

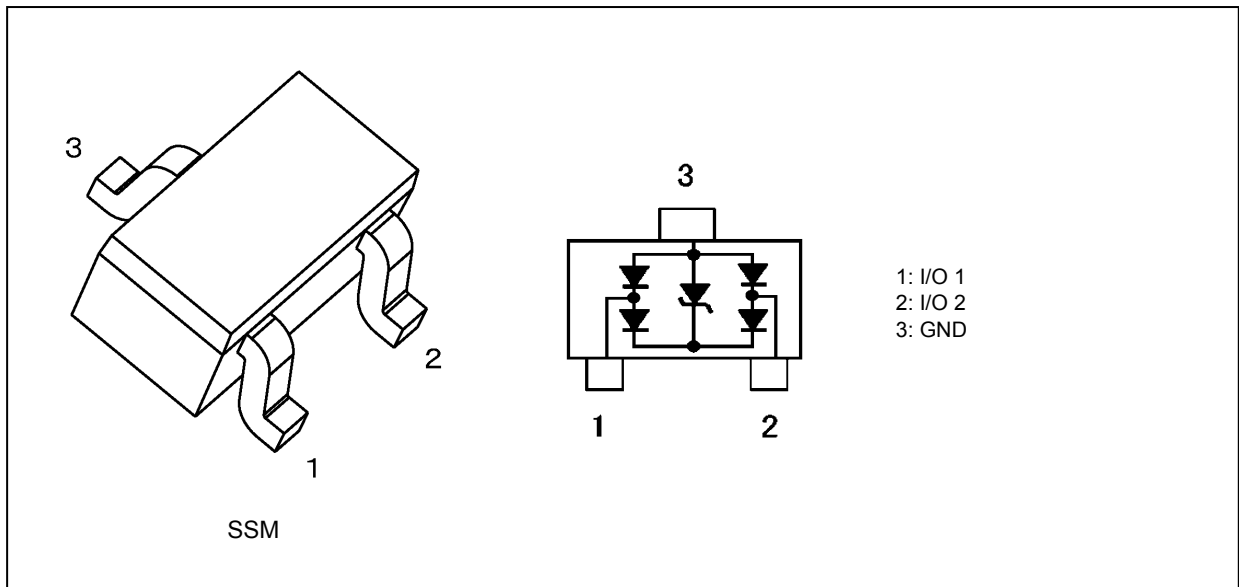
# DF3D6.8MS

## 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



## 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) | $V_{ESD}$ | $\pm 8$    | kV               |
| Junction temperature                                    | $T_j$     | 150        | $^\circ\text{C}$ |
| Storage temperature                                     | $T_{stg}$ | -55 to 150 | $^\circ\text{C}$ |

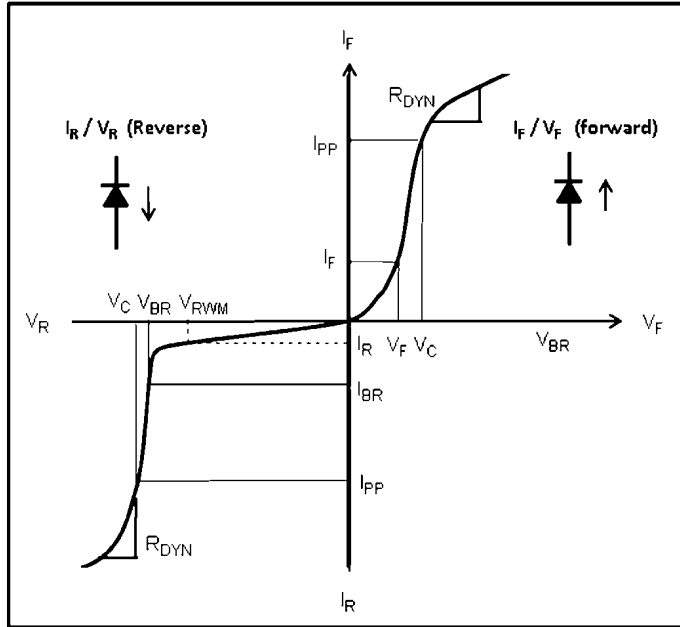
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

