

HN1L02FU

High Speed Switching Applications
Analog 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 Absolute Maximum Ratings ($T_a = 25^\circ C$)

Characteristics	Symbol	Rating	Unit
Drain-Source voltage	V_{DS}	20	V
Gate-Source voltage	V_{GSS}	10	V
Drain current	I_D	50	mA

Q2 Absolute Maximum Ratings ($T_a = 25^\circ C$)

Characteristics	Symbol	Rating	Unit
Drain-Source voltage	V_{DS}	-20	V
Gate-Source voltage	V_{GSS}	-7	V
Drain current	I_D	-50	mA

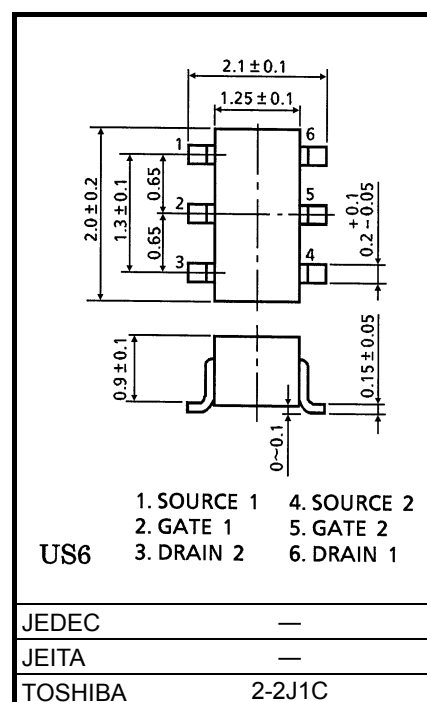
Absolute Maximum Ratings (Q1, Q2 Common) ($T_a = 25^\circ C$)

Characteristics	Symbol	Rating	Unit
Drain power dissipation	P_{D^*}	200	mW
Channel temperature	T_{ch}	150	$^\circ C$
Storage temperature range	T_{stg}	-55~150	$^\circ C$

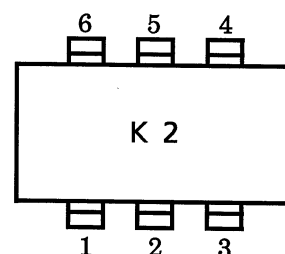
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

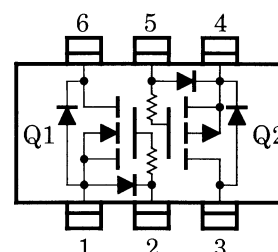
* Total rating



Marking



Equivalent Circuit (top view)



Q1 Electrical Characteristics (Ta = 25°C)

