

Preliminary

TOSHIBA Field Effect Transistor
Silicon N Channel MOS Type

HN1K04FU

High Speed Switching Applications

Analog Switch Applications

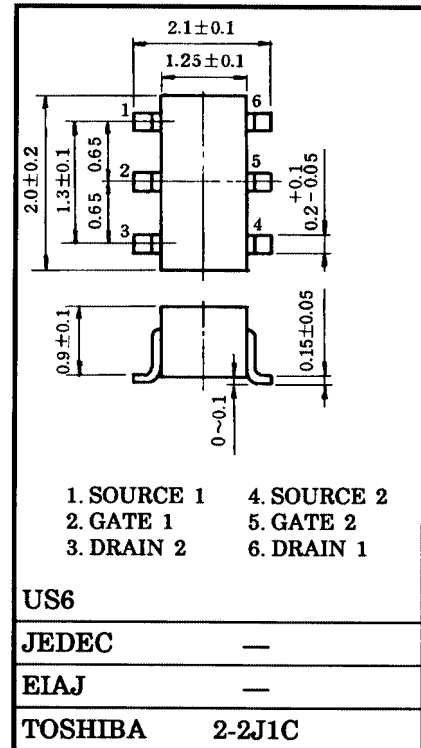
- High input impedance and extremely low drive current.
- V_{th} is low and it is possible to drive directly at low-voltage CMOS.
: $V_{th} = 0.8$ to 2.5 V
- Switching speed is fast.
- Suitable for high-density mounting because of a compact package.

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

Characteristics	Symbol	Rating	Unit
Drain-source voltage	V_{DS}	50	V
Gate-source voltage	V_{GSS}	10	V
DC drain current	I_D	50	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



Weight : 6.8mg

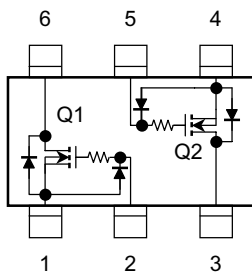
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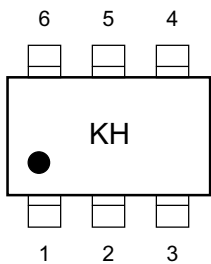
Electrical Characteristics (Ta = 25°C) (Q1, Q2 common)

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	$V_{(BR)DSS}$	$I_D = 100\text{ }\mu\text{A}, V_{GS} = 0\text{ V}$	50	—	—	V
Drain cut-off current	I_{DSS}	$V_{DS} = 50\text{ V}, V_{GS} = 0\text{ V}$	—	—	1	μA
Gate threshold voltage	V_{th}	$V_{DS} = 5\text{ V}, I_D = 0.1\text{ mA}$	0.8	—	2.5	V
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 5\text{ V}, I_D = 10\text{ mA}$	20	—	—	mS
Drain-source ON resistance	$R_{DS(ON)}$	$I_D = 10\text{ mA}, V_{GS} = 4.0\text{ V}$	—	20	50	Ω
Input capacitance	C_{iss}	$V_{DS} = 5\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	—	6.3	—	pF
Reverse transfer capacitance	C_{rss}	$V_{DS} = 5\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	—	1.3	—	pF
Output capacitance	C_{oss}	$V_{DS} = 5\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	—	5.7	—	pF
Switching time	t_{on}	$V_{DD} = 5\text{ V}, I_D = 10\text{ mA}, V_{GS} = 0\text{ to }4.0\text{ V}$	—	0.11	—	μs
	t_{off}	$V_{DD} = 5\text{ V}, I_D = 10\text{ mA}, V_{GS} = 0\text{ to }4.0\text{ V}$	—	0.15	—	

Equivalent Circuit (top view)



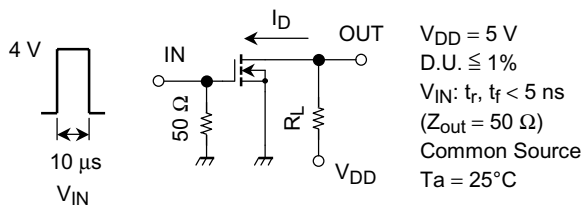
Marking



(Q1, Q2 common)

