

$V_R$	650V
$I_F$	10A/20A*
$Q_C$	15nC(Per leg)

(\*Per leg/ Both legs)

### ●Features

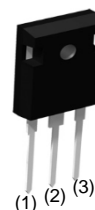
- 1) Shorter recovery time
- 2) Reduced temperature dependence
- 3) High-speed switching possible

### ●Applications

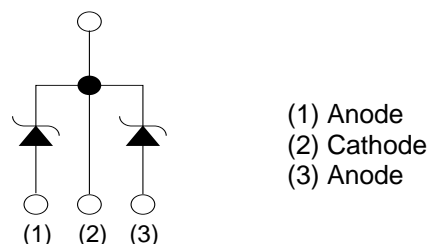
- PFC Boost Topology
- Secondary Side Rectification
- Data Center
- PV Power Conditioners

### ●Outline

TO-247



### ●Inner circuit



### ●Packaging specifications

Type	Packaging	Tube
	Reel size (mm)	-
	Tape width (mm)	-
	Basic ordering unit (pcs)	30
	Packing code	C
	Marking	SCS220AE2

### ●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 <sup>*3</sup> ( $T_c = 137^\circ\text{C}$ )		$I_F$	10/20	A
Surge non-repetitive forward current <sup>*3</sup>	PW=10ms sinusoidal, $T_j=25^\circ\text{C}$	$I_{FSM}$	38/76	A
	PW=10ms sinusoidal, $T_j=150^\circ\text{C}$		30/60	A
	PW=10μs square, $T_j=25^\circ\text{C}$		150/300	A
Repetitive peak forward current <sup>*3</sup>		$I_{FRM}$	45/91 <sup>*1</sup>	A
$i^2t$ value <sup>*3</sup>	PW=10ms, $T_j=25^\circ\text{C}$	$\int i^2 dt$	7.2/29	A <sup>2</sup> s
	PW=10ms, $T_j=150^\circ\text{C}$		4.5/18	A <sup>2</sup> s
Total power dissipation <sup>*3</sup>		$P_D$	83/160 <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  $T_c=25^\circ\text{C}$  \*3 Per leg/ Both legs

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

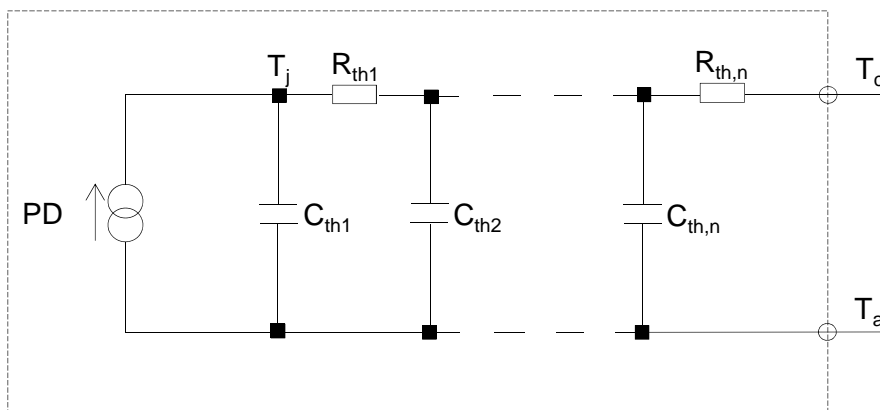
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	$V_{DC}$	$I_R = 2.0\text{mA}$	650	-	-	V
Forward voltage	$V_F$	$I_F = 10\text{A}, T_j = 25^\circ\text{C}$	-	1.35	1.55	V
		$I_F = 10\text{A}, T_j = 150^\circ\text{C}$	-	1.55	-	V
		$I_F = 10\text{A}, T_j = 175^\circ\text{C}$	-	1.63	-	V
Reverse current	$I_R$	$V_R = 600\text{V}, T_j = 25^\circ\text{C}$	-	2	200	$\mu\text{A}$
		$V_R = 600\text{V}, T_j = 150^\circ\text{C}$	-	30	-	$\mu\text{A}$
		$V_R = 600\text{V}, T_j = 175^\circ\text{C}$	-	70	-	$\mu\text{A}$
Total capacitance	$C$	$V_R = 1\text{V}, f = 1\text{MHz}$	-	360	-	pF
		$V_R = 600\text{V}, f = 1\text{MHz}$	-	37	-	pF
Total capacitive charge	$Q_C$	$V_R = 400\text{V}, di/dt = 350\text{A}/\mu\text{s}$	-	15	-	nC
Switching time	$t_C$	$V_R = 400\text{V}, di/dt = 350\text{A}/\mu\text{s}$	-	15	-	ns

