



**ELECTRONICS, INC.**

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## NTE5111A thru NTE5166A Zener Diode, 5 Watt ±5% Tolerance

**Features:**

- Zener Voltage: 3.3V to 200V
- High Surge Current Capability

**Absolute Maximum Ratings:**

DC Power Dissipation ( $T_L = +75^\circ\text{C}$ , Lead Length = 3/8"),  $P_D$  ..... 5W  
 Derate Above  $75^\circ\text{C}$  ..... 40mW/ $^\circ\text{C}$   
 Forward Voltage ( $I_F = 1\text{A}$ ),  $V_F$  ..... 1.2V  
 Operating Junction Temperature Range,  $T_J$  .....  $-65^\circ$  to  $+200^\circ\text{C}$   
 Storage Temperature Range,  $T_{stg}$  .....  $-65^\circ$  to  $+200^\circ\text{C}$

**Electrical Characteristics:** ( $T_A = +25^\circ\text{C}$  unless otherwise specified)

|          | Nominal Zener Voltage<br>$V_Z @ I_{ZT}$<br>(Note 1) | Test Current<br>$I_{ZT}$ | Max Zener Impedance           |  | Max Reverse Leakage Current |       | Max Surge Current<br>$i_r$<br>(Note 2) | Max Voltage Regulation<br>$\Delta V_Z$<br>(Note 3) | Max Regulator Current<br>$I_{ZM}$ |
|----------|---|--------------------------|-------------------------------|--|-----------------------------|-------|--|--|-----------------------------------|
|          |   |                          | $Z_{ZT} @ I_{ZT}$<br>(Note 1) | $Z_{ZK} @ I_{ZK} = 1\text{mA}$<br>(Note 1) | $I_R @ V_R$                 |       |  |  |                                   |
|          |   |                          | $\Omega$                      | $\Omega$                                   | $\mu\text{A}$               | Volts |  |  |                                   |
|          | Volts   | mA                       |                               |  |                             |       | Amps                                   | Volt   | mA                                |
| NTE5111A | 3.3   | 380                      | 3.0                           | 400  | 300                         | 1     | 20                                     | 0.85   | 1440                              |
| NTE5112A | 3.6   | 350                      | 2.5                           | 500  | 150                         | 1     | 18.7                                   | 0.8  | 1320                              |
| NTE5113A | 3.9   | 320                      | 2                             | 500  | 50                          | 1     | 17.6                                   | 0.54   | 1220                              |
| NTE5114A | 4.3   | 290                      | 2                             | 500  | 10                          | 1     | 16.4                                   | 0.49   | 1100                              |
| NTE5115A | 4.7   | 260                      | 2                             | 450  | 5                           | 1     | 15.3                                   | 0.44   | 1010                              |
| NTE5116A | 5.1   | 240                      | 1.5                           | 400  | 1                           | 1     | 14.4                                   | 0.39   | 930                               |
| NTE5117A | 5.6   | 220                      | 1                             | 400  | 1                           | 2     | 13.4                                   | 0.25   | 865                               |
| NTE5118A | 6.0   | 200                      | 1                             | 300  | 1                           | 3     | 12.7                                   | 0.19   | 790                               |
| NTE5119A | 6.2   | 200                      | 1                             | 200  | 1                           | 3     | 12.4                                   | 0.1  | 765                               |
| NTE5120A | 6.8   | 175                      | 1                             | 200  | 10                          | 5.2   | 11.5                                   | 0.15   | 700                               |
| NTE5121A | 7.5   | 175                      | 1.5                           | 200  | 10                          | 5.7   | 10.7                                   | 0.15   | 630                               |
| NTE5122A | 8.2   | 150                      | 1.5                           | 200  | 10                          | 6.2   | 10                                     | 0.2  | 580                               |

