

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

**Q1, Q2 COMMON**

- 2.5V Gate Drive
- Low Threshold Voltage  
 $Q1 : V_{th} = 0.5 \sim 1.5V$      $Q2 : V_{th} = -0.5 \sim -1.5V$
- 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

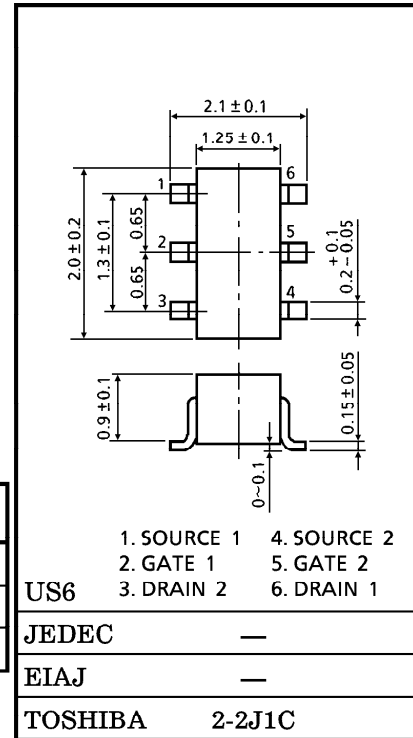
**Q2 MAXIMUM RATINGS (Ta = 25°C)**

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)**

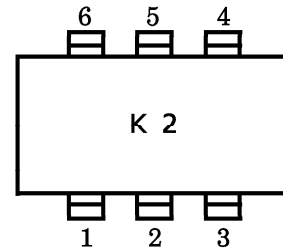
CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain Power Dissipation	$P_D$ ※	200	mW
Channel Temperature	$T_{ch}$	150	°C
Storage Temperature Range	$T_{stg}$	-55 ~ 150	°C

※ Total Rating

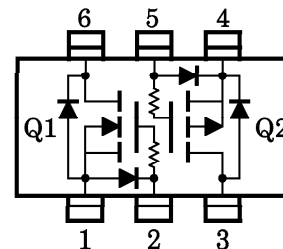


Weight : 6.8mg

**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 <sub>GSS</sub>	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 0	—	—	1	μA
Drain-Source Breakdown Voltage		V (BR) DSS	I <sub>D</sub> = 100μA, V <sub>GS</sub> = 0	20	—	—	V
Drain Cut-off Current		I <sub>DSS</sub>	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0	—	—	1	μA
Gate Threshold Voltage		V <sub>th</sub>	V <sub>DS</sub> = 3V, I <sub>D</sub> = 0.1mA	0.5	—	1.5	V
Forward Transfer Admittance		Y <sub>fs</sub>	V <sub>DS</sub> = 3V, I <sub>D</sub> = 10mA	20	—	—	mS
Drain-Source ON Resistance		R <sub>DS(ON)</sub>	I <sub>D</sub> = 10mA, V <sub>GS</sub> = 2.5V	—	20	40	Ω
Input Capacitance		C <sub>iss</sub>	V <sub>DS</sub> = 3V, V <sub>GS</sub> = 0, f = 1MHz	—	5.5	—	pF
Reverse Transfer Capacitance		C <sub>rss</sub>	V <sub>DS</sub> = 3V, V <sub>GS</sub> = 0, f = 1MHz	—	1.6	—	pF
Output Capacitance		C <sub>oss</sub>	V <sub>DS</sub> = 3V, V <sub>GS</sub> = 0, f = 1MHz	—	6.5	—	pF
Switching Time	Turn-on Time	t <sub>on</sub>	V <sub>DD</sub> = 3V, I <sub>D</sub> = 10mA, V <sub>GS</sub> = 0~2.5V	—	0.14	—	μs
	Turn-off Time	t <sub>off</sub>	V <sub>DD</sub> = 3V, I <sub>D</sub> = 10mA, V <sub>GS</sub> = 0~2.5V	—	0.14	—	μs

