

# Interface and switching (30V, 200mA)

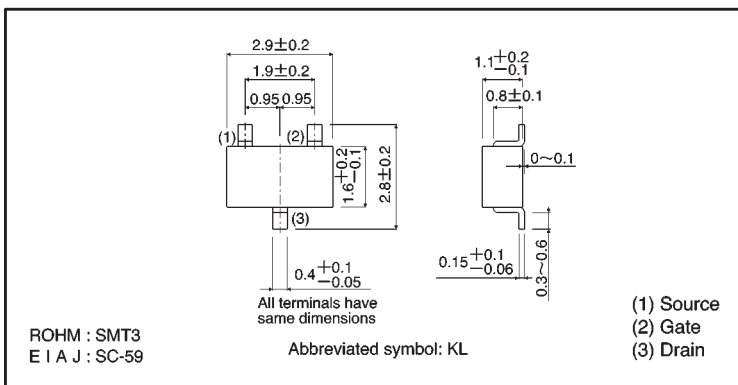
## ● Features

- 1) Low on-resistance.
- 2) Fast switching speed.
- 3) Low-voltage drive (4V).
- 4) Easily designed drive circuits.
- 5) Easy to parallel.

## ● Structure

Silicon N-channel  
MOSFET

● External dimensions (Units: mm)

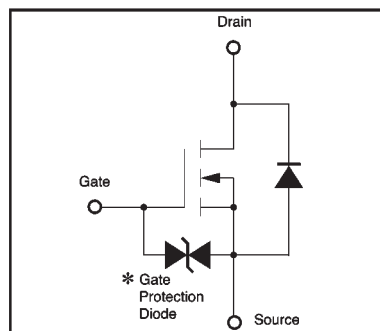


●Absolute maximum ratings (Ta = 25°C)

| Parameter               |            | Symbol                          | Limits   | Unit |
|-------------------------|------------|---------------------------------|----------|------|
| Drain-source voltage    |            | V <sub>DSS</sub>                | 30       | V    |
| Gate-source voltage     |            | V <sub>GSS</sub>                | ±20      | V    |
| Drain current           | Continuous | I <sub>D</sub>                  | 200      | mA   |
|                         | Pulsed     | I <sub>DP</sub> * <sup>1</sup>  | 800      | mA   |
| Reverse drain current   | Continuous | I <sub>DR</sub>                 | 200      | mA   |
|                         | Pulsed     | I <sub>DRP</sub> * <sup>2</sup> | 800      | mA   |
| Total power dissipation |            | P <sub>D</sub>                  | 200      | mW   |
| Channel temperature     |            | T <sub>ch</sub>                 | 150      | °C   |
| Storage temperature     |            | T <sub>stg</sub>                | −55~+150 | °C   |

\*  $P_w \leq 10 \mu s$ , Duty cycle  $\leq 1\%$

●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 voltage are exceeded.

●Electrical characteristics (Ta = 25°C)

| Parameter                               | Symbol          | Min. | Typ. | Max.     | Unit     | Test Conditions                  |
|-----------------------------------------|-----------------|------|------|----------|----------|----------------------------------|
| Gate-source leakage                     | $I_{GSS}$       | —    | —    | $\pm 10$ | $\mu A$  | $V_{GS} = \pm 20V, V_{DS} = 0V$  |
| Drain-source breakdown voltage          | $V_{(BR) DSS}$  | 30   | —    | —        | V        | $I_D = 1mA, V_{GS} = 0V$         |
| Zero gate voltage drain current         | $I_{DSS}$       | —    | —    | 10       | $\mu A$  | $V_{DS} = 30V, V_{GS} = 0V$      |
| Gate threshold voltage                  | $V_{GS(th)}$    | 1.0  | —    | 2.5      | V        | $V_{DS} = 10V, I_D = 1mA$        |
| Static drain-source on-state resistance | $R_{DS(on)}$    | —    | 1.5  | 2.8      | $\Omega$ | $I_D = 0.1A, V_{GS} = 10V$       |
|                                         |                 | —    | 2.8  | 4.5      |          | $I_D = 0.1A, V_{GS} = 4V$        |
| Forward transfer admittance             | $ Y_{fs} ^{pk}$ | 100  | —    | —        | mS       | $I_D = 0.1A, V_{DS} = 10V$       |
| Input capacitance                       | $C_{iss}$       | —    | 25   | —        | pF       | $V_{DS} = 10V$                   |
| Output capacitance                      | $C_{oss}$       | —    | 15   | —        | pF       | $V_{GS} = 0V$                    |
| Reverse transfer capacitance            | $C_{rss}$       | —    | 10   | —        | pF       | $f = 1MHz$                       |
| Turn-on delay time                      | $t_{d(on)}$     | —    | 15   | —        | ns       | $I_D = 0.1A, V_{DD} \approx 15V$ |
| Rise time                               | $t_r$           | —    | 20   | —        | ns       | $V_{GS} = 10V$                   |
| Turn-off delay time                     | $t_{d(off)}$    | —    | 90   | —        | ns       | $R_L = 150\Omega$                |
| Fall time                               | $t_f$           | —    | 100  | —        | ns       | $R_G = 10\Omega$                 |

