

V_R	650V
I_F	10A
Q_C	24nC

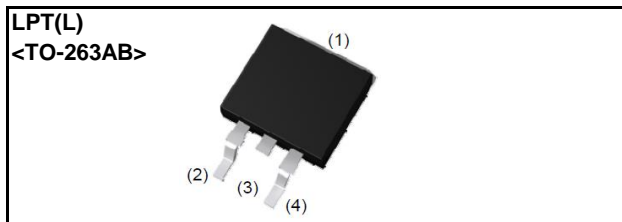
●Features

- 1) Low forward voltage
- 2) Negligible recovery time/current
- 3) Temperature independent switching behavior
- 4) High surge current capability
- 5) Low leakage current

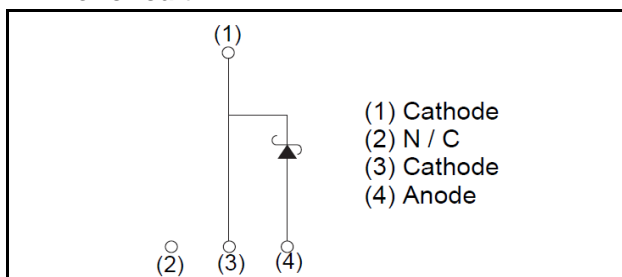
●Applications

- Switch Mode Power Supply
- Uninterruptible Power Supply
- Solar Inverter
- Motor Drive
- Air Conditioner
- EV Charger

●Outline



●Inner circuit



●Packaging specifications

Type	Packaging	Embossed tape
	Reel size (mm)	330
	Tape width (mm)	24
	Basic ordering unit (pcs)	1.000
	Packing code	TLL
	Marking	SCS310AJ

●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	10	A
Surge non-repetitive forward current	PW=10ms sinusoidal, $T_j=25^\circ\text{C}$	I_{FSM}	82	A
	PW=10ms sinusoidal, $T_j=150^\circ\text{C}$		69	A
	PW=10μs square, $T_j=25^\circ\text{C}$		300	A
Repetitive peak forward current		I_{FRM}	47 *1	A
i^2t value	$1 \leq PW \leq 10\text{ms}$, $T_j=25^\circ\text{C}$	$\int i^2 dt$	33	A^2s
	$1 \leq PW \leq 10\text{ms}$, $T_j=150^\circ\text{C}$		23	A^2s
Total power dissipation		P_D	75 *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_j = 25°C)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	V_{DC}	$I_R=50\mu A$	650	-	-	V
Forward voltage	V_F	$I_F=10A, T_j=25^{\circ}C$	-	1.35	1.50	V
		$I_F=10A, T_j=150^{\circ}C$	-	1.44	1.71	V
		$I_F=10A, T_j=175^{\circ}C$	-	1.50	-	V
Reverse current	I_R	$V_R=650V, T_j=25^{\circ}C$	-	0.03	50	μA
		$V_R=650V, T_j=150^{\circ}C$	-	2	200	μA
		$V_R=650V, T_j=175^{\circ}C$	-	6	-	μA
Total capacitance	C	$V_R=1V, f=1MHz$	-	500	-	pF
		$V_R=650V, f=1MHz$	-	46	-	pF
Total capacitive charge	Q_C	$V_R=400V, di/dt=350A/\mu s$	-	24	-	nC
Switching time	t_C	$V_R=400V, di/dt=350A/\mu s$	-	15	-	ns
Non-repetitive Avaranche Energy	E_{ava}	$L=1mH$	-	130	-	mJ

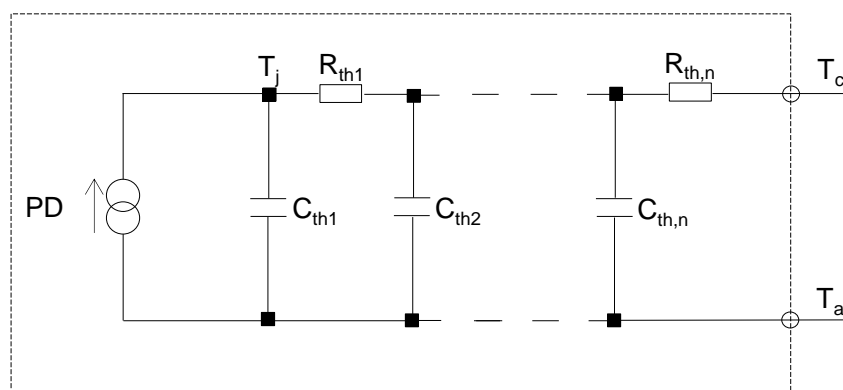
●Thermal characteristics

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance	$R_{th(j-c)}$	-	-	1.4	2.0	°C/W

