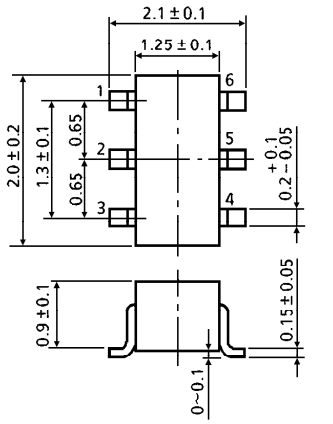
TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE SILICON P CHANNEL MOS TYPE

HN1L02FU

HIGH SPEED SWITCHING APPLICATIONS

ANAROG SWITCH APPLICATIONS

Unit in mm



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

US6	
JEDEC	—
EIAJ	—
TOSHIBA	2-2J1C

Weight : 6.8mg

Q1, Q2 COMMON

- 2.5V Gate Drive
- Low Threshold Voltage
  Q1 : V_{th} = 0.5~1.5V Q2 : V_{th} = −0.5~−1.5V
- High Speed
- Small Package

Q1 MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GSS}	10	V
Drain Current	I_D	50	mA

Q2 MAXIMUM RATINGS (Ta = 25°C)

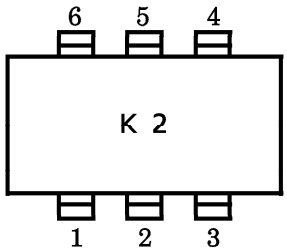
CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	V_{DS}	−20	V
Gate-Source Voltage	V_{GSS}	−7	V
Drain Current	I_D	−50	mA

MAXIMUM RATINGS (Q1, Q2 COMMON) (Ta = 25°C)

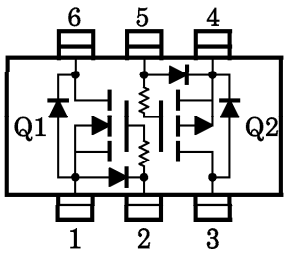
CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain Power Dissipation	P_D※	200	mW
Channel Temperature	T_{ch}	150	°C
Storage Temperature Range	T_{stg}	−55 ~ 150	°C

※ Total Rating

MARKING



EQUIVALENT CIRCUIT (TOP VIEW)



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Q1 ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	V_{GS} = 10V, V_{DS} = 0	—	—	1	μA
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	I_D = 100μA, V_{GS} = 0	20	—	—	V
Drain Cut-off Current		I_{DSS}	V_{DS} = 20V, V_{GS} = 0	—	—	1	μA
Gate Threshold Voltage		V_{th}	V_{DS} = 3V, I_D = 0.1mA	0.5	—	1.5	V
Forward Transfer Admittance		$\|Y_{fs}\|$	V_{DS} = 3V, I_D = 10mA	20	—	—	mS
Drain-Source ON Resistance		$R_{DS(ON)}$	I_D = 10mA, V_{GS} = 2.5V	—	20	40	Ω
Input Capacitance		C_{iss}	V_{DS} = 3V, V_{GS} = 0, f = 1MHz	—	5.5	—	pF
Reverse Transfer Capacitance		C_{rss}	V_{DS} = 3V, V_{GS} = 0, f = 1MHz	—	1.6	—	pF
Output Capacitance		C_{oss}	V_{DS} = 3V, V_{GS} = 0, f = 1MHz	—	6.5	—	pF
Switching Time	Turn-on Time	t_{on}	V_{DD} = 3V, I_D = 10mA, V_{GS} = 0~2.5V	—	0.14	—	μs
	Turn-off Time	t_{off}	V_{DD} = 3V, I_D = 10mA, V_{GS} = 0~2.5V	—	0.14	—	μs

