

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N-P CHANNEL MOS TYPE

# HN1L03FU

HIGH SPEED SWITCHING APPLICATIONS

ANAROG SWITCH APPLICATIONS

Unit in mm

**Q1, Q2 COMMON**

- Low Threshold Voltage  
 $Q1 : V_{th} = 0.8 \sim 2.5 \text{ V}$      $Q2 : V_{th} = -0.5 \sim -1.5 \text{ V}$
- High Speed
- Small Package

**Q1 MAXIMUM RATINGS (Ta = 25°C)**

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

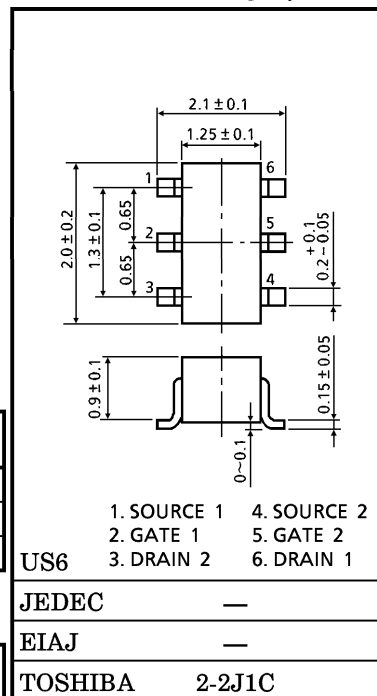
**Q2 MAXIMUM RATINGS (Ta = 25°C)**

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

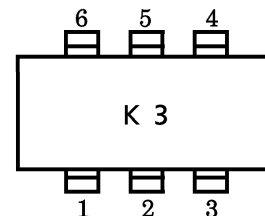
**MAXIMUM RATINGS (Q1, Q2 COMMON) (Ta = 25°C)**

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

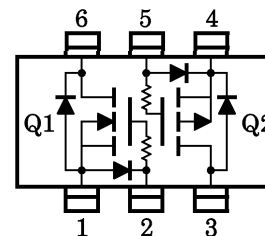
\* : Total Rating



Weight : 6.8 mg  
 MARKING



EQUIVALENT CIRCUIT (TOP VIEW)



961001EAA1

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## Q1 ELECTRICAL CHARACTERISTICS (Ta = 25°C)

