BORN SEMICONDUCTOR

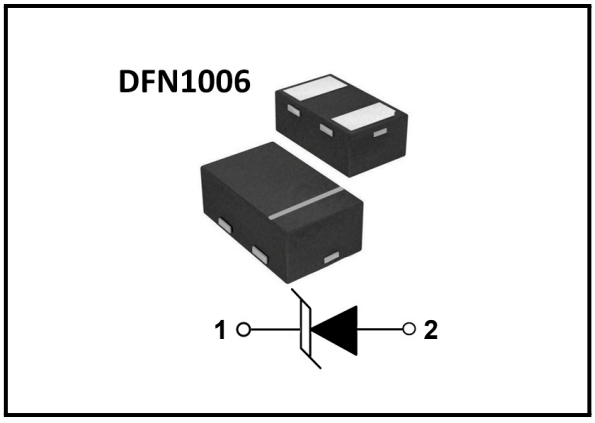
# BN52Bxx

**Zener Diode**

## Features

- Low Zener Impedance
- Power Dissipation of 200mW
- High Stability and High Reliability

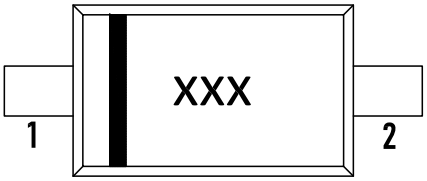
## Package




## Description

- Case: molded plastic
- Polarity: Color band denotes cathode
- Package: DFN1006 Plastic Package
- Epoxy UL: 94V-0

## Marking




## Ordering information

| Order code | Package | Base qty | Deliverymode |
|---|---|---|---|
| BN52Bxx | DFN1006 | 10K | Tape and reel |

## Maximum Ratings @$T_A$=25°C unless otherwise noted

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $P_D$ | Power Dissipation | 200(1) | mW |
| $V_F$ | Forward Voltage @$I_F$=10mA | 0.9(2) | V |
| $T_J$ | Junction temperature | 150 | °C |
| $T_S$ | Storage temperature range | -55 to +150 | °C |

Notes: (1) Device mounted on ceramic PCB: 7.6mm x 9.4mm x 0.87mm with pad areas 25mm²

