

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

(\*Per leg/ Both legs)

### ●Features

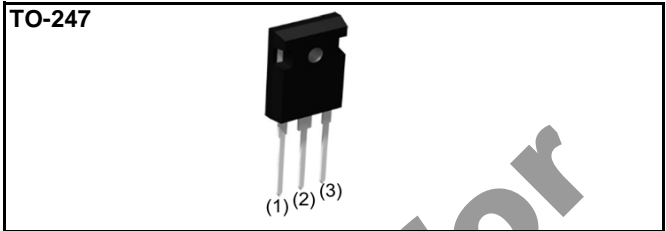
- 1) Shorter recovery time
- 2) Reduced temperature dependence
- 3) High-speed switching possible

### ●Construction

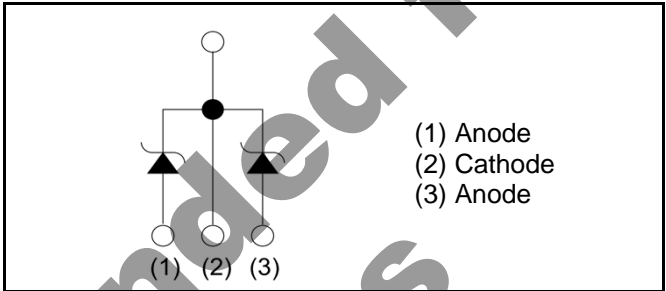
Silicon carbide epitaxial planar type

### ●AEC-Q101 Qualified

### ●Outline



### ●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<sub>j</sub> = 25°C) (Per Leg)**

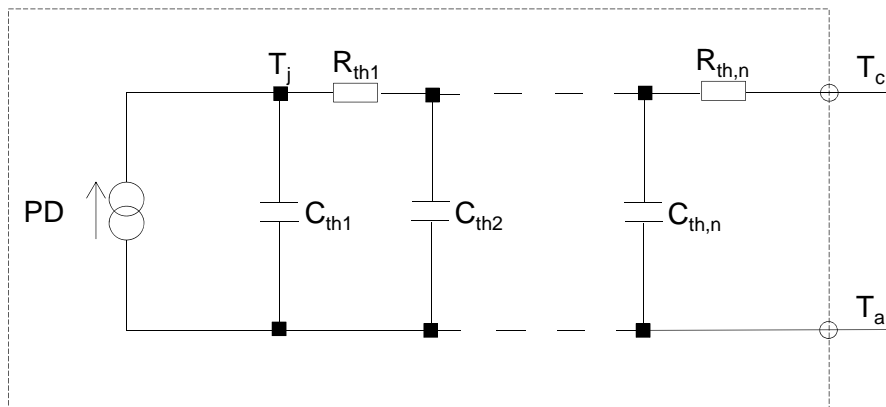
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	V <sub>DC</sub>	I <sub>R</sub> =0.3mA	1200	-	-	V
Forward voltage	V <sub>F</sub>	I <sub>F</sub> =15A, T <sub>j</sub> =25°C	-	1.4	1.6	V
		I <sub>F</sub> =15A, T <sub>j</sub> =150°C	-	1.8	-	V
		I <sub>F</sub> =15A, T <sub>j</sub> =175°C	-	1.9	-	V
Reverse current	I <sub>R</sub>	V <sub>R</sub> =1200V, T <sub>j</sub> =25°C	-	15	300	μA
		V <sub>R</sub> =1200V, T <sub>j</sub> =150°C	-	120	-	μA
		V <sub>R</sub> =1200V, T <sub>j</sub> =175°C	-	195	-	μA
Total capacitance	C	V <sub>R</sub> =1V, f=1MHz	-	790	-	pF
		V <sub>R</sub> =600V, f=1MHz	-	64	-	pF
Total capacitive charge	Q <sub>C</sub>	V <sub>R</sub> =800V, di/dt=500A/μs	-	51	-	nC
Switching time	t <sub>C</sub>	V <sub>R</sub> =800V, di/dt=500A/μs	-	18	-	ns

**●Thermal characteristics**

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance	R <sub>th(j-c)</sub>	Per Leg	-	0.67	0.81	°C/W
		Both Legs	-	0.34	0.41	°C/W

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

Symbol	Value	Unit	Symbol	Value	Unit
R <sub>th1</sub>	1.25E-01	K/W	C <sub>th1</sub>	3.81E-03	Ws/K
R <sub>th2</sub>	4.03E-01		C <sub>th2</sub>	4.54E-03	
R <sub>th3</sub>	1.43E-01		C <sub>th3</sub>	7.59E-02	



