S6401

SiC Schottky Barrier Diode Bare Die Datasheet

V_R	1700V
I_F	10A*1
Q_C	51nC

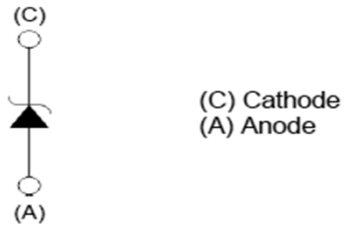
●Features

1) Shorter recovery time

2) Reduced temperature dependence

3) High-speed switching possible

●Inner Circuit



●Construction

Silicon carbide epitaxial planar type

Schottky diode

●Absolute Maximum Ratings (T_j = 25°C)

Parameter		Symbol	Value	Unit
Reverse voltage (repetitive peak)		V_{RM}	1700	V
Reverse voltage (DC)		V_R	1700	V
Continuous forward current		I_F	10 *1	A
Surge non-repetitive forward current	PW=10ms sinusoidal, T_j=25°C	I_{FSM} *2	41	A
	PW=10ms sinusoidal, T_j=150°C		30	A
	PW=10μs square, T_j=25°C		160	A
i^2t value	1≦PW≦10ms, T_j=25°C	$\int i^2dt$ *2	8.4	A^2s
	1≦PW≦10ms, T_j=150°C		4.5	A^2s
Junction temperature		T_j	175	°C
Range of storage temperature		T_{stg}	−55 to +175	°C

*1 Limited by T_j *2 Assumes $Z_{th(j-a)}$ of 0.57 °C/W or less. (Pulse Width = 8.3ms)

●Electrical characteristics (T_j = 25°C)

Parameter	Symbol	Conditions	Values			Unit
			Min.	Typ.	Max.	
DC blocking voltage	V_{DC}	I_R =0.06mA	1700	-	-	V
Forward voltage	V_F	I_F=10A,T_j=25°C	-	1.65	1.95	V
		I_F=10A,T_j=150°C	-	2.5	-	V
		I_F=10A,T_j=175°C	-	2.8	-	V
Reverse current	I_R	V_R=1700V,T_j=25°C	-	1	60	μA
		V_R=1700V,T_j=150°C	-	22	-	μA
		V_R=1700V,T_j=175°C	-	50	-	μA
Total capacitance	C	V_R=1V,f=1MHz	-	620	-	pF
		V_R=1700V,f=1MHz	-	34	-	pF
Total capacitive charge	Q_C	V_R=800V,di/dt=500A/μs	-	51	-	nC
Switching time	t_C	V_R=800V,di/dt=500A/μs	-	20	-	ns

