

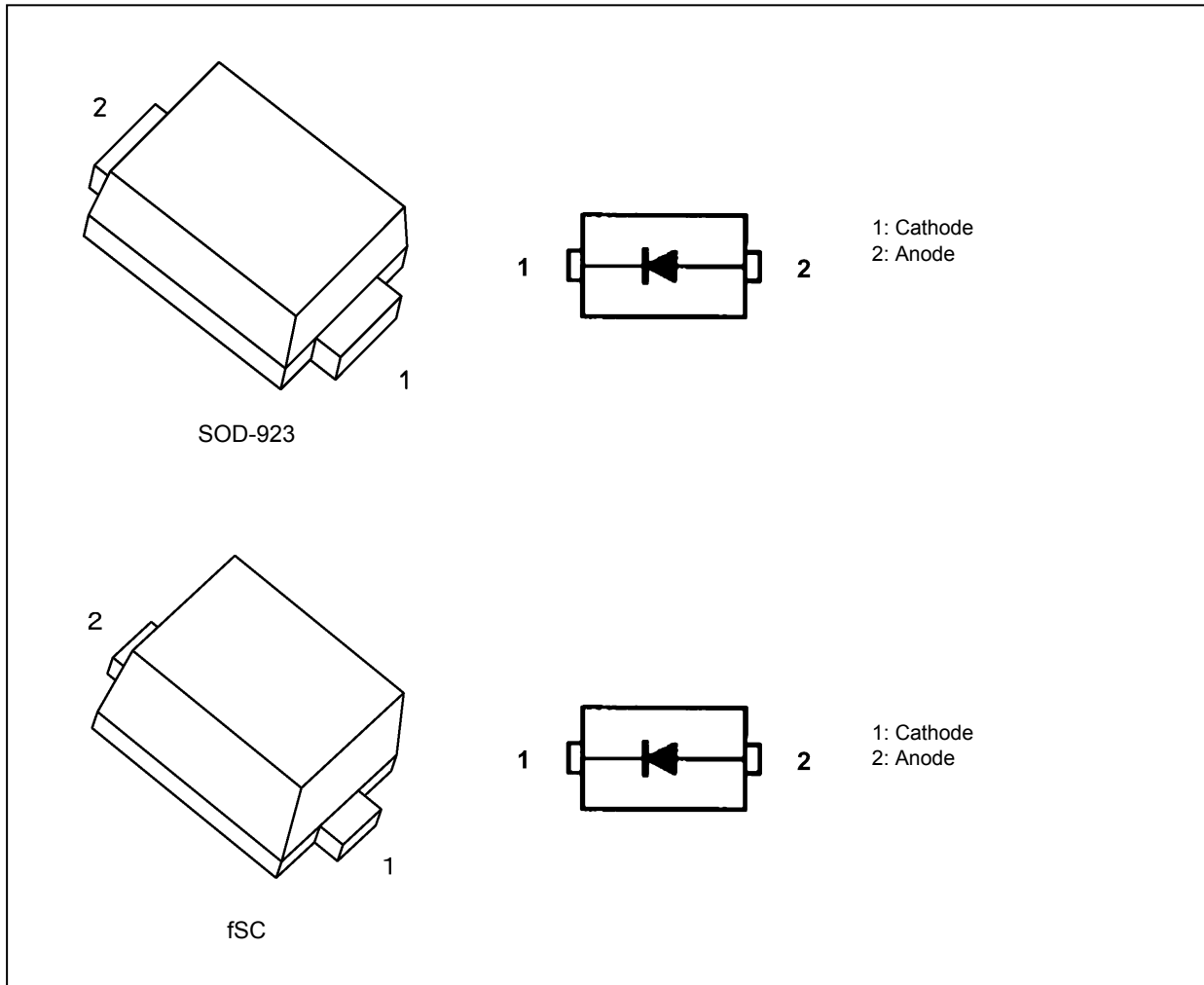
Schottky Barrier Diode Silicon Epitaxial

# 1SS413

## 1. Applications

- High-Speed Switching

## 2. Packaging and Internal Circuit



Start of commercial production

2002-11

2014-07-09

Rev.3.0

**3. Absolute Maximum Ratings (Note) (Unless otherwise specified,  $T_a = 25\text{ }^\circ\text{C}$ )**

Characteristics	Symbol	Note	Rating	Unit
Peak reverse voltage	$V_{RM}$		25	V
Reverse voltage	$V_R$		20	
Peak forward current	$I_{FM}$		100	mA
Average rectified current	$I_O$		50	mA
Power dissipation	$P_D$	(Note 1)	100	mW
Non-repetitive peak forward surge current	$I_{FSM}$	(Note 2)	1	A
Junction temperature	$T_j$		125	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-55 to 125	$^\circ\text{C}$

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).

Note 1: Mounted on a glass epoxy circuit board of 20 mm × 20 mm, Pad dimension of 4 mm × 4 mm.

Note 2: Measured with a 10 ms pulse.

