

V_R	650V
I_F	10A
Q_C	15nC

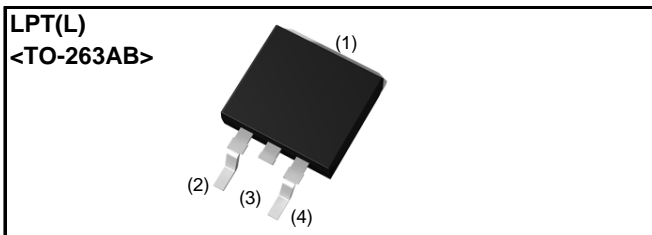
●Features

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

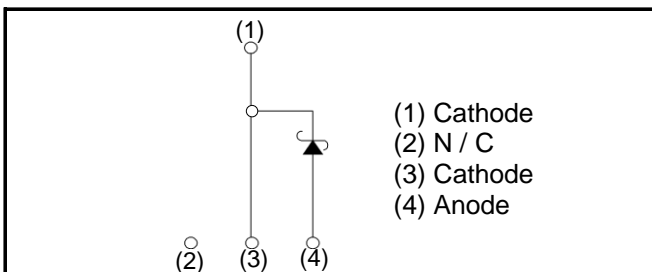
●Applications

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

●Outline



●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	SCS210AJ

●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 ($T_c = 137^\circ\text{C}$)		I_F	10	A
Surge non-repetitive forward current	PW=10ms sinusoidal, $T_j=25^\circ\text{C}$	I_{FSM}	38	A
	PW=10ms sinusoidal, $T_j=150^\circ\text{C}$		30	A
	PW=10μs square, $T_j=25^\circ\text{C}$		150	A
Repetitive peak forward current		I_{FRM}	45 ^{*1}	A
i^2t value	PW=10ms, $T_j=25^\circ\text{C}$	$\int i^2 dt$	7.2	A ² s
	PW=10ms, $T_j=150^\circ\text{C}$		4.5	A ² s
Total power dissipation		P_D	83 ^{*2}	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} $T_c=25^\circ\text{C}$

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

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	μA
		$V_R = 600\text{V}, T_j = 150^\circ\text{C}$	-	30	-	μA
		$V_R = 600\text{V}, T_j = 175^\circ\text{C}$	-	70	-	μA
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

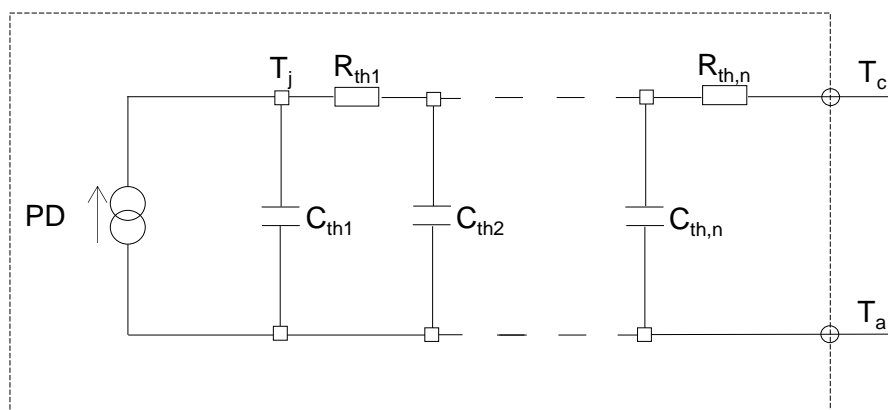
●Thermal characteristics

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance	$R_{th(j-c)}$	-	-	1.5	1.8	$^\circ\text{C}/\text{W}$

