Transistor

# 2.5V Drive Nch MOS FET

## 2SK3019

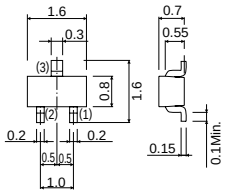
●**Structure**
Silicon N-channel
MOSFET

●**Applications**
Interfacing, switching (30V, 100mA)

●**Features**
1) Low on-resistance.
2) Fast switching speed.
3) Low voltage drive (2.5V) makes this device ideal for portable equipment.
4) Drive circuits can be simple.
5) Parallel use is easy.

●**Dimensions** (Unit : mm)

**EMT3**



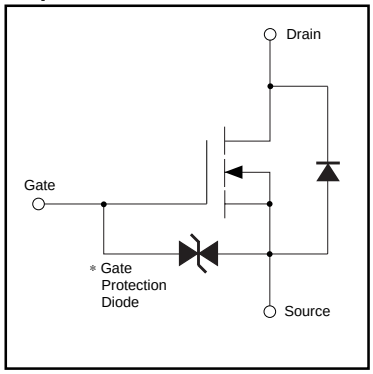

(1)Source
(2)Gate
(3)Drain

Abbreviated symbol : KN

●**Packaging specifications**

| | | |
|---|---|---|
| Type | Package | Taping |
| | Code | TL |
| | Basic ordering unit (pieces) | 3000 |
| 2SK3019 | | ◯ |

●**Equivalent circuit**




∗A protection diode is included between the gate and the source terminals to protect the diode against static electricity when the product is in use. Use a protection circuit when the fixed voltages are exceeded.

●**Absolute maximum ratings** (Ta=25°C)

| Parameter | | Symbol | Limits | Unit |
|---|---|---|---|---|
| Drain-source voltage | | $V_{DSS}$ | 30 | V |
| Gate-source voltage | | $V_{GSS}$ | ±20 | V |
| Drain current | Continuous | $I_D$ | ±100 | mA |
| | Pulsed | $I_{DP}$∗1 | ±400 | mA |
| Total power dissipation | | $P_D$∗2 | 150 | mW |
| Channel temperature | | Tch | 150 | °C |
| Storage temperature | | Tstg | −55 to +150 | °C |

∗1 Pw≤10μs, Duty cycle≤1%
∗2 With each pin mounted on the recommended lands.

●**Thermal resistance**

| Parameter | Symbol | Limits | Unit |
|---|---|---|---|
| Channel to ambient | Rth(ch-a) ∗ | 833 | °C / W |

∗ With each pin mounted on the recommended lands.

●**Electrical characteristics** (Ta=25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Gate-source leakage | $I_{GSS}$ | – | – | ±1 | μA | $V_{GS}$=±20V, $V_{DS}$=0V |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | 30 | – | – | V | $I_D$=10μA, $V_{GS}$=0V |
| Zero gate voltage drain current | $I_{DSS}$ | – | – | 1.0 | μA | $V_{DS}$=30V, $V_{GS}$=0V |
| Gate threshold voltage | $V_{GS(th)}$ | 0.8 | – | 1.5 | V | $V_{DS}$=3V, $I_D$=100μA |
| Static drain-source on-state resistance | $R_{DS(on)}$ | – | 5 | 8 | Ω | $I_D$=10mA, $V_{GS}$=4V |
| | $R_{DS(on)}$ | – | 7 | 13 | Ω | $I_D$=1mA, $V_{GS}$=2.5V |
| Forward transfer admittance | $\|Y_{fs}\|$ | 20 | – | – | ms | $I_D$=10mA, $V_{DS}$=3V |
| Input capacitance | $C_{iss}$ | – | 13 | – | pF | $V_{DS}$=5V |
| Output capacitance | $C_{oss}$ | – | 9 | – | pF | $V_{GS}$=0V |
| Reverse transfer capacitance | $C_{rss}$ | – | 4 | – | pF | f=1MHz |
| Turn-on delay time | $t_{d(on)}$ | – | 15 | – | ns | $I_D$=10mA, $V_{DD}$ ≒5V |
| Rise time | $t_r$ | – | 35 | – | ns | $V_{GS}$=5V |
| Turn-off delay time | $t_{d(off)}$ | – | 80 | – | ns | $R_L$=500Ω |
| Fall time | $t_f$ | – | 80 | – | ns | $R_G$=10Ω |