Q2 ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	V_{GS} = −7V, V_{DS} = 0	—	—	−1	μA
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	I_D = −100μA, V_{GS} = 0	−20	—	—	V
Drain Cut-off Current		I_{DSS}	V_{DS} = −20V, V_{GS} = 0	—	—	−1	μA
Gate Threshold Voltage		V_{th}	V_{DS} = −3V, I_D = −0.1mA	−0.5	—	−1.5	V
Forward Transfer Admittance		$\|Y_{fs}\|$	V_{DS} = −3V, I_D = −10mA	15	—	—	mS
Drain-Source ON Resistance		$R_{DS(ON)}$	I_D = −10mA, V_{GS} = −2.5V	—	20	40	Ω
Input Capacitance		C_{iss}	V_{DS} = −3V, V_{GS} = 0, f = 1MHz	—	10.4	—	pF
Reverse Transfer Capacitance		C_{rss}	V_{DS} = −3V, V_{GS} = 0, f = 1MHz	—	2.8	—	pF
Output Capacitance		C_{oss}	V_{DS} = −3V, V_{GS} = 0, f = 1MHz	—	8.4	—	pF
Switching Time	Turn-on Time	t_{on}	V_{DD} = −3V, I_D = −10mA, V_{GS} = 0~−2.5V	—	0.15	—	μs
	Turn-off Time	t_{off}	V_{DD} = −3V, I_D = −10mA, V_{GS} = 0~−2.5V	—	0.13	—	μs

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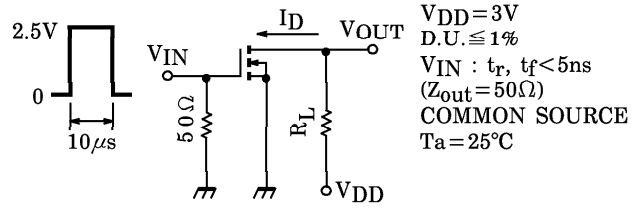
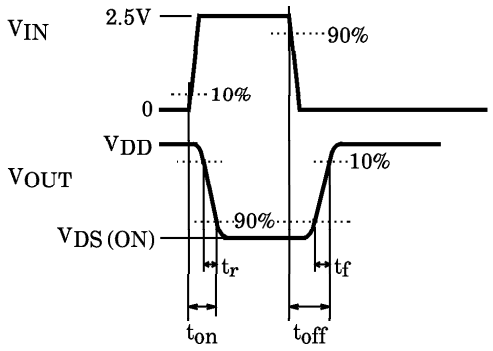
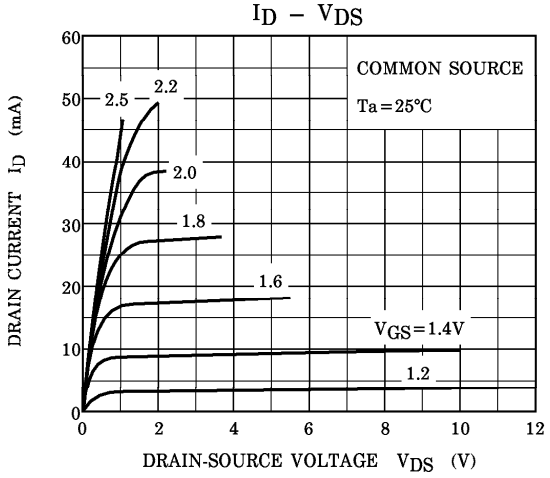
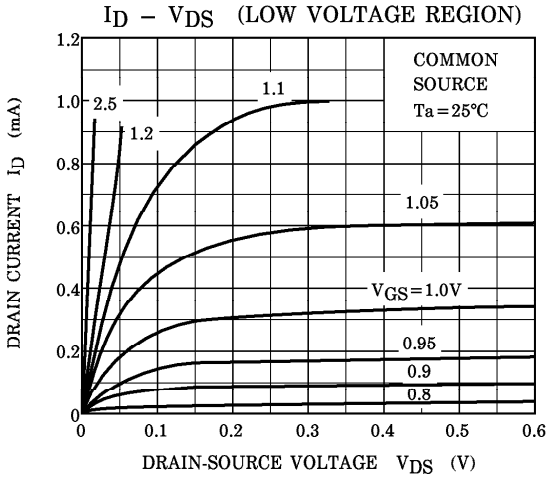
Q1 (Nch MOS FET)

