

# HN1K05FU

For Portable Devices

High Speed Switching Applications

Interface 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  $1.0$  V
- Suitable for high-density mounting because of a compact package.

## Absolute Maximum Ratings (Ta = 25°C) (Q1, Q2 common)

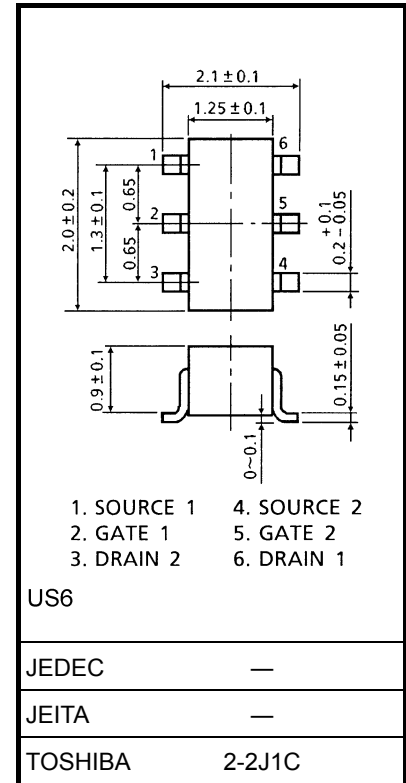
Characteristics	Symbol	Rating	Unit
Drain-source voltage	$V_{DS}$	20	V
Gate-source voltage	$V_{GSS}$	10	V
DC drain current	$I_D$	100	mA
Drain power dissipation	$P_D$ (Note 1)	200	mW
Channel temperature	$T_{ch}$	150	°C
Storage temperature range	$T_{stg}$	-55 to 150	°C

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

Unit: mm

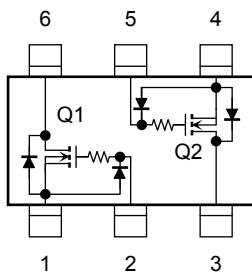


Weight: 6.8 mg

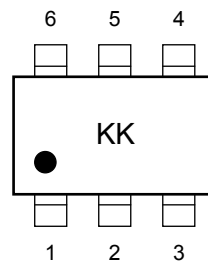
## Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	$I_{GSS}$	$V_{GS} = 10\text{ V}, V_{DS} = 0\text{ V}$	—	—	1	$\mu\text{A}$
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 100\ \mu\text{A}, V_{GS} = 0\text{ V}$	20	—	—	V
Drain cut-off current	$I_{DSS}$	$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}$	—	—	1	$\mu\text{A}$
Gate threshold voltage	$V_{th}$	$V_{DS} = 1.5\text{ V}, I_D = 0.1\text{ mA}$	0.5	—	1	V
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 1.5\text{ V}, I_D = 10\text{ mA}$	35	70	—	mS
Drain-Source ON resistance 1	$R_{DS(ON)1}$	$I_D = 1\text{ mA}, V_{GS} = 1.2\text{ V}$	—	15	50	$\Omega$
Drain-Source ON resistance 2	$R_{DS(ON)2}$	$I_D = 10\text{ mA}, V_{GS} = 1.5\text{ V}$	—	10	40	$\Omega$
Drain-Source ON resistance 3	$R_{DS(ON)3}$	$I_D = 10\text{ mA}, V_{GS} = 2.5\text{ V}$	—	7	28	$\Omega$
Input capacitance	$C_{iss}$	$V_{DS} = 1.5\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	—	12	—	pF
Reverse transfer capacitance	$C_{rss}$	$V_{DS} = 1.5\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	—	3.4	—	pF
Output capacitance	$C_{oss}$	$V_{DS} = 1.5\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	—	12	—	pF
Switching time	$t_{on}$	$V_{DD} = 1.5\text{ V}, I_D = 10\text{ mA}, V_{GS} = 0\text{ to }1.5\text{ V}$	—	0.35	—	$\mu\text{s}$
	$t_{off}$	$V_{DD} = 1.5\text{ V}, I_D = 10\text{ mA}, V_{GS} = 0\text{ to }1.5\text{ V}$	—	0.2	—	

### Equivalent Circuit (top view)



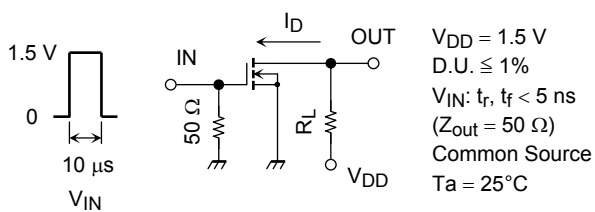
### Marking



(Q1, Q2 common)

