

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type

## HN1K06FU

High Speed Switching Applications

Analog Switch Applications

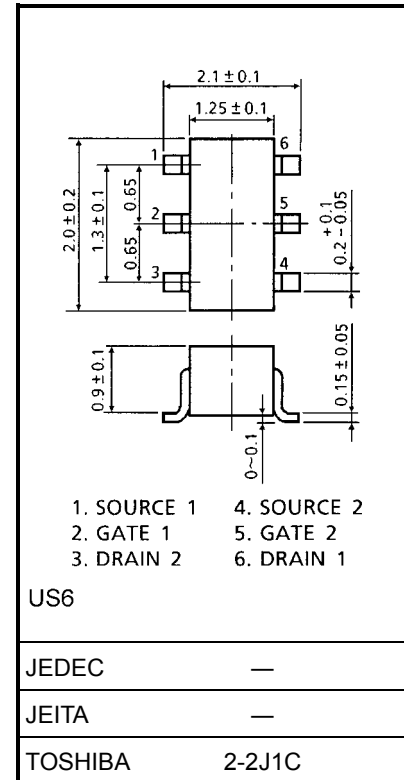
Unit: mm

- High input impedance and extremely low drive current.
- $V_{th}$  is low and it is possible to drive directly at low-voltage CMOS.  
:  $V_{th} = 0.5$  to  $1.5$  V
- Switching speed is fast.
- Suitable for high-density mounting because of a compact package

### Maximum Ratings ( $T_a = 25^\circ\text{C}$ ) (Q1, Q2 common)

| Characteristics           | Symbol       | Rating     | Unit             |
|---------------------------|--------------|------------|------------------|
| Drain-source voltage      | $V_{DS}$     | 20         | V                |
| Gate-source voltage       | $V_{GSS}$    | 10         | V                |
| Drain current             | $I_D$        | 100        | mA               |
| Drain power dissipation   | $P_D$ (Note) | 200        | mW               |
| Channel temperature       | $T_{ch}$     | 150        | $^\circ\text{C}$ |
| Storage temperature range | $T_{stg}$    | -55 to 150 | $^\circ\text{C}$ |

Note: TOTAL rating

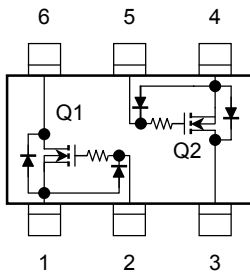


Weight: 6.8 mg

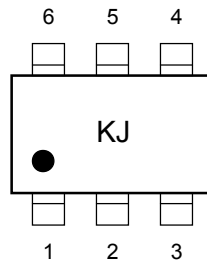
### Electrical Characteristics ( $T_a = 25^\circ\text{C}$ ) (Q1, Q2 common)

| Characteristic                 | Symbol        | Test Condition                                       | Min | Typ. | Max | Unit          |
|--------------------------------|---------------|--|-----|------|-----|---------------|
| Gate leakage current           | $I_{GSS}$     | $V_{GS} = 10$ V, $V_{DS} = 0$ V                      | —   | —    | 1   | $\mu\text{A}$ |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $I_D = 100$ $\mu\text{A}$ , $V_{GS} = 0$ V           | 20  | —    | —   | V             |
| Drain cut-off current          | $I_{DSS}$     | $V_{DS} = 20$ V, $V_{GS} = 0$ V                      | —   | —    | 1   | $\mu\text{A}$ |
| Gate threshold voltage         | $V_{th}$      | $V_{DS} = 3$ V, $I_D = 0.1$ mA                       | 0.5 | —    | 1.5 | V             |
| Forward transfer admittance    | $ Y_{fs} $    | $V_{DS} = 3$ V, $I_D = 10$ mA                        | 35  | 62   | —   | mS            |
| Drain-source ON resistance     | $R_{DS(ON)}$  | $I_D = 10$ mA, $V_{GS} = 2.5$ V                      | —   | 3.5  | 6.0 | $\Omega$      |
| Input capacitance              | $C_{iss}$     | $V_{DS} = 3$ V, $V_{GS} = 0$ V, $f = 1$ MHz          | —   | 14   | —   | pF            |
| Reverse transfer capacitance   | $C_{rSS}$     | $V_{DS} = 3$ V, $V_{GS} = 0$ V, $f = 1$ MHz          | —   | 5.3  | —   | pF            |
| Output capacitance             | $C_{oss}$     | $V_{DS} = 3$ V, $V_{GS} = 0$ V, $f = 1$ MHz          | —   | 16   | —   | pF            |
| Switching time                 | $t_{on}$      | $V_{DD} = 3$ V, $I_D = 10$ mA, $V_{GS} = 0$ to 2.5 V | —   | 0.28 | —   | $\mu\text{s}$ |
|                                | $t_{off}$     | $V_{DD} = 3$ V, $I_D = 10$ mA, $V_{GS} = 0$ to 2.5 V | —   | 0.34 | —   |               |

