# NW6510TX1

**650V Silicon Carbide Schottky Diode**

| Parameter | Value | Unit |
|---|---|---|
| $V_{RRM}$ | 650 | V |
| $Q_C$ | 36 | nC |
| $I_F$ ( $T_C$ = 153℃) | 10 | A |

## Features

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


TO-252-2


## Applications

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

## Description

The NW6510TX1 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 |
|---|---|---|
| NW6510TX1 | TO-252-2 | NW6510TX1 |

## Absolute Maximum Ratings

$T_J$ = 25 °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 | $I_F$ | 33<br>15<br>10 | A | $T_C$ = 25 °C<br>$T_C$ = 135 °C<br>$T_C$ = 153 °C |
| Non-Repetitive Forward Surge Current | $I_{FSM}$ | 80 | A | $T_C$ = 25 °C, $t_p$ = 10 ms, Half Sine Pulse |
| Power Dissipation | $P_{tot}$ | 120<br>52 | W | $T_C$ = 25 °C<br>$T_C$ = 110 °C |
| Operating Junction Range | $T_J$ | -55 to +175 | °C | - |
| Storage Temperature Range | $T_S$ | -55 to +175 | °C | - |

## Thermal Characteristics

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Thermal Resistance from Junction to Case | $R_{TH,J-C}$ | 1.25 | °C/W |

## Electrical Characteristics

| Parameters | Symbol | Min | Typ | Max | Unit | Condition |
|---|---|---|---|---|---|---|
| Forward Voltage | $V_F$ | - | 1.4<br>1.65 | 1.7<br>2.2 | V | $I_F$=10 A, $T_C$ = 25 °C<br>$I_F$=10 A, $T_C$ = 175 °C |
| Reverse Current | $I_R$ | - | 2<br>10 | 50<br>200 | µA | $V_R$=650 V, $T_C$ = 25 °C<br>$V_R$=650 V, $T_C$ = 175 °C |

| | | | | | | |
|---|---|---|---|---|---|---|
| Total Capacitive Charge | $Q_c$ | - | 36 | - | nC | $V_R$=400 V, $I_F$=10 A, $T_C$ = 25 °C |
| Total Capacitance | C | - | 695<br>69<br>52 | - | pF | $V_R$=0 V, $T_C$ = 25 °C, f= 1 MHz<br>$V_R$=200 V, $T_C$ = 25 °C, f= 1 MHz<br>$V_R$=400 V, $T_C$ = 25 °C, f= 1 MHz |
| Capacitance Stored Energy | $E_C$ | | 4.6 | | µJ | $V_R$=400 V |