(2) Short duration test pulse used to minimize self-heating effect

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**Revision: 2022-Jan-1-A**

# BN52Bxx

**Zener Diode**

## Typical Performance Characteristics($T_A$ = 25 °C, unless otherwise noted)

| Device | Marking | Zener Voltage Range | | | Maximum Zener Impedance | | | | Maximum | | Typical Temperature coefficent | | Test Current |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $V_Z$@$I_{ZT}$ | | | $I_{Zt}$ | $Z_{Zt}$ | $Z_{ZK}$@$I_{ZK}$ | $I_{ZK}$ | Reverse Current $I_R$ | $V_R$ | @ $I_{ZTC}$=mV/°C | | $I_{ZTC}$ |
| | | Nom.(V) | Min.(V) | Max.(V) | (mA) | (Ω) | (Ω) | (mA) | (uA) | (V) | (Min) | (Max) | (mA) |
| BN52B2V4 | 2WX | 2.4 | 2.35 | 2.45 | 5 | 100 | 600 | 1.0 | 50 | 1.0 | -3.5 | 0 | 5 |
| BN52B2V7 | 2W1 | 2.7 | 2.65 | 2.75 | 5 | 100 | 600 | 1.0 | 20 | 1.0 | -3.5 | 0 | 5 |
| BN52B3V0 | 2W2 | 3.0 | 2.94 | 3.06 | 5 | 95 | 600 | 1.0 | 10 | 1.0 | -3.5 | 0 | 5 |
| BN52B3V3 | 2W3 | 3.3 | 3.23 | 3.37 | 5 | 95 | 600 | 1.0 | 5 | 1.0 | -3.5 | 0 | 5 |
| BN52B3V6 | 2W4 | 3.6 | 3.53 | 3.67 | 5 | 90 | 600 | 1.0 | 5 | 1.0 | -3.5 | 0 | 5 |
| BN52B3V9 | 2W5 | 3.9 | 3.82 | 3.98 | 5 | 90 | 600 | 1.0 | 3 | 1.0 | -3.5 | 0 | 5 |
| BN52B4V3 | 2W6 | 4.3 | 4.21 | 4.39 | 5 | 90 | 600 | 1.0 | 3 | 1.0 | -3.5 | 0 | 5 |
| BN52B4V7 | 2W7 | 4.7 | 4.61 | 4.79 | 5 | 80 | 500 | 1.0 | 3 | 2.0 | -3.5 | 0.2 | 5 |
| BN52B5V1 | 2W8 | 5.1 | 5.00 | 5.20 | 5 | 60 | 480 | 1.0 | 2 | 2.0 | -2.7 | 1.2 | 5 |
| BN52B5V6 | 2W9 | 5.6 | 5.49 | 5.71 | 5 | 40 | 400 | 1.0 | 1 | 2.0 | -2.0 | 2.5 | 5 |
| BN52B6V2 | 2WA | 6.2 | 6.08 | 6.32 | 5 | 10 | 150 | 1.0 | 3 | 4.0 | 0.4 | 3.7 | 5 |
| BN52B6V8 | 2WB | 6.8 | 6.66 | 6.94 | 5 | 15 | 80 | 1.0 | 2 | 4.0 | 1.2 | 4.5 | 5 |
| BN52B7V5 | 2WC | 7.5 | 7.35 | 7.65 | 5 | 15 | 80 | 1.0 | 1 | 5.0 | 2.5 | 5.3 | 5 |
| BN52B8V2 | 2WD | 8.2 | 8.04 | 8.36 | 5 | 15 | 80 | 1.0 | 0.7 | 5.0 | 3.2 | 6.2 | 5 |
| BN52B9V1 | 2WE | 9.1 | 8.92 | 9.28 | 5 | 15 | 100 | 1.0 | 0.5 | 6.0 | 3.8 | 7.0 | 5 |
| BN52B10 | 2WF | 10 | 9.80 | 10.20 | 5 | 20 | 150 | 1.0 | 0.2 | 7.0 | 4.5 | 8.0 | 5 |
| BN52B11 | 2WG | 11 | 10.78 | 11.22 | 5 | 20 | 150 | 1.0 | 0.1 | 8.0 | 5.4 | 9.0 | 5 |
| BN52B12 | 2WH | 12 | 11.76 | 12.24 | 5 | 25 | 150 | 1.0 | 0.1 | 8.0 | 6.0 | 10.0 | 5 |
| BN52B13 | 2WI | 13 | 12.74 | 13.26 | 5 | 30 | 170 | 1.0 | 0.1 | 8.0 | 7.0 | 11.0 | 5 |
| BN52B14 | 2WY | 14 | 13.72 | 14.28 | 5 | 30 | 170 | 1.0 | 0.1 | 10.5 | 8.1 | 12.0 | 5 |
| BN52B15 | 2WJ | 15 | 14.70 | 15.30 | 5 | 30 | 200 | 1.0 | 0.2 | 10.5 | 9.2 | 13.0 | 5 |
| BN52B16 | 2WK | 16 | 15.68 | 16.32 | 5 | 40 | 200 | 1.0 | 0.1 | 11.2 | 10.4 | 14.0 | 5 |
| BN52B18 | 2WL | 18 | 17.64 | 18.36 | 5 | 45 | 225 | 1.0 | 0.2 | 12.6 | 12.4 | 16.0 | 5 |
| BN52B20 | 2WM | 20 | 19.60 | 20.40 | 5 | 55 | 225 | 1.0 | 0.1 | 14.0 | 14.4 | 18.0 | 5 |
| BN52B22 | 2WN | 22 | 21.56 | 22.44 | 5 | 55 | 250 | 1.0 | 0.1 | 15.4 | 16.4 | 20.0 | 5 |
| BN52B24 | 2WO | 24 | 23.52 | 24.48 | 5 | 70 | 250 | 1.0 | 0.1 | 16.8 | 18.4 | 22.0 | 5 |
| BN52B27 | 2WP | 27 | 26.46 | 27.54 | 2 | 80 | 300 | 0.5 | 0.1 | 18.9 | 21.4 | 25.3 | 2 |
| BN52B30 | 2WQ | 30 | 29.40 | 30.60 | 2 | 80 | 300 | 0.5 | 0.1 | 21.0 | 24.4 | 29.4 | 2 |
| BN52B33 | 2WR | 33 | 32.34 | 33.66 | 2 | 80 | 325 | 0.5 | 0.1 | 23.1 | 27.4 | 33.4 | 2 |
| BN52B36 | 2WS | 36 | 35.28 | 36.72 | 2 | 90 | 350 | 0.5 | 0.1 | 25.2 | 30.4 | 37.4 | 2 |
| BN52B39 | 2WT | 39 | 38.22 | 39.78 | 2 | 130 | 350 | 0.5 | 0.1 | 27.3 | 33.4 | 41.2 | 2 |
| BN52B43 | 2WU | 43 | 41.16 | 43.84 | 2 | 100 | 700 | 1.0 | 0.1 | 32.0 | 10.0 | 12.0 | 5 |