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

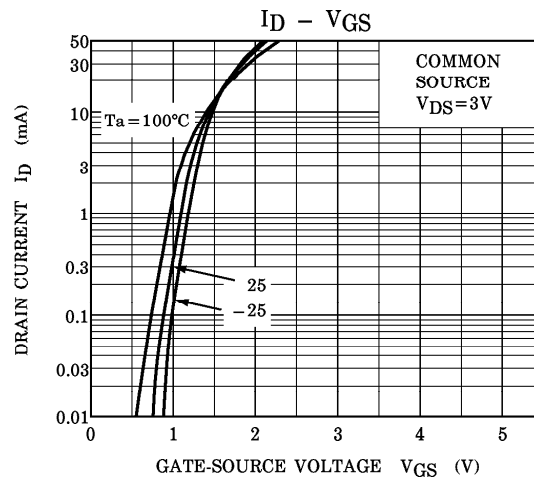
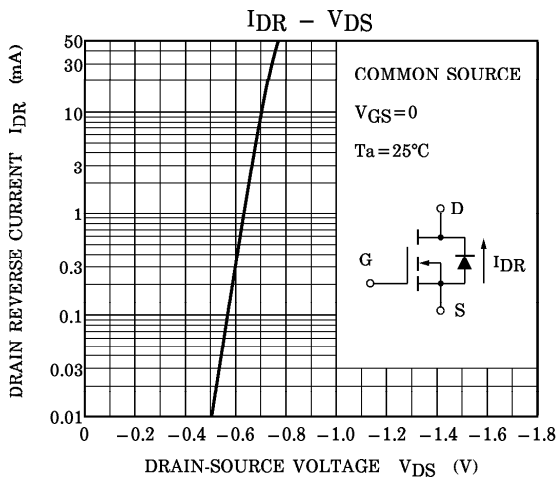
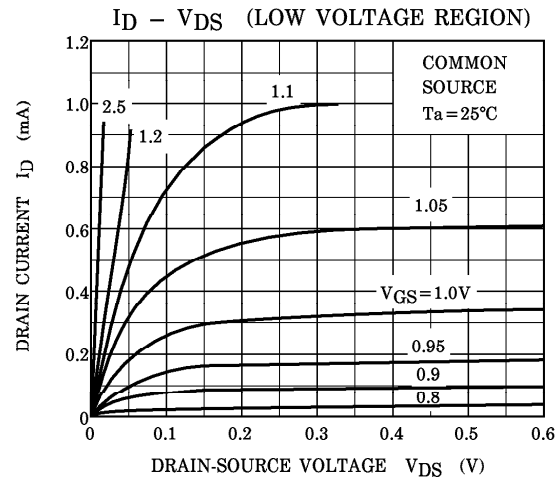
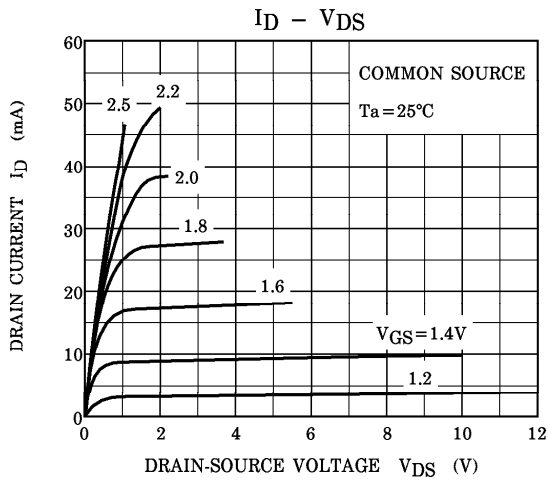
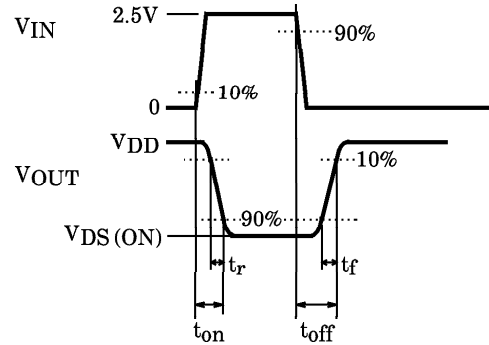
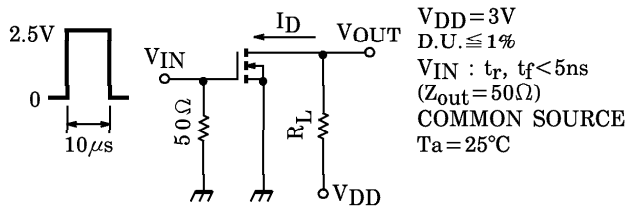
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I <sub>GSS</sub>	V <sub>GS</sub> = -7V, V <sub>DS</sub> = 0	—	—	-1	μA
Drain-Source Breakdown Voltage		V (BR) DSS	I <sub>D</sub> = -100μA, V <sub>GS</sub> = 0	-20	—	—	V
Drain Cut-off Current		I <sub>DSS</sub>	V <sub>DS</sub>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