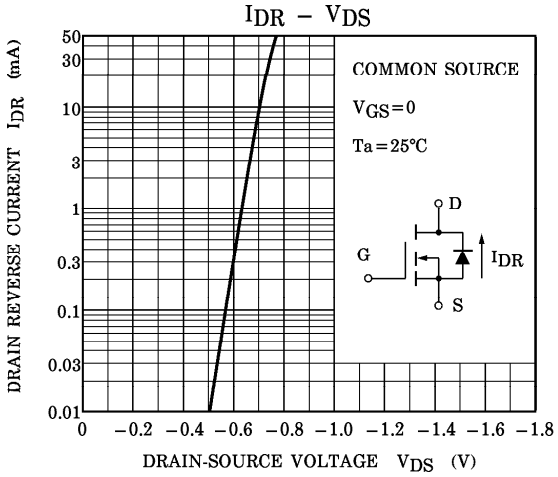
SWITCHING TIME TEST CIRCUIT

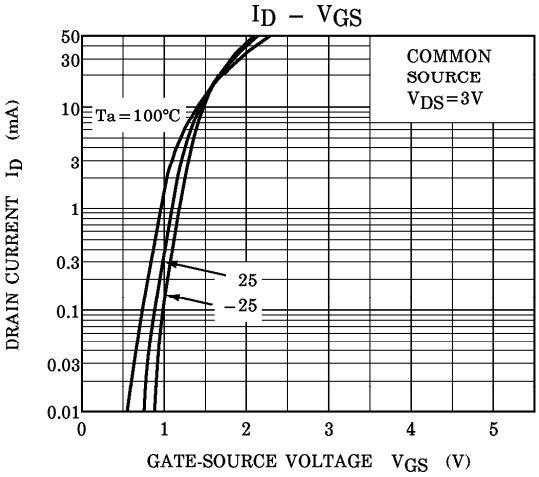






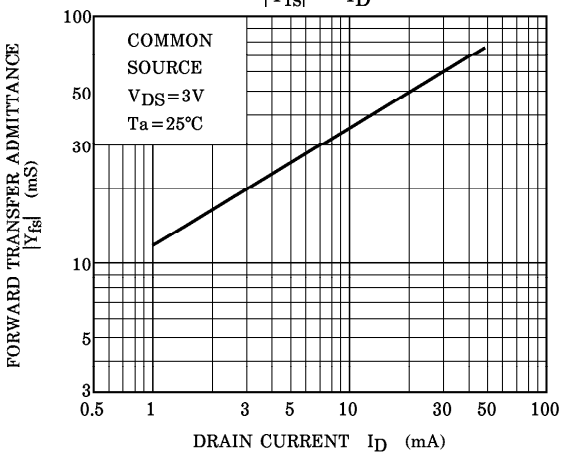




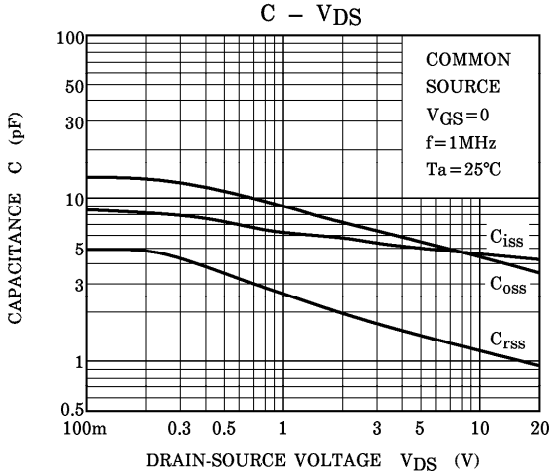


Q1 (Nch MOS FET)