Switching Time Test Circuit

(a) Test circuit

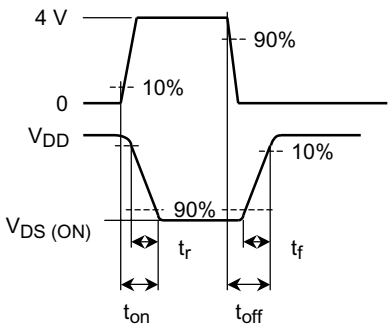


(b) VIN

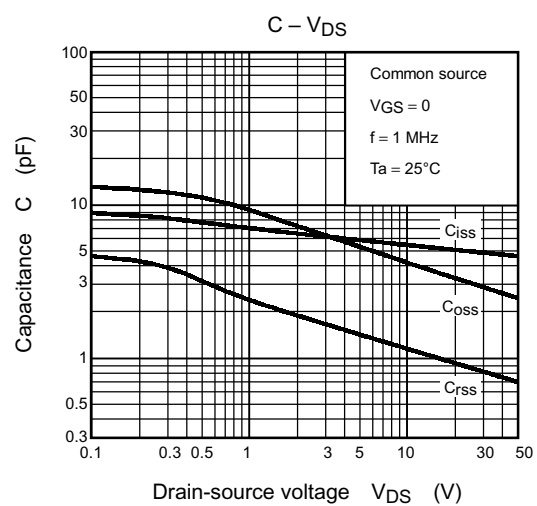
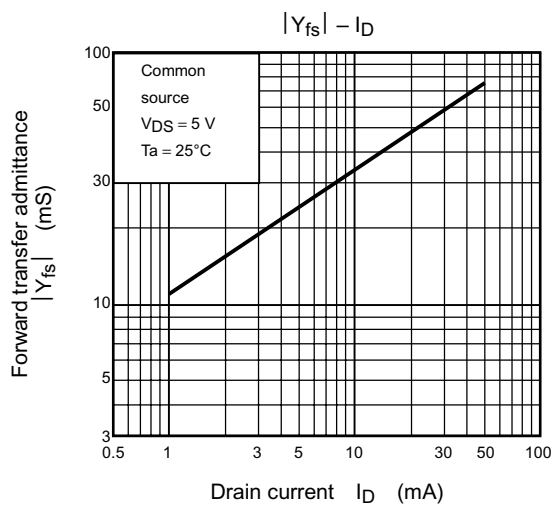
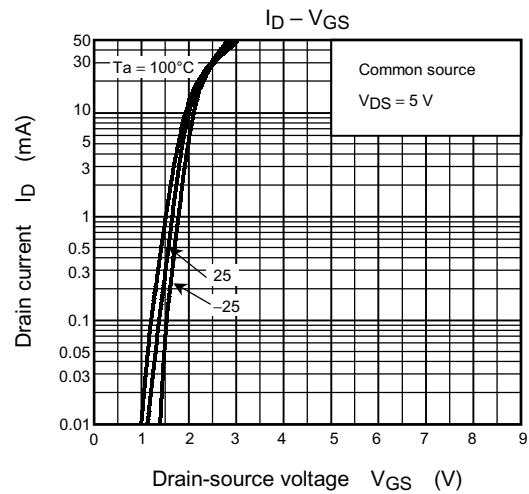
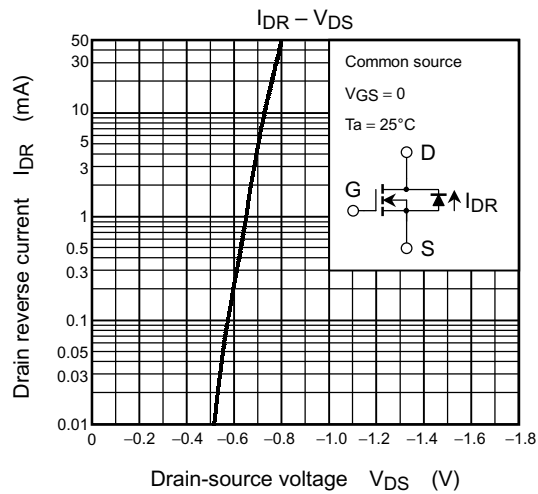
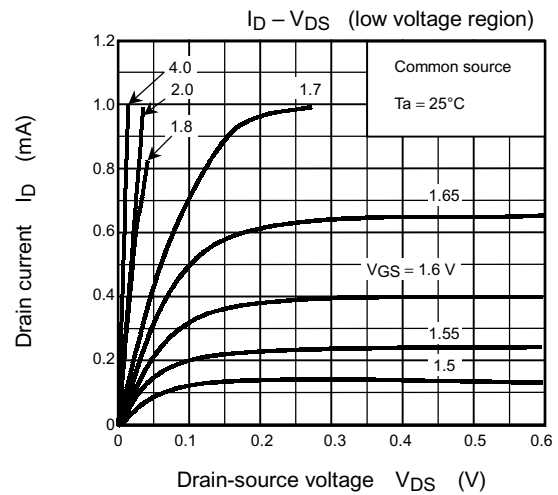
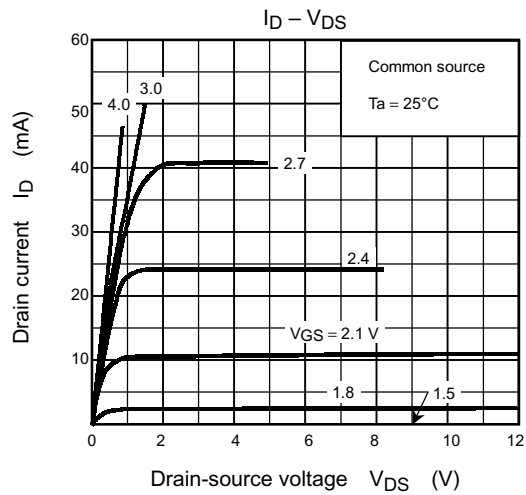
VGS