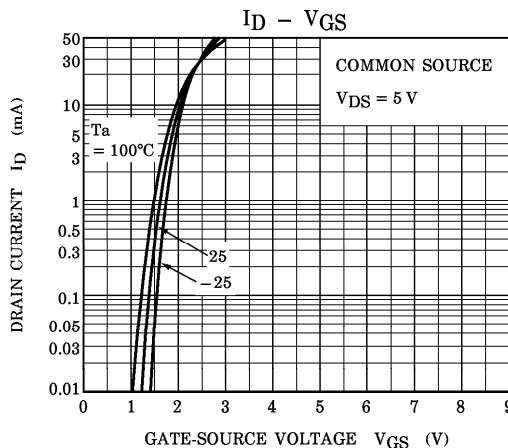
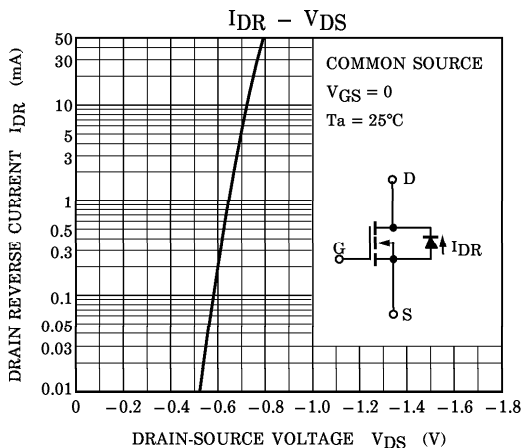
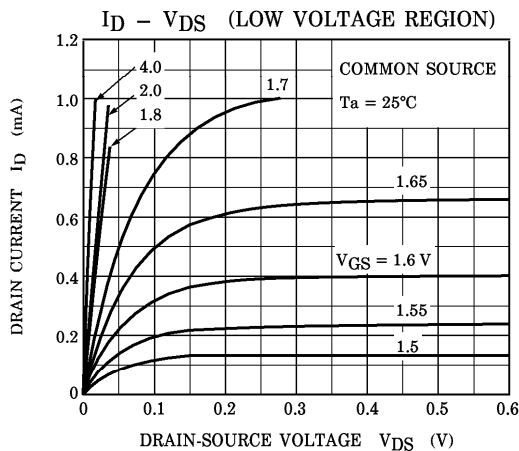
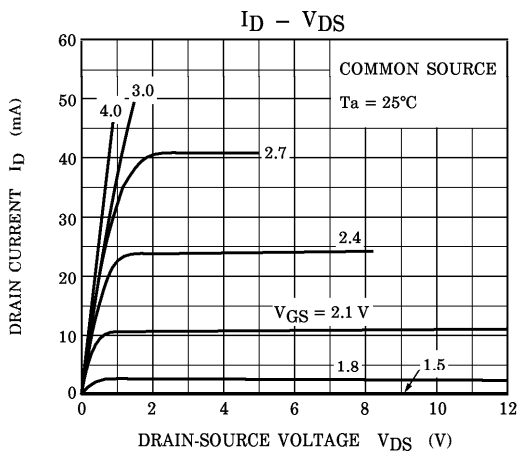
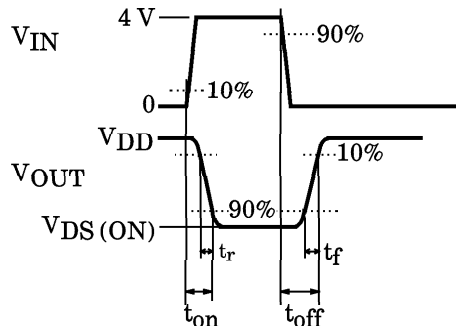
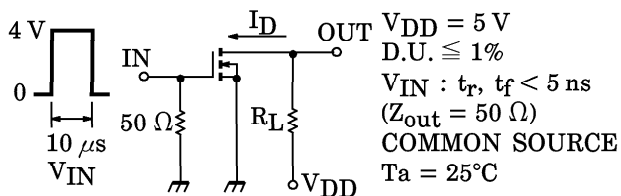
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I <sub>GSS</sub>	V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0	—	—	1	μA
Drain-Source Breakdown Voltage		V (BR) DSS	I <sub>D</sub> = 100 μA, V <sub>GS</sub> = 0	50	—	—	V
Drain Cut-off Current		I <sub>DSS</sub>	V <sub>DS</sub> = 50 V, V <sub>GS</sub> = 0	—	—	1	μA
Gate Threshold Voltage		V <sub>th</sub>	V <sub>DS</sub> = 5 V, I <sub>D</sub> = 0.1 mA	0.8	—	2.5	V
Forward Transfer Admittance		Y <sub>fs</sub>	V <sub>DS</sub> = 5 V, I <sub>D</sub> = 10 mA	20	—	—	mS
Drain-Source ON Resistance		R <sub>DS(ON)</sub>	I <sub>D</sub> = 10 mA, V <sub>GS</sub> = 4.0 V	—	20	50	Ω
Input Capacitance		C <sub>iss</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 0, f = 1 MHz	—	6.3	—	pF
Reverse Transfer Capacitance		C <sub>rss</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 0, f = 1 MHz	—	1.3	—	pF
Output Capacitance		C <sub>oss</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 0, f = 1 MHz	—	5.7	—	pF
Switching Time	Turn-on Time	t <sub>on</sub>	V <sub>DD</sub> = 5 V, I <sub>D</sub> = 10 mA, V <sub>GS</sub> = 0~4.0 V	—	0.11	—	μs
	Turn-off Time	t <sub>off</sub>	V <sub>DD</sub> = 5 V, I <sub>D</sub> = 10 mA, V <sub>GS</sub> = 0~4.0 V	—	0.15	—	μs

