

$V_R$	1200V
$I_F$	15A/30A*
$Q_C$	51nC(Per leg)

(\*Per leg/ Both legs)

### ●Features

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

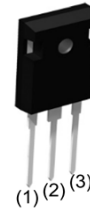
### ●Construction

Silicon carbide epitaxial planar type

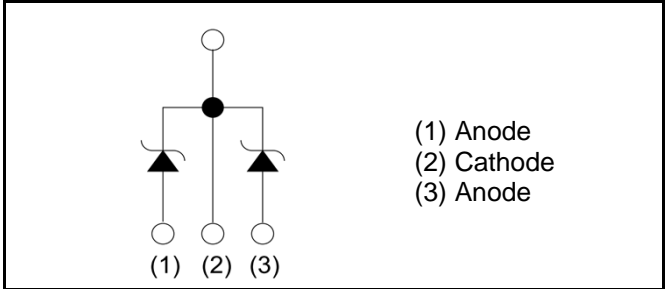
### ●AEC-Q101 Qualified

### ●Outline

TO-247



### ●Inner circuit



### ●Packaging specifications

Type	Packaging	Tube
	Reel size (mm)	-
	Tape width (mm)	-
	Basic ordering unit (pcs)	30
	Packing code	C
	Marking	SCS230KE2A

### ●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 * <sup>3</sup> ( $T_c = 139^\circ\text{C}$ )	$I_F$	15/30	A	
Surge non-repetitive forward current * <sup>3</sup>	$I_{FSM}$	PW=10ms sinusoidal, $T_j=25^\circ\text{C}$	62/120	A
		PW=10ms sinusoidal, $T_j=150^\circ\text{C}$	46/92	A
		PW=10μs square, $T_j=25^\circ\text{C}$	240/480	A
Repetitive peak forward current * <sup>3</sup>	$I_{FRM}$	67/130 * <sup>1</sup>	A	
$i^2t$ value * <sup>3</sup>	$\int i^2 dt$	PW=10ms, $T_j=25^\circ\text{C}$	19/77	A <sup>2</sup> s
		PW=10ms, $T_j=150^\circ\text{C}$	10/42	A <sup>2</sup> s
Total power dissipation * <sup>3</sup>	$P_D$	180/370 * <sup>2</sup>	W	
Junction temperature	$T_j$	175	°C	
Range of storage temperature	$T_{stg}$	-55 to +175	°C	

\*<sup>1</sup>  $T_c=100^\circ\text{C}$ ,  $T_j=150^\circ\text{C}$ , Duty cycle=10% \*<sup>2</sup>  $T_c=25^\circ\text{C}$  \*<sup>3</sup> Per leg/ Both legs

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

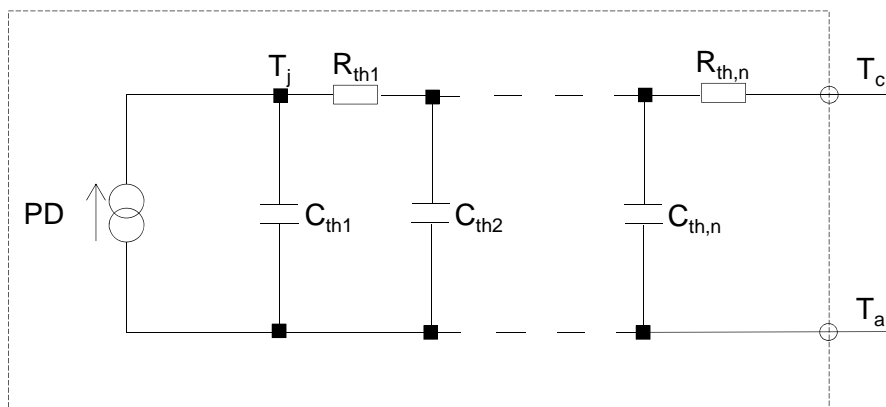
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	$V_{DC}$	$I_R=0.3\text{mA}$	1200	-	-	V
Forward voltage	$V_F$	$I_F=15\text{A}, T_j=25^\circ\text{C}$	-	1.4	1.6	V
		$I_F=15\text{A}, T_j=150^\circ\text{C}$	-	1.8	-	V
		$I_F=15\text{A}, T_j=175^\circ\text{C}$	-	1.9	-	V
Reverse current	$I_R$	$V_R=1200\text{V}, T_j=25^\circ\text{C}$	-	15	300	$\mu\text{A}$
		$V_R=1200\text{V}, T_j=150^\circ\text{C}$	-	120	-	$\mu\text{A}$
		$V_R=1200\text{V}, T_j=175^\circ\text{C}$	-	195	-	$\mu\text{A}$
Total capacitance	C	$V_R=1\text{V}, f=1\text{MHz}$	-	790	-	pF
		$V_R=600\text{V}, f=1\text{MHz}$	-	64	-	pF
Total capacitive charge	$Q_C$	$V_R=800\text{V}, di/dt=500\text{A}/\mu\text{s}$	-	51	-	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	$R_{th(j-c)}$	Per Leg	-	0.67	0.81	$^\circ\text{C}/\text{W}$
		Both Legs	-	0.34	0.41	$^\circ\text{C}/\text{W}$

