

$V_R$	1200V
$I_F$	20A
$Q_C$	65nC

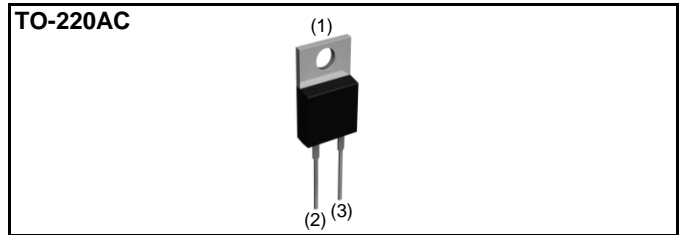
### ●Features

- 1) Shorter recovery time
- 2) Reduced temperature dependence
- 3) High-speed switching possible

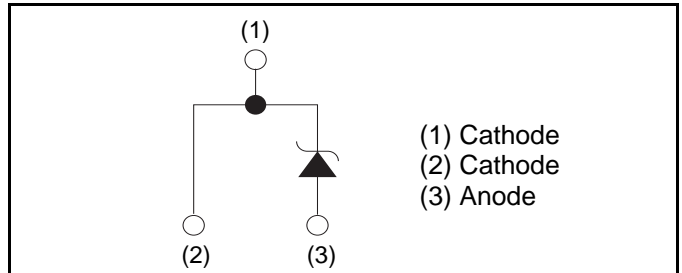
### ●Applications

- PFC Boost Topology
- Secondary Side Rectification
- Data Center
- PV Power Conditioners

### ●Outline



### ●Inner circuit



### ●Packaging specifications

Type	Packaging	Tube
	Reel size (mm)	-
	Tape width (mm)	-
	Basic ordering unit (pcs)	50
	Packing code	C
	Marking	SCS220KG

### ●Absolute maximum ratings ( $T_j = 25^\circ\text{C}$ )

Parameter	Symbol	Value	Unit	
Reverse voltage (repetitive peak)	$V_{RM}$	1200	V	
Reverse voltage (DC)	$V_R$	1200	V	
Continuous forward current ( $T_c = 133^\circ\text{C}$ )	$I_F$	20	A	
Surge non-repetitive forward current	$I_{FSM}$	PW=10ms sinusoidal, $T_j=25^\circ\text{C}$	79	A
		PW=10ms sinusoidal, $T_j=150^\circ\text{C}$	59	A
		PW=10μs square, $T_j=25^\circ\text{C}$	310	A
Repetitive peak forward current	$I_{FRM}$	83 <sup>*1</sup>	A	
$i^2t$ value	$\int i^2 dt$	PW=10ms, $T_j=25^\circ\text{C}$	31	A <sup>2</sup> s
		PW=10ms, $T_j=150^\circ\text{C}$	17	A <sup>2</sup> s
Total power dissipation	$P_D$	210 <sup>*2</sup>	W	
Junction temperature	$T_j$	175	°C	
Range of storage temperature	$T_{stg}$	-55 to +175	°C	

