Silicon Carbide Schottky Diode

Product Summary

V_{RRM}	=	1200 V
I_F (T_C=154 ℃)	=	20 A
Q_C	=	126 nC

Package



TO-220-2



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

Part Number	Package	Marking
TK3D20120A	TO-220-2	NF3D20120A

Maximum Ratings （Tc = 25 ℃ 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	69 32 20	A	T_c=25 ℃ T_c=135 ℃ T_c=154 ℃	Fig. 3
I_{FSM}	Non-Repetitive Forward Surge Current	160	A	T_c=25 ℃，t_p=10 ms，Half Sine Pulse	
P_{tot}	Power Dissipation	333 144	W	T_c=25 ℃ T_c=110 ℃	Fig. 4
T_J	Operating Junction Range	-55 to +175	℃		
T_{stg}	Storage Temperature Range	-55 to +175	℃		

Electrical Characteristics

Symbol	Parameter	Typ.	Max.	Unit	Test Conditions	Note
V_F	Forward Voltage	1.45 2.2	1.75 2.6	V	I_F = 20 A， T_J = 25 ℃ I_F = 20 A， T_J = 175 ℃	Fig. 1
I_R	Reverse Current	15 50	200 500	μA	V_R = 1200 V， T_J = 25 ℃ V_R = 1200 V， T_J = 175 ℃	Fig. 2
Q_C	Total Capacitive Charge	126		nC	V_R = 800 V， I_F = 20 A， T_J = 25 ℃	Fig. 6
C	Total Capacitance	1702 120 95		pF	V_R = 0 V， T_J = 25 ℃，f = 1 MHz V_R = 400 V， T_J = 25 ℃，f = 1 MHz V_R = 800 V， T_J = 25 ℃，f = 1 MHz	Fig. 5
E_C	Capacitance Stored Energy	32.5		μJ	V_R = 800 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		0.45		℃/W	Fig.8

