

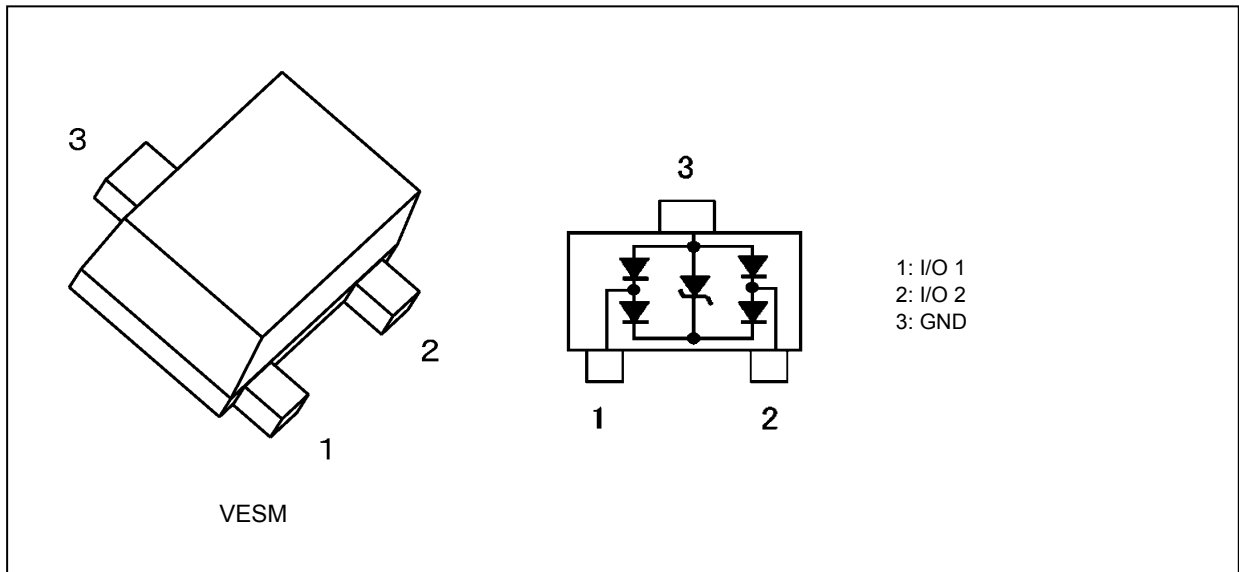
# DF3D6.8MFV

## 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, $T_a = 25^\circ\text{C}$ )

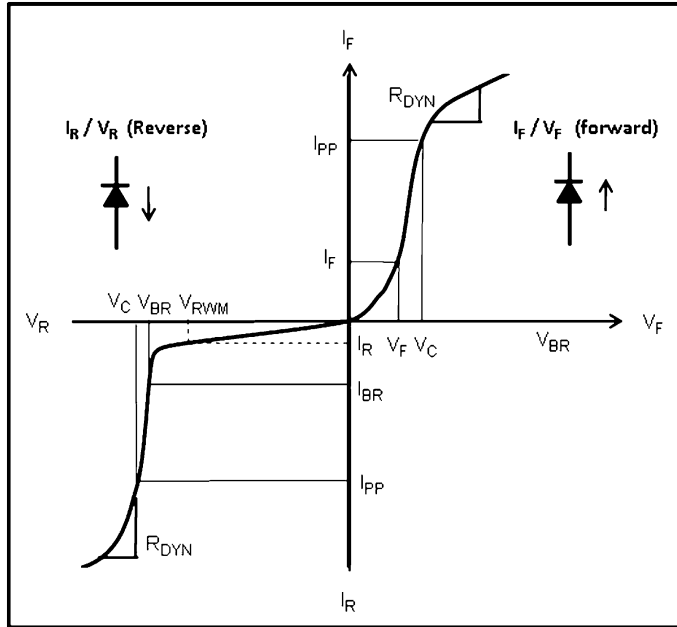
Characteristics	Symbol	Rating	Unit
Electrostatic discharge voltage (IEC61000-4-2)(Contact)	$V_{ESD}$	$\pm 8$	kV
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to 150	$^\circ\text{C}$

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).

