S6508

SiC Schottky Barrier Diode Bare Die

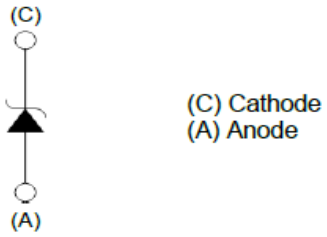
Datasheet

V_R	650V
I_F	20A[*1]
Q_C	47nC

●Features

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

●Inner circuit



●Applications

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

●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		I_F	20 [*1]	A
Surge non-repetitive forward current	PW=10ms sinusoidal, T_{vj}=25°C	I_{FSM} [*2]	120	A
	PW=10ms sinusoidal, T_{vj}=150°C		104	A
	PW=10μs square, T_{vj}=25°C		450	A
i^2t value	PW=10ms, T_{vj}=25°C	$\int i^2dt$ [*2]	75	A^2s
	PW=10ms, T_{vj}=150°C		54	A^2s
Virtual Junction temperature		T_{vj}	175	°C
Range of storage temperature		T_{stg}	−55 to +175	°C

*1 Limited by maximum T_{vj} *2 In case of TO-220AC package using alminum wire 400μm in diameter and Z_{thJC} of 1.30 K/W or less (PW = 10ms).

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

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	V_{DC}	I_R =40μA	650	-	-	V
Forward voltage	V_F	I_F= 20A, T_{vj}=25°C	-	1.35	1.50	V
		I_F= 20A, T_{vj}=150°C	-	1.44	1.71	V
		I_F= 20A, T_{vj}=175°C	-	1.50	-	V
Reverse current	I_R	V_R= 600 V,T_{vj}=25°C	-	0.06	100	μA
		V_R= 600 V,T_{vj}=150°C	-	4	-	μA
		V_R= 600 V,T_{vj}=175°C	-	20	-	μA
Total capacitance	C	V_R=1V,f=1MHz	-	730	-	pF
		V_R=650V,f=1MHz	-	74	-	pF
Total capacitive charge	Q_C	V_R=400V,di/dt=350A/μs	-	47	-	nC
Switching time	t_C	V_R=400V,di/dt=350A/μs	-	25	-	ns
Non-repetetive Avaranche Energy	E_{ava}	L=1mH	-	220	-	mJ