## Electrical Performance Graphs

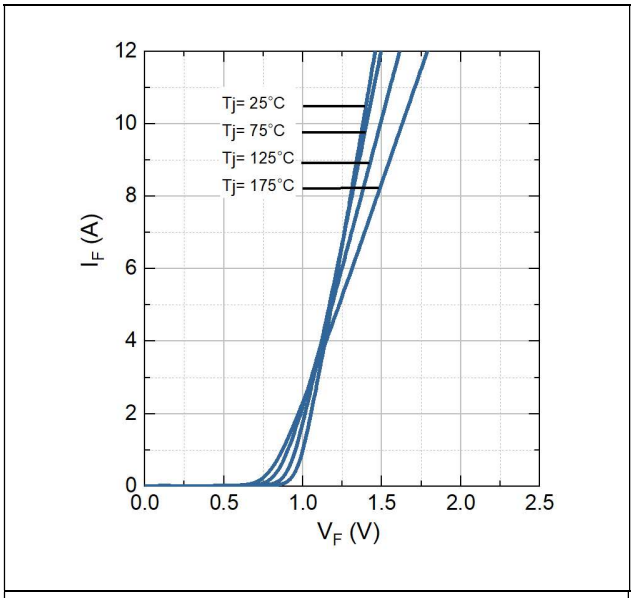



Figure 1: Forward Characteristics

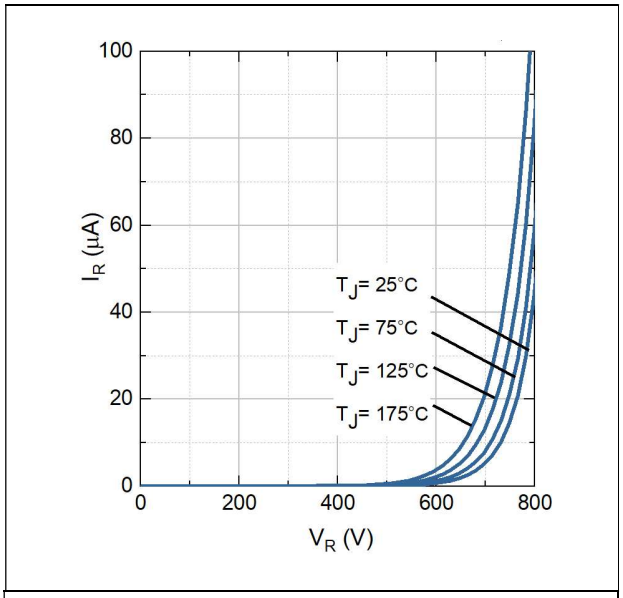



Figure 2: Reverse Characteristics

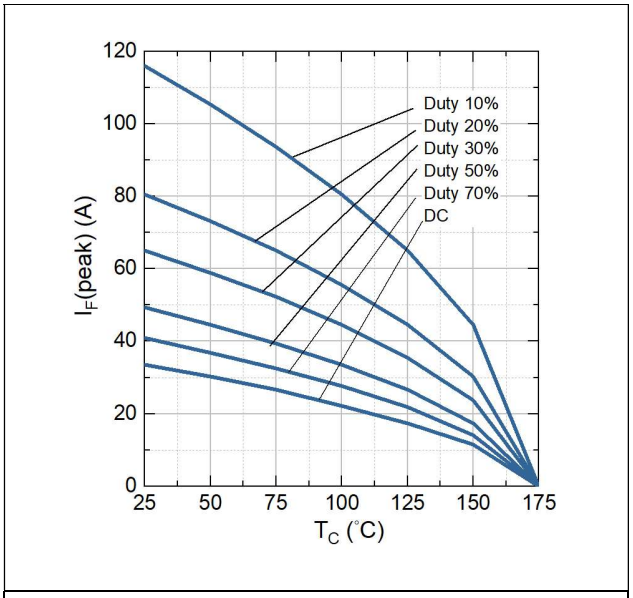



Figure 3: Current Derating

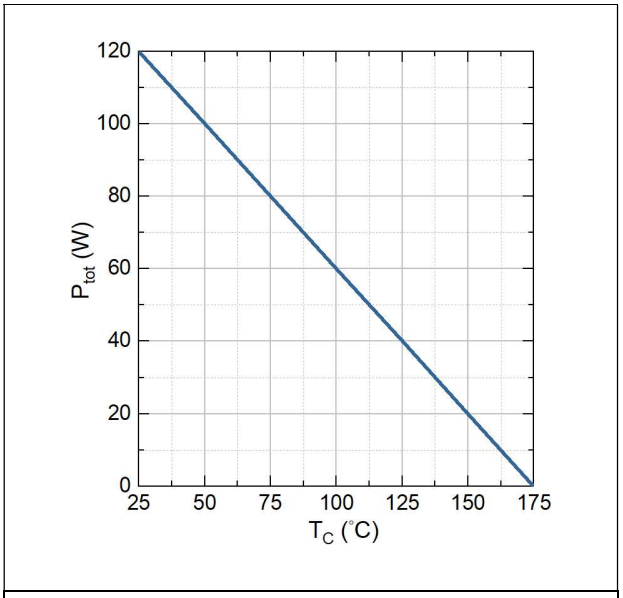



Figure 4: Power Derating

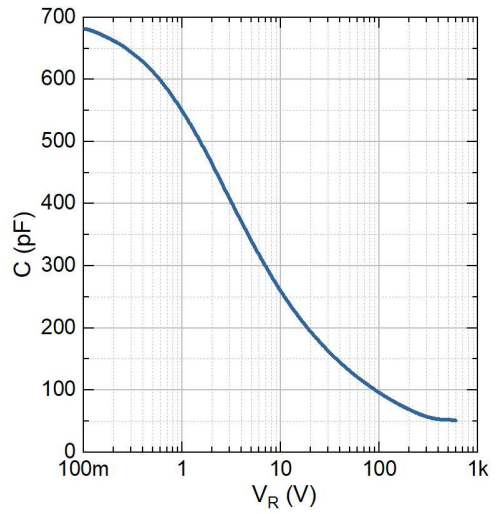



Figure 5: Capacitance vs. Reverse Voltage

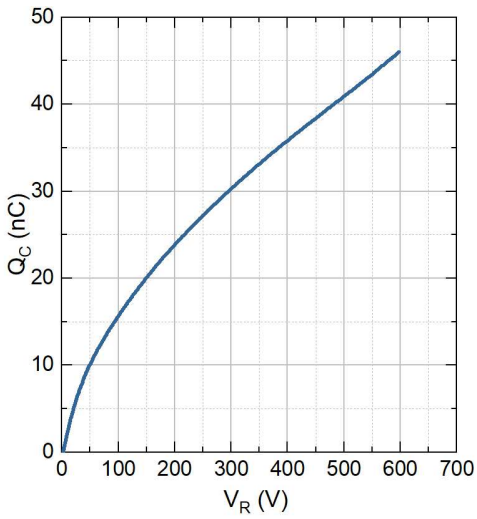