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

### ●Electrical characteristics ( $T_j = 25^\circ\text{C}$ )

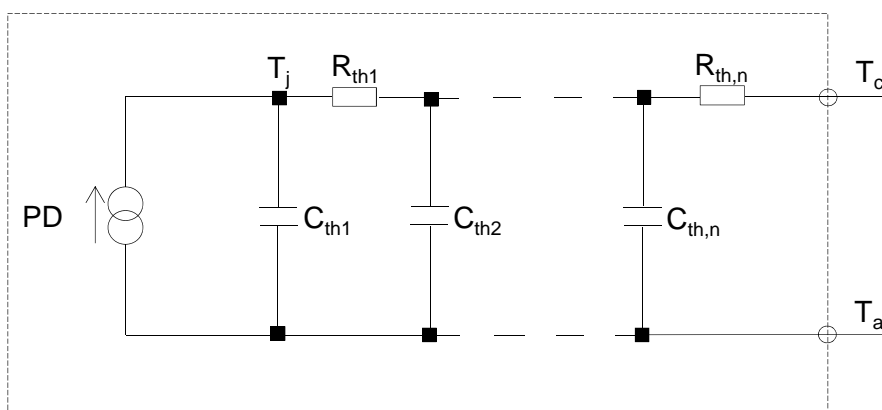
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	$V_{DC}$	$I_R=0.4\text{mA}$	1200	-	-	V
Forward voltage	$V_F$	$I_F=20\text{A}, T_j=25^\circ\text{C}$	-	1.4	1.6	V
		$I_F=20\text{A}, T_j=150^\circ\text{C}$	-	1.8	-	V
		$I_F=20\text{A}, T_j=175^\circ\text{C}$	-	1.9	-	V
Reverse current	$I_R$	$V_R=1200\text{V}, T_j=25^\circ\text{C}$	-	20	400	$\mu\text{A}$
		$V_R=1200\text{V}, T_j=150^\circ\text{C}$	-	160	-	$\mu\text{A}$
		$V_R=1200\text{V}, T_j=175^\circ\text{C}$	-	260	-	$\mu\text{A}$
Total capacitance	C	$V_R=1\text{V}, f=1\text{MHz}$	-	1050	-	pF
		$V_R=800\text{V}, f=1\text{MHz}$	-	85	-	pF
Total capacitive charge	$Q_C$	$V_R=800\text{V}, di/dt=500\text{A}/\mu\text{s}$	-	65	-	nC
Switching time	$t_C$	$V_R=800\text{V}, di/dt=500\text{A}/\mu\text{s}$	-	18	-	ns

### ●Thermal characteristics

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance	$R_{th(j-c)}$	-	-	0.62	0.71	$^\circ\text{C}/\text{W}$

### ●Typical Transient Thermal Characteristics

Symbol	Value	Unit	Symbol	Value	Unit
$R_{th1}$	1.59E-01	K/W	$C_{th1}$	5.03E-03	Ws/K
$R_{th2}$	2.74E-01		$C_{th2}$	7.27E-03	
$R_{th3}$	1.87E-01		$C_{th,n}$	1.39E-01	



