

TOSHIBA Diode Silicon Epitaxial Planar Type

## HN1D03F

### Ultra High Speed Switching Application

- Built in anode common and cathode common.

#### Unit 1

- Low forward voltage Q1, Q2:  $V_F^{(3)} = 0.90 \text{ V (typ.)}$
- Fast reverse recovery time Q1, Q2:  $t_{rr} = 1.6 \text{ ns (typ.)}$
- Small total capacitance Q1, Q2:  $C_T = 0.9 \text{ pF (typ.)}$

#### Unit 2

- Low forward voltage Q3, Q4:  $V_F^{(3)} = 0.92 \text{ V (typ.)}$
- Fast reverse recovery time Q3, Q4:  $t_{rr} = 1.6 \text{ ns (typ.)}$
- Small total capacitance Q3, Q4:  $C_T = 2.2 \text{ pF (typ.)}$

### Unit 1, Unit 2 Common Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

Characteristic	Symbol	Rating	Unit
Maximum (peak) reverse voltage	$V_{RM}$	85	V
Reverse voltage	$V_R$	80	V
Maximum (peak) forward current	$I_{FM}$	300 (*)	mA
Average forward current	$I_O$	100 (*)	mA
Surge current (10 ms)	$I_{FSM}$	2 (*)	A
Power dissipation	$P_D$ (Note 3)	300	mW
Junction temperature	$T_j$ (Note 1)	150	°C
	$T_j$ (Note 2)	125	
Storage temperature	$T_{stg}$ (Note 1)	-55 to 150	°C
	$T_{stg}$ (Note 2)	-55 to 125	

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).

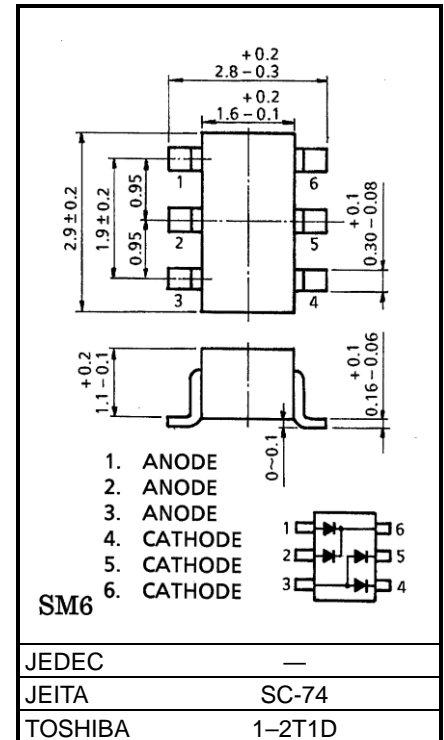
Note 1: For devices with the ordering part number ending in LF(T).

Note 2: For devices with the ordering part number in other than LF(T).

Note 3: Total rating.

(\*) These are the Absolute Maximum Ratings for a single diode (Q1 or Q2 or Q3 or Q4). If Unit 1 and Unit 2 are used independently or simultaneously, the Absolute Maximum Ratings per diode are 75% of those of a single diode.

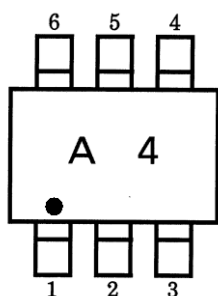
Unit: mm



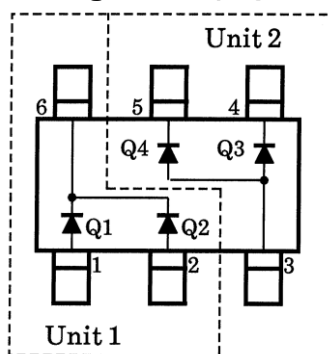
Weight: 15 mg (typ.)

