

NF3D02120F

Silicon Carbide Schottky Diode

$$V_{RRM} = 1200 \text{ V}$$

$$I_F (T_C=160 \text{ }^\circ\text{C}) = 2 \text{ A}$$

$$Q_C = 14 \text{ nC}$$

Features

- 1.2kV Schottky Rectifier
- Zero Reverse Recovery Current
- High-Frequency Operation
- Temperature-Independent Switching
- Extremely Fast Switching

Benefits

- Replace Bipolar with Unipolar Rectifiers
- Essentially No Switching Losses
- High Efficiency
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

Applications

- Switching Mode Power Supply
- Boost Diodes in PFC
- DC/DC Converters
- AC/DC Converters
- Free Wheeling Diodes in Inverter

Maximum Ratings (T_c = 25 °C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions	Note
V_{RRM}	Repetitive Peak Reverse Voltage	1200	V		
V_{RSM}	Surge Peak Reverse Voltage	1300	V		
V_R	DC Peak Reverse Voltage	1200	V		
I_F	Continuous Forward Current	10 4.6 2	A	$T_c=25 \text{ }^\circ\text{C}$ $T_c=135 \text{ }^\circ\text{C}$ $T_c=160 \text{ }^\circ\text{C}$	Fig. 3
I_{FSM}	Non-Repetitive Forward Surge Current	24	A	$T_c=25 \text{ }^\circ\text{C}$, $t_p=10 \text{ ms}$, Half Sine Pulse	
P_{tot}	Power Dissipation	58 25	W	$T_c=25 \text{ }^\circ\text{C}$ $T_c=110 \text{ }^\circ\text{C}$	Fig. 4
T_J	Operating Junction Range	-55 to +175	°C		
T_{stg}	Storage Temperature Range	-55 to +175	°C		

Package



TO-252-2



Part Number	Package	Marking
NF3D02120F	TO-252-2	NF3D02120F

Electrical Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.4	1.65	V	$I_F = 2\text{ A}, T_J = 25\text{ }^\circ\text{C}$	Fig. 1
		1.9	2.4		$I_F = 2\text{ A}, T_J = 175\text{ }^\circ\text{C}$	
I_R	Reverse Current	1	50	μA	$V_R = 1200\text{ V}, T_J = 25\text{ }^\circ\text{C}$	Fig. 2
		10	100		$V_R = 1200\text{ V}, T_J = 175\text{ }^\circ\text{C}$	
Q_C	Total Capacitive Charge	14		nC	$V_R = 800\text{ V}, I_F = 2\text{ A}, T_J = 25\text{ }^\circ\text{C}$	Fig. 6
C	Total Capacitance	174		pF	$V_R = 0\text{ V}, T_J = 25\text{ }^\circ\text{C}, f = 1\text{ MHz}$	Fig. 5
		13			$V_R = 400\text{ V}, T_J = 25\text{ }^\circ\text{C}, f = 1\text{ MHz}$	
		9			$V_R = 800\text{ V}, T_J = 25\text{ }^\circ\text{C}, f = 1\text{ MHz}$	
E_C	Capacitance Stored Energy	3.5		μJ	$V_R = 800\text{ V}$	Fig. 7

Note: This is a majority carrier diode, so there is no reverse recovery charge.

Thermal Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Note
$R_{\theta JC}$	Thermal Resistance from Junction to Case		2.6		$^\circ\text{C/W}$	Fig.8