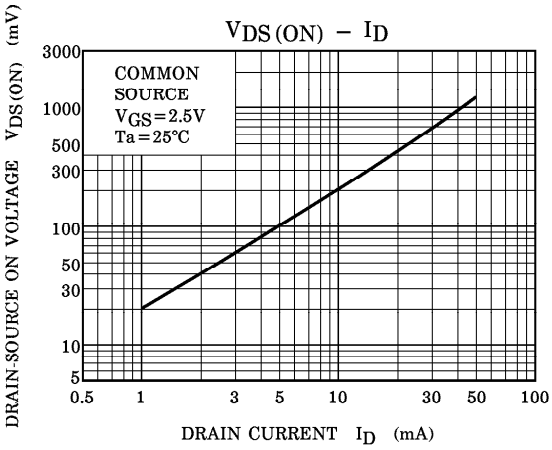
$|Y_{fs}|$ – I_D



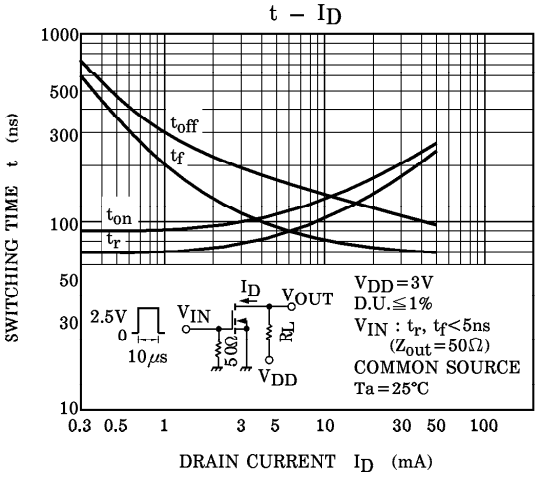
C – V_{DS}



$V_{DS(ON)}$ – I_D

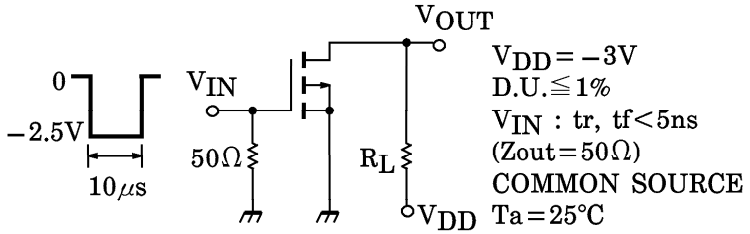


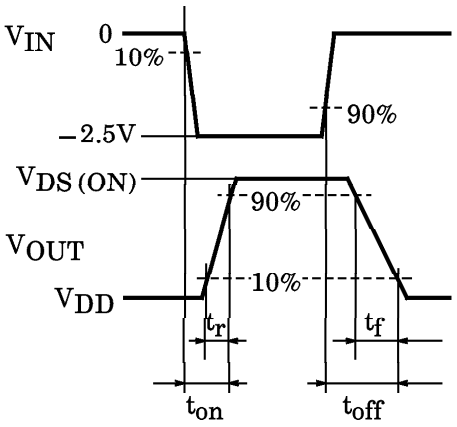
t – I_D

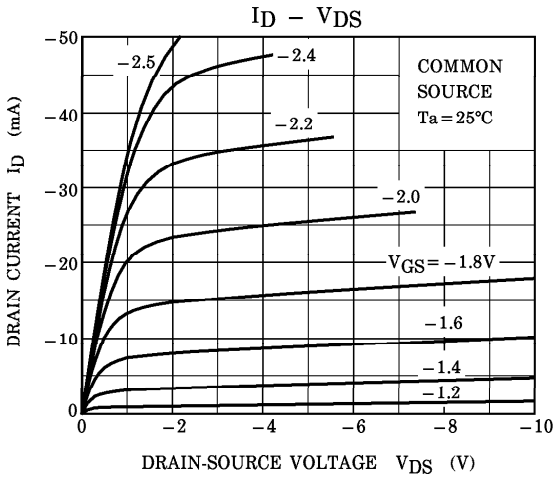


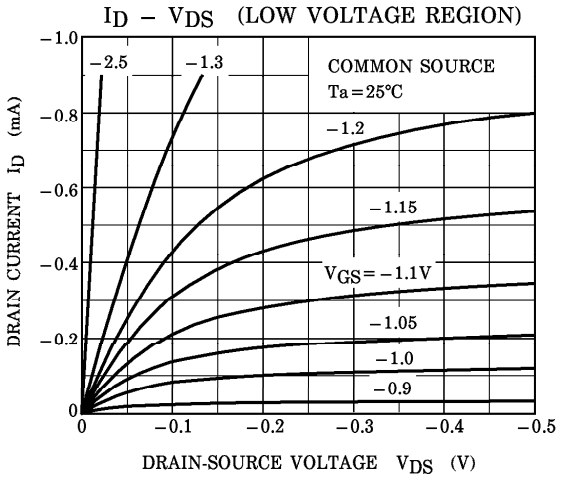
Q2 (Pch MOS FET)

