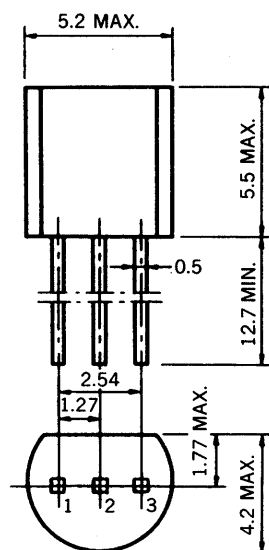


# MOS FIELD EFFECT TRANSISTOR

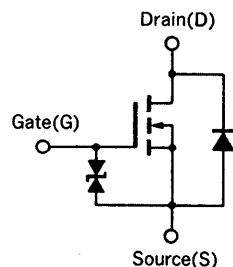
## 2SK679A

### N-CHANNEL MOS FET FOR HIGH-SPEED SWITCHING

#### PACKAGE DIMENSIONS (Unit : mm)



1. Gate (G)  
2. Drain (D)  
3. Source (S)



(Diode in the figure is the parasitic diode.)

The 2SK679A, N-channel vertical type MOS FET, is a switching device which can be directly driven from an IC operating with a 5 V single power supply. The device featuring low ON-state resistance is of the voltage drive type and thus is ideal for driving actuators such as motors, solenoids, and relays.

#### FEATURES

- Low ON-state resistance  
 $R_{DS(on)} = 1.0 \Omega$  MAX. at  $V_{GS} = 4.0$  V,  $I_D = 0.5$  A  
 $R_{DS(on)} = 0.7 \Omega$  MAX. at  $V_{GS} = 10$  V,  $I_D = 0.5$  A
- Voltage drive at logic level ( $V_{GS} = 4$  V) is possible.
- Bidirectional zener diode for protection is incorporated in between the gate and the source.
- Inductive loads can be driven without protective circuit thanks to the improved breakdown voltage between the Drain and Source.

#### QUALITY GRADE

Standard

Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

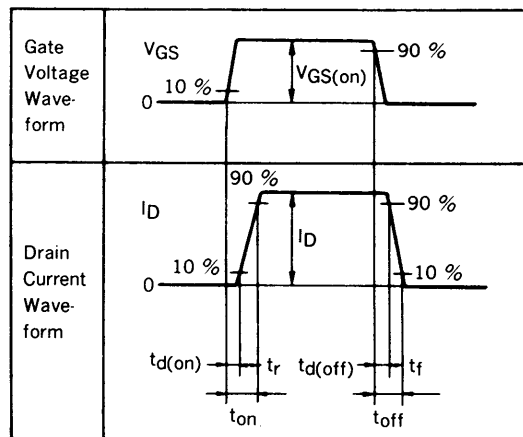
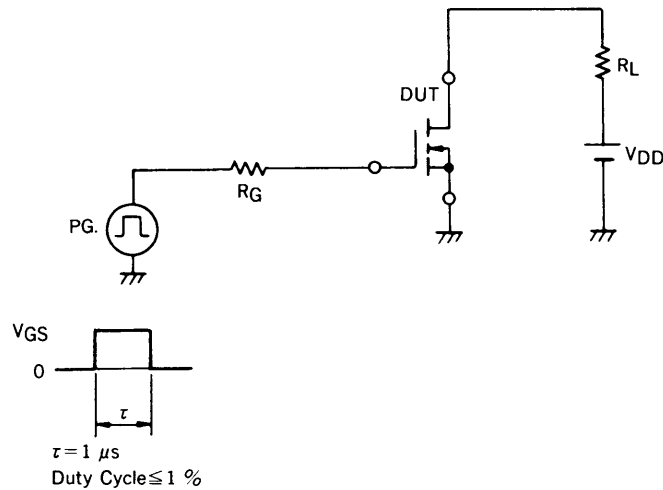
#### ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

| PARAMETER               | SYMBOL         | RATINGS         | UNIT             | TEST CONDITIONS                         |
|-------------------------|----------------|-----------------|------------------|-----------------------------------------|
| Drain to Source Voltage | $V_{DSS}$      | 30              | V                | $V_{GS} = 0$                            |
| Gate to Source Voltage  | $V_{GSS}$      | $\pm 20$        | V                | $V_{DS} = 0$                            |
| Drain Current (DC)      | $I_{D(DC)}$    | $\pm 0.5$       | A                |                                         |
| Drain Current (pulse)   | $I_{D(pulse)}$ | $\pm 1.5$       | A                | $PW \leq 10$ ms, Duty Cycle $\leq 50$ % |
| Total Power Dissipation | $P_T$          | 750             | mW               |                                         |
| Channel Temperature     | $T_{ch}$       | 150             | $^\circ\text{C}$ |                                         |
| Storage Temperature     | $T_{stg}$      | $-55$ to $+150$ | $^\circ\text{C}$ |                                         |