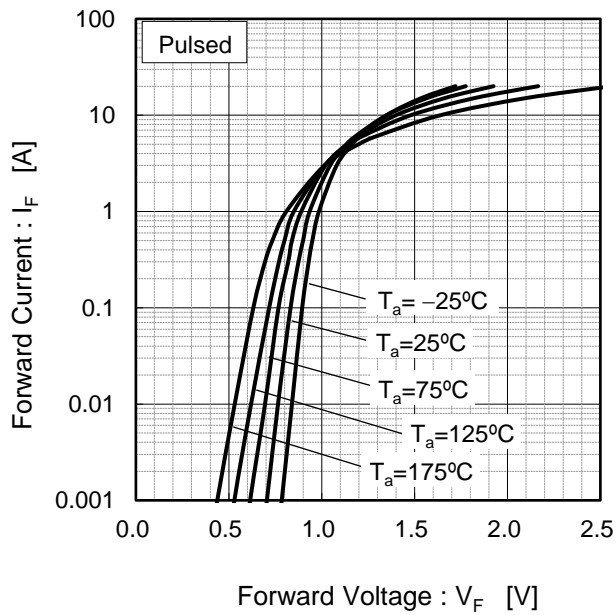
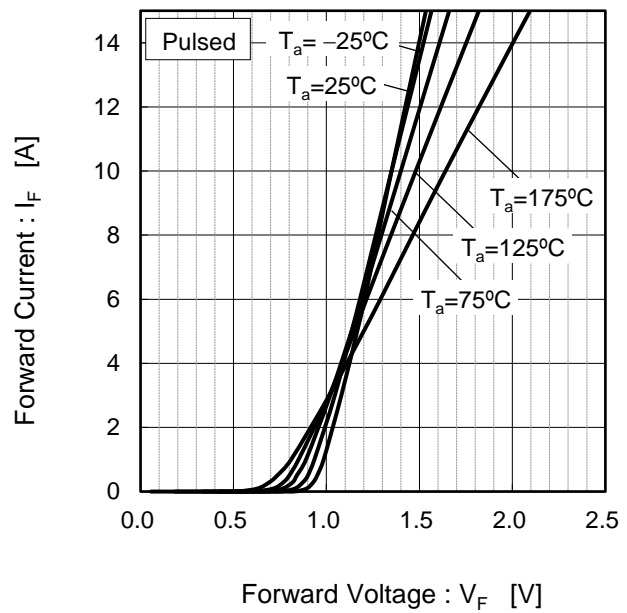
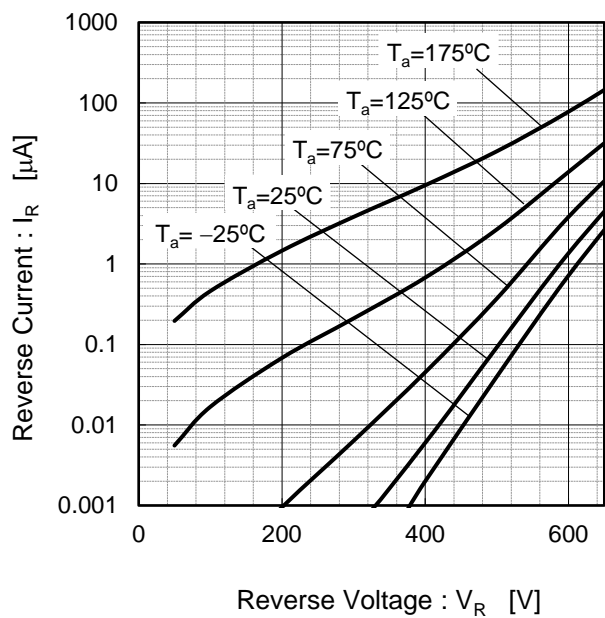
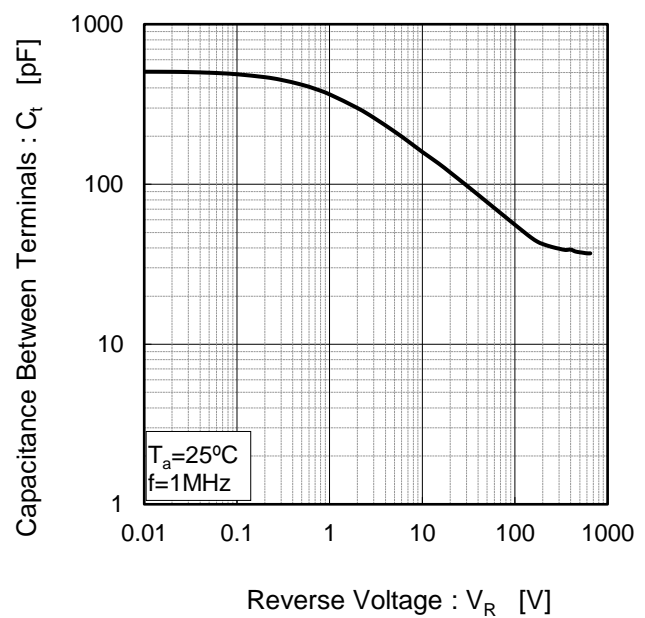
●Typical Transient Thermal Characteristics

