

650V Silicon Carbide Schottky Diode

DESCRIPTION :

- Zero reverse recovery current
- Zero forward recovery voltage
- Temperature independent switching behavior
- Excellent Surge Current Capability
- Positive Temperature Coefficient on VF
- High Frequency Operation

V_{RRM}	650V
I_F	2A ($T_C=160^{\circ}C$)
Q_C	5.6nC

TYPICAL APPLICATIONS :

- SMPS, PFC
- Solar application, UPS, EV/HEV
- Motor drives, Wind turbine, Rail traction



SMB

MAXIMUM RATINGS (at $T_J = 25^{\circ}C$, unless otherwise specified)

Characteristic	Condition	Symbol	Value	Unit
Repetitive Peak Reverse Voltage		V_{RRM}	650	V
Average Forward Current	$T_C=25^{\circ}C$ $T_C=160^{\circ}C$	I_F	8 2	A
Repetitive Forward Surge Current	$T_C=25^{\circ}C$; $t_p = 10ms$; Half sine pulse	I_{FRM}	16	A
Non-Repetitive Forward Surge Current	$T_C=25^{\circ}C$; $t_p = 10ms$; Half sine pulse $T_C=150^{\circ}C$; $t_p = 10ms$; Half sine pulse	I_{FSM}	18 15	A
Non-Repetitive Forward Surge Current	$T_C=25^{\circ}C$, $t_p=10\mu s$, Half Sine Wave	$I_{F,max}$	228	A
i^2t Value	$T_C=25^{\circ}C$, $t_p=10ms$ $T_C=150^{\circ}C$, $t_p=10ms$	$\int i^2 dt$	1.6 1.1	A ² S
Power dissipation	$T_C=25^{\circ}C$ $T_C=110^{\circ}C$	P_{tot}	19 8	W
Non-Repetitive Avalanche Switching Energy	VDD=50V, L=1mH, ID=4.5A	E_{AS}	10	mJ
Repetitive Avalanche Energy	VDD=50V, L=500 μ H, ID=4.5A	E_{AR}	5	mJ
Storage temperature Range		T_{STG}	-40~+150	$^{\circ}C$
Operation Junction Range		T_J	-40~+175	$^{\circ}C$

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Typical	Unit
Thermal resistance, junction to case	with heatsink compound	$R_{th(j-c)}$	8	$^{\circ}C/W$

**ELECTRICAL CHARACTERISTICS (at $T_J = 25^\circ\text{C}$, unless otherwise specified)**

Characteristic	Symbol	Min.	Typ.	Max.	Unit
DC Blocking Voltage	V_{DC}	650			V
Forward Voltage $I_F = 2\text{A}$, $T_J = 25^\circ\text{C}$ $I_F = 2\text{A}$, $T_J = 175^\circ\text{C}$	V_F		1.38 1.54 1.63	1.71 2.06 2.34	V
Reverse Current $V_R = 650\text{V}$, $T_J = 25^\circ\text{C}$ $V_R = 650\text{V}$, $T_J = 175^\circ\text{C}$	I_R		1 20	20 200	μA
Total Capacitive Charge $V_R = 400\text{V}$, $T_J = 25^\circ\text{C}$	Q_C		5.6		nC
Diode Capacitance $V_R = 1\text{V}$, $f = 1\text{MHz}$ $V_R = 300\text{V}$, $f = 1\text{MHz}$ $V_R = 600\text{V}$, $f = 1\text{MHz}$	C_d		68 10 8		pF
Capacitance Stored Energy $V_R = 400\text{V}$	E_C		0.7		mJ