**●Thermal characteristics**

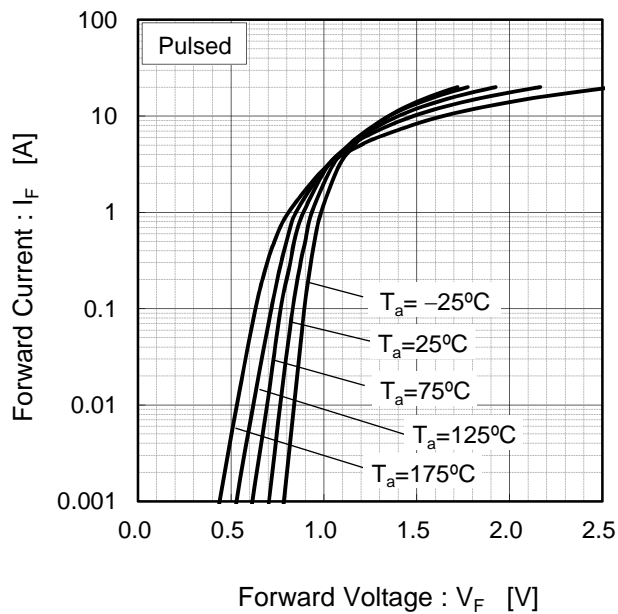
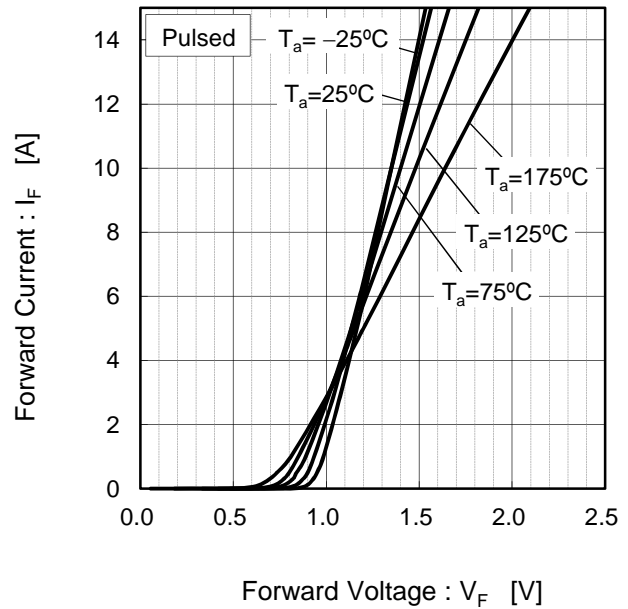
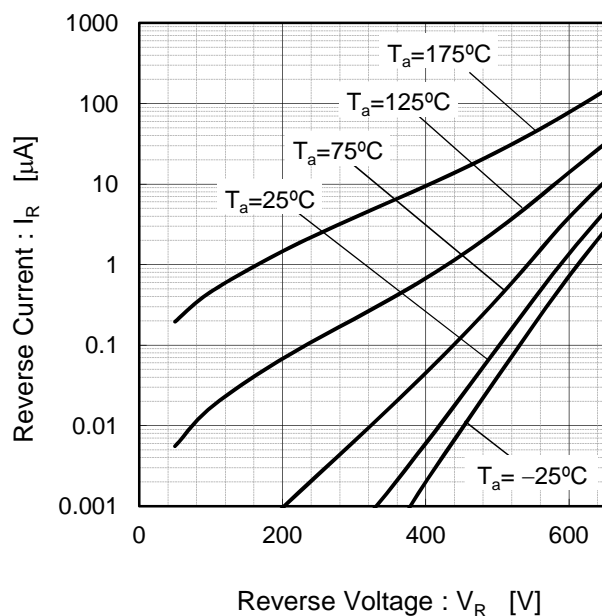
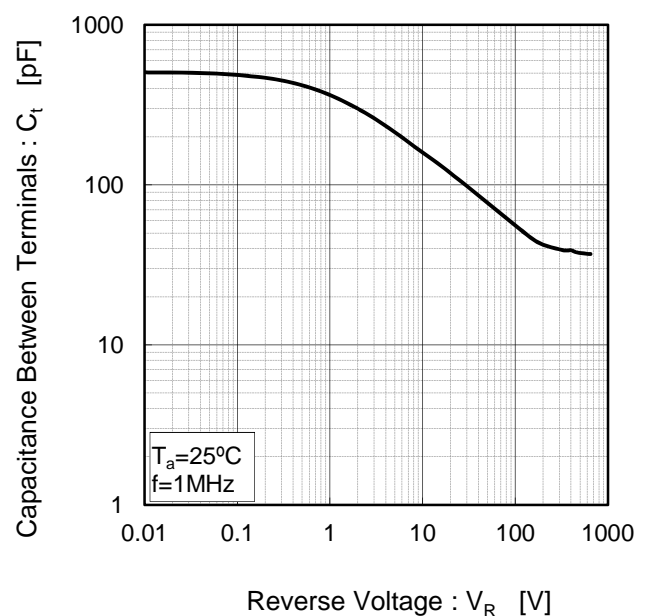
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance	$R_{th(j-c)}$	Per Leg	-	1.6	1.8	$^\circ\text{C}/\text{W}$
		Both Legs	-	0.80	0.90	$^\circ\text{C}/\text{W}$