Start of commercial production  
2013-09

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

$V_{RWM}$ : Working peak reverse voltage  
 $V_{BR}$ : Reverse breakdown voltage  
 $I_{BR}$ : Reverse breakdown current  
 $I_R$ : Reverse current  
 $V_C$ : Clamp voltage  
 $I_{PP}$ : Peak pulse current  
 $R_{DYN}$ : 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                  | $V_{RWM}$          |          | —   | —   | —    | 5   | V             |
| Reverse breakdown voltage                     | $V_{BR}$           |          | $I_{BR} = 5 \text{ mA}$   | 6   | —    | —   | V             |
| Reverse current                               | $I_R$              |          | $V_{RWM} = 5 \text{ V}$   | —   | —    | 0.5 | $\mu\text{A}$ |
| Clamp voltage                                 | $V_C$              | (Note 1) | $I_{PP} = 1 \text{ A}$  | —   | 11   | —   | V             |
| Input/output-to-ground capacitance            | $C_{I-GND}$        | (Note 2) | $V_R = 0 \text{ V}$ , $f = 1 \text{ MHz}$<br>(Between I/O and GND pins) | —   | 0.5  | 0.9 | pF            |
| Input/output-to-ground capacitance difference | $\Delta C_{I-GND}$ |          | $V_R = 0 \text{ V}$ , $f = 1 \text{ MHz}$<br>(Between I/O and GND pins) | —   | 0.01 | —   |               |
| Total capacitance                             | $C_t$              | (Note 2) | $V_R = 0 \text{ V}$ , $f = 1 \text{ MHz}$<br>(Between I/O and I/O pins) | —   | 0.22 | 0.5 | pF            |

Note 1: Based on IEC61000-4-5 8/20  $\mu\text{s}$  pulse.

Note 2: Guaranteed by design.

**5. Guaranteed ESD Protection (Note)**

| Test Condition                   | ESD Protection     |
|----------------------------------|--------------------|
| IEC61000-4-2 (Contact discharge) | $\pm 8 \text{ kV}$ |

Note: Criterion: No damage to devices.

6. Marking

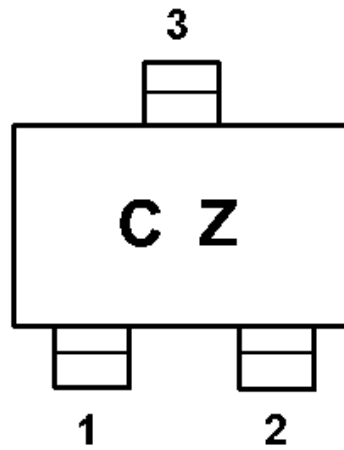


Fig. 6.1 Marking

| Marking Code | Part Number |
|--------------|-------------|
| CZ           | DF3D6.8MS   |