**Electrical Characteristics (Cont'd):** ( $T_A = +25^\circ\text{C}$  unless otherwise specified)

|          | Nominal Zener Voltage<br>$V_Z @ I_{ZT}$<br>(Note 1) | Test Current<br>$I_{ZT}$ | Max Zener Impedance           |  | Max Reverse Leakage Current |       | Max Surge Current<br>$i_r$<br>(Note 2) | Max Voltage Regulation<br>$\Delta V_Z$<br>(Note 3) | Max Regulator Current<br>$I_{ZM}$ |
|----------|---|--------------------------|-------------------------------|--|-----------------------------|-------|--|--|-----------------------------------|
|          |   |                          | $Z_{ZT} @ I_{ZT}$<br>(Note 1) | $Z_{ZK} @ I_{ZK} = 1\text{mA}$<br>(Note 1) | $I_R @ V_R$                 |       |  |  |                                   |
|          |   |                          | $\Omega$                      | $\Omega$                                   | $\mu\text{A}$               | Volts |  |  |                                   |
| NTE5123A | 8.7   | 150                      | 2                             | 200  | 10                          | 6.6   | 9.5                                    | 0.2  | 545                               |
| NTE5124A | 9.1   | 150                      | 2                             | 150  | 7.5                         | 6.9   | 9.2                                    | 0.22   | 520                               |
| NTE5125A | 10  | 125                      | 2                             | 125  | 5                           | 7.6   | 8.6                                    | 0.22   | 475                               |
| NTE5126A | 11  | 125                      | 2.5                           | 125  | 5                           | 8.4   | 8                                      | 0.25   | 430                               |
| NTE5127A | 12  | 100                      | 2.5                           | 125  | 2                           | 9.1   | 7.5                                    | 0.25   | 395                               |
| NTE5128A | 13  | 100                      | 2.5                           | 100  | 1                           | 9.9   | 7                                      | 0.25   | 365                               |
| NTE5129A | 14  | 100                      | 2.5                           | 75   | 1                           | 10.6  | 6.7                                    | 0.25   | 340                               |
| NTE5130A | 15  | 75                       | 2.5                           | 75   | 1                           | 11.5  | 6.3                                    | 0.25   | 315                               |
| NTE5131A | 16  | 75                       | 2.5                           | 75   | 1                           | 12.2  | 6                                      | 0.3  | 295                               |
| NTE5132A | 17  | 70                       | 2.5                           | 75   | 0.5                         | 12.9  | 5.8                                    | 0.35   | 280                               |
| NTE5133A | 18  | 65                       | 2.5                           | 75   | 0.5                         | 13.7  | 5.5                                    | 0.4  | 265                               |
| NTE5134A | 19  | 65                       | 3                             | 75   | 0.5                         | 14.4  | 5.3                                    | 0.4  | 250                               |
| NTE5135A | 20  | 65                       | 3                             | 75   | 0.5                         | 15.2  | 5.1                                    | 0.4  | 237                               |
| NTE5136A | 22  | 50                       | 3.5                           | 75   | 0.5                         | 16.7  | 4.7                                    | 0.45   | 216                               |
| NTE5137A | 24  | 50                       | 3.5                           | 100  | 0.5                         | 18.2  | 4.4                                    | 0.55   | 198                               |
| NTE5138A | 25  | 50                       | 4                             | 110  | 0.5                         | 19    | 4.3                                    | 0.55   | 190                               |
| NTE5139A | 27  | 50                       | 5                             | 120  | 0.5                         | 20.6  | 4.1                                    | 0.6  | 176                               |
| NTE5140A | 28  | 50                       | 6                             | 130  | 0.5                         | 21.2  | 3.9                                    | 0.6  | 170                               |
| NTE5141A | 30  | 40                       | 8                             | 140  | 0.5                         | 22.8  | 3.7                                    | 0.6  | 158                               |
| NTE5142A | 33  | 40                       | 10                            | 150  | 0.5                         | 25.1  | 3.5                                    | 0.6  | 144                               |
| NTE5143A | 36  | 30                       | 11                            | 160  | 0.5                         | 27.4  | 3.3                                    | 0.65   | 132                               |
| NTE5144A | 39  | 30                       | 14                            | 170  | 0.5                         | 29.7  | 3.1                                    | 0.65   | 122                               |
| NTE5145A | 43  | 30                       | 20                            | 190  | 0.5                         | 32.7  | 2.8                                    | 0.7  | 110                               |
| NTE5146A | 47  | 25                       | 25                            | 210  | 0.5                         | 35.8  | 2.7                                    | 0.8  | 100                               |
| NTE5147A | 51  | 25                       | 27                            | 230  | 0.5                         | 38.8  | 2.5                                    | 0.9  | 93                                |
| NTE5148A | 56  | 20                       | 35                            | 280  | 0.5                         | 42.6  | 2.3                                    | 1  | 86                                |
| NTE5149A | 60  | 20                       | 40                            | 350  | 0.5                         | 42.5  | 2.2                                    | 1.2  | 79                                |
| NTE5150A | 62  | 20                       | 42                            | 400  | 0.5                         | 47.1  | 2.1                                    | 1.35   | 76                                |
| NTE5151A | 68  | 20                       | 44                            | 500  | 0.5                         | 51.7  | 2                                      | 1.5  | 70                                |
| NTE5152A | 75  | 20                       | 45                            | 620  | 0.5                         | 56    | 1.9                                    | 1.6  | 63                                |
| NTE5153A | 82  | 15                       | 65                            | 720  | 0.5                         | 62.2  | 1.8                                    | 1.8  | 58                                |
| NTE5154A | 87  | 15                       | 75                            | 760  | 0.5                         | 66    | 1.7                                    | 2  | 54.5                              |
| NTE5155A | 91  | 15                       | 75                            | 760  | 0.5                         | 69.2  | 1.6                                    | 2.2  | 52.5                              |
| NTE5156A | 100   | 12                       | 90                            | 800  | 0.5                         | 76    | 1.5                                    | 2.5  | 47.5                              |
| NTE5157A | 110   | 12                       | 125                           | 1000                                       | 0.5                         | 83.6  | 1.4                                    | 2.5  | 43                                |
| NTE5158A | 120   | 10                       | 170                           | 1150                                       | 0.5                         | 91.2  | 1.3                                    | 2.5  | 39.5                              |

