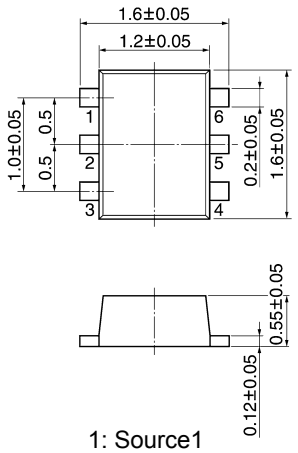
Field Effect Transistor Silicon P/N Channel MOS Type

High Speed Switching Applications
Analog Switch Applications

- Small package
- Low on-resistance Q1: R_{on} = 4 Ω (max) (@V_{GS} = 2.5 V)
  Q2: R_{on} = 12 Ω (max) (@V_{GS} = −2.5 V)

Unit: mm



1: Source1
2: Gate1
3: Drain2
4: Source2
5: Gate2
6: Drain1

SOT-563

Q1 Absolute Maximum Ratings (Ta = 25°C)

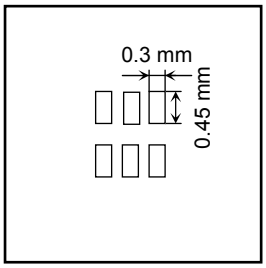
Characteristics		Symbol	Rating	Unit
Drain-Source voltage		V_{DS}	20	V
Gate-Source voltage		V_{GSS}	±10	V
Drain current	DC	I_D	100	mA
	Pulse	I_{DP}	200	

Q2 Absolute Maximum Ratings (Ta = 25°C)

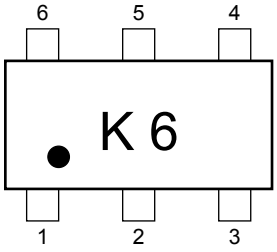
Characteristics		Symbol	Rating	Unit
Drain-Source voltage		V_{DS}	-20	V
Gate-Source voltage		V_{GSS}	±10	V
Drain current	DC	I_D	-100	mA
	Pulse	I_{DP}	-200	

Absolute Maximum Ratings (Q1, Q2 Common) (Ta = 25°C)

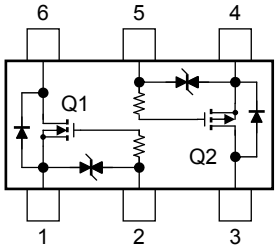
Characteristics	Symbol	Rating	Unit
Drain power dissipation (Ta = 25°C)	P_D (Note 1)	150	mW
Channel temperature	T_{ch}	150	°C
Storage temperature range	T_{stg}	−55~150	°C



Marking



Equivalent Circuit (top view)

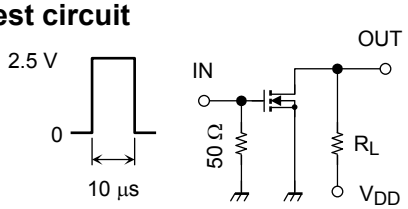


Q1 Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	MIN.	TYP.	MAX.	UNIT
Gate leakage current		I_{GSS}	V_{GS} = ±10 V, V_{DS} = 0	—	—	±1	μA
Drain-Source breakdown voltage		$V_{(BR)\ DSS}$	I_D = 0.1 mA, V_{GS} = 0	20	—	—	V
Drain cut-off current		I_{DSS}	V_{DS} = 20 V, V_{GS} = 0	—	—	1	μA
Gate threshold voltage		V_{th}	V_{DS} = 3 V, I_D = 0.1 mA	0.6	—	1.1	V
Forward transfer admittance		$\|Y_{fs}\|$	V_{DS} = 3 V, I_D = 10 mA	40	—	—	mS
Drain-Source on-resistance		$R_{DS\ (ON)}$	I_D = 10 mA, V_{GS} = 4 V	—	1.5	3.0	Ω
			I_D = 10 mA, V_{GS} = 2.5 V	—	2.2	4.0	
			I_D = 1 mA, V_{GS} = 1.5 V	—	5.2	15	
Input capacitance		C_{iss}	V_{DS} = 3 V, V_{GS} = 0, f = 1 MHz	—	9.3	—	pF
Reverse transfer capacitance		C_{rss}		—	4.5	—	pF
Output capacitance		C_{oss}		—	9.8	—	pF
Switching time	Turn-on time	t_{on}	V_{DD} = 3 V, I_D = 10 mA, V_{GS} = 0~2.5 V	—	70	—	nS
	Turn-off time	t_{off}		—	125	—	

