TOSHIBA Field Effect Transistor Silicon N Channel MOS Type

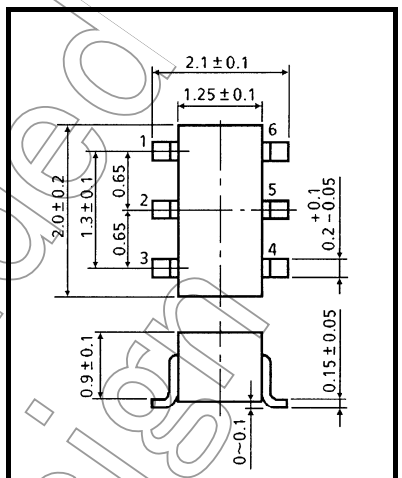
HN1K06FU

High Speed Switching Applications

Analog Switch Applications

- 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

Unit: mm



1. SOURCE 1
2. GATE 1
3. DRAIN 2
4. SOURCE 2
5. GATE 2
6. DRAIN 1

US6	
JEDEC	—
JEITA	—
TOSHIBA	2-2J1C

Weight: 6.8 mg (typ.)

Absolute Maximum Ratings (Ta = 25°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 1)	200	mW
Channel temperature	T_{ch}	150	°C
Storage temperature range	T_{stg}	−55 to 150	°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).

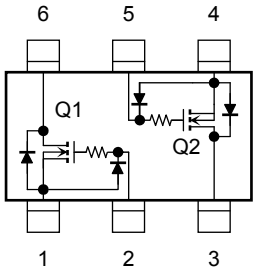
Note 1: TOTAL rating

Not Recommended for New Design

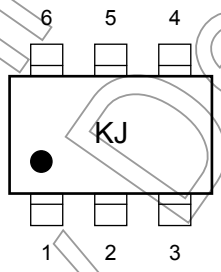
Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GSS}	V_{GS} = 10 V, V_{DS} = 0 V	—	—	1	μA
Drain-source breakdown voltage	$V_{(BR)\ DSS}$	I_D = 100 μA, V_{GS} = 0 V	20	—	—	V
Drain cut-off current	I_{DSS}	V_{DS} = 20 V, V_{GS} = 0 V	—	—	1	μA
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	Ω
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	—	μs
	t_{off}	V_{DD} = 3 V, I_D = 10 mA, V_{GS} = 0 to 2.5 V	—	0.34	—	

Equivalent Circuit (top view)



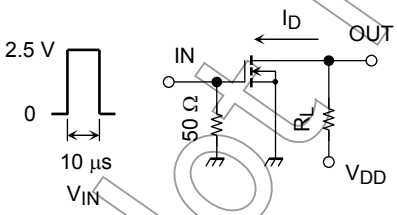
Marking



(Q1, Q2 common)

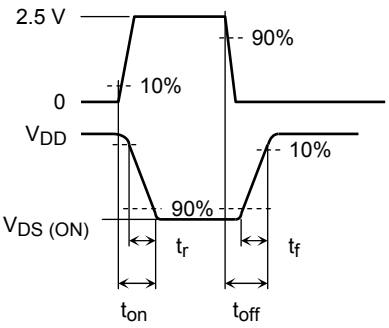
Switching Time Test Circuit

(a) Test circuit



V_{DD} = 3 V
D.U. ≦ 1%
V_{IN}: t_r, t_f < 5 ns
(Z_{out} = 50 Ω)
Common Source
Ta = 25°C

(b) V_{IN}



(c) V_{OUT}

V_{DS}

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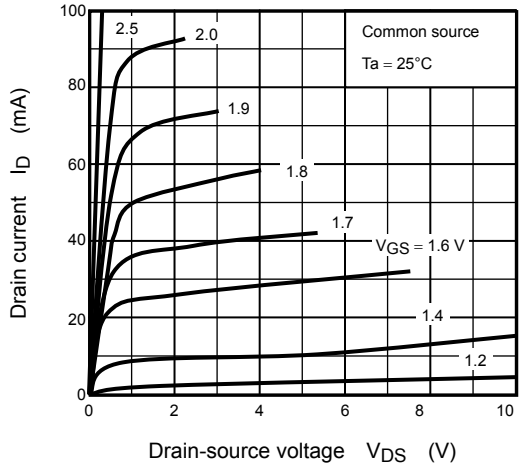
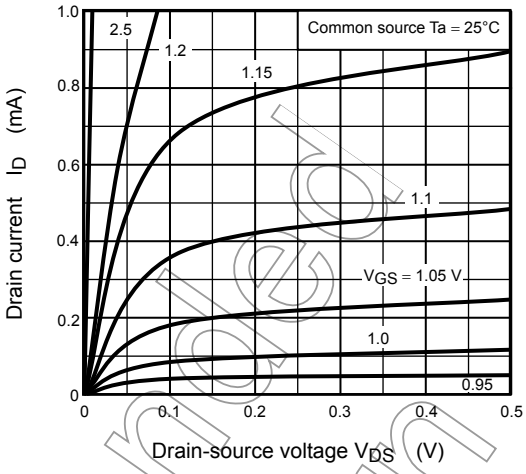
(Q1, Q2 common)