## Q2 ELECTRICAL CHARACTERISTICS (Ta = 25°C)

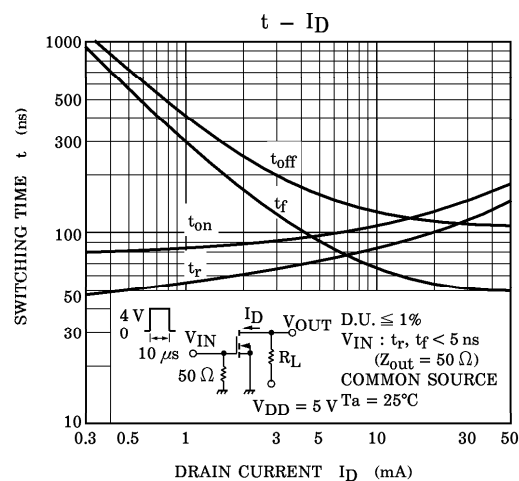
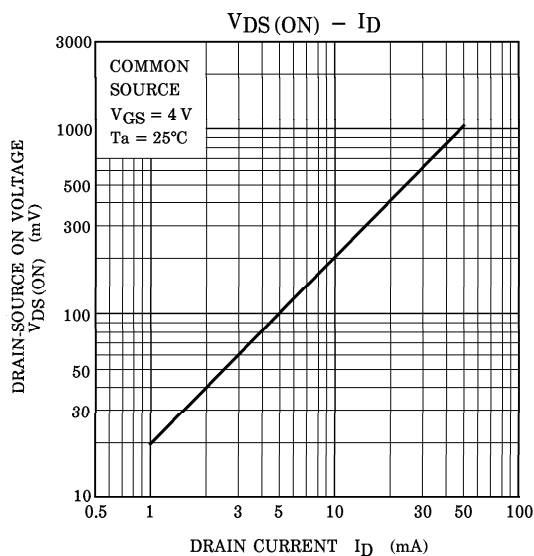
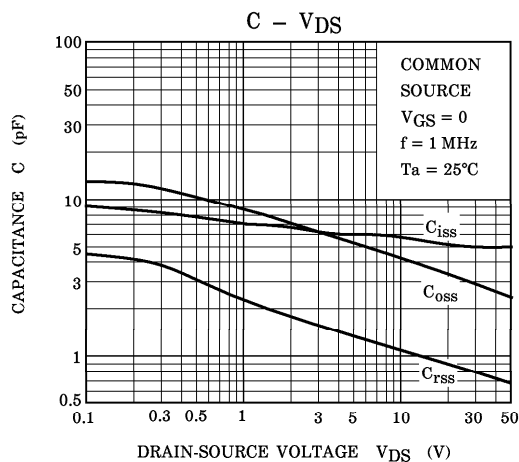
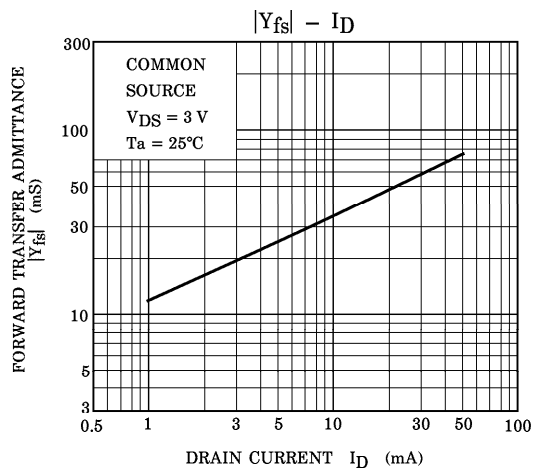
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I <sub>GSS</sub>	V <sub>GS</sub> = -7 V, V <sub>DS</sub> = 0	—	—	-1	μA
Drain-Source Breakdown Voltage		V (BR) DSS	I <sub>D</sub> = -100 μA, V <sub>GS</sub> = 0	-20	—	—	V
Drain Cut-off Current		I <sub>DSS</sub>	V <sub>DS</sub> = -20 V, V <sub>GS</sub> = 0	—	—	-1	μA
Gate Threshold Voltage		V <sub>th</sub>	V <sub>DS</sub> = -3 V, I <sub>D</sub> = -0.1 mA	-0.5	—	-1.5	V
Forward Transfer Admittance		Y <sub>fs</sub>	V <sub>DS</sub> = -3 V, I <sub>D</sub> = -10 mA	15	—	—	mS
Drain-Source ON Resistance		R <sub>DS(ON)</sub>	I <sub>D</sub> = -10 mA, V <sub>GS</sub> = -2.5 V	—	20	40	Ω
Input Capacitance		C <sub>iss</sub>	V <sub>DS</sub> = -3 V, V <sub>GS</sub> = 0, f = 1 MHz	—	10.4	—	pF
Reverse Transfer Capacitance		C <sub>rss</sub>	V <sub>DS</sub> = -3 V, V <sub>GS</sub> = 0, f = 1 MHz	—	2.8	—	pF
Output Capacitance		C <sub>oss</sub>	V <sub>DS</sub> = -3 V, V <sub>GS</sub> = 0, f = 1 MHz	—	8.4	—	pF
Switching Time	Turn-on Time	t <sub>on</sub>	V <sub>DD</sub> = -3 V, I <sub>D</sub> = -10 mA, V <sub>GS</sub> = 0~-2.5 V	—	0.15	—	μs
	Turn-off Time	t <sub>off</sub>	V <sub>DD</sub> = -3 V, I <sub>D</sub> = -10 mA, V <sub>GS</sub> = 0~-2.5 V	—	0.13	—	μs

