SCS215KG

SiC Schottky Barrier Diode

Datasheet

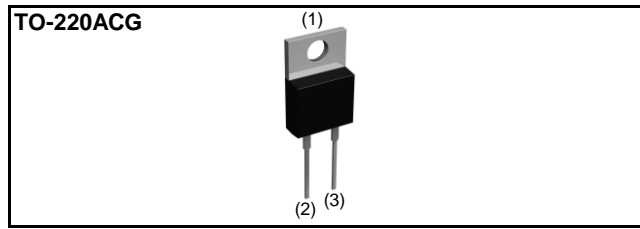|	
V_R	1200V
I_F	15A
Q_C	51nC

●Features

1) Shorter recovery time

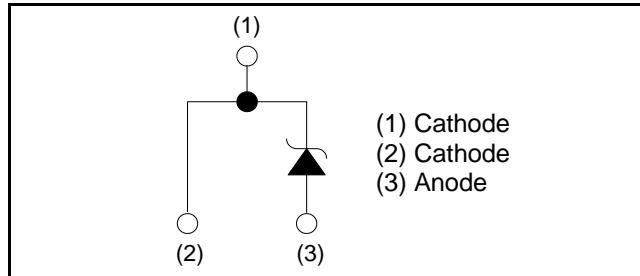2) Reduced temperature dependence

3) High-speed switching possible

●Applications

・ PFC Boost Topology

・ Secondary Side Rectification

・ Data Center

・ PV Power Conditioners

●Outline

TO-220ACG

●Inner circuit

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

●Packaging specifications

Type	Packaging	Tube
	Reel size (mm)	-
	Tape width (mm)	-
	Basic ordering unit (pcs)	50
	Packing code	C17
	Marking	SCS215KG

●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= 140°C)		I_F	15	A
Surge non-repetitive forward current	PW=10ms sinusoidal, T_j=25°C	I_{FSM}	62	A
	PW=10ms sinusoidal, T_j=150°C		46	A
	PW=10μs square, T_j=25°C		240	A
Repetitive peak forward current		I_{FRM}	68 *1	A
i^2t value	PW=10ms, T_j=25°C	$\int i^2 dt$	19	A^2s
	PW=10ms, T_j=150°C		10	A^2s
Total power disspation		P_D	180*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 = 0.3mA	1200	-	-	V
Forward voltage	V_F	I_F= 15A, T_j=25°C	-	1.4	1.6	V
		I_F= 15A, T_j=150°C	-	1.8	-	V
		I_F= 15A, T_j=175°C	-	1.9	-	V
Reverse current	I_R	V_R= 1200 V,T_j=25°C	-	15	300	μA
		V_R= 1200 V,T_j=150°C	-	120	-	μA
		V_R= 1200 V,T_j=175°C	-	195	-	μA
Total capacitance	C	V_R= 1V,f=1MHz	-	790	-	pF
		V_R= 800V,f=1MHz	-	64	-	pF
Total capacitive charge	Q_C	V_R =800V,di/dt=500A/μs	-	51	-	nC
Switching time	t_C	V_R =800V,di/dt=500A/μs	-	18	-	ns

●**Thermal characteristics**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance	$R_{th(j\text{-}c)}$	-	-	0.67	0.80	°C/W

●**Typical Transient Thermal Characteristics**

Symbol	Value	Unit	Symbol	Value	Unit
R_{th1}	1.24 $\times 10^{-1}$		C_{th1}	3.81 $\times 10^{-3}$	
R_{th2}	3.92 $\times 10^{-1}$	K/W	C_{th2}	4.44 $\times 10^{-3}$	Ws/K
R_{th3}	1.54 $\times 10^{-1}$		C_{th3}	6.02 $\times 10^{-2}$	