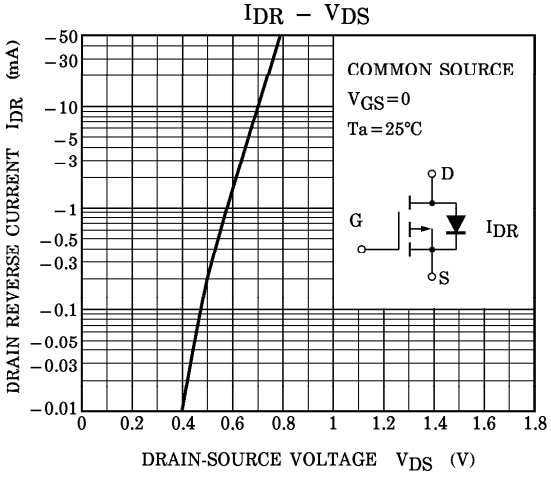
SWITCHING TIME TEST CIRCUIT

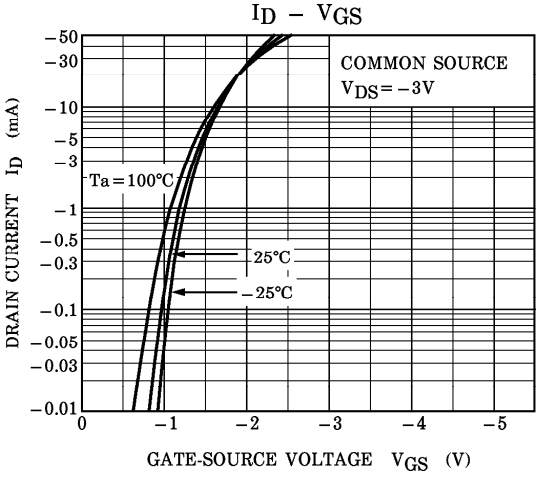






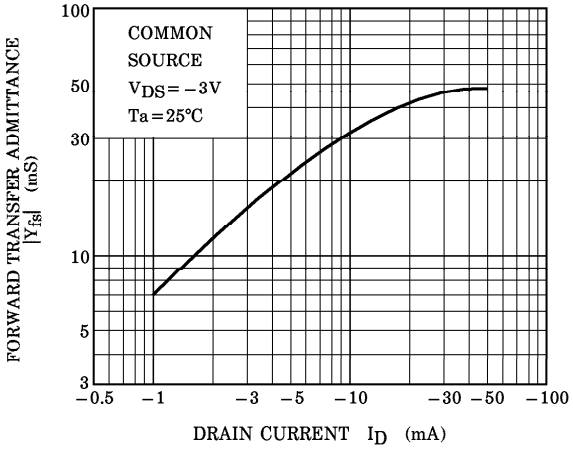




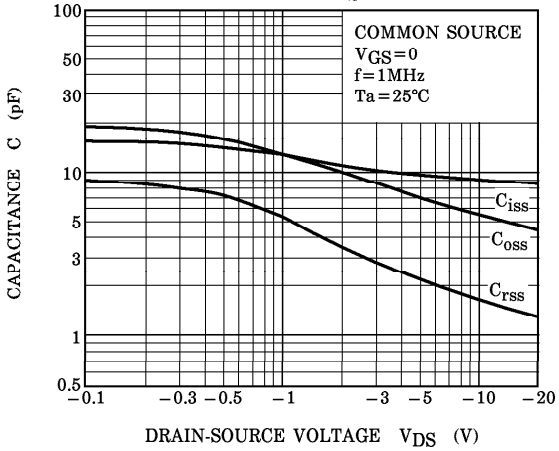


Q2 (Pch MOS FET)