●Electrical characteristic curves

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

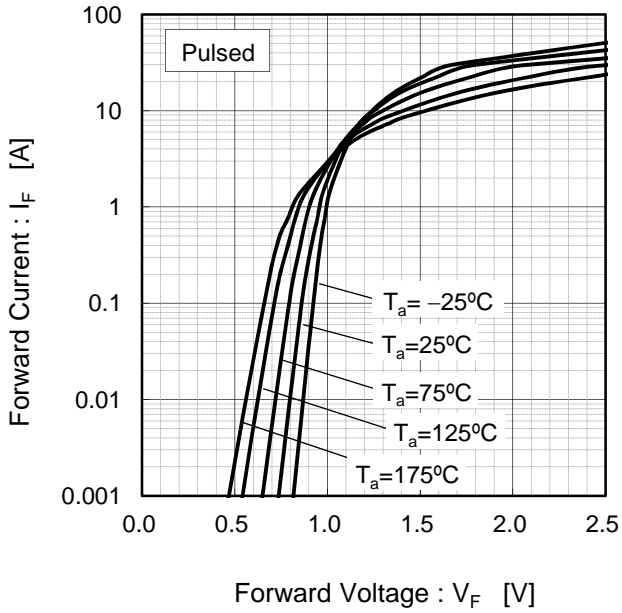


Fig.2  $V_F - I_F$  Characteristics (Per Leg)

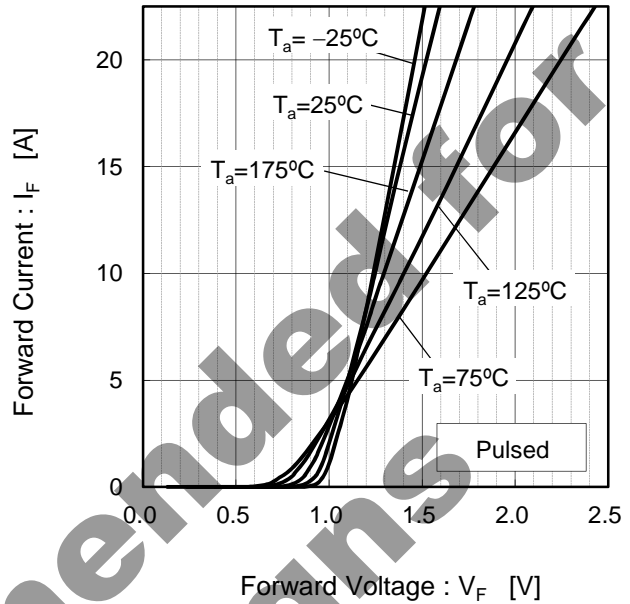


Fig.3  $V_R - I_R$  Characteristics (Per Leg)

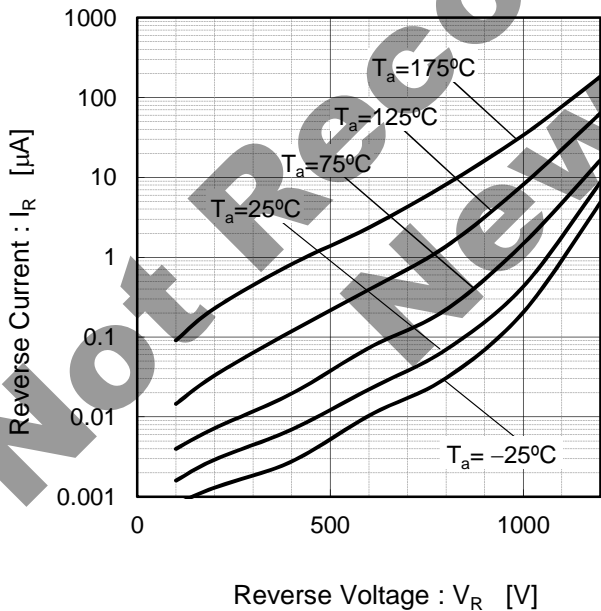
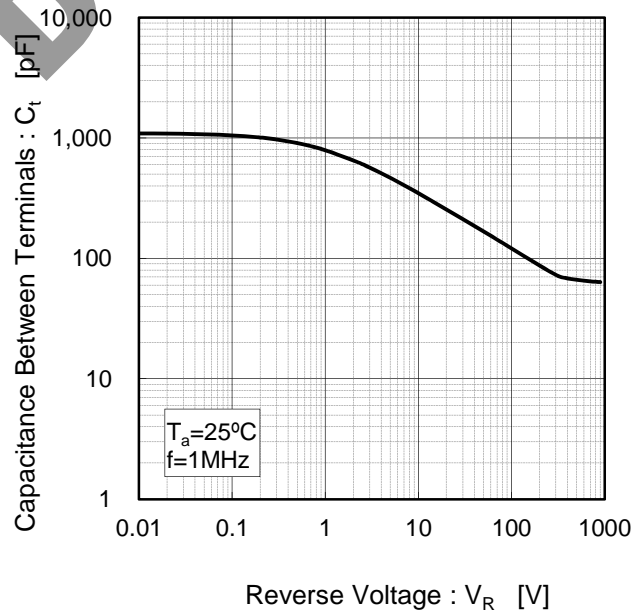