●Electrical characteristic curves

Fig.1  $V_F - I_F$  Characteristics

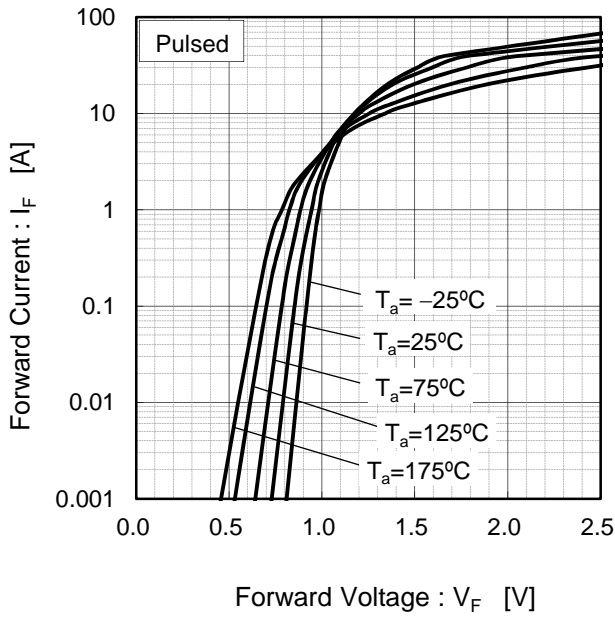


Fig.2  $V_F - I_F$  Characteristics

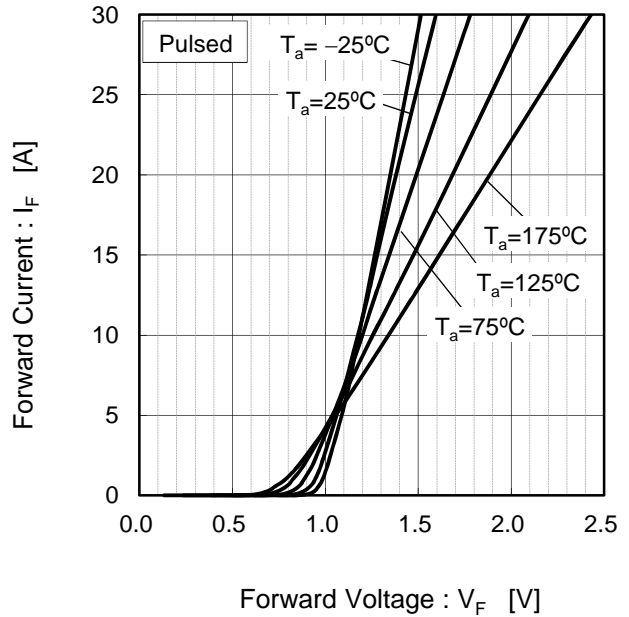


Fig.3  $V_R - I_R$  Characteristics

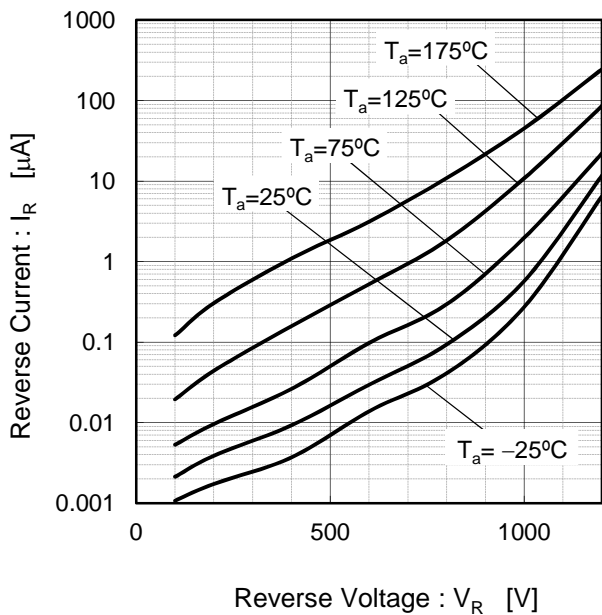
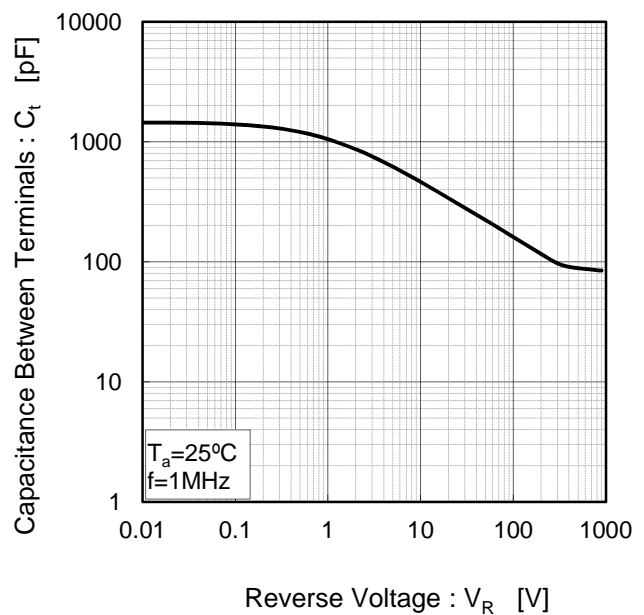


