

$V_R$	650V
$I_F$	20A/40A*
$Q_C$	31nC(Per leg)

(\*Per leg/ Both legs)

### ●Features

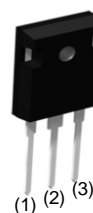
- 1) AEC-Q101 qualified
- 2) Low forward voltage
- 3) Negligible recovery time/current
- 4) Temperature independent switching behavior

### ●Applications

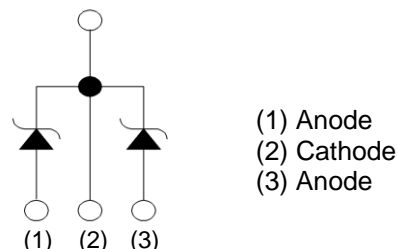
- On Board Charger
- DC/DC Converter
- Wireless Charger
- EV Charger

### ●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	SCS240AE2

### ●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> ( $T_c = 129^\circ\text{C}$ )		$I_F$	20/40	A
Surge non-repetitive forward current <sup>*3</sup>	PW=10ms sinusoidal, $T_j=25^\circ\text{C}$	$I_{FSM}$	67/130	A
	PW=10ms sinusoidal, $T_j=150^\circ\text{C}$		53/100	A
	PW=10μs square, $T_j=25^\circ\text{C}$		260/520	A
Repetitive peak forward current <sup>*3</sup>		$I_{FRM}$	81/160 <sup>*1</sup>	A
$i^2t$ value <sup>*3</sup>	PW=10ms, $T_j=25^\circ\text{C}$	$\int i^2 dt$	22/91	A <sup>2</sup> s
	PW=10ms, $T_j=150^\circ\text{C}$		14/56	A <sup>2</sup> s
Total power dissipation <sup>*3</sup>		$P_D$	130/270 <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)

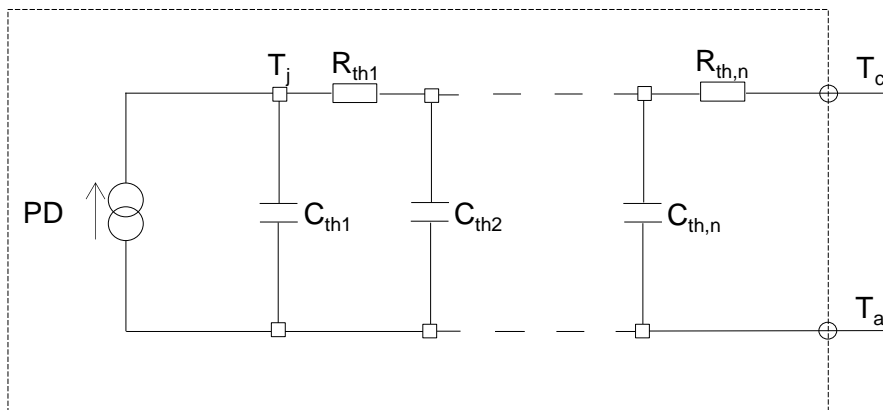
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	$V_{DC}$	$I_R = 4.0\text{mA}$	650	-	-	V
Forward voltage	$V_F$	$I_F = 20\text{A}, T_j = 25^\circ\text{C}$	-	1.35	1.55	V
		$I_F = 20\text{A}, T_j = 150^\circ\text{C}$	-	1.55	-	V
		$I_F = 20\text{A}, T_j = 175^\circ\text{C}$	-	1.63	-	V
Reverse current	$I_R$	$V_R = 600\text{V}, T_j = 25^\circ\text{C}$	-	4	400	$\mu\text{A}$
		$V_R = 600\text{V}, T_j = 150^\circ\text{C}$	-	60	-	$\mu\text{A}$
		$V_R = 600\text{V}, T_j = 175^\circ\text{C}$	-	140	-	$\mu\text{A}$
Total capacitance	$C$	$V_R = 1\text{V}, f = 1\text{MHz}$	-	730	-	pF
		$V_R = 600\text{V}, f = 1\text{MHz}$	-	74	-	pF
Total capacitive charge	$Q_C$	$V_R = 400\text{V}, di/dt = 350\text{A}/\mu\text{s}$	-	31	-	nC
Switching time	$t_C$	$V_R = 400\text{V}, di/dt = 350\text{A}/\mu\text{s}$	-	19	-	ns