Switching Time Test Circuit

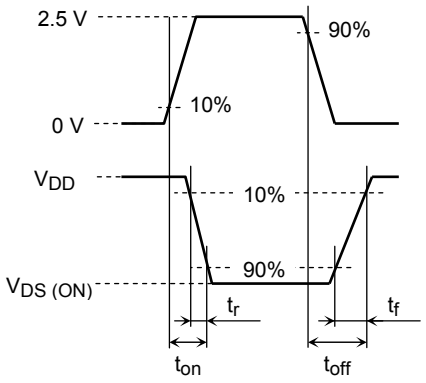
(a) Test circuit



V_{DD} = 3 V
Duty ≦ 1%
V_{IN}: t_r, t_f < 5 ns
(Z_{out} = 50 Ω)
Common Source
Ta = 25°C

(b) V_{IN}

(c) V_{OUT}

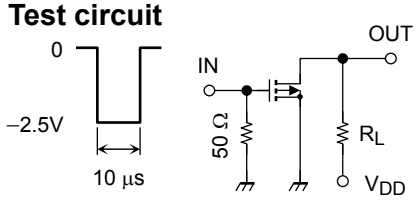


Q2 Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	MIN.	TYP.	MAX.	UNIT
Gate leakage current		I_{GSS}	V_{GS} = ±10 V, V_{DS} = 0	—	—	±1	μA
Drain-Source breakdown voltage		$V_{(BR)\ DSS}$	I_D = −0.1 mA, V_{GS} = 0	−20	—	—	V
Drain cut-off current		I_{DSS}	V_{DS} = −20 V, V_{GS} = 0	—	—	−1	μA
Gate threshold voltage		V_{th}	V_{DS} = −3 V, I_D = −0.1 mA	−0.6	—	−1.1	V
Forward transfer admittance		$\|Y_{fs}\|$	V_{DS} = −3 V, I_D = −10 mA	25	—	—	mS
Drain-Source on-resistance		$R_{DS\ (ON)}$	I_D = −10 mA, V_{GS} = −4 V	—	6	8	Ω
			I_D = −10 mA, V_{GS} = −2.5 V	—	8	12	
			I_D = −1 mA, V_{GS} = −1.5 V	—	18	45	
Input capacitance		C_{iss}	V_{DS} = −3 V, V_{GS} = 0, f = 1 MHz	—	11	—	pF
Reverse transfer capacitance		C_{rss}		—	3.7	—	pF
Output capacitance		C_{oss}		—	10	—	pF
Switching time	Turn-on time	t_{on}	V_{DD} = −3 V, I_D = − 10 mA, V_{GS} = 0 ~ −2.5 V	—	130	—	ns
	Turn-off time	t_{off}		—	190	—	

Switching Time Test Circuit

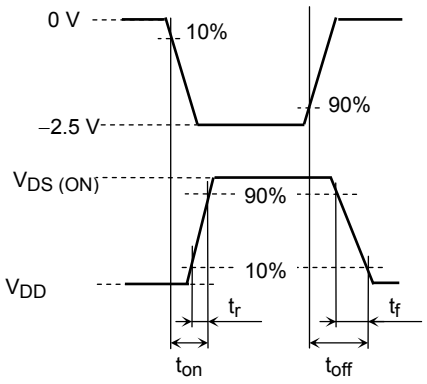
(a) Test circuit



V_{DD} = −3 V
Duty ≦ 1%
V_{IN}: t_r, t_f < 5 ns
(Z_{out} = 50 Ω)
Common Source
Ta = 25°C