**●Typical Transient Thermal Characteristics (Per Leg)**

Symbol	Value	Unit	Symbol	Value	Unit
$R_{th1}$	1.25E-01	K/W	$C_{th1}$	3.81E-03	Ws/K
$R_{th2}$	4.03E-01		$C_{th2}$	4.54E-03	
$R_{th3}$	1.43E-01		$C_{th,n}$	7.59E-02	



●Electrical characteristic curves

Fig.1  $V_F - I_F$  Characteristics (Per Leg)

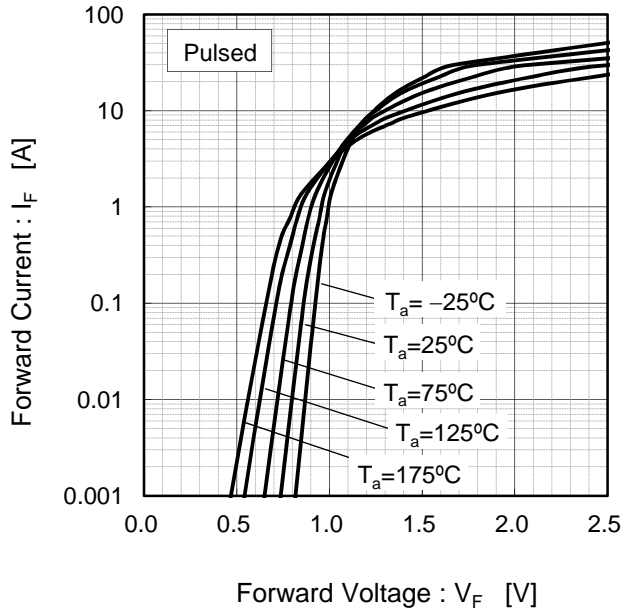


Fig.2  $V_F - I_F$  Characteristics (Per Leg)

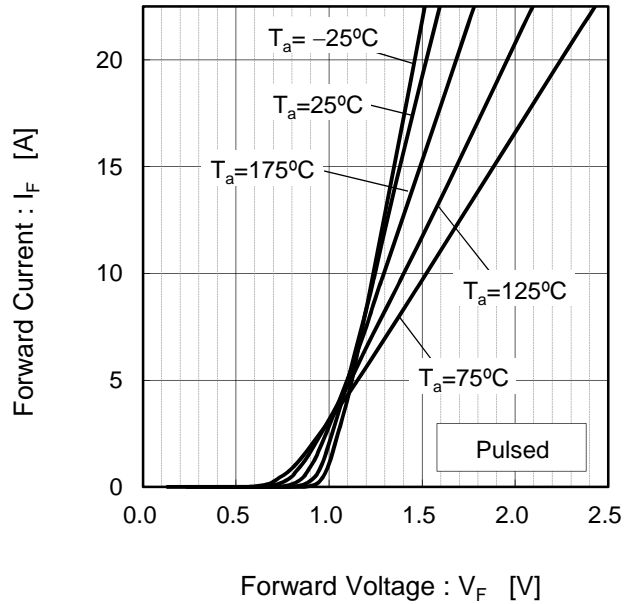


Fig.3  $V_R - I_R$  Characteristics (Per Leg)

