

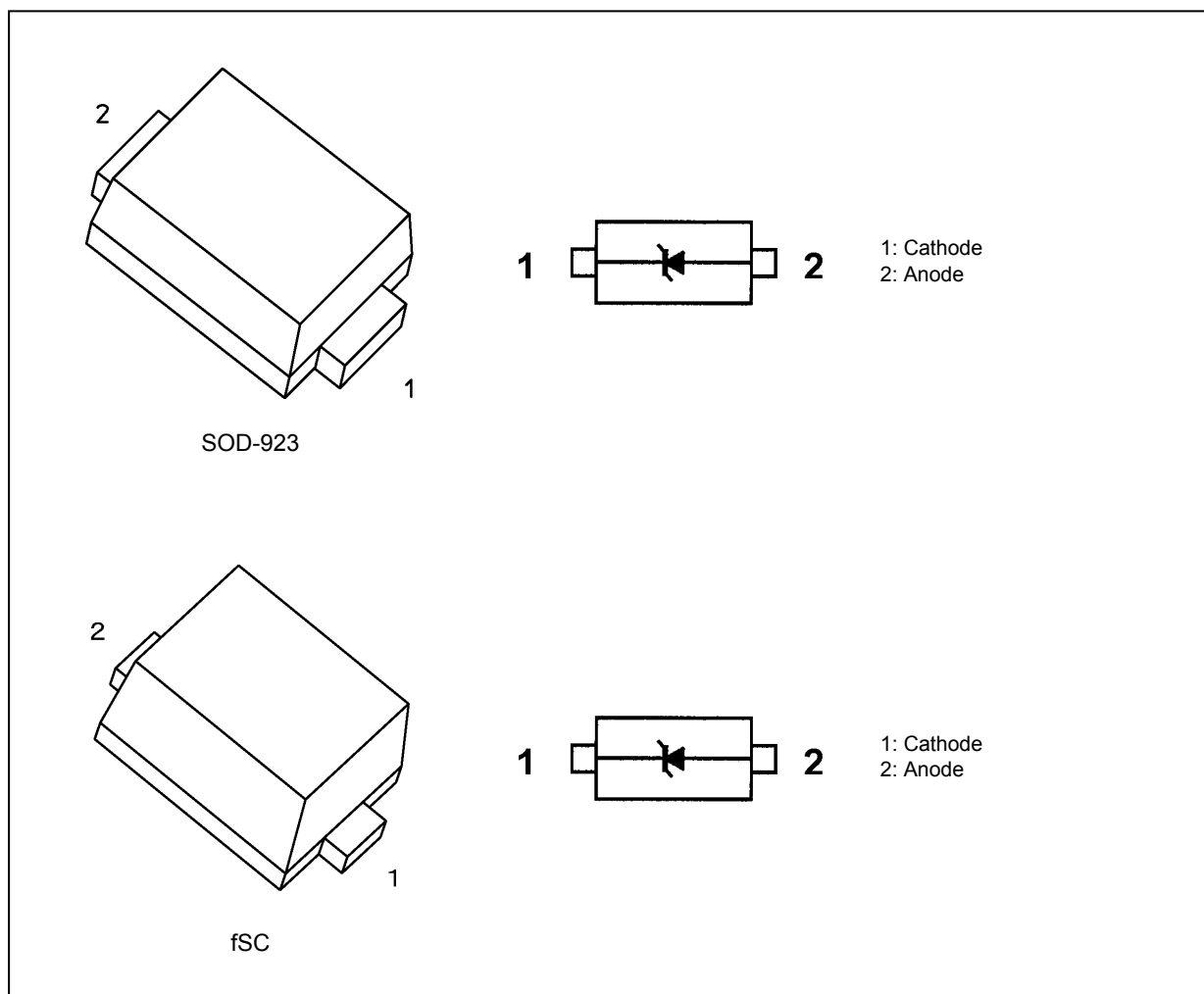
# DF2S24FS

## 1. Applications

- ESD Protection

Note: This product is designed for protection against electrostatic discharge (ESD) and is not intended for any other purpose, including, but not limited to, voltage regulation.