**Equivalent Circuit (top view)**



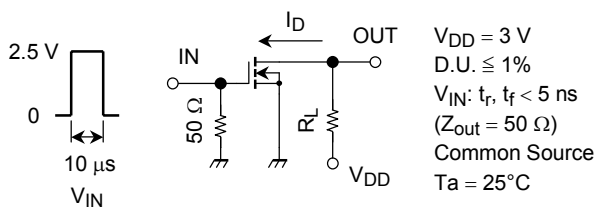
**Marking**



(Q1, Q2 common)

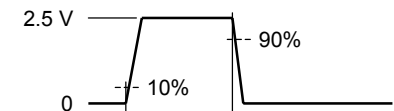
**Switching Time Test Circuit**

**(a) Test circuit**



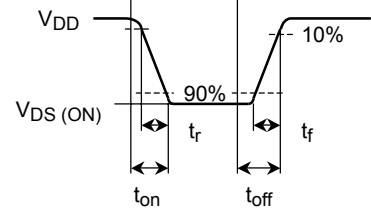
**(b)  $V_{IN}$**

$V_{GS}$

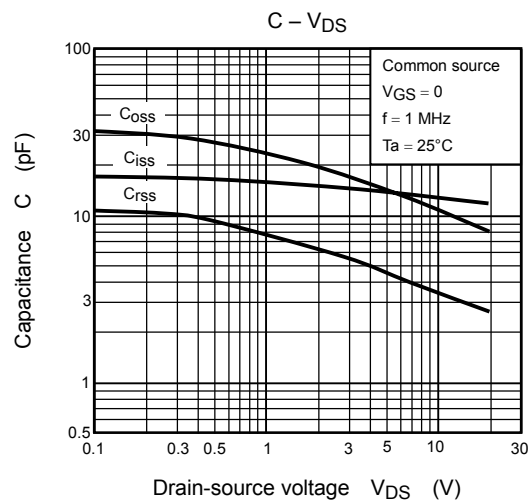
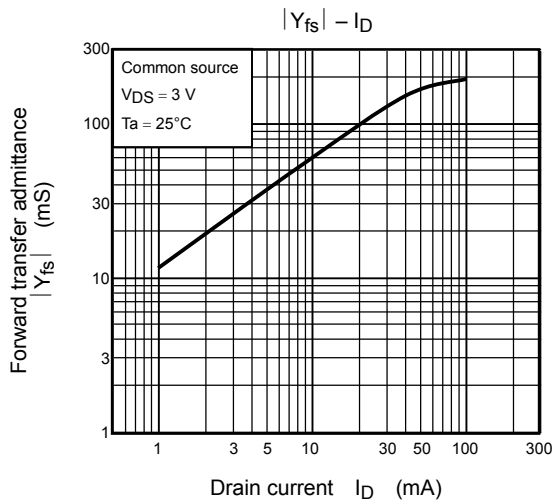
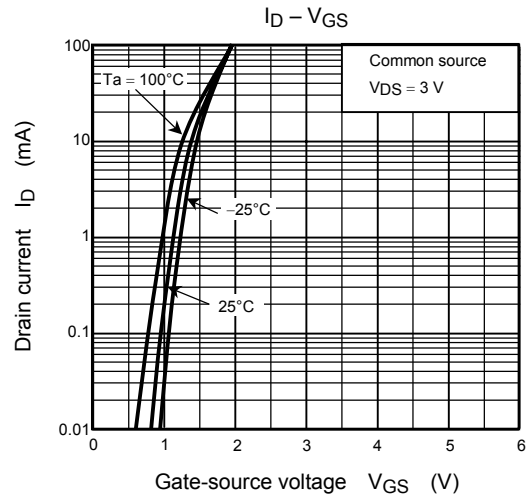
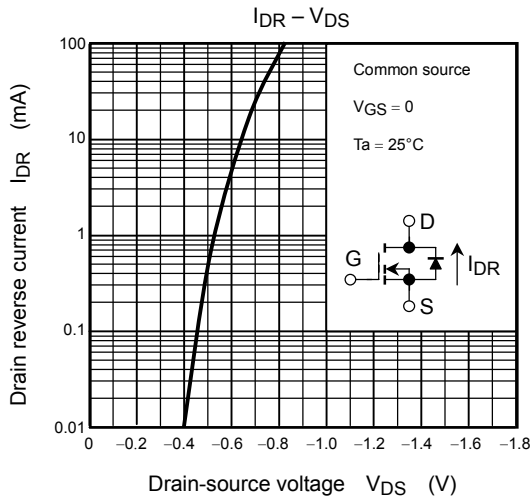
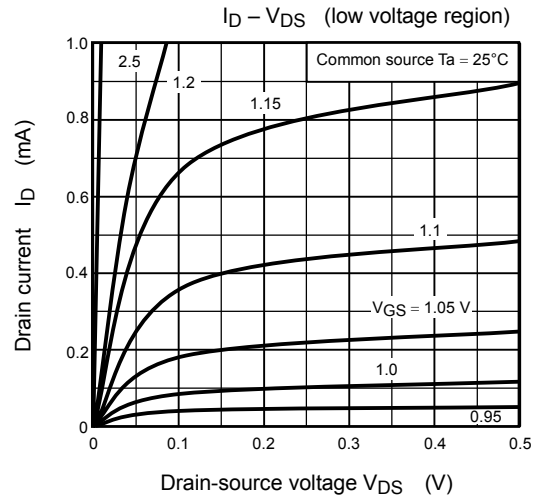
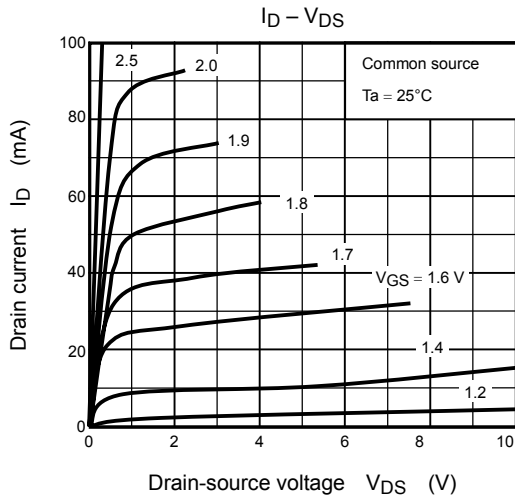