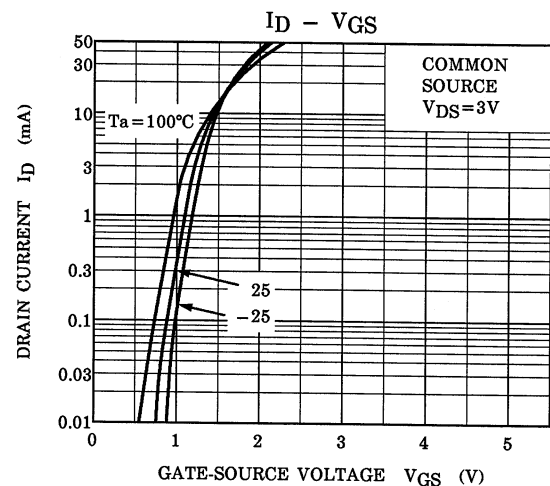
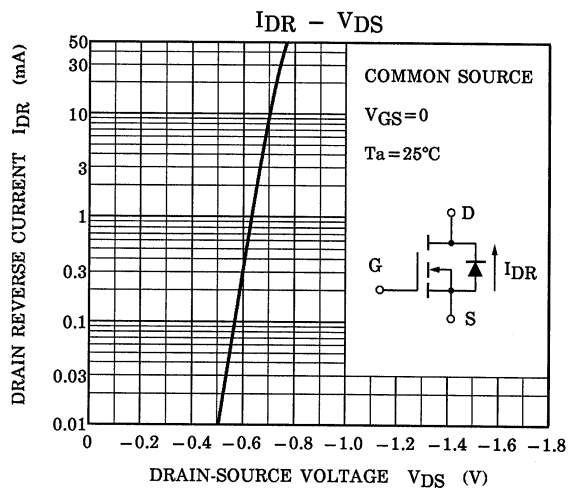
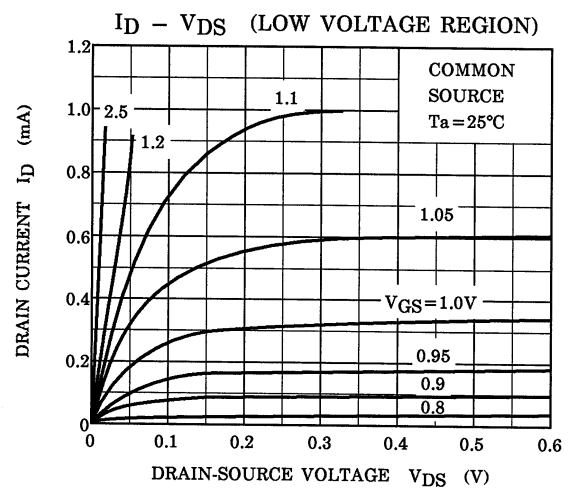
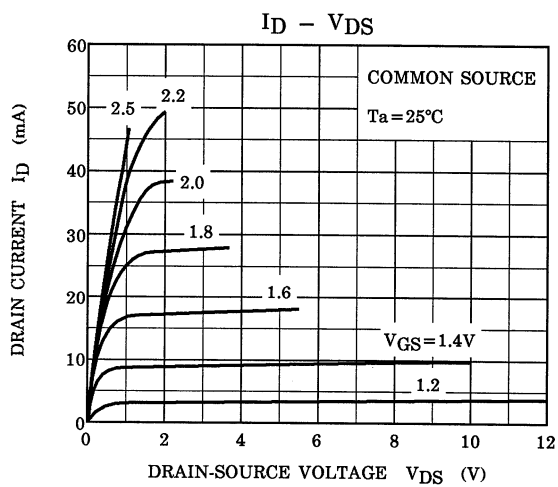
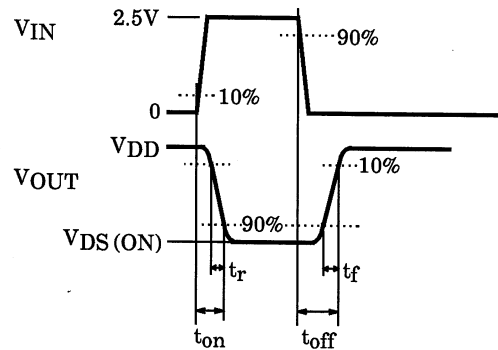
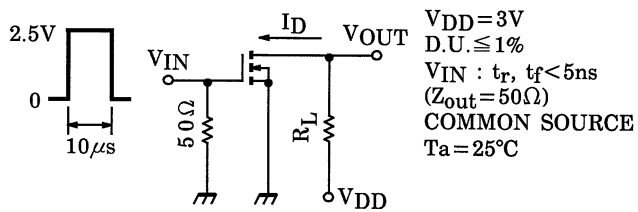
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = 10V, V_{DS} = 0$	—	—	1	μA
Drain-Source breakdown voltage		$V_{(BR)DSS}$	$I_D = 100\mu A, V_{GS} = 0$	20	—	—	V
Drain cut-off current		I_{DSS}	$V_{DS} = 20V, V_{GS} = 0$	—	—	1	μA
Gate threshold voltage		V_{th}	$V_{DS} = 3V, I_D = 0.1mA$	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}	$V_{DD} = 3V, I_D = 10mA, V_{GS} = 0 \sim 2.5V$	—	0.14	—	μs
	Turn-off time	t_{off}	$V_{DD} = 3V, I_D = 10mA, V_{GS} = 0 \sim 2.5V$	—	0.14	—	μs