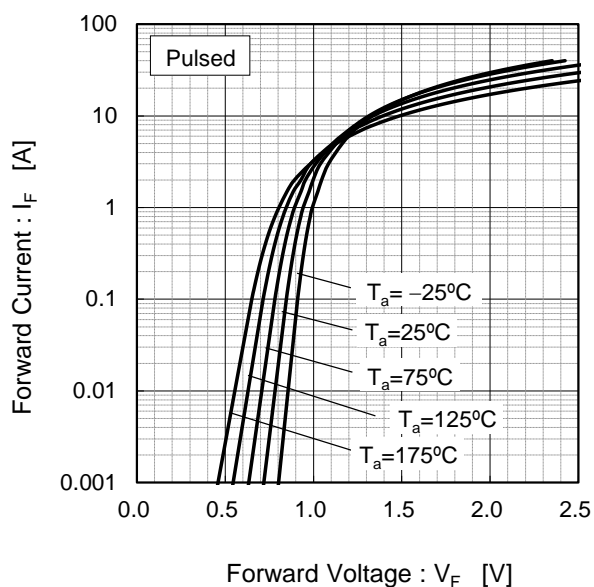
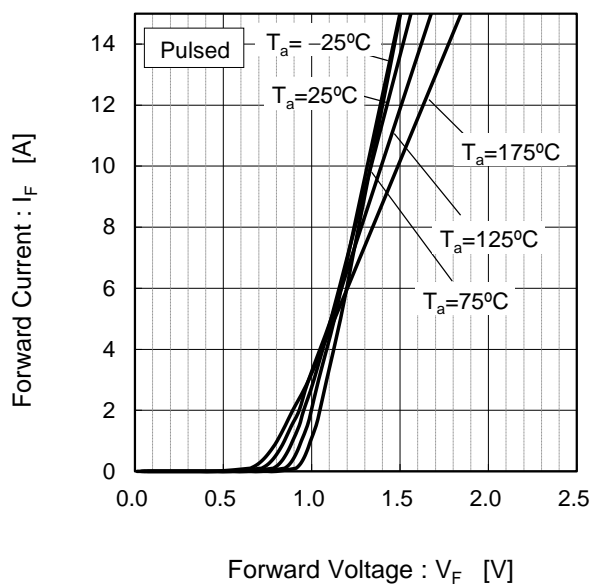
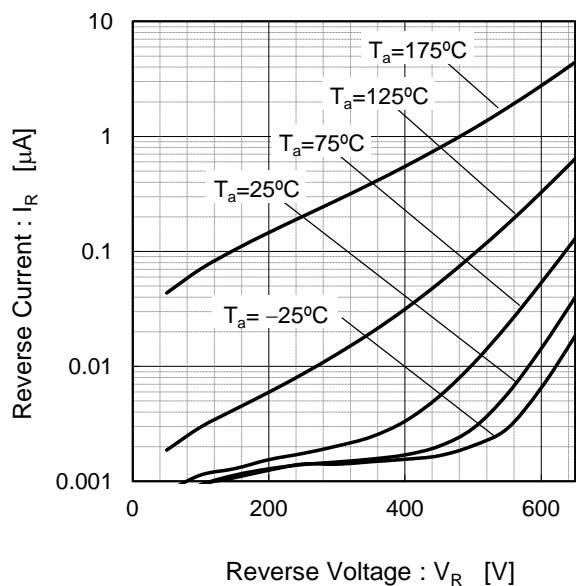
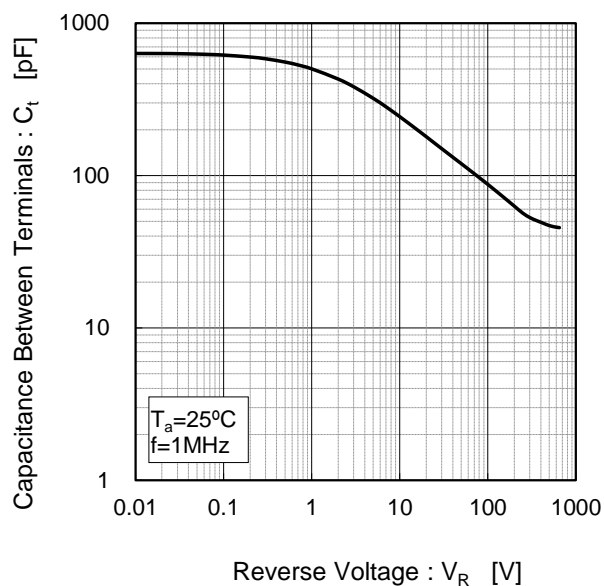
● Typical Transient Thermal Characteristics

