DONGGUAN NANJING ELECTRONICS LTD.,

# TO-247-2 Silicon Carbide Schottky Diode

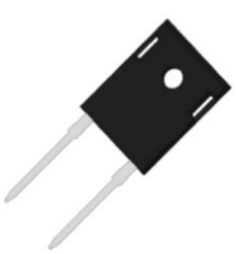
## NJ65C10T2 SiC Diode 650 V, 10 A, 38 nC

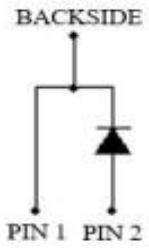
## General Description

This product family offers state of the art performance. It is designed for high frequency applications here high efficiency and high reliability are required.

## Features

- Zero Forward/Reverse Recovery Current
- High Blocking Voltage
- High Frequency Operation
- Positive Temperature Coefficient on VF
- Temperature Independent Switching Behavior






**TO-247-2**
**Pin definition**

## Applications

- Motor Drives
- Solar
- AC/DC converters
- DC/DC converters
- Uninterruptable power supplies

## Benefits

- Higher System Efficiency
- Parallel Device Convenience without thermal runaway
- Higher Temperature Application
- No Switching loss
- Hard Switching & Higher Reliability
- Environmental Protection

## Key performance parameters

| Type | $V_R$ | $I_F$ $T_C$=150°C | $Q_C$ |
|---|---|---|---|
| NJ65C10T2 | 650 V | 10A | 38 nC |

Caution: This device is sensitive to electrostatic discharge .Users should follow ESD handing procedures.

## Maximum Ratings

$T_C$=25℃, unless otherwise specified

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Peak Repetitive Reverse Voltage | $V_{RRM}$ | 650 | V |
| Peak Reverse Surge Voltage | $V_{RSM}$ | 650 | V |
| DC Blocking Voltage | $V_R$ | 650 | V |

## Maximum Ratings

$T_C$=25℃, unless otherwise specified

| Symbol | Parameter | Test conditions | Value | Unit |
|---|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | | 650 | V |
| $I_F$ | Continuous forward current | $T_C$=25°C<br>$T_C$=155°C | 40<br>10 | A |
| $I_{FSM}$ | Non-Repetitive forward surge current | $T_C$=25°C , $t_p$=10ms, Half Sine Wave | 85 | A |
| $\int i^2dt$ | $i^2t$ value | $T_c$=25°C, $t_p$=10ms | 36 | $A^2S$ |
| $P_{tot}$ | Power dissipation | Tc=25℃<br>Tc=110℃ | 144<br>62 | W |
| $T_j$ | Operating junction temperature | | -55~175 | ℃ |
| $T_{stg}$ | Storage temperature | | -55~175 | ℃ |

## Thermal Resistance

| Symbol | Parameter | Value | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| $R_{th(jc)}$ | Thermal Resistance from Junction to Cas | | 1.04 | | ° C/W |

## Electrica Characteristic

$T_C$ =25℃, unless otherwise specified

| Symbol | Parameter | Test conditions | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $V_{DC}$ | DC blocking voltage | $T_j$=25°C | 650 | | | V |
| $V_F$ | Diode forward voltage | $I_F$=10A,$T_j$=25℃<br>$I_F$=10A,$T_j$=135℃<br>$I_F$=10A,$T_j$=175℃ | | 1.29<br>1.31<br>1.43 | 1.42<br>1.54<br>1.74 | V |
| $I_R$ | Reverse current | $V_R$=650V ,$T_j$=25°C<br>$V_R$=650V ,$T_j$=175°C | | 1<br>9 | 50<br>200 | μA |

## AC Characteristic

| Symbol | Parameter | Test conditions | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| $Q_C$ | Total capactive charge | $V_R$=400V ,$T_j$=25°C<br>$Q_C = \int_0^V R\ C(V)dV$ | | 38 | | nC |
| C | Total capacitance | $V_R$=1V f=1MHz<br>$V_R$=300V f=1MHz<br>$V_R$=600V f=1MHz | | 551<br>63<br>57 | | pF |
| $E_C$ | Capacitance stored energy | $V_R$=400V | | 5.7 | | μJ |