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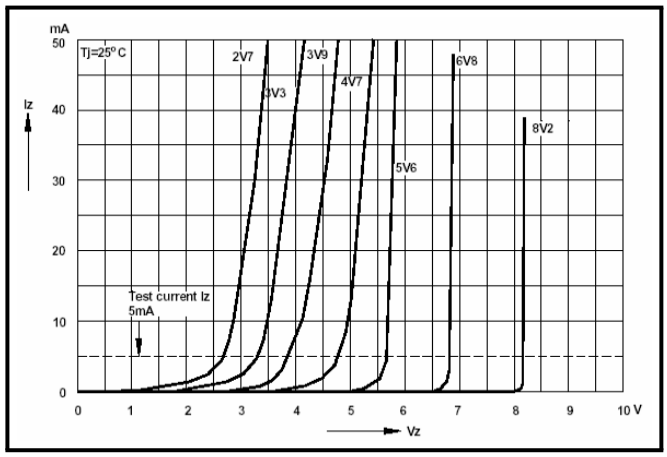
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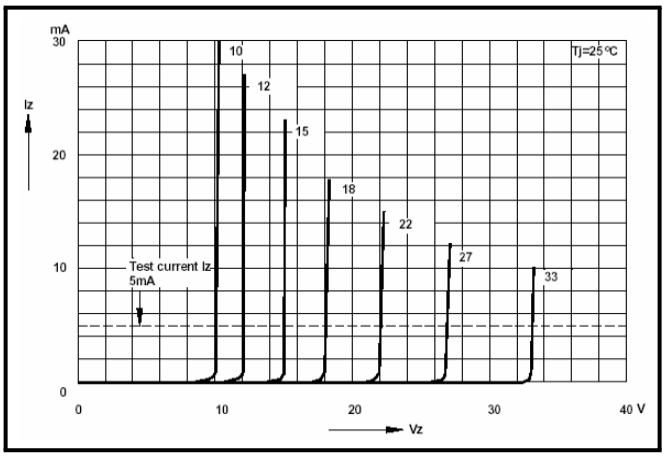
# BN52Bxx

Zener Diode

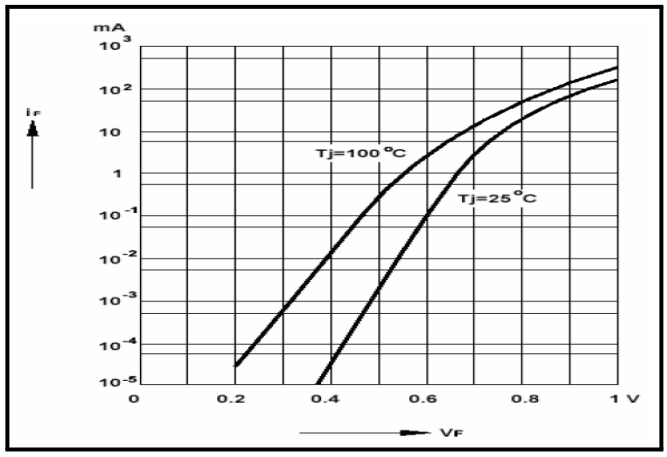
## Typical Performance Characteristics($T_J$ = 25°C, unless otherwise noted)

