

# MAZ2000 series (MA2000 Series)

## Silicon planar type

For stabilization of power supply

### ■ Features

- High reliability, achieved by the combination the planar type and the glass seal
- Large power dissipation:  $P_D = 1$  W
- Wide voltage range:  $V_Z = 5.1$  V to 56 V
- Easy-to-use because of the finely divided zener voltage ranks, such as A and B ranks

### ■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

| Parameter                                                    | Symbol    | Rating      | Unit             |
|--------------------------------------------------------------|-----------|-------------|------------------|
| Repetitive peak forward current                              | $I_{FRM}$ | 400         | mA               |
| Total power dissipation <sup>*1</sup>                        | $P_{tot}$ | 1           | W                |
| Non-repetitive reverse surge power dissipation <sup>*2</sup> | $P_{ZSM}$ | 75          | W                |
| Junction temperature                                         | $T_j$     | 200         | $^\circ\text{C}$ |
| Storage temperature                                          | $T_{stg}$ | -55 to +200 | $^\circ\text{C}$ |

Note) \*1 : With a printed-circuit board

\*2 :  $t = 100$   $\mu\text{s}$ ,  $T_j = 150^\circ\text{C}$

### ■ Common Electrical Characteristics $T_a = 25^\circ\text{C}$ <sup>\*1</sup>

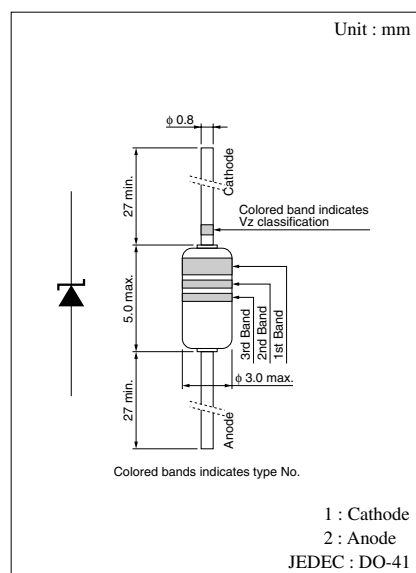
| Parameter                                              | Symbol | Conditions                  | Min | Typ | Max | Unit                 |
|--------------------------------------------------------|--------|-----------------------------|-----|-----|-----|----------------------|
| Forward voltage                                        | $V_F$  | $I_F = 200$ mA              |     |     | 1   | V                    |
| Zener voltage <sup>*2</sup>                            | $V_Z$  | $I_Z$ ..... Specified value |     |     |     | V                    |
| Operating resistance                                   | $R_Z$  | $I_Z$ ..... Specified value |     |     |     | $\Omega$             |
| Reverse current                                        | $I_R$  | $V_R$ ..... Specified value |     |     |     | $\mu\text{A}$        |
| Temperature coefficient of zener voltage <sup>*3</sup> | $S_Z$  | $I_Z$ ..... Specified value |     |     |     | mV/ $^\circ\text{C}$ |
| Terminal capacitance                                   | $C_t$  | $V_R$ ..... Specified value |     |     |     | pF                   |

Note) 1. Rated input/output frequency: 5 MHz

2. \*1 : The  $V_Z$  value is for the temperature of  $25^\circ\text{C}$ . In other cases, carry out the temperature compensation.

\*2 : Guaranteed at 20 ms after power application.

\*3 :  $T_j = 25^\circ\text{C}$  to  $150^\circ\text{C}$



### •Color indication of $V_Z$ rank classification

| A rank | B rank |
|--------|--------|
| Blue   | Red    |

Note) The part number in the parenthesis shows conventional part number.