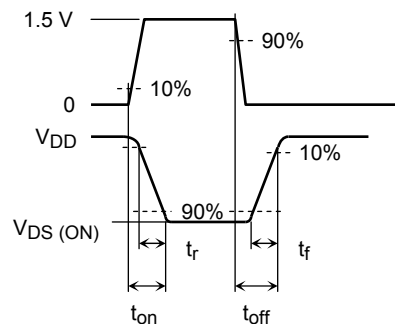
### Switching Time Test Circuit

#### (a) Test circuit



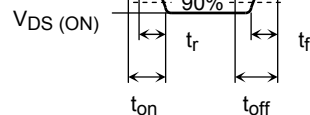
#### (b) $V_{IN}$

$V_{GS}$

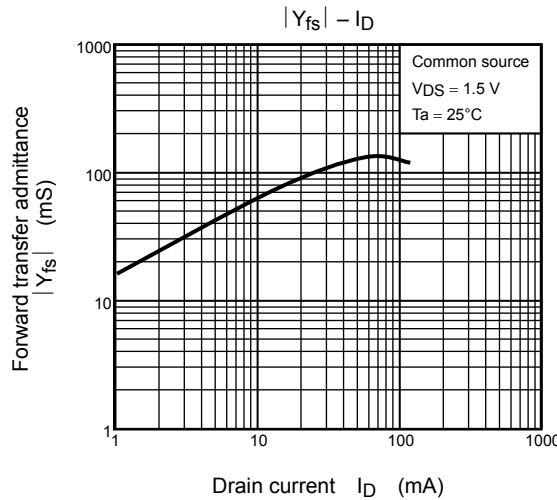
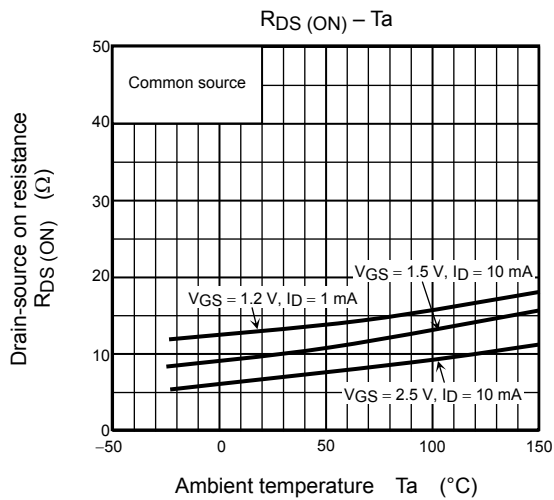
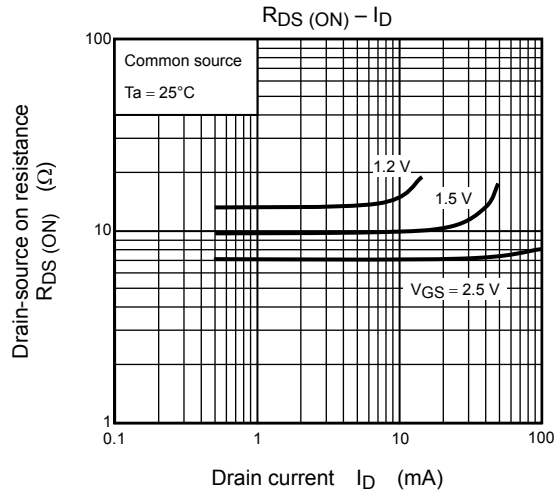
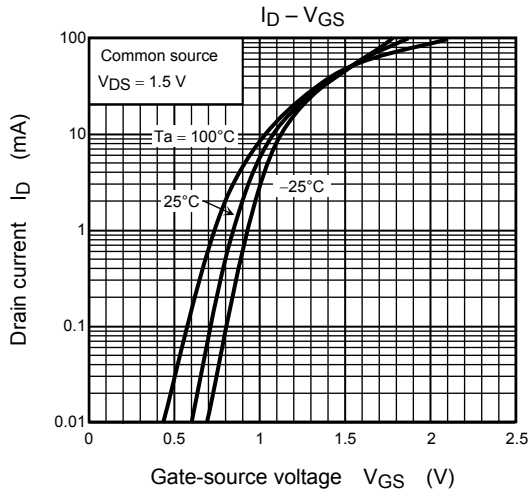
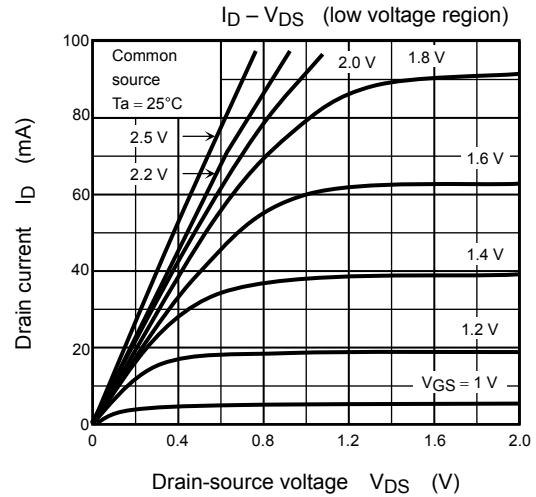
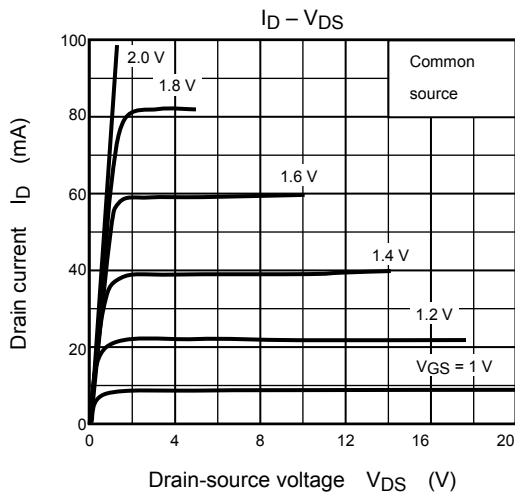


