

TOSHIBA Diodes for Protecting against ESD

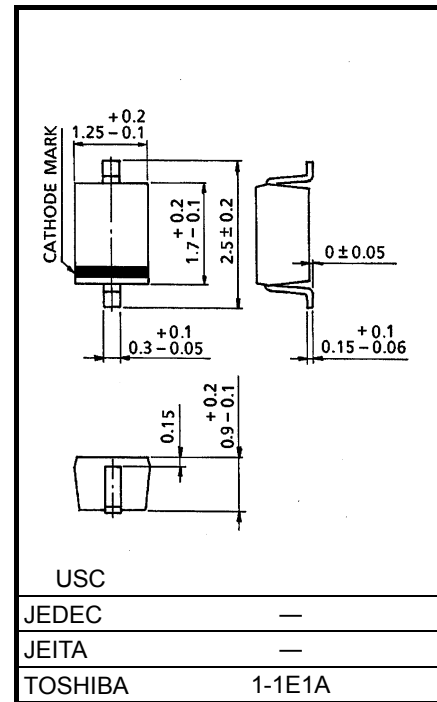
# DF2S12FU

Unit: mm

Product for Use Only as Protection against Electrostatic Discharge (ESD)

\* This product is for protection against electrostatic discharge (ESD) only and is not intended for any other usage, including without limitation, the constant voltage diode application.

- Two-pin ultra-small packages are suitable for higher mounting densities.
- Small total capacitance:  $C_T = 15\text{pF}$  (typ.)



Weight: 4.5 mg (typ.)

### Absolute Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Power dissipation	P	150	mW
Junction temperature	T <sub>j</sub>	125	°C
Storage temperature range	T <sub>stg</sub>	-55 to 125	°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).

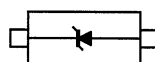
### Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Zener voltage	V <sub>Z</sub>	I <sub>Z</sub> = 5mA	11.4	12.0	12.6	V
Dynamic impedance	Z <sub>Z</sub>	I <sub>Z</sub> = 5mA	—	10	—	Ω
Knee dynamic impedance	Z <sub>ZK</sub>	I <sub>Z</sub> = 0.5mA	—	20	—	Ω
Reverse current	I <sub>R</sub>	V <sub>R</sub> = 9V	—	—	0.05	μA
Total capacitance	C <sub>T</sub>	V <sub>R</sub> = 0V, f = 1MHz	—	15	—	pF

### Marking



### Equivalent Circuit (Top View)

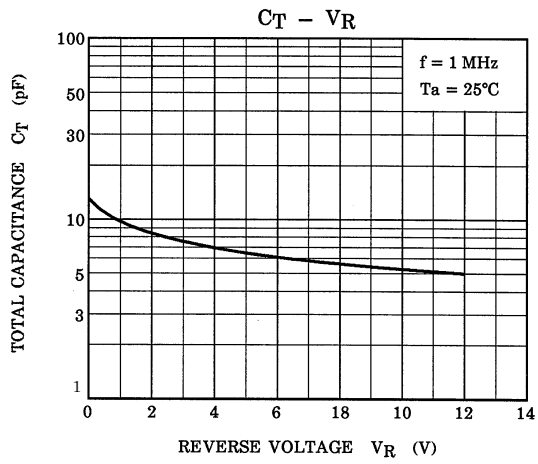
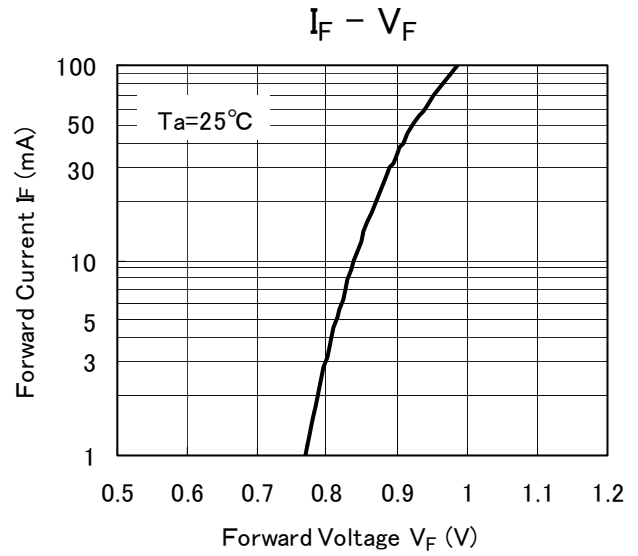
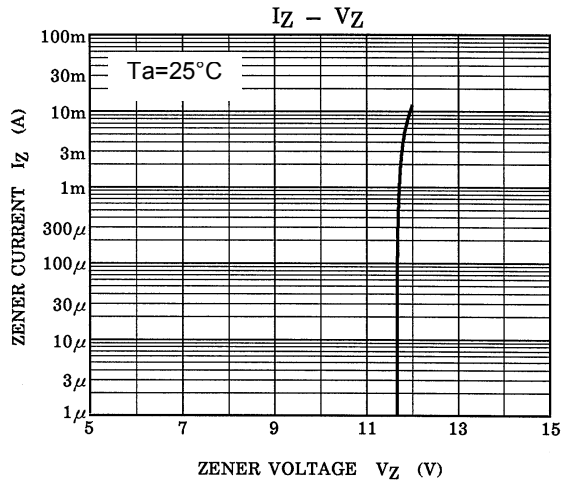


Start of commercial production  
1998-09

**Guaranteed Level of ESD Immunity**

Test Condition	ESD Immunity Level
IEC61000-4-2 (contact discharge)	± 20 kV

Criterion: No damage to device elements



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