

DF2S6.8MFS

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. Features

- (1) Ultra compact packaging for easy configuration in any ESD protection circuits.
- (2) Low total capacitance: $C_t = 0.5 \text{ pF}$ (typ.).

3. Packaging and Internal Circuit



4. 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}	± 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).

5. 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

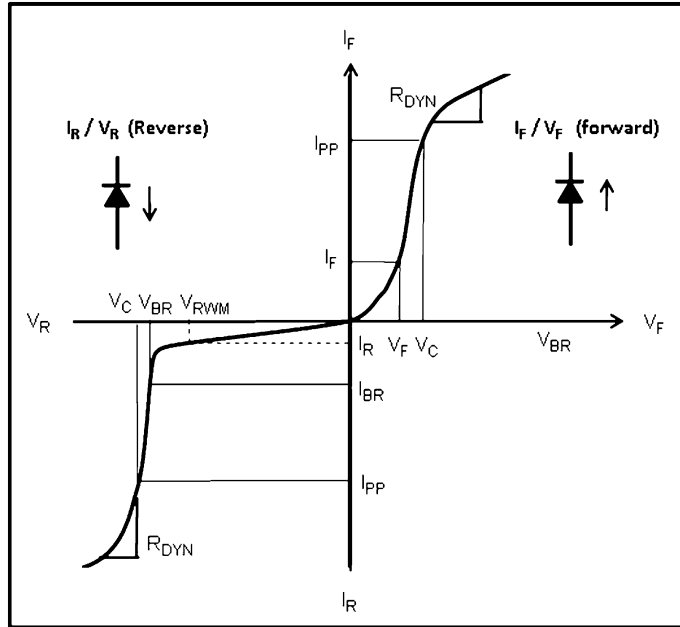


Fig. 5.1 Definitions of Electrical Characteristics

Characteristics	Symbol	Note	Test Condition	Min	Typ.	Max	Unit
Working peak reverse voltage	V_{RWM}		—	—	—	5.0	V
Reverse breakdown voltage	V_{BR}		$I_{BR} = 5 \text{ mA}$	6.0	—	—	V
Reverse current	I_R		$V_{RWM} = 5 \text{ V}$	—	—	0.5	μA
Clamp voltage	V_C	(Note 1)	$I_{PP} = 1 \text{ A}$	—	15	—	V
Dynamic resistance	R_{DYN}	(Note 2)	—	—	1.3	—	Ω
Total capacitance	C_t	(Note 3)	$V_R = 0 \text{ V}, f = 1 \text{ MHz}$	—	0.5	0.9	pF

Note 1: Based on IEC61000-4-5 8/20 μs pulse.

Note 2: TLP parameter: $Z_0 = 50 \Omega$, $t_p = 100 \text{ ns}$, $t_r = 300 \text{ ps}$, averaging window: $t_1 = 30 \text{ ns}$ to $t_2 = 60 \text{ ns}$, extraction of dynamic resistance using a least-squares fit of TLP characteristics at I_{PP} between 3 A to 8 A.

Note 3: Guaranteed by design.

6. Guaranteed ESD Protection (Note)

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

Note: Criterion: No damage to devices.

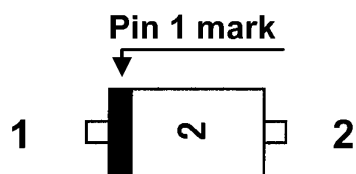
7. Marking

Fig. 7.1 Marking

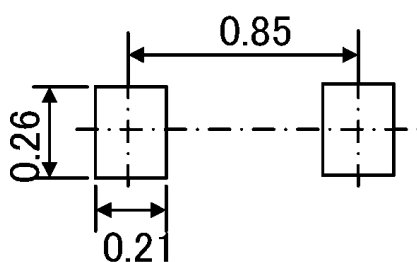
8. Land Pattern Dimensions (for reference only)

Fig. 8.1 Land Pattern Dimensions (Unit: mm)