Q2 Electrical Characteristics (Ta = 25°C)

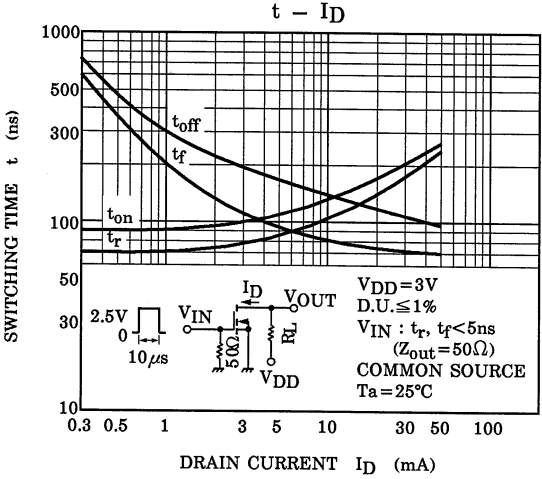
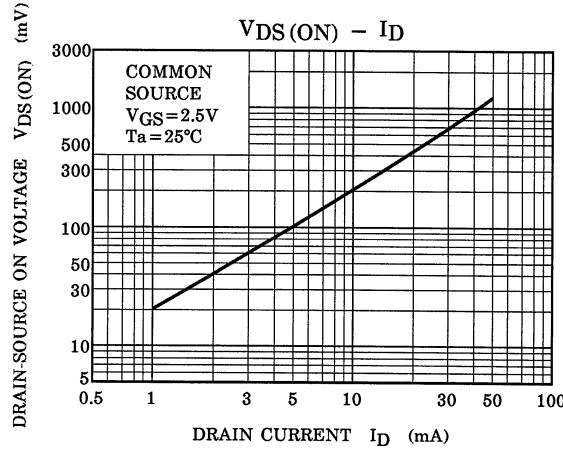
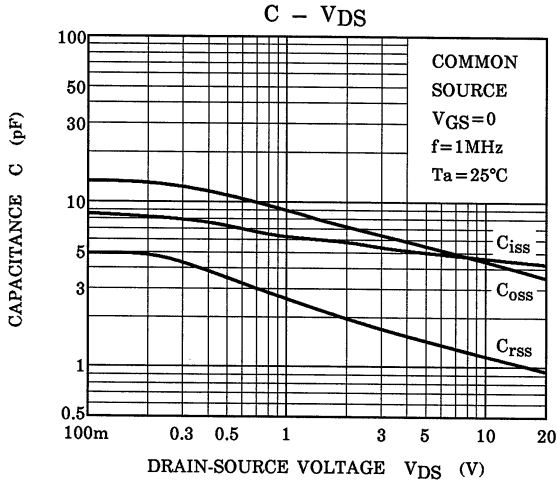
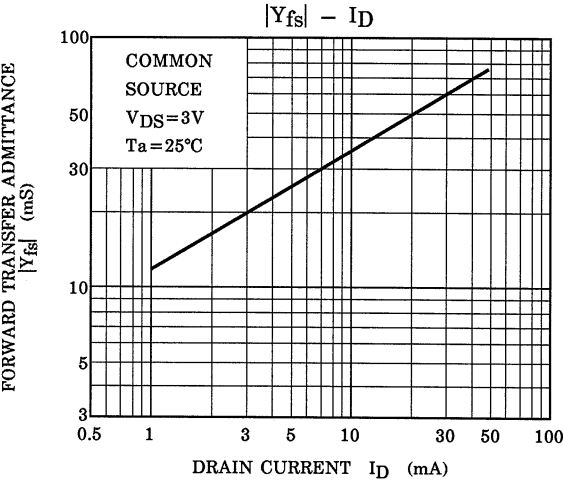
Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = -7V, V_{DS} = 0$	—	—	-1	μA
Drain-Source breakdown voltage		$V_{(BR)DSS}$	$I_D = -100\mu A, V_{GS} = 0$	-20	—	—	V
Drain cut-off current		I_{DSS}	$V_{DS} = -20V, V_{GS} = 0$	—	—	-1	μA
Gate threshold voltage		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}	$V_{DD} = -3V, I_D = -10mA, V_{GS} = 0 \sim -2.5V$	—	0.15	—	μs
	Turn-off time	t_{off}	$V_{DD} = -3V, I_D = -10mA, V_{GS} = 0 \sim -2.5V$	—	0.13	—	μs

