Datasheet

SiC Schottky Barrier Diode

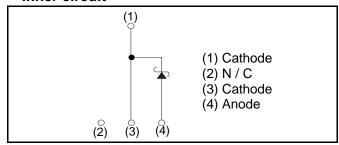
V_R	650V
I _F	12A
Q_{C}	18nC

● Outline LPT(L) <TO-263AB> (2) (3) (4)

Features

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

•Inner circuit



Applications

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

Packaging specifications

_		ging speemeanens	
		Packaging	Embossed tape
		Reel size (mm)	330
	Typo	Tape width (mm)	24
	Туре	Basic ordering unit (pcs)	1 000
		Packing code	TLL
		Marking	SCS212AJ

● Absolute maximum ratings (T_i = 25°C)

Parameter		Symbol	Value	Unit
Reverse voltage (repetitive peak)		V_{RM}	650	V
Reverse voltage (D	Reverse voltage (DC)		650	V
Continuous forward	d current (T _c = 132°C)	I _F	12	А
Surge non-	PW=10ms sinusoidal, T _j =25°C		43	А
repetitive forward current	PW=10ms sinusoidal, T _j =150°C	I_{FSM}	34	А
	PW=10μs square, T _j =25°C		170	А
Repetitive peak forward current		I _{FRM}	51 *1	А
PW=10ms, T _j =25°C		ſ.2	9.2	A ² s
i ² t value	PW=10ms, T _j =150°C	$\int i^2 dt$	5.7	A ² s
Total power dissipation		P_{D}	88 *2	W
Junction temperature		T _j	175	°C
Range of storage temperature		T _{stg}	-55 to +175	°C

^{*1} T_c=100°C, T_i=150°C, Duty cycle=10% *2 T_c=25°C

●Electrical characteristics (T_j = 25°C)

Parameter	eter Symbol Conditions -	Conditions	Values			Unit
Parameter		Min.	Тур.	Max.	Unit	
DC blocking voltage	V_{DC}	I _R =2.4mA	650	-	-	V
	V _F	I _F =12A,T _j =25°C	-	1.35	1.55	V
Forward voltage		I _F =12A,T _j =150°C	-	1.55	-	V
		I _F =12A,T _j =175°C	-	1.63	-	V
Reverse current	I _R	V _R =600V,T _j =25°C	-	2.4	240	μΑ
		V _R =600V,T _j =150°C	-	36	-	μΑ
		V _R =600V,T _j =175°C	-	84	-	μΑ
Total capacitance	С	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

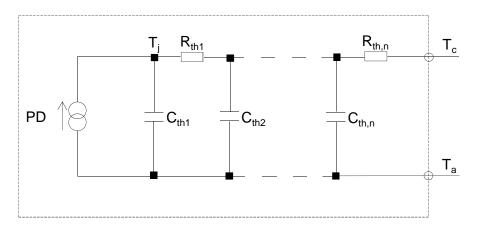
●Thermal characteristics

Parameter	Symbol	Conditions	Values			Unit
			Min.	Тур.	Max.	Offic
Thermal resistance	R _{th(j-c)}	-	-	1.4	1.7	°C/W

●Typical Transient Thermal Characteristics

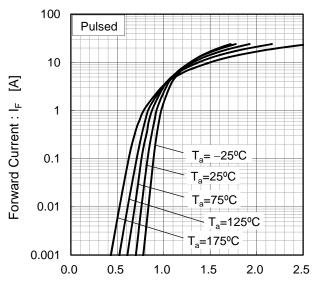
Symbol	Value	Unit
R _{th1}	1.56E-01	
R _{th2}	7.96E-01	K/W
R _{th3}	4.48E-01	

Symbol	Value	Unit
C_{th1}	1.81E-03	
C_{th2}	1.65E-03	Ws/K
C_{th3}	6.83E-02	



•Electrical characteristic curves

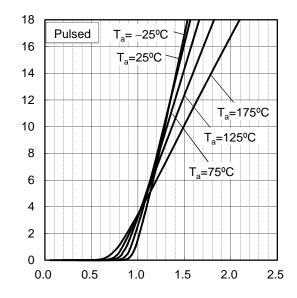
Fig.1 V_F - I_F Characteristics



Forward Voltage : V_F [V]

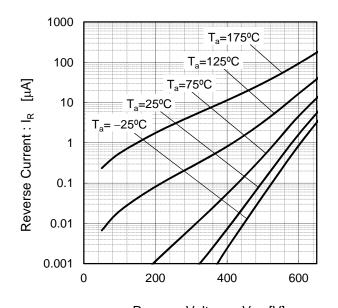
Fig.2 V_F - I_F Characteristics

Forward Current : IF [A]



