



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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$V_R$	650V
$I_F$	6A
$Q_C$	19nC

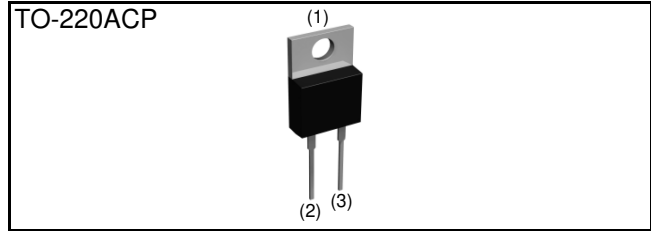
### ●Features

- 1) Shorter recovery time
- 2) Reduced temperature dependence
- 3) High-speed switching possible
- 4) High surge current capability

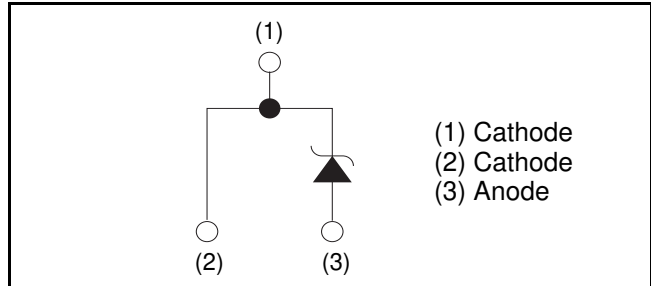
### ●Construction

Silicon carbide epitaxial planar type

### ●Outline



### ●Inner Circuit



### ●Packaging Specifications

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

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

Parameter		Symbol	Value	Unit
Reverse voltage (repetitive peak)		$V_{RM}$	650	V
Reverse voltage (DC)		$V_R$	650	V
Continuous forward current ( $T_c=135^\circ\text{C}$ )		$I_F$	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 $\mu\text{s}$ 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	$\text{A}^2\text{s}$
	$1 \leq PW \leq 10\text{ms}$ , $T_j=150^\circ\text{C}$		8	$\text{A}^2\text{s}$
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  $T_c=25^\circ\text{C}$

### ●Electrical characteristics (T<sub>j</sub> = 25°C)

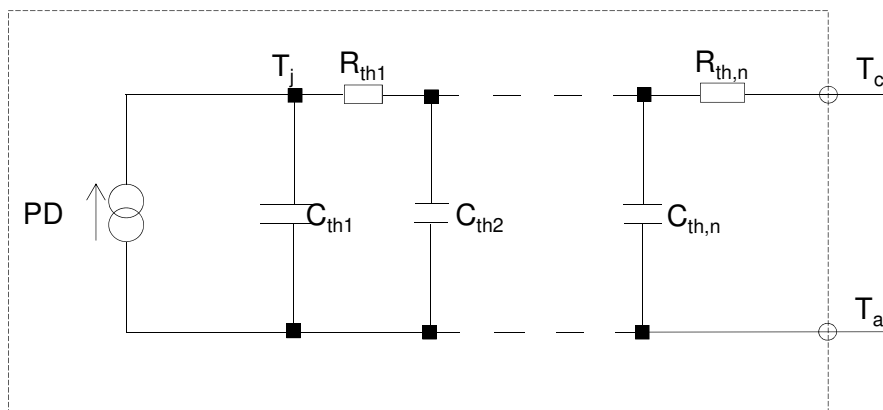
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	V <sub>DC</sub>	I <sub>R</sub> =30μA	650	-	-	V
Forward voltage	V <sub>F</sub>	I <sub>F</sub> =6A, T <sub>j</sub> =25°C	-	1.35	1.50	V
		I <sub>F</sub> =6A, T <sub>j</sub> =150°C	-	1.44	1.71	V
		I <sub>F</sub> =6A, T <sub>j</sub> =175°C	-	1.50	-	V
Reverse current	I <sub>R</sub>	V <sub>R</sub> =650V, T <sub>j</sub> =25°C	-	0.018	30	μA
		V <sub>R</sub> =650V, T <sub>j</sub> =150°C	-	1.2	120	μA
		V <sub>R</sub> =650V, T <sub>j</sub> =175°C	-	3.6	-	μA
Total capacitance	C	V <sub>R</sub> =1V, f=1MHz	-	300	-	pF
		V <sub>R</sub> =650V, f=1MHz	-	27	-	pF
Total capacitive charge	Q <sub>C</sub>	V <sub>R</sub> =400V, di/dt=350A/μs	-	19	-	nC
Switching time	t <sub>C</sub>	V <sub>R</sub> =400V, di/dt=350A/μs	-	15	-	ns
Non-repetitive Avaranche Energy	E <sub>ava</sub>	L=1mH	-	71	-	mJ