(c) VOUT

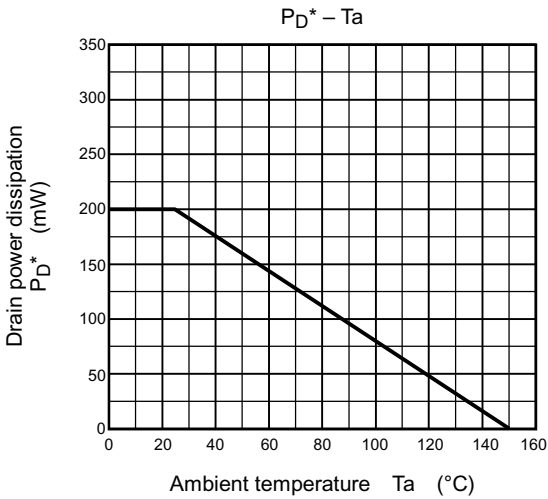
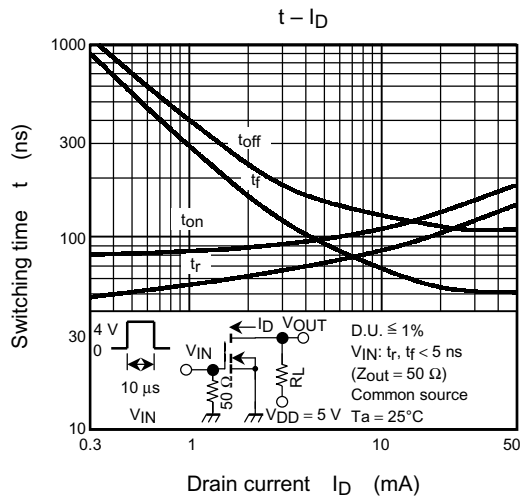
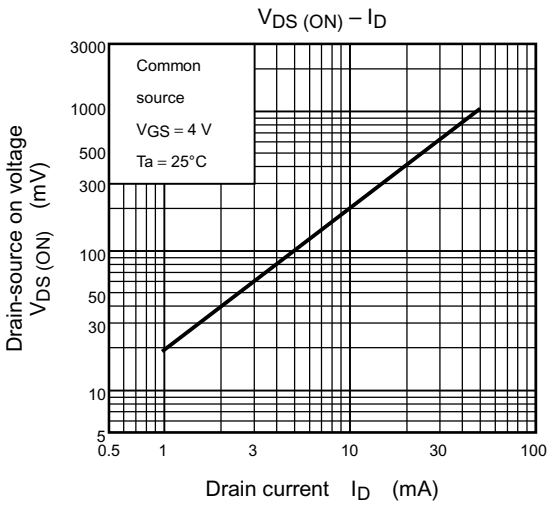
VDS



(Q1, Q2 common)



(Q1, Q2 common)



*: TOTAL rating