Symbol	Value	Unit
R_{th1}	5.01E-02	K/W
R_{th2}	1.14E+00	
R_{th3}	3.10E-01	

Symbol	Value	Unit
C_{th1}	1.43E-03	Ws/K
C_{th2}	8.50E-04	
C_{th3}	1.14E-01	



●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

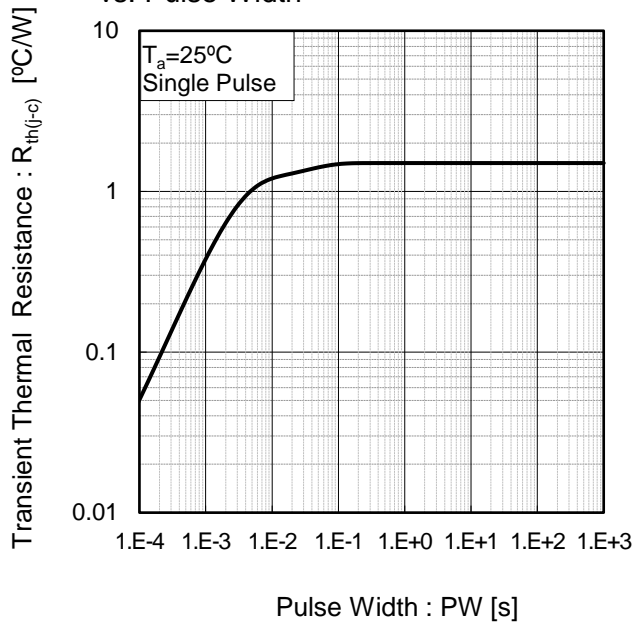


Fig.6 Power Dissipation

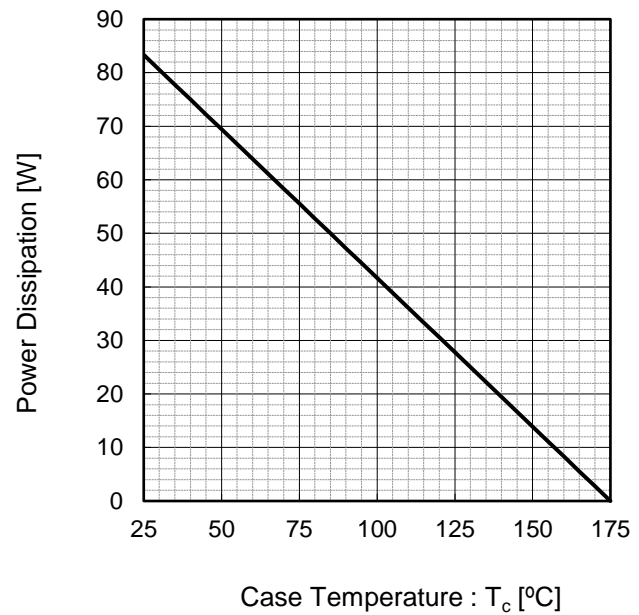
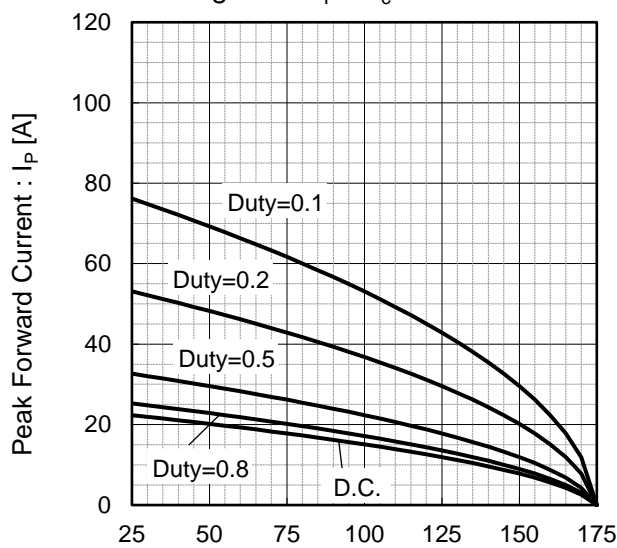


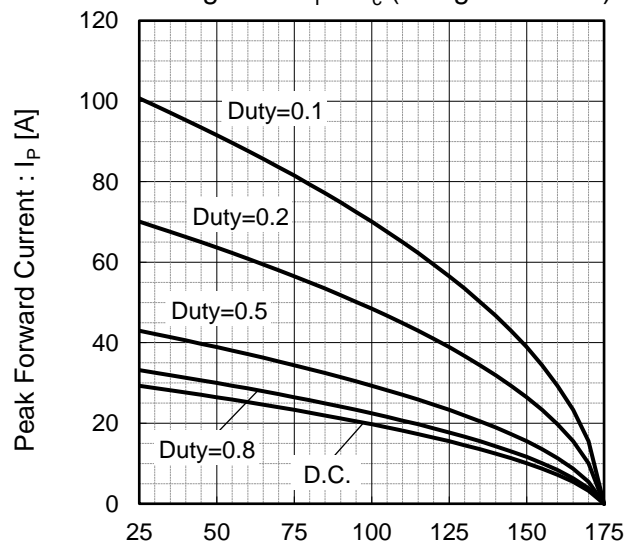
Fig.7*3 Maximum peak forward current derating curve $I_P - T_c$