\*  $P_w \leq 300 \mu s$ , Duty cycle  $\leq 1\%$

●Packaging specifications

|         |                              |        |
|---------|------------------------------|--------|
| Type    | Package                      | Taping |
|         | Code                         | T146   |
|         | Basic ordering unit (pieces) | 3000   |
| 2SK2731 |                              | ○      |

●Electrical characteristic curves

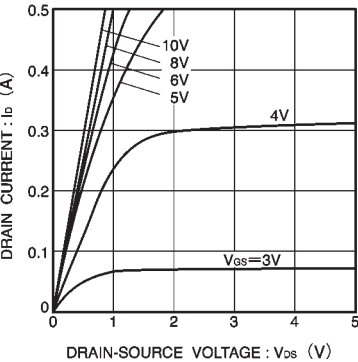


Fig.1 Typical output characteristics

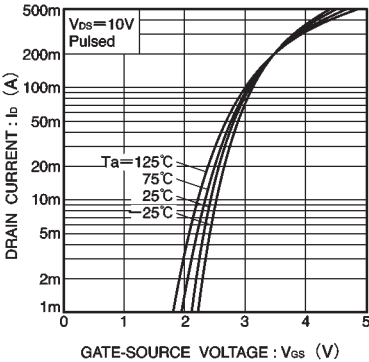


Fig.2 Typical transfer characteristics

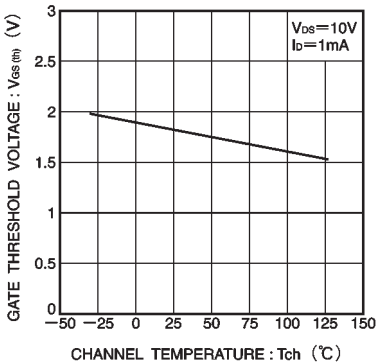


Fig.3 Gate threshold voltage vs. channel temperature

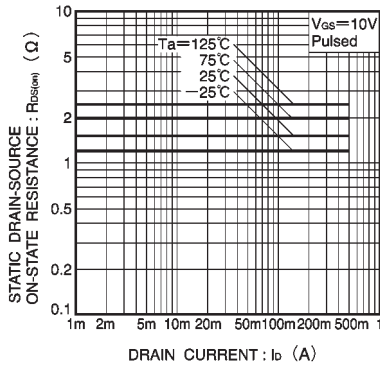


Fig.4 Static drain-source on-state resistance vs. drain current ( I )

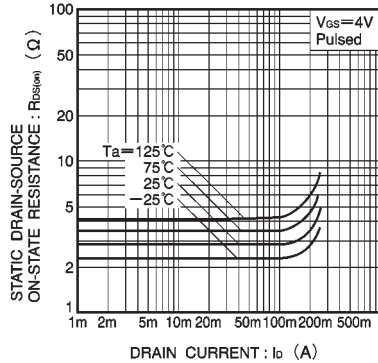


Fig.5 Static drain-source on-state resistance vs. drain current ( II )

