

Preliminary

TOSHIBA Field Effect Transistor
Silicon N Channel MOS Type

HN1K05FU

For Portable Devices

High Speed Switching Applications

Interface Applications

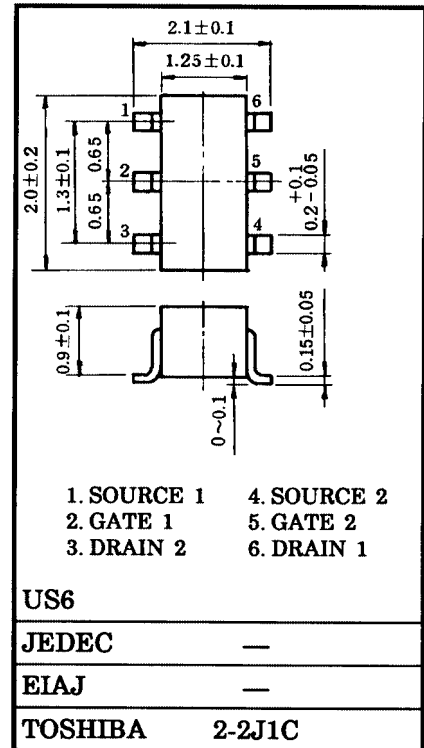
- High input impedance and extremely low drive current.
- V_{th} is low and it is possible to drive directly at low-voltage CMOS.
 $V_{th} = 0.5$ to 1.0 V
- Suitable for high-density mounting because of a compact package.

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
DC 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

Unit in mm



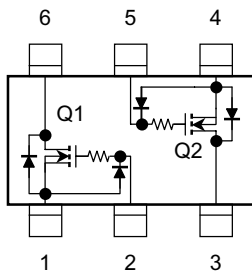
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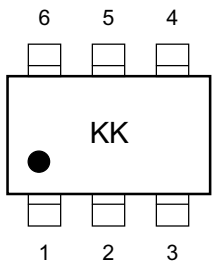
Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GSS}	$V_{GS} = 10\text{ V}, V_{DS} = 0\text{ V}$	—	—	1	μA
Drain-source breakdown voltage	$V_{(BR)DSS}$	$I_D = 100\text{ }\mu\text{A}, V_{GS} = 0\text{ V}$	20	—	—	V
Drain cut-off current	I_{DSS}	$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}$	—	—	1	μA
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	Ω
Drain-Source ON resistance 2	$R_{DS(ON)2}$	$I_D = 10\text{ mA}, V_{GS} = 1.5\text{ V}$	—	10	40	Ω
Drain-Source ON resistance 3	$R_{DS(ON)3}$	$I_D = 10\text{ mA}, V_{GS} = 2.5\text{ V}$	—	7	28	Ω
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	—	μs
	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)



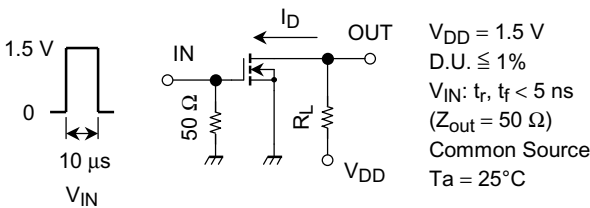
Marking



(Q1, Q2 common)

