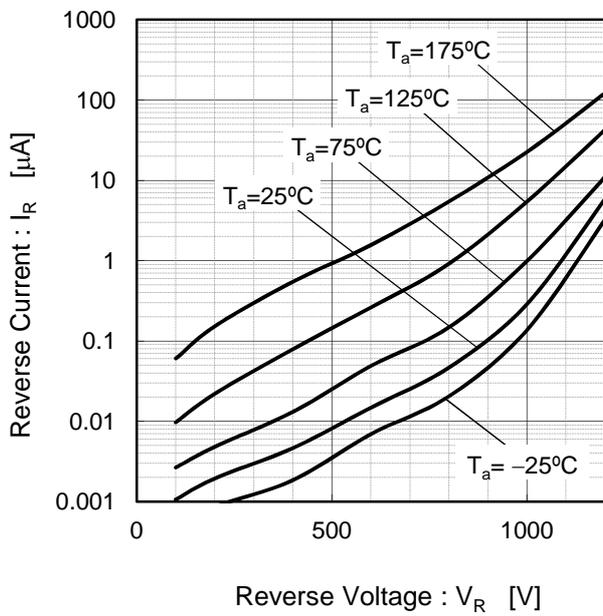

Fig.4 V_R - C_t Characteristics

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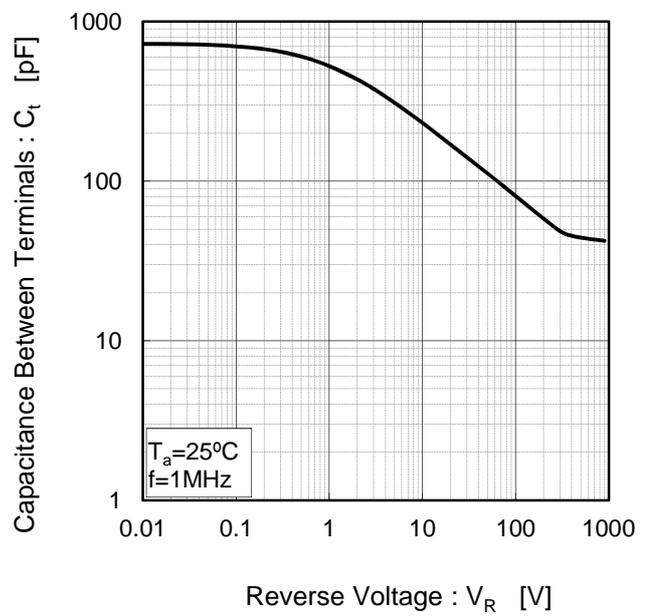
●**Electrical characteristic curves**

Fig.5 Typical Transient Thermal Resistance vs. Pulse Width

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

Pulse Width : PW [s]

T_a=25ºC
Single Pulse
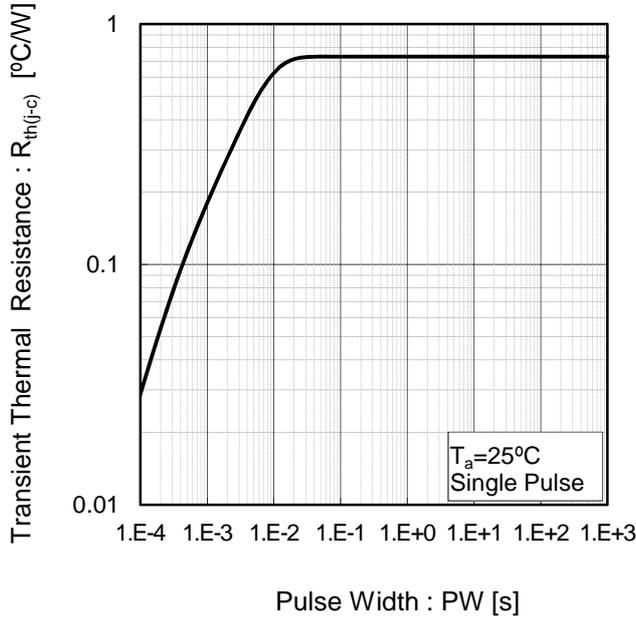
Fig.6 Power Dissipation

Power Dissipation [W]