**●Thermal characteristics**

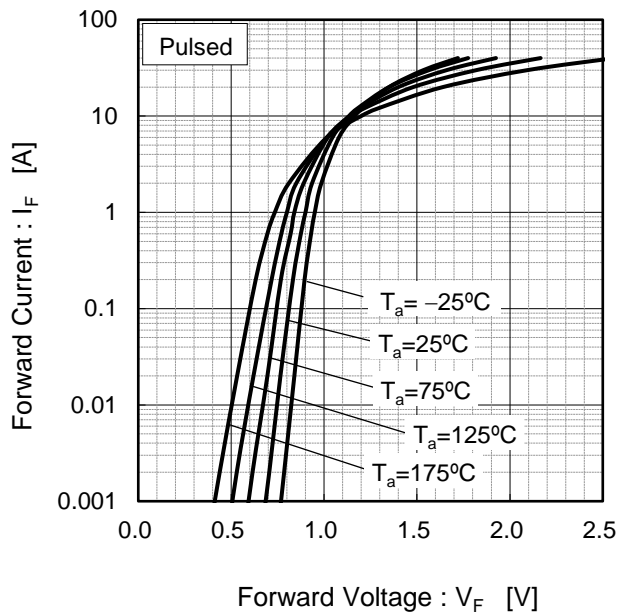
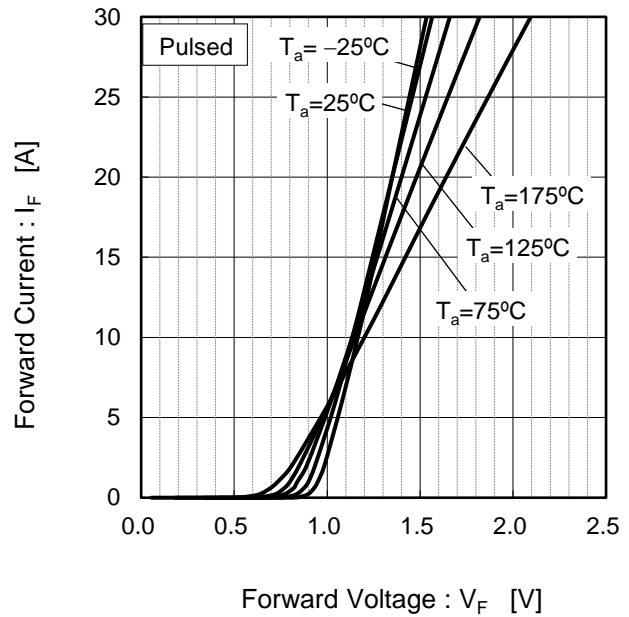
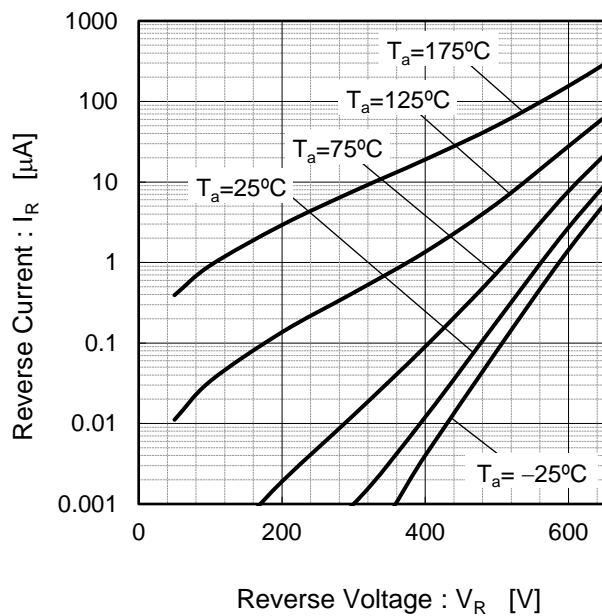
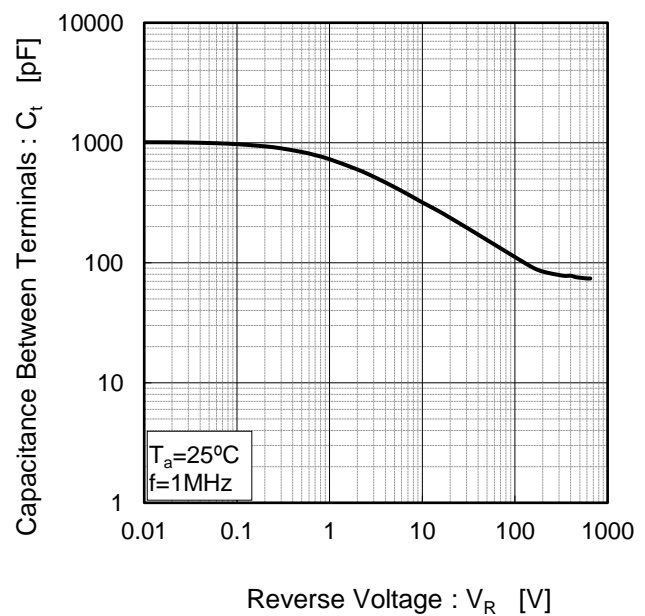
Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance	$R_{th(j-c)}$	Per Leg	-	0.92	1.1	$^\circ\text{C}/\text{W}$
		Both Legs	-	0.46	0.54	$^\circ\text{C}/\text{W}$