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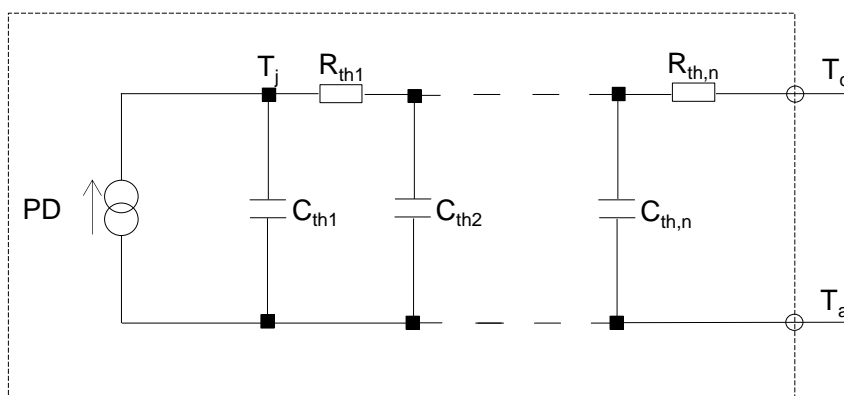
●**Electrical characteristic curves**
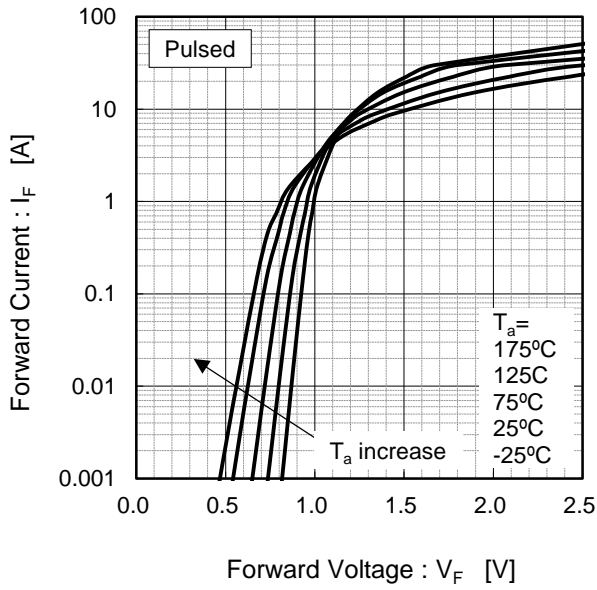
Fig.1 V_F - I_F Characteristics

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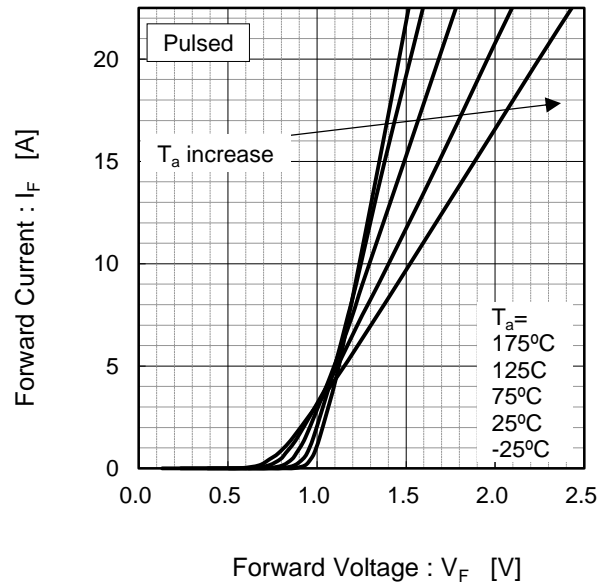
Fig.3 V_R - I_R Characteristics
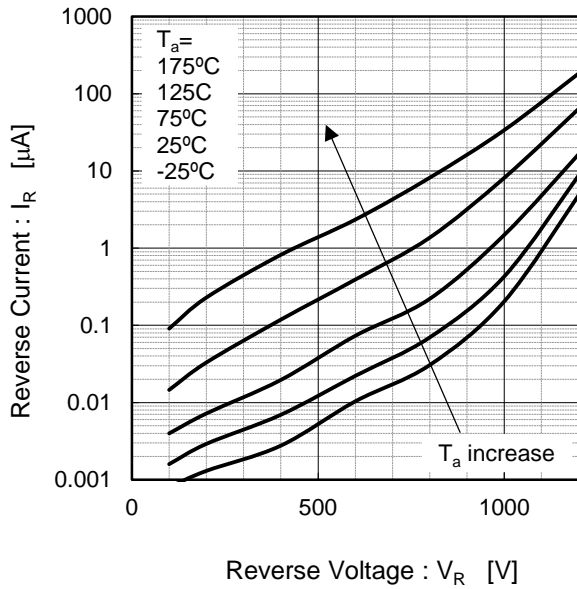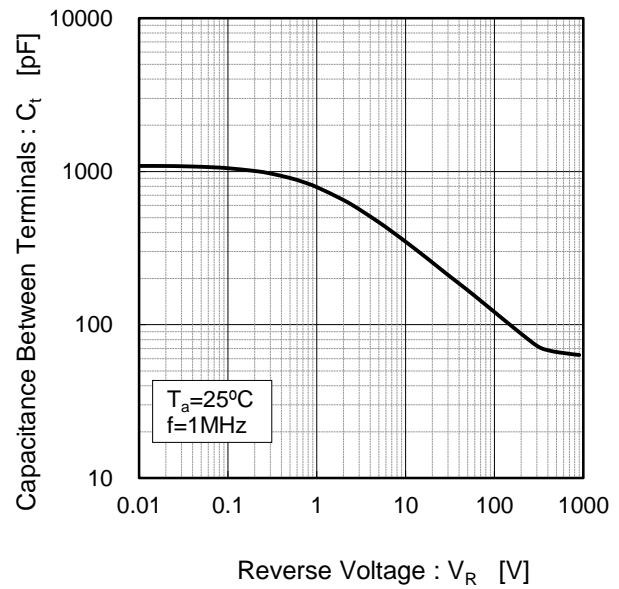