●**Electrical characteristic curves**

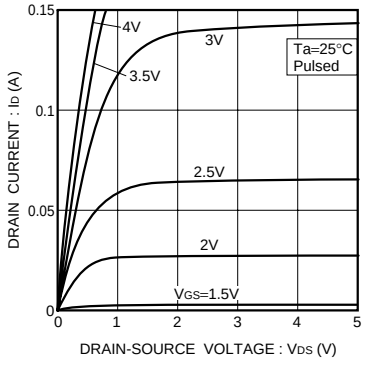



Fig.1 Typical output characteristics

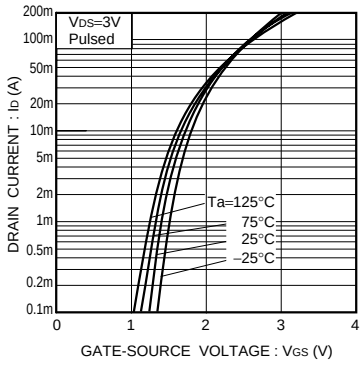



Fig.2 Typical transfer characteristics

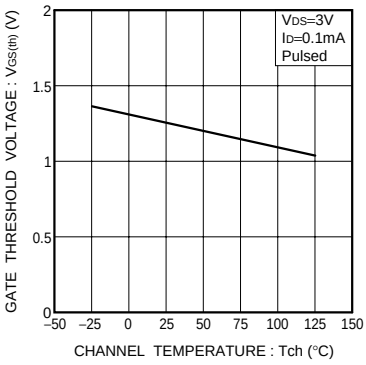



Fig.3 Gate threshold voltage vs. channel temperature

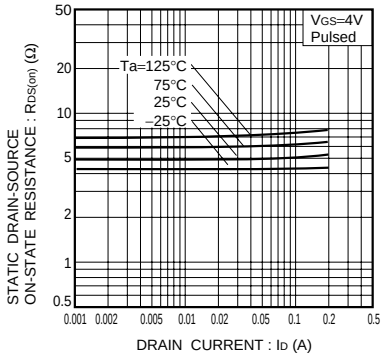



Fig.4 Static drain-source on-state resistance vs. drain current (I)

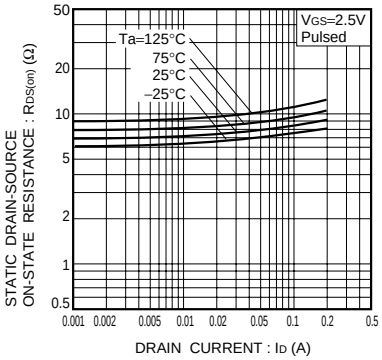



Fig.5 Static drain-source on-state resistance vs. drain current (II)