### ●Thermal characteristics

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance	R <sub>th(j-c)</sub>	-	-	2.2	3.2	°C/W

### ●Typical Transient Thermal Characteristics

Symbol	Value	Unit	Symbol	Value	Unit
R <sub>th1</sub>	3.09E-02	K/W	C <sub>th1</sub>	1.81E-04	Ws/K
R <sub>th2</sub>	3.09E-01		C <sub>th2</sub>	6.65E-04	
R <sub>th3</sub>	1.83E+00		C <sub>th3</sub>	1.58E-03	



●Electrical characteristic curves

Fig.1  $V_F - I_F$  Characteristics

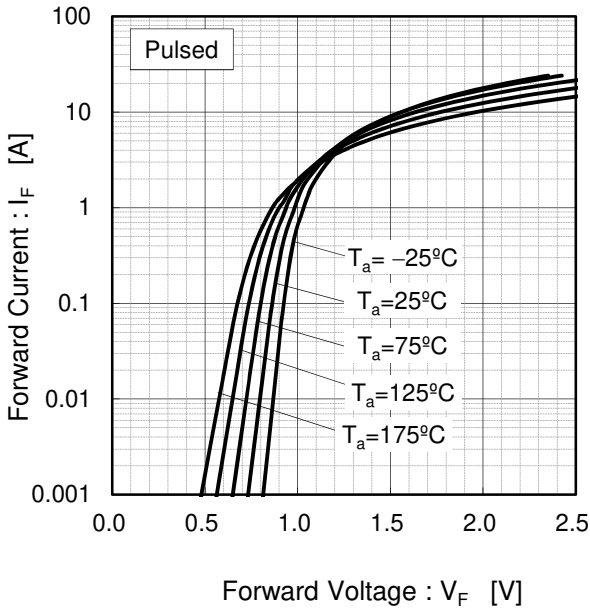


Fig.2  $V_F - I_F$  Characteristics

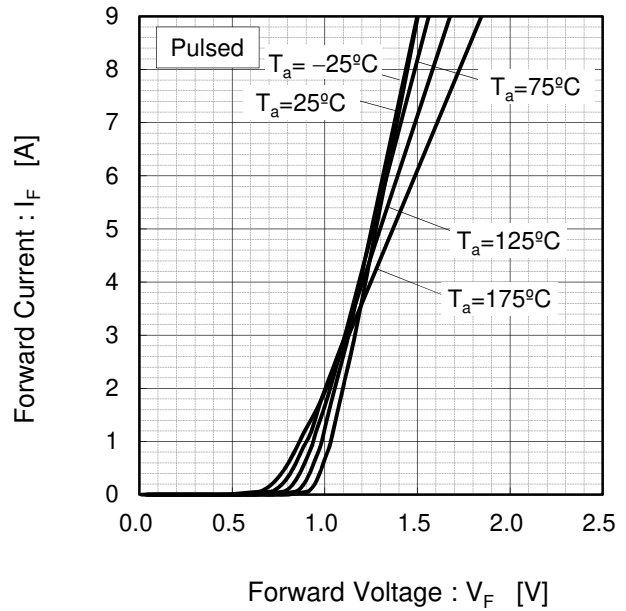


Fig.3  $V_R - I_R$  Characteristics

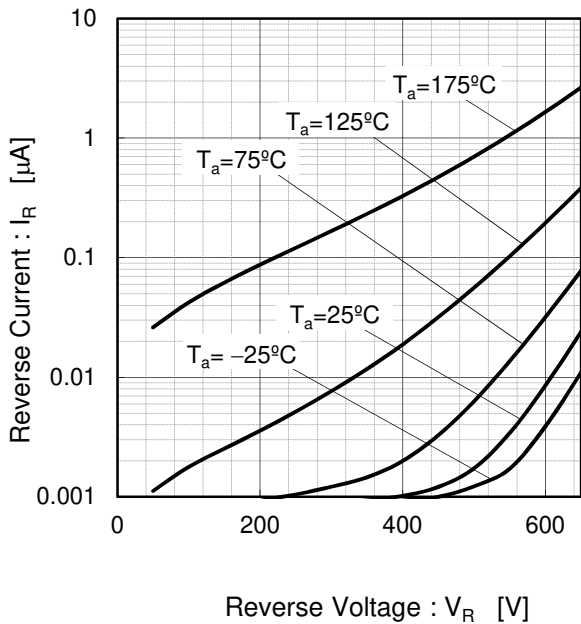
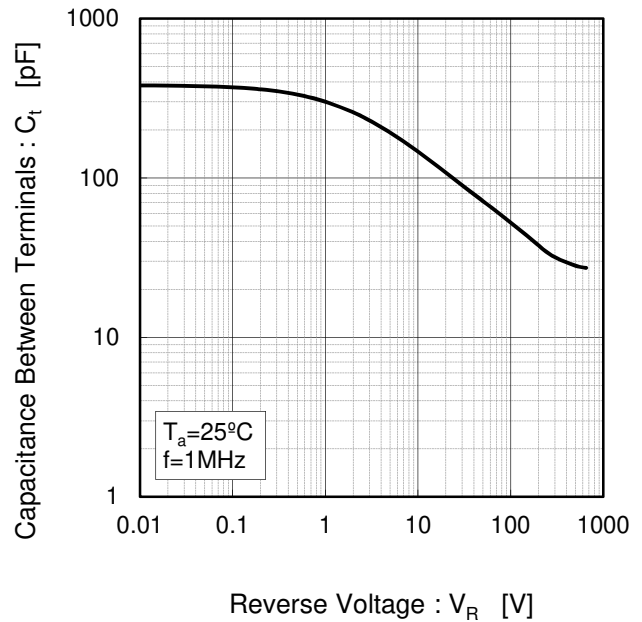