■ Electrical characteristics within part numbers  $T_a = 25^\circ\text{C}$

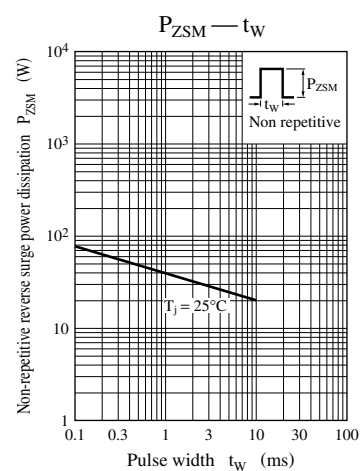
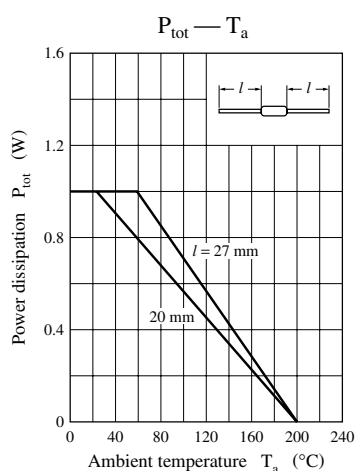
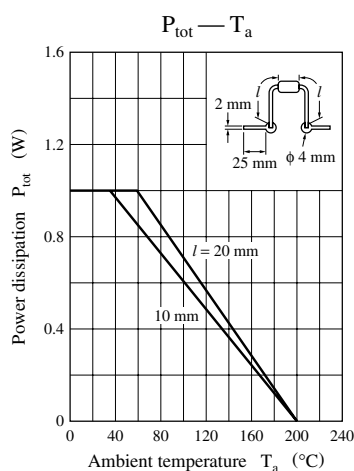
| Part Number | Zener voltage          |       |      |       | Reverse current       |     | Operating resistance   |     | Temperature coefficient of zener voltage |      | Terminal capacitance                                       | Marking<br>Color indication |        |       |
|-------------|------------------------|-------|------|-------|-----------------------|-----|------------------------|-----|------------------------------------------|------|------------------------------------------------------------|-----------------------------|--------|-------|
|             | V <sub>Z</sub> (V)     |       |      |       | I <sub>R</sub> (μA)   |     | R <sub>Z</sub> (Ω)     |     | S <sub>Z</sub> (mV/°C)                   |      | C <sub>t</sub> (pF)<br>(V <sub>R</sub> = 0 V)<br>f = 1 MHz |                             |        |       |
|             | I <sub>Z</sub><br>(mA) | Min   | Nom  | Max   | V <sub>R</sub><br>(V) | Max | I <sub>Z</sub><br>(mA) | Max | I <sub>Z</sub><br>(mA)                   | Typ  | Typ                                                        | 1st.                        | 2nd.   | 3rd.  |
|             |                        |       |      |       |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2051     | 40                     | 4.8   | 5.1  | 5.4   | 1                     | 20  | 40                     | 10  | 40                                       | 0    | 200                                                        | Green                       | Brown  | Brown |
| MAZ2051-A   |                        | 4.8   |      | 5.15  |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2051-B   |                        | 5.05  |      | 5.4   |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2056     | 40                     | 5.2   | 5.6  | 6.0   | 2                     | 20  | 40                     | 8   | 40                                       | 1.5  | 180                                                        | Green                       | Blue   | Blue  |
| MAZ2056-A   |                        | 5.3   |      | 5.7   |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2056-B   |                        | 5.6   |      | 6.0   |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2062     | 40                     | 5.8   | 6.2  | 6.6   | 3                     | 20  | 40                     | 6   | 40                                       | 2.4  | 330                                                        | Blue                        | Red    | Red   |
| MAZ2062-A   |                        | 5.8   |      | 6.2   |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2062-B   |                        | 6.1   |      | 6.5   |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2068     | 40                     | 6.4   | 6.8  | 7.2   | 3                     | 10  | 40                     | 6   | 40                                       | 3.1  | 280                                                        | Blue                        | Gray   | Gray  |
| MAZ2068-A   |                        | 6.4   |      | 6.8   |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2068-B   |                        | 6.7   |      | 7.1   |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2075     | 40                     | 7.0   | 7.5  | 7.9   | 3                     | 10  | 40                     | 5   | 40                                       | 3.8  | 250                                                        | Purple                      | Green  | Green |
| MAZ2075-A   |                        | 7.0   |      | 7.45  |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2075-B   |                        | 7.35  |      | 7.8   |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2082     | 40                     | 7.7   | 8.2  | 8.7   | 4                     | 10  | 40                     | 5   | 40                                       | 4.5  | 230                                                        | Gray                        | Red    | Red   |
| MAZ2082-A   |                        | 7.7   |      | 8.2   |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2082-B   |                        | 8.1   |      | 8.6   |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2091     | 40                     | 8.5   | 9.1  | 9.6   | 5                     | 10  | 40                     | 6   | 40                                       | 5.4  | 220                                                        | White                       | Brown  | Brown |