7. Land Pattern Dimensions (for reference only)

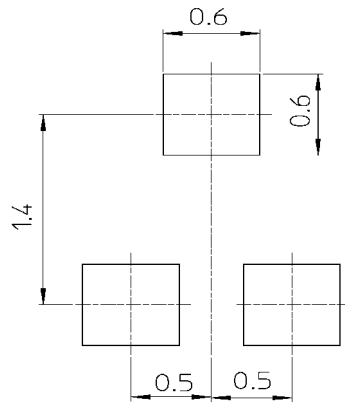
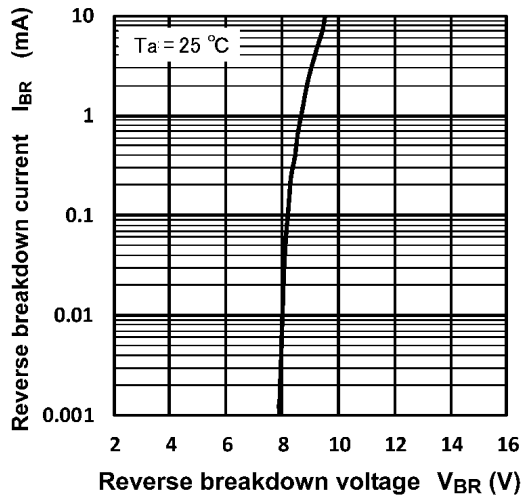
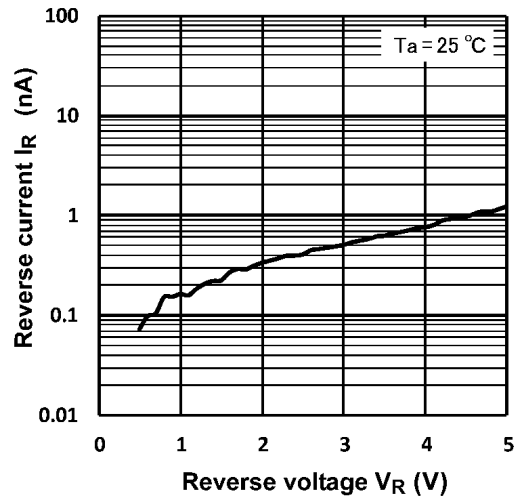


Fig. 7.1 Land Pattern Dimensions (Unit: mm)