●Electrical characteristic curves

Fig.1 V_F - I_F Characteristics

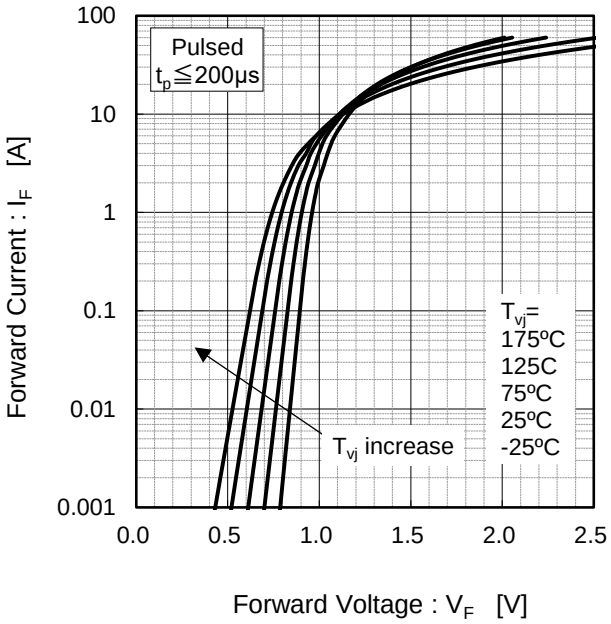


Fig.2 V_F - I_F Characteristics

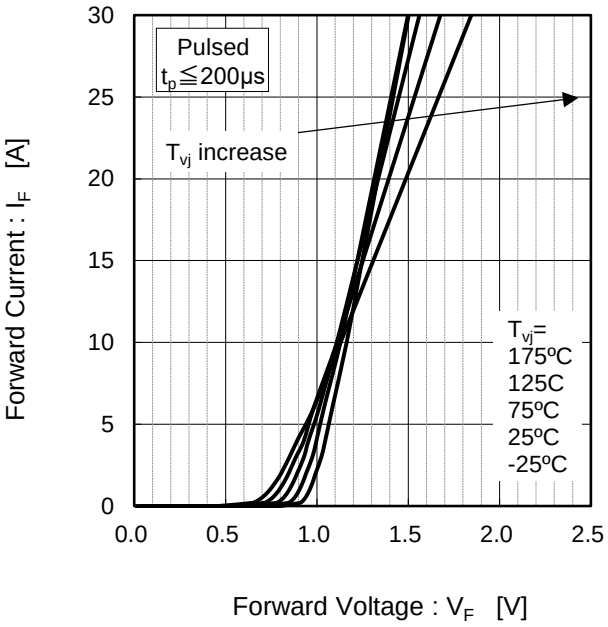


Fig.3 V_R - I_R Characteristics

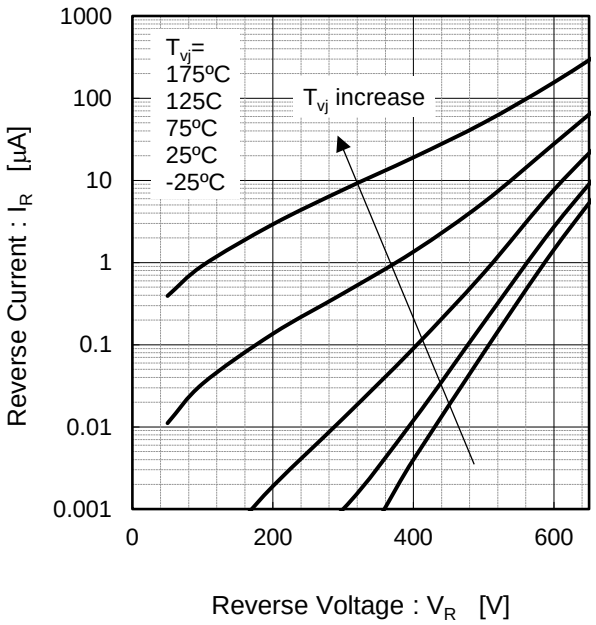
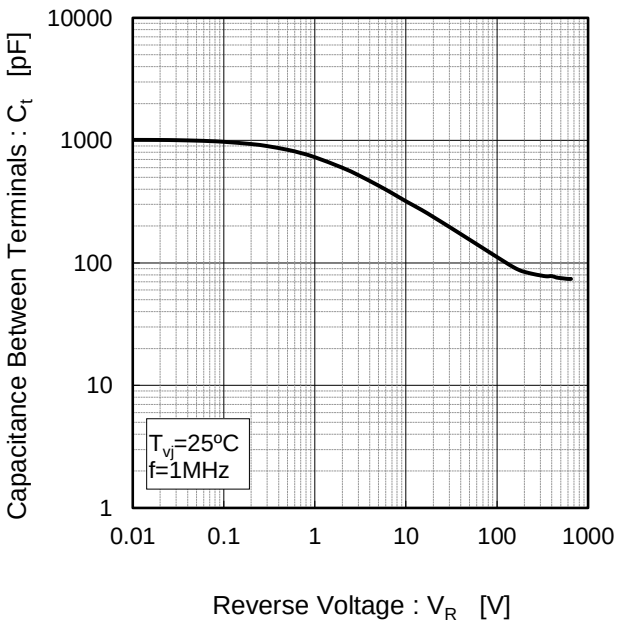
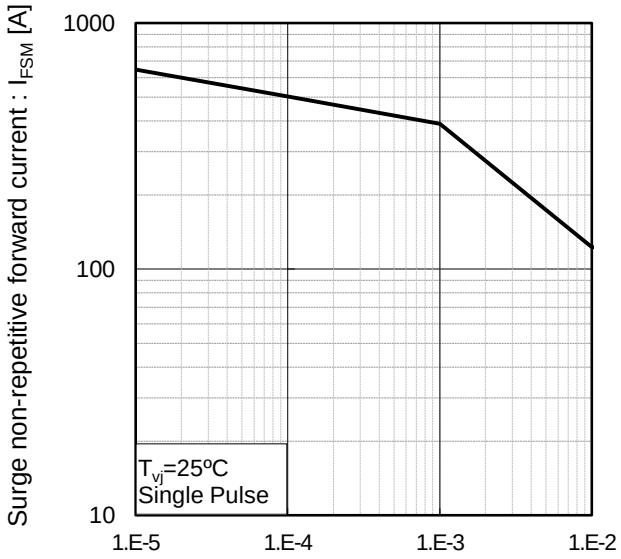


Fig.4 V_R-C_t Characteristics



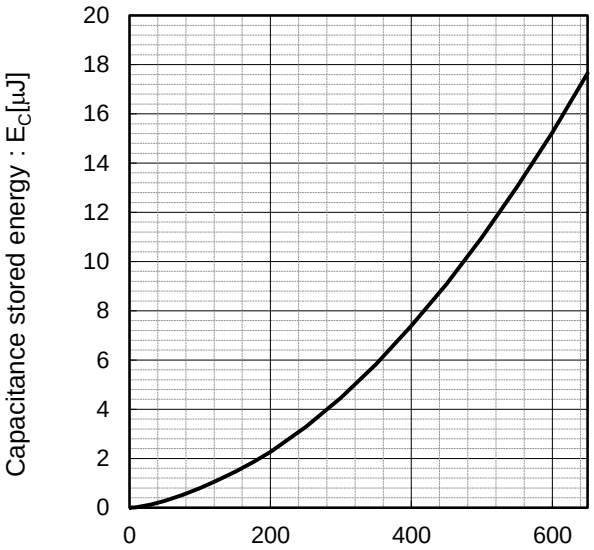
●Electrical characteristic curves

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



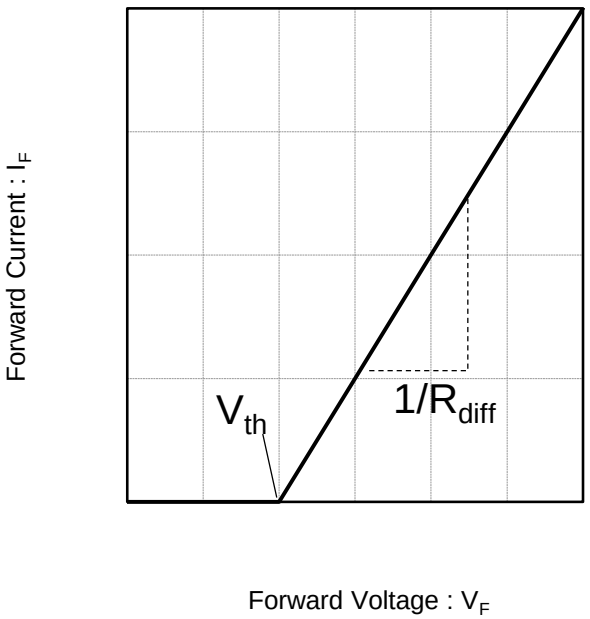
* Assumes Z_{thJC} of 0.76 ˚C/W or less.
(Pulse Width = 10ms)

Fig.10 Typical capacitance store energy



●Symplified forward characteristic model

Fig.11 Equivalent forward current curve

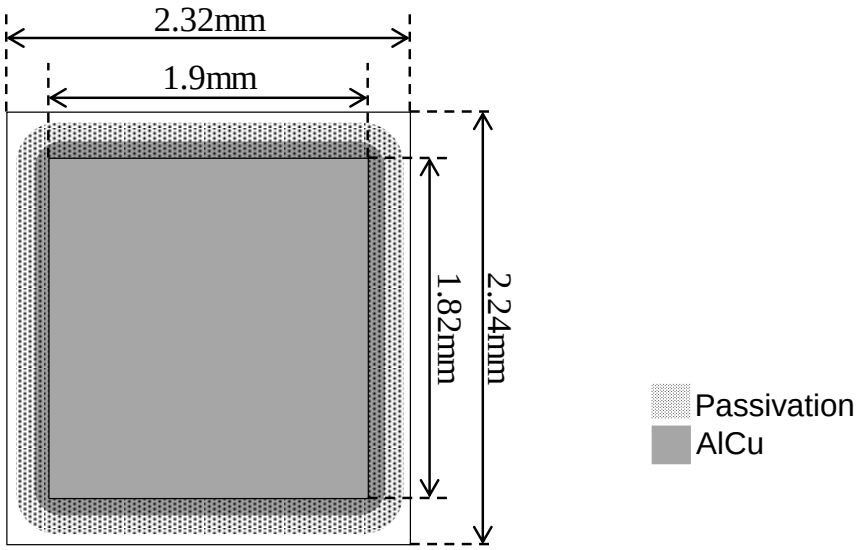


$$V_F = V_{th} + R_{diff} I_F$$

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

Symbol	Typical Value	Unit
a_0	9.66×10^{-1}	V
a_1	-1.10×10^{-3}	mV/°C
b_0	1.76×10^{-2}	mΩ
b_1	3.73×10^{-5}	mΩ/°C
b_2	3.84×10^{-7}	µΩ/°C^2

T_{vj} in ºC; -55 ºC < T_{vj} < 175ºC ; I_F < 40 A



●Mechanical Parameters

S508MTFCZ

Die Size	2.32mm × 2.24mm (Including Scribe Width)
Thickness	235 ± 35 μm
Anode Pad Size	1.90mm × 1.82mm

Wafer Size	150mm
Topside Metallization	AlCu
Backside Metallization	Ti-Ni(1.2μm)-Au(70nm)
Passivation	Polyimide

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