# N2S065006PE2

## Silicon Carbide Schottky Diode

| | | |
|---|---|---|
| $V_{RRM}$ | = | 650V |
| $I_F(T_C \leq 135℃)$ | = | 11A |
| $Q_c$ | = | 17nC |

## Features

- New Thin Wafer Technology
- Low Forward Voltage Drop ($V_F$)
- Zero Reverse Recovery Current
- Zero Forward Recovery Voltage
- Positive Temperature Coefficient on $V_F$
- Temperature-independent Switching

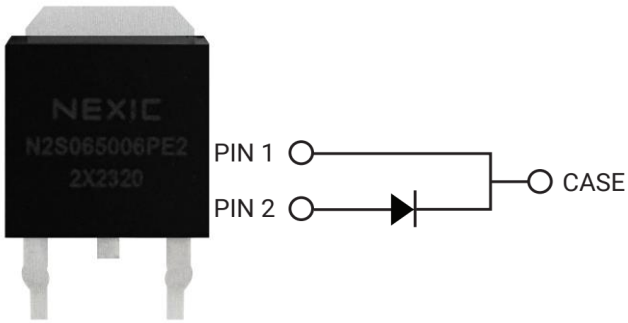
## Benefits

- Replace Bipolar with Unipolar Device
- Reduction of Heat Sink Size
- Parallel Devices Without Thermal Runaway
- Essentially No Switching Losses

## Applications

- Switch Mode Power Supplies
- Uninterruptible Power Supplies
- Motor drive, PV Inverter, Wind Power Station

## Package




TO-252

| Part Number | Package | Marking |
|---|---|---|
| N2S065006PE2 | TO-252 | N2S065006PE2 |

## Maximum Ratings

| Symbol | Parameter | Value | Unit | Test Conditions | Note |
|---|---|---|---|---|---|
| $V_{RRM}$ | Repetitive Peak Reverse Voltage | 650 | V | $T_C$ = 25℃ | |
| $V_{RSM}$ | Surge Peak Reverse Voltage | 650 | V | $T_C$ = 25℃ | |
| $V_R$ | DC Blocking Voltage | 650 | V | $T_C$ = 25℃ | |
| $I_F$ | Forward Current | 25<br>11<br>6 | A | $T_C \leq$ 25℃<br>$T_C \leq$ 135℃<br>$T_C \leq$ 156℃ | |
| $I_{FSM}$ | Non-Repetitive Forward Surge Current | 52 | A | $T_C$ = 25℃, $t_p$ = 8.3ms, Half Sine Wave | |
| $P_{tot}$ | Power Dissipation | 83 | W | $T_C$ = 25℃ | Fig.3 |
| $T_J$, $T_{STG}$ | Operating Junction and Storage Temperature | -55 to 175 | ℃ | | |

## Electrical Characteristics

| Symbol | Parameter | Typ. | Max. | Unit | Test Conditions | Note |
|---|---|---|---|---|---|---|
| $V_F$ | Forward Voltage | 1.27<br>1.38 | 1.5<br>1.6 | V | $I_F$ = 6A, $T_J$ = 25℃<br>$I_F$ = 6A, $T_J$ = 175℃ | Fig.1 |
| $I_R$ | Reverse Current | 4<br>20 | 50<br>200 | μA | $V_R$ = 650V, $T_J$ = 25℃<br>$V_R$ = 650V, $T_J$ = 175℃ | Fig.2 |
| C | Total Capacitance | 380<br>39<br>28 | / | pF | $V_R$ = 0.1V, $T_J$ = 25℃, f = 1MHz<br>$V_R$ = 200V, $T_J$ = 25℃, f = 1MHz<br>$V_R$ = 400V, $T_J$ = 25℃, f = 1MHz | Fig.5 |
| $Q_C$ | Total Capacitive Charge | 17 | / | nC | $V_R$ = 400V, $I_F$ = 6A<br>di/dt = 200A/μs, $T_J$ = 25℃ | Fig.4 |

## Thermal Characteristics

| Symbol | Parameter | Typ. | Unit | Note |
|---|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance from Junction to Case | 1.8 | ℃/W | Fig.6 |
| $R_{\theta JA}$ | Thermal Resistance from Junction to Ambient | 80 | ℃/W | |
| $T_{sold}$ | Soldering Temperature | 260 | ℃ | |

