TOSHIBA Diode Silicon Epitaxial Planar Type

# HN1D03F

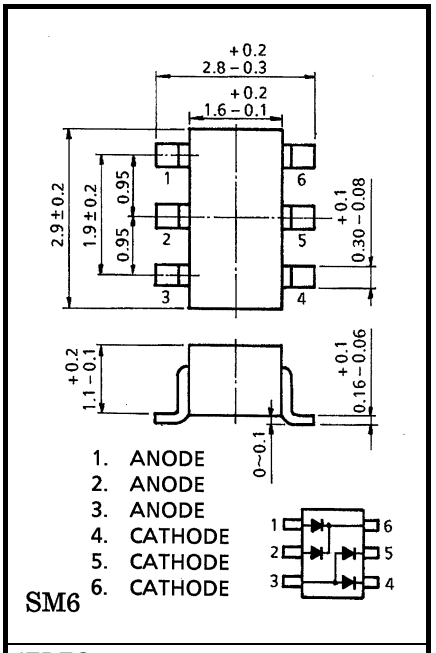
## Ultra High Speed Switching Application

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.)




| | |
|---|---|
| JEDEC | — |
| JEITA | SC-74 |
| TOSHIBA | |

Weight: 15 mg (typ.)

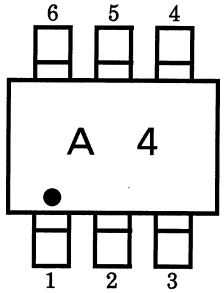
## Unit 1, Unit 2 Common Absolute Maximum Ratings (Ta = 25°C)

| 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 | 300 | mW |
| Junction temperature | $T_j$ | 125 | °C |
| Storage temperature range | $T_{stg}$ | −55~125 | °C |

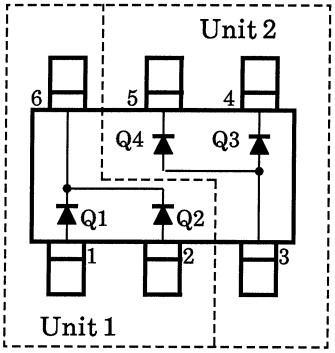
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.)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

(*) 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.

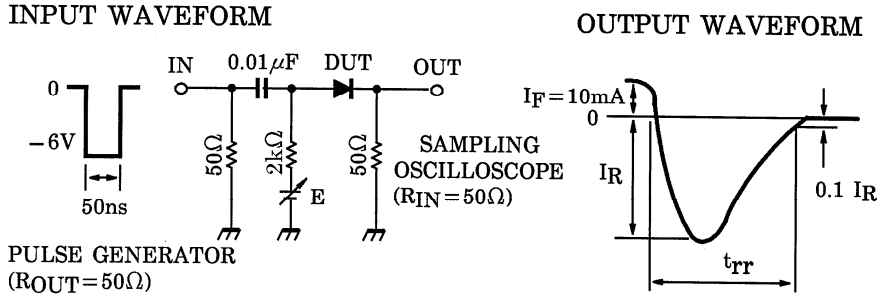
## Marking




## Pin Assignment (Top View)



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



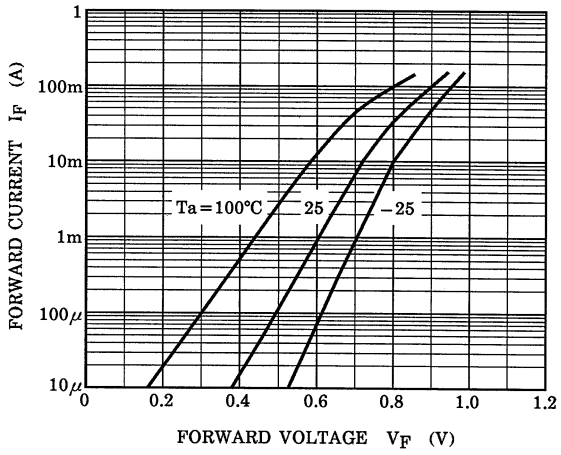

## Unit 1 Electrical Characteristics (Q1, Q2, Common) (Ta = 25°C)

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

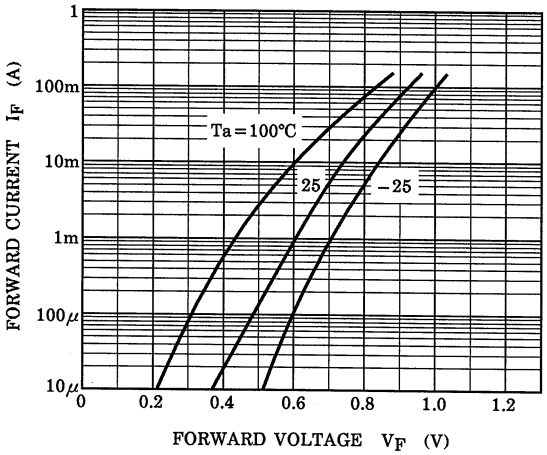
## Unit 2 Electrical Characteristics (Q3, Q4, Common) (Ta = 25°C)