Fig.4  $V_R - C_t$  Characteristics



●Electrical characteristic curves

Fig.5 Typical Transient Thermal Resistance vs. Pulse Width

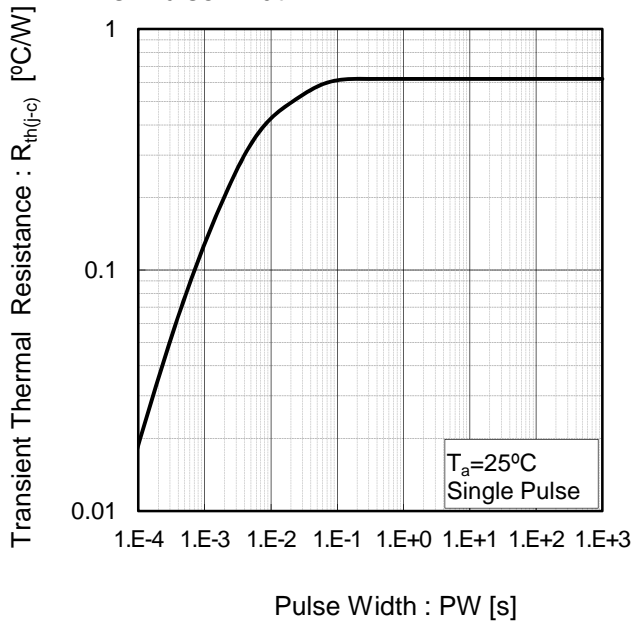


Fig.6 Power Dissipation

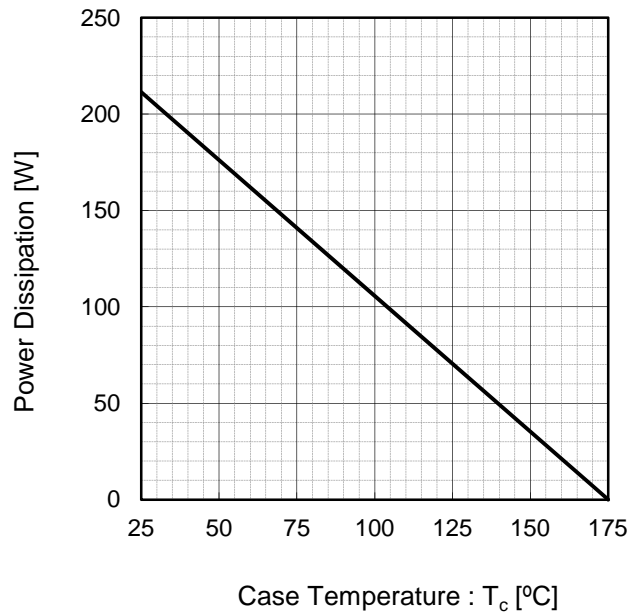
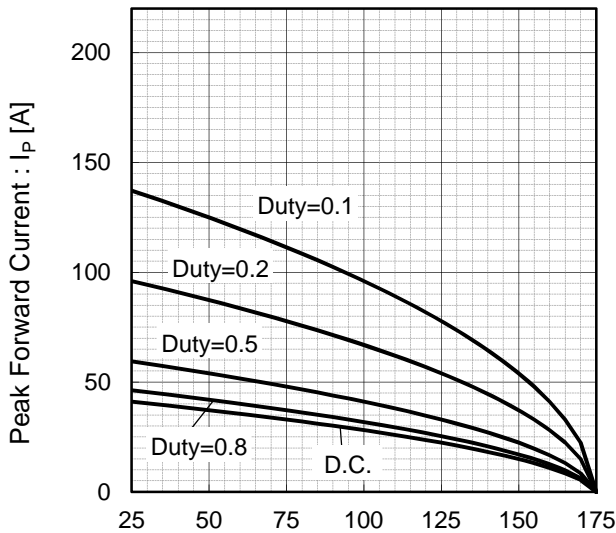
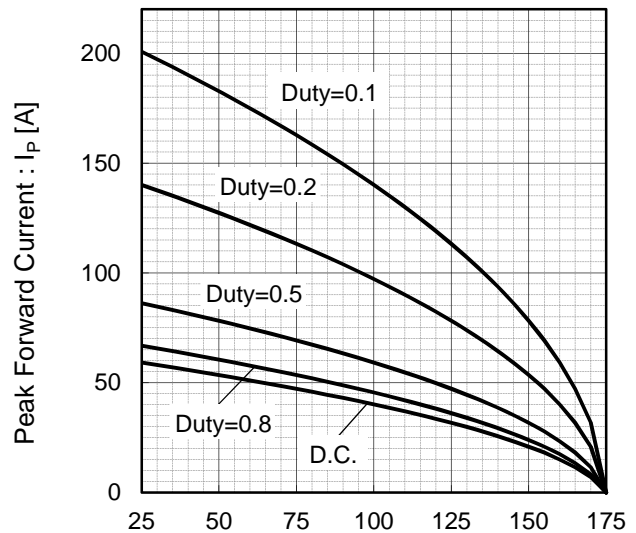