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

Symbol	Value	Unit	Symbol	Value	Unit
$R_{th1}$	1.94E-01	K/W	$C_{th1}$	3.08E-03	Ws/K
$R_{th2}$	7.23E-01		$C_{th2}$	8.36E-03	
$R_{th3}$	5.52E-03		$C_{th3}$	1.03E+00	



# ●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)

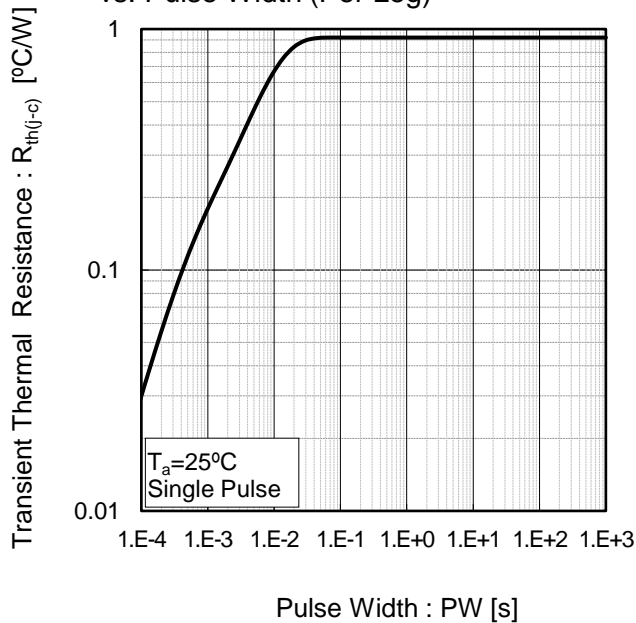


Fig.6 Power Dissipation (Per Leg)