**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)	$I_{PP} = 1 \text{ A}$	—	15	—	V
Input/output-to-ground capacitance	$C_{I-GND}$	(Note 2)	$V_R = 0 \text{ V}$ , $f = 1 \text{ MHz}$ (Between I/O and GND pins)	—	0.5	0.9	pF
Input/output-to-ground capacitance difference	$\Delta C_{I-GND}$		$V_R = 0 \text{ V}$ , $f = 1 \text{ MHz}$ (Between I/O and GND pins)	—	0.01	—	
Total capacitance	$C_t$	(Note 2)	$V_R = 0 \text{ V}$ , $f = 1 \text{ MHz}$ (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

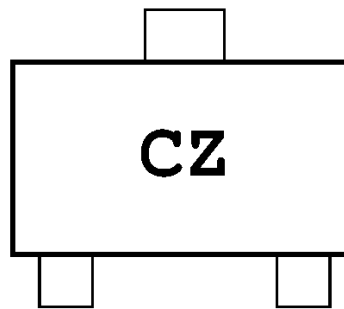


Fig. 6.1 Marking

Marking Code	Part Number
CZ	DF3D6.8MFV

7. Land Pattern Dimensions (for reference only)

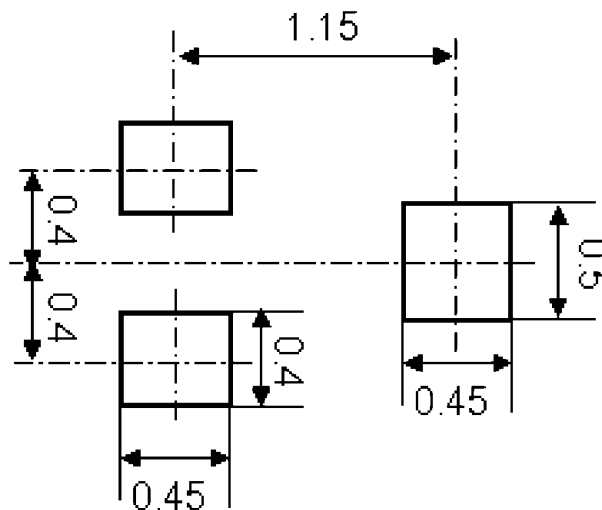
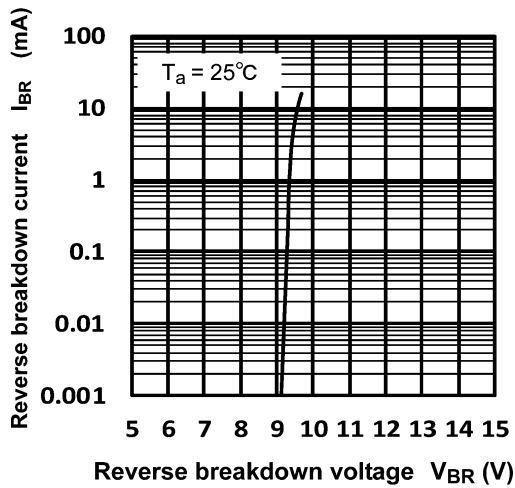
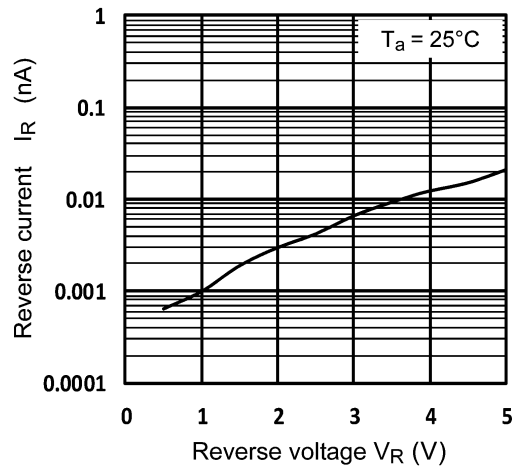


Fig. 7.1 Land Pattern Dimensions (Unit: mm)