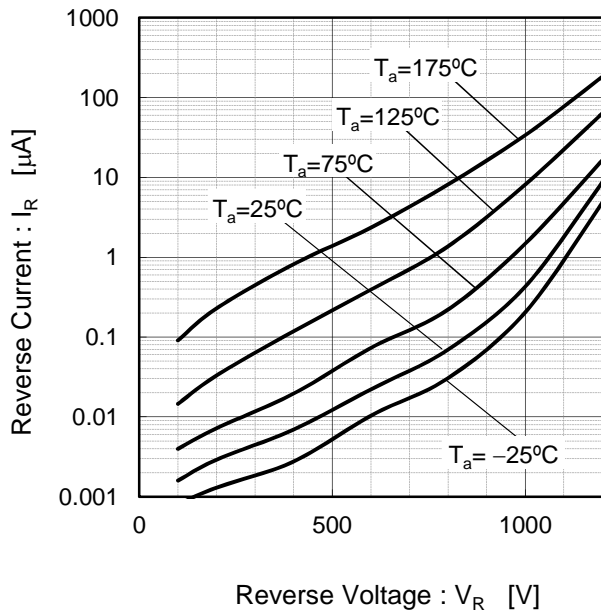
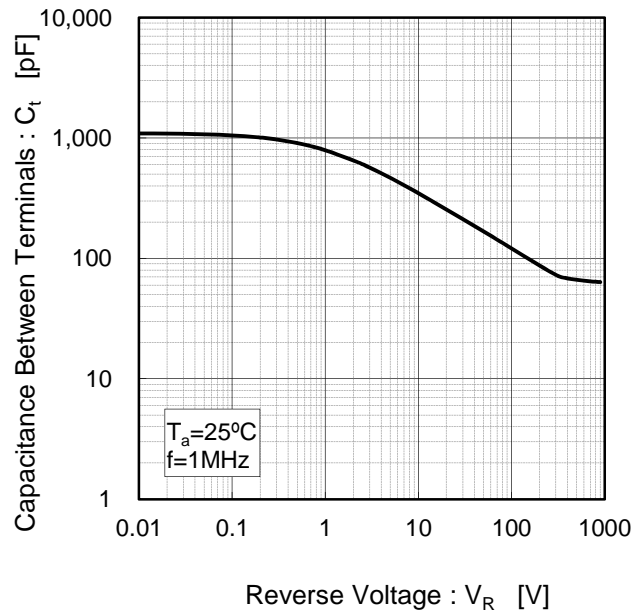


Fig.4  $V_R - C_t$  Characteristics (Per Leg)



●Electrical characteristic curves

Fig.5 Typical Transient Thermal Resistance vs. Pulse Width (Per Leg)

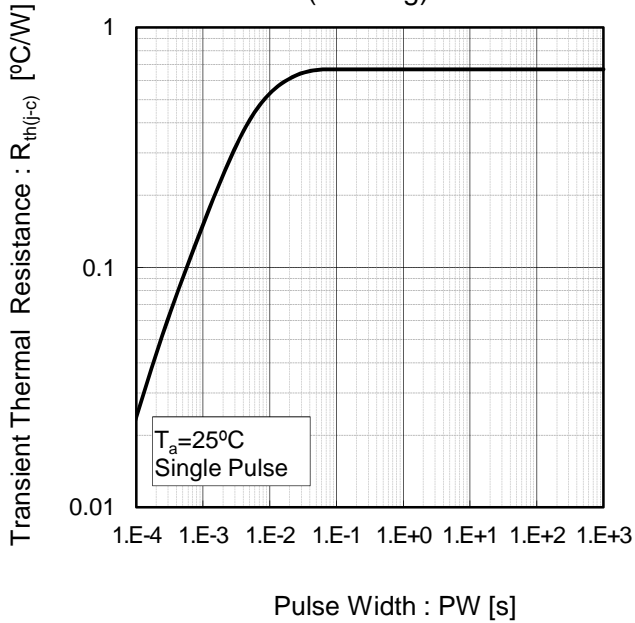


Fig.6 Power Dissipation (Per Leg)