9. Characteristics Curves (Note)

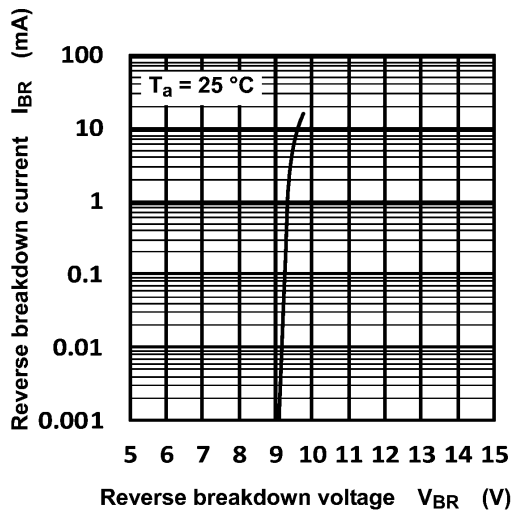


Fig. 9.1 $I_{BR} - V_{BR}$

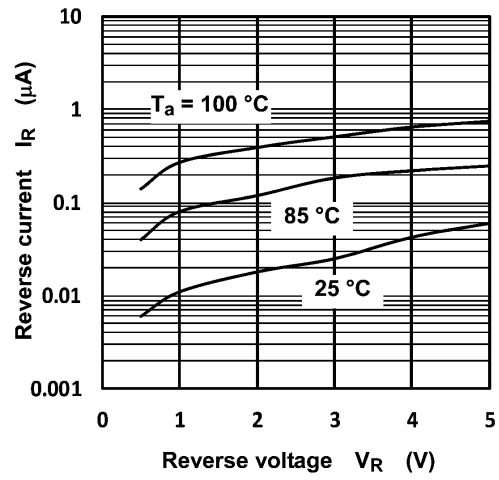


Fig. 9.2 $I_R - V_R$

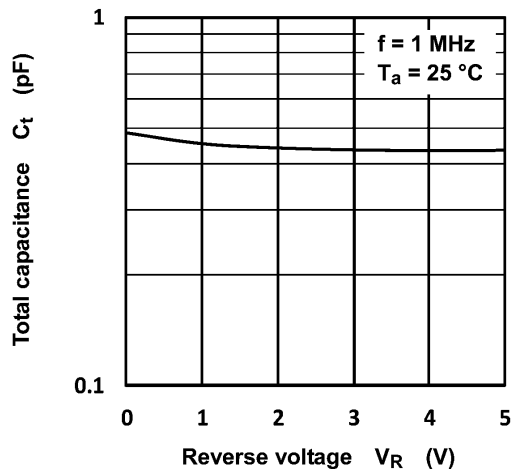


Fig. 9.3 $C_t - V_R$

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

10. Clamp Voltage V_C - Peak Pulse Current (I_{PP}) (Note)

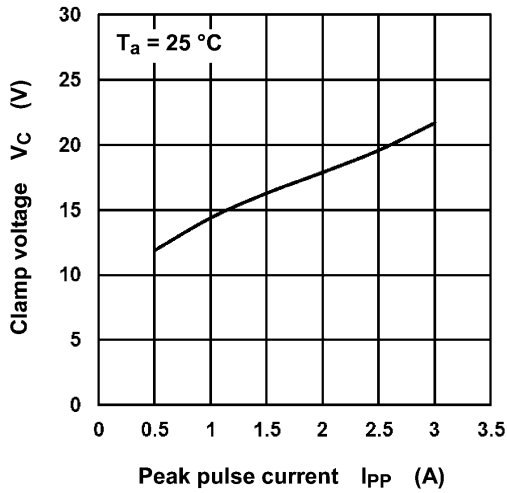


Fig. 10.1 V_C - I_{PP}

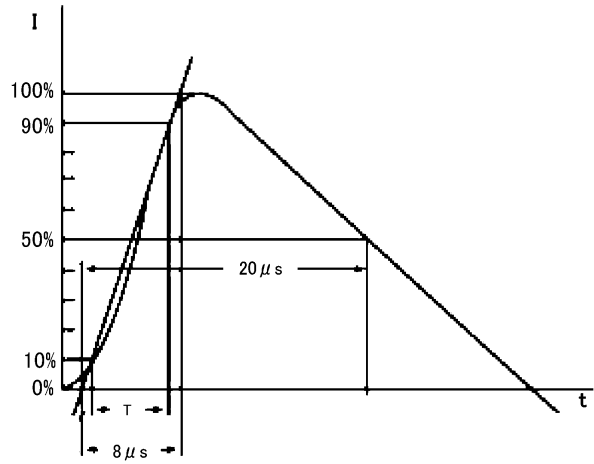


Fig. 10.2 Based on IEC61000-4-5 8/20 μ s pulse.