Q1 (Nch MOS FET)

Switching Time Test Circuit

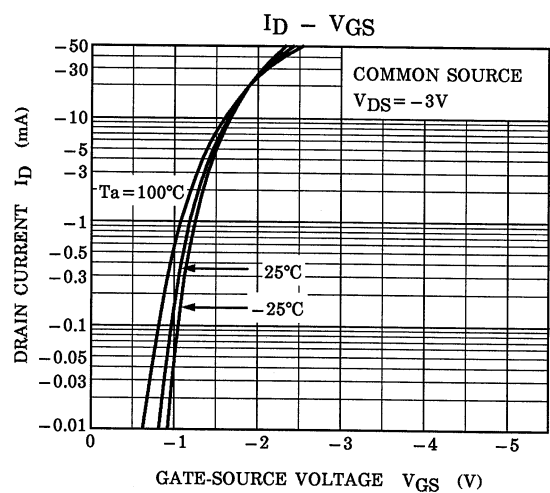
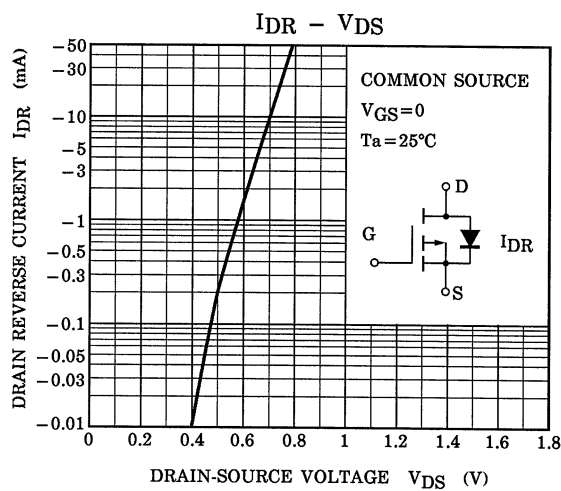