Switching Time Test Circuit

(a) Test circuit

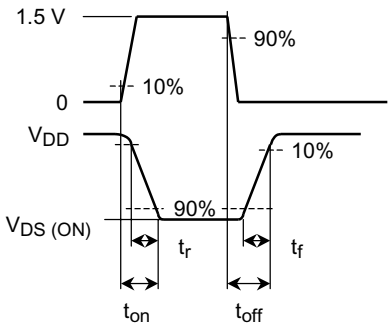


(b) VIN

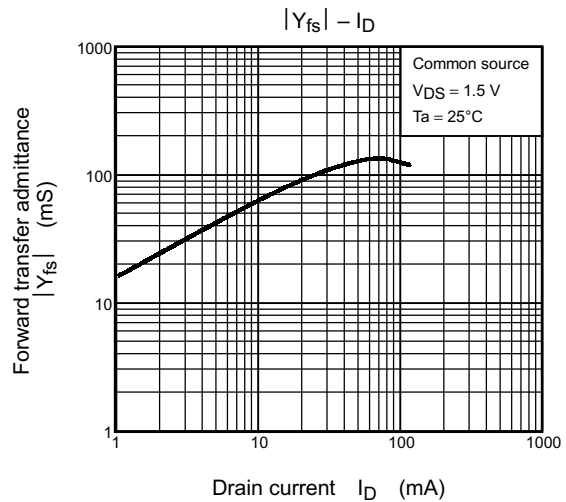
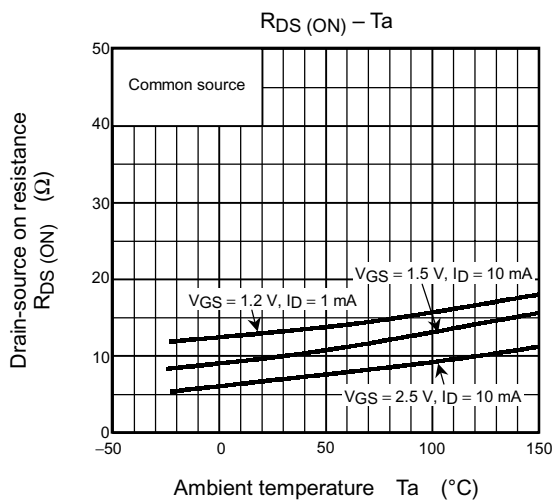
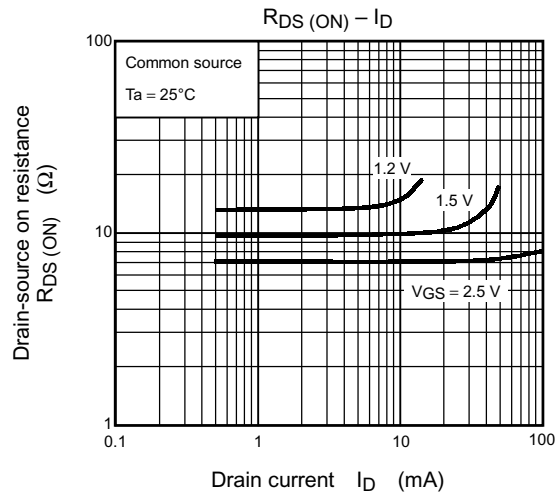
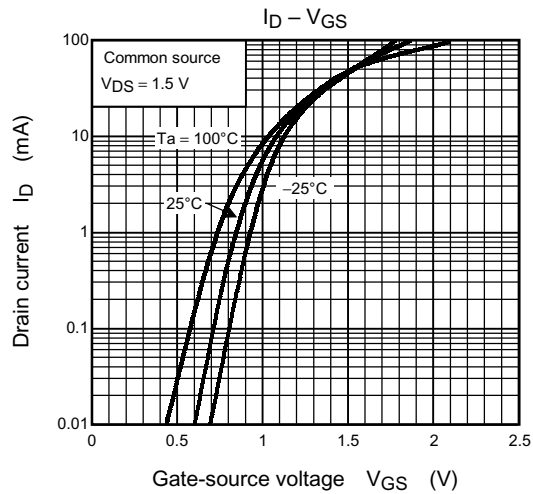
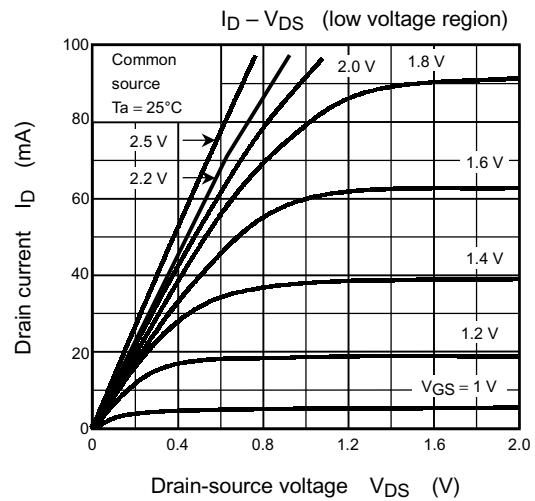
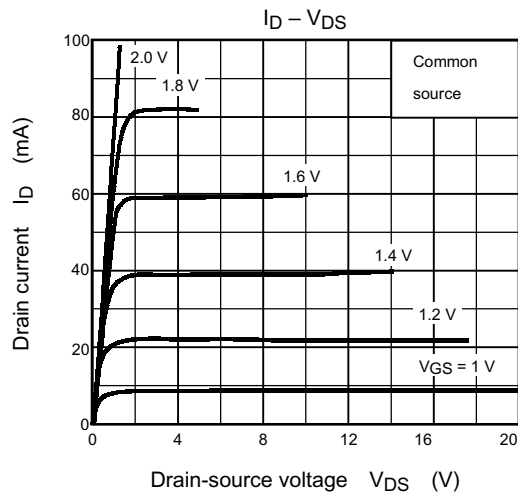
V_{GS}

