SCS212AJHR

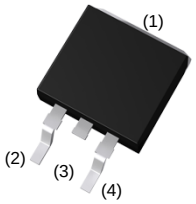
Automotive Grade SiC Schottky Barrier Diode

Datasheet

V_R	650V
I_F	12A
Q_C	18nC

●Outline

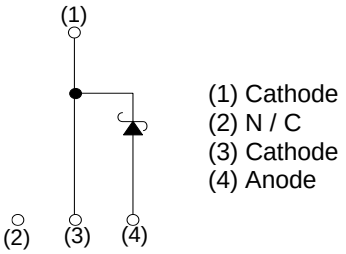
LPT(L)
<TO-263AB>



●Features

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

●Inner circuit



(1) Cathode
(2) N / C
(3) Cathode
(4) Anode

●Applications

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

●Packaging specifications

Type	Packaging	Embossed tape
	Reel size (mm)	330
	Tape width (mm)	24
	Basic ordering unit (pcs)	1000
	Packing code	TLL
	Marking	SCS212AJ

●Absolute maximum ratings (T_{vj} = 25°C unless otherwise specified)

Parameter		Symbol	Value	Unit
Reverse voltage (repetitive peak)		V_{RM}	650	V
Reverse voltage (DC)		V_R	650	V
Continuous forward current (T_c= 132°C)		I_F	12 *1	A
Surge non-repetitive forward current	PW=10ms sinusoidal, T_{vj}=25°C	I_{FSM}	43	A
	PW=10ms sinusoidal, T_{vj}=150°C		34	A
	PW=10μs square, T_{vj}=25°C		170	A
Repetitive peak forward current		I_{FRM}	51 *2	A
i^2t value	PW=10ms, T_{vj}=25°C	$\int i^2dt$	9.2	A^2s
	PW=10ms, T_{vj}=150°C		5.7	A^2s
Total power dissipation		P_D	88 *3	W
Virtual Junction temperature		T_{vj}	175	°C
Range of storage temperature		T_{stg}	−55 to +175	°C

*1 Limited by maximum T_{vj} and for Max. R_{thJC}.

*2 T_c=100°C, T_{vj}=150°C, Duty cycle=10% *3 T_c=25°C

●Electrical characteristics (T_{vj} = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	V_{DC}	I_R =2.4mA	650	-	-	V
Forward voltage	V_F	I_F=12A,T_{vj}=25°C	-	1.35	1.55	V
		I_F=12A,T_{vj}=150°C	-	1.55	-	V
		I_F=12A,T_{vj}=175°C	-	1.63	-	V
Reverse current	I_R	V_R=600V,T_{vj}=25°C	-	2.4	240	μA
		V_R=600V,T_{vj}=150°C	-	36	-	μA
		V_R=600V,T_{vj}=175°C	-	84	-	μA
Total capacitance	C	V_R=1V,f=1MHz	-	440	-	pF
		V_R=600V,f=1MHz	-	44	-	pF
Total capacitive charge	Q_C	V_R=400V,di/dt=350A/μs	-	18	-	nC
Switching time	t_C	V_R=400V,di/dt=350A/μs	-	16	-	ns

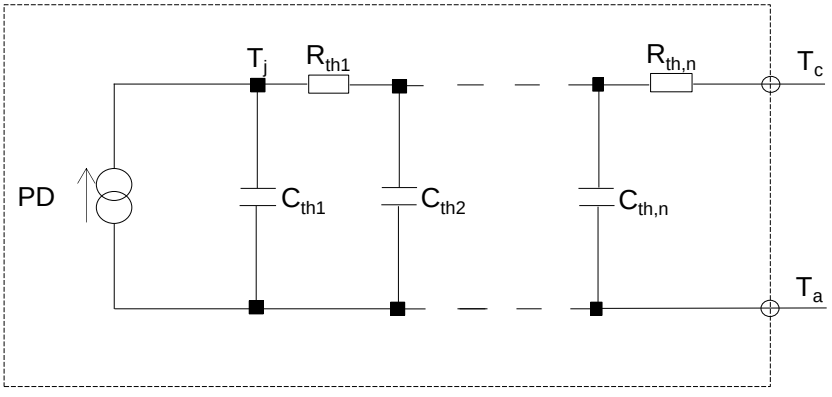
●Thermal characteristics

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
Thermal resistance	$R_{th(j-c)}$	-	-	1.4	1.7	K/W

●Typical Transient Thermal Characteristics

Symbol	Value	Unit
R_{th1}	1.6×10^{-1}	K/W
R_{th2}	8.0×10^{-1}	
R_{th3}	4.5×10^{-1}	