Fig.7\*3 Maximum peak forward current derating curve  $I_P - T_c$



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)



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

●Electrical characteristic curves

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

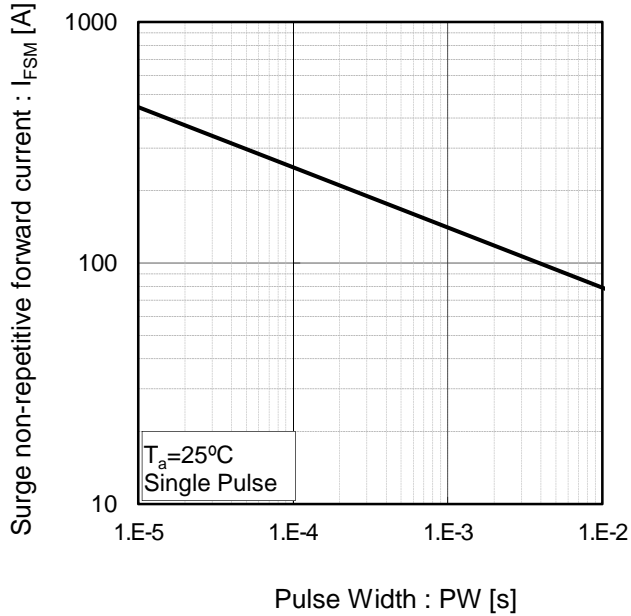
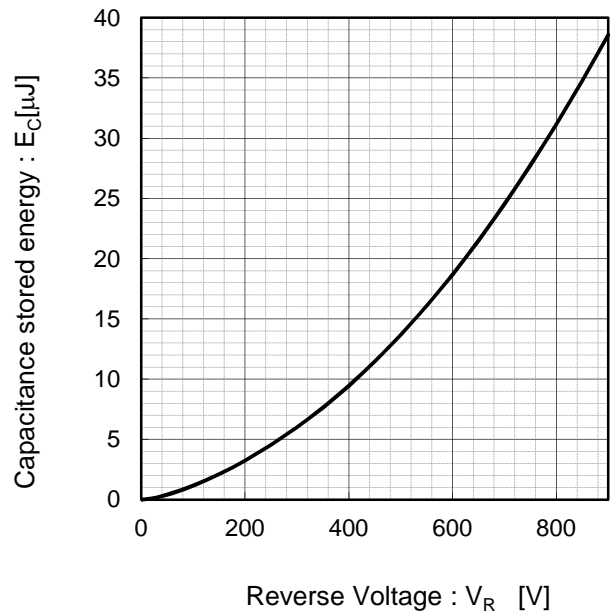


Fig.10 Typical capacitance store energy



●Simplified 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 <sub>0</sub>	9.93E-01	V
a <sub>1</sub>	-1.27E-03	V/°C
b <sub>0</sub>	1.83E-02	Ω
b <sub>1</sub>	1.03E-04	Ω/°C
b <sub>2</sub>	6.65E-07	Ω/°C <sup>2</sup>

T<sub>j</sub> in °C; -55 °C < T<sub>j</sub> < °C ; I<sub>F</sub> < 40 A

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