### Fig 1:Breakdown characteristics (at $T_J$=constant (pulsed))

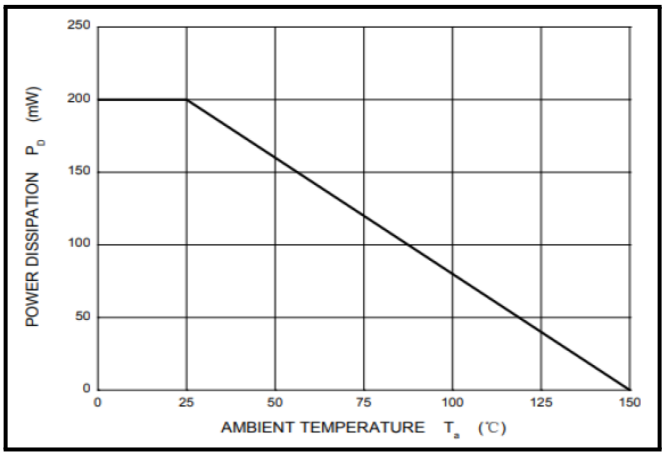


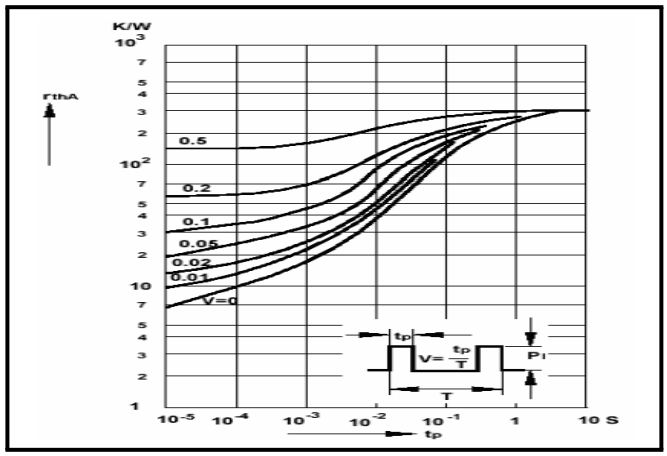

### Fig 2:Forward characteristics



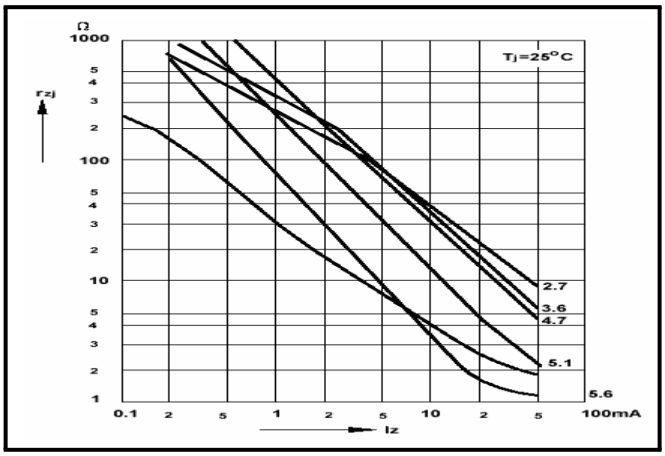

### Fig 3:Admissible power dissipation versus ambient temperature




### Fig 4:Pulse thermal resistance versus pulse duration




### Fig 5:Dynamic resistance versus Zener current




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# BN52Bxx

Zener Diode

**Fig 6:Capacitance versus Zener voltage**

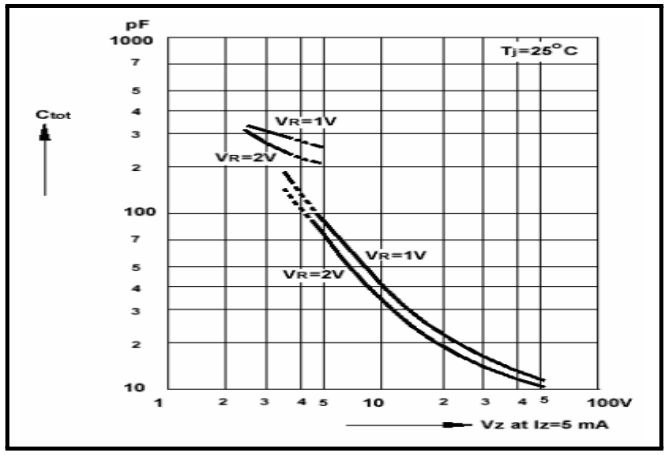