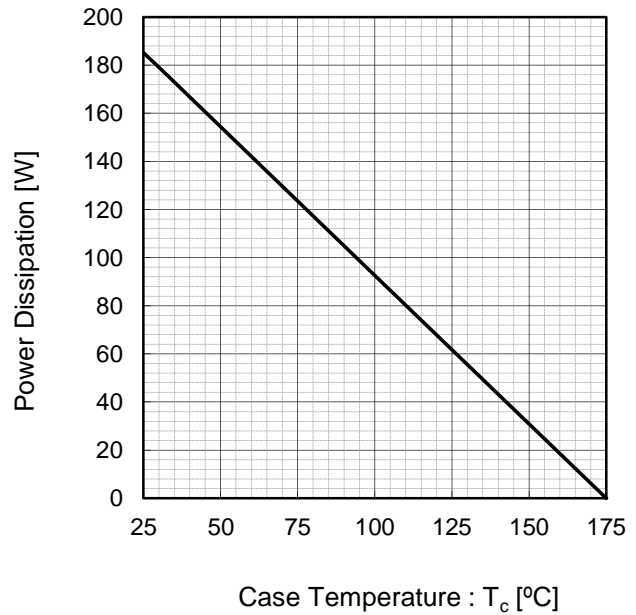
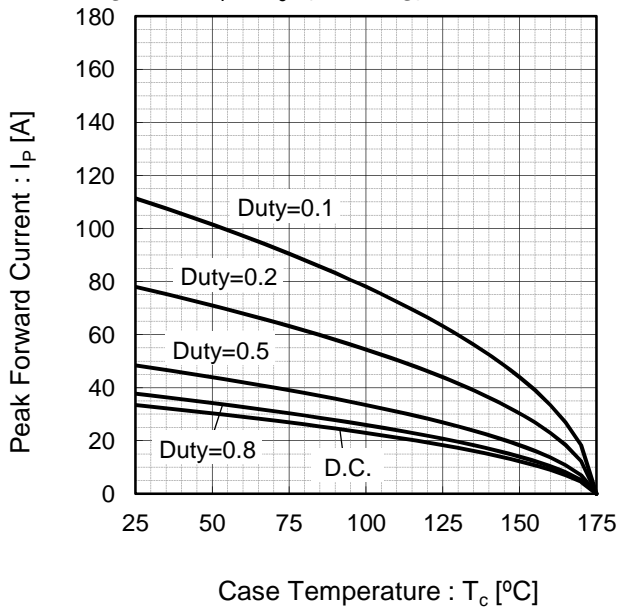
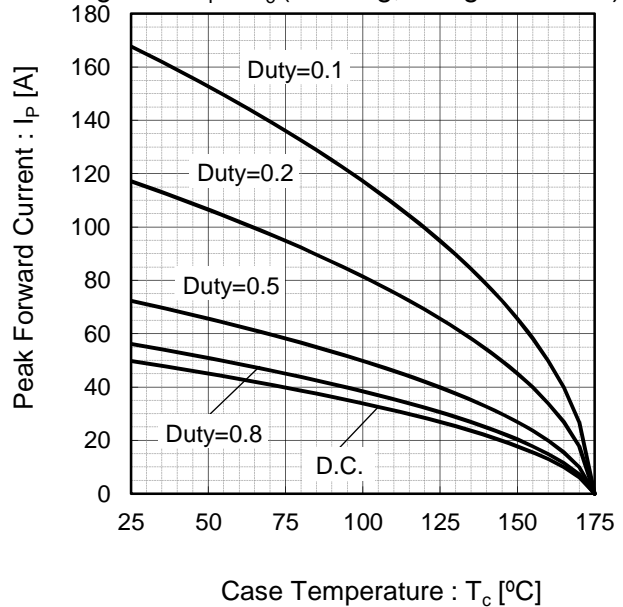


Fig.7\*3 Maximum peak forward current derating curve  $I_P - T_c$  (Per Leg)



\*3 Based on max  $V_f$ , max  $R_{th(j-c)}$   
Valid for switching of above 10kHz,  
excluding D.C. curve.