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

Symbol	Value	Unit	Symbol	Value	Unit
$R_{th1}$	4.16E-01	K/W	$C_{th1}$	1.55E-03	Ws/K
$R_{th2}$	9.92E-01		$C_{th2}$	6.13E-03	
$R_{th3}$	1.93E-01		$C_{th3}$	1.34E-01	



## ●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)

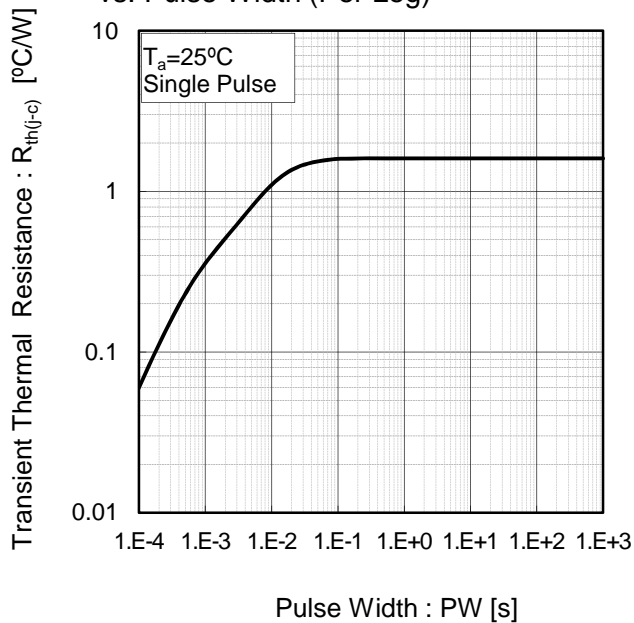


Fig.6 Power Dissipation (Per Leg)