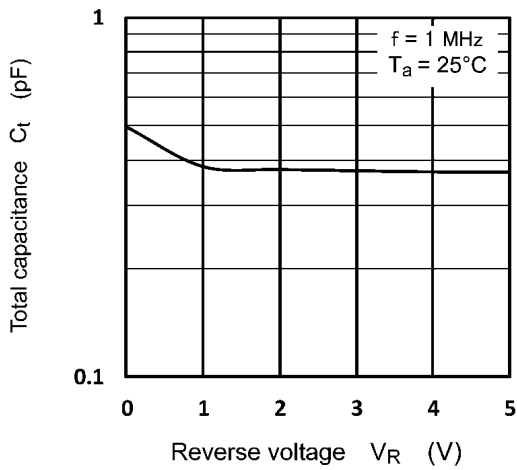
**8. Characteristics Curves (Note)**



**Fig. 8.1  $I_{BR} - V_{BR}$**



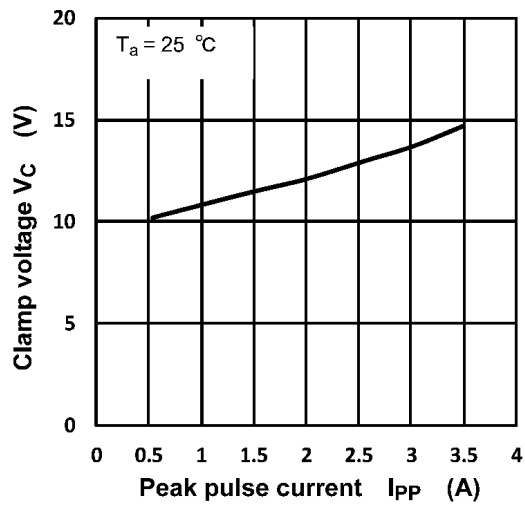
**Fig. 8.2  $I_R - V_R$**



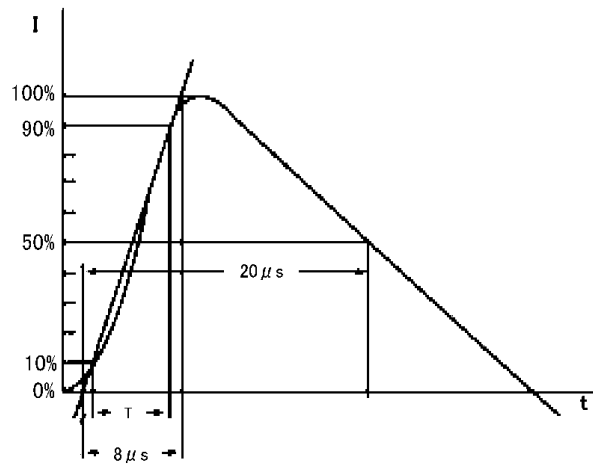
**Fig. 8.3  $C_t - V_R$**

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

**9. Clamp Voltage  $V_C$  - Peak Pulse Current ( $I_{PP}$ ) (Note)**



**Fig. 9.1  $V_C$  -  $I_{PP}$**



**Fig. 9.2 Based on IEC61000-4-5 8/20  $\mu\text{s}$  pulse.**

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