## 2. Packaging and Internal Circuit



The SOD-923 package is recommended.

| Package | Product name                |
|---------|-----------------------------|
| SOD-923 | DF2S24FS,L3M (Note 1)       |
| fSC     | DF2S24FS,L3J , DF2S24FS,L3F |

Note 1: The product name of the devices housed in the SOD-923 package are suffixed with the "M".

Start of commercial production

2013-12

### 3. Absolute Maximum Ratings (Note) (Unless otherwise specified, $T_a = 25^\circ\text{C}$ )

| Characteristics                                         | Symbol           | Rating     | Unit             |
|---------------------------------------------------------|------------------|------------|------------------|
| Electrostatic discharge voltage (IEC61000-4-2)(Contact) | $V_{\text{ESD}}$ | $\pm 10$   | kV               |
| Junction temperature                                    | $T_j$            | 150        | $^\circ\text{C}$ |
| Storage temperature                                     | $T_{\text{stg}}$ | -55 to 150 | $^\circ\text{C}$ |

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.).

### 4. Electrical Characteristics (Unless otherwise specified, $T_a = 25^\circ\text{C}$ )

$V_{\text{RWM}}$ : Working peak reverse voltage  
 $V_Z$ : Zener voltage  
 $V_{\text{BR}}$ : Reverse breakdown voltage  
 $Z_Z$ : Dynamic impedance  
 $I_Z$ : Zener current  
 $I_{\text{BR}}$ : Reverse breakdown current  
 $I_R$ : Reverse current  
 $V_C$ : Clamp voltage  
 $I_{\text{PP}}$ : Peak pulse current  
 $R_{\text{DYN}}$ : Dynamic resistance  
 $I_F$ : Forward current  
 $V_F$ : Forward voltage

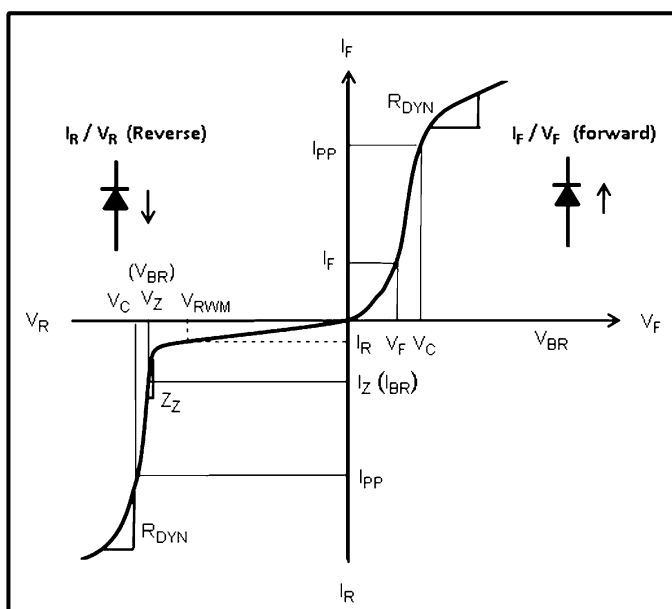


Fig. 4.1 Definitions of Electrical Characteristics

| Characteristics                              | Symbol                       | Note | Test Condition                              | Min  | Typ. | Max  | Unit          |
|----------------------------------------------|------------------------------|------|---------------------------------------------|------|------|------|---------------|
| Working peak reverse voltage                 | $V_{\text{RWM}}$             |      | —                                           | —    | —    | 19   | V             |
| Zener voltage<br>(Reverse breakdown voltage) | $V_Z$<br>( $V_{\text{BR}}$ ) |      | $I_Z = 5 \text{ mA}$<br>( $I_{\text{BR}}$ ) | 22.8 | 24.0 | 25.6 | V             |
| Dynamic impedance                            | $Z_Z$                        |      | $I_Z = 5 \text{ mA}$<br>( $I_{\text{BR}}$ ) | —    | —    | 70   | $\Omega$      |
| Reverse current                              | $I_R$                        |      | $V_{\text{RWM}} = 19 \text{ V}$             | —    | —    | 0.5  | $\mu\text{A}$ |
| Total capacitance                            | $C_t$                        |      | $V_R = 0 \text{ V}$ , $f = 1 \text{ MHz}$   | —    | 8.5  | —    | pF            |

## 5. Guaranteed ESD Protection (Note)

| Test Condition                   | ESD Protection |
|----------------------------------|----------------|
| IEC61000-4-2 (Contact discharge) | $\pm 10$ kV    |

Note: Criterion: No damage to devices.