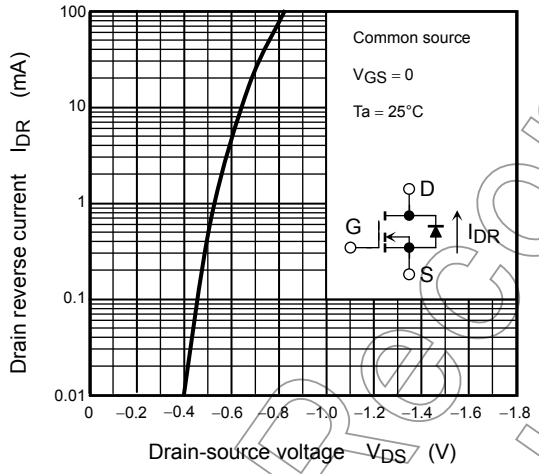
$I_D - V_{DS}$



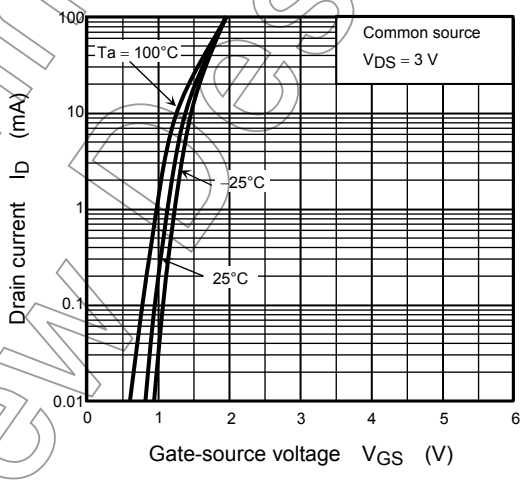
$I_D - V_{DS}$ (low voltage region)



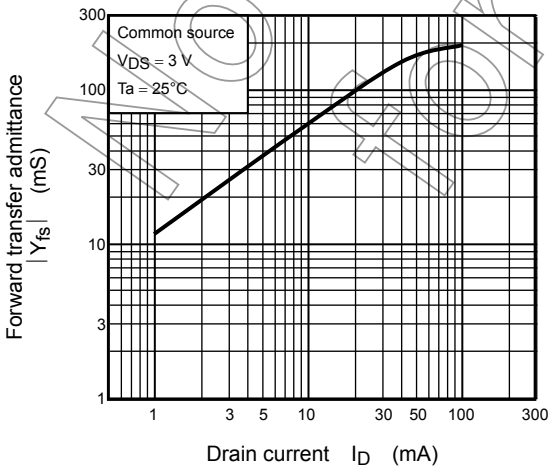
$I_{DR} - V_{DS}$



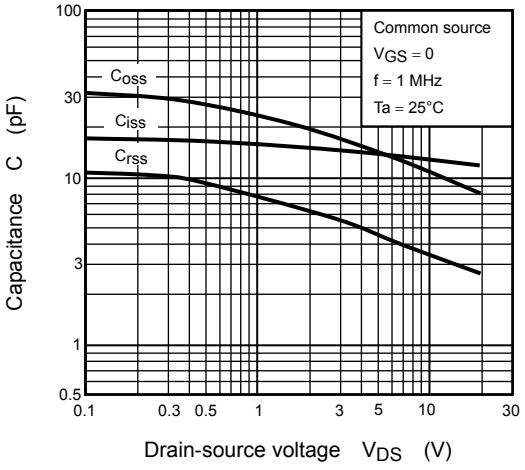
$I_D - V_{GS}$



$|Y_{fs}| - I_D$



$C - V_{DS}$



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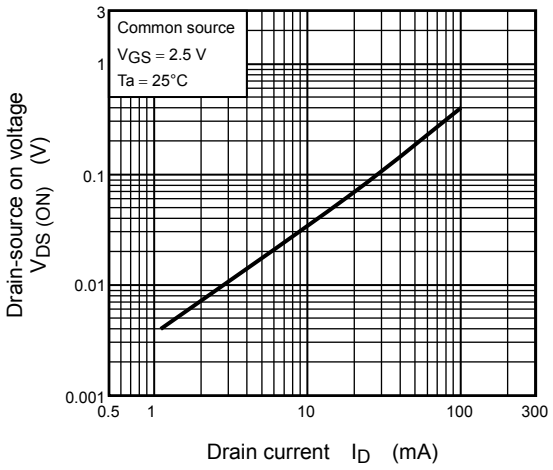
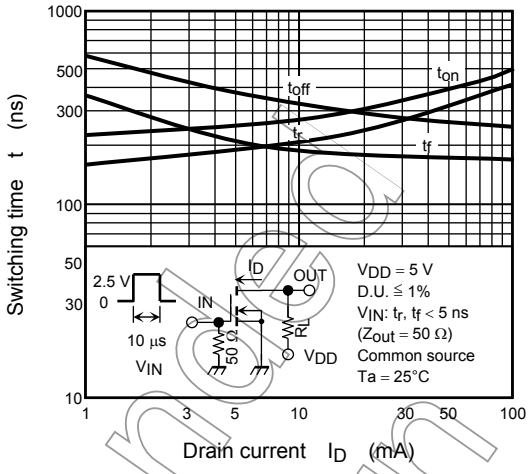
(Q1, Q2 common)

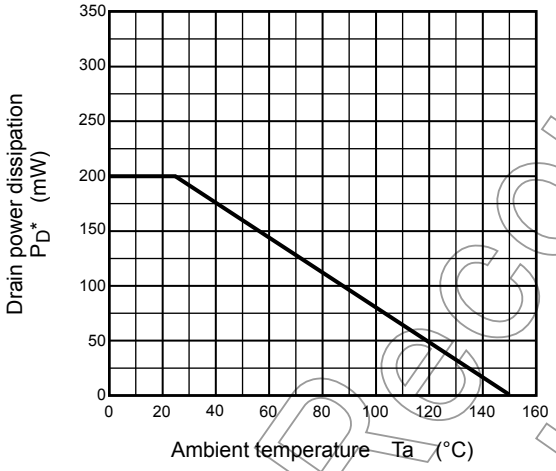
$V_{DS\ (ON)} - I_D$



$t - I_D$



$P_D^* - Ta$



*: TOTAL rating

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