10. ESD Clamp Waveform (Note)

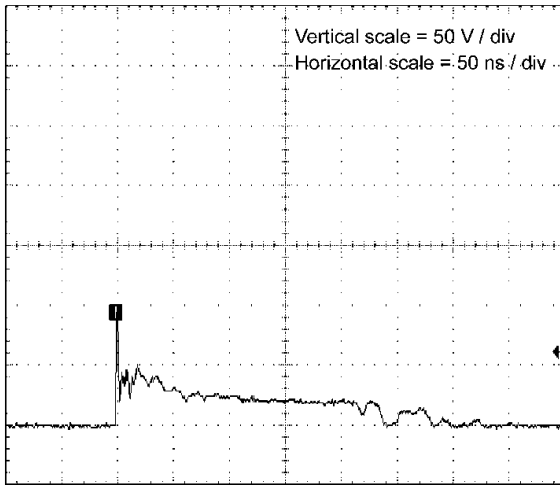


Fig. 10.1 +8 kV

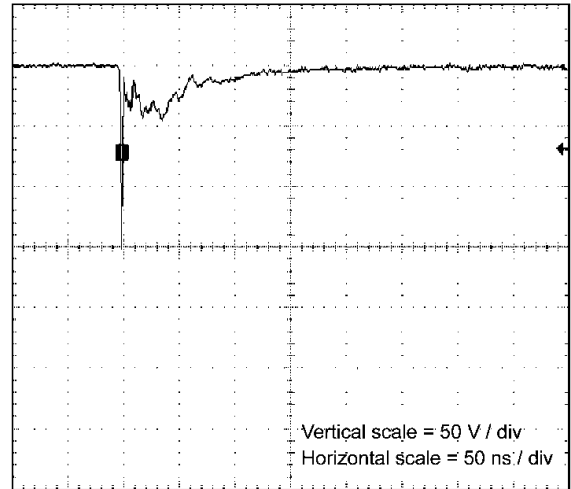


Fig. 10.2 -8 kV

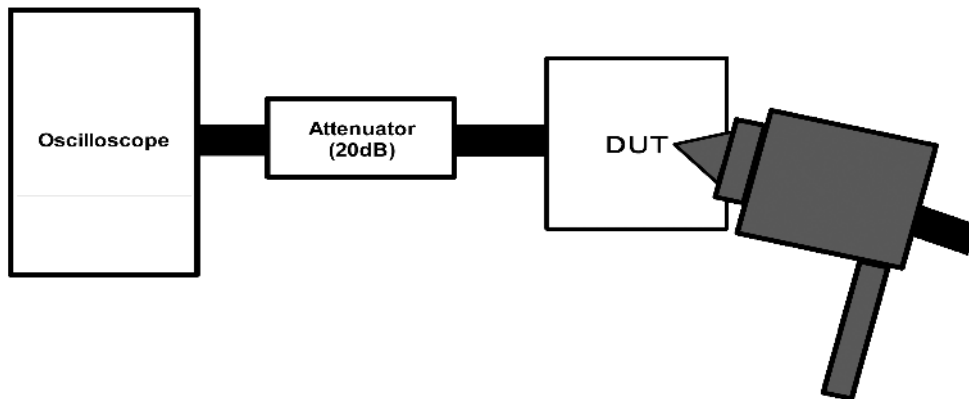
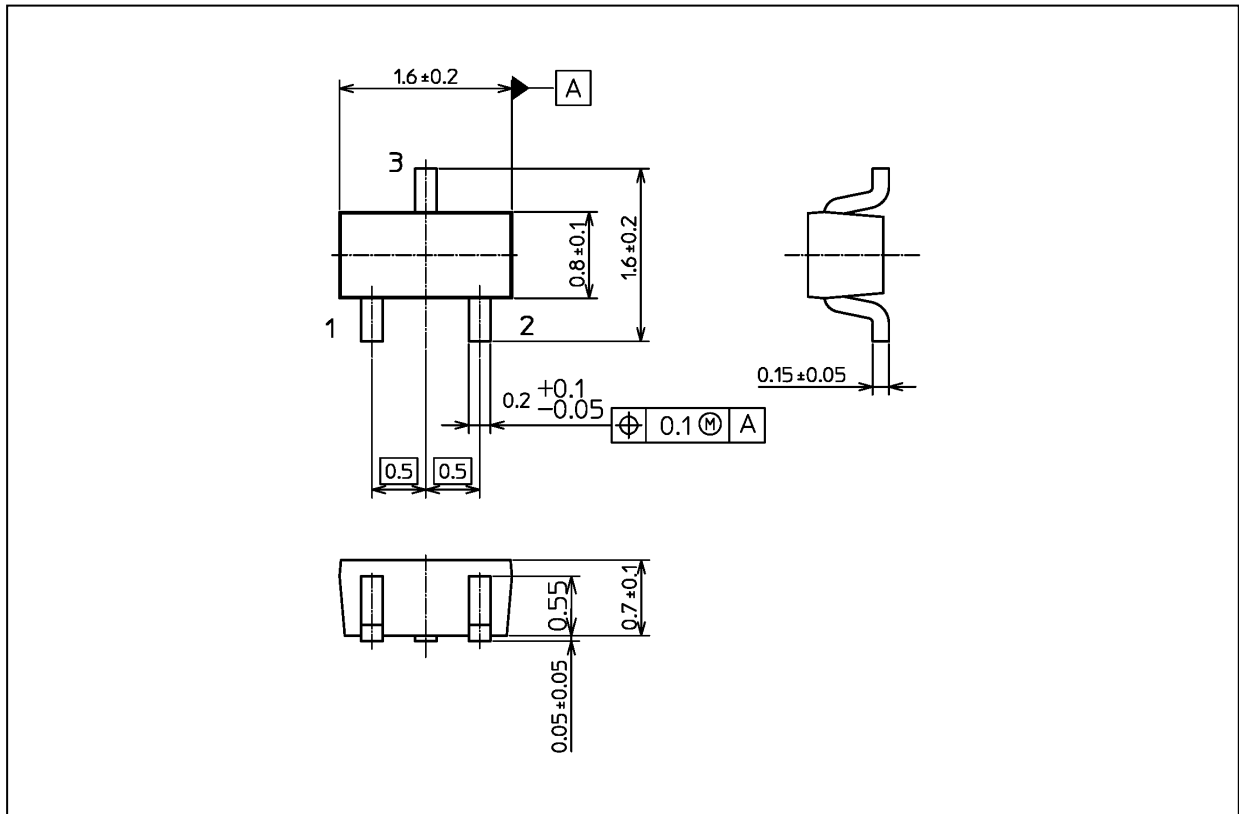


Fig. 10.3 IEC61000-4-2 (Contact)

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

Package Dimensions

Unit: mm



Weight: 2.4 mg (typ.)

| Package Name(s) |
|-----------------|
| TOSHIBA: 2-2H1S |
| Nickname: SSM   |

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