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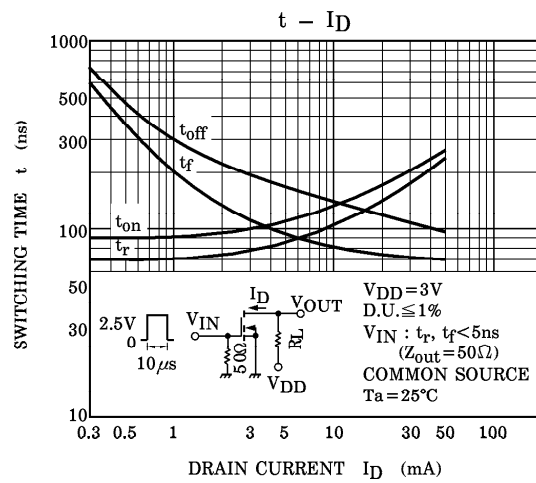
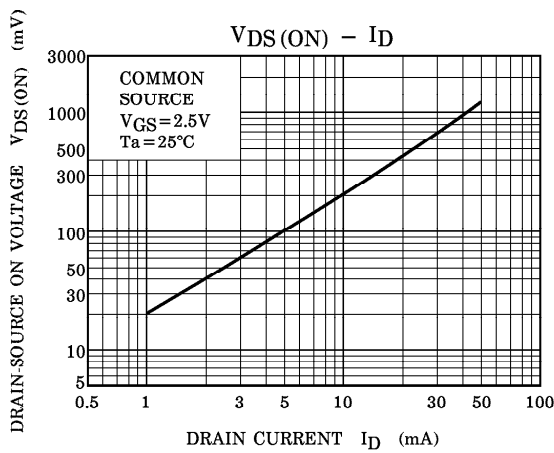
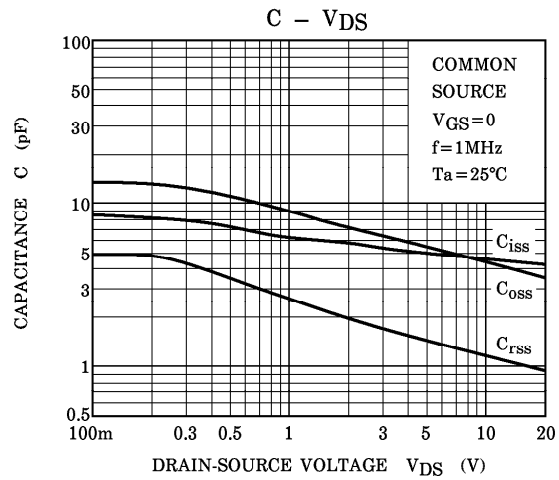
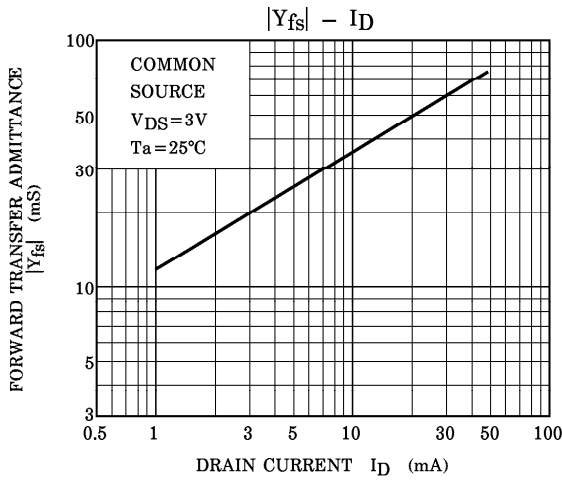
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Q1 (Nch MOS FET)