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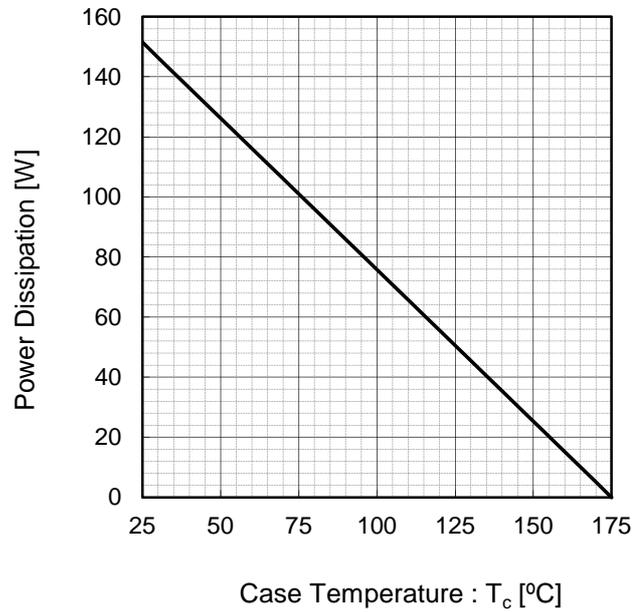
Fig.7[*3] Maximum peak forward current derating curve I_P - T_c

Peak Forward Current : I_P [A]

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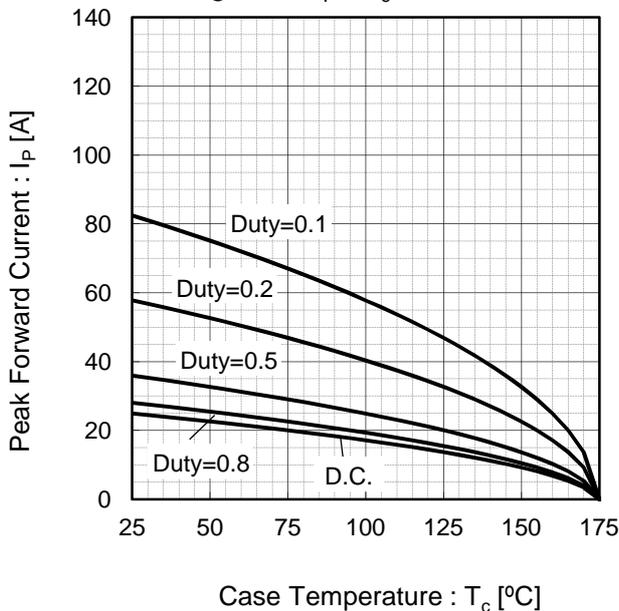
Case Temperature : T_c [ºC]
*3 Based on max Vf, max $R_{th(j-c)}$
Valid for switching of above 10kHz,
excluding D.C. curve.

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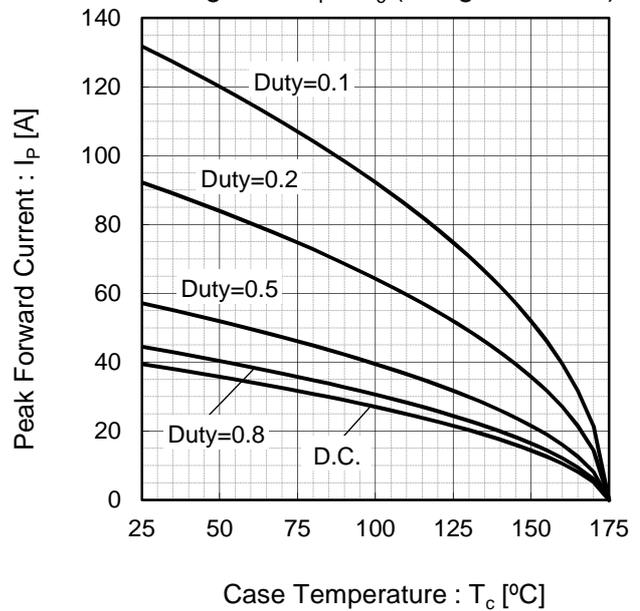
Case Temperature : T_c [ºC]
*4 Based on typ Vf, typ $R_{th(j-c)}$
Typical value, not guaranteed
Valid for switching of above 10kHz,
excluding D.C. curve

●**Electrical characteristic curves**

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

Surge non-repetitive forward current : I_{FSM} [A]

T_a=25ºC
Single Pulse

Pulse Width : PW [s]