●Electrical characteristic curves

Fig.1 V_F - I_F Characteristics

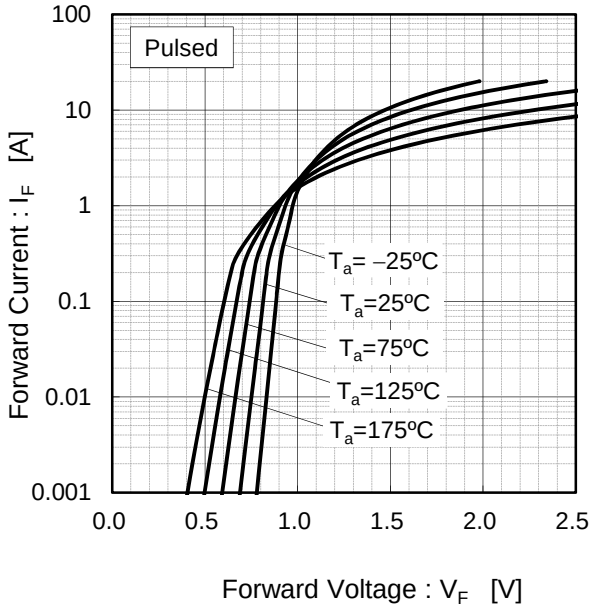


Fig.2 V_F - I_F Characteristics

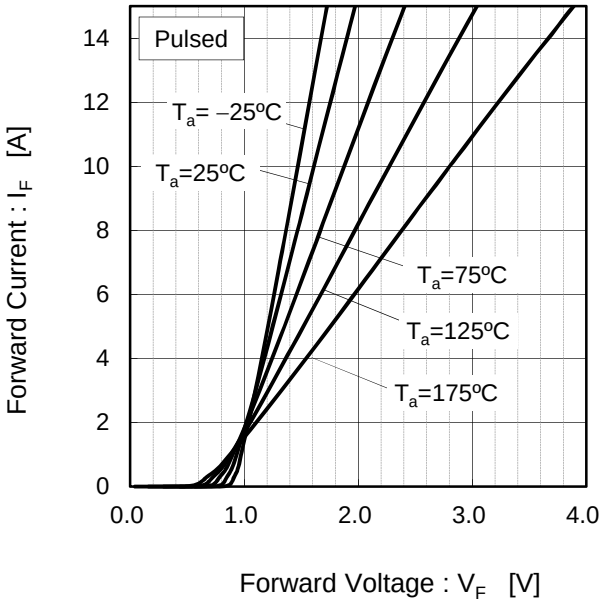


Fig.3 V_R - I_R Characteristics

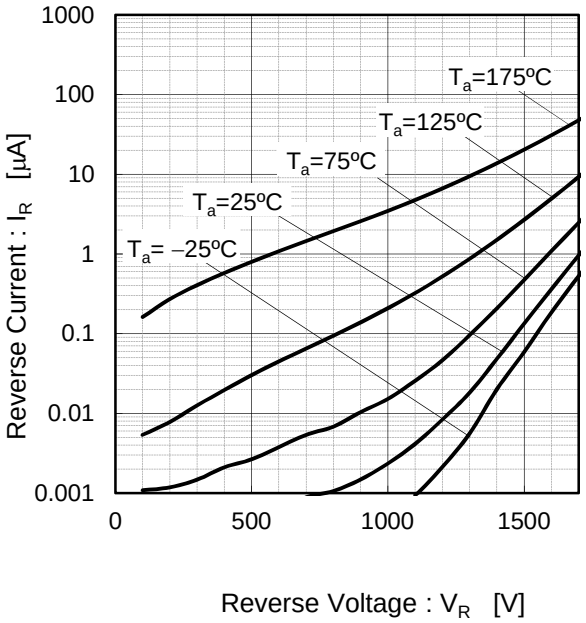
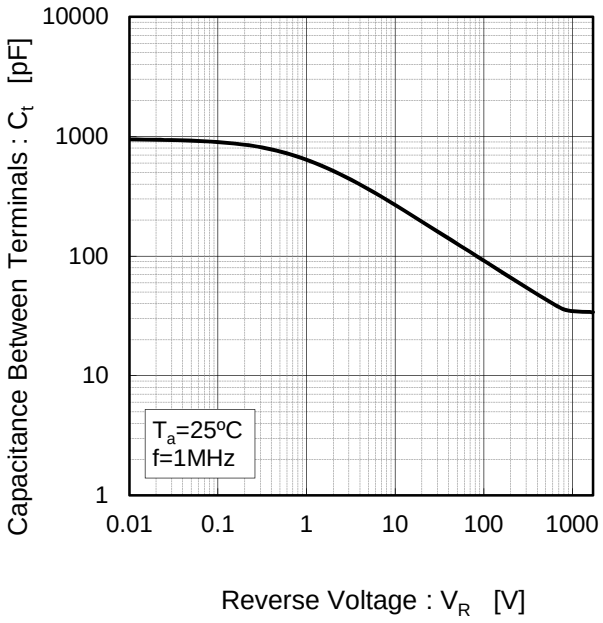
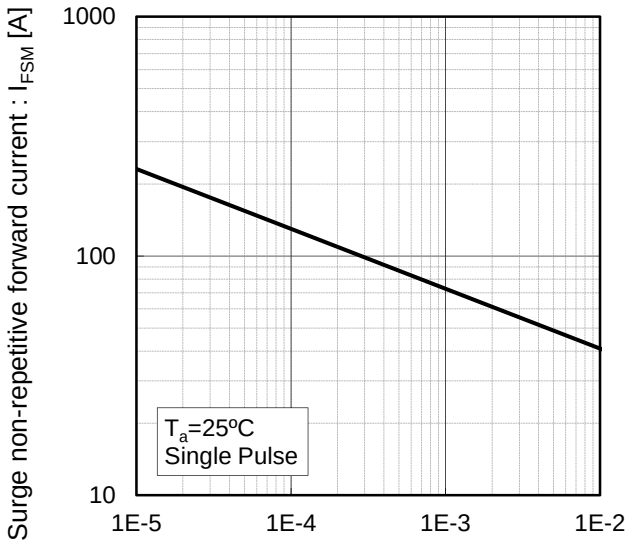


