TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE

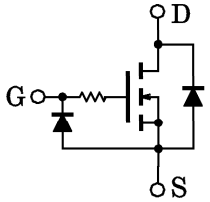
# 2SK1827

HIGH SPEED SWITCHING APPLICATIONS

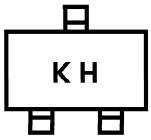
ANALOG SWITCH APPLICATIONS

- 4V Gate Drive
- Low Threshold Voltage : $V_{th}$ = 0.8~2.5V
- High Speed
- Enhanncement-Mode
- Small Package

EQUIVALENT CIRCUIT

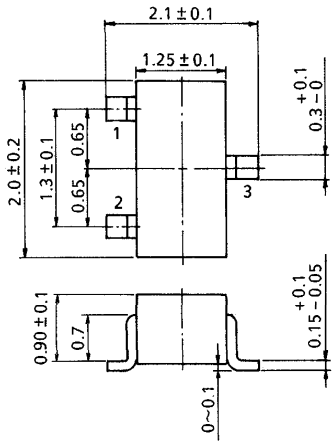



MARKING




This transistor is electrostatic sensitive device.
Please handle with caution.

Unit in mm




1. GATE
2. SOURCE
3. DRAIN

| | |
|---|---|
| USM | |
| JEDEC | — |
| EIAJ | SC-70 |
| TOSHIBA | 2-2E1E |

Weight : 0.006g (Typ.)

MAXIMUM RATINGS (Ta = 25°C)

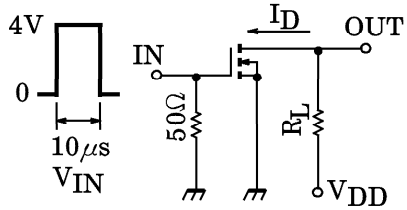
| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 50 | V |
| Gate-Source Voltage | $V_{GSS}$ | 10 | V |
| DC Drain Current | $I_D$ | 50 | mA |
| Drain Power Dissipation | $P_D$ | 100 | mW |
| Channel Temperature | $T_{ch}$ | 150 | °C |
| Storage Temperature Range | $T_{stg}$ | −55~150 | °C |

000707EAA1

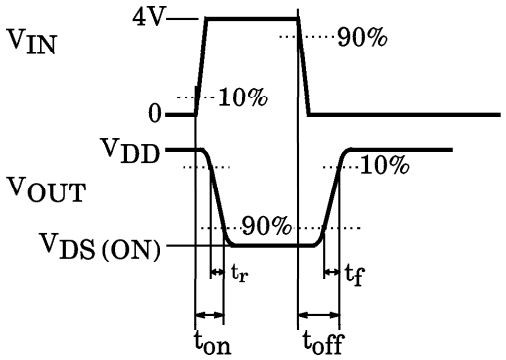
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| 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 | 50 | — | — | V |
| Drain Cut-off Current | | $I_{DSS}$ | $V_{DS}$ = 50V, $V_{GS}$ = 0 | — | — | 1 | μA |
| Gate Threshold Voltage | | $V_{th}$ | $V_{DS}$ = 5V, $I_D$ = 0.1mA | 0.8 | — | 2.5 | V |
| Forward Transfer Admittance | | $\|Y_{fs}\|$ | $V_{DS}$ = 5V, $I_D$ = 10mA | 20 | — | — | mS |
| Drain-Source ON Resistance | | $R_{DS\,(ON)}$ | $I_D$ = 10mA, $V_{GS}$ = 4.0V | — | 20 | 50 | Ω |
| Input Capacitance | | $C_{iss}$ | $V_{DS}$ = 5V, $V_{GS}$ = 0, f = 1MHz | — | 6.3 | — | pF |
| Reverse Transfer Capacitance | | $C_{rss}$ | $V_{DS}$ = 5V, $V_{GS}$ = 0, f = 1MHz | — | 1.3 | — | pF |
| Output Capacitance | | $C_{oss}$ | $V_{DS}$ = 5V, $V_{GS}$ = 0, f = 1MHz | — | 5.7 | — | pF |
| Switching Time | Turn-on Time | $t_{on}$ | $V_{DD}$ = 5V, $I_D$ = 10mA, $V_{GS}$ = 0~4.0V | — | 0.11 | — | μs |
| | Turn-off Time | $t_{off}$ | $V_{DD}$ = 5V, $I_D$ = 10mA, $V_{GS}$ = 0~4.0V | — | 0.15 | — | μs |