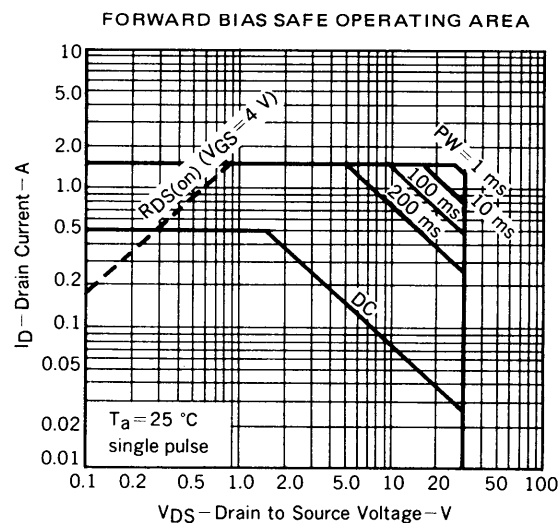
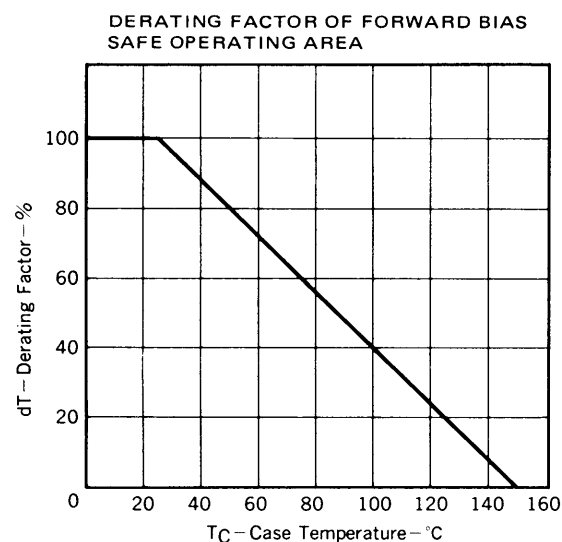
ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

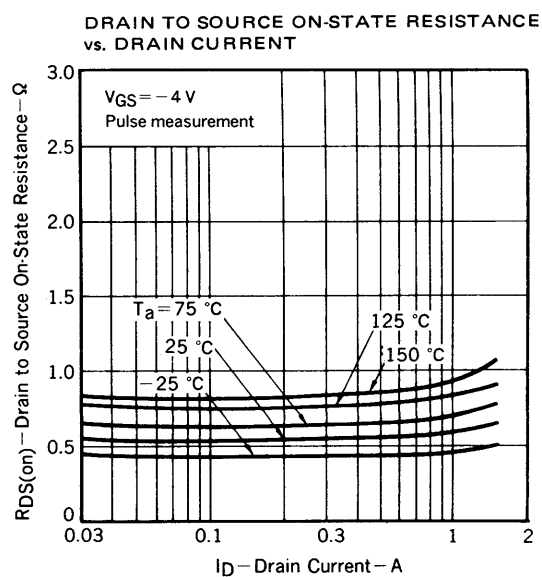
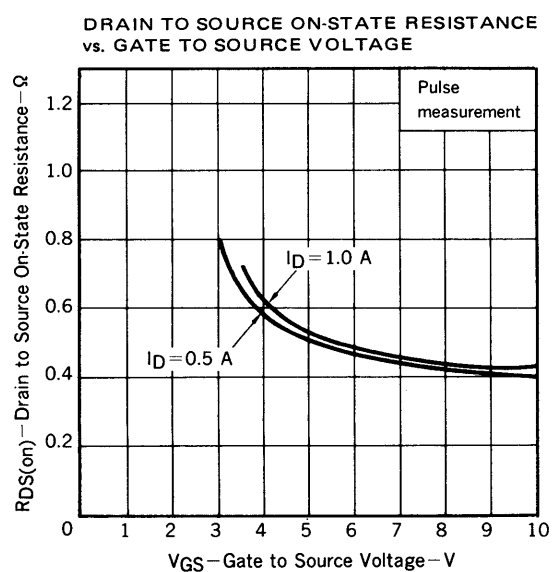
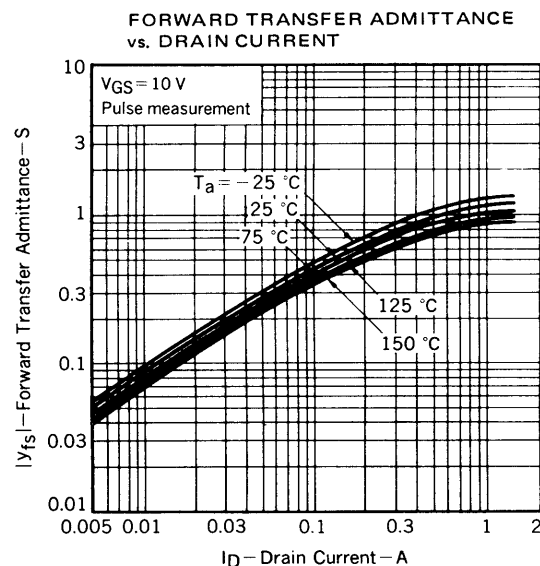