## Typical Performance

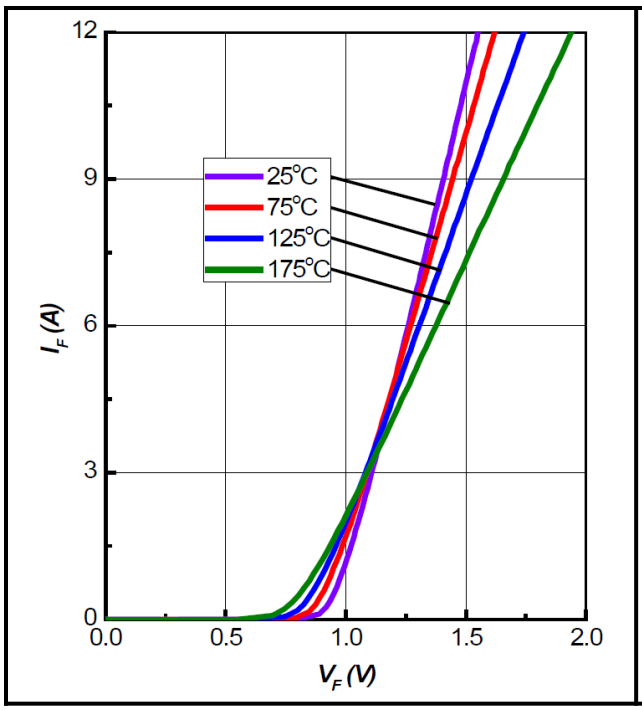



Figure 1. Forward Characteristics

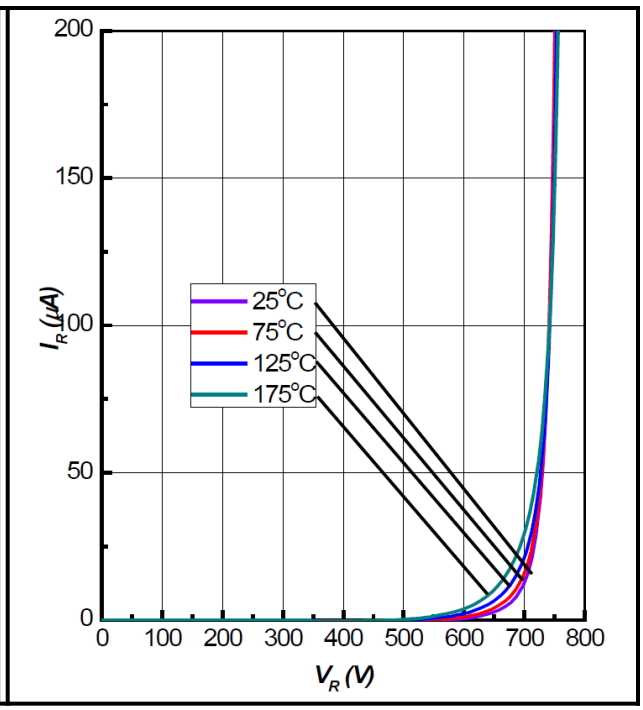



Figure 2. Reverse Characteristics

## Typical Performance

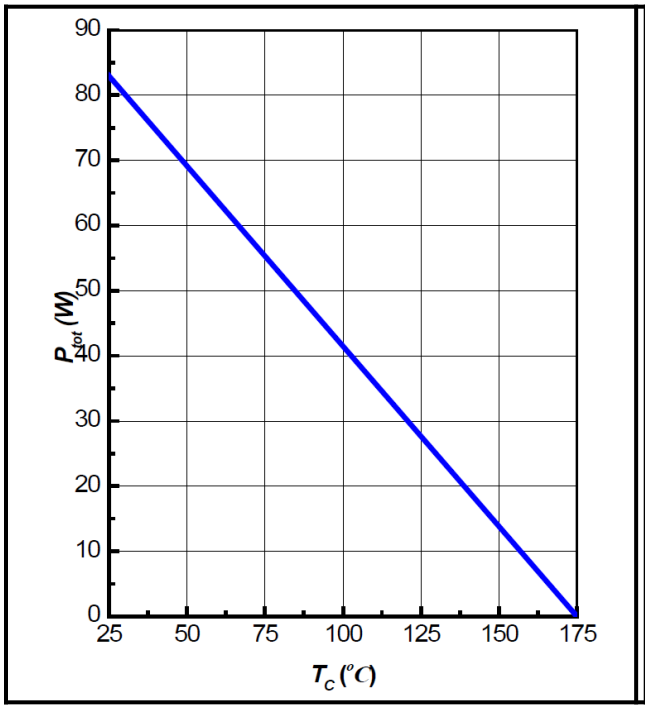



Figure 3. Power Derating

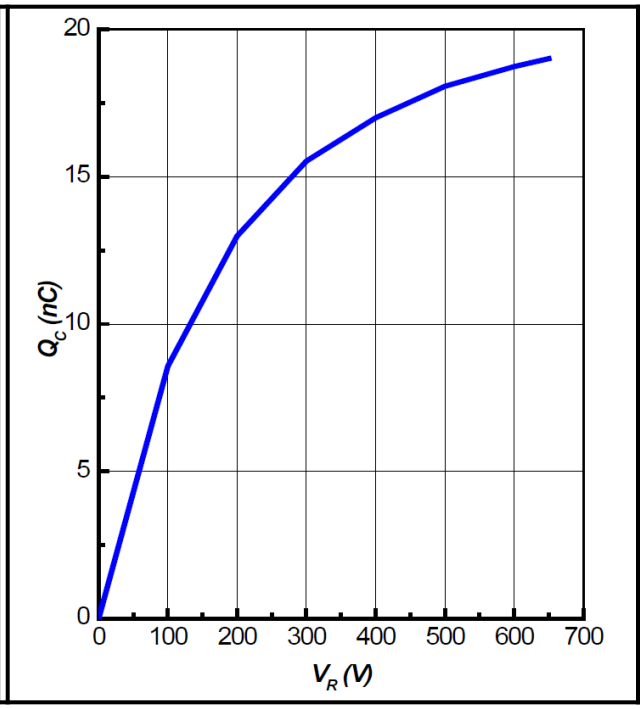



Figure 4. Total Capacitive Charge vs. Reverse Voltage

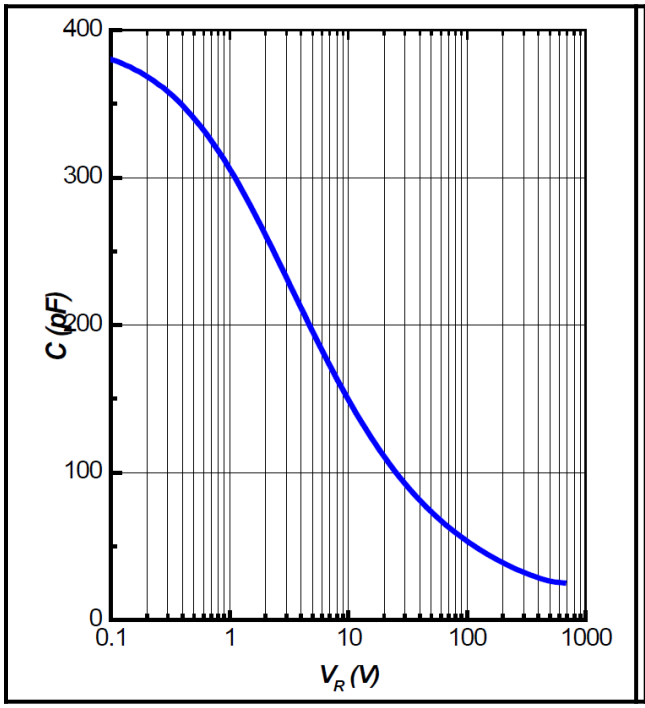



Figure 5. Total Capacitance vs. Reverse Voltage