Fig.4  $V_R - C_t$  Characteristics



●Electrical characteristic curves

Fig.5 Typical Transient Thermal Resistance vs. Pulse Width

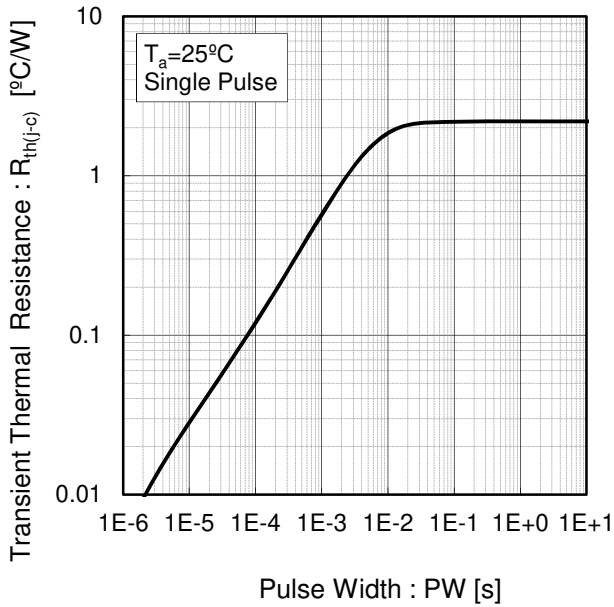


Fig.6 Power Dissipation

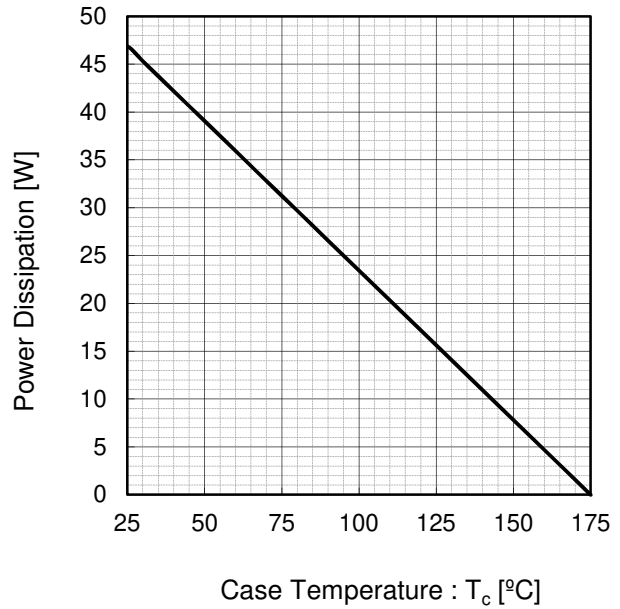
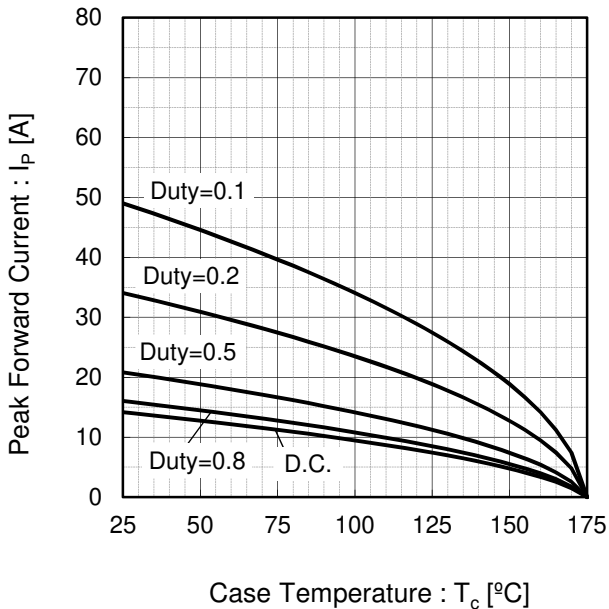
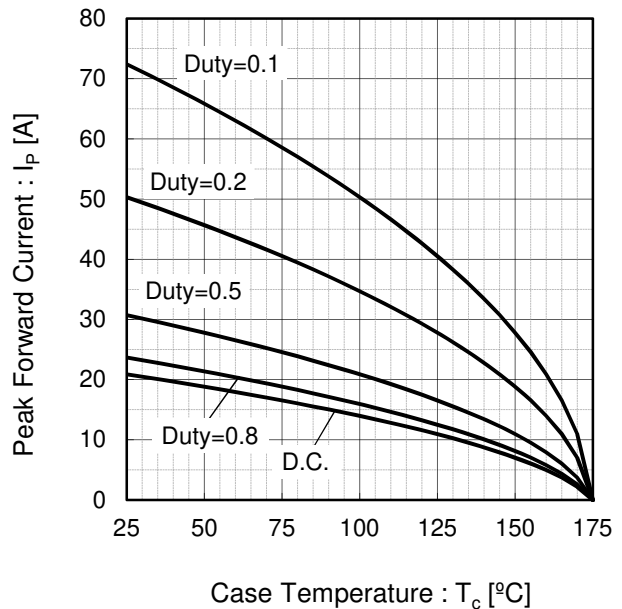


Fig.7\*3 Maximum peak forward current derating curve  $I_P - T_c$



\*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)