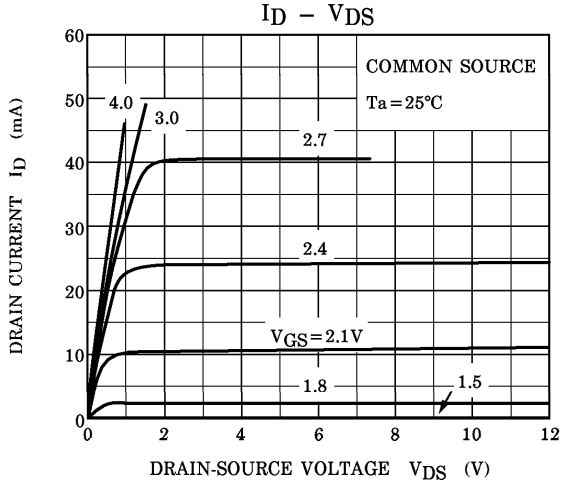
SWITCHING TIME TEST CIRCUIT



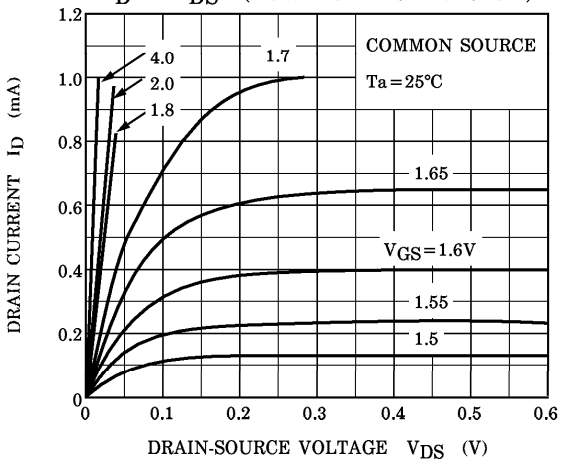

$V_{DD}$ = 5V
D.U. ≦ 1%
$V_{IN}$ : $t_r$, $t_f$ < 5ns
($Z_{out}$ = 50Ω)
COMMON SOURCE
Ta = 25°C



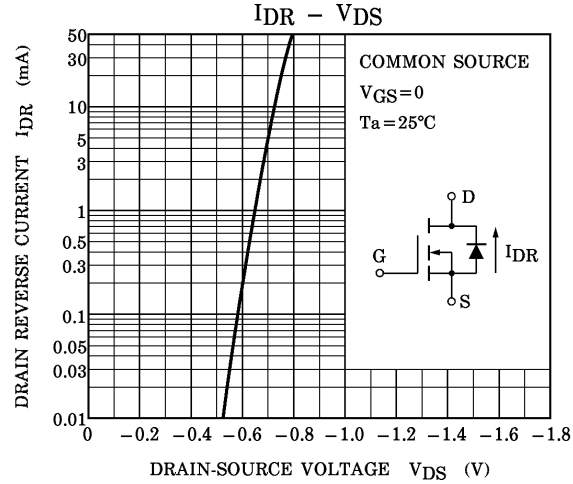
$I_D$ – $V_{DS}$



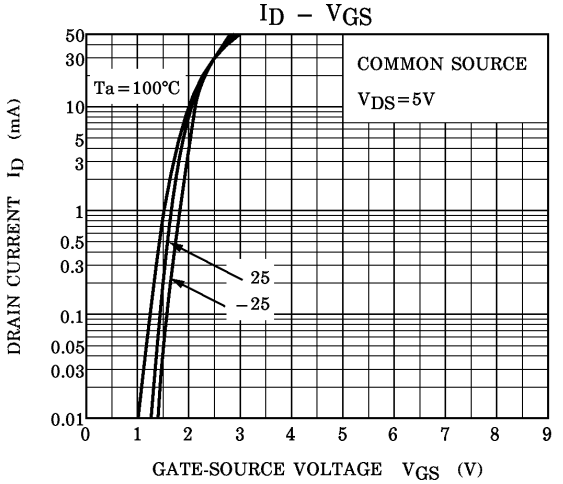

$I_D$ – $V_{DS}$ (LOW VOLTAGE REGION)