**Fig 7:Dynamic resistance versus Zener current**

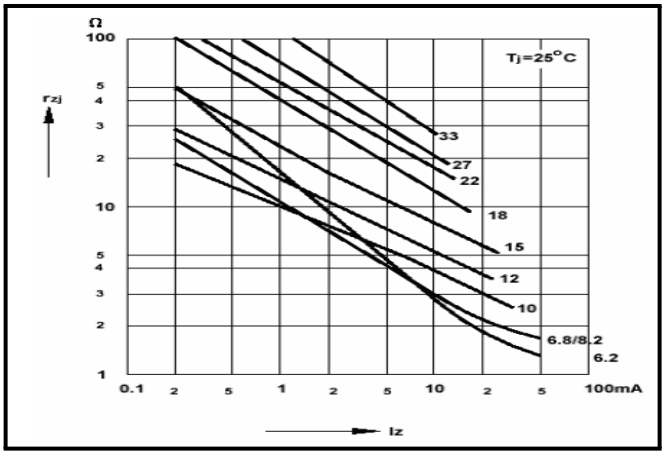



**Fig 8:Dynamic resistance versus Zener current**

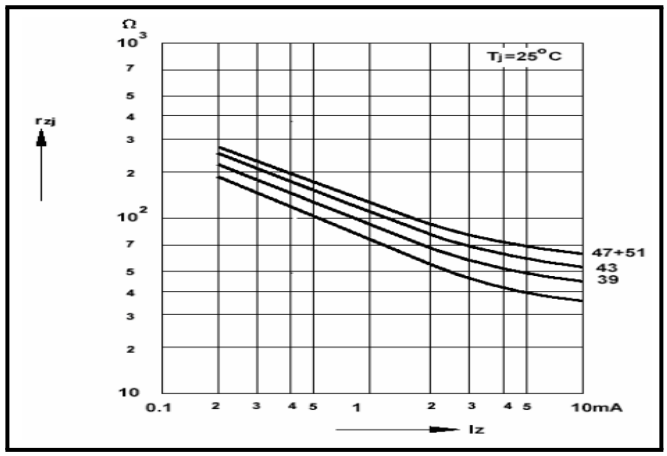



**Fig 9:Thermal differential resistance versus Zener voltage**

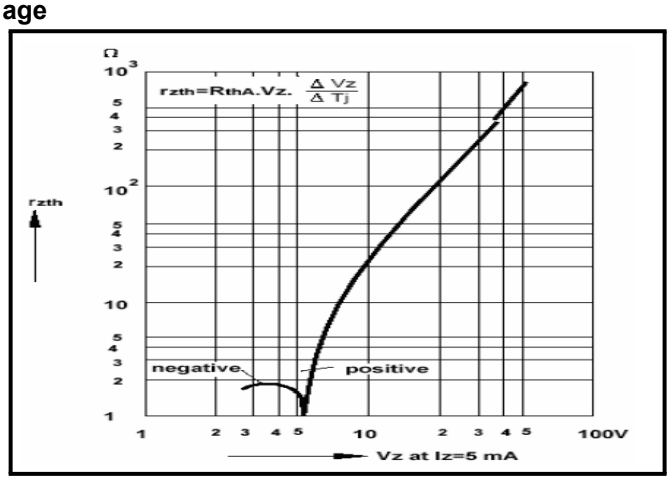



**Fig 10:Dynamic resistance versus Zener voltage**

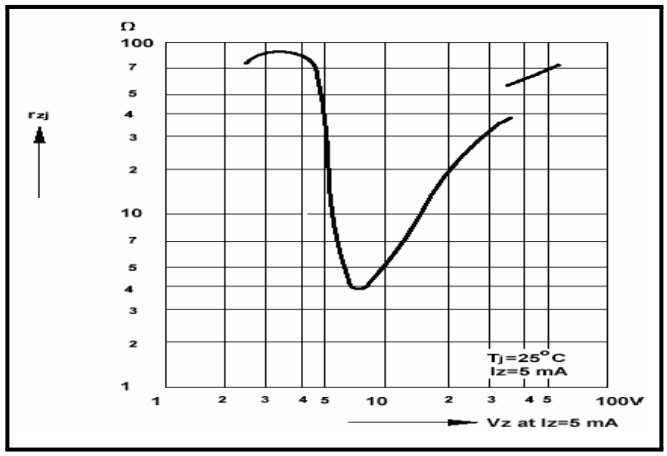
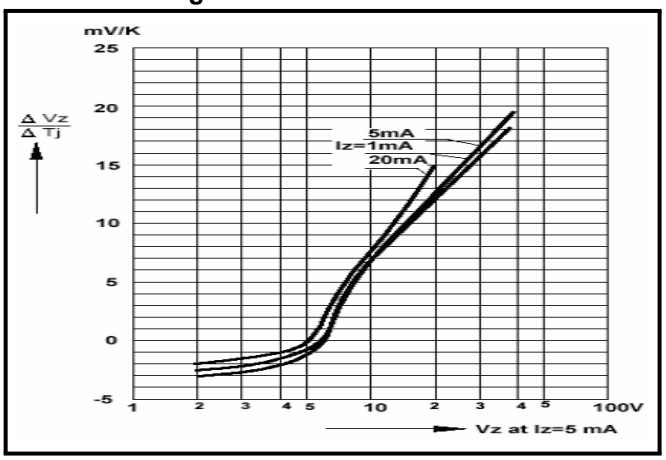



**Fig 11:Temperature dependence of Zener voltage versus Zener voltage**




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**Fig 12:Temperature dependence of Zener voltage versus Zener voltage**