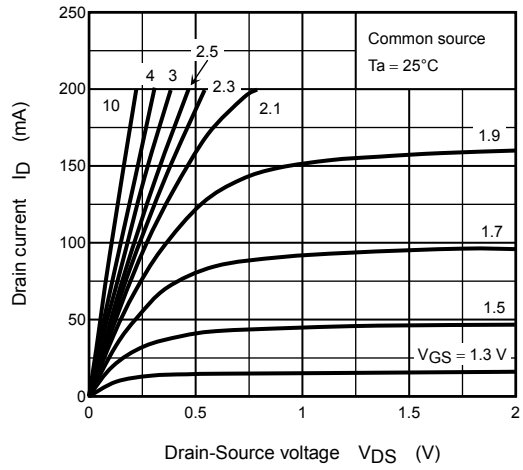
(b) V_{IN}

(c) V_{OUT}

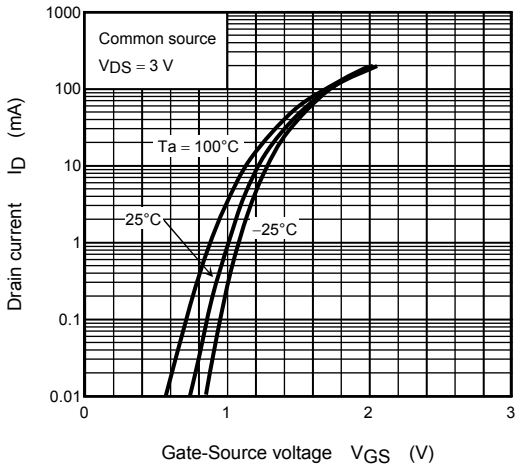


Q1 (N-ch MOSFET)