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

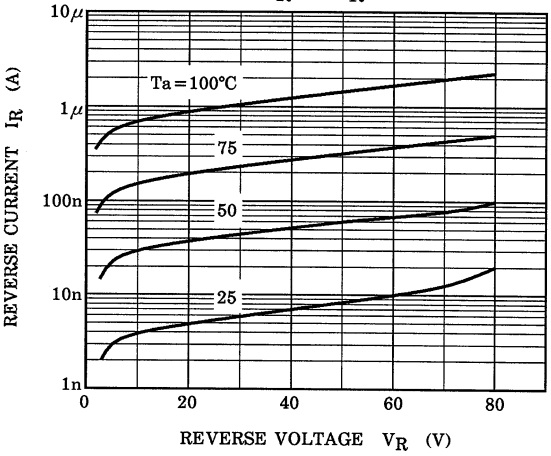
Unit 1 $I_F - V_F$



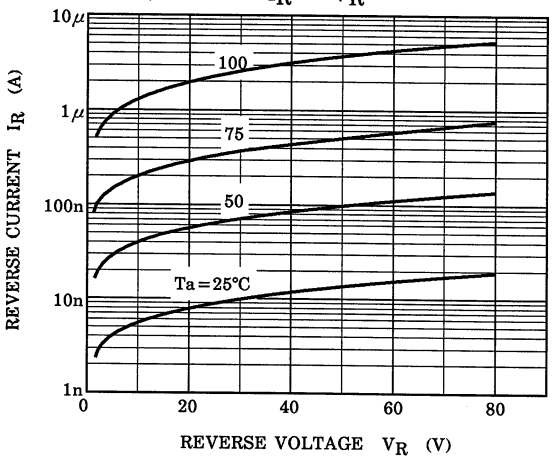

Unit 2 $I_F - V_F$



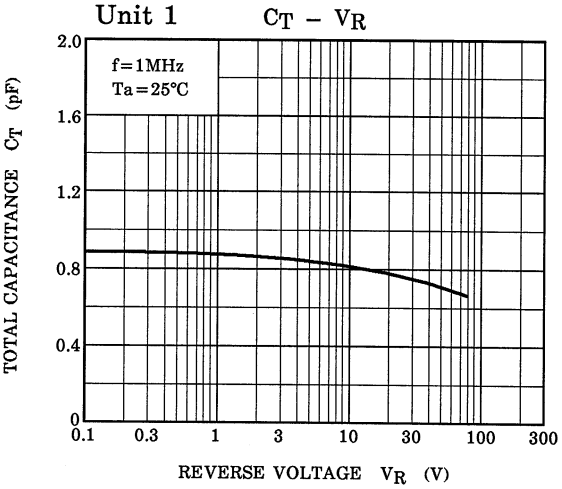

Unit 1 $I_R - V_R$



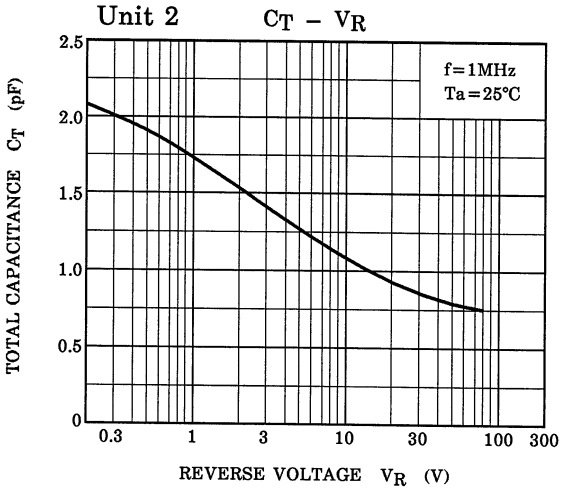

Unit 2 $I_R - V_R$




Unit 1 $C_T - V_R$




Unit 2 $C_T - V_R$



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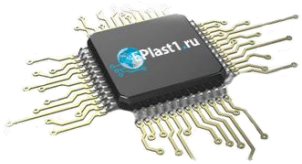


**Как с нами связаться**

**Телефон:** 8 (812) 309 58 32 (многоканальный)
**Факс:** 8 (812) 320-02-42
**Электронная почта:** org@eplast1.ru
**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.