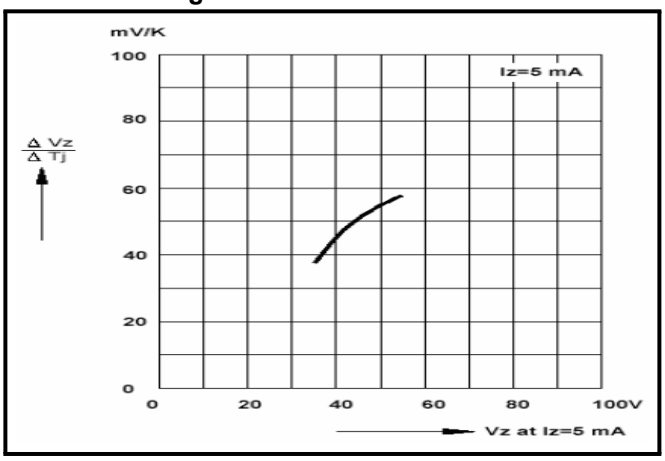



**Fig 13:Change of Zener voltage versus junctiontemperature**

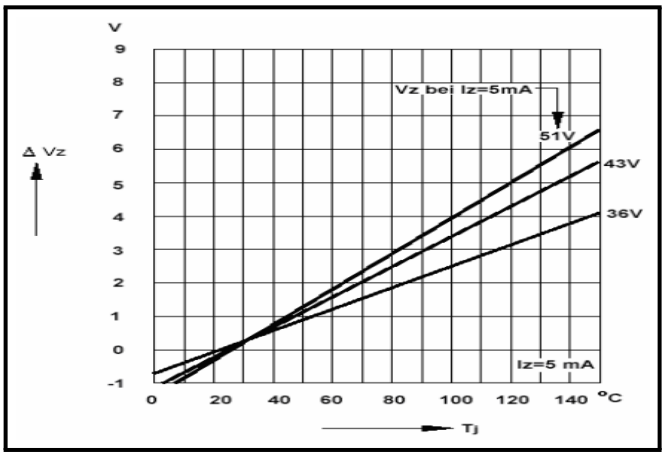



**Fig 14:Change of Zener voltage versus junctiontemperature**

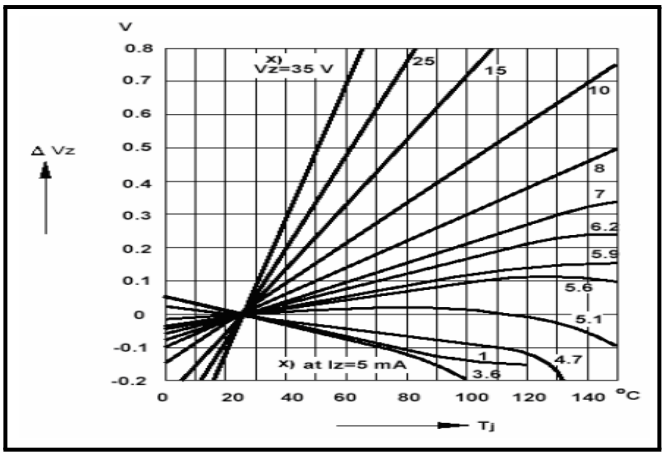
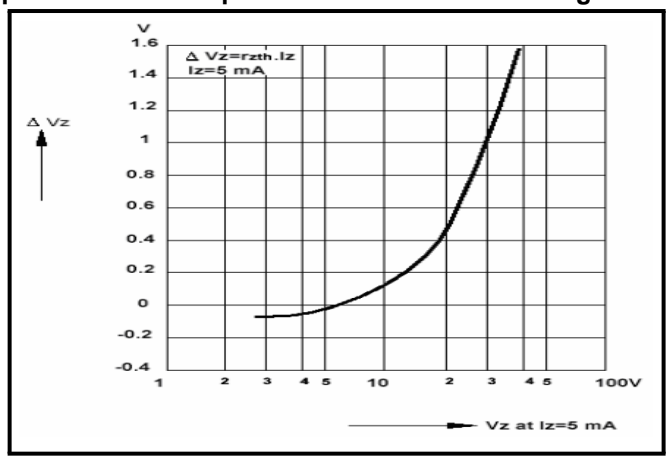