## Typical Characteristics

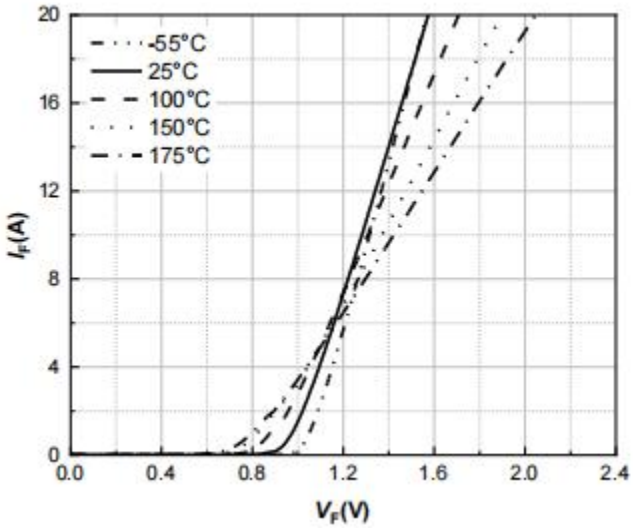



**Figure 1. Typical forward characteristics**

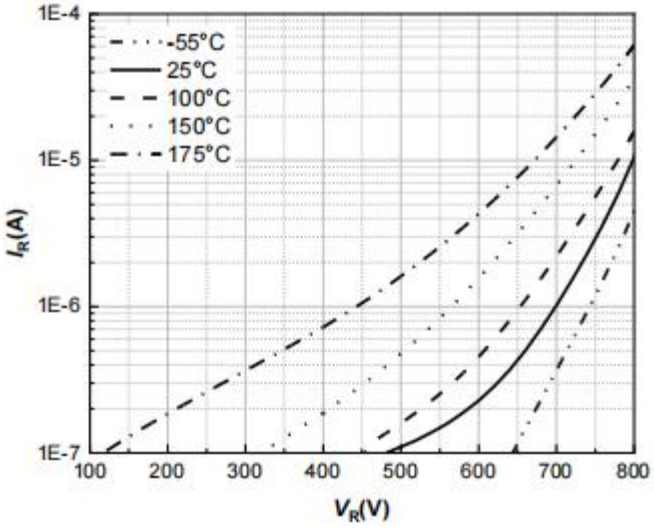



**Figure 2. Typical reverse current as function of reverse voltage**

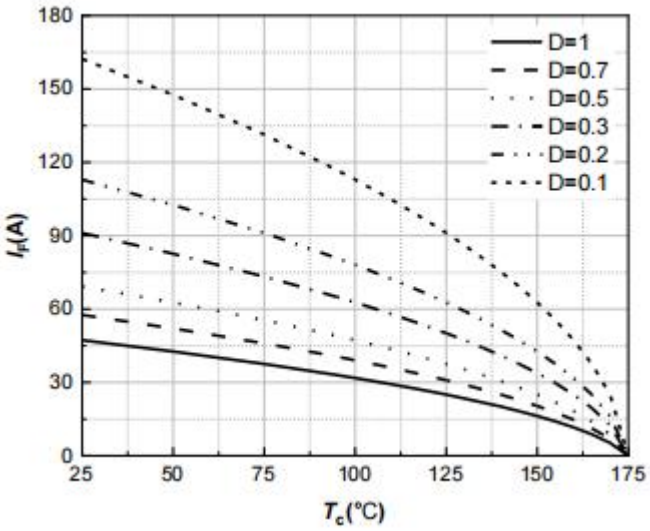



**Figure 3. Diode forward current as function of temperature, D=duty cycle**

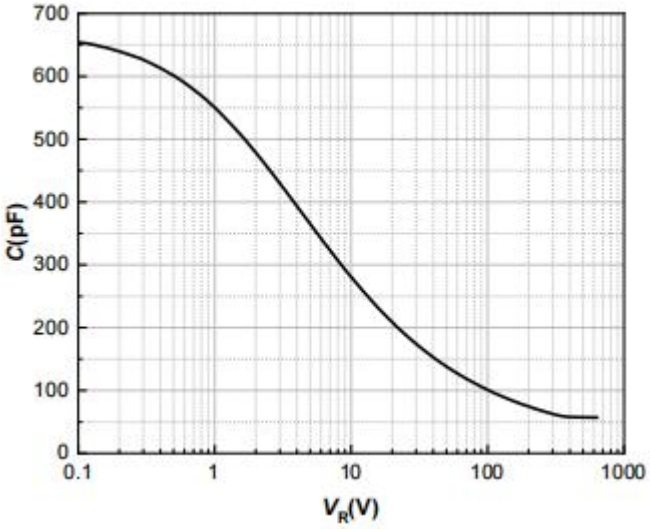



