

TOSHIBA Diode Silicon Epitaxial Planar Type

## 02DZ2.0~02DZ24

Constant Voltage Regulation Applications

Reference Voltage Applications

Unit: mm

- The mounting of four devices on an ultra-compact package allows the number of parts and the mounting cost to be reduced.
- Nominal voltage tolerance about  $\pm 2.5\%$  (2.0V~24V)

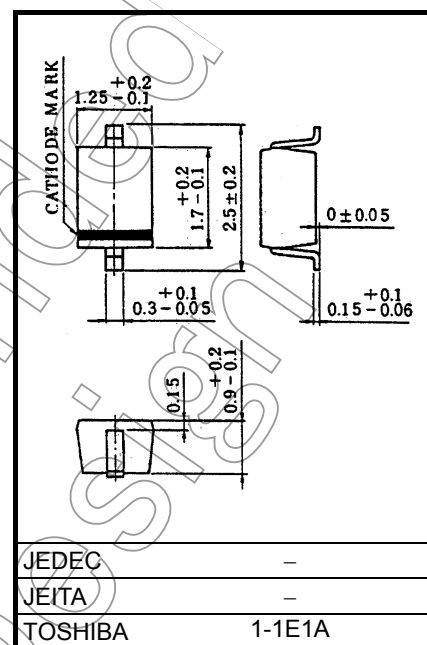
Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

| Characteristic            | Symbol           | Rating  | Unit             |
|---------------------------|------------------|---------|------------------|
| Power dissipation         | $P^*$            | 200     | mW               |
| Junction temperature      | $T_j$            | 125     | $^\circ\text{C}$ |
| Storage temperature range | $T_{\text{stg}}$ | -55~125 | $^\circ\text{C}$ |

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

\*: Mounted on a glass epoxy circuit board of  $20 \times 20\text{mm}$ , pad dimensions of  $4 \times 4\text{mm}$ .



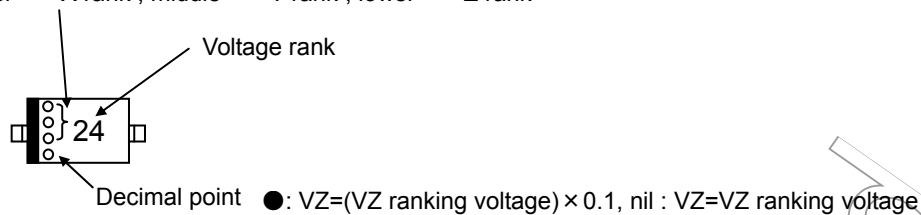
Weight: 4.5mg (typ.)

## Electrical Characteristics

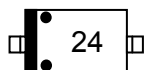
(See Pages 3~5.)