Symbol	Value	Unit
C_{th1}	1.8×10^{-3}	Ws/K
C_{th2}	1.7×10^{-3}	
C_{th3}	6.8×10^{-2}	



●Electrical characteristic curves

Fig.1 V_F - I_F Characteristics

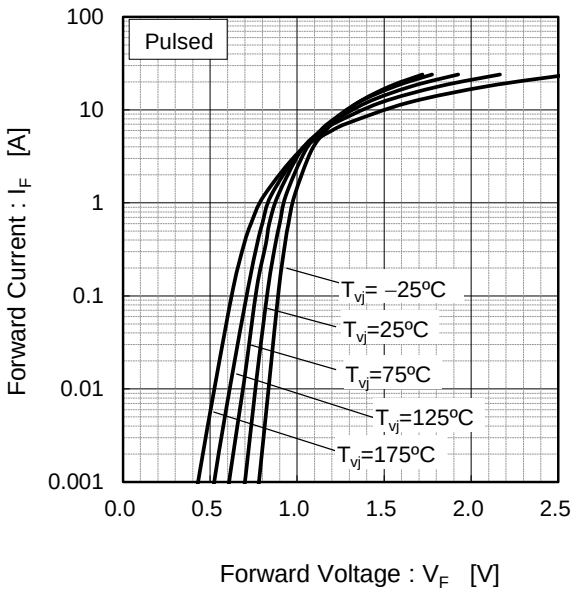


Fig.2 V_F - I_F Characteristics

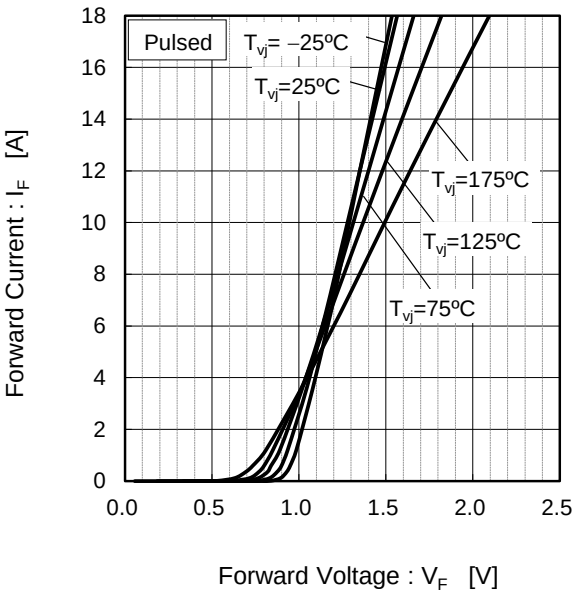


Fig.3 V_R - I_R Characteristics

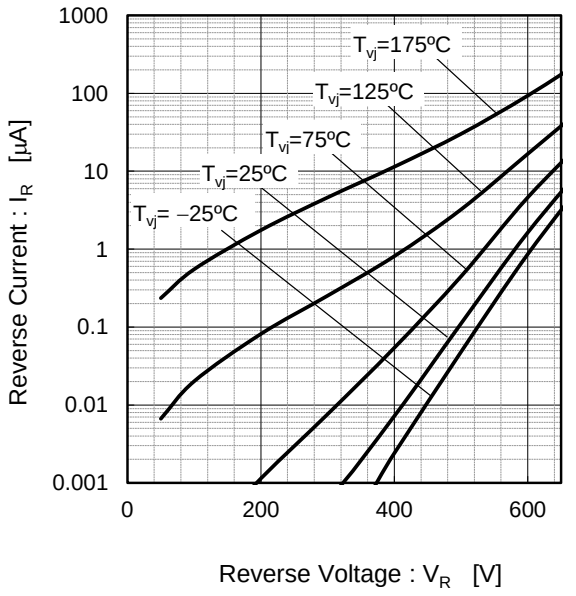
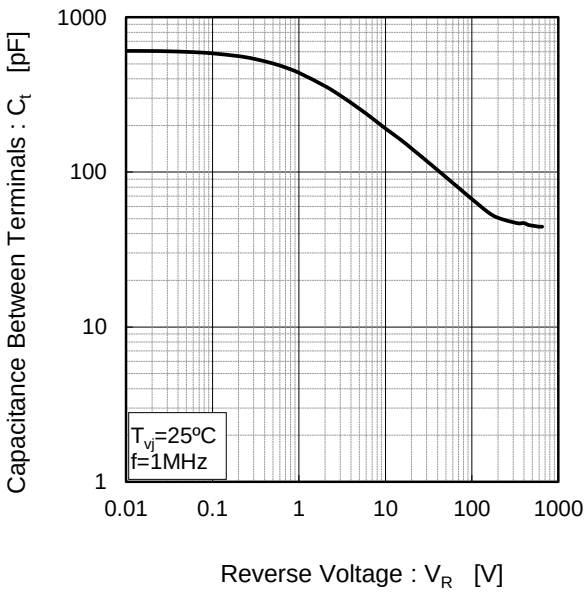