Fig.4 V_R-C_t Characteristics

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● **Electrical characteristic curves**
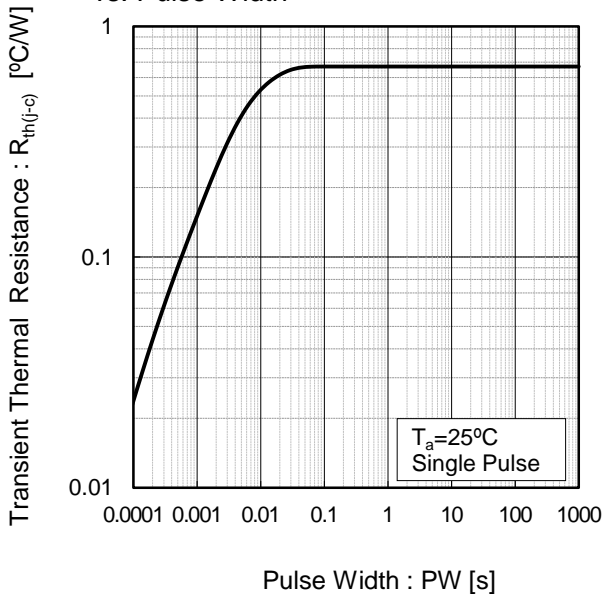
Fig.5 Typical Transient Thermal Resistance
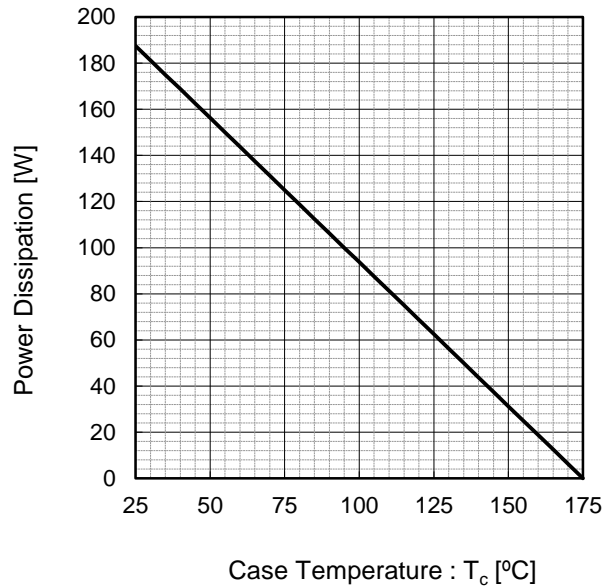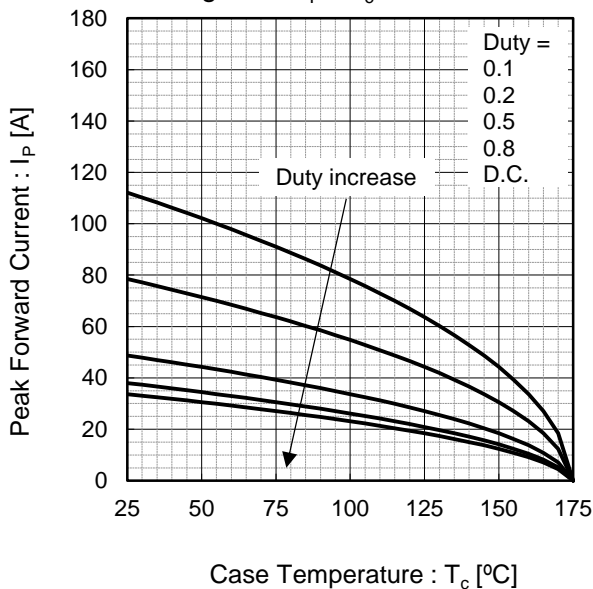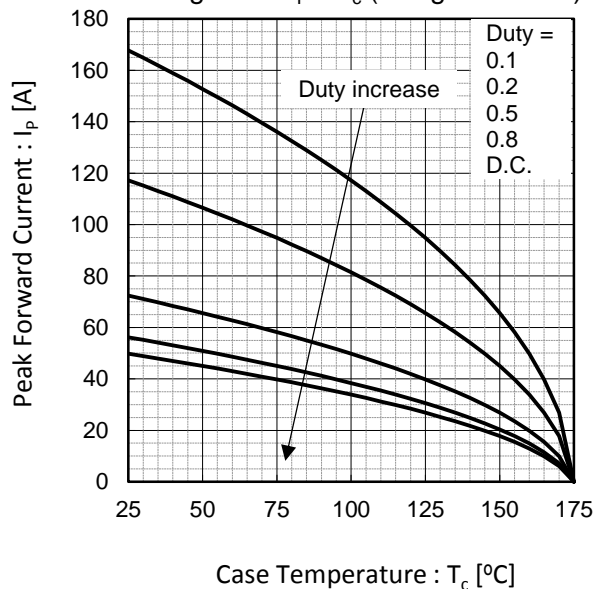vs. Pulse Width