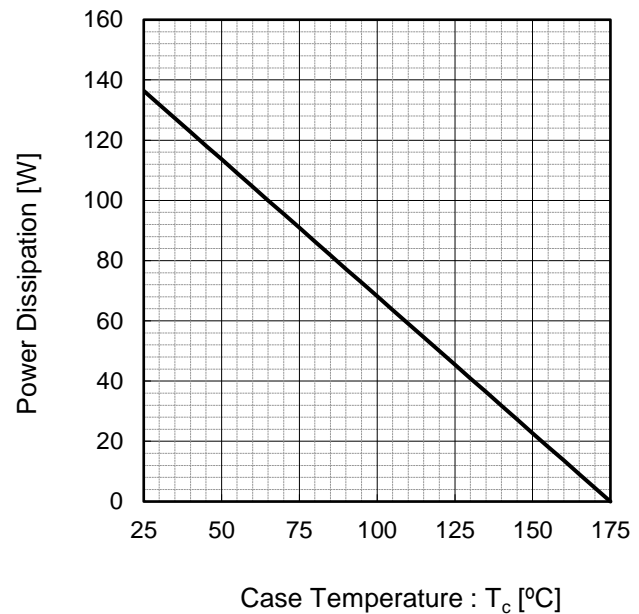
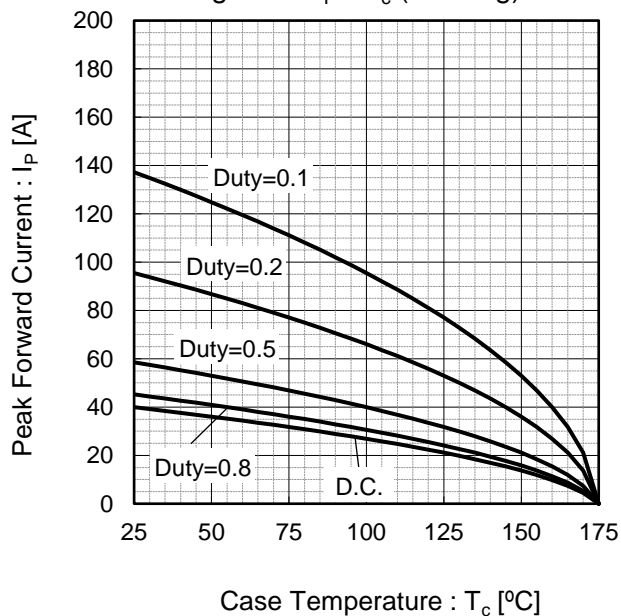
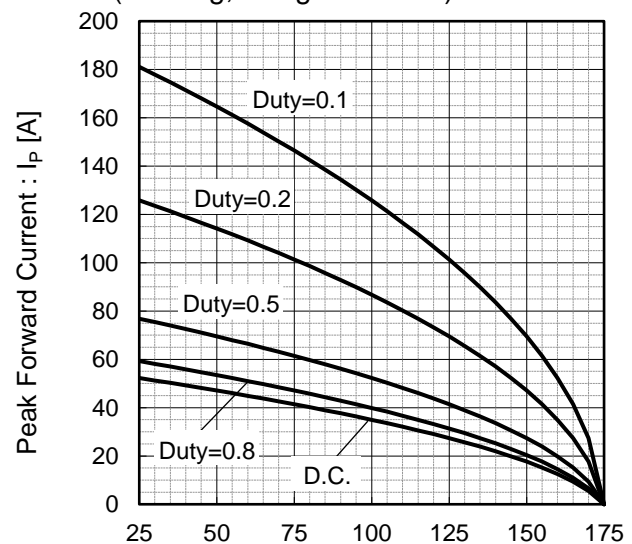


Fig.7\*3 Maximum peak forward current derating curve  $I_P - T_c$  (Per Leg)



Case Temperature :  $T_c$  [°C]  
 \*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)



Case Temperature :  $T_c$  [°C]  
 \*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)