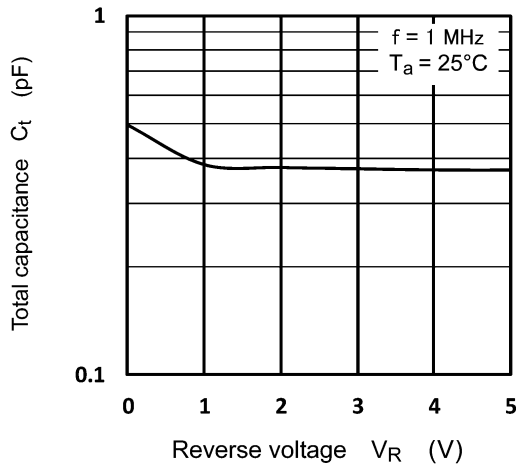
**8. Characteristics Curves (Note)**



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



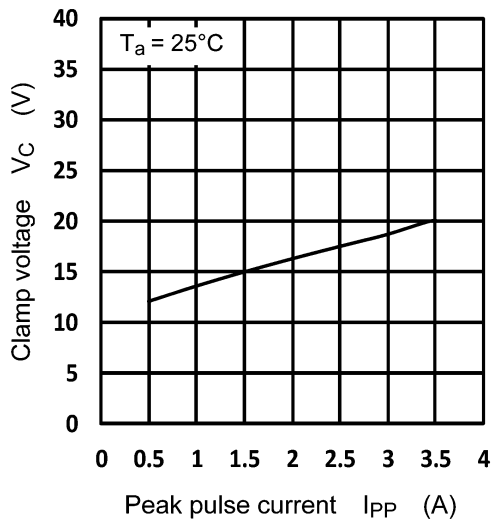
**Fig. 8.2  $I_R - V_R$**



**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)**



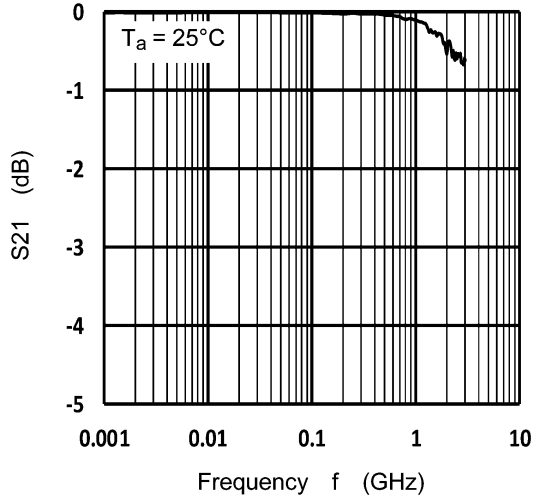
**Fig. 9.1  $V_C$  -  $I_{PP}$**



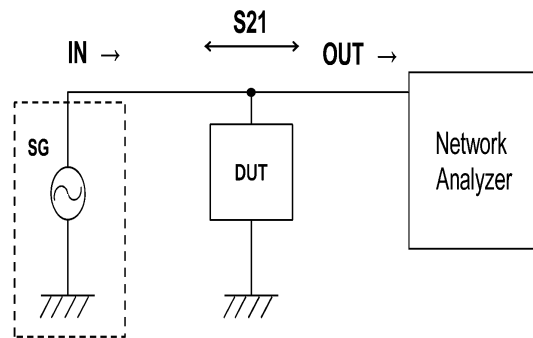
**Fig. 9.2 Based on IEC61000-4-5 8/20  $\mu$ s pulse.**