## 6. Marking

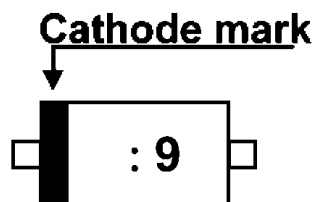


Fig. 6.1 Marking

## 7. Land Pattern Dimensions (for reference only)

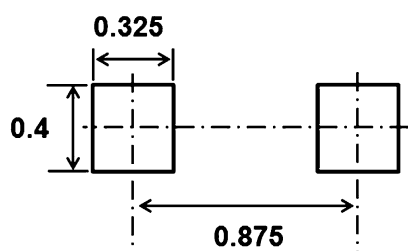


Fig. 7.1 SOD-923 (unit: mm)

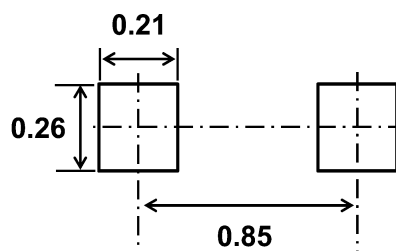
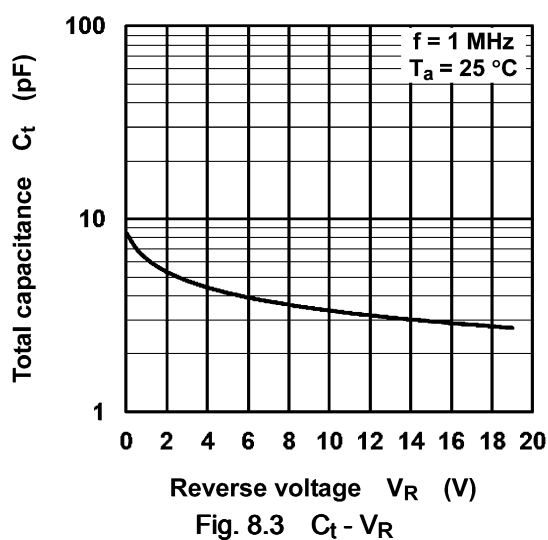
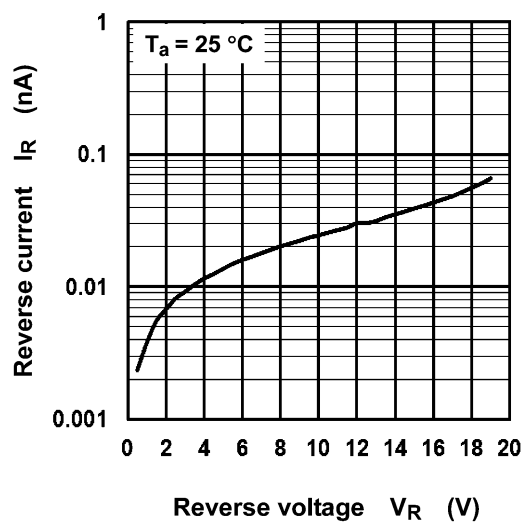
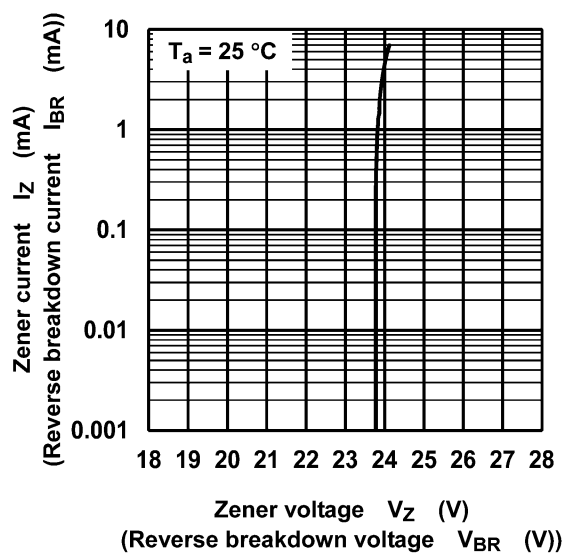


Fig. 7.2 fSC (unit: mm)