Fig.6 Power Dissipation

Fig.7*3 Maximum peak forward current
derating curve I_P - T_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)

*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)
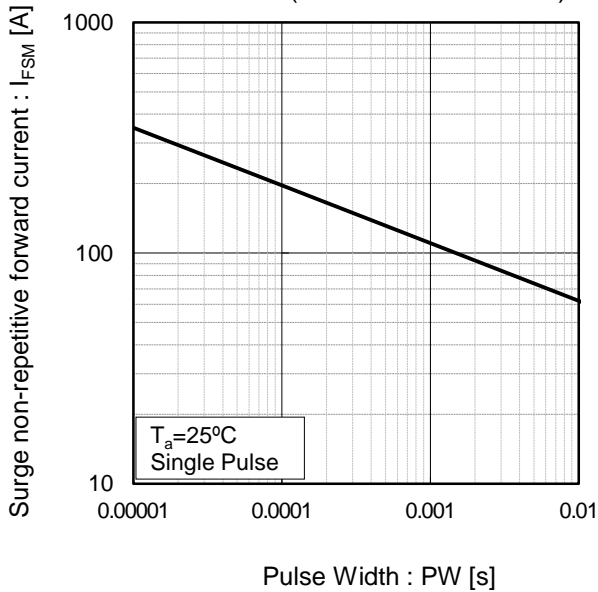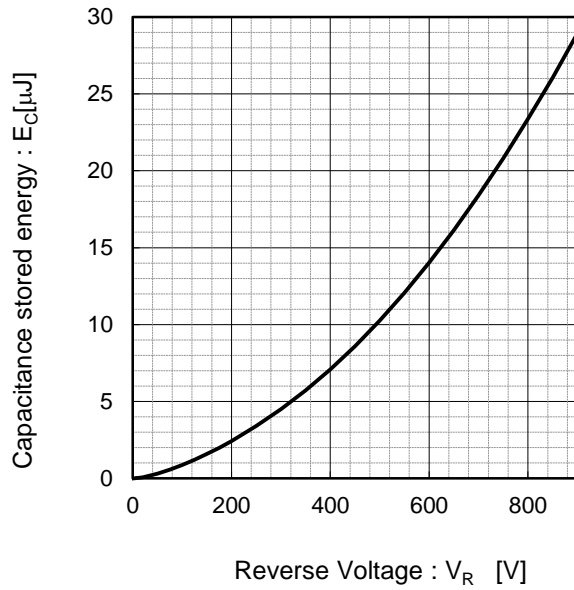
Fig.10 Typical capacitance store energy

●**Symplified forward characteristic model**

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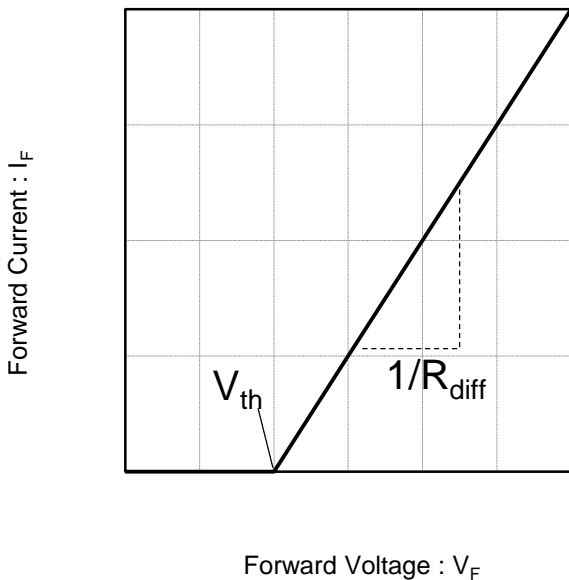
$$V_F = V_{th} + R_{diff} I_F$$

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

Symbol	Typical Value	Unit
a_0	9.93 $\times 10^{-1}$	V
a_1	-1.27 $\times 10^{-3}$	V/°C
b_0	2.43 $\times 10^{-2}$	Ω
b_1	1.37 $\times 10^{-4}$	Ω/°C
b_2	8.87 $\times 10^{-7}$	Ω/°C^2

T_j in °C; -55 °C < T_j < °C ; I_F < 30 A

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