Fig.4 V_R - C_t Characteristics



●Electrical characteristic curves

Fig.5 Typical Transient Thermal Impedance vs. Pulse Width

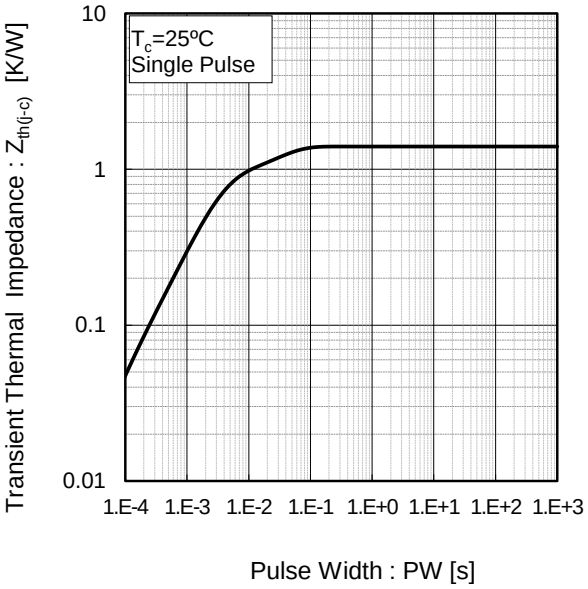


Fig.6 Power Dissipation

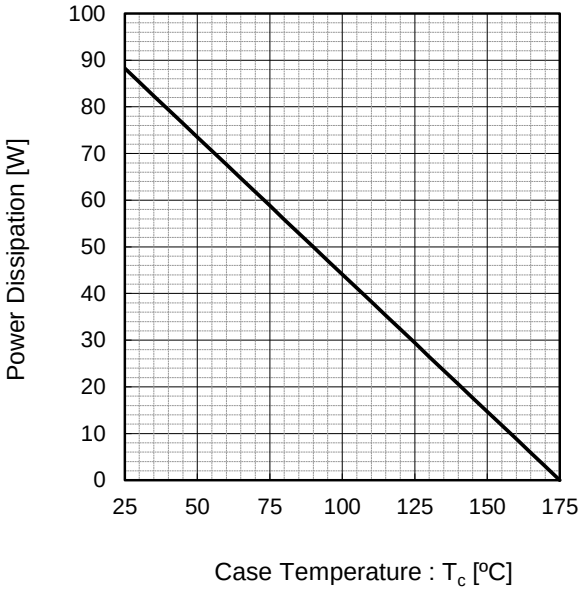
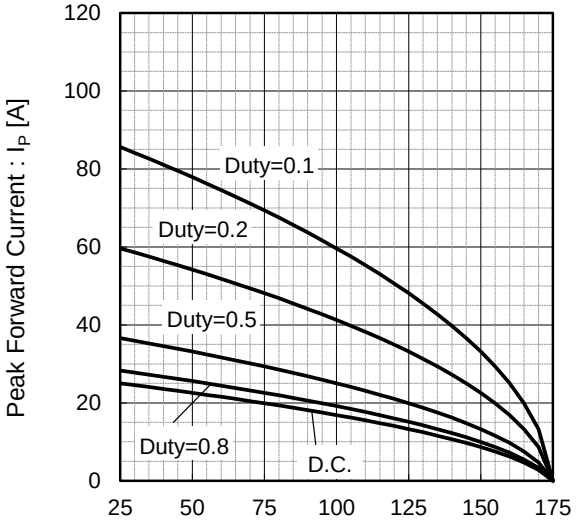
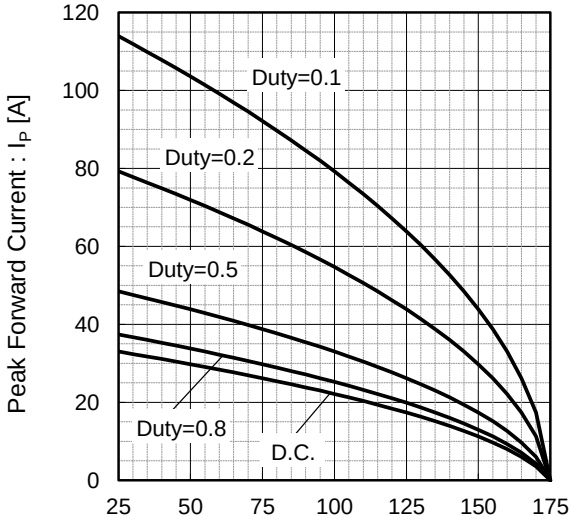


Fig.7*4 Maximum peak forward current derating curve I_P - T_c



*4 Based on max Vf, max $Z_{th(j-c)}$
Valid for switching of above 10kHz, excluding D.C. curve.