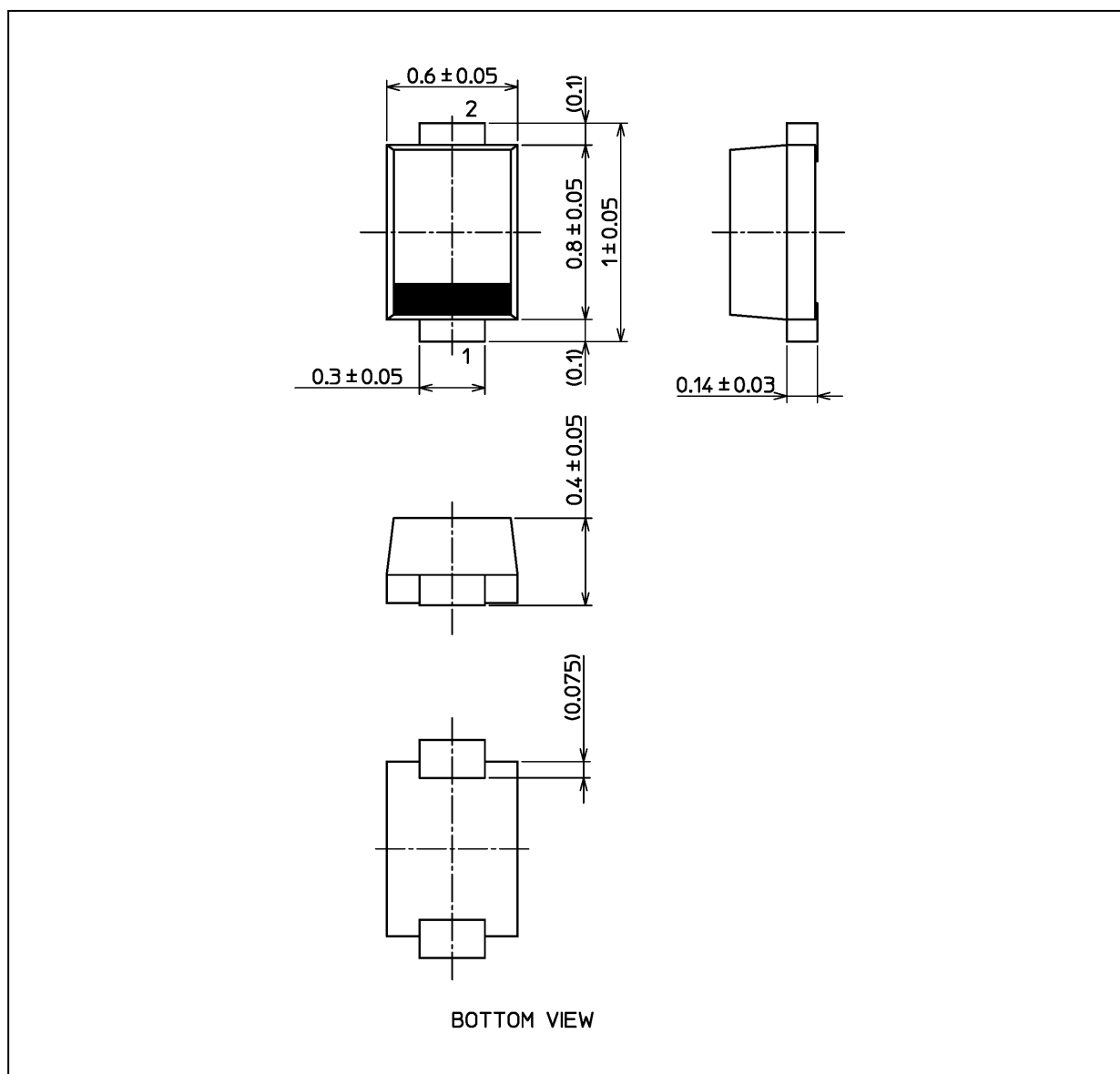
# 8. Characteristics Curves (Note)



Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

## Package Dimensions

Unit: mm



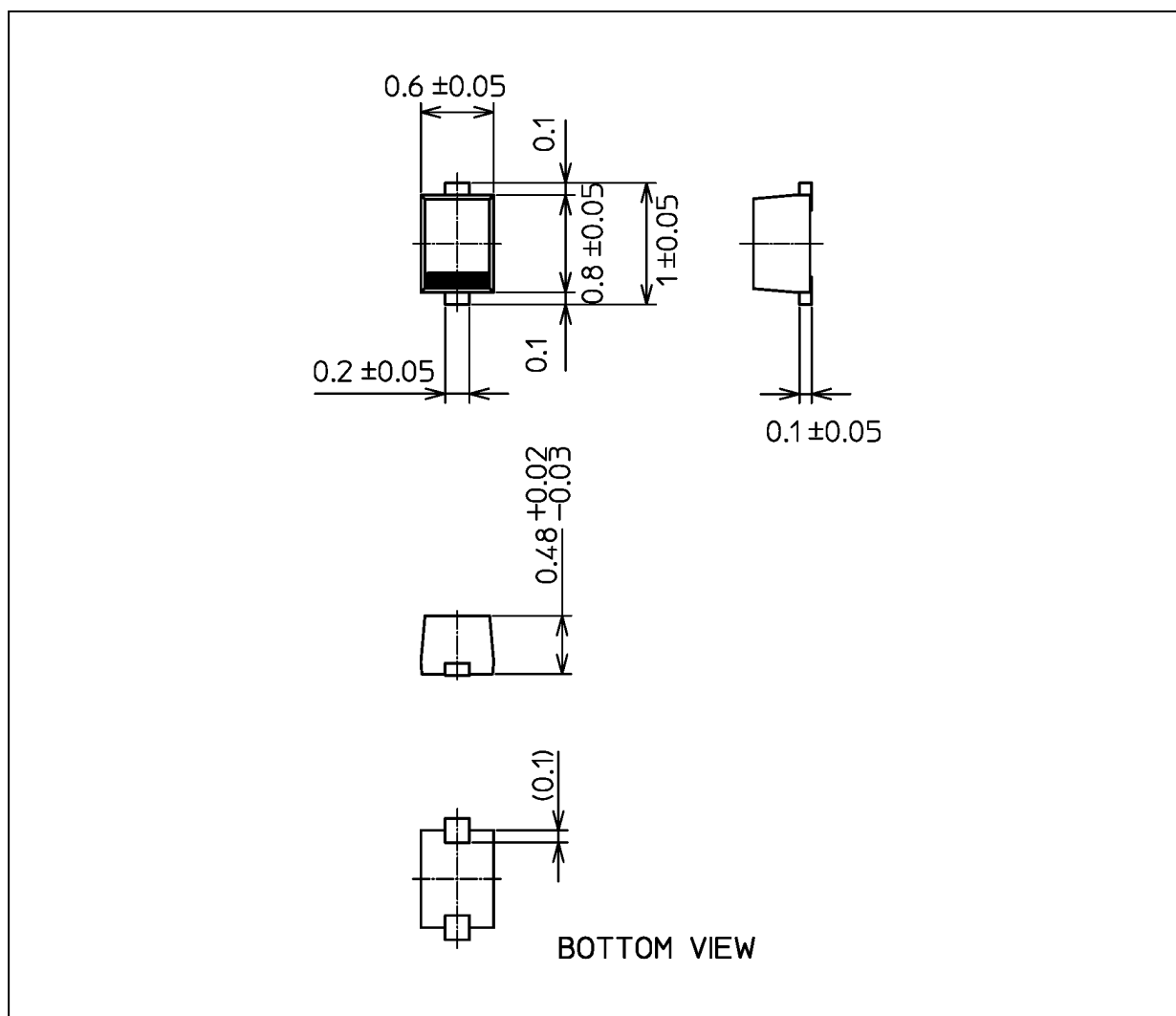
The shapes and dimensions of the package vary, depending on the manufacturing plant. For details, contact the Toshiba sales representative.

Weight: 0.55 mg (typ.)

| Package Name(s)   |
|-------------------|
| TOSHIBA: 1-1AH1A  |
| Nickname: SOD-923 |

## Package Dimensions

Unit: mm



The shapes and dimensions of the package vary, depending on the manufacturing plant. For details, contact the Toshiba sales representative.

Weight: 0.6 mg (typ.)

| Package Name(s) |
|-----------------|
| TOSHIBA: 1-1L1S |
| Nickname: fSC   |

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