| MAZ2091-A   |                        | 8.5   |      | 9.05  |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2091-B   |                        | 8.95  |      | 9.5   |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2100     | 40                     | 9.4   | 10.0 | 10.6  | 7                     | 10  | 40                     | 6   | 40                                       | 6.3  | 200                                                        | Brown                       | Black  | —     |
| MAZ2100-A   |                        | 9.4   |      | 10    |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2100-B   |                        | 9.9   |      | 10.5  |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2110     | 20                     | 10.4  | 11.0 | 11.6  | 7                     | 5   | 20                     | 8   | 20                                       | 7.4  | 160                                                        | Brown                       | Brown  | —     |
| MAZ2110-A   |                        | 10.4  |      | 11.05 |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2110-B   |                        | 10.85 |      | 11.5  |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2120     | 20                     | 11.4  | 12.0 | 12.7  | 8                     | 5   | 20                     | 8   | 20                                       | 8.4  | 160                                                        | Brown                       | Red    | —     |
| MAZ2120-A   |                        | 11.4  |      | 12.1  |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2120-B   |                        | 11.9  |      | 12.6  |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2130     | 20                     | 12.4  | 13.0 | 14.1  | 9                     | 5   | 20                     | 10  | 20                                       | 9.4  | 155                                                        | Brown                       | Orange | —     |
| MAZ2130-A   |                        | 12.4  |      | 13.25 |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2130-B   |                        | 13.15 |      | 14.0  |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2150     | 20                     | 13.8  | 15.0 | 15.6  | 10                    | 5   | 20                     | 12  | 20                                       | 11.4 | 150                                                        | Brown                       | Green  | —     |
| MAZ2150-A   |                        | 13.8  |      | 14.7  |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2150-B   |                        | 14.5  |      | 15.4  |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2160     | 20                     | 15.3  | 16.0 | 17.1  | 11                    | 5   | 20                     | 12  | 20                                       | 12.5 | 135                                                        | Brown                       | Blue   | —     |
| MAZ2160-A   |                        | 15.3  |      | 16.3  |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2160-B   |                        | 16.1  |      | 17.1  |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2180     | 20                     | 16.8  | 18.0 | 19.1  | 12                    | 5   | 20                     | 15  | 20                                       | 14.5 | 110                                                        | Brown                       | Gray   | —     |
| MAZ2180-A   |                        | 16.8  |      | 18.0  |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2180-B   |                        | 17.8  |      | 19.0  |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2200     | 20                     | 18.8  | 20.0 | 21.2  | 14                    | 5   | 20                     | 15  | 20                                       | 16.6 | 100                                                        | Red                         | Black  | —     |
| MAZ2200-A   |                        | 18.8  |      | 20.0  |                       |     |                        |     |                                          |      |                                                            |                             |        |       |
| MAZ2200-B   |                        | 19.8  |      | 21.0  |                       |     |                        |     |                                          |      |                                                            |                             |        |       |