**Electrical Characteristics (Cont'd):** ( $T_A = +25^\circ\text{C}$  unless otherwise specified)

|          | Nominal Zener Voltage<br>$V_Z @ I_{ZT}$<br>(Note 1) | Test Current<br>$I_{ZT}$ | Max Zener Impedance           |  | Max Reverse Leakage Current |       | Max Surge Current<br>$i_r$<br>(Note 2) | Max Voltage Regulation<br>$\Delta V_Z$<br>(Note 3) | Max Regulator Current<br>$I_{ZM}$ |
|----------|---|--------------------------|-------------------------------|--|-----------------------------|-------|--|--|-----------------------------------|
|          |   |                          | $Z_{ZT} @ I_{ZT}$<br>(Note 1) | $Z_{ZK} @ I_{ZK} = 1\text{mA}$<br>(Note 1) | $I_R @ V_R$                 |       |  |  |                                   |
|          |   |                          | $\Omega$                      | $\Omega$                                   | $\mu\text{A}$               | Volts |  |  |                                   |
|          | Volts   | mA                       | $\Omega$                      | $\Omega$                                   | $\mu\text{A}$               | Volts | Amps                                   | Volt   | mA                                |
| NTE5159A | 130   | 10                       | 190                           | 1250                                       | 0.5                         | 98.8  | 1.2                                    | 2.5  | 36.6                              |
| NTE5160A | 140   | 8                        | 230                           | 1500                                       | 0.5                         | 106   | 1.2                                    | 2.5  | 34                                |
| NTE5161A | 150   | 8                        | 330                           | 1500                                       | 0.5                         | 114   | 1.1                                    | 3  | 31.6                              |
| NTE5162A | 160   | 8                        | 350                           | 1650                                       | 0.5                         | 122   | 1.1                                    | 3  | 29.4                              |
| NTE5163A | 170   | 8                        | 380                           | 1750                                       | 0.5                         | 129   | 1                                      | 3  | 28                                |
| NTE5164A | 180   | 5                        | 430                           | 1750                                       | 0.5                         | 137   | 1                                      | 4  | 26.4                              |
| NTE5165A | 190   | 5                        | 450                           | 1850                                       | 0.5                         | 144   | 0.9                                    | 5  | 25                                |
| NTE5166A | 200   | 5                        | 480                           | 1850                                       | 0.5                         | 152   | 0.9                                    | 5  | 23.6                              |

Note 1 Test conditions for zener voltage and impedance are as follows:  $I_Z$  is applied  $40 \pm 10\text{ms}$  prior to reading. Mounting contacts are located  $3/8''$  to  $1/2''$  from the inside edge of mounting clips to the body of the diode ( $T_A = +25^\circ\text{C} +8^\circ, -2^\circ\text{C}$ ).

Note 2 Surge current is specified as the maximum allowable peak, non-recurrent square-wave current with a pulse width, PW, of 8.3ms. Mounting contact located as specified in Note 1.

Note 3 Test conditions for voltage regulation are as follows:  $V_Z$  measurements are made at 10% and then at 50% of the  $I_Z$  max value listed in the "Electrical Characteristic" table. The test current time duration for each  $V_Z$  measurement is  $40 \pm 10\text{ms}$  ( $T_A = +25^\circ\text{C} +8^\circ, -2^\circ\text{C}$ ). Mounting contact located as specified in Note 1.

