

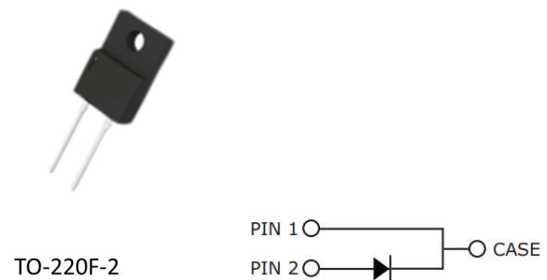
NW6504TW1

650V Silicon Carbide Schottky Diode

Parameter	Value	Unit
V_{RRM}	650	V
Q_C	11	nC
I_F ($T_C = 145^\circ\text{C}$)	4	A

Features

- 650 V Schottky Rectifier
- Zero Reverse Recovery Current
- High-Frequency Operation
- Temperature-Independent Switching
- Extremely Fast Switching



Applications

- Switch Mode Power Supplies
- Boost Diodes in PFC
- DC/DC Converters
- AC/DC Converters
- Free Wheeling Diodes in Inverter

Description

The NW6504TW1 is a 650V, SiC Schottky Barrier Diode (SBD) based on NovaWave's advanced SiC power technology resulting in high performance and long-term reliability. It supports high-temperature operation while showing minimal losses, zero reverse recovery, and low leakage current.

Part Description

Part Number	Package	Marking
NW6504TW1	TO-220F-2	NW6504TW1

Absolute Maximum Ratings

$T_J = 25\text{ }^{\circ}\text{C}$ except as noted. Exceeding the maximum ratings may damage the device.

Parameter	Symbol	Value	Unit	Test conditions
Repetitive Peak Reverse Voltage	V_{RRM}	650	V	
Surge Peak Reverse Voltage	V_{RSM}	650	V	
DC Peak Reverse Voltage	V_R	650	V	
Continuous Forward Current	I_F	10.7 5 4	A	$T_C = 25\text{ }^{\circ}\text{C}$ $T_C = 135\text{ }^{\circ}\text{C}$ $T_C = 145\text{ }^{\circ}\text{C}$
Non-Repetitive Forward Surge Current	I_{FSM}	34	A	$T_C = 25\text{ }^{\circ}\text{C}$, $t_p = 10\text{ ms}$, Half Sine Pulse
Power Dissipation	P_{tot}	37 6	W	$T_C = 25\text{ }^{\circ}\text{C}$ $T_C = 110\text{ }^{\circ}\text{C}$
Operating Junction Range	T_J	-55 to +175	$^{\circ}\text{C}$	-
Storage Temperature Range	T_S	-55 to +175	$^{\circ}\text{C}$	-

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction to Case	$R_{TH,J-C}$	4.05	$^{\circ}\text{C}/\text{W}$

Electrical Characteristics

Parameters	Symbol	Min	Typ	Max	Unit	Condition
Forward Voltage	V_F	-	1.41 1.8	1.65 2.4	V	$I_F=4\text{ A}$, $T_C = 25\text{ }^{\circ}\text{C}$ $I_F=4\text{ A}$, $T_C = 175\text{ }^{\circ}\text{C}$
Reverse Current	I_R	-	2 10	30 100	μA	$V_R=650\text{ V}$, $T_C = 25\text{ }^{\circ}\text{C}$ $V_R=650\text{ V}$, $T_C = 175\text{ }^{\circ}\text{C}$

Total Capacitive Charge	Q_c	-	11	-	nC	$V_R=400\text{ V}, I_F=4\text{ A}, T_C=25\text{ }^\circ\text{C}$
Total Capacitance	C	-	213 22 17	-	pF	$V_R=0\text{ V}, T_C=25\text{ }^\circ\text{C}, f=1\text{ MHz}$ $V_R=200\text{ V}, T_C=25\text{ }^\circ\text{C}, f=1\text{ MHz}$ $V_R=400\text{ V}, T_C=25\text{ }^\circ\text{C}, f=1\text{ MHz}$
Capacitance Stored Energy	E_c		1.5		μJ	$V_R=400\text{ V}$