**Fig 15:Change of Zener voltge from turn-on up to the point ofthermal equilibrium versus Zener voltage**



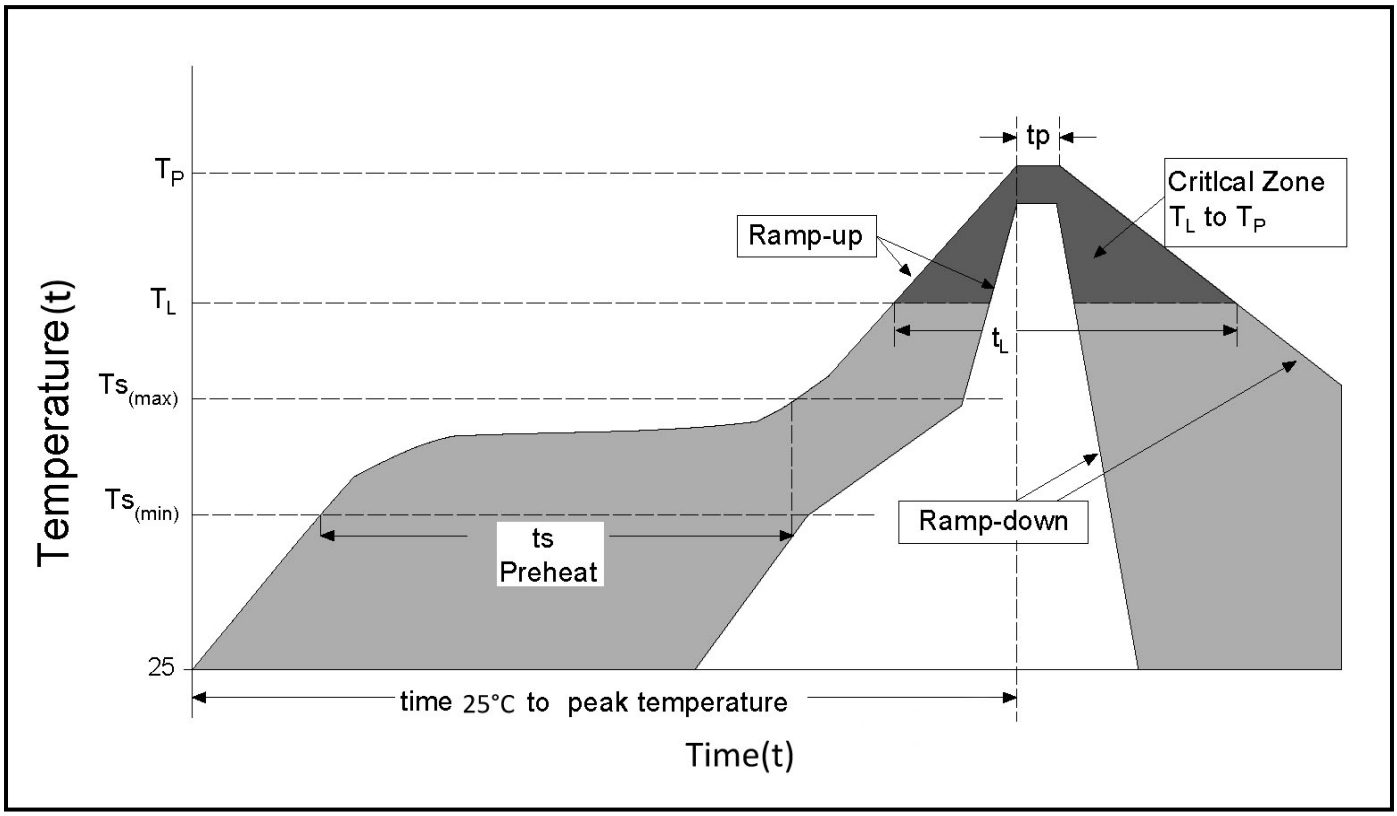

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# BN52Bxx

**Zener Diode**

## Soldering Parameters




| Reflow Condition | | Lead-free assembly |
|---|---|---|
| Pre Heat | - Temperature Min ($T_S$(min)) | 150°C |
| | - Temperature Max ($T_S$(max)) | 200°C |
| | - Time (min to max) ($t_S$) | 60 - 180 secs |
| Average ramp up rate (Liquidus Temp ($T_L$) to peak) | | 3°C/second max |
| $T_S$(max) to $T_L$ - Ramp-up Rate | | 3°C/second max |
| Reflow | - Temperature ($T_L$) (Liquidus) | 217°C |
| | - Time ($t_L$) | 60 -150 secs |
| Peak Temperature ($T_P$) | | $260^{+0/-5°C}$ |
| Time within 5°C of actual peak Temperature ($t_p$) | | 20 -40 secs |
| Ramp-down Rate | | 6°C/second max |
| Time 25°C to peak Temperature (t) | | 8 minutes Max. |
| Do not exceed | | 260°C |