**Figure 4.Typical capacitance as function of reverse voltage, C=f($V_R$); $T_j$=25℃; f=1 MHz**

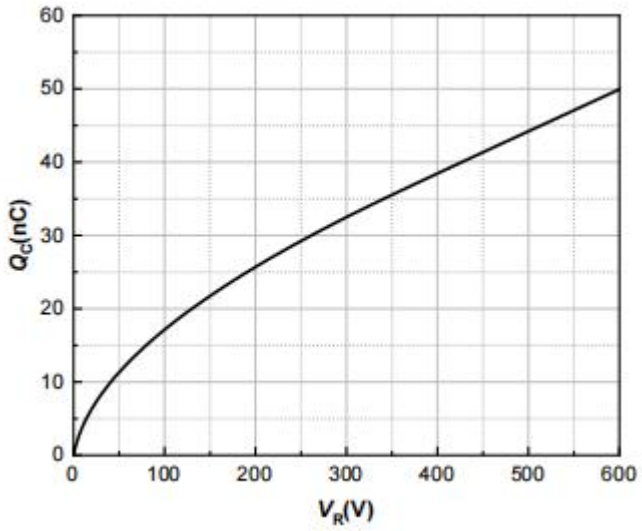



**Figure 5. Typical reverse charge as function of reverse voltage**

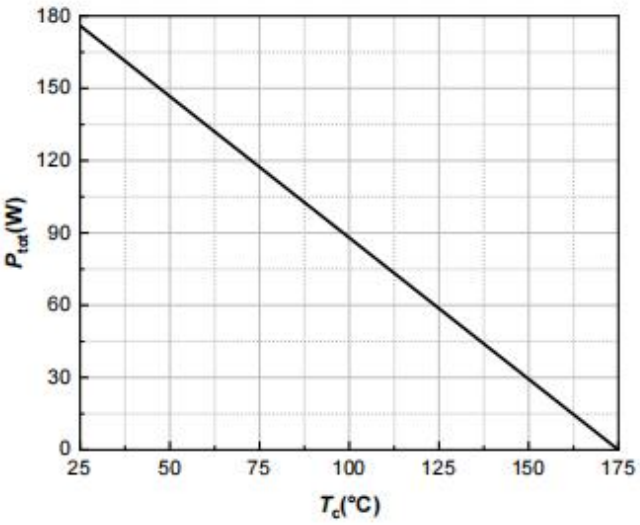



**Figure 6. Power dissipation as function of case temperature**

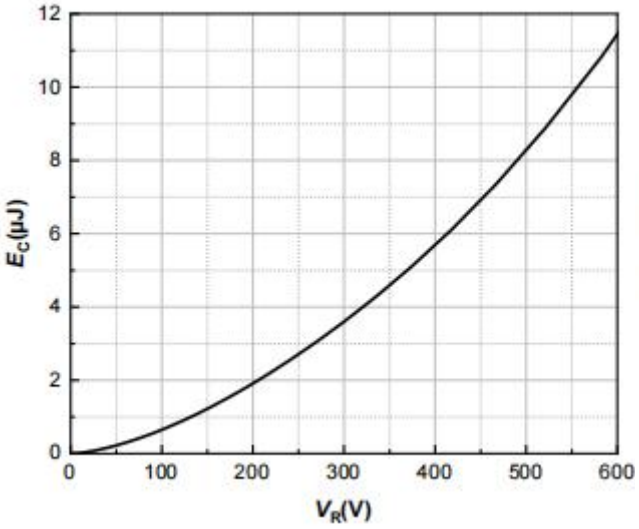



**Figure7. Capacitance stored energy**

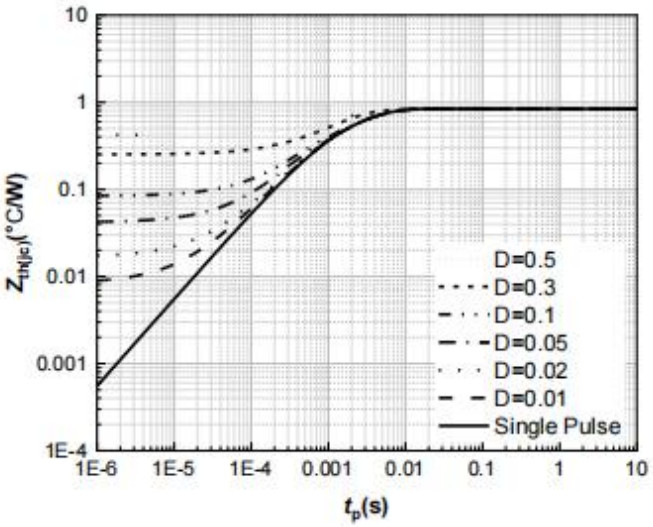
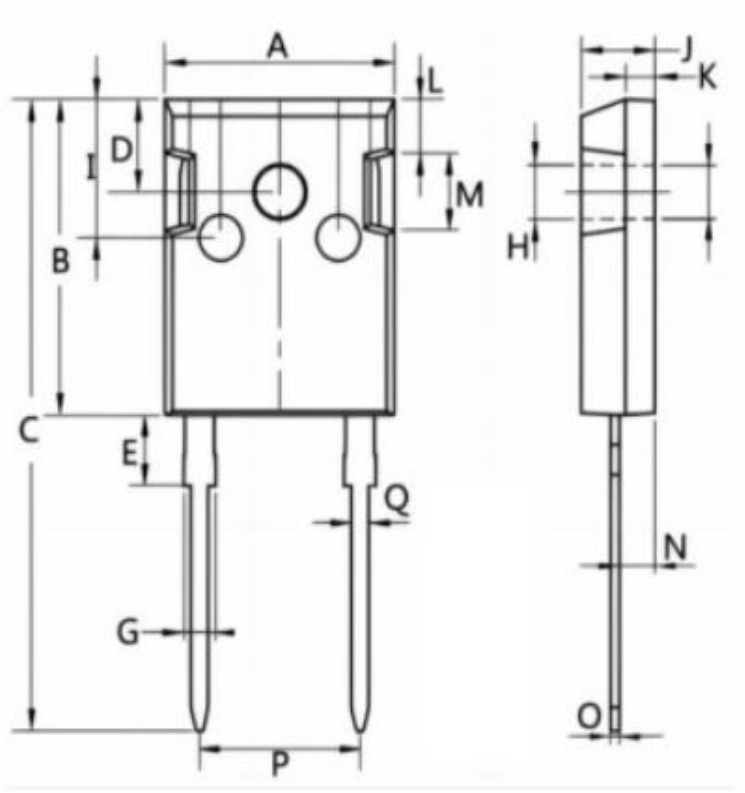



**Figure 8. Max.transient thermal impedance,$Z_{th(jc)}=f_{(tp)}$,parameter:$D=t_p/T$**

## Package Outline: TO-247-2




| Dim. | Min. | Max. |
|---|---|---|
| A | 15.51 | 15.71 |
| B | 20.40 | 20.50 |
| C | 40.5 | 42 |
| D | 5.80 | 6.15 |
| E | 4.25 | 4.40 |
| G | 2.05 | 2.15 |
| H | 3.62 | 4.59 |
| I | 8.15 | 8.60 |
| J | 4.95 | 5.05 |
| K | 1.96 | 1.99 |
| L | 3.65 | 3.8 |
| M | 4.50 | 5.05 |
| N | 2.30 | 2.85 |
| O | 0.59 | 0.61 |
| P | Typ 10.8 | |
| All Dimensions in millimeter | | |