## Marking

VZ additional ranking  
upper ... X rank , middle ... Y rank , lower ... Z rank



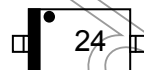
Example1:02DZ2.4-X



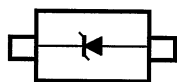
Example2:02DZ2.4-Z



Example3:02DZ24-X



## Pin Assignment (top view)



## Electrical Characteristics (Ta = 25°C)

| Type No.  |   | Zener Voltage        |      |                     | Dynamic Impedance  |                     | Knee Dynamic Impedance |                     | Reverse Current     |                    |
|-----------|---|----------------------|------|---------------------|--------------------|---------------------|------------------------|---------------------|---------------------|--------------------|
|           |   | * V <sub>Z</sub> (V) |      | I <sub>Z</sub> (mA) | Z <sub>Z</sub> (Ω) | I <sub>Z</sub> (mA) | Z <sub>ZK</sub> (Ω)    | I <sub>Z</sub> (mA) | I <sub>R</sub> (μA) | V <sub>R</sub> (V) |
|           |   |                      |      |                     | Max                |                     | Max                    |                     | Max                 |                    |
| 02DZ2.0** | X | 1.85                 | 2.05 | 5                   | 100                | 5                   | 1000                   | 0.5                 | 120                 | 0.5                |
|           | Z | 1.95                 | 2.15 |                     |                    |                     |                        |                     |                     |                    |
| 02DZ2.2** | X | 2.05                 | 2.26 | 5                   | 100                | 5                   | 1000                   | 0.5                 | 120                 | 1.0                |
|           | Z | 2.16                 | 2.38 |                     |                    |                     |                        |                     |                     |                    |
| 02DZ2.4   | X | 2.28                 | 2.50 | 5                   | 100                | 5                   | 1000                   | 0.5                 | 120                 | 1.0                |
|           | Z | 2.40                 | 2.60 |                     |                    |                     |                        |                     |                     |                    |
| 02DZ2.7   | X | 2.50                 | 2.75 | 5                   | 110                | 5                   | 1000                   | 0.5                 | 120                 | 1.0                |
|           | Z | 2.65                 | 2.90 |                     |                    |                     |                        |                     |                     |                    |
| 02DZ3.0   | X | 2.80                 | 3.05 | 5                   | 120                | 5                   | 1000                   | 0.5                 | 50                  | 1.0                |
|           | Z | 2.95                 | 3.20 |                     |                    |                     |                        |                     |                     |                    |
| 02DZ3.3   | X | 3.10                 | 3.35 | 5                   | 130                | 5                   | 1000                   | 0.5                 | 20                  | 1.0                |
|           | Z | 3.25                 | 3.50 |                     |                    |                     |                        |                     |                     |                    |
| 02DZ3.6   | X | 3.40                 | 3.65 | 5                   | 130                | 5                   | 1000                   | 0.5                 | 10                  | 1.0                |
|           | Z | 3.55                 | 3.80 |                     |                    |                     |                        |                     |                     |                    |
| 02DZ3.9   | X | 3.70                 | 3.97 | 5                   | 130                | 5                   | 1000                   | 0.5                 | 10                  | 1.0                |
|           | Z | 3.87                 | 4.10 |                     |                    |                     |                        |                     |                     |                    |
| 02DZ4.3   | X | 4.00                 | 4.23 | 5                   | 130                | 5                   | 1000                   | 0.5                 | 5                   | 1.0                |
|           | Y | 4.13                 | 4.35 |                     |                    |                     |                        |                     |                     |                    |
|           | Z | 4.25                 | 4.50 |                     |                    |                     |                        |                     |                     |                    |
| 02DZ4.7   | X | 4.40                 | 4.63 | 5                   | 120                | 5                   | 1000                   | 0.5                 | 5                   | 1.0                |
|           | Y | 4.53                 | 4.76 |                     |                    |                     |                        |                     |                     |                    |
|           | Z | 4.66                 | 4.90 |                     |                    |                     |                        |                     |                     |                    |
| 02DZ5.1   | X | 4.80                 | 5.07 | 5                   | 70                 | 5                   | 1000                   | 0.5                 | 1                   | 1.5                |
|           | Y | 4.97                 | 5.24 |                     |                    |                     |                        |                     |                     |                    |
|           | Z | 5.14                 | 5.40 |                     |                    |                     |                        |                     |                     |                    |
| 02DZ5.6   | X | 5.30                 | 5.63 | 5                   | 40                 | 5                   | 900                    | 0.5                 | 1                   | 2.5                |
|           | Y | 5.43                 | 5.81 |                     |                    |                     |                        |                     |                     |                    |
|           | Z | 5.61                 | 6.00 |                     |                    |                     |                        |                     |                     |                    |
| 02DZ6.2   | X | 5.80                 | 6.20 | 5                   | 30                 | 5                   | 500                    | 0.5                 | 1                   | 3.0                |
|           | Y | 6.00                 | 6.39 |                     |                    |                     |                        |                     |                     |                    |
|           | Z | 6.19                 | 6.60 |                     |                    |                     |                        |                     |                     |                    |