Typical Performance

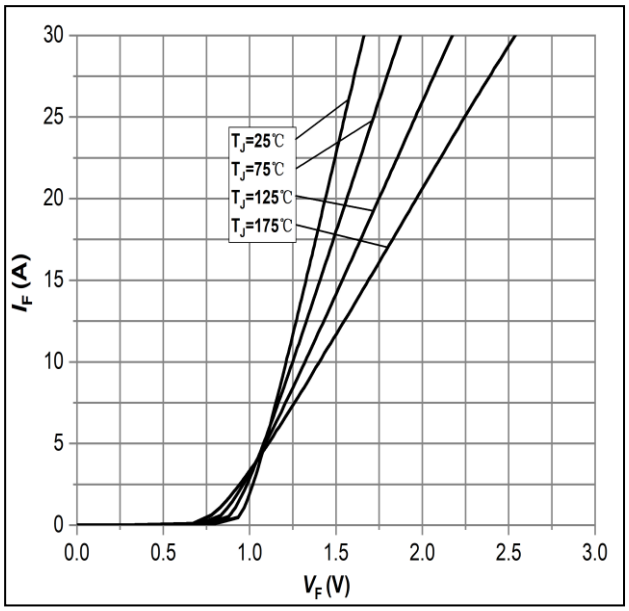


Figure 1: Forward Characteristics

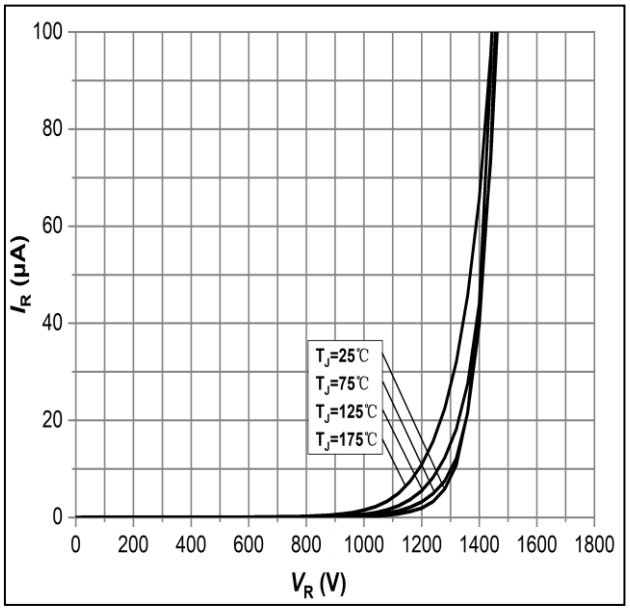


Figure 2: Reverse Characteristics

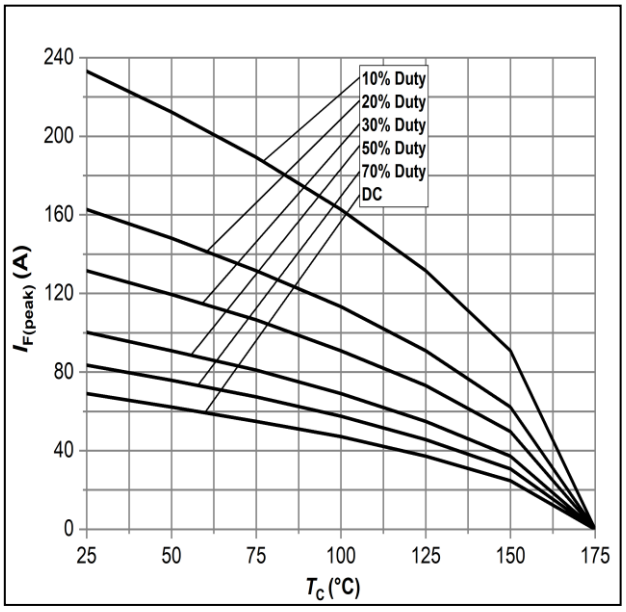


Figure 3: Current Derating

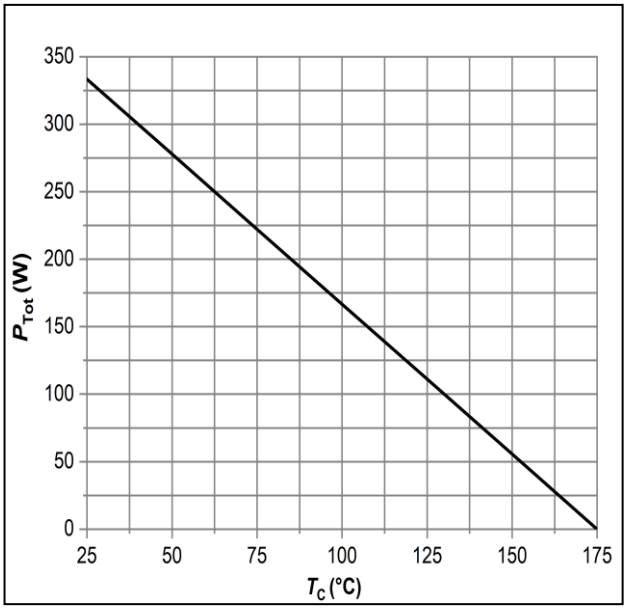


Figure 4: Power Derating

Typical Performance

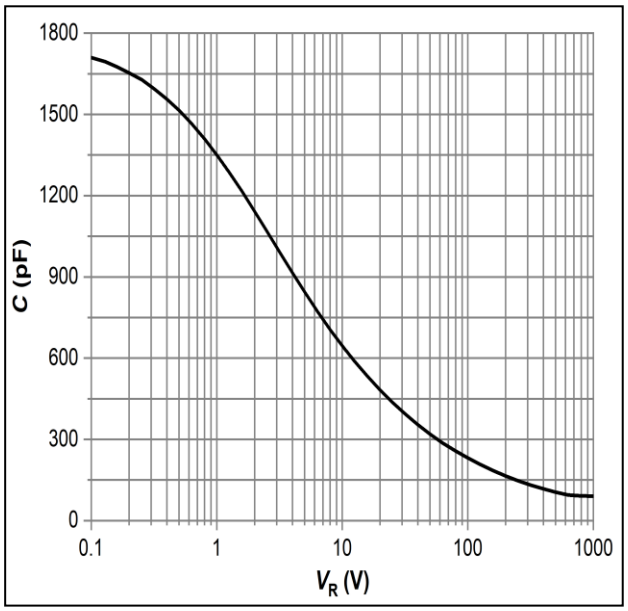


Figure 5: Capacitance vs. Reverse Voltage

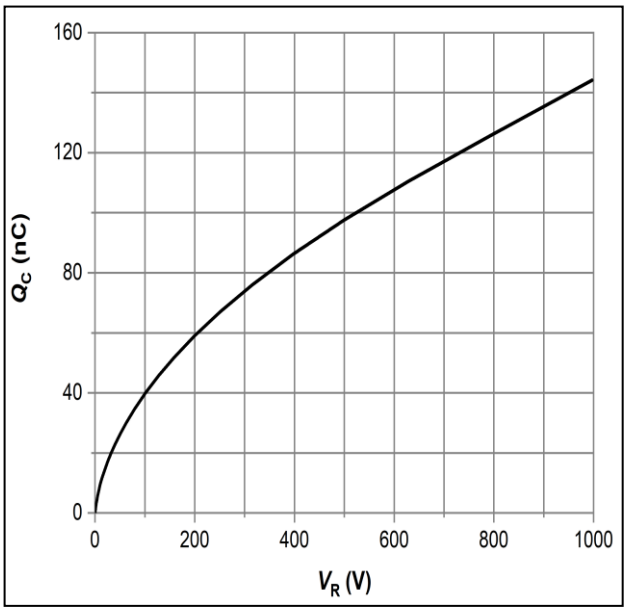


Figure 6: Total Capacitance Charge vs. Reverse Voltage

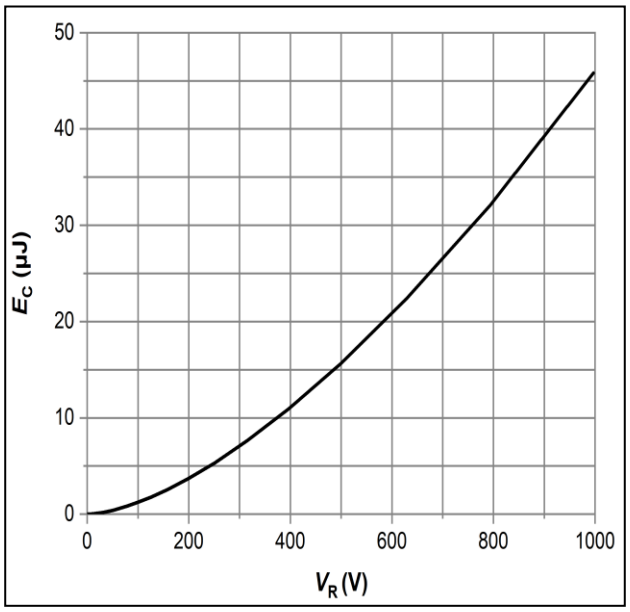


Figure 7:Typical Capacitance Stored Energy

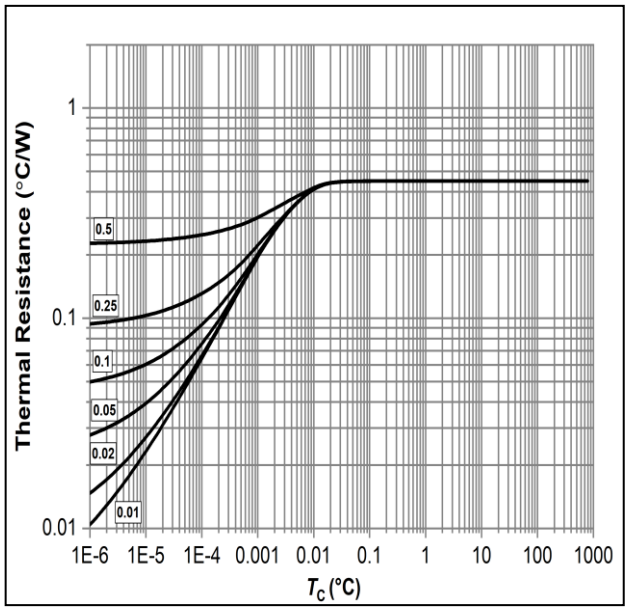