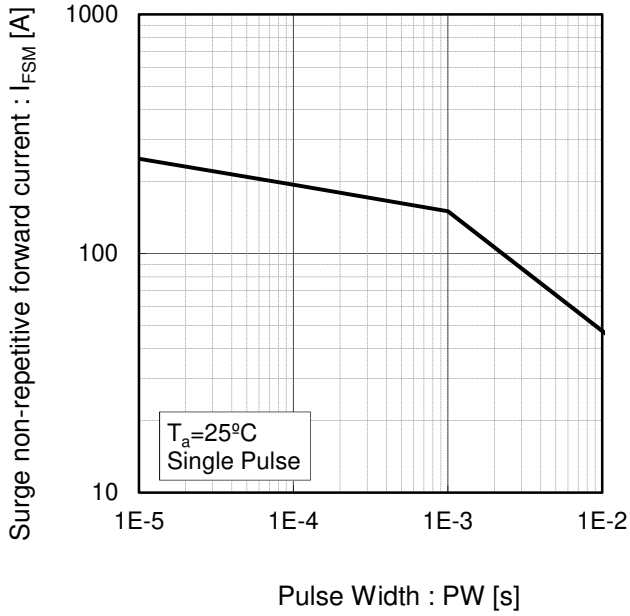


Fig.10 Typical capacitance store energy

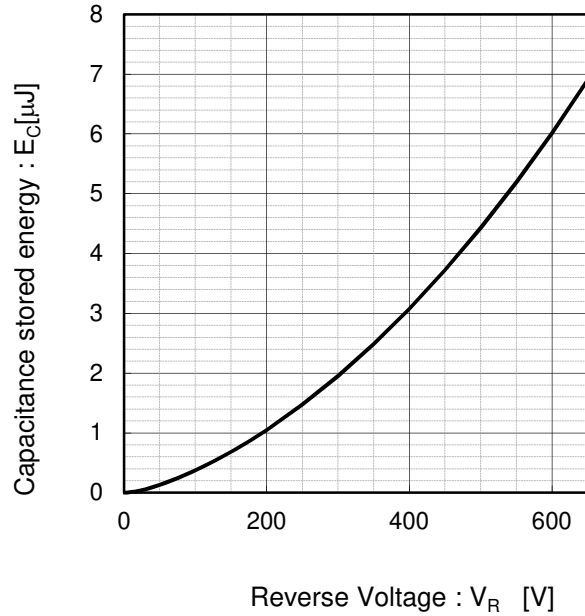
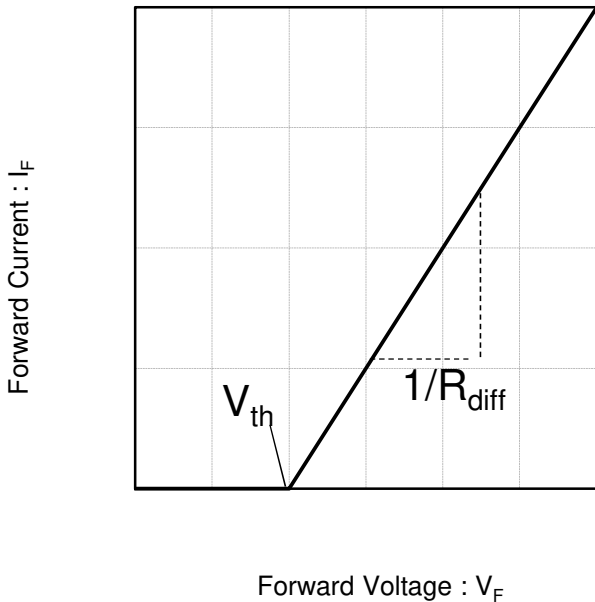


Fig.11 Equivalent forward current curve



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

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

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

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	Ω/°C
$b_2$	1.28E-06	Ω/°C <sup>2</sup>

$T_j$  in °C; -55 °C <  $T_j$  < 175°C ;  $I_F$  < 12A

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SCS306AHG - Web Page

[Distribution Inventory](#)

Part Number	SCS306AHG
Package	TO-220ACP
Unit Quantity	1000
Minimum Package Quantity	50
Packing Type	Tube
Constitution Materials List	inquiry
RoHS	Yes