**4. Electrical Characteristics (Unless otherwise specified,  $T_a = 25\text{ }^\circ\text{C}$ )**

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Forward voltage	$V_{F(1)}$	$I_F = 1\text{ mA}$	—	0.33	—	V
Forward voltage	$V_{F(2)}$	$I_F = 5\text{ mA}$	—	0.38	—	V
Forward voltage	$V_{F(3)}$	$I_F = 50\text{ mA}$	—	0.50	0.55	V
Reverse current	$I_R$	$V_R = 20\text{ V}$	—	—	0.5	$\mu\text{A}$
Total capacitance	$C_t$	$V_R = 0\text{ V}, f = 1\text{ MHz}$	—	3.9	—	pF

**5. Marking**

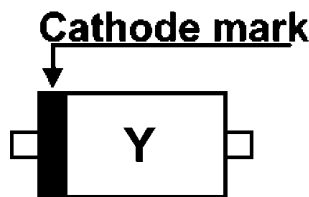


Fig. 5.1 Marking

**6. Usage Considerations**

- Schottky barrier diodes (SBDs) have reverse leakage greater than other types of diodes. This makes SBDs more susceptible to thermal runaway under high-temperature and high-voltage conditions. Thus, both forward and reverse power losses of SBDs should be considered for thermal and safety design.

**7. Land Pattern Dimensions (for reference only)**

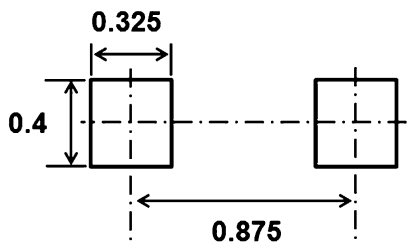


Fig. 7.1 SOD-923 (Unit: mm)

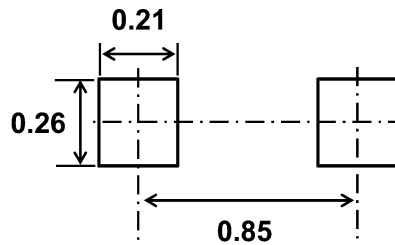
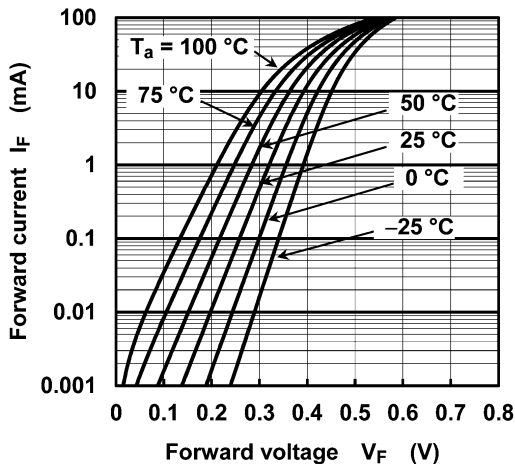
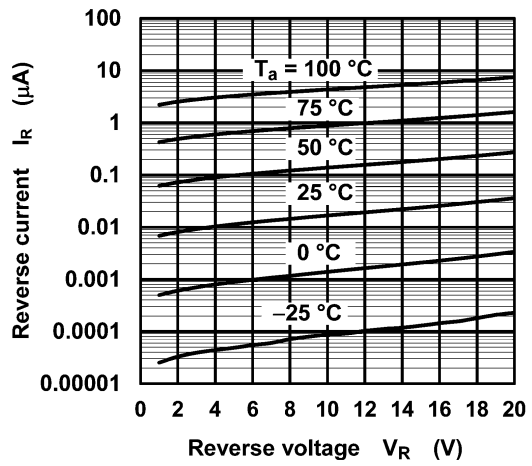


Fig. 7.2 fSC (Unit: mm)

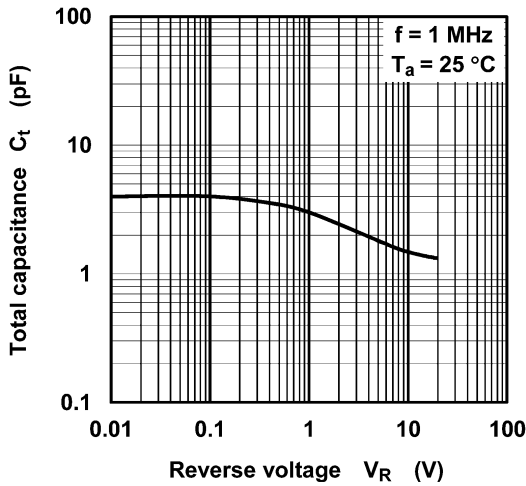
**8. Characteristics Curves (Note)**



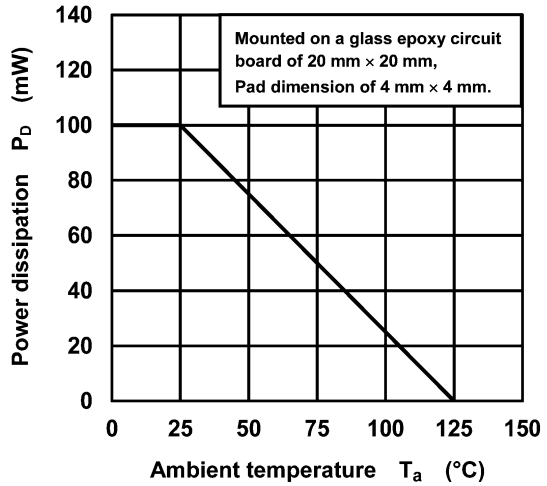
**Fig. 8.1  $I_F - V_F$**



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



**Fig. 8.3  $C_t - V_R$**



**Fig. 8.4  $P_D - T_a$**

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

Package Dimensions

Unit: mm



Weight: 0.55 mg (typ.)

Package Name(s)
TOSHIBA: 1-1AH1A
Nickname: SOD-923

**Package Dimensions**

Unit: mm



Weight: 0.6 mg (typ.)

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

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