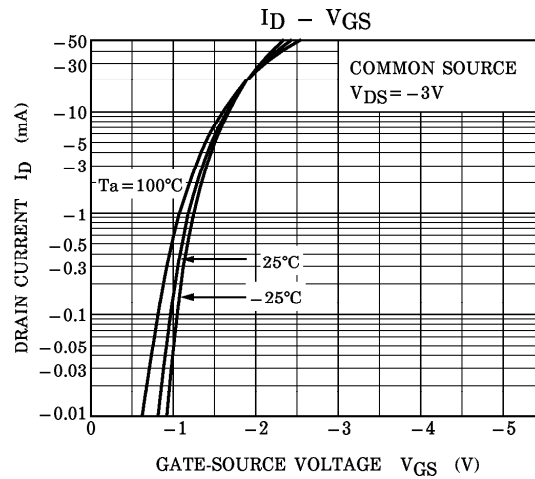
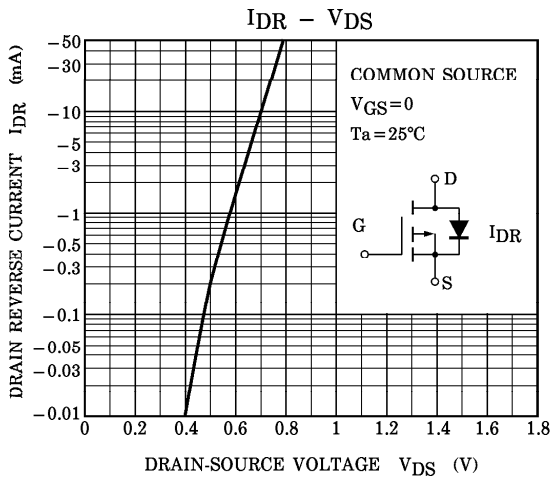
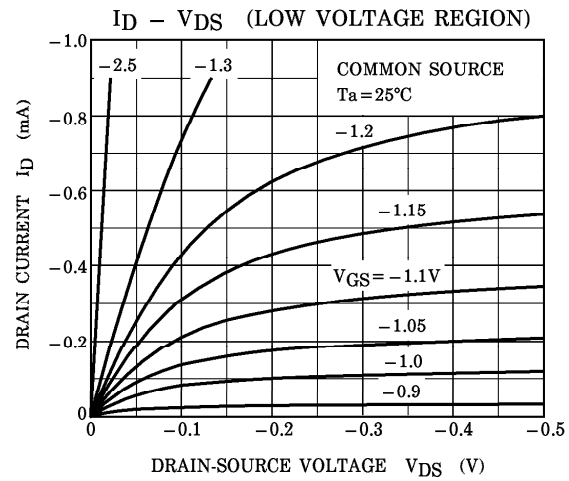
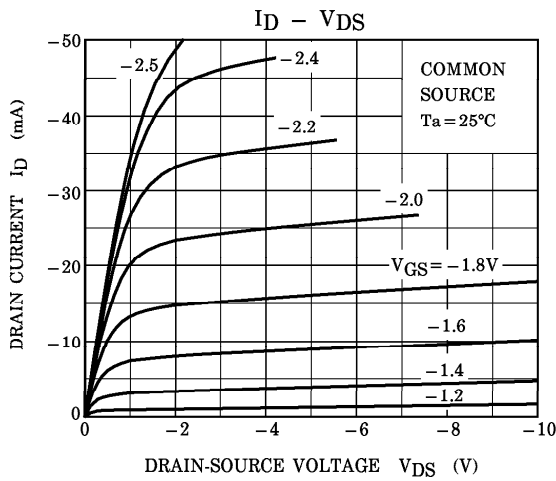
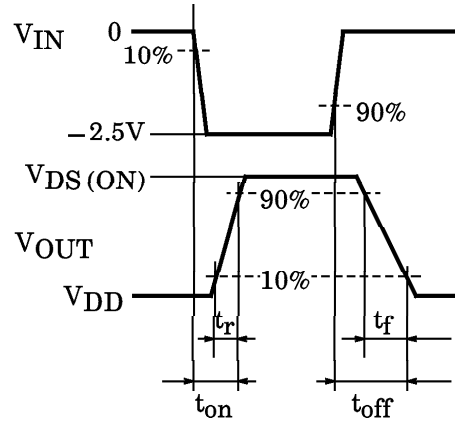
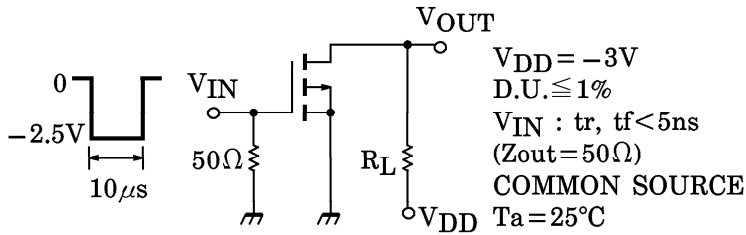
SWITCHING TIME TEST CIRCUIT



