

TOSHIBA Diode Silicon Epitaxial Planar Type

# HN1D03FU

## Ultra High Speed Switching Application

Unit: mm

- Built in anode common and cathode common.

### Unit 1

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

### Unit 2

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

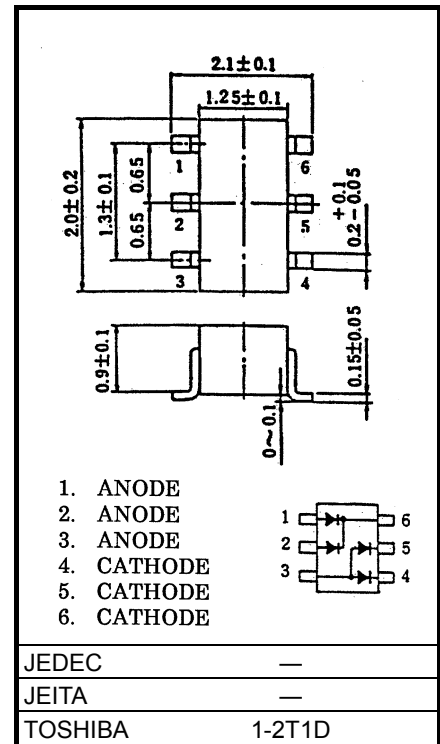
## Unit 1, Unit 2 Common Absolute Maximum Ratings ( $T_a = 25^\circ C$ )

| 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 (10ms)           | $I_{FSM}$ | 2*         | A          |
| Power dissipation              | P         | 200        | mW         |
| Junction temperature           | $T_j$     | 125        | $^\circ C$ |
| Storage temperature            | $T_{stg}$ | -55 to 125 | $^\circ C$ |

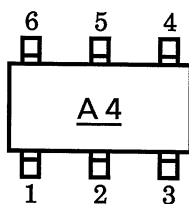
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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).

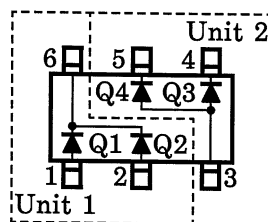
\*: This is the Absolute Maximum Ratings of single diode (Q1 or Q2 or Q3 or Q4). In the case of using Unit 1 and Unit 2 independently or simultaneously, the Absolute Maximum Ratings per diode is 75% of the single diode one.



## Marking

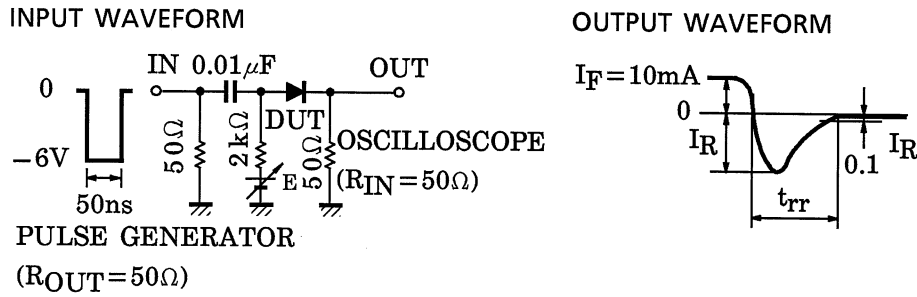


## Pin Assignment (Top View)



Start of commercial production  
1992-05

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



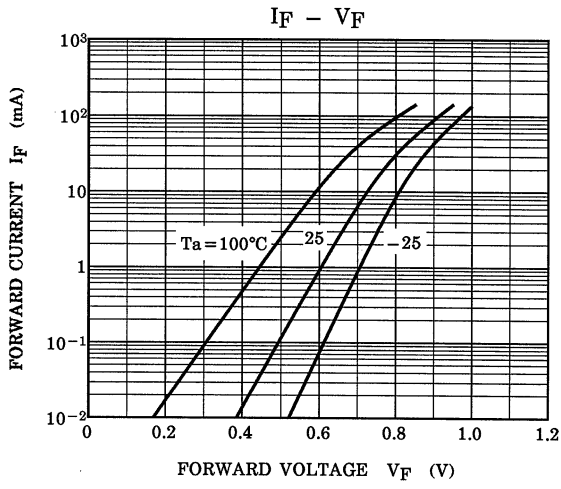
**Unit 1 Electrical Characteristics (Q1, Q2 Common) ( $T_a = 25^\circ\text{C}$ )**

| 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     | $C_T$     | —            | $V_R = 0, f = 1\text{MHz}$  | —   | 0.9  | 3.0  | pF            |
| Reverse recovery time | $t_{rr}$  | —            | $I_F = 10\text{mA}$ (fig.1) | —   | 1.6  | 4.0  | ns            |