Fig.4  $V_R - C_t$  Characteristics (Per Leg)



●Electrical characteristic curves

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

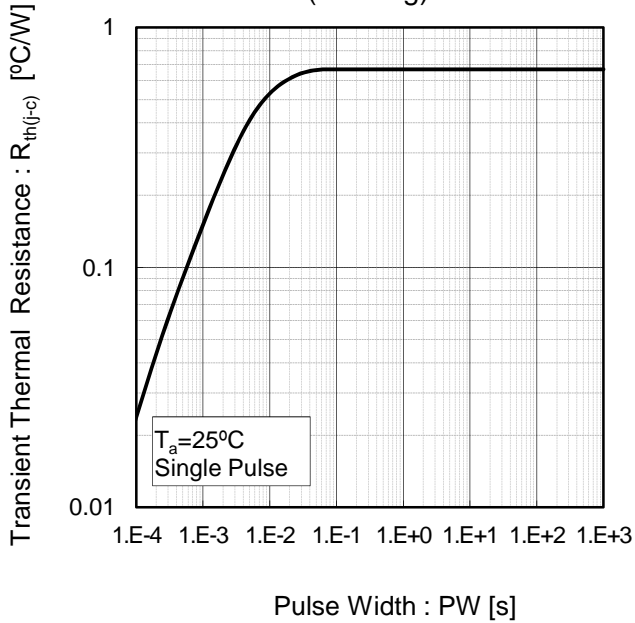


Fig.6 Power Dissipation (Per Leg)

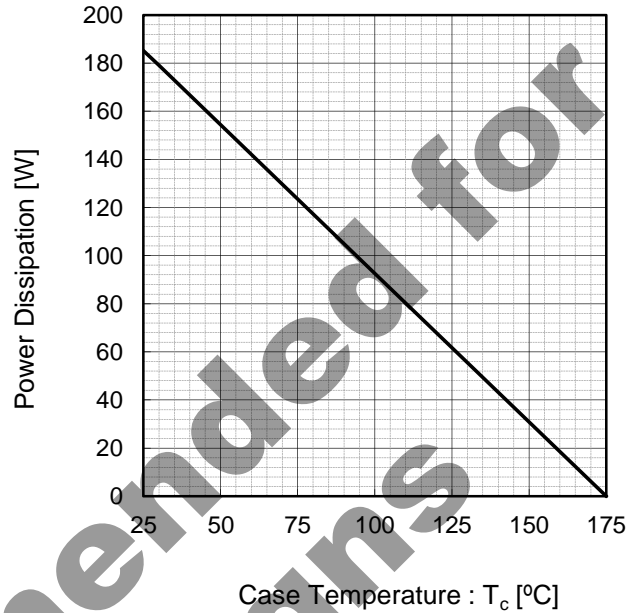
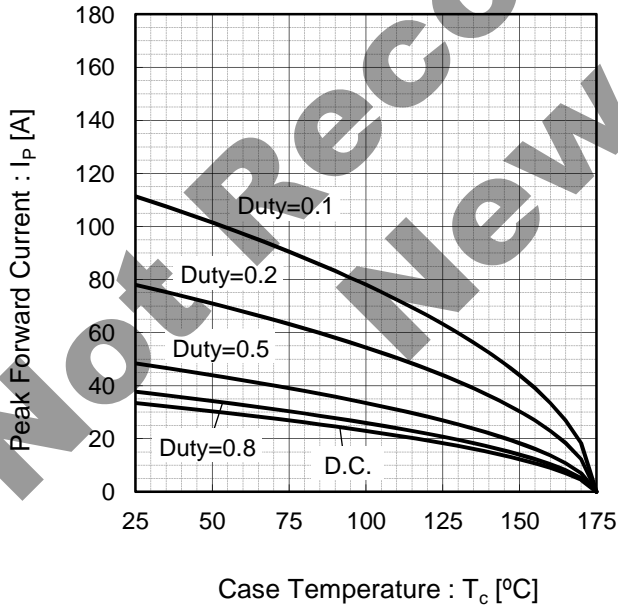
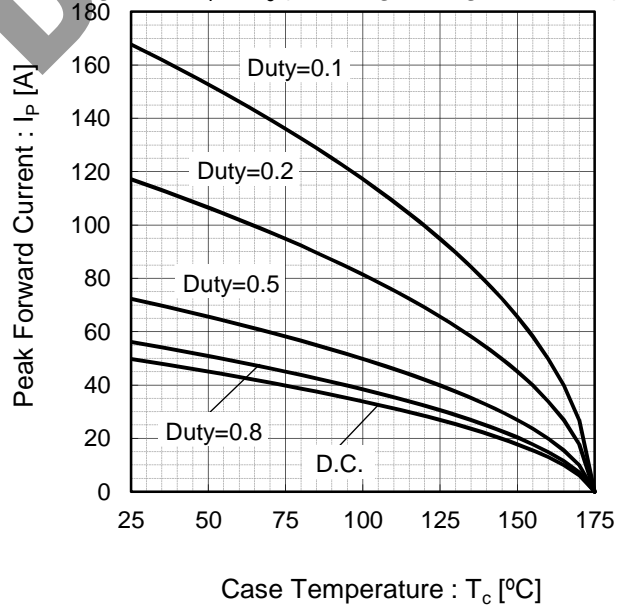