Electrical Performance Graphs

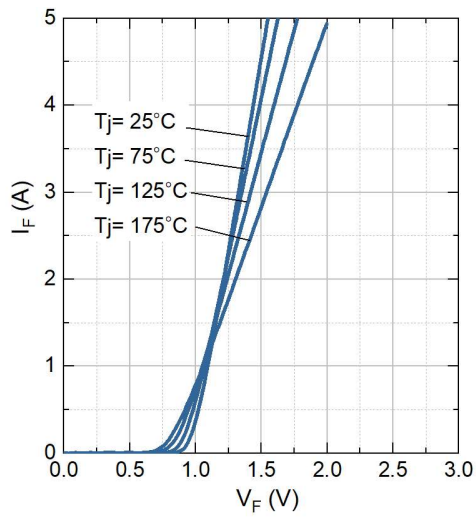


Figure 1: Forward Characteristics

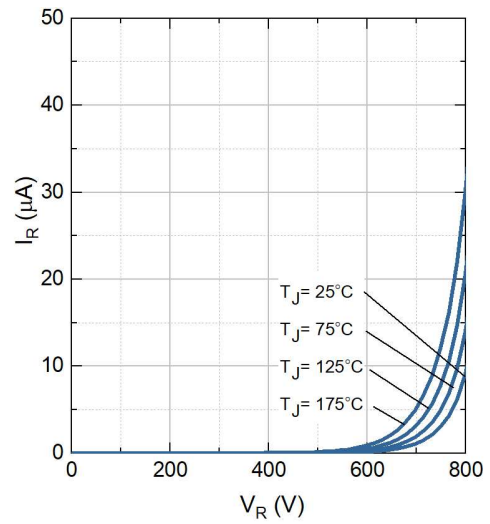


Figure 2: Reverse Characteristics

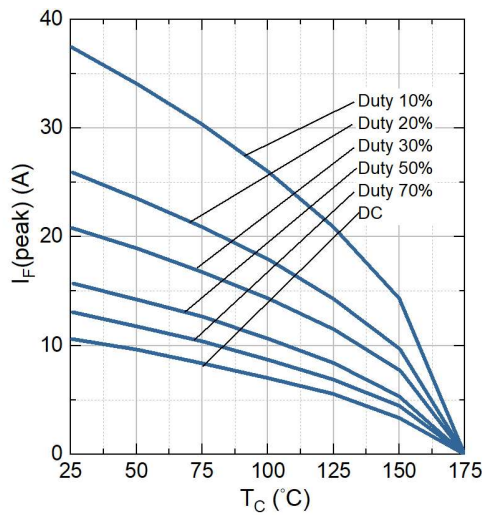


Figure 3: Current Derating

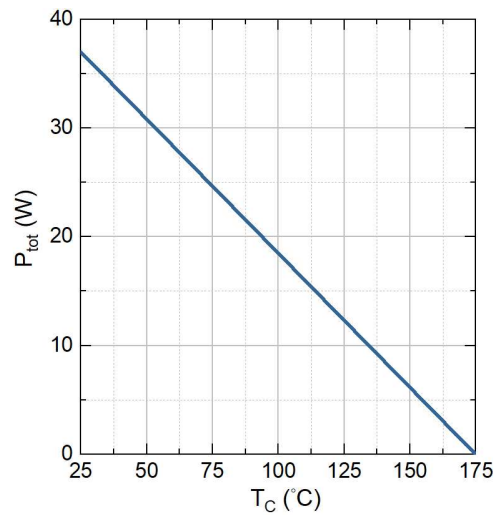


Figure 4: Power Derating

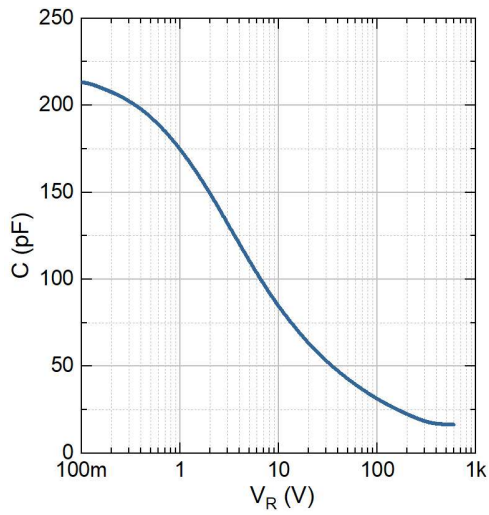


Figure 5: Capacitance vs. Reverse Voltage

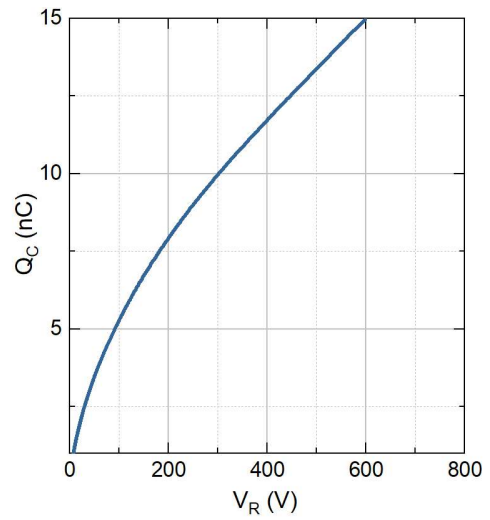


Figure 6: Total Capacitance Charge vs. Reverse Voltage

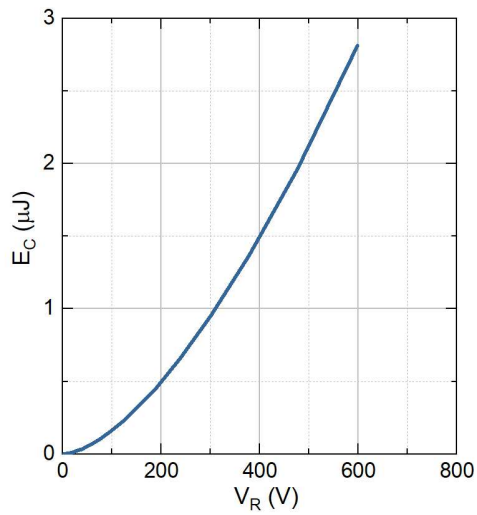


Figure 7: Typical Capacitance Stored Energy