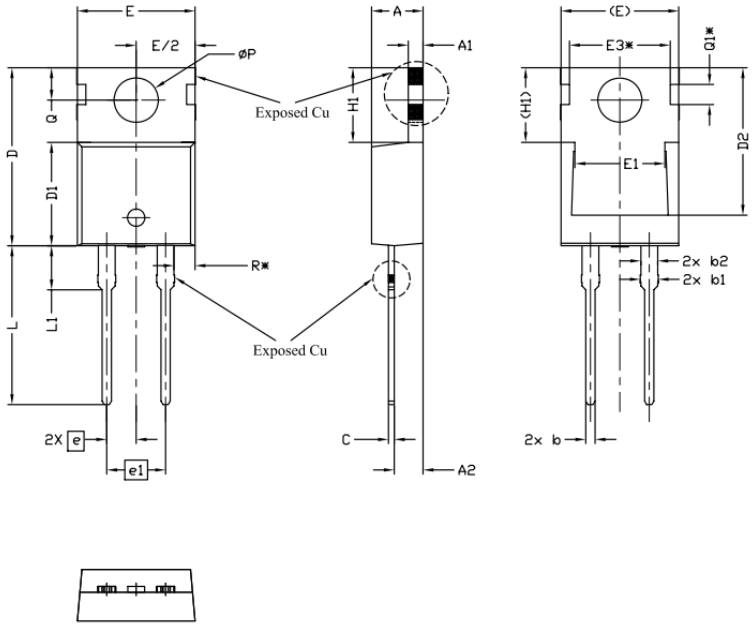


Figure 8: Transient Thermal Impedance

Package Dimensions

Package：TO-220-2



SYMBOL	DIMENSIONS			NOTES
	Min.	NOM	Max.	
A	4.24	4.44	4.64	
A1	1.15	1.27	1.40	
A2	2.30	2.48	2.70	
b	0.70	0.80	0.90	
b1	1.20	1.55	1.75	
b2	1.20	1.45	1.70	
c	0.40	0.50	0.60	
D	14.70	15.37	16.00	4
D1	8.82	8.92	9.02	
D2	12.43	12.73	12.83	5
E	9.96	10.16	10.36	4.5
E1	6.86	7.77	8.89	5
E3*	8.70 REF			
e	2.54 BSC			
e1	5.08 BSC			
H1	6.30	6.45	6.60	5.6
L	13.47	13.72	13.97	
L1	3.60	3.80	4.00	
ØP	3.75	3.84	3.93	
Q	2.60	2.80	3.00	
Q1*	1.73 REF			
R*	1.82 REF			

NOTE : Dimension L, M, W apply for Solder Dip Finish