Fig.7\*3 Maximum peak forward current derating curve  $I_P - T_c$  (Per Leg)



\*3 Based on max 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  $I_P - T_c$  (Per Leg, 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) (Per Leg)

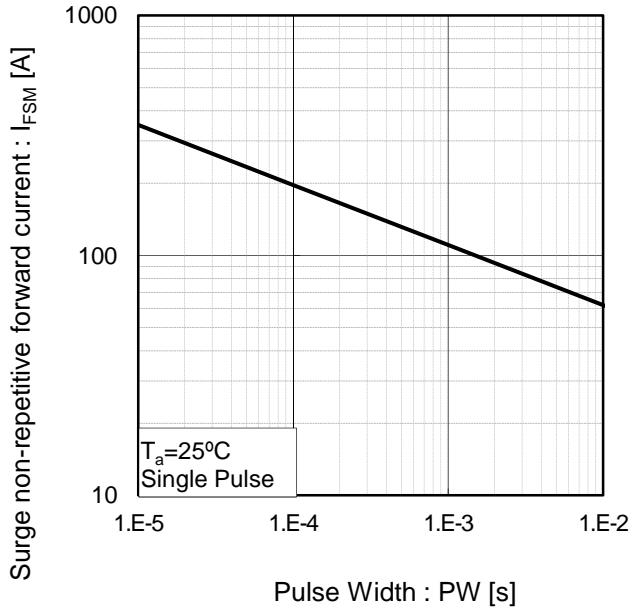
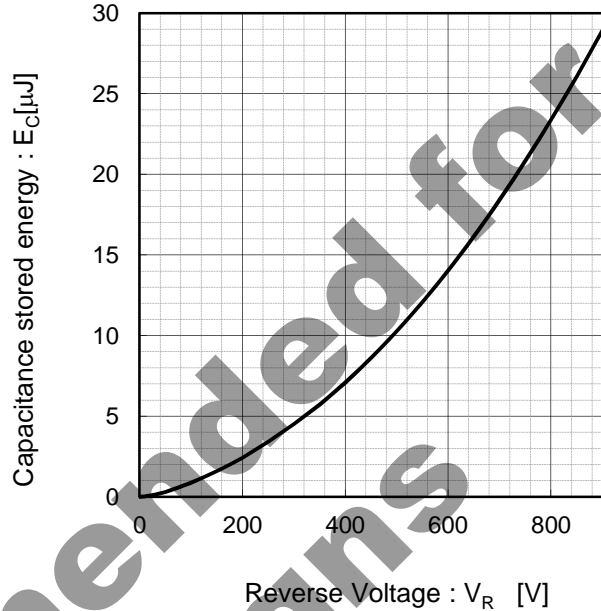
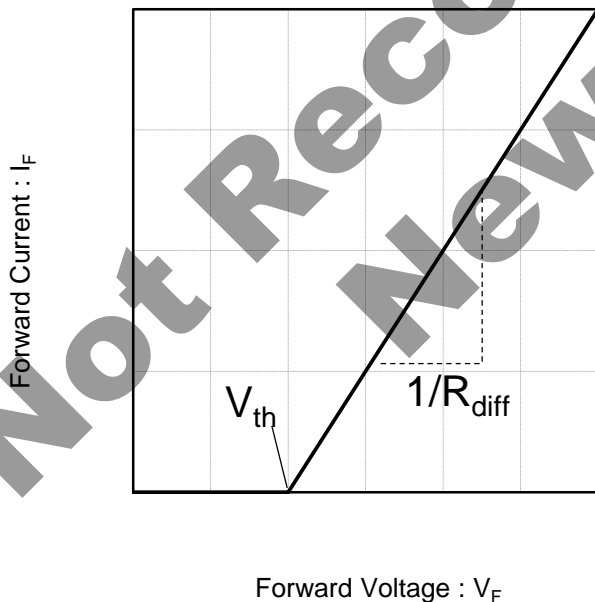


Fig.10 Typical capacitance store energy (Per Leg)



●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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