Fig.10 Typical capacitance store energy
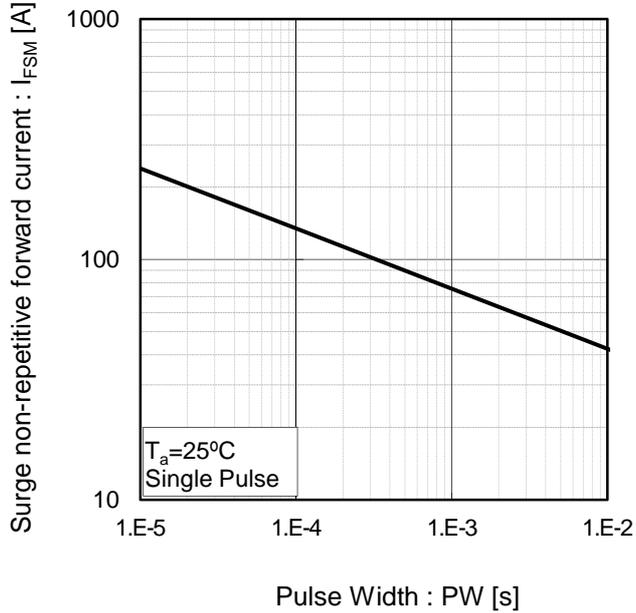

Capacitance stored energy : E_C[μJ]

Reverse Voltage : V_R [V]
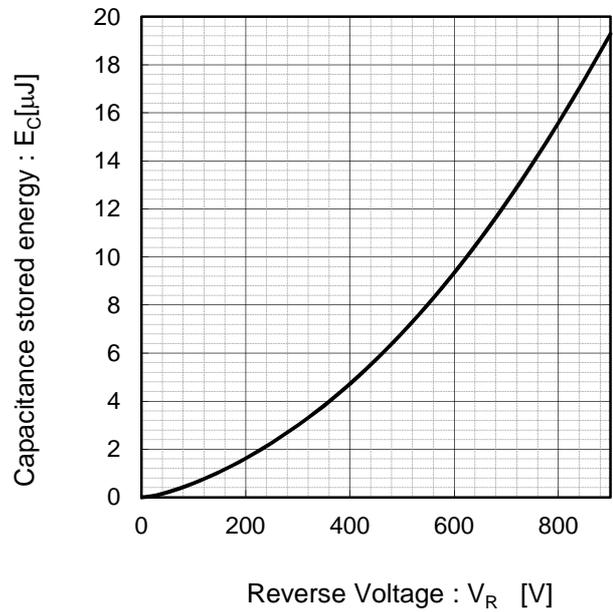
●**Symplified forward characteristic model**

Fig.11 Equivalent forward current curve

Forward Current : I_F

V_{th} $1/R_{diff}$

Forward Voltage : V_F
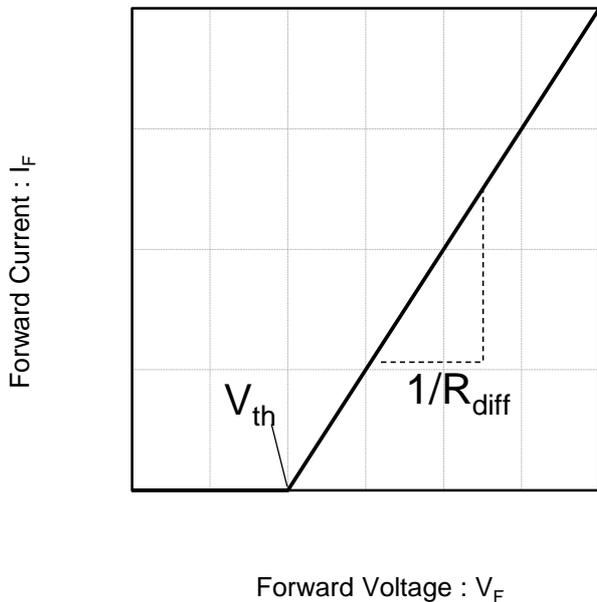
$$V_F = V_{th} + R_{diff} \, I_F$$

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

Symbol	Typical Value	Unit
a_0	9.93E-01	V
a_1	-1.27E-03	V/°C
b_0	3.65E-02	Ω
b_1	2.06E-04	Ω/°C
b_2	1.33E-06	Ω/°C^2

T_j in ºC; -55 ºC < T_j < ºC ; I_F < 20 A

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