**(c)  $V_{OUT}$**

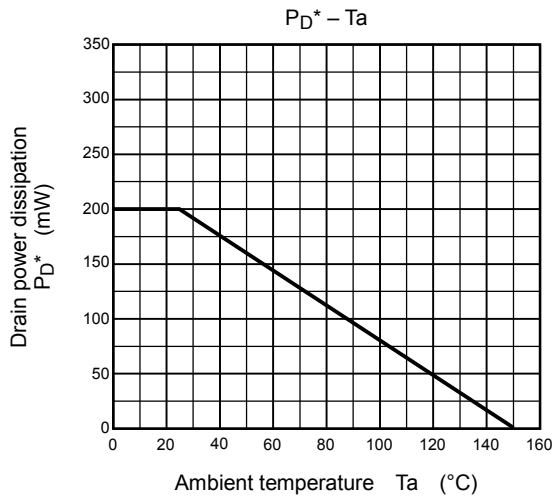
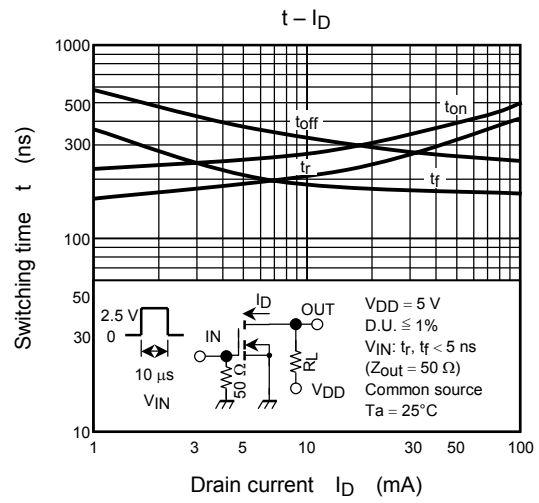
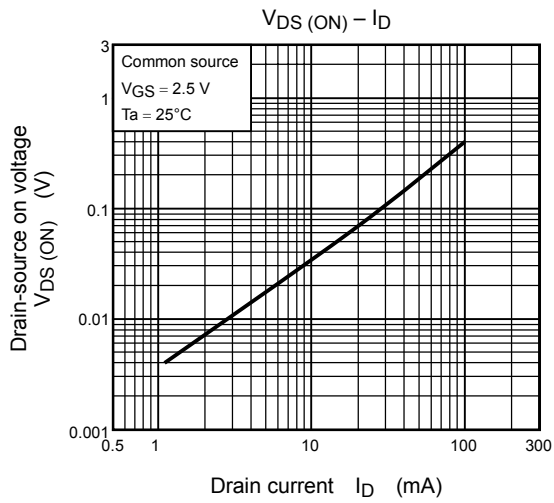
$V_{DS}$



(Q1, Q2 common)



(Q1, Q2 common)



\*: TOTAL rating

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