Start of commercial production  
1992-05

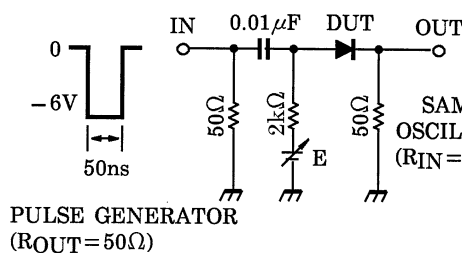
## Marking



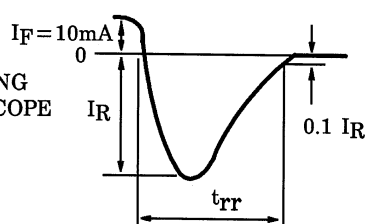
## Pin Assignment (Top View)



### INPUT WAVEFORM



### OUTPUT WAVEFORM



**Fig.1 Reverse Recovery Time ( $t_{rr}$ ) Test Circuit**

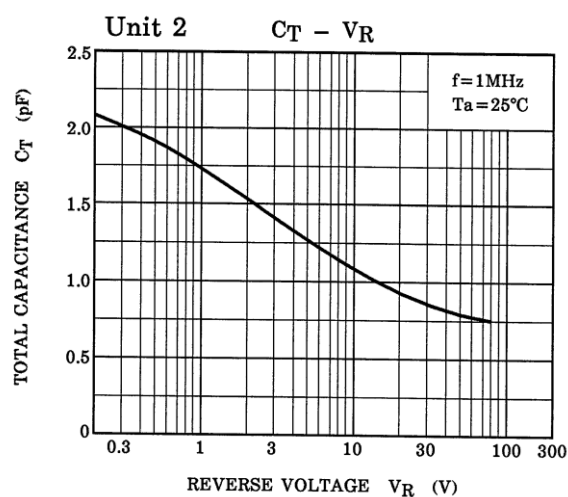
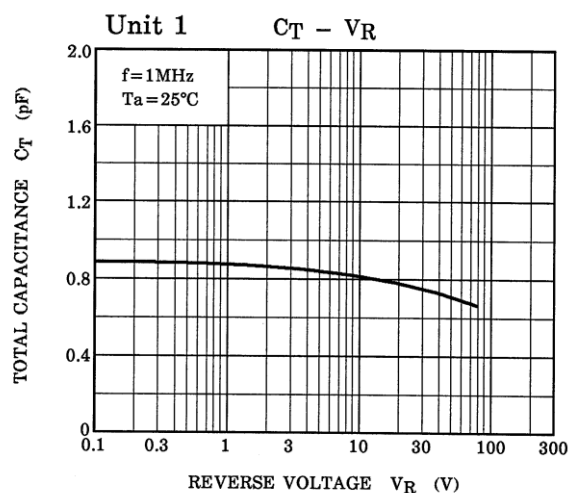
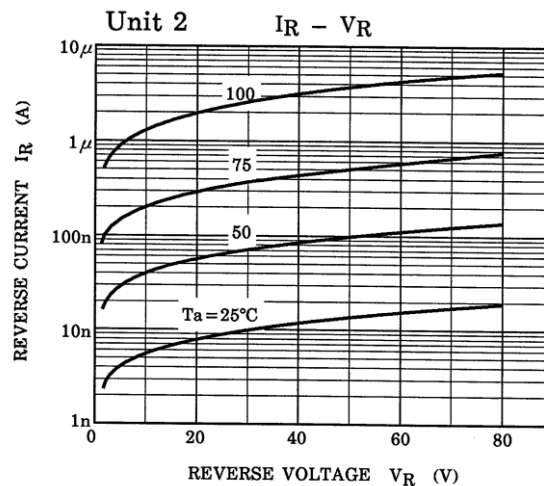
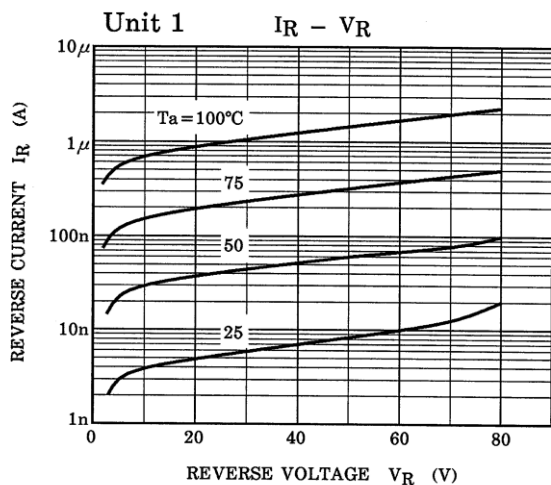
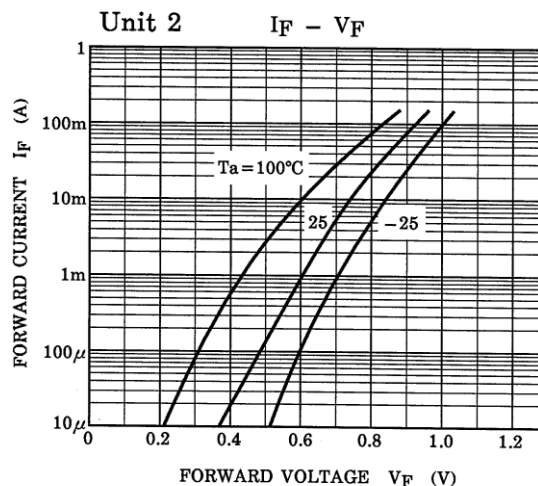
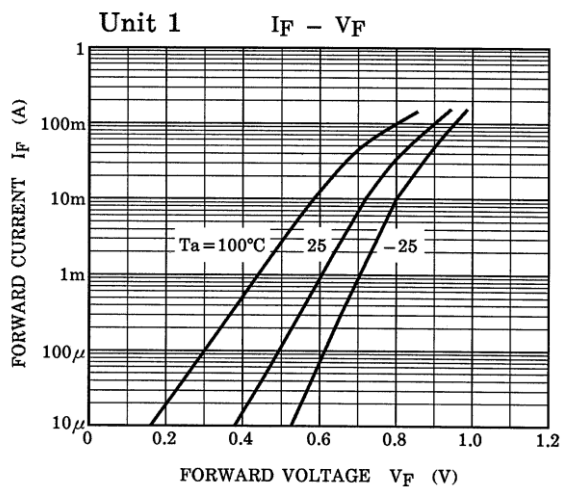
## Unit 1 Electrical Characteristics (Q1, Q2 Common) ( $T_a = 25^\circ\text{C}$ )

Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Forward voltage	$V_F$ (1)	—	$I_F = 1 \text{ mA}$	—	0.60	—	V
	$V_F$ (2)	—	$I_F = 10 \text{ mA}$	—	0.72	—	
	$V_F$ (3)	—	$I_F = 100 \text{ mA}$	—	0.90	1.20	
Reverse current	$I_R$ (1)	—	$V_R = 30 \text{ V}$	—	—	0.1	$\mu\text{A}$
	$I_R$ (2)	—	$V_R = 80 \text{ V}$	—	—	0.5	
Total capacitance	$C_T$	—	$V_R = 0 \text{ V}, f = 1 \text{ MHz}$	—	0.9	3.0	pF
Reverse recovery time	$t_{rr}$	—	$I_F = 10 \text{ mA}$ (fig.1)	—	1.6	4.0	ns

## Unit 2 Electrical Characteristics (Q3, Q4 Common) ( $T_a = 25^\circ\text{C}$ )

Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Forward voltage	$V_F$ (1)	—	$I_F = 1 \text{ mA}$	—	0.61	—	V
	$V_F$ (2)	—	$I_F = 10 \text{ mA}$	—	0.74	—	
	$V_F$ (3)	—	$I_F = 100 \text{ mA}$	—	0.92	1.20	
Reverse current	$I_R$ (1)	—	$V_R = 30 \text{ V}$	—	—	0.1	$\mu\text{A}$
	$I_R$ (2)	—	$V_R = 80 \text{ V}$	—	—	0.5	
Total capacitance	$C_T$	—	$V_R = 0 \text{ V}, f = 1 \text{ MHz}$	—	2.2	4.0	pF
Reverse recovery time	$t_{rr}$	—	$I_F = 10 \text{ mA}$ (fig.1)	—	1.6	4.0	ns

### Characteristics Curves



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

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