\*: Test time: t = 30ms

\*\*: Product by order

## Electrical Characteristics (Ta = 25°C)

| Type No. |   | Zener Voltage        |       |                     | Dynamic Impedance  |                     | Knee Dynamic Impedance |                     | Reverse Current     |                    |
|----------|---|----------------------|-------|---------------------|--------------------|---------------------|------------------------|---------------------|---------------------|--------------------|
|          |   | * V <sub>Z</sub> (V) |       | I <sub>Z</sub> (mA) | Z <sub>Z</sub> (Ω) | I <sub>Z</sub> (mA) | Z <sub>ZK</sub> (Ω)    | I <sub>Z</sub> (mA) | I <sub>R</sub> (μA) | V <sub>R</sub> (V) |
|          |   | Min                  | Max   |                     | Max                |                     | Max                    |                     | Max                 |                    |
| 02DZ6.8  | X | 6.40                 | 6.80  | 5                   | 25                 | 5                   | 150                    | 0.5                 | 0.5                 | 5.0                |
|          | Y | 6.60                 | 7.02  |                     |                    |                     |                        |                     |                     |                    |
|          | Z | 6.82                 | 7.20  |                     |                    |                     |                        |                     |                     |                    |
| 02DZ7.5  | X | 7.00                 | 7.43  | 5                   | 23                 | 5                   | 120                    | 0.5                 | 0.5                 | 6.0                |
|          | Y | 7.23                 | 7.66  |                     |                    |                     |                        |                     |                     |                    |
|          | Z | 7.46                 | 7.90  |                     |                    |                     |                        |                     |                     |                    |
| 02DZ8.2  | X | 7.70                 | 8.16  | 5                   | 20                 | 5                   | 120                    | 0.5                 | 0.5                 | 6.5                |
|          | Y | 7.96                 | 8.43  |                     |                    |                     |                        |                     |                     |                    |
|          | Z | 8.23                 | 8.70  |                     |                    |                     |                        |                     |                     |                    |
| 02DZ9.1  | X | 8.50                 | 9.00  | 5                   | 18                 | 5                   | 120                    | 0.5                 | 0.5                 | 7.0                |
|          | Y | 8.80                 | 9.30  |                     |                    |                     |                        |                     |                     |                    |
|          | Z | 9.10                 | 9.60  |                     |                    |                     |                        |                     |                     |                    |
| 02DZ10   | X | 9.40                 | 9.93  | 5                   | 15                 | 5                   | 120                    | 0.5                 | 0.5                 | 8.0                |
|          | Y | 9.73                 | 10.26 |                     |                    |                     |                        |                     |                     |                    |
|          | Z | 10.06                | 10.60 |                     |                    |                     |                        |                     |                     |                    |
| 02DZ11   | X | 10.40                | 10.98 | 5                   | 15                 | 5                   | 120                    | 0.5                 | 0.5                 | 8.5                |
|          | Y | 10.73                | 11.26 |                     |                    |                     |                        |                     |                     |                    |
|          | Z | 11.06                | 11.60 |                     |                    |                     |                        |                     |                     |                    |
| 02DZ12   | X | 11.40                | 11.93 | 5                   | 15                 | 5                   | 110                    | 0.5                 | 0.5                 | 9.0                |
|          | Y | 11.73                | 12.26 |                     |                    |                     |                        |                     |                     |                    |
|          | Z | 12.06                | 12.60 |                     |                    |                     |                        |                     |                     |                    |
| 02DZ13   | X | 12.40                | 13.08 | 5                   | 15                 | 5                   | 110                    | 0.5                 | 0.5                 | 10                 |
|          | Y | 12.88                | 13.57 |                     |                    |                     |                        |                     |                     |                    |
|          | Z | 13.37                | 14.10 |                     |                    |                     |                        |                     |                     |                    |
| 02DZ15   | X | 13.80                | 14.63 | 5                   | 15                 | 5                   | 110                    | 0.5                 | 0.5                 | 11                 |
|          | Y | 14.33                | 15.11 |                     |                    |                     |                        |                     |                     |                    |
|          | Z | 14.81                | 15.60 |                     |                    |                     |                        |                     |                     |                    |
| 02DZ16   | X | 15.30                | 16.10 | 5                   | 18                 | 5                   | 150                    | 0.5                 | 0.5                 | 12                 |
|          | Y | 15.80                | 16.60 |                     |                    |                     |                        |                     |                     |                    |
|          | Z | 16.30                | 17.10 |                     |                    |                     |                        |                     |                     |                    |
| 02DZ18   | X | 16.80                | 17.76 | 5                   | 20                 | 5                   | 150                    | 0.5                 | 0.5                 | 14                 |
|          | Y | 17.46                | 18.43 |                     |                    |                     |                        |                     |                     |                    |
|          | Z | 18.13                | 19.10 |                     |                    |                     |                        |                     |                     |                    |