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

11. Insertion Loss (S_{21}) (Note)

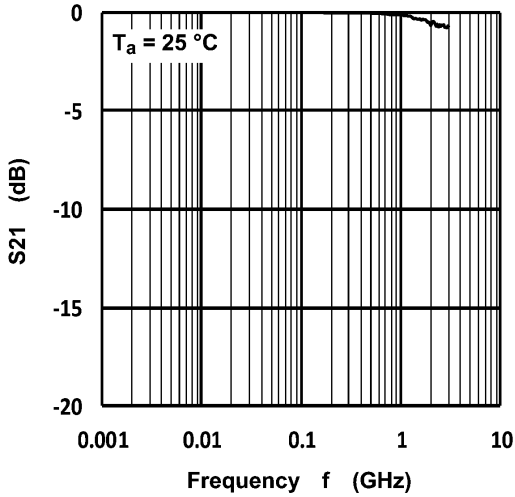
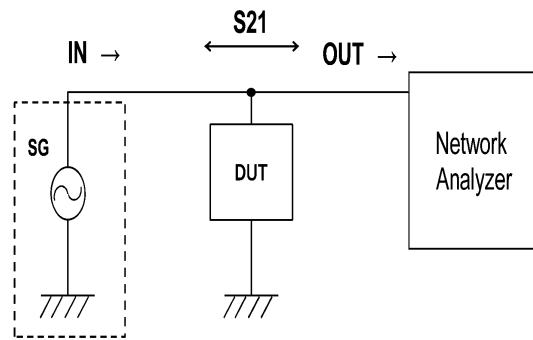


