

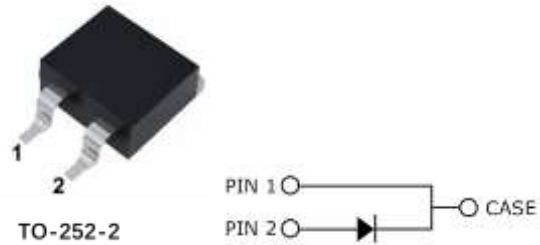
# NW6504TX1

## 650V Silicon Carbide Schottky Diode

Parameter	Value	Unit
$V_{RRM}$	650	V
$Q_C$	11	nC
$I_F (T_C = 153^\circ\text{C})$	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 NW6504TX1 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
NW6504TX1	TO-252-2	NW6504TX1

## 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	$I_F$	13 6 4	A	$T_C = 25\text{ }^\circ\text{C}$ $T_C = 135\text{ }^\circ\text{C}$ $T_C = 153\text{ }^\circ\text{C}$
Non-Repetitive Forward Surge Current	$I_{FSM}$	26	A	$T_C = 25\text{ }^\circ\text{C}$ , $t_p = 10\text{ ms}$ , Half Sine Pulse
Power Dissipation	$P_{tot}$	51 22	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	$R_{TH,J-C}$	2.9	$^\circ\text{C/W}$

## 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	$\mu\text{A}$	$V_R=650\text{ V}$ , $T_C = 25\text{ }^\circ\text{C}$ $V_R=650\text{ V}$ , $T_C = 175\text{ }^\circ\text{C}$

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		$\mu\text{J}$	$V_R=400\text{ V}$