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 $I_P - T_c$ (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)

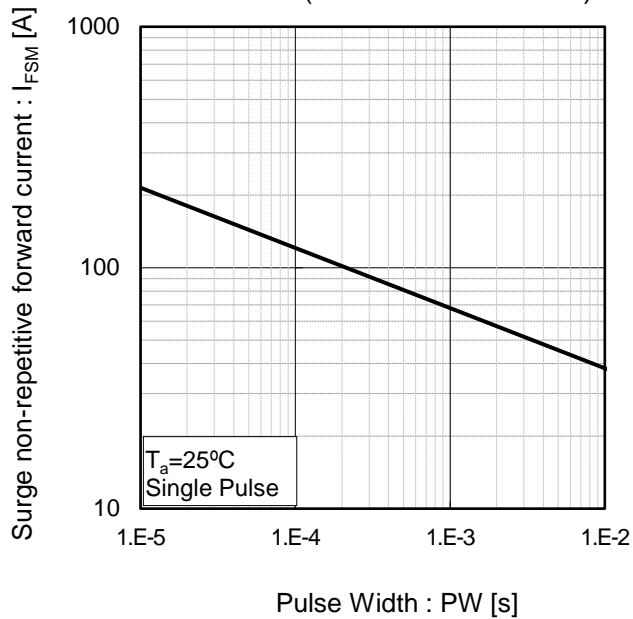
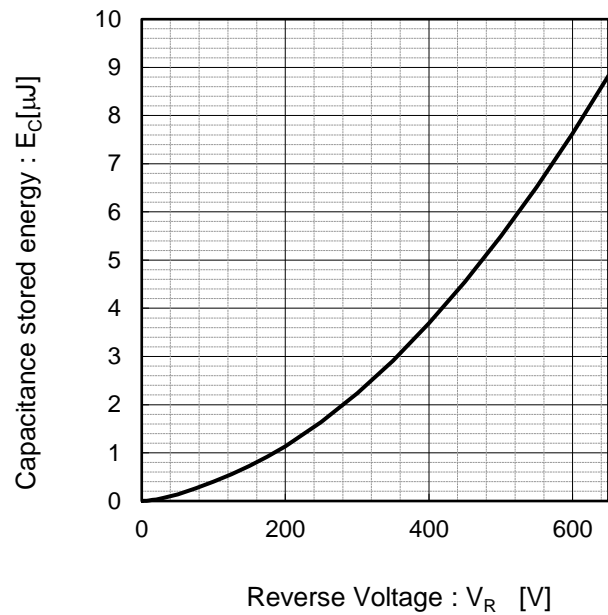
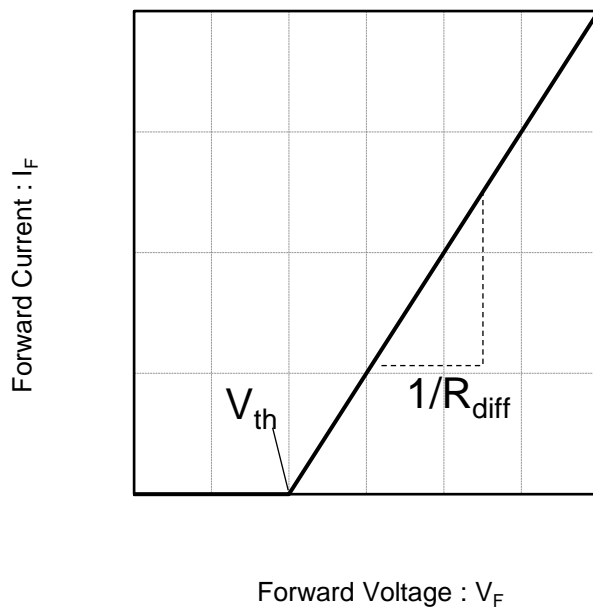


Fig.10 Typical capacitance store energy



●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	9.35E-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 ²

T_j in °C; -55 °C < T_j < °C ; I_F < 20 A

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