Q1 (Nch MOS FET)

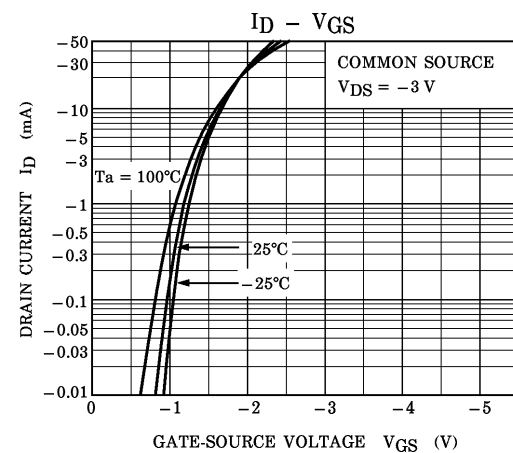
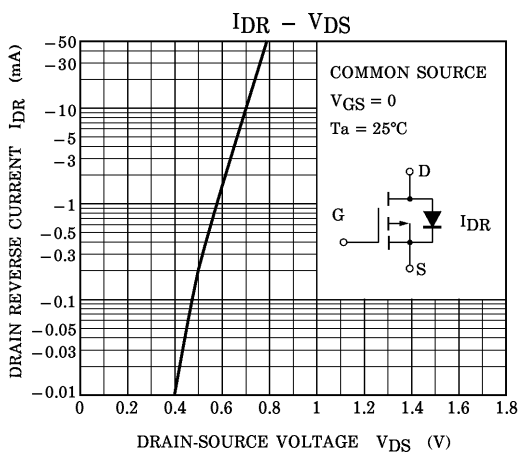
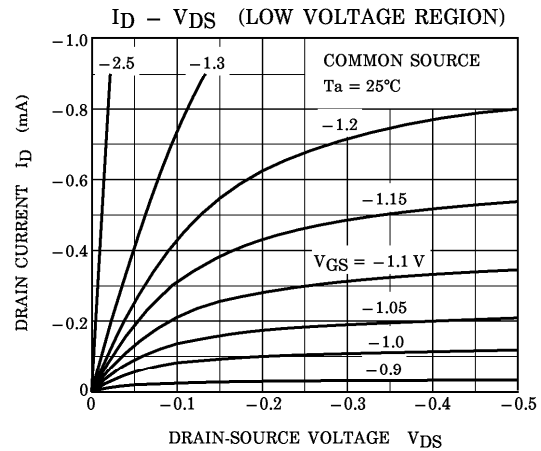
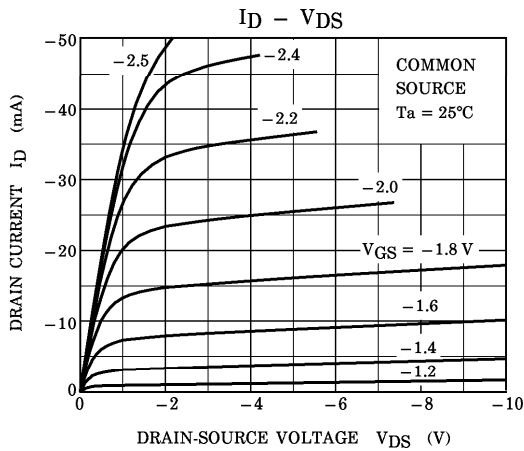
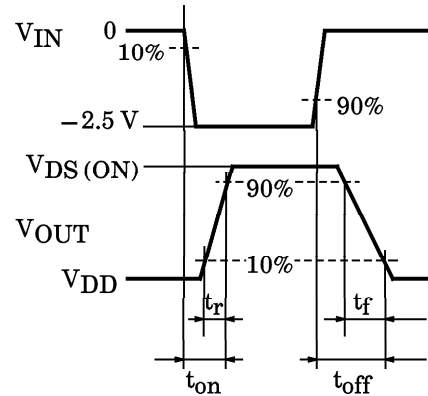
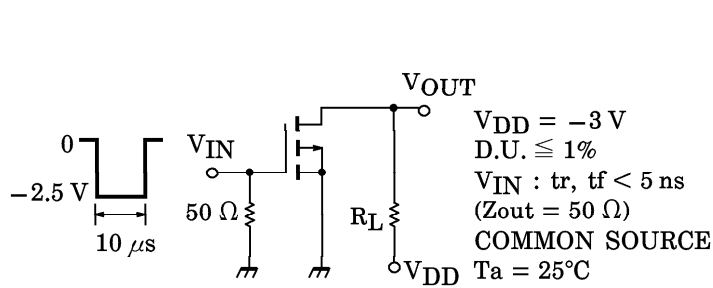
SWITCHING TIME TEST CIRCUIT