■ Electrical characteristics within part numbers (continued)  $T_a = 25^\circ\text{C}$

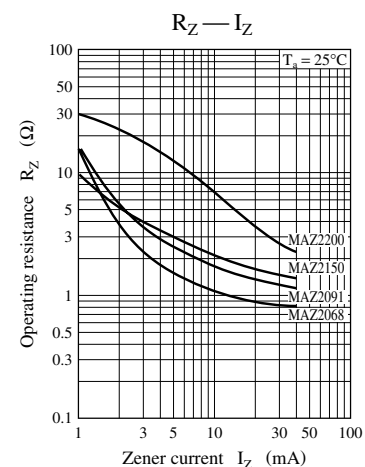
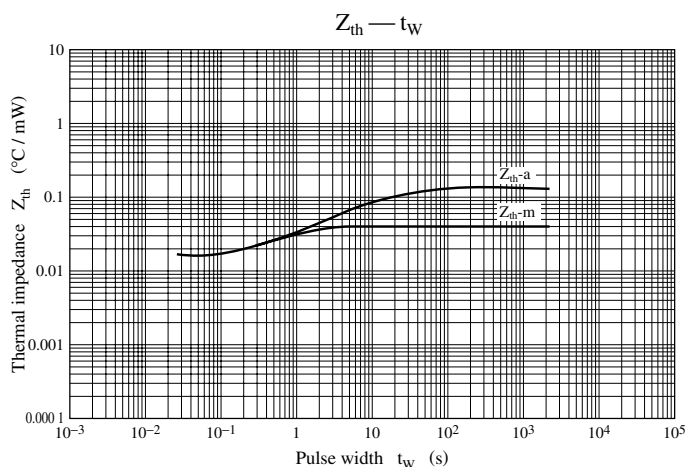
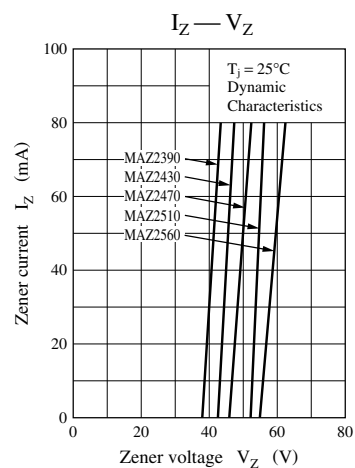
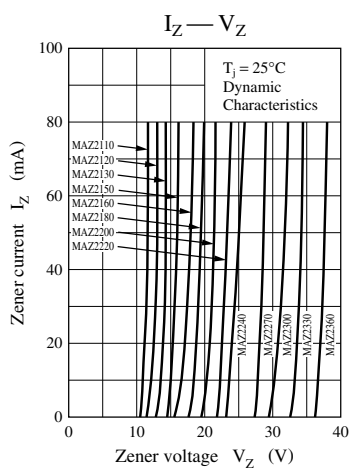
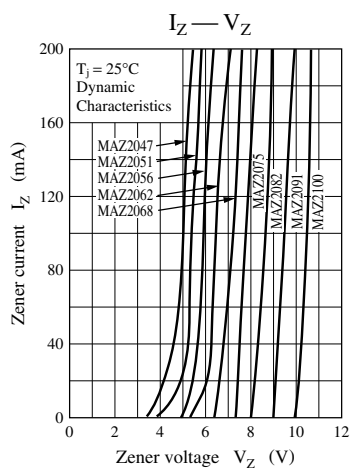
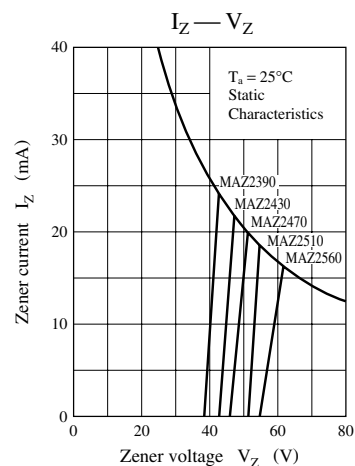
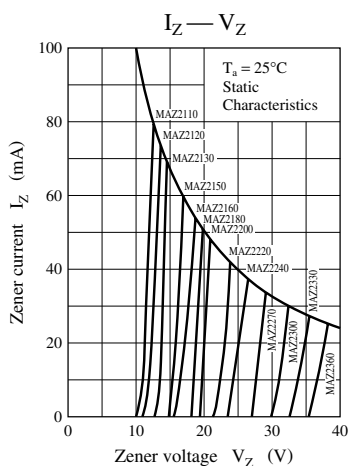
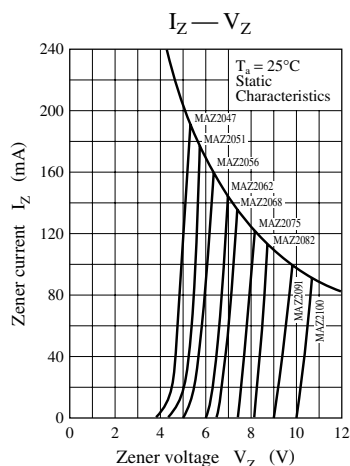
| Part Number | Zener voltage |       |      |       | Reverse current         |     | Operating resistance |     | Temperature coefficient of zener voltage |      | Terminal capacitance                        | Marking<br>(Color indication)<br>Main body:<br>Yellow green |        |      |
|-------------|---------------|-------|------|-------|-------------------------|-----|----------------------|-----|------------------------------------------|------|---------------------------------------------|-------------------------------------------------------------|--------|------|
|             | $V_Z$ (V)     |       |      |       | $I_R$ ( $\mu\text{A}$ ) |     | $R_Z$ ( $\Omega$ )   |     | $S_Z$ (mV/ $^\circ\text{C}$ )            |      | $C_T$ (pF)<br>( $V_R = 0$ V)<br>$f = 1$ MHz |                                                             |        |      |
|             | $I_Z$<br>(mA) | Min   | Nom  | Max   | $V_R$<br>(V)            | Max | $I_Z$<br>(mA)        | Max | $I_Z$<br>(mA)                            | Typ  | Typ                                         | 1st.                                                        | 2nd.   | 3rd. |
| MAZ2220     | 10            | 20.8  | 22.0 | 23.3  | 15                      | 5   | 10                   | 20  | 10                                       | 18.6 | 95                                          | Red                                                         | Red    | —    |
| MAZ2220-A   |               | 20.8  | —    | 22.15 |                         |     |                      |     |                                          |      |                                             |                                                             |        |      |
| MAZ2220-B   |               | 21.85 | —    | 23.2  |                         |     |                      |     |                                          |      |                                             |                                                             |        |      |
| MAZ2240     | 10            | 22.8  | 24.0 | 25.6  | 16                      | 5   | 10                   | 20  | 10                                       | 20.7 | 90                                          | Red                                                         | Yellow | —    |
| MAZ2240-A   |               | 22.8  | —    | 24.35 |                         |     |                      |     |                                          |      |                                             |                                                             |        |      |
| MAZ2240-B   |               | 24.15 | —    | 25.6  |                         |     |                      |     |                                          |      |                                             |                                                             |        |      |
| MAZ2270     | 10            | 25.1  | 27.0 | 28.9  | 18                      | 2   | 10                   | 25  | 10                                       | 23.8 | 85                                          | Red                                                         | Purple | —    |
| MAZ2270-A   |               | 25.1  | —    | 27.0  |                         |     |                      |     |                                          |      |                                             |                                                             |        |      |
| MAZ2270-B   |               | 26.9  | —    | 28.9  |                         |     |                      |     |                                          |      |                                             |                                                             |        |      |