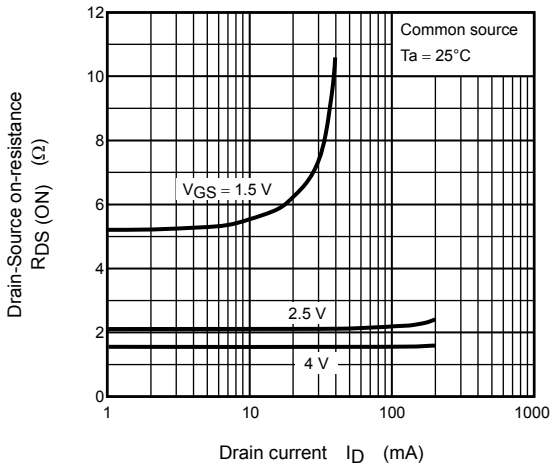
$I_D - V_{DS}$



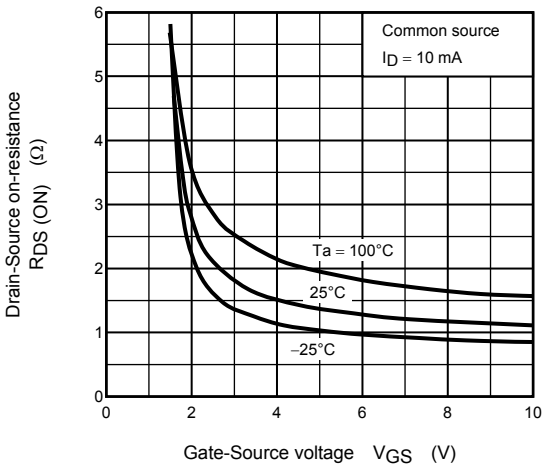
$I_D - V_{GS}$



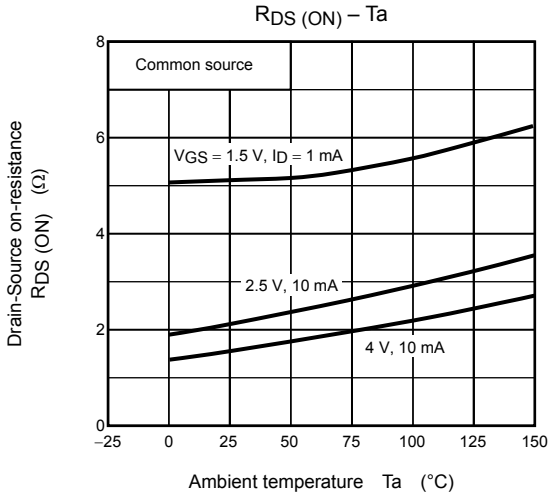
$R_{DS\ (ON)} - I_D$



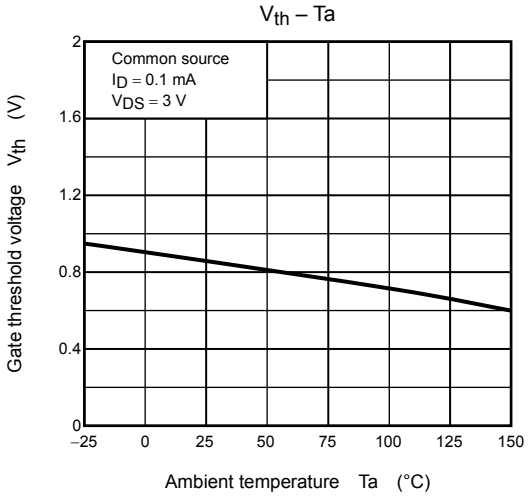
$R_{DS\ (ON)} - V_{GS}$



$R_{DS\ (ON)} - Ta$

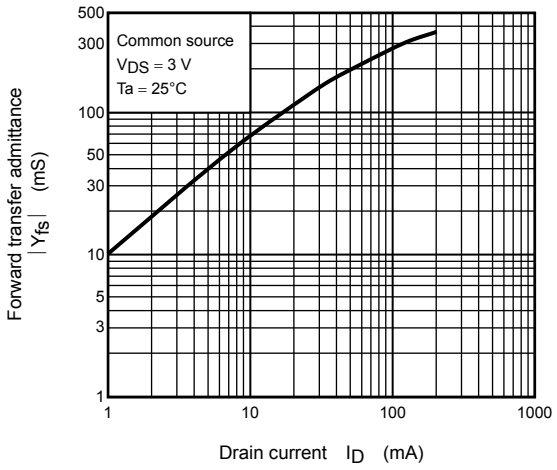


$V_{th} - Ta$

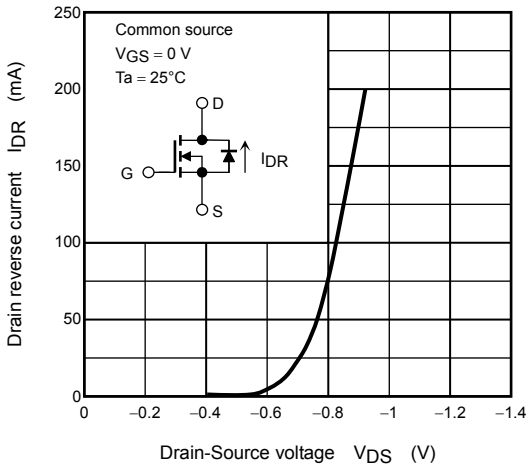


Q1 (N-ch MOSFET)