Fig.8\*4 Typical peak forward current derating curve  $I_P - T_c$  (Per Leg, Not guaranteed)



\*4 Based on typ  $V_f$ , 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) (Per Leg)

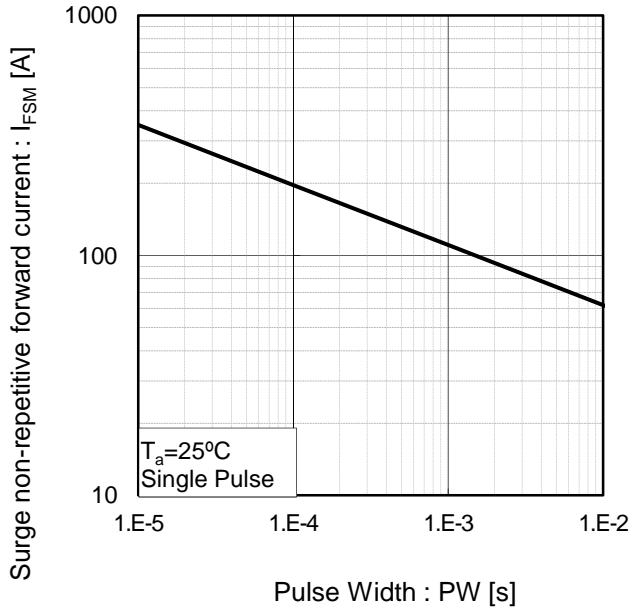
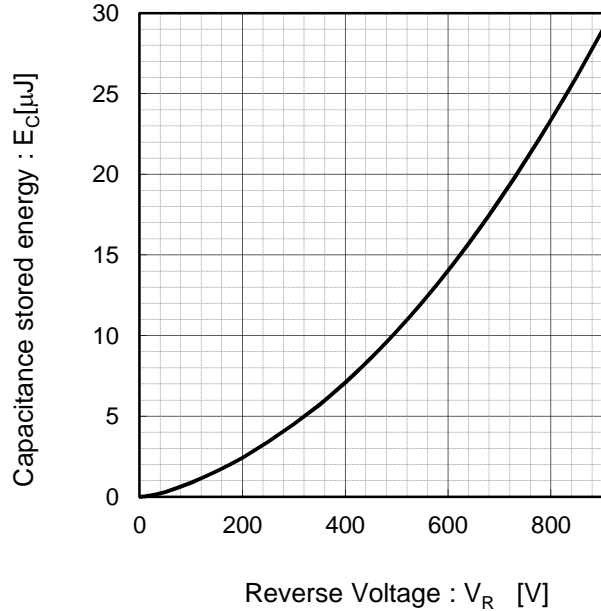
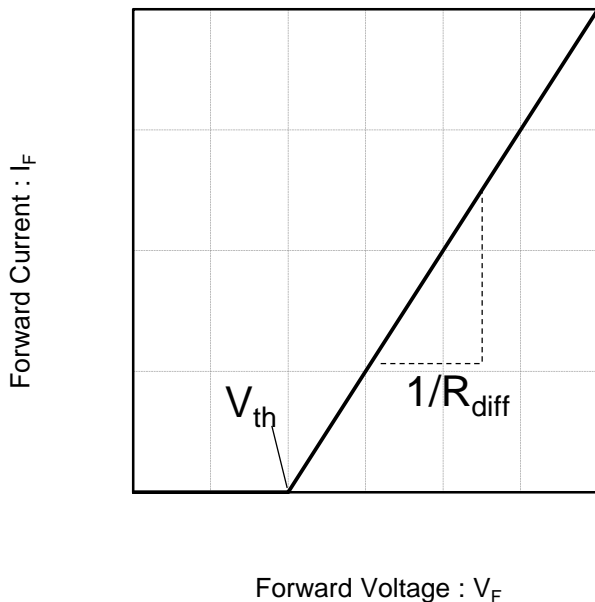


Fig.10 Typical capacitance store energy (Per Leg)



●Simplified forward characteristic model (Per Leg)

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>	2.43E-02	Ω
b <sub>1</sub>	1.37E-04	Ω/°C
b <sub>2</sub>	8.87E-07	Ω/°C <sup>2</sup>

T<sub>j</sub> in °C; -55 °C < T<sub>j</sub> < 175°C ; I<sub>F</sub> < 30A

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SCS230KE2AHR - Web Page

Part Number	SCS230KE2AHR
Package	TO-247
Unit Quantity	360
Minimum Package Quantity	30
Packing Type	Tube
Constitution Materials List	inquiry
RoHS	Yes