Figure 6: Total Capacitance Charge vs. Reverse Voltage

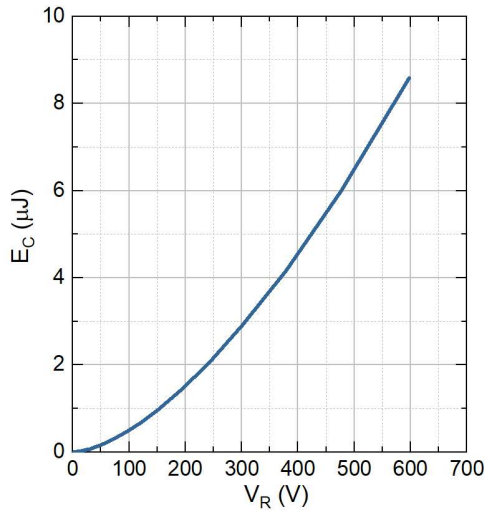



Figure 7: Typical Capacitance Stored Energy

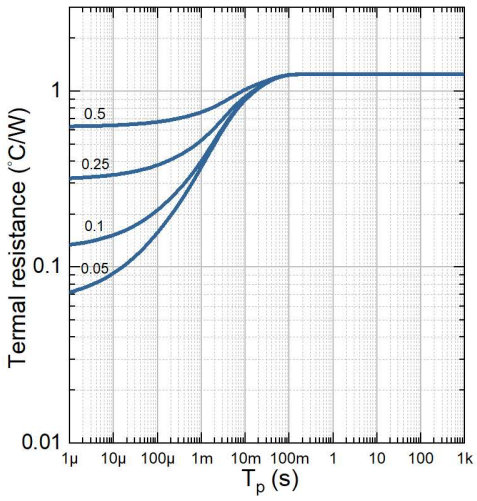
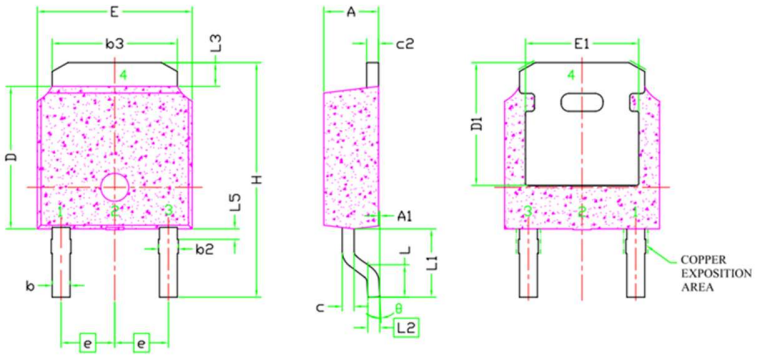



Figure 8: Transient Thermal Impedance

## Package Dimensions

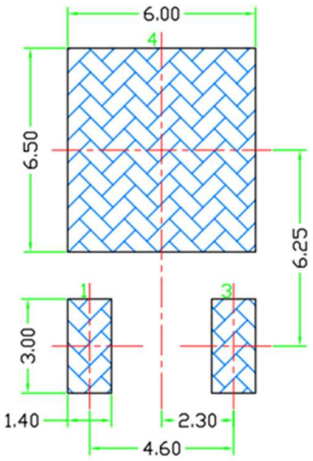
Package： TO-252-2




| 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.

Land Pattern
(Only for Reference)



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