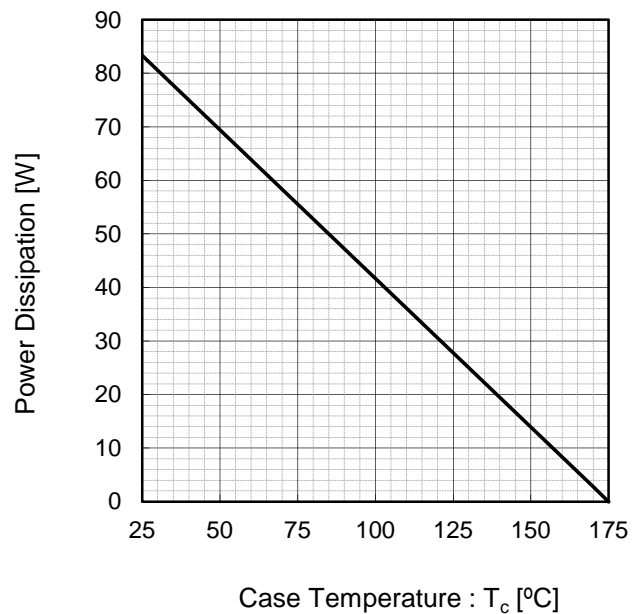
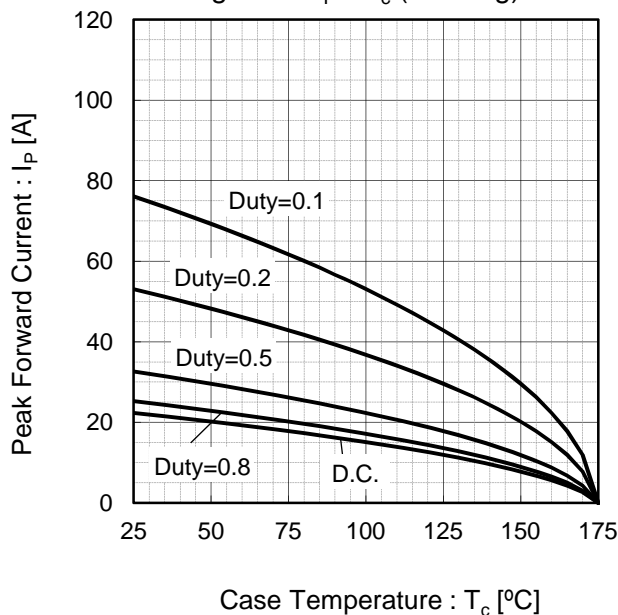
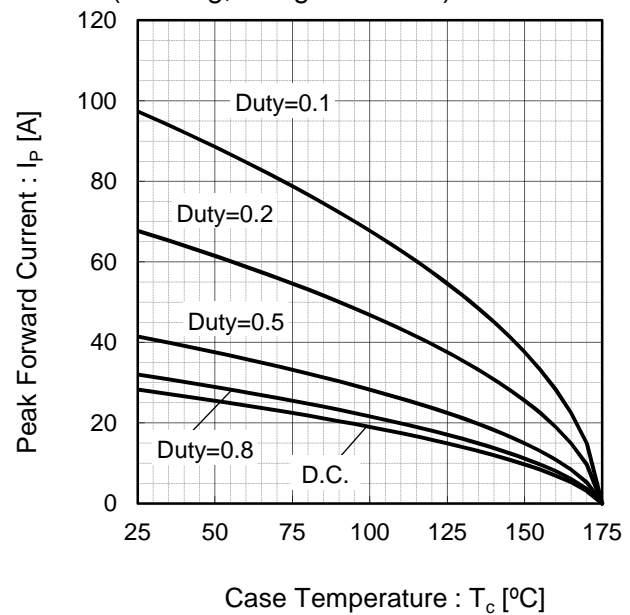


Fig.7\*3 Maximum peak forward current derating curve  $I_P - T_c$  (Per Leg)



\*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)