Fig.8*5 Typical peak forward current derating curve I_P - T_c (Not guaranteed)



*5 Based on typ Vf, typ $Z_{th(j-c)}$
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)

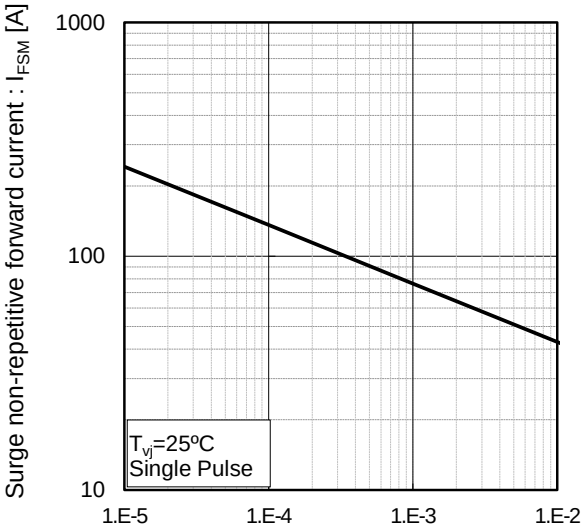
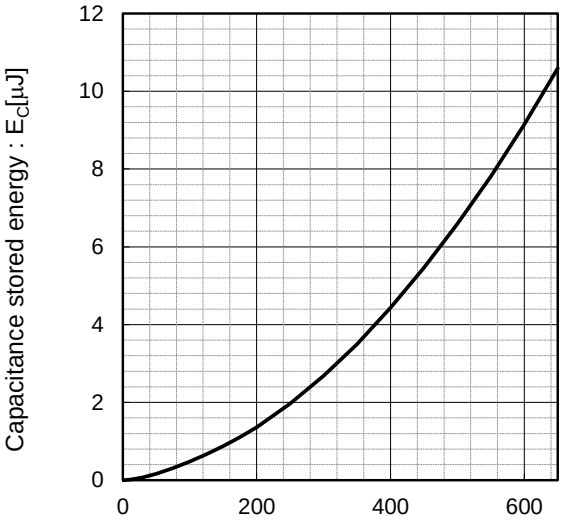
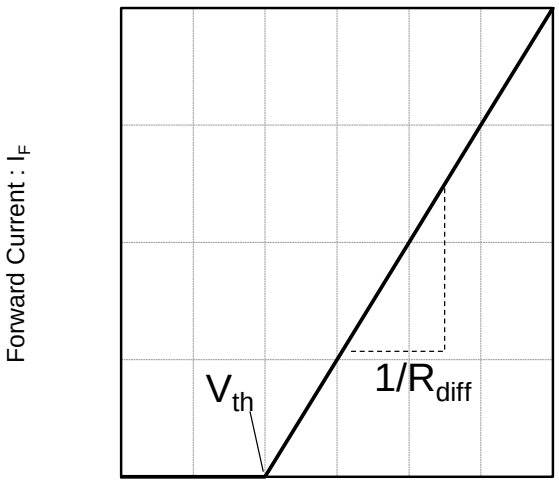


Fig.10 Typical capacitance store energy



●Symplified forward characteristic model

Fig.11 Equivalent forward current curve



$$V_F = V_{th} + R_{diff} I_F$$

$$V_{th}(T_{vj}) = a_0 + a_1 T_{vj}$$
$$R_{diff}(T_{vj}) = b_0 + b_1 T_{vj} + b_2 T_{vj}^2$$

Symbol	Typical Value	Unit
a_0	9.4×10^{-1}	V
a_1	-1.1×10^{-3}	V/°C
b_0	3.3×10^{-2}	Ω
b_1	8.5×10^{-5}	Ω/°C
b_2	9.0×10^{-7}	Ω/°C^2

T_{vj} in ºC; -55 ºC < T_{vj} < 175 ºC ; I_F < 24 A

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