Symbol	Value	Unit
R_{th1}	2.06E-01	K/W
R_{th2}	1.07E+00	
R_{th3}	1.22E-01	

Symbol	Value	Unit
C_{th1}	1.92E-04	Ws/K
C_{th2}	2.30E-03	
C_{th3}	4.39E-02	



●Electrical characteristic curves

Fig.1 $V_F - I_F$ CharacteristicsFig.2 $V_F - I_F$ CharacteristicsFig.3 $V_R - I_R$ CharacteristicsFig.4 $V_R - C_t$ Characteristics

●Electrical characteristic curves

Fig.5 Typical Transient Thermal Resistance vs. Pulse Width

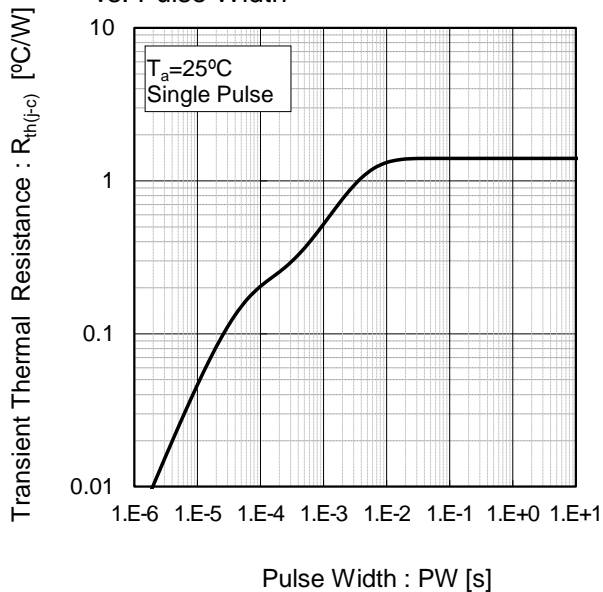


Fig.6 Power Dissipation

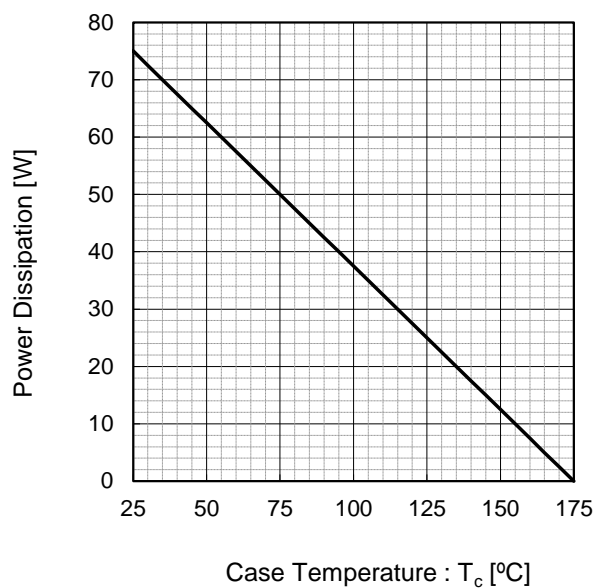
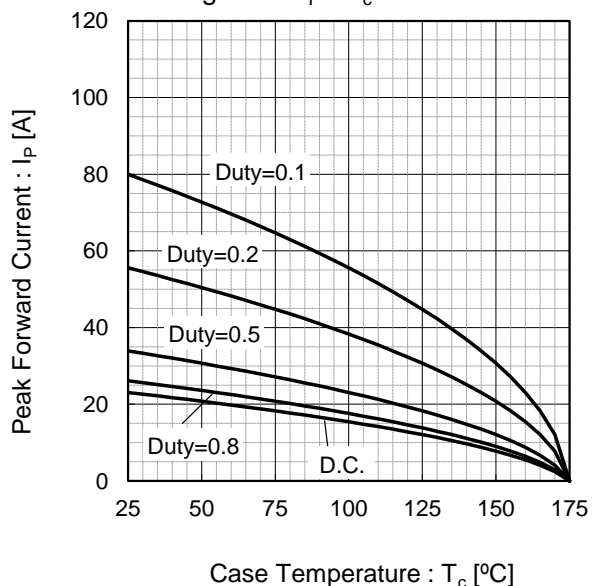
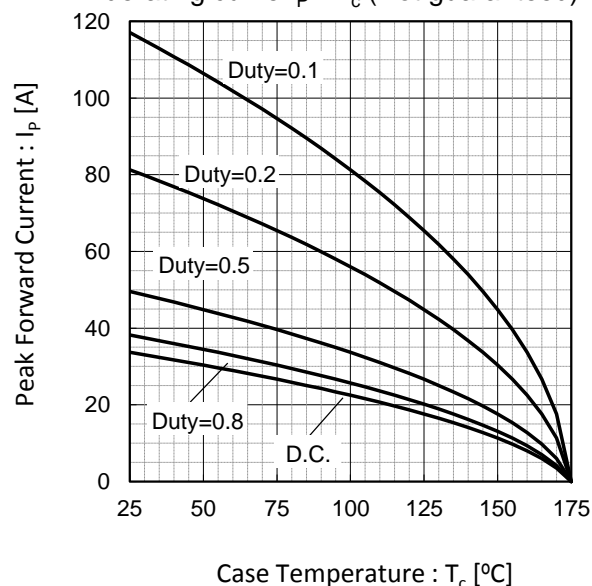