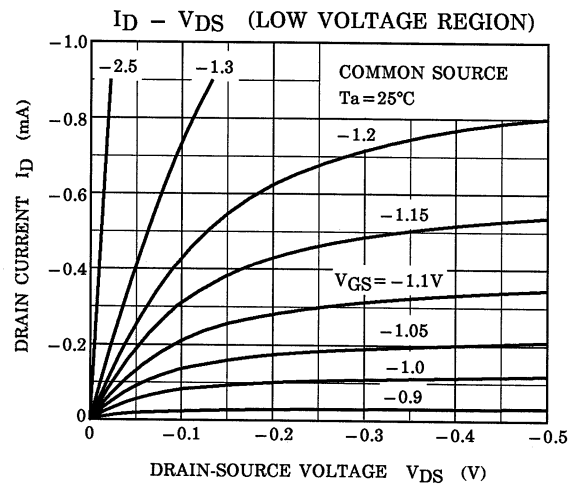
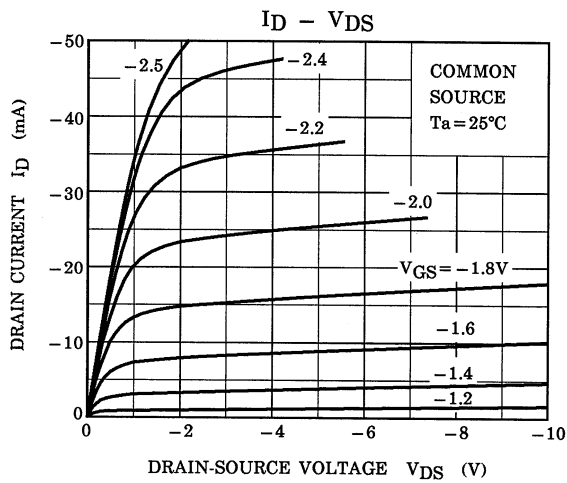
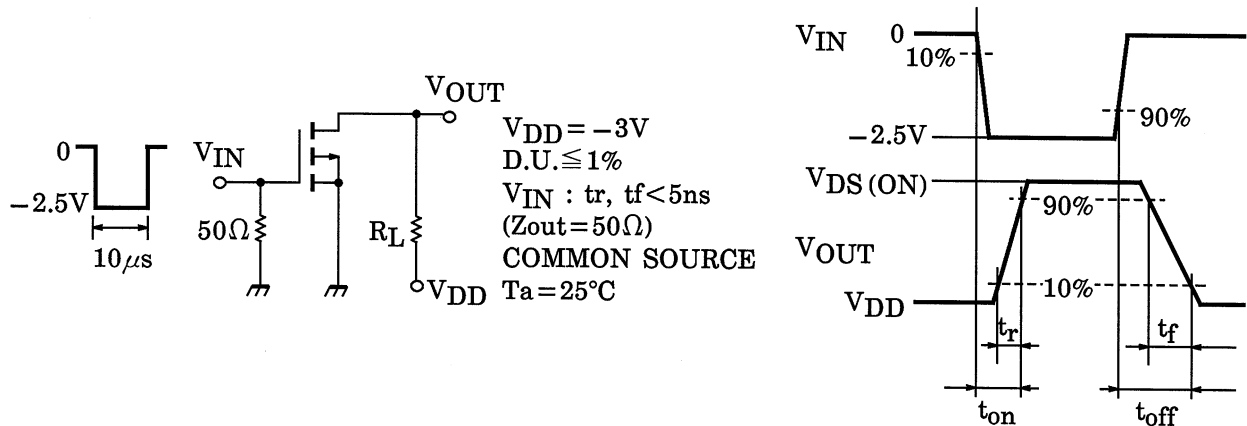