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

**10. Insertion Loss ( $S_{21}$ ) (Note)**



**Fig. 10.1  $S_{21}$  - f**



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

11. ESD Clamp Waveform (Note)

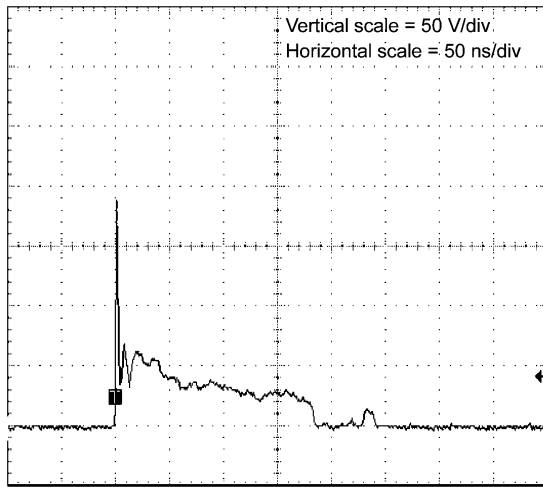


Fig. 11.1 +8 kV

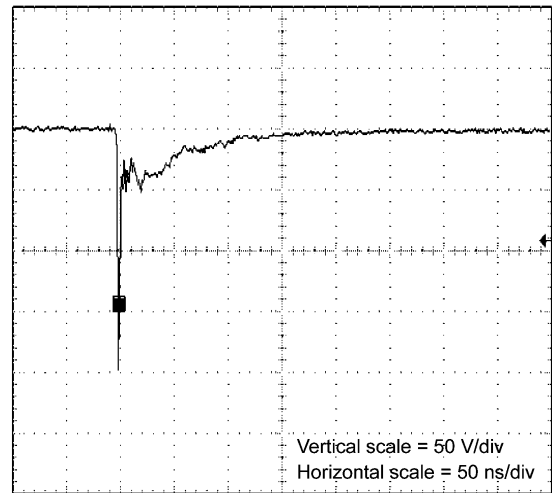


Fig. 11.2 -8 kV

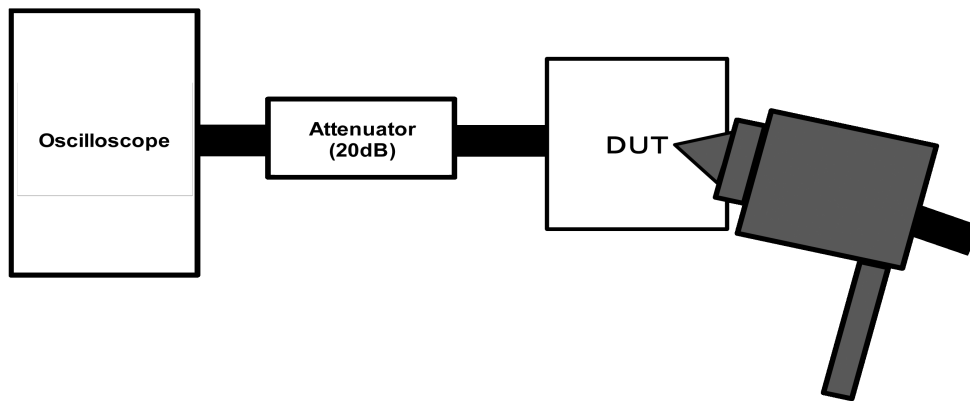
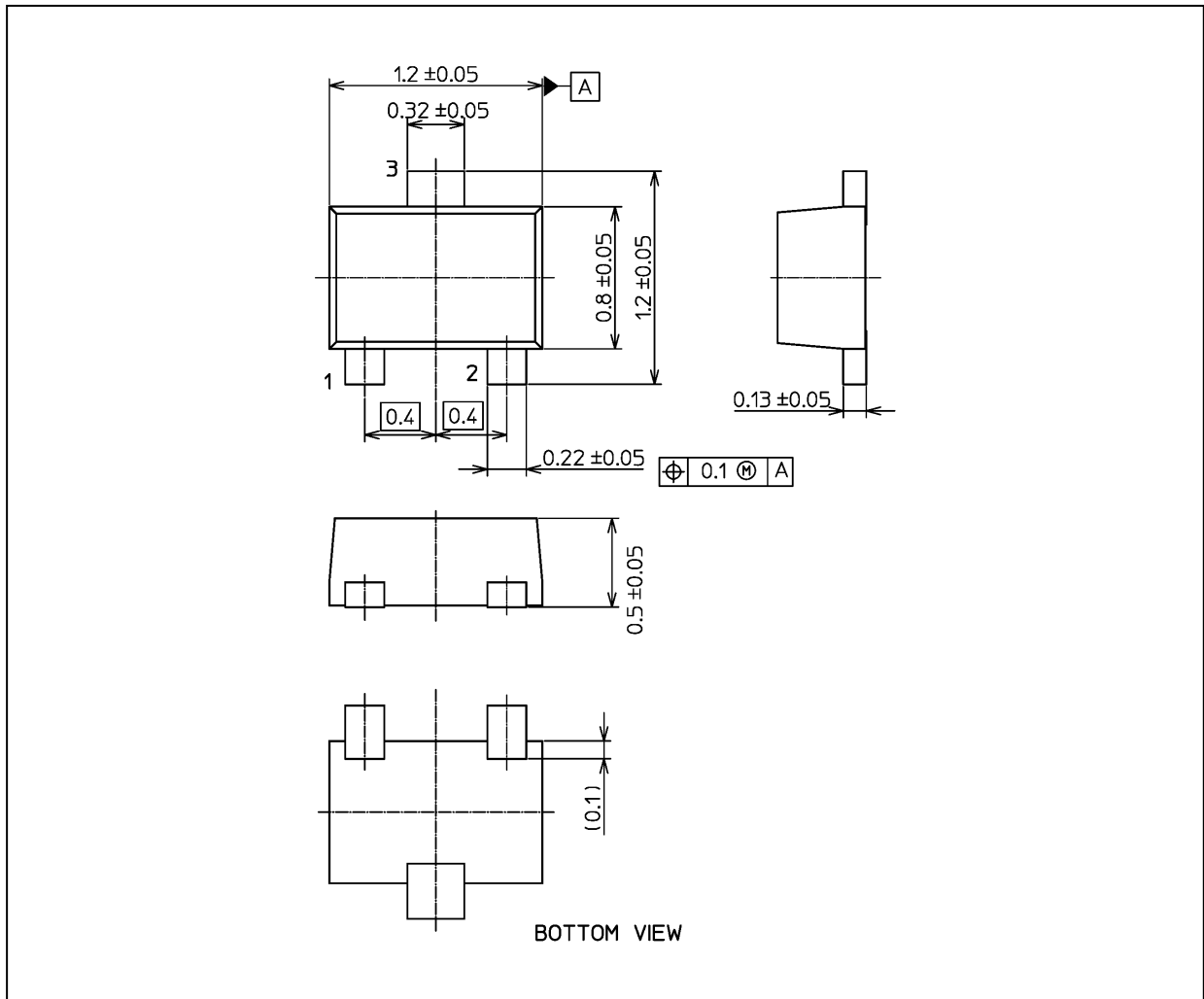


Fig. 11.3 IEC61000-4-2 (Contact)

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

**Package Dimensions**

Unit: mm



Weight: 1.5 mg (typ.)

Package Name(s)
TOSHIBA: 1-1Q1S
Nickname: VESM

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