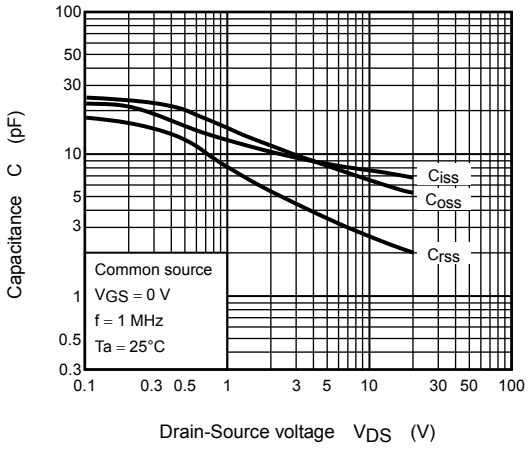
$|Y_{fs}| - I_D$



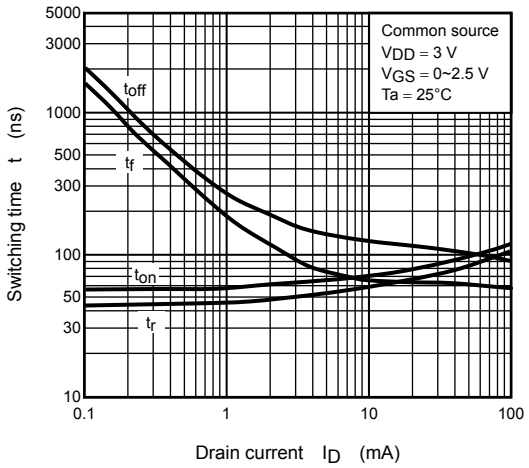
$I_{DR} - V_{DS}$



$C - V_{DS}$

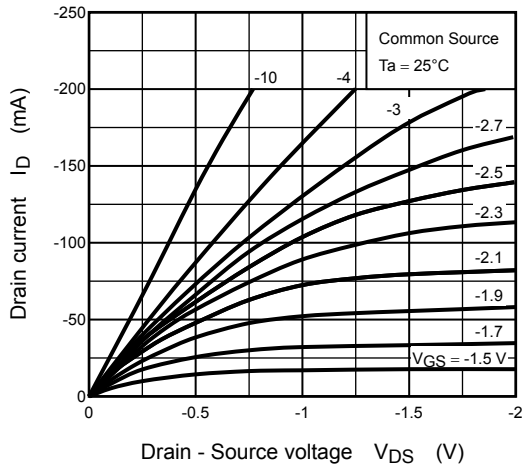


$t - I_D$

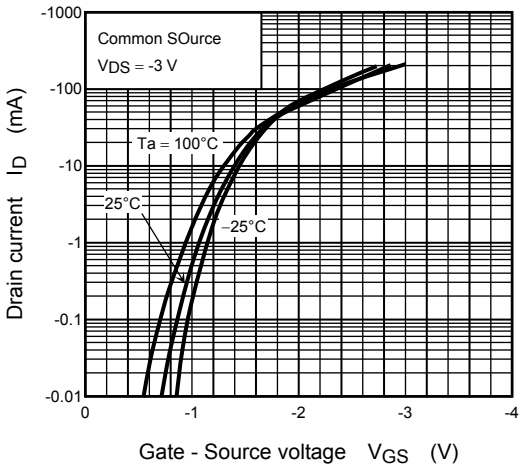


Q2 (P-ch MOSFET)