Typical Performance

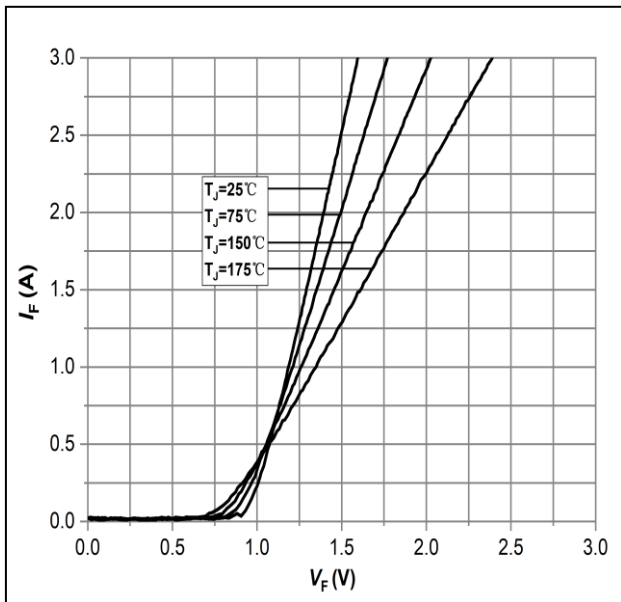


Figure 1: Forward Characteristics

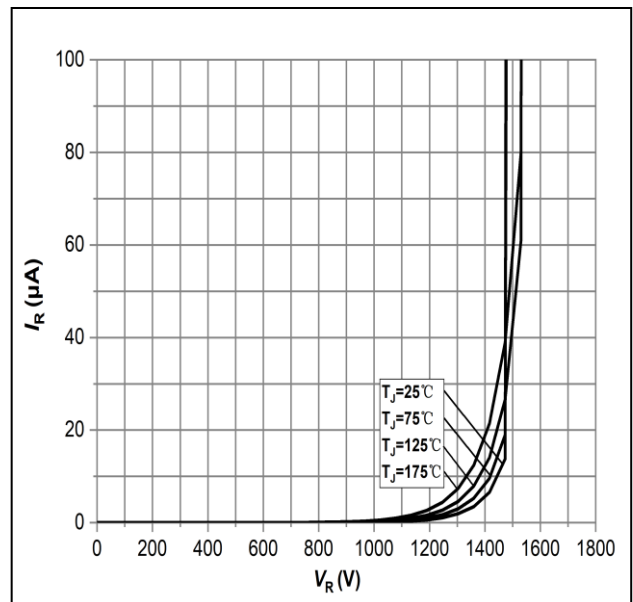


Figure 2: Reverse Characteristics

Typical Performance

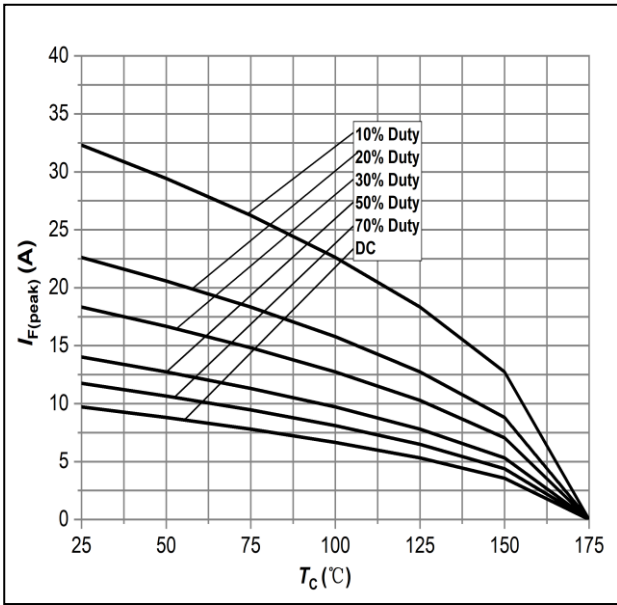


Figure 3: Current Derating

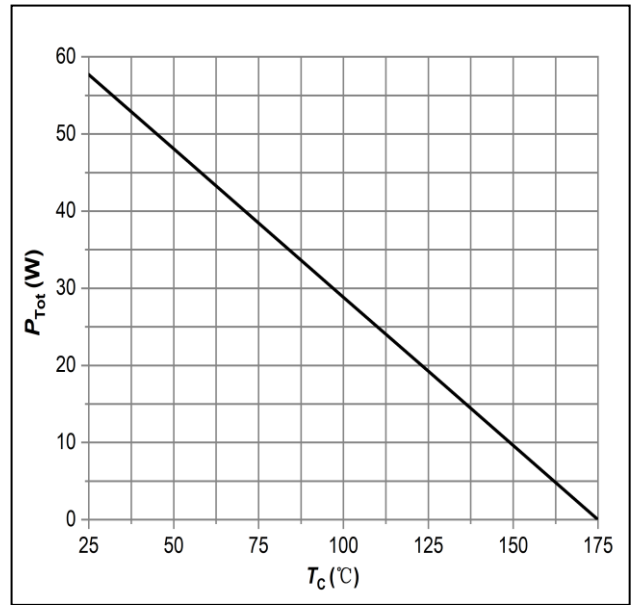


Figure 4: Power Derating

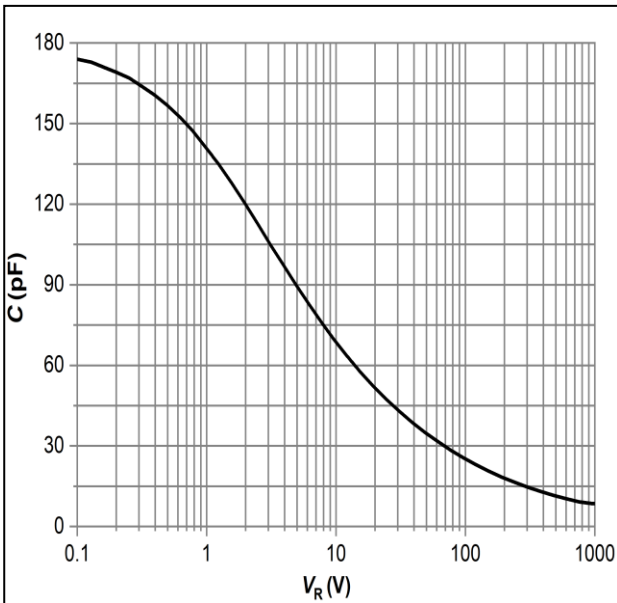