\*: Test time: t = 30ms

\*\*: Product by order

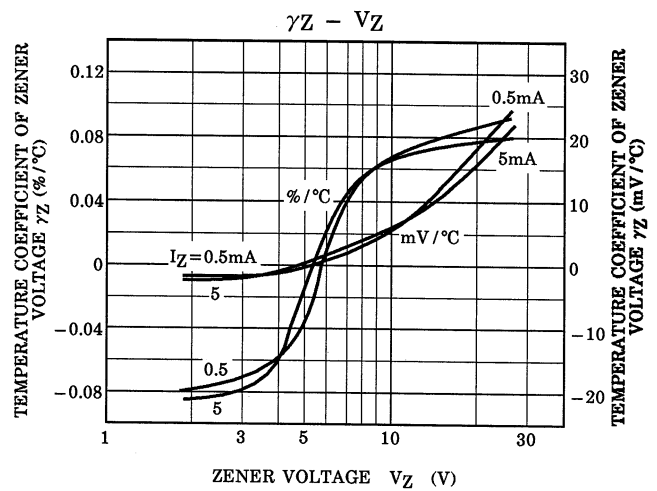
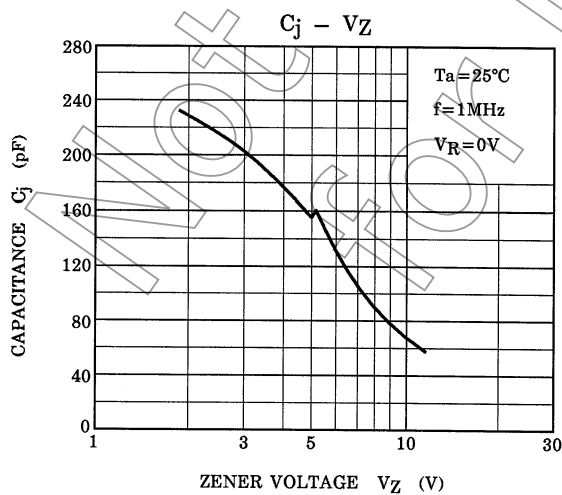
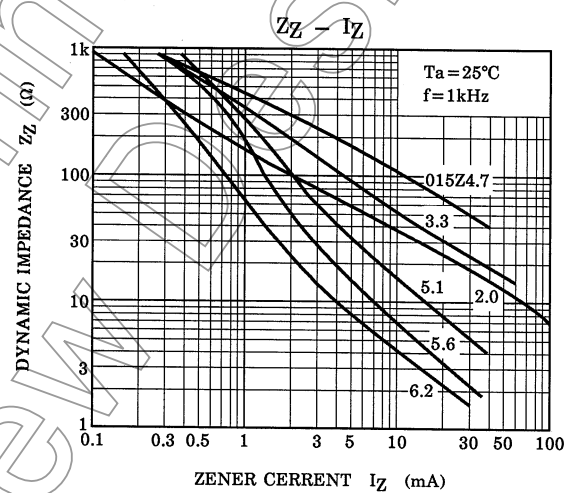
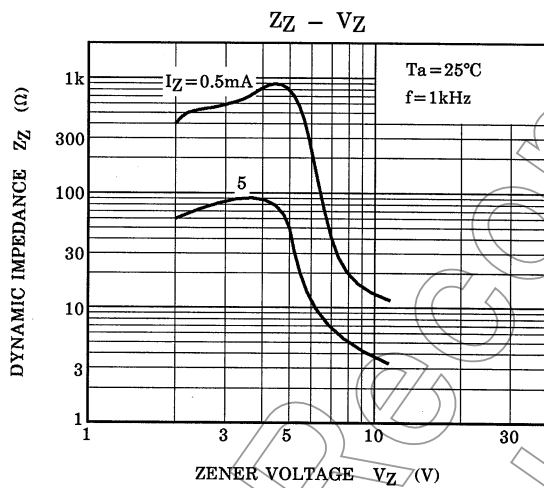
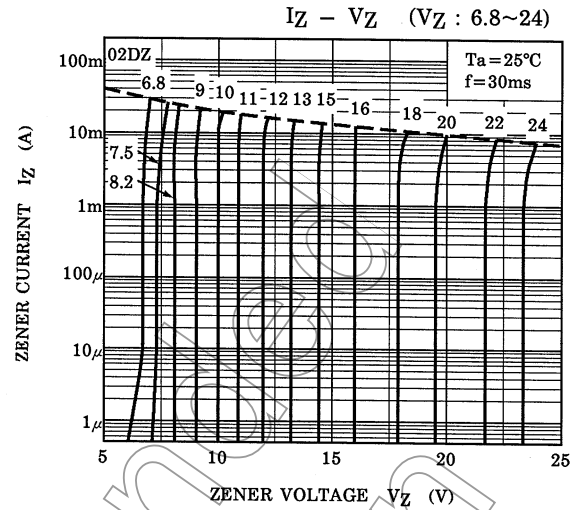
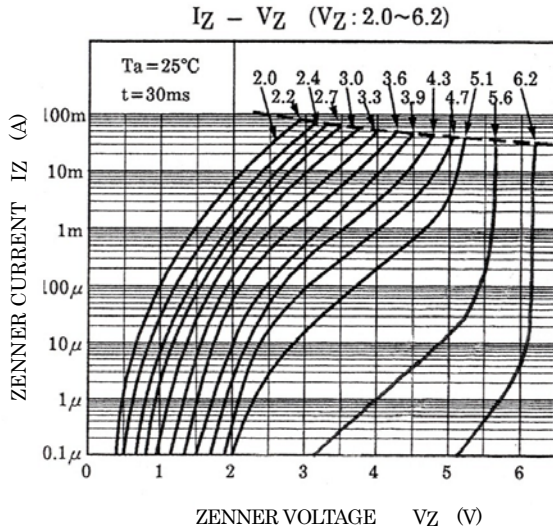
**Electrical Characteristics (Ta = 25°C)**