Fig.7*3 Maximum peak forward current derating curve $I_P - T_c$



*3 Based on max 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 $I_P - T_c$ (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)

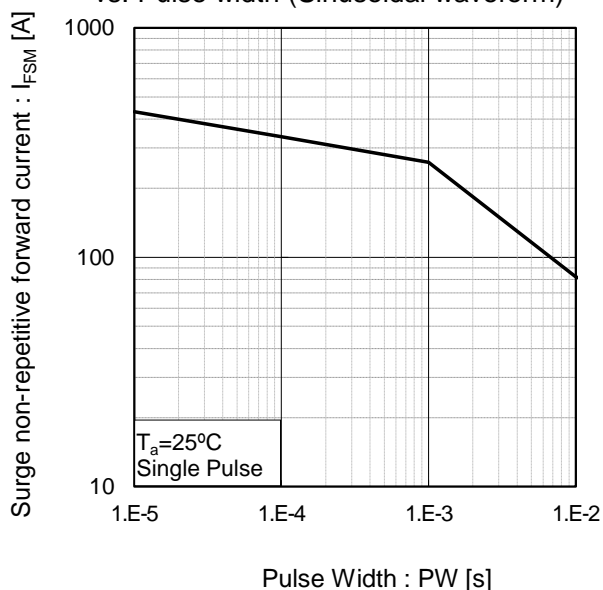
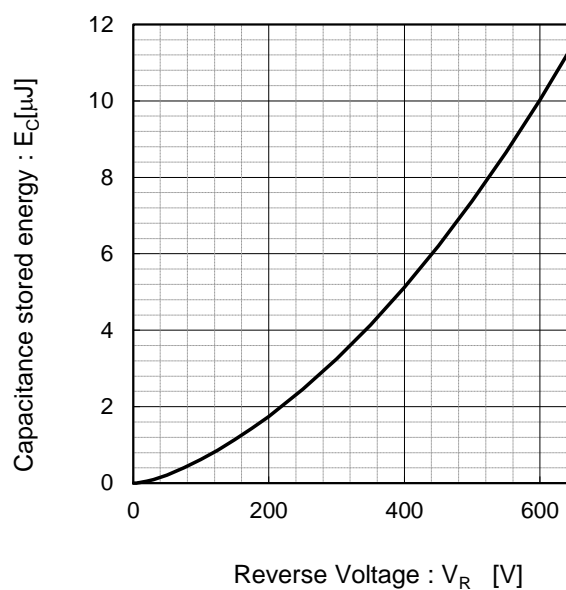
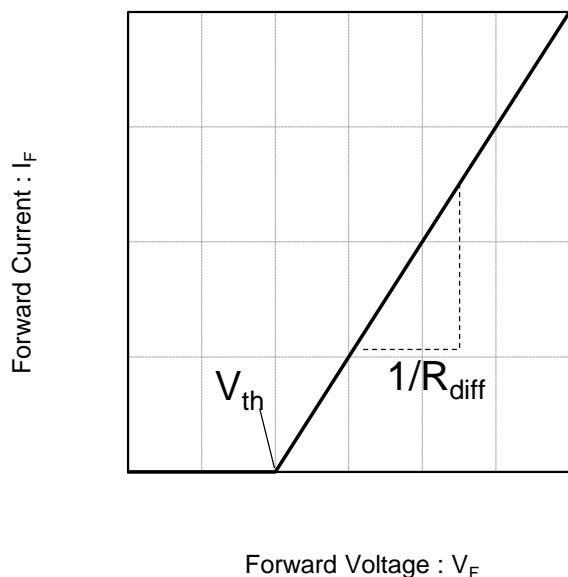


Fig.10 Typical capacitance store energy



●Simplified forward characteristic model

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	3.52E-02	Ω
b_1	7.46E-05	Ω/°C
b_2	7.68E-07	Ω/°C ²

T_j in °C; $-55^\circ\text{C} < T_j < 175^\circ\text{C}$; $I_F < 20\text{ A}$

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