(c) VOUT

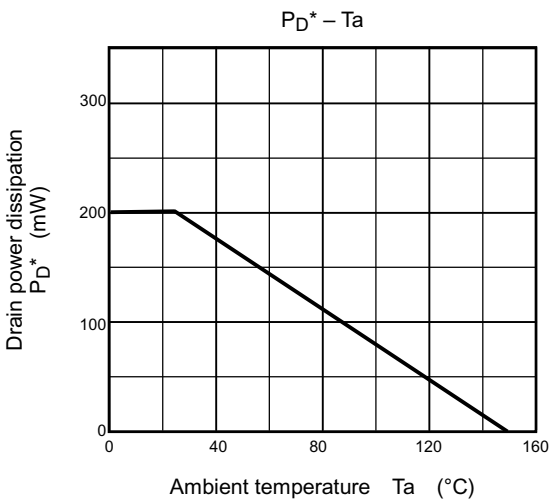
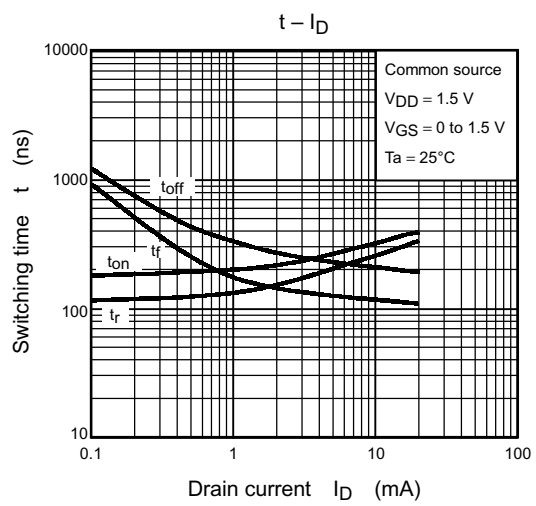
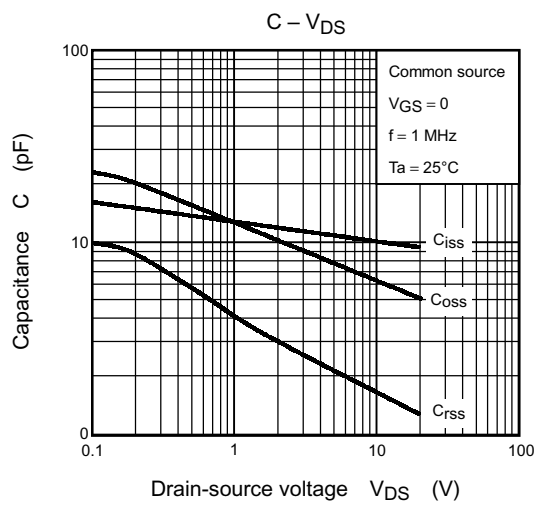
V_{DS}



(Q1, Q2 common)



(Q1, Q2 common)



*: TOTAL rating