| MAZ2300     | 10            | 28.0  | 30.0 | 32.0  | 20                      | 2   | 10                   | 25  | 10                                       | 26.9 | 80                                          | Orange                                                      | Black  | —    |
| MAZ2300-A   |               | 28.0  | —    | 30.1  |                         |     |                      |     |                                          |      |                                             |                                                             |        |      |
| MAZ2300-B   |               | 29.9  | —    | 32.0  |                         |     |                      |     |                                          |      |                                             |                                                             |        |      |
| MAZ2330     | 10            | 31.0  | 33.0 | 35.0  | 22                      | 2   | 10                   | 30  | 10                                       | 30.0 | 75                                          | Orange                                                      | Orange | —    |
| MAZ2330-A   |               | 31.0  | —    | 33.14 |                         |     |                      |     |                                          |      |                                             |                                                             |        |      |
| MAZ2330-B   |               | 32.86 | —    | 35.0  |                         |     |                      |     |                                          |      |                                             |                                                             |        |      |
| MAZ2360     | 10            | 34.0  | 36.0 | 38.0  | 24                      | 2   | 10                   | 30  | 10                                       | 33.4 | 70                                          | Orange                                                      | Blue   | —    |
| MAZ2360-A   |               | 34.0  | —    | 36.16 |                         |     |                      |     |                                          |      |                                             |                                                             |        |      |
| MAZ2360-B   |               | 35.84 | —    | 38.0  |                         |     |                      |     |                                          |      |                                             |                                                             |        |      |
| MAZ2390     | 10            | 37.0  | 39.0 | 41.0  | 26                      | 5   | 10                   | 50  | 10                                       | 36.3 | 65                                          | Orange                                                      | White  | —    |
| MAZ2430     | 10            | 40.0  | 43.0 | 46.0  | 29                      | 5   | 10                   | 50  | 10                                       | 41.1 | 60                                          | Yellow                                                      | Orange | —    |
| MAZ2470     | 10            | 44.0  | 47.0 | 50.0  | 31                      | 5   | 10                   | 50  | 10                                       | 44.9 | 55                                          | Yellow                                                      | Purple | —    |
| MAZ2510     | 10            | 48.0  | 51.0 | 54.0  | 33                      | 5   | 10                   | 50  | 10                                       | 48.6 | 50                                          | Green                                                       | Brown  | —    |
| MAZ2560     | 10            | 52.0  | 56.0 | 60.0  | 35                      | 5   | 10                   | 50  | 10                                       | 54.9 | 45                                          | Green                                                       | Blue   | —    |

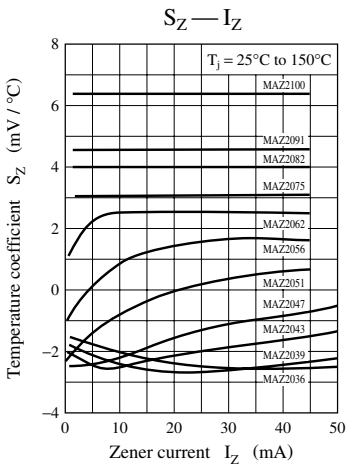
Note) 1. The  $V_Z$  value is the one after power application for 20 ms at  $T_a = 25^\circ\text{C}$ .

2. The zener voltage temperature coefficient is the one for  $T_j = 25^\circ\text{C}$  to  $150^\circ\text{C}$ .



Zener  
Diodes





Zener  
Diodes