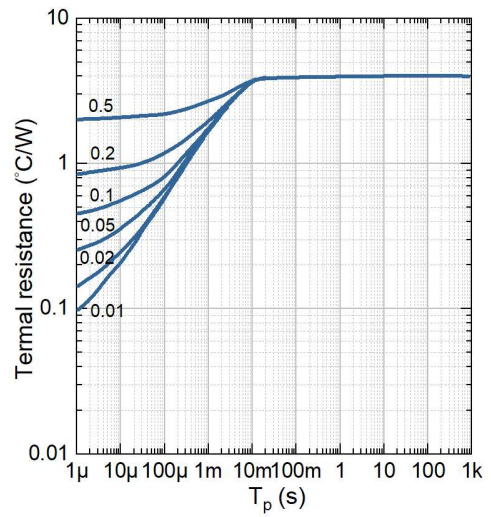
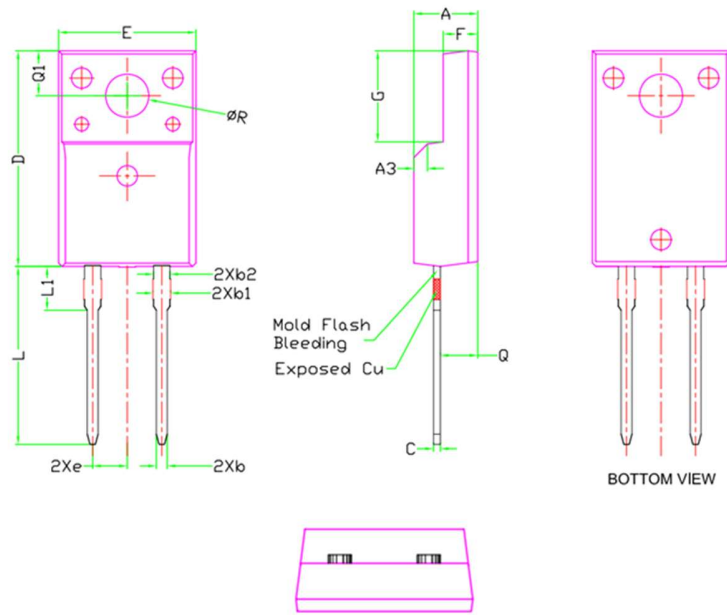


Figure 8: Transient Thermal Impedance

Package Dimensions

Package: TO-220F-2



SYMBOL	DIMENSIONS		
	Min.	Nom.	Max.
A	4.60	4.70	4.80
b	0.70	0.80	0.91
b1	1.20	1.30	1.47
b2	1.10	1.20	1.30
C	0.45	0.50	0.63
D	15.80	15.87	15.97
e	2.54		
E	10.00	10.10	10.30
F	2.44	2.54	2.64
G	6.50	6.70	6.90
L	12.90	13.10	13.30
L1	3.13	3.23	3.33
Q	2.65	2.75	2.85
Q1	3.20	3.30	3.40
ϕR	3.08	3.18	3.28

Note:

1. All Dimension Are In mm.
2. Package Body Sizes Exclude Mold Flash And Burrs
Mold Flash Should Be Less Than 6 Mil.

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