Typical Performance

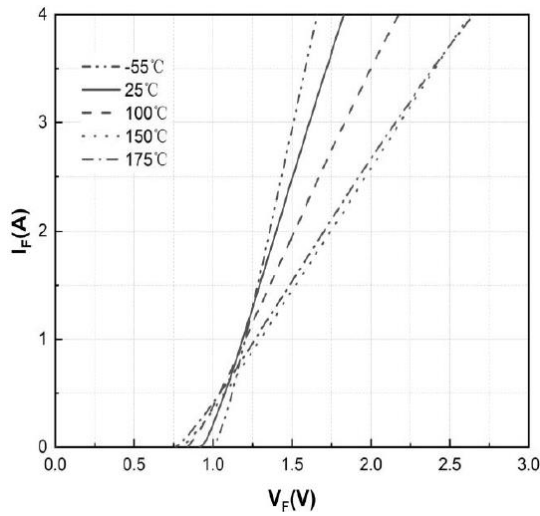


Figure 1. Typical forward characteristics

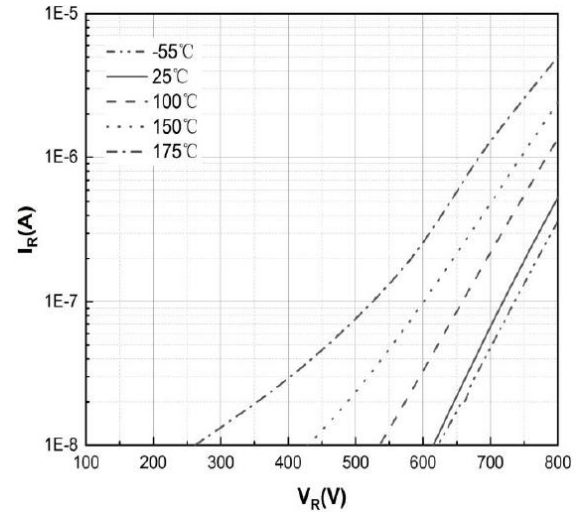


Figure 2. Typical reverse current as function of reverse voltage

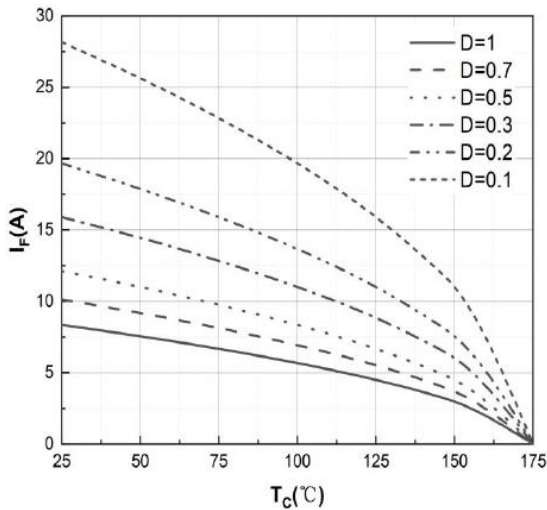


Figure 3. Diode forward current as function of temperature, D=duty cycle

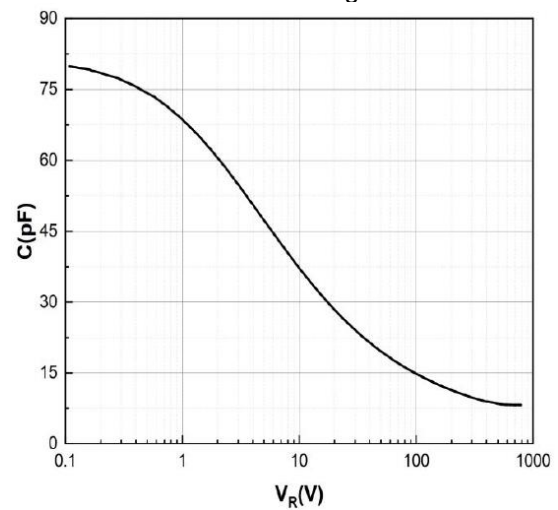


Figure 4. Typical capacitance as function of reverse voltage, $C=f(V_R)$; $T_j=25^\circ\text{C}$; $f=1\text{ MHz}$

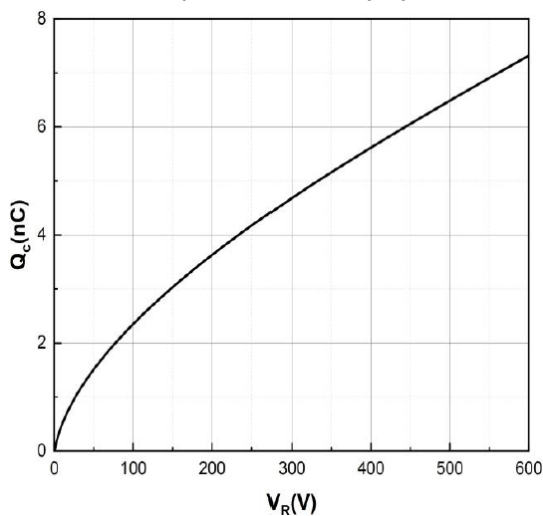


Figure 5. Typical reverse charge as function of reverse voltage

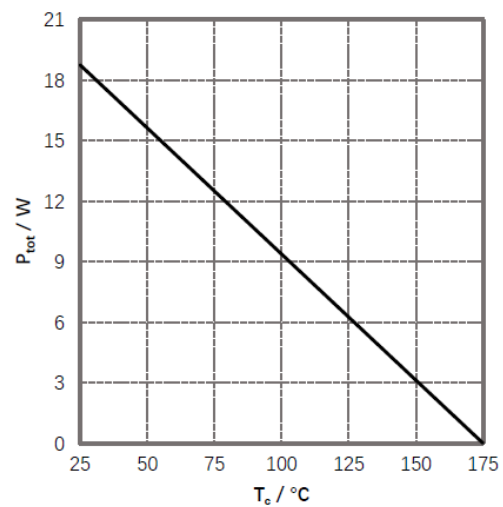


Figure 6. Power dissipation as function of case temperature