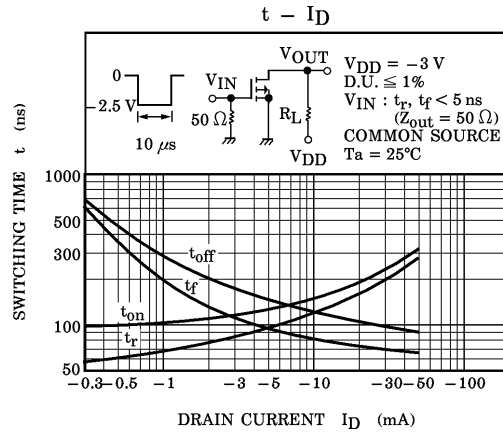
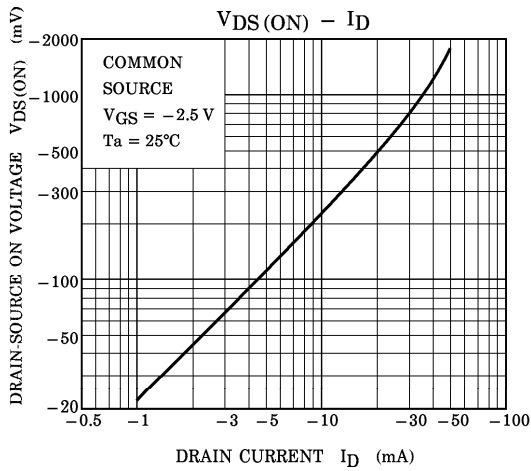
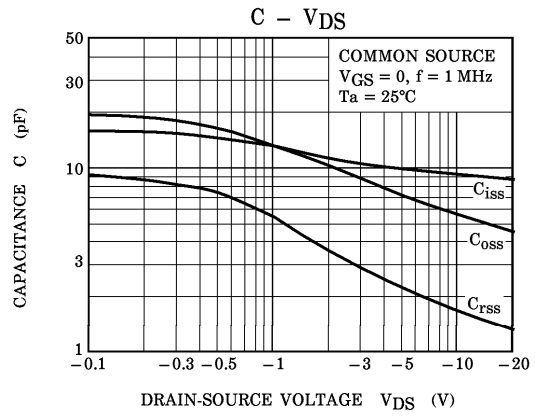
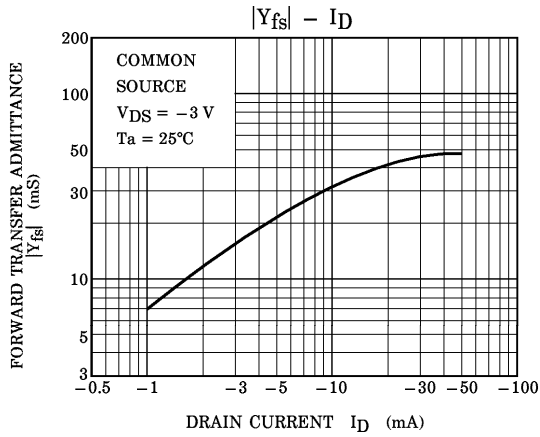
Q1 (Nch MOS FET)



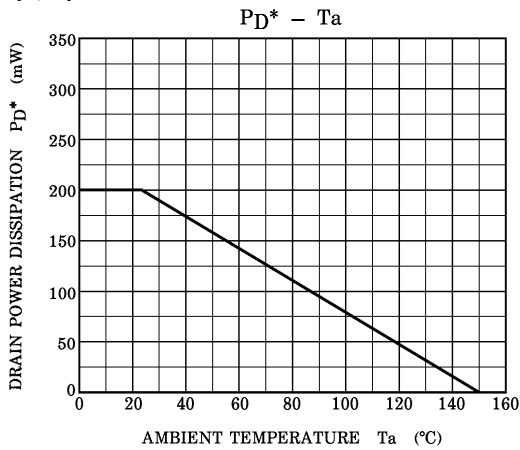
Q2 (Pch MOS FET)  
SWITCHING TIME TEST CIRCUIT



Q2 (Pch MOS FET)



(Q1, Q2 COMMON)



\* : Total Rating