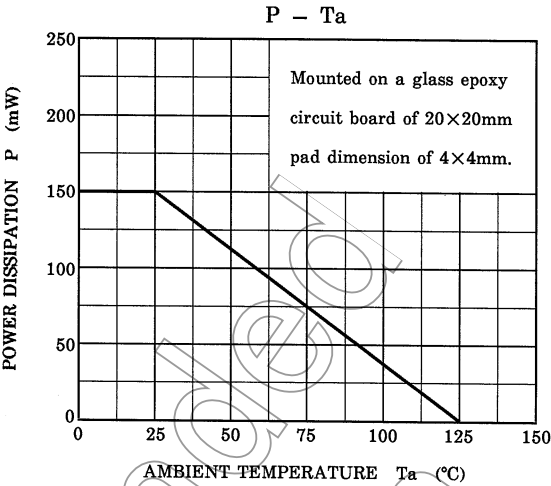
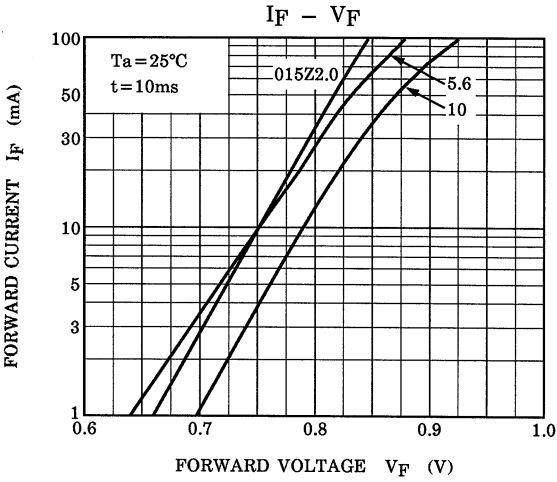
| Type No. |   | Zener Voltage        |       | I <sub>Z</sub><br>(mA) | Dynamic Impedance  |                        | Knee Dynamic Impedance |                        | Reverse Current     |                       |
|----------|---|----------------------|-------|------------------------|--------------------|------------------------|------------------------|------------------------|---------------------|-----------------------|
|          |   | * V <sub>Z</sub> (V) |       |                        | Z <sub>Z</sub> (Ω) | I <sub>Z</sub><br>(mA) | Z <sub>ZK</sub> (Ω)    | I <sub>Z</sub><br>(mA) | I <sub>R</sub> (μA) | V <sub>R</sub><br>(V) |
|          |   | Min                  | Max   |                        | Max                |                        | Max                    |                        | Max                 |                       |
| 02DZ20   | X | 18.80                | 19.78 | 5                      | 25                 | 5                      | 200                    | 0.5                    | 0.5                 | 15                    |
|          | Y | 19.48                | 20.46 |                        |                    |                        |                        |                        |                     |                       |
|          | Z | 20.16                | 21.20 |                        |                    |                        |                        |                        |                     |                       |
| 02DZ22   | X | 20.80                | 21.88 | 5                      | 30                 | 5                      | 200                    | 0.5                    | 0.5                 | 17                    |
|          | Y | 21.48                | 22.56 |                        |                    |                        |                        |                        |                     |                       |
|          | Z | 22.16                | 23.30 |                        |                    |                        |                        |                        |                     |                       |
| 02DZ24   | X | 22.80                | 24.11 | 5                      | 40                 | 5                      | 200                    | 0.5                    | 0.5                 | 19                    |
|          | Y | 23.61                | 24.92 |                        |                    |                        |                        |                        |                     |                       |
|          | Z | 24.42                | 25.60 |                        |                    |                        |                        |                        |                     |                       |

\*: Test time: t = 30ms

\*\*: Product by order

Not Recommended for New Design





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