

TOSHIBA Diodes for Protecting against ESD

# DF2S12FU

Unit: mm

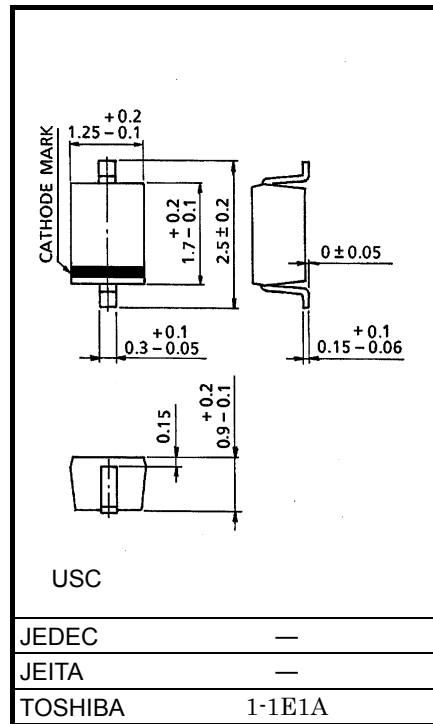
Product for Use Only as Protection against Electrostatic Discharge (ESD)

\* 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.)
- Zener voltage correspond to E24 series.

### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

Characteristic	Symbol	Rating	Unit
Power dissipation	P	150	mW
Junction temperature	$T_j$	125	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	-55 to 125	$^\circ\text{C}$



Weight: 4.5 mg (typ.)

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).

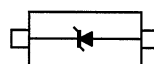
### Electrical Characteristics ( $T_a = 25^\circ\text{C}$ )

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Zener voltage	$V_Z$	$I_Z = 5\text{mA}$	11.4	12.0	12.6	V
Dynamic impedance	$Z_Z$	$I_Z = 5\text{mA}$	—	10	—	$\Omega$
Knee dynamic impedance	$Z_{ZK}$	$I_Z = 0.5\text{mA}$	—	20	—	$\Omega$
Reverse current	$I_R$	$V_R = 9\text{V}$	—	—	0.05	$\mu\text{A}$
Total capacitance	$C_T$	$V_R = 0\text{V}$ , $f=1\text{MHz}$	—	15	—	pF

### Marking



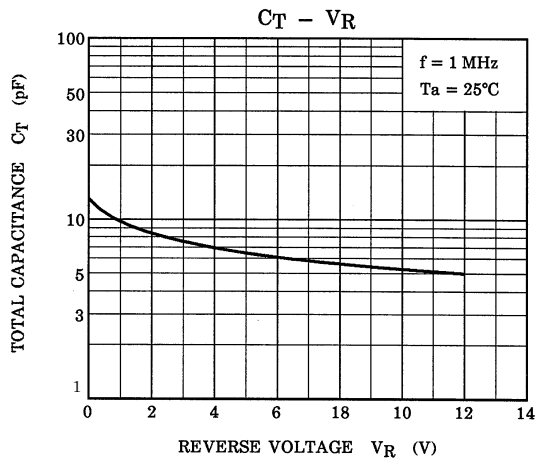
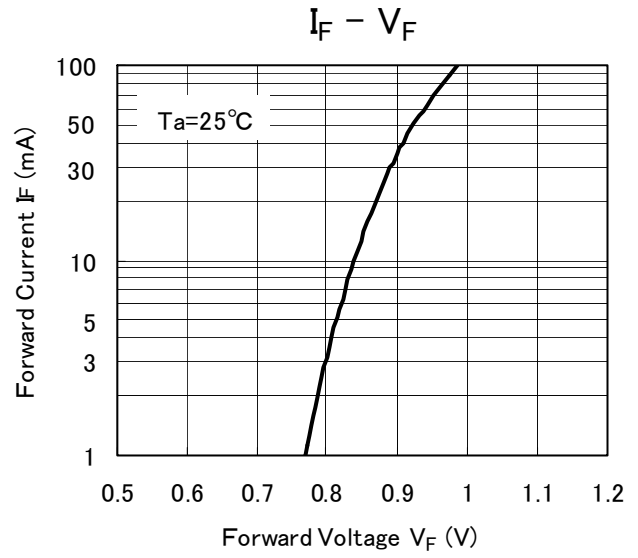
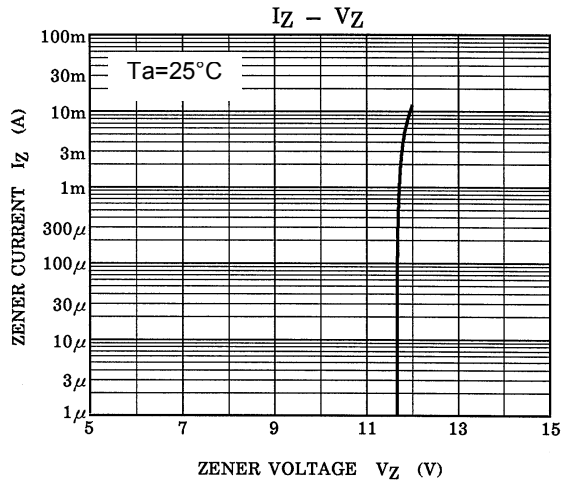
### Equivalent Circuit (Top View)



**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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