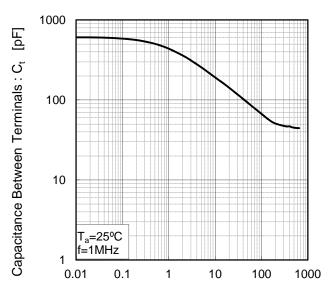
Forward Voltage : V_F [V]

Fig.3 V_R - I_R Characteristics



Reverse Voltage : V_R [V]

Fig.4 V_R - C_t Characteristics



Reverse Voltage : V_R [V]

•Electrical characteristic curves

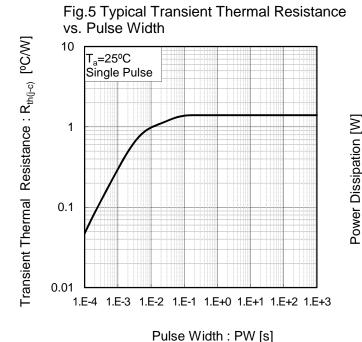
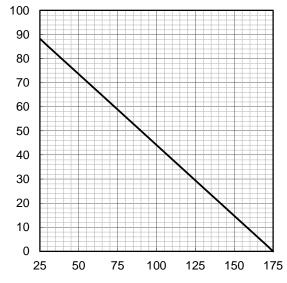
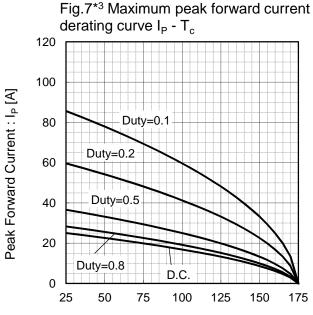


Fig.6 Power Dissipation



Case Temperature : T_c [°C]



Case Temperature : T_c [°C] *3 Based on max Vf, max R_{th(j-c)} Valid for switching of above 10kHz, excluding D.C. curve.

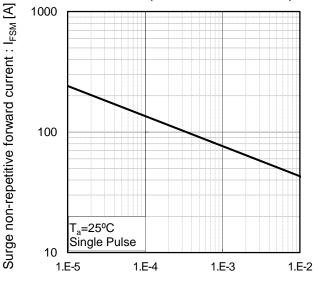
derating curve I_P - T_c (Not guaranteed) Duty=0.1 100 Peak Forward Current : Ip [A] Duty=0.2 80 60 Duty=0.5 40 20 Duty=0.8 D.C. 0 25 50 75 100 125 150 175

Fig.8*4 Typical peak forward current

Case Temperature : T_c [°C] *4 Based on typ Vf, typ R_{th(j-c)} Typical value, not guaranteed Valid for switching of above 10kHz, excluding D.C. curve

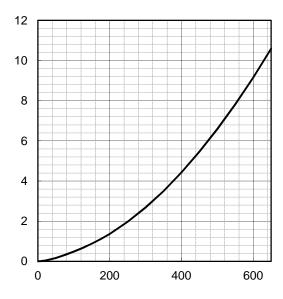
•Electrical characteristic curves

Fig.9 Surge non-repetitive forward current vs. Pulse width (Sinusoidal waveform)



Pulse Width: PW [s]

Fig.10 Typical capacitance store energy

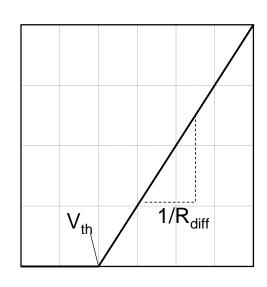


Capacitance stored energy : $\mathsf{E}_{\mathrm{C}}[\mu J]$

Reverse Voltage: V_R [V]

Symplified forward characteristic model

Fig.11 Equivalent forward current curve



Forward Voltage: V_F

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

$$\begin{aligned} &V_{th} \left(\ T_{j} \ \right) = a_{0} + a_{1} \, T_{j} \\ &R_{diff} \left(\ T_{j} \ \right) = b_{0} + b_{1} \, T_{j} + b_{2} \, T_{j}^{2} \end{aligned}$$

Symbol	Typical Value	Unit
a ₀	9.35E-01	V
a ₁	-1.12E-03	V/°C
b_0	3.32E-02	Ω
b ₁	8.50E-05	Ω/°C
b ₂	9.00E-07	Ω/°C ²

 T_i in ${}^{\circ}C$; -55 ${}^{\circ}C$ < T_i < ${}^{\circ}C$; I_F < 24 A

Forward Current: IF

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