Figure 5: Capacitance vs. Reverse Voltage

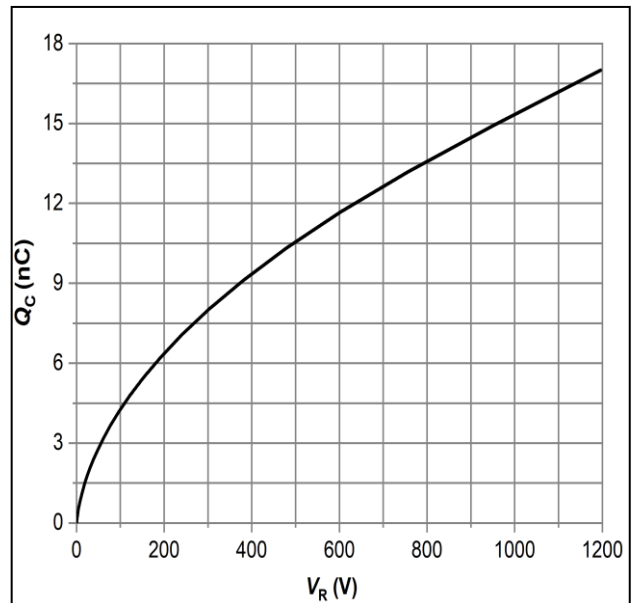


Figure 6: Total Capacitance Charge vs. Reverse Voltage

Typical Performance

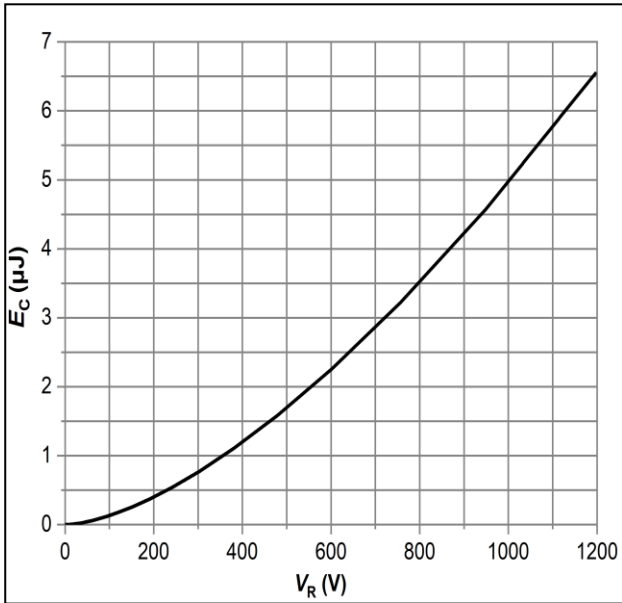


Figure 7: Typical Capacitance Stored Energy

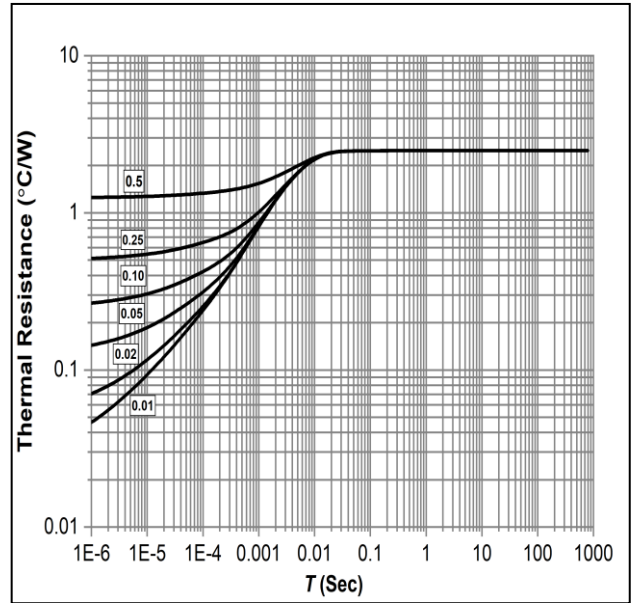
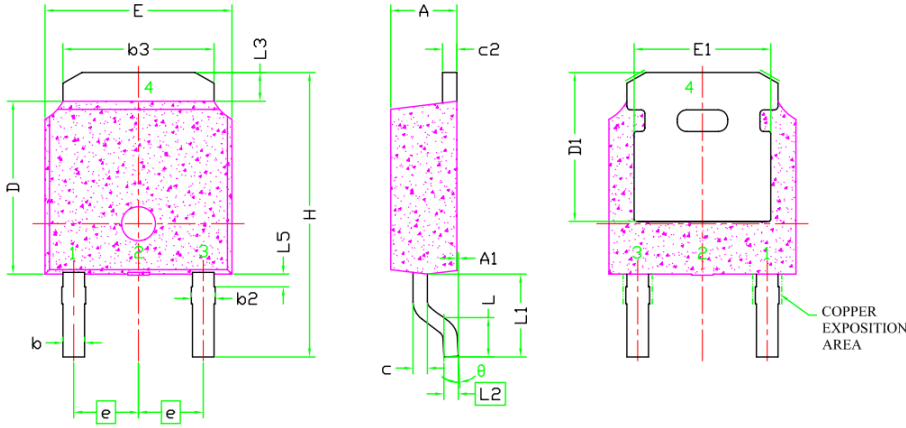


Figure 8: Transient Thermal Impedance

Package Dimensions



SYMBOL	DIMENSIONAL REQMTS		
	MIN	NOM	MAX
E	6.40	6.60	6.731
L	1.40	1.52	1.77
L1	2.743 REF		
L2	0.508 BSC		
L3	0.89	--	1.27
L5	--	--	--
D	6.00	6.10	6.223
H	9.40	10.00	10.40
b	0.64	0.76	0.88
b2	0.77	0.84	1.14
b3	5.21	5.34	5.46
e	2.286 BSC		
A	2.20	2.30	2.38
A1	0	--	0.127
c	0.46	0.50	0.60
c2	0.46	0.50	0.58
D1	5.21	--	--
E1	4.40	--	--
θ	0°	--	10°