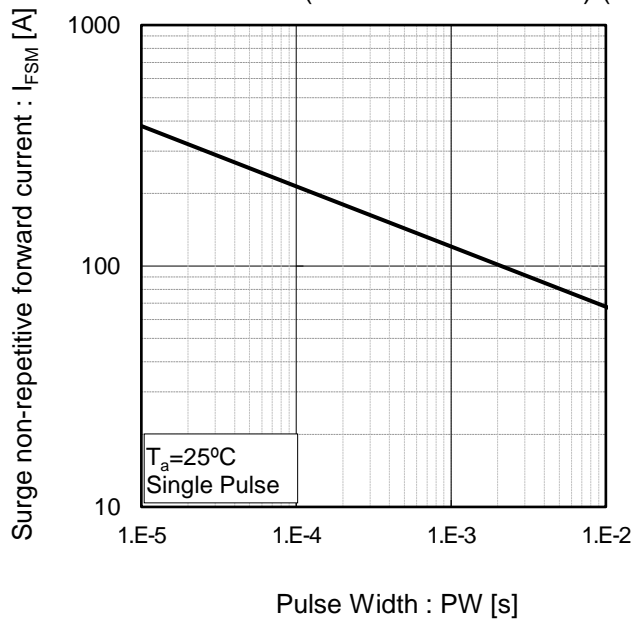
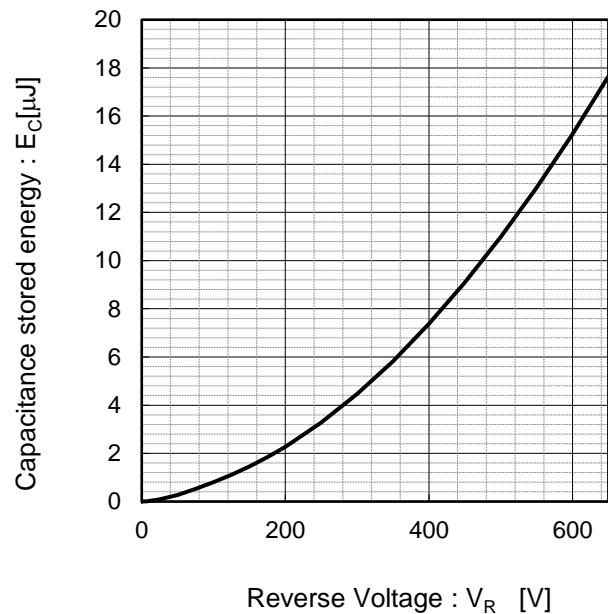
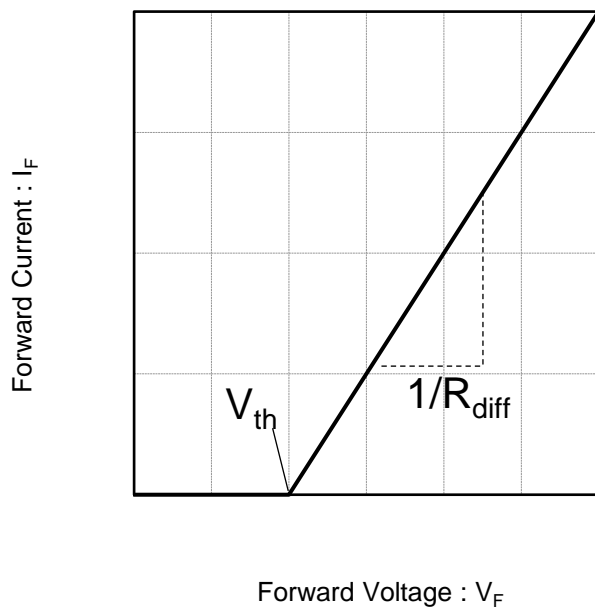


Fig.10 Typical capacitance store energy (Per Leg)



## ●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
$b_0$	1.99E-02	Ω
$b_1$	5.10E-05	Ω/°C
$b_2$	5.40E-07	Ω/°C <sup>2</sup>

$T_j$  in °C;  $-55^\circ\text{C} < T_j < 150^\circ\text{C}$ ;  $I_F < 40\text{ A}$

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## SCS240AE2HR - Web Page

[Distribution Inventory](#)

Part Number	SCS240AE2HR
Package	TO-247
Unit Quantity	360
Minimum Package Quantity	30
Packing Type	Tube
Constitution Materials List	inquiry
RoHS	Yes