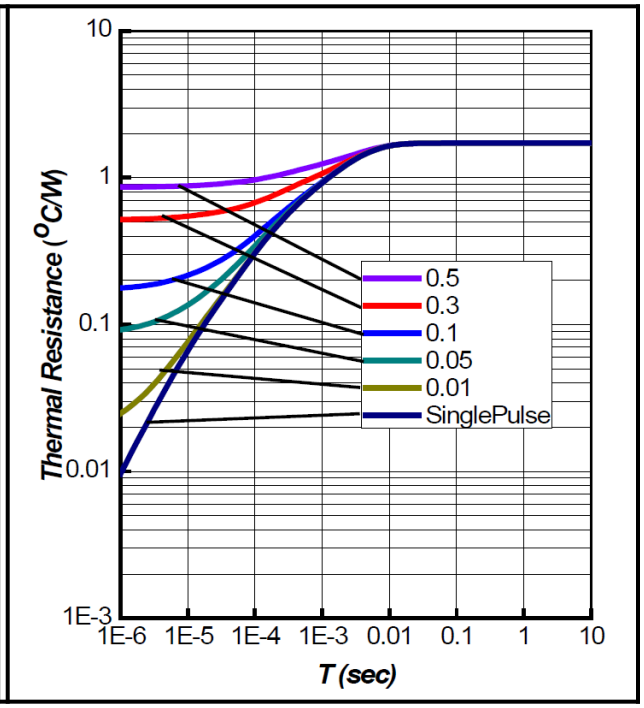
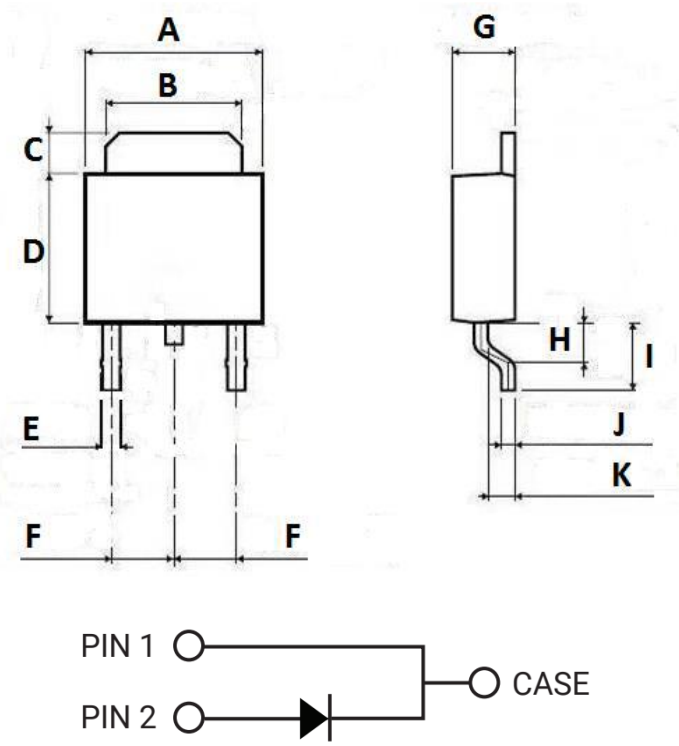



Figure 6. Transient Thermal Impedance

## Package Dimensions

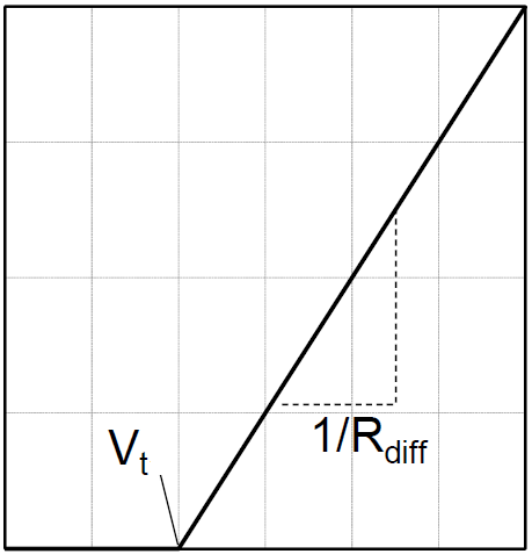
Package TO-252




| SYMBOL | mm | | |
|---|---|---|---|
| | MIN | NOM | MAX |
| A | 6.30 | 6.50 | 6.70 |
| B | 5.20 | 5.30 | 5.40 |
| C | 1.15 | 1.25 | 1.35 |
| D | 5.70 | 5.90 | 6.10 |
| E | 0.65 | 0.70 | 0.75 |
| F | 2.10 | 2.30 | 2.50 |
| G | 2.20 | 2.30 | 2.40 |
| H | 1.45 | 1.50 | 1.55 |
| I | 2.90 | 3.00 | 3.10 |
| J | 0.45 | 0.50 | 0.55 |
| K | 0.90 | 1.00 | 1.10 |

## Simplified Diode Model

**Equivalent IV Curve for Model**




**Mathematical Equation**

$$V_F = V_t + I_F \times R_{diff}$$

$$V_t = -0.001 \times T_j + 0.99 \text{ [V]}$$
$$R_{diff} = 1.2 \times 10^{-6} \times T_j^2 + 7.2 \times 10^{-5} \times T_j + 0.46 \text{ [}\Omega\text{]}$$

**Note:**

**$T_j$ = Diode Junction Temperature In Degrees Celsius, valid from 25°C to175°C**
**$I_F$= Forward Current Less than 12A**