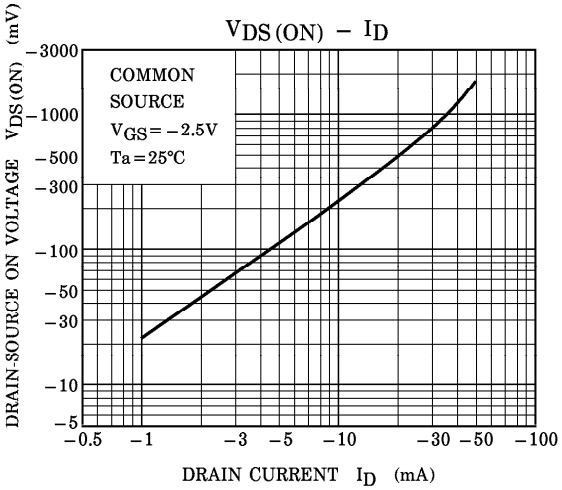
$|Y_{fs}|$ – I_D



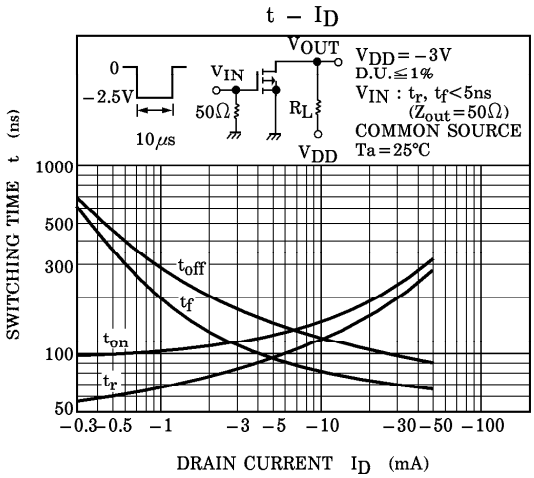
C – V_{DS}



$V_{DS\,(ON)}$ – I_D

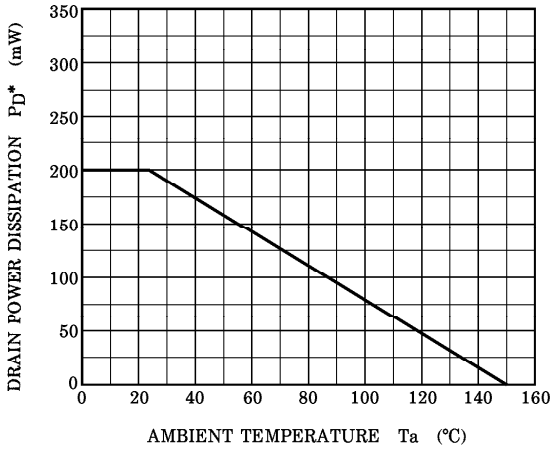


t – I_D



(Q1, Q2 COMMON)

P_D* – Ta



* : Total Rating