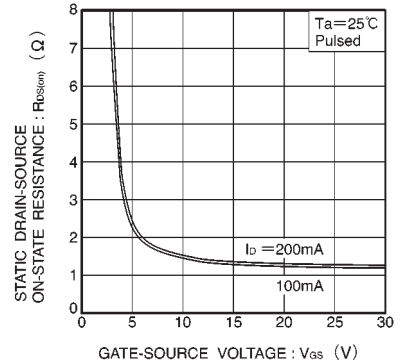


Fig.6 Static drain-source on-state resistance vs. gate-source voltage

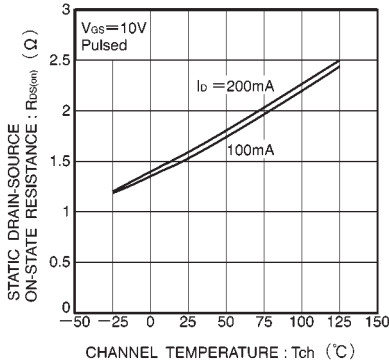


Fig.7 Static drain-source on-state resistance vs. channel temperature

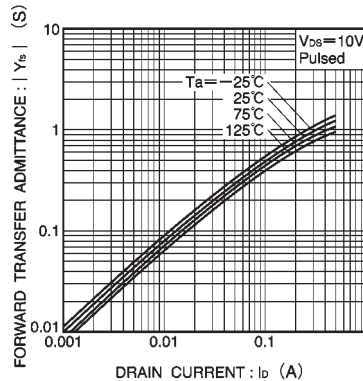


Fig.8 Forward transfer admittance vs. drain current

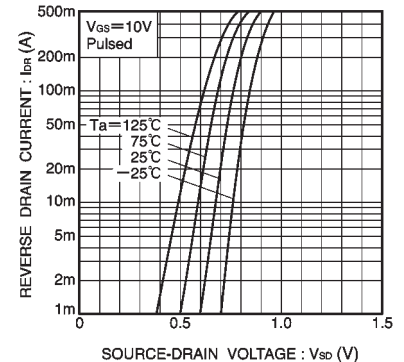


Fig.9 Reverse drain current vs. source-drain voltage ( I )

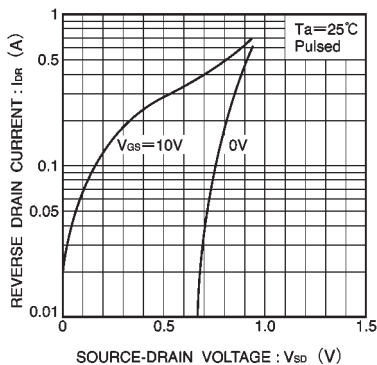


Fig.10 Reverse drain current vs. source-drain voltage ( II )

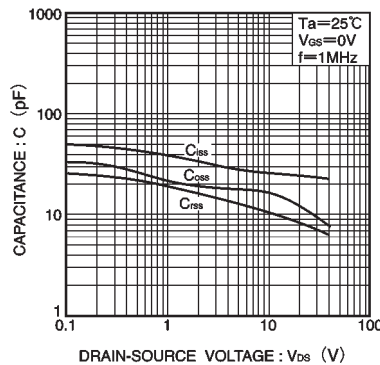


Fig.11 Typical capacitance vs. drain-source voltage

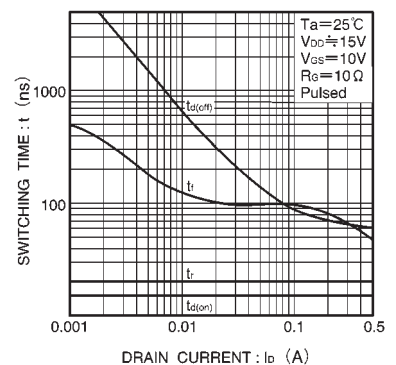


Fig.12 Switching characteristics ( See Figures 13 and 14 for the measurement circuit and resultant waveforms )

●Switching characteristics measurement circuit

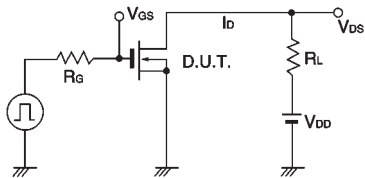


Fig.13 Switching time measurement circuit

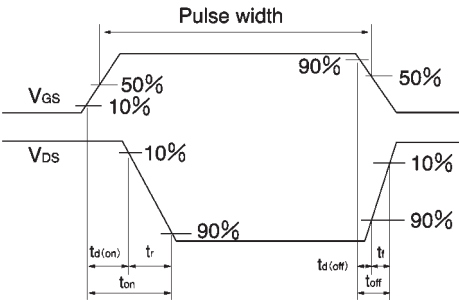


Fig.14 Switching time waveforms