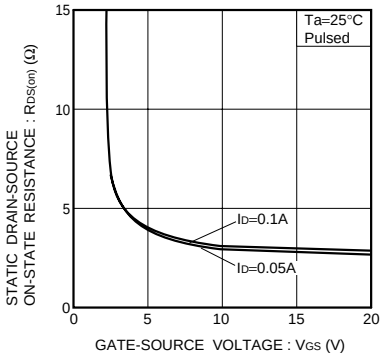



Fig.6 Static drain-source on-state resistance vs. gate-source voltage

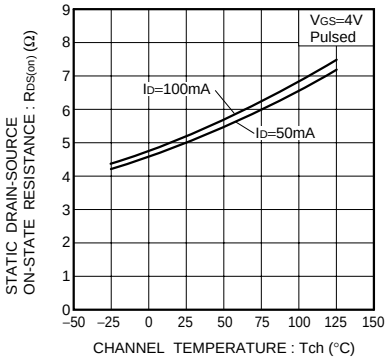



Fig.7 Static drain-source on-state resistance vs. channel temperature

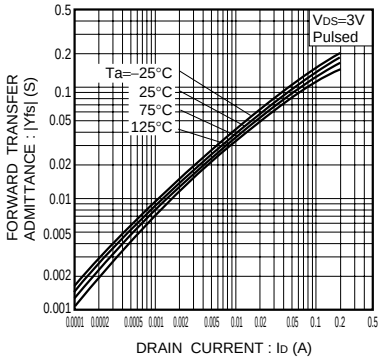



Fig.8 Forward transfer admittance vs. drain current

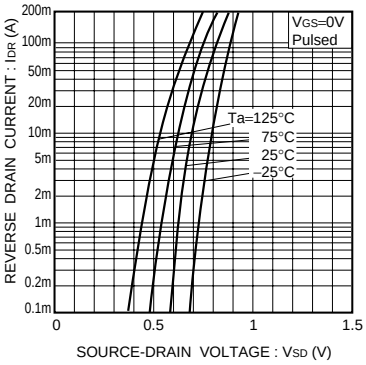



Fig.9 Reverse drain current vs. source-drain voltage (I)

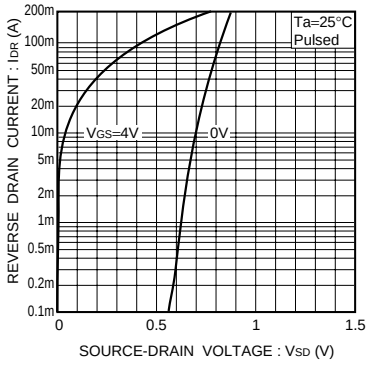



Fig.10 Reverse drain current vs. source-drain voltage (II)

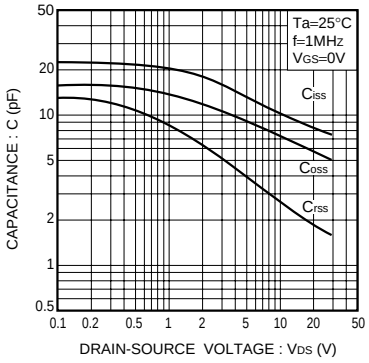



Fig.11 Typical capacitance vs. drain-source voltage

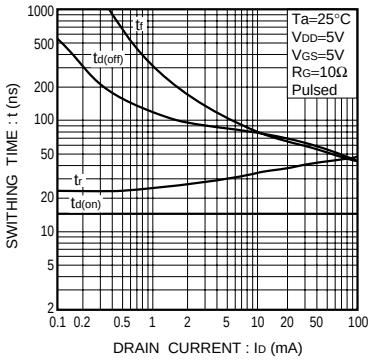



Fig.12 Switching characteristics (See Figures 13 and 14 for the measurement circuit and resultant waveforms)

**●Switching characteristics measurement circuit**

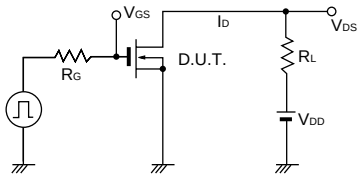



Fig.13 Switching time measurement circuit

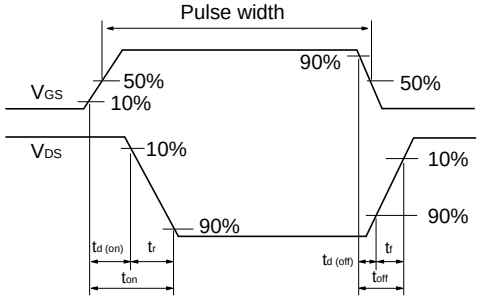



Fig.14 Switching time waveforms

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