Q1 (Nch MOS FET)

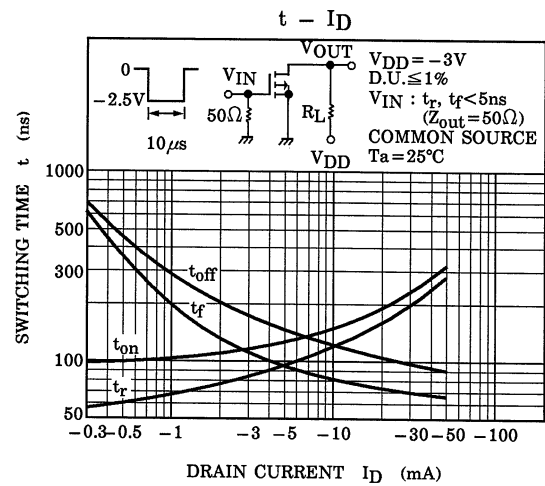
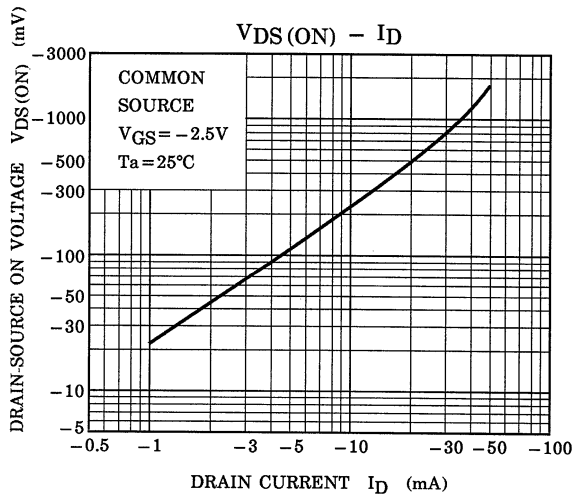
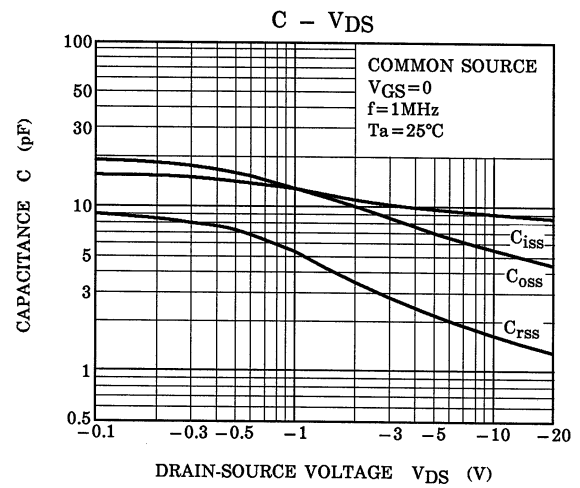
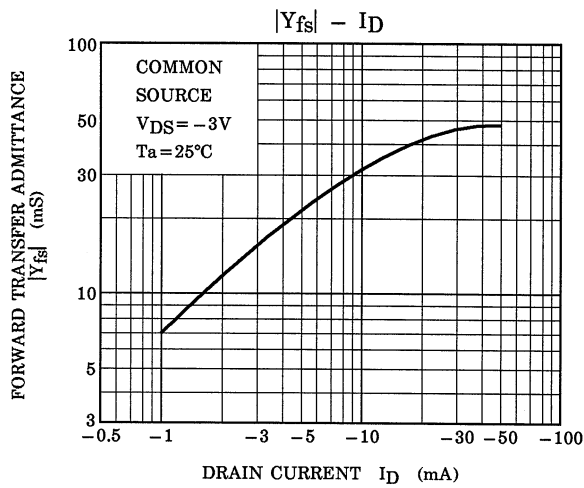


Q2 (Pch MOS FET)

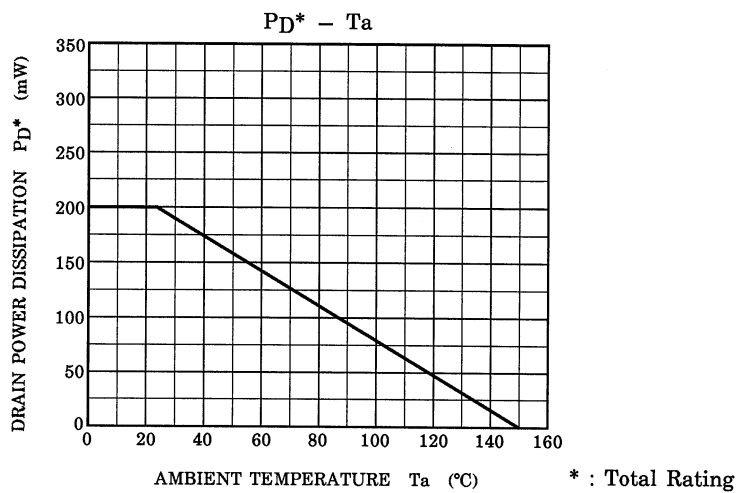
Switching Time Test Circuit



Q2 (Pch MOS FET)



(Q1, Q2 common)



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