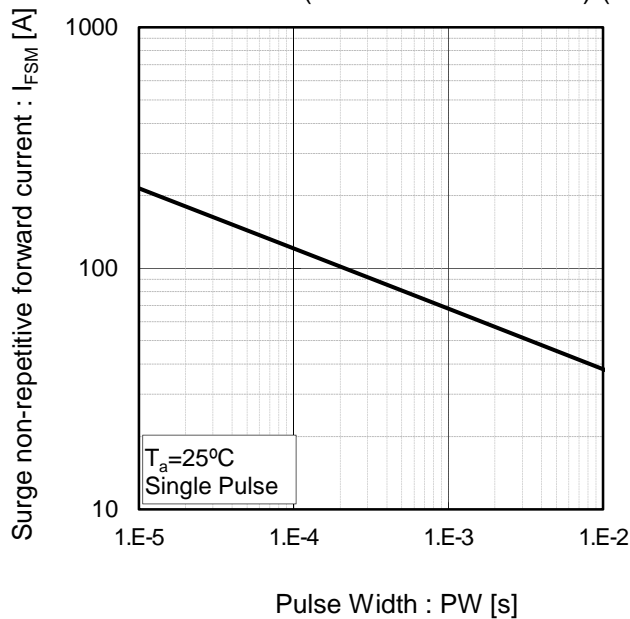
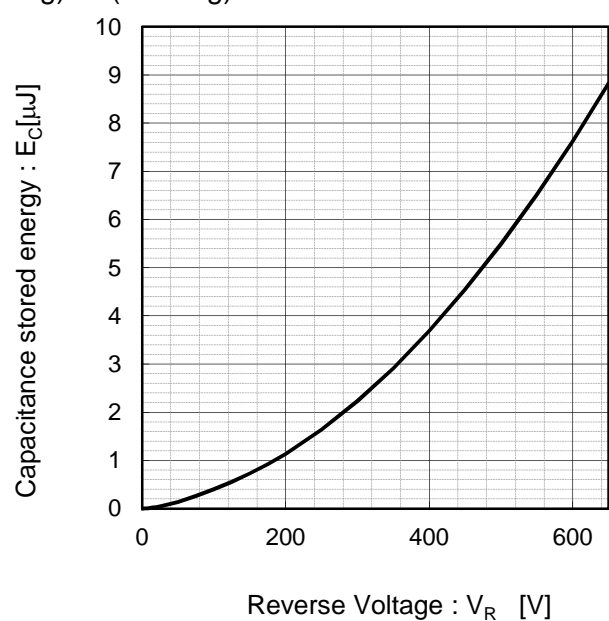
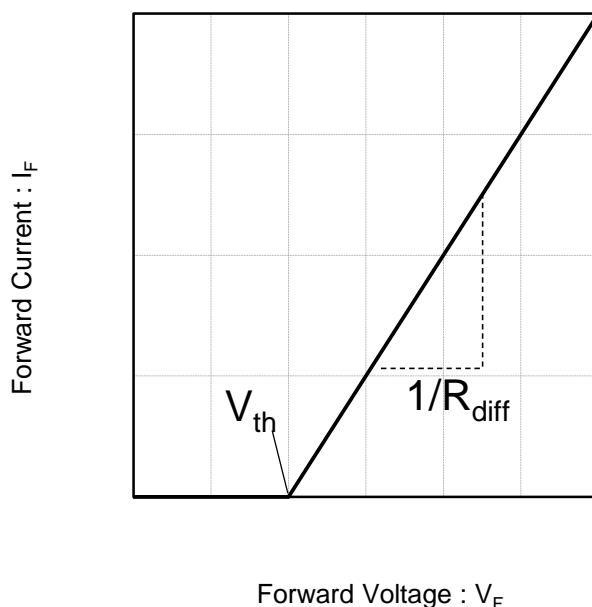


Fig.10 Typical capacitance store energy (Per Leg)



## ●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
$a_0$	9.35E-01	V
$a_1$	-1.12E-03	V/°C
$b_0$	3.98E-02	Ω
$b_1$	1.02E-04	Ω/°C
$b_2$	1.08E-06	Ω/°C <sup>2</sup>

$T_j$  in °C;  $-55^\circ\text{C} < T_j < ^\circ\text{C}$ ;  $I_F < 20\text{ A}$

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## SCS220AE2 - Web Page

[Distribution Inventory](#)

Part Number	SCS220AE2
Package	TO-247
Unit Quantity	360
Minimum Package Quantity	30
Packing Type	Tube
Constitution Materials List	inquiry
RoHS	Yes