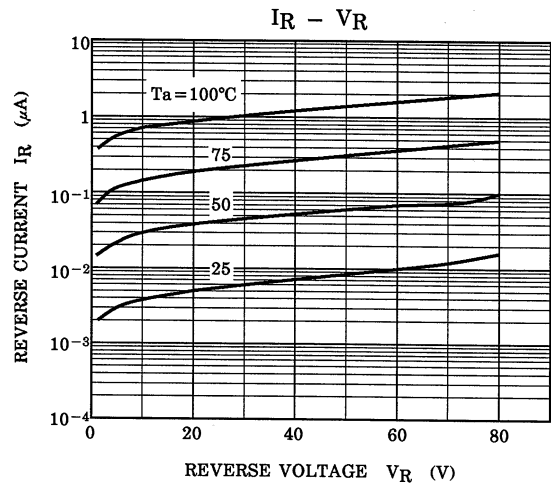
**Unit 2 Electrical Characteristics (Q3, Q4 Common) ( $T_a = 25^\circ\text{C}$ )**

| 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     | $C_T$     | —            | $V_R = 0, f = 1\text{MHz}$  | —   | 2.2  | 4.0  | pF            |
| Reverse recovery time | $t_{rr}$  | —            | $I_F = 10\text{mA}$ (fig.1) | —   | 1.6  | 4.0  | ns            |

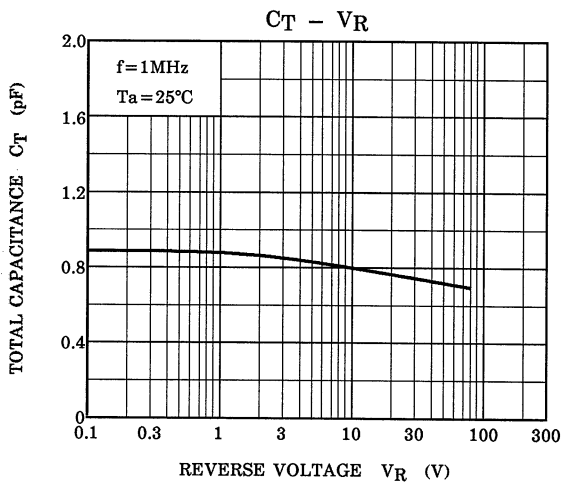
Unit 1 (Q1, Q2 COMMON)



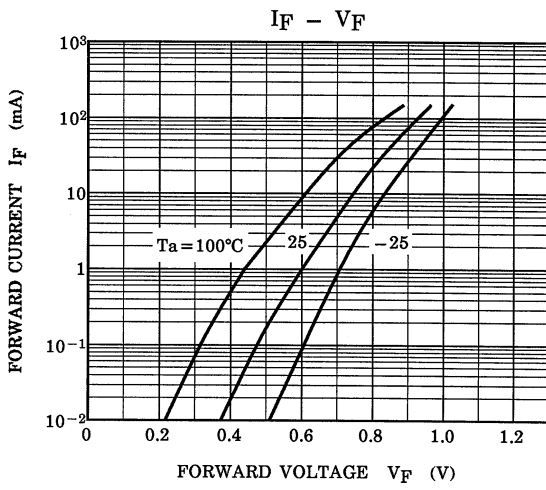
Unit 1 (Q1, Q2 COMMON)



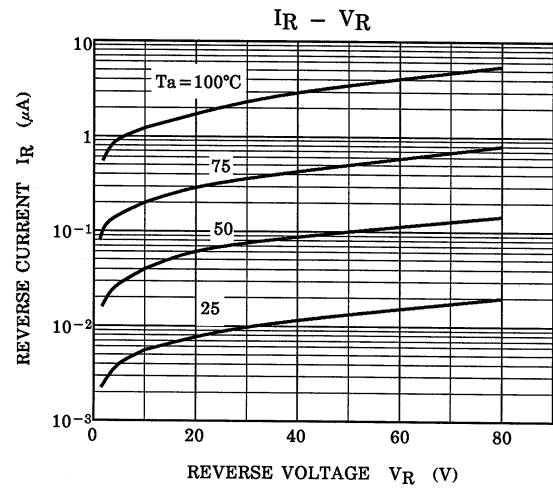
Unit 1 (Q1, Q2 COMMON)



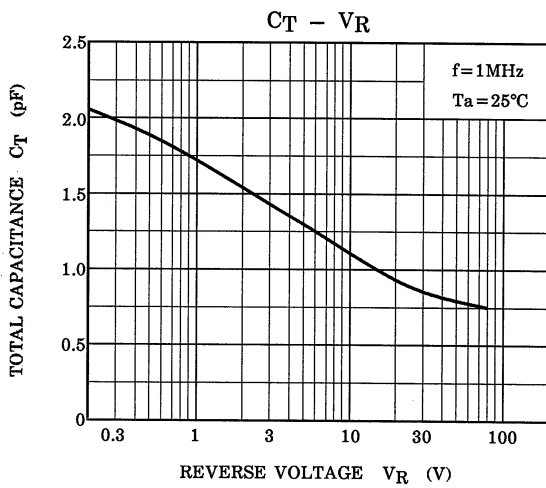
Unit 2 (Q3, Q4 COMMON)



Unit 2 (Q3, Q4 COMMON)



Unit 2 (Q3, Q4 COMMON)



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