#### (c) $V_{OUT}$

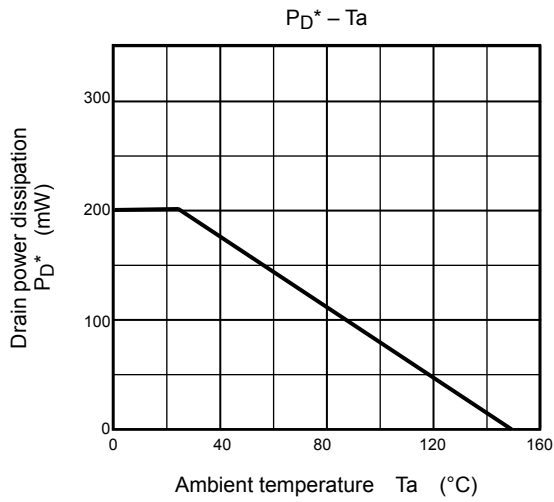
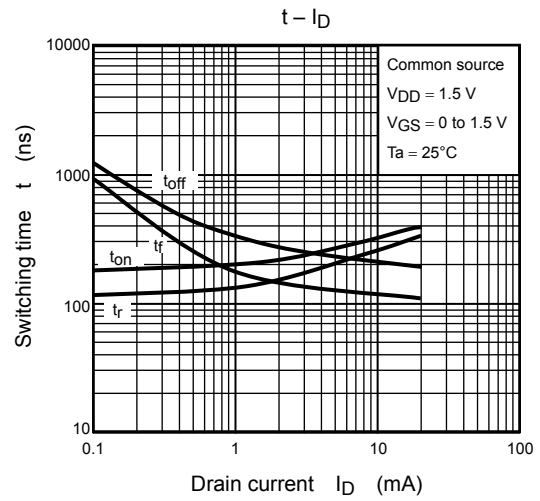
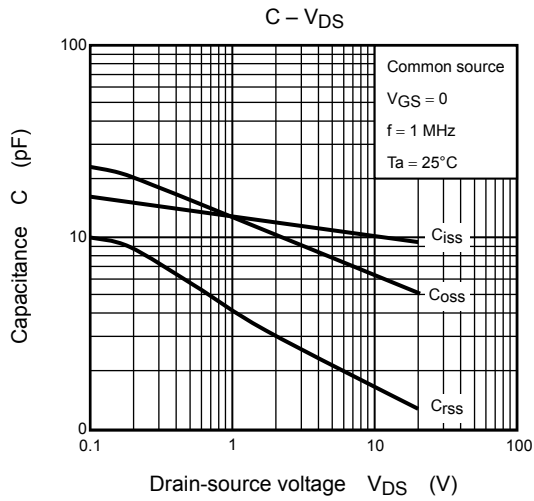
$V_{DS}$



(Q1, Q2 common)



(Q1, Q2 common)



\*: TOTAL rating

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20070701-EN GENERAL

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