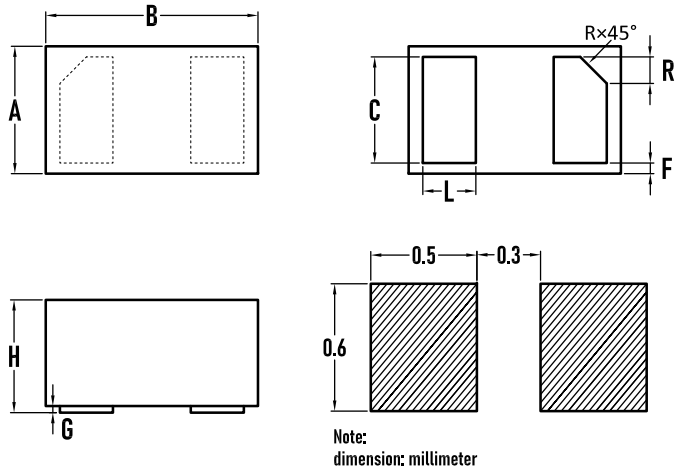
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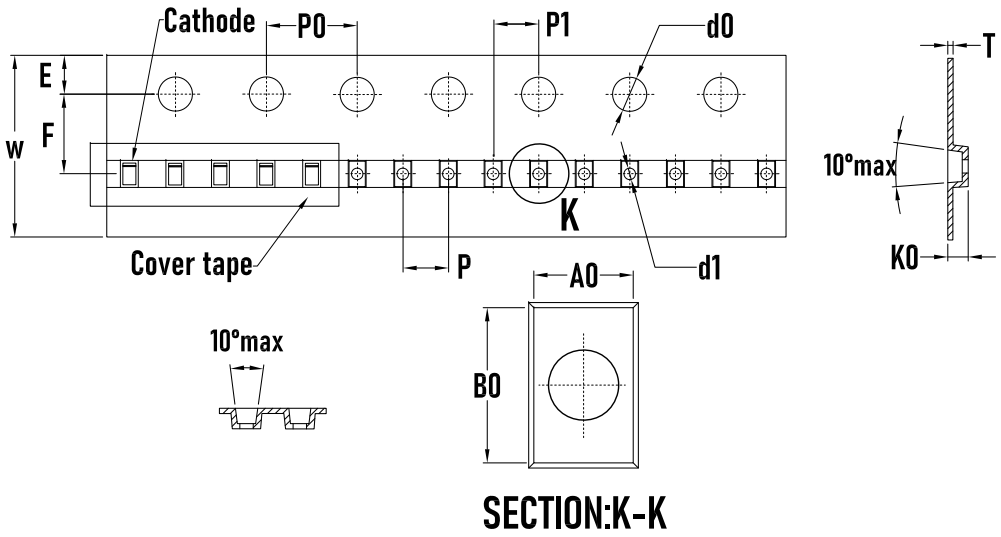
**ESD Protection Diode**

## Outline Drawing – DFN1006



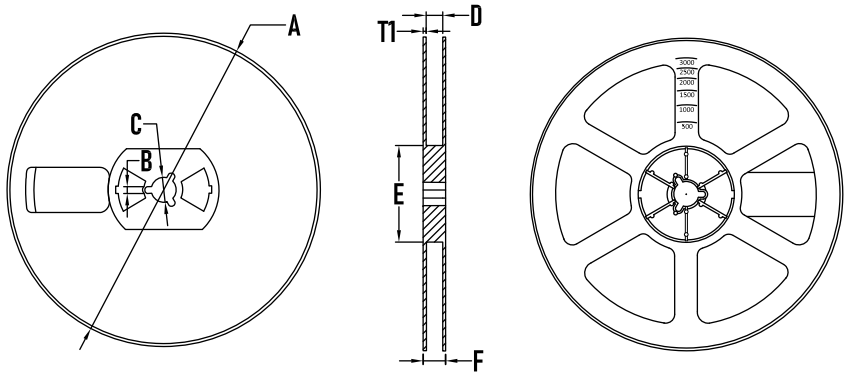

| SYMBOL | MILLIMETER | | |
|---|---|---|---|
| | MIN. | Typ. | MAX. |
| A | 0.55 | 0.60 | 0.65 |
| B | 0.95 | 1.00 | 1.05 |
| C | 0.45 | 0.50 | 0.55 |
| L | 0.20 | 0.25 | 0.30 |
| F | 0.05REF | | |
| G | 0.00 | 0.02 | 0.05 |
| H | 0.45 | 0.50 | 0.55 |
| R | 0.07 | 0.12 | 0.17 |

## Packaging Tape - DFN1006




| SYMBOL | MILLIMETER |
|---|---|
| A0 | 0.71±0.05 |
| B0 | 1.11±0.05 |
| d0 | $1.5^{+0.1}_{-0}$ |
| d1 | 0.50±0.05 |
| E | 1.75±0.10 |
| F | 3.50±0.05 |
| K0 | 0.56±0.05 |
| P | 2.00±0.05 |
| P0 | 4.00±0.10 |
| P1 | 2.00±0.05 |
| W | $8.00^{+0.03}_{-0.01}$ |
| T | 0.2±0.015 |

## Packaging Reel




| SYMBOL | MILLIMETER |
|---|---|
| A | 178±1 |
| B | 3.5±0.2 |
| C | 14.3±0.2 |
| D | $9.8^{+2}_{-1}$ |
| E | 54.5±0.5 |
| F | 12.4±0.2 |
| T1 | 1.0±0.2 |
| Quantity | 10000PCS |

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