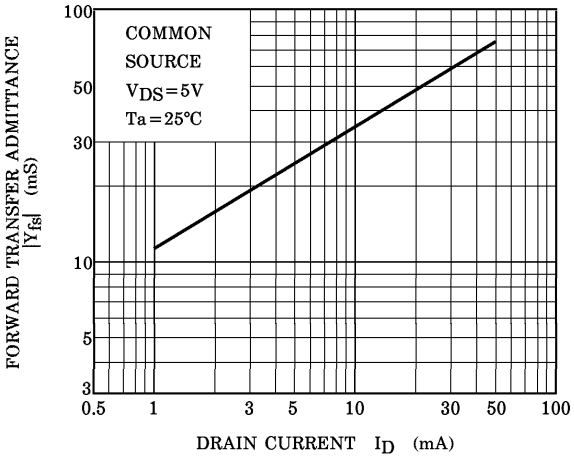

$I_{DR}$ – $V_{DS}$



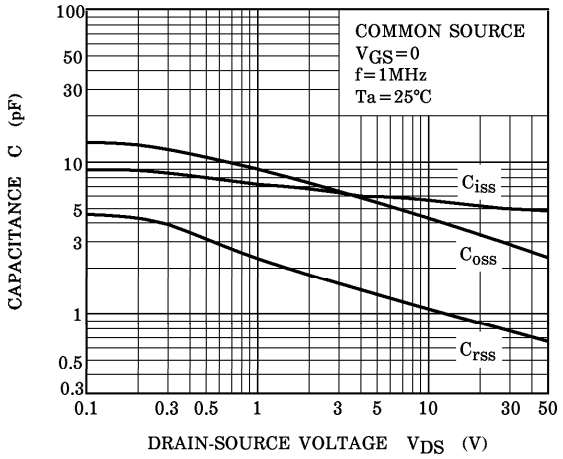

$I_D$ – $V_{GS}$

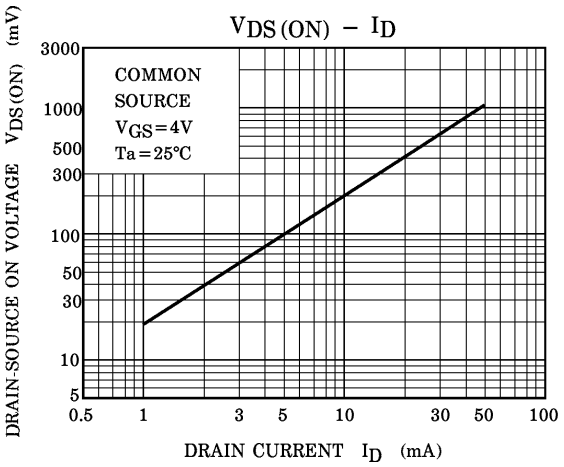


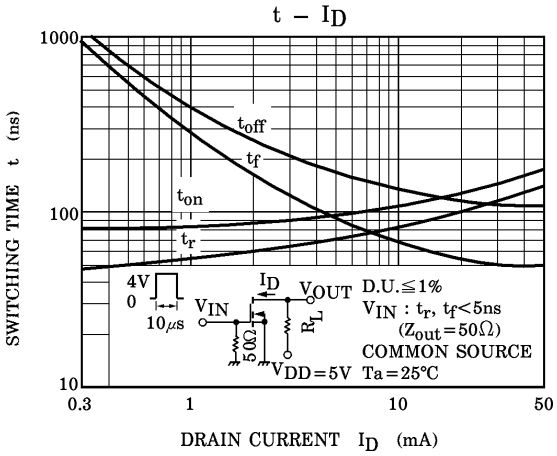

$|Y_{fs}|$ – $I_D$

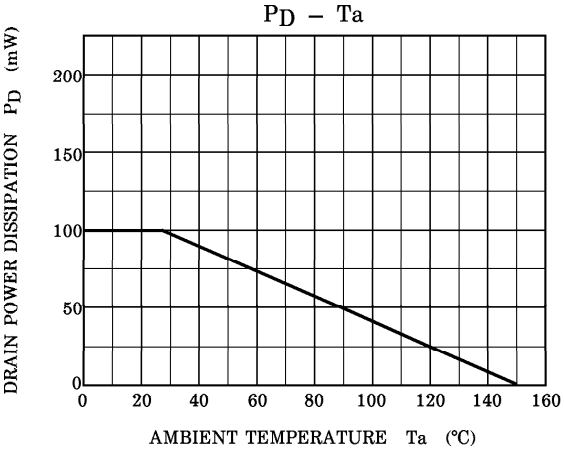



C – $V_{DS}$




$V_{DS(ON)}$ – $I_D$
COMMON SOURCE
$V_{GS}$=4V
Ta=25°C
DRAIN-SOURCE ON VOLTAGE $V_{DS(ON)}$ (mV)
DRAIN CURRENT $I_D$ (mA)
3000
1000
500
300
100
50
30
10
5
0.5
1
3
5
10
30
50
100


t – $I_D$
SWITCHING TIME t (ns)
DRAIN CURRENT $I_D$ (mA)
$t_{off}$
$t_f$
$t_{on}$
$t_r$
1000
100
10
0.3
1
10
50
4V
0
10μs
$V_{IN}$
$I_D$
$V_{OUT}$
$R_L$
50Ω
$V_{DD}$=5V
D.U.≦1%
$V_{IN}$ : $t_r$, $t_f$<5ns
($Z_{out}$=50Ω)
COMMON SOURCE
Ta=25°C


$P_D$ – Ta
DRAIN POWER DISSIPATION $P_D$ (mW)
AMBIENT TEMPERATURE Ta (°C)
200
150
100
50
0
0
20
40
60
80
100
120
140
160