## Electrical Performance Graphs

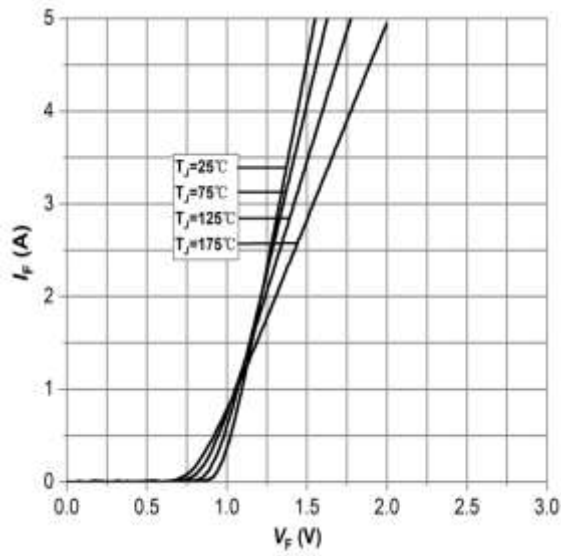


Figure 1: Forward Characteristics

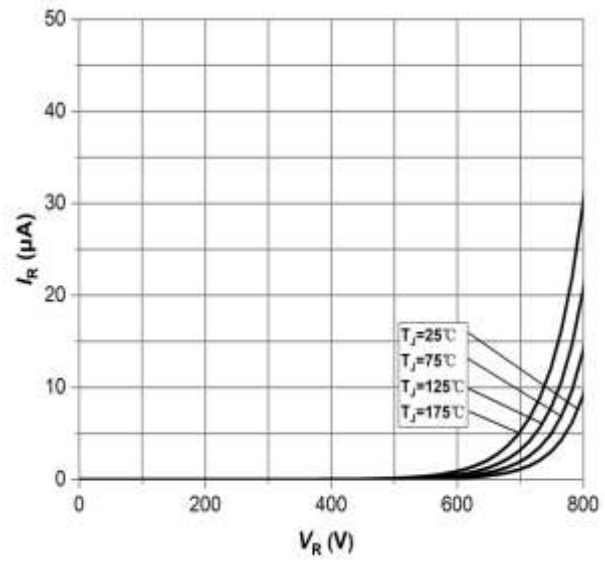


Figure 2: Reverse Characteristics

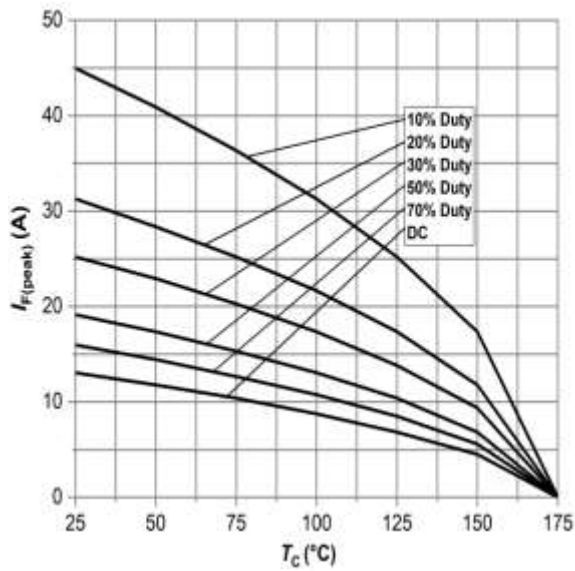


Figure 3: Current Derating

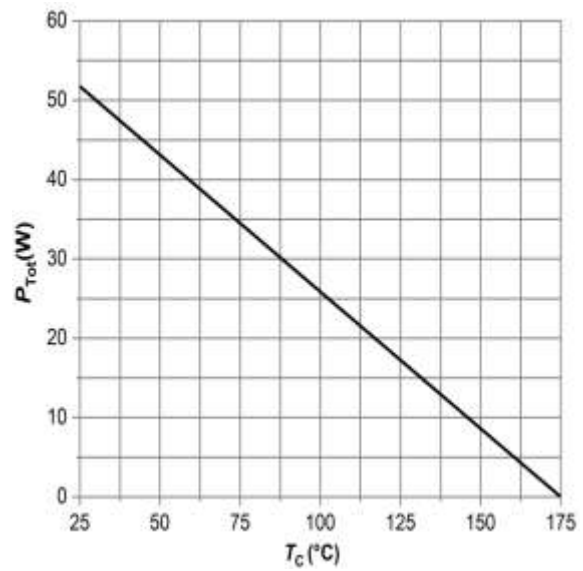


Figure 4: Power Derating

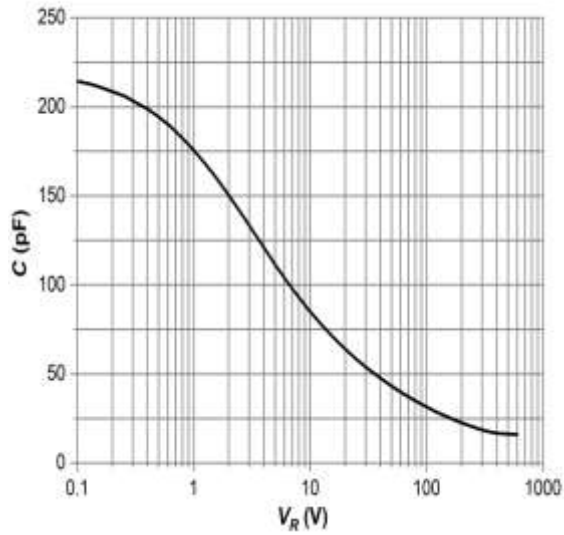


Figure 5: Capacitance vs. Reverse Voltage

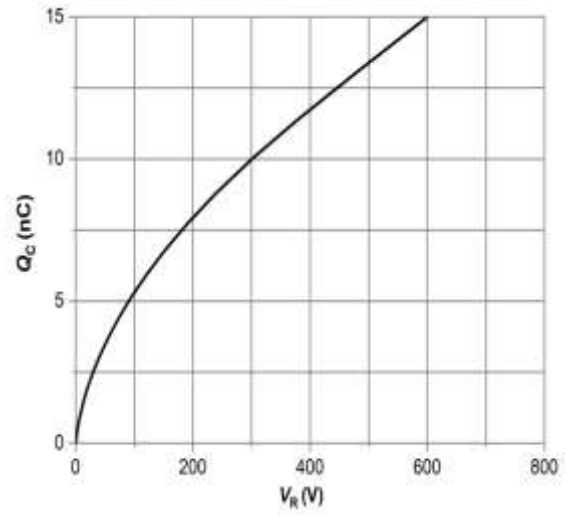


Figure 6: Total Capacitance Charge vs. Reverse Voltage

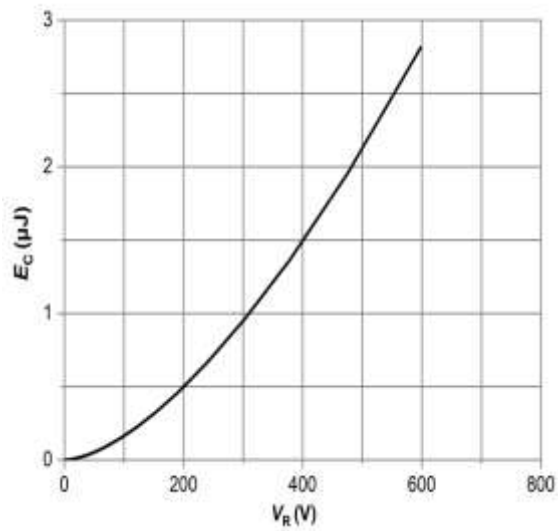


Figure 7: Typical Capacitance Stored Energy

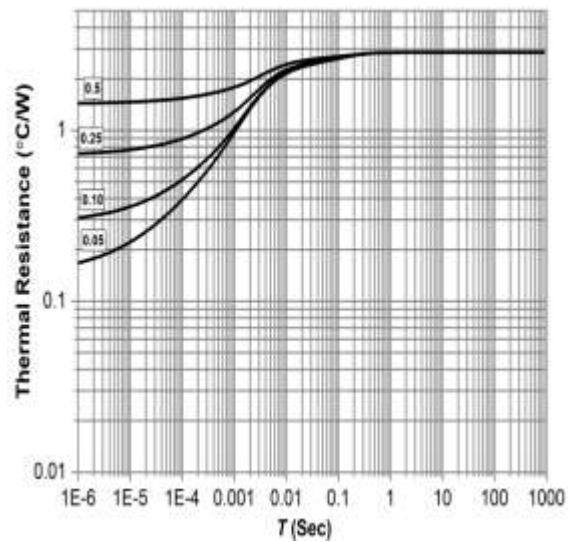
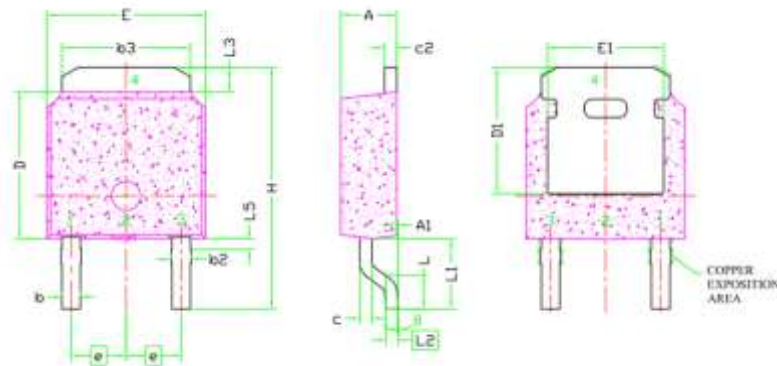


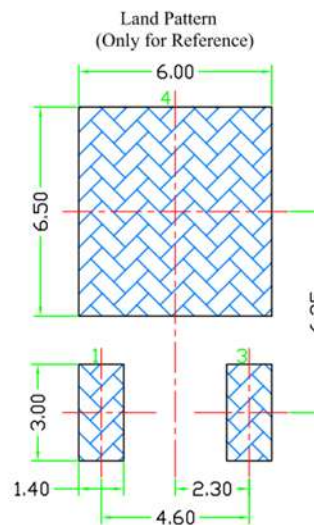
Figure 8: Transient Thermal Impedance

## Package Dimensions

Package: TO-252-2



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°



Note:

1. All Dimension Are In mm.
2. Package Body Sizes Exclude Mold Flash, Protrusion Or Gate Burrs. Mold Flash, Protrusion Or Gate Burrs Shall Not Exceed 0.10 mm Per Side.
3. Package Body Sizes Determined At The Outermost Extremes Of The Plastic Body Exclusive Of Mold Flash, Gate Burrs And Interlead Flash, But Including Any Mismatch Between The Top And Bottom Of The Plastic Body.
4. The Package Top May Be Smaller Than The Package Bottom.
5. Dimension "b" Does Not Include Dambar Protrusion. Allowable Dambar Protrusion Shall Be 0.10 mm Total In Excess Of "b" Dimension At Maximum Material Condition. The Dambar Cannot Be Located On The Lower Radius Of The Foot.

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