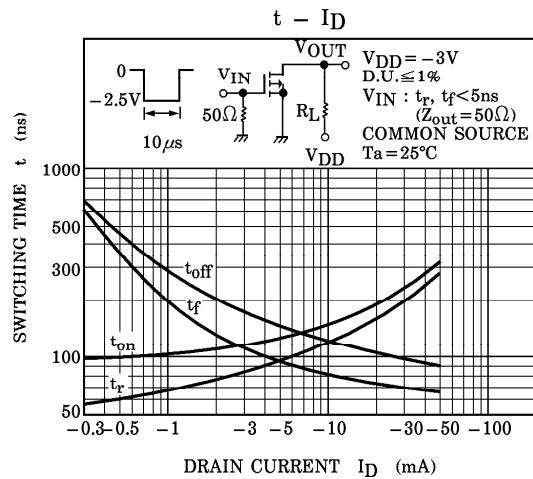
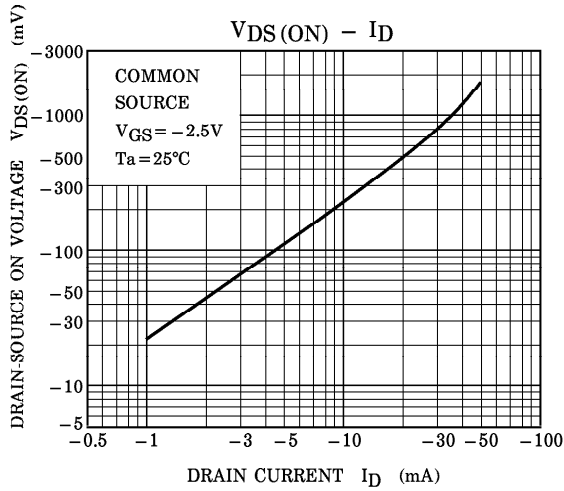
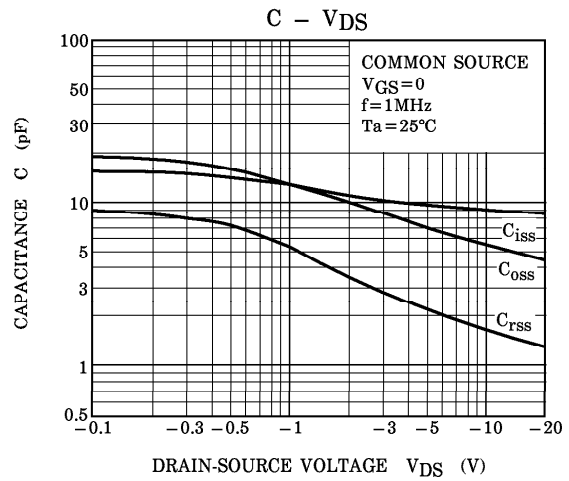
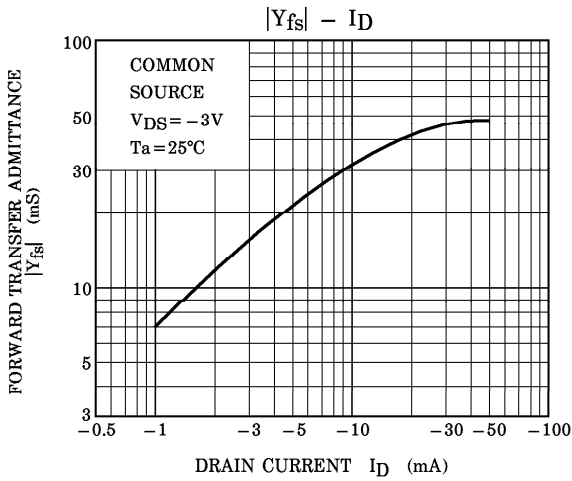
Q1 (Nch MOS FET)



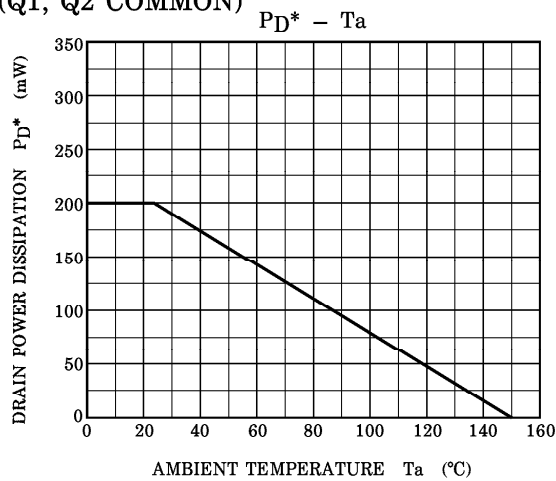
Q2 (Pch MOS FET)  
SWITCHING TIME TEST CIRCUIT



Q2 (Pch MOS FET)



(Q1, Q2 COMMON)



\* : Total Rating