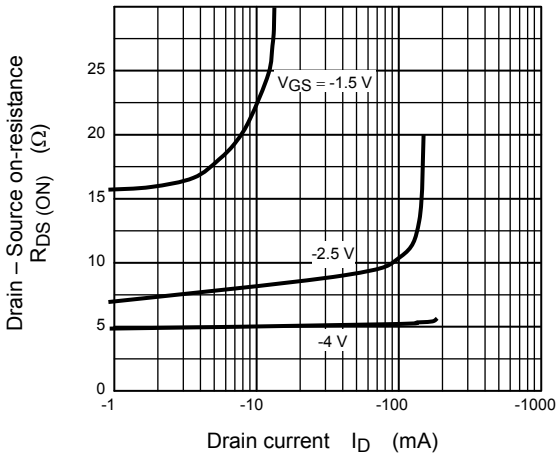
$I_D - V_{DS}$



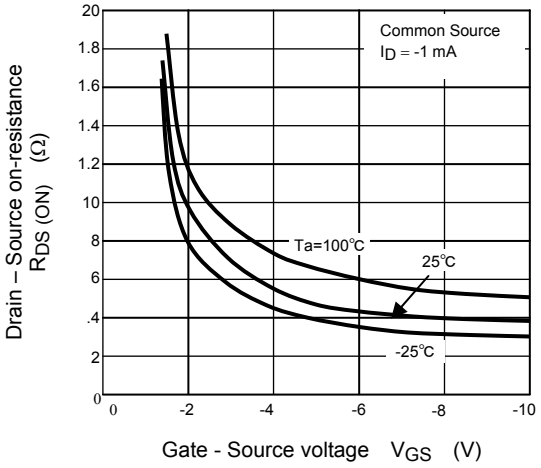
$I_D - V_{GS}$



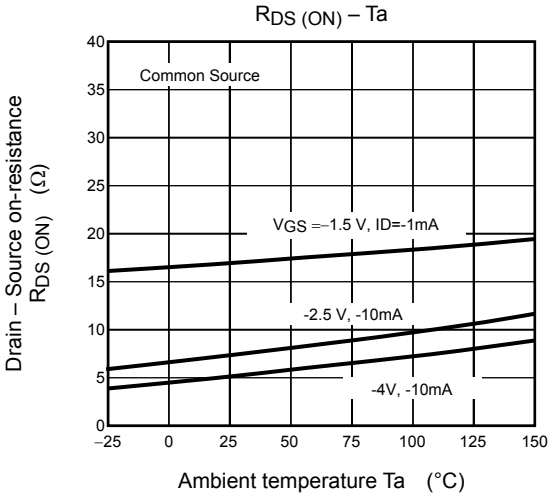
$R_{DS\ (ON)} - I_D$



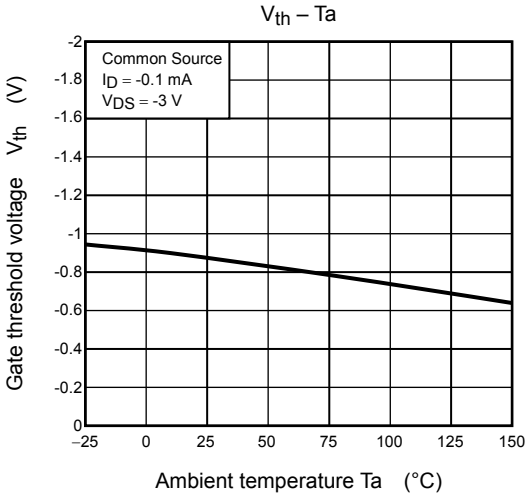
$R_{DS\ (ON)} - V_{GS}$



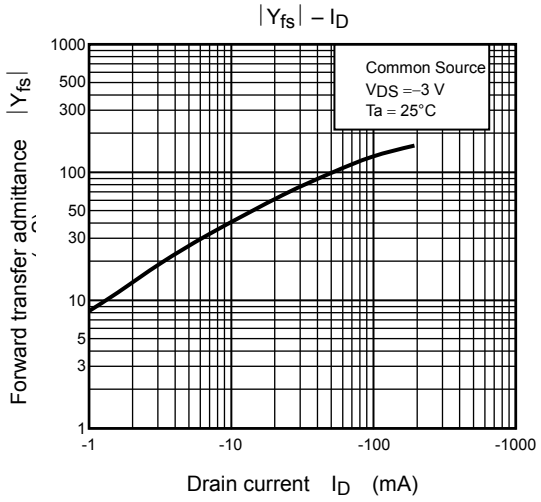
$R_{DS\ (ON)} - Ta$

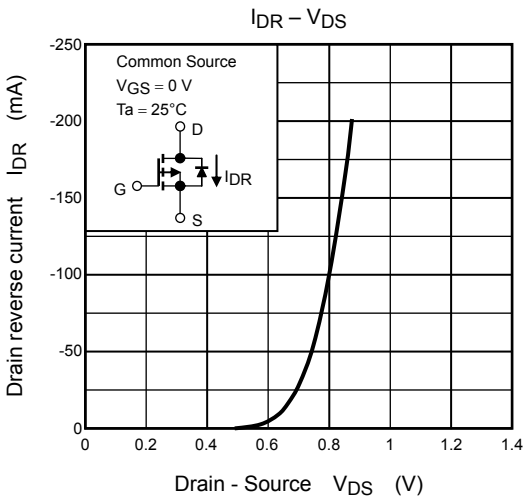


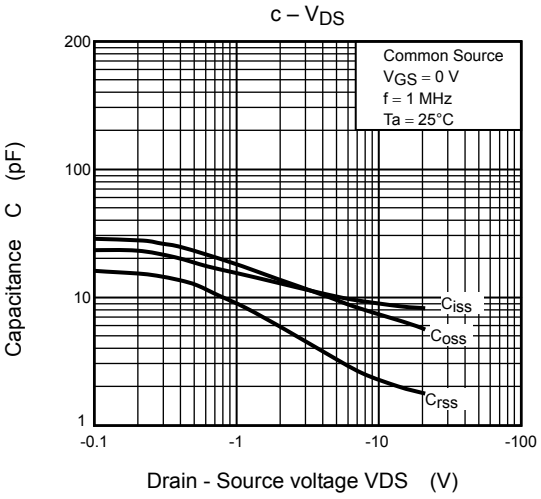
$V_{th} - Ta$

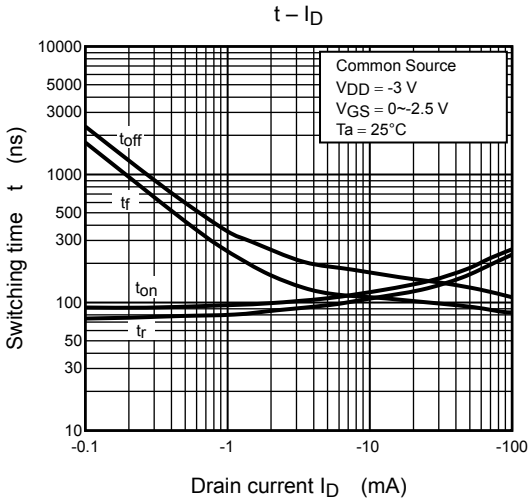


Q2 (P-ch MOSFET)









Common Characteristics