Fig. 11.1 S_{21} - f



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

12. ESD Clamp Waveform (Note)

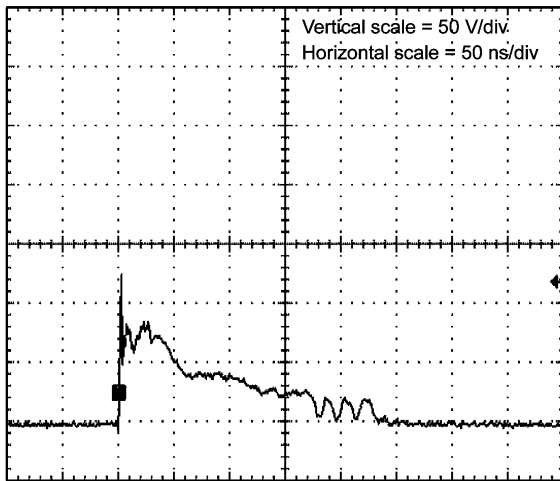


Fig. 12.1 +8 kV

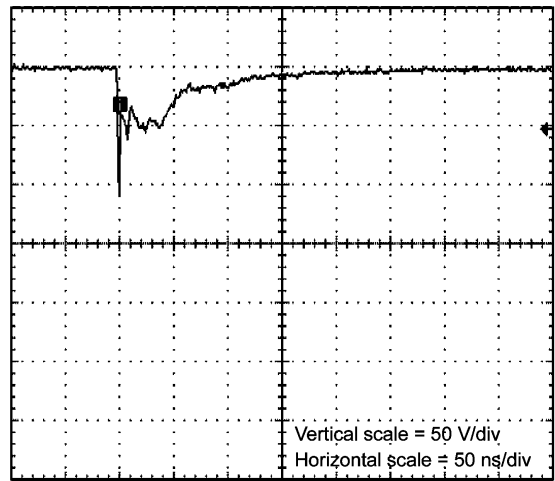


Fig. 12.2 -8 kV

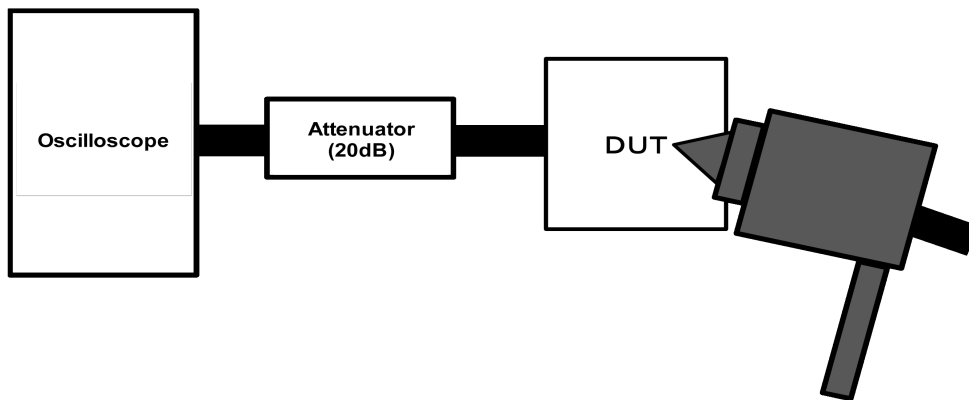
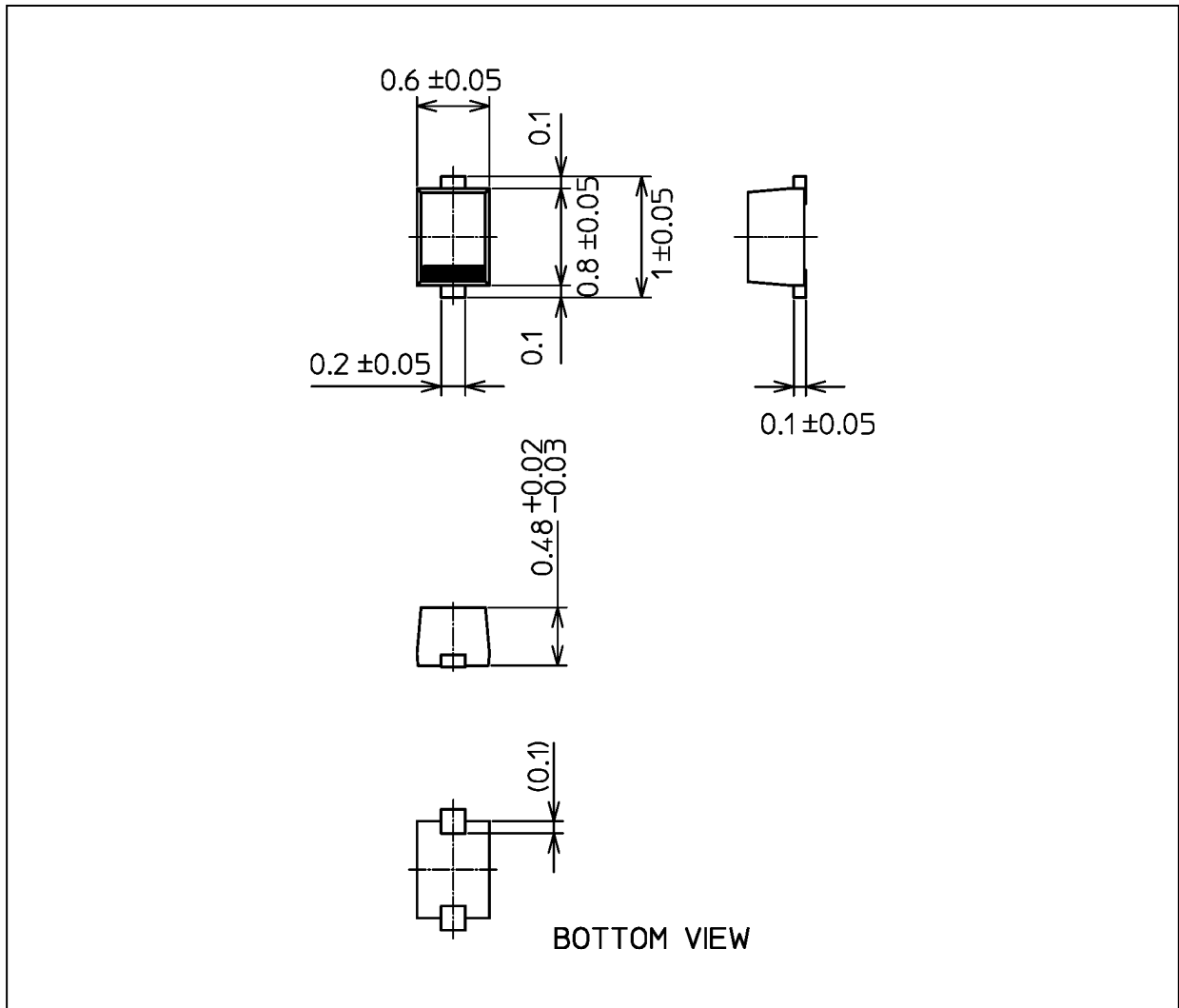


Fig. 12.3 IEC61000-4-2(Contact)

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

Package Dimensions

Unit: mm



Weight: 0.6 mg (typ.)



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

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