Fig.4 V_R-C_t Characteristics



●Electrical characteristic curves

Fig.5 Surge non-repetitive forward current vs. Pulse width (Sinusoidal waveform)*



* Assumes $Z_{th(j-a)}$ of 0.38 °C/W or less.
(Pulse Width = 8.3ms)

Fig.6 Typical capacitance store energy

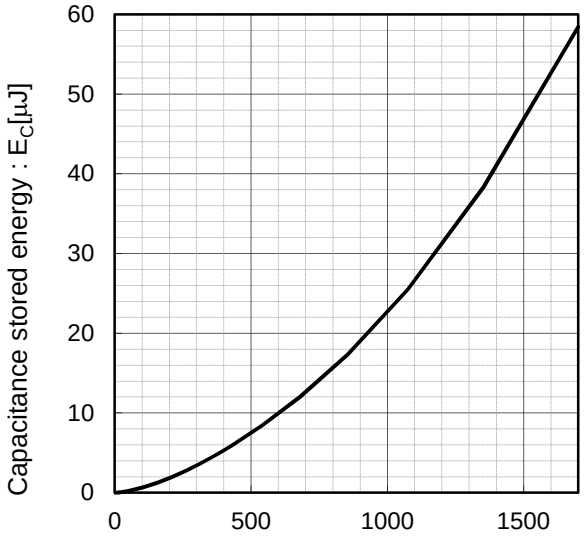
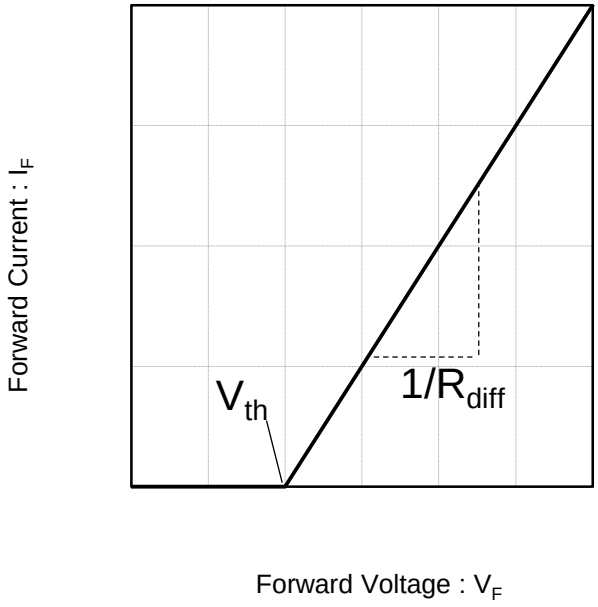


Fig.7 Equivalent forward current curve



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

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

Symbol	Typical Value	Unit
a_0	9.21E-01	V
a_1	– 1.52E-03	V/°C
b_0	6.02E-02	Ω
b_1	4.06E-04	Ω/°C
b_2	2.82E-06	Ω/°C^2

T_j in ºC; -55 ºC < T_j < ºC ; I_F < 20A

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