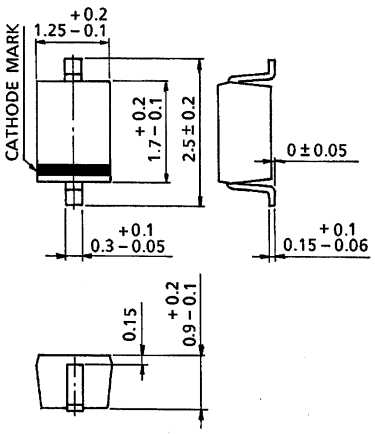
TOSHIBA Diodes for Protecting Against ESD Epitaxial Planar Type

DF2S12FU

Diodes for Protecting Against ESD

- Two-pin ultra-small packages are suitable for higher mounting densities.
- Small total capacitance: C_T = 15pF (typ.)
- Zener voltage correspond to E24 series.

Unit in mm



JEDEC	—
JEITA	—
TOSHIBA	1-1E1A

Weight: 4.5 mg

Absolute Maximum Ratings (Ta = 25°C)

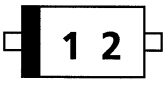
Characteristic	Symbol	Rating	Unit
Power dissipation	P	150	mW
Junction temperature	T_j	125	°C
Storage temperature range	T_{stg}	−55~125	°C

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 Circuit	Test Condition	Min	Typ.	Max	Unit
Zener voltage	V_Z	—	I_Z = 5mA	11.4	12.0	12.6	V
Dynamic impedance	Z_Z	—	I_Z = 5mA	—	10	—	Ω
Knee dynamic impedance	Z_{ZK}	—	I_Z = 0.5mA	—	20	—	Ω
Reverse current	I_R	—	V_R = 9V	—	—	0.05	μA
Total capacitance	C_T	—	V_R = 0V	—	15	—	pF

Marking

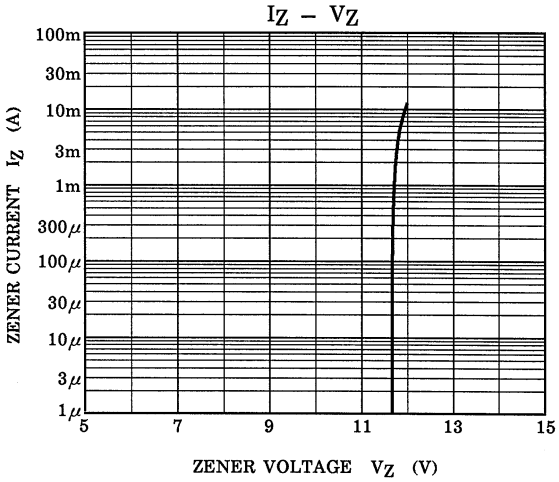


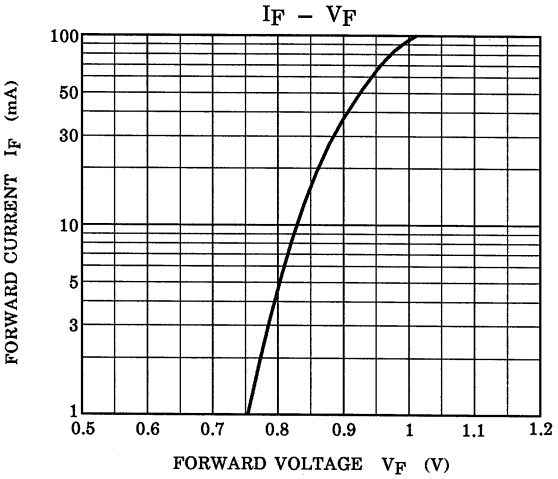
Equivalent Circuit (Top View)

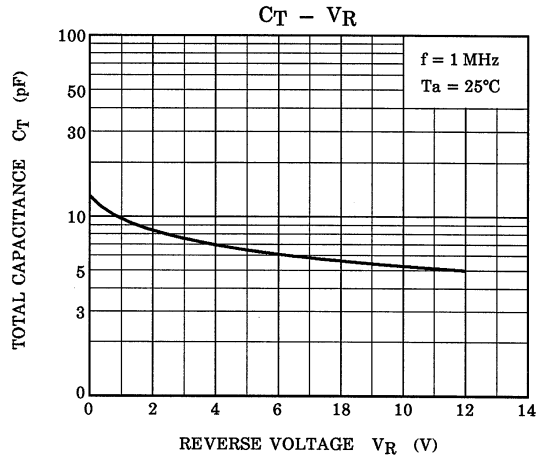
Guaranteed Level of ESD Immunity

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

Criterion: No damage to device elements


I_Z – V_Z
ZENER CURRENT I_Z (A)
100m
30m
10m
3m
1m
300μ
100μ
30μ
10μ
3μ
1μ
5
7
9
11
13
15
ZENER VOLTAGE V_Z (V)


I_F – V_F
FORWARD CURRENT I_F (mA)
100
50
30
10
5
3
1
0.5
0.6
0.7
0.8
0.9
1
1.1
1.2
FORWARD VOLTAGE V_F (V)


C_T – V_R
f = 1 MHz
Ta = 25°C
TOTAL CAPACITANCE C_T (pF)
100
50
30
10
5
3
0
0
2
4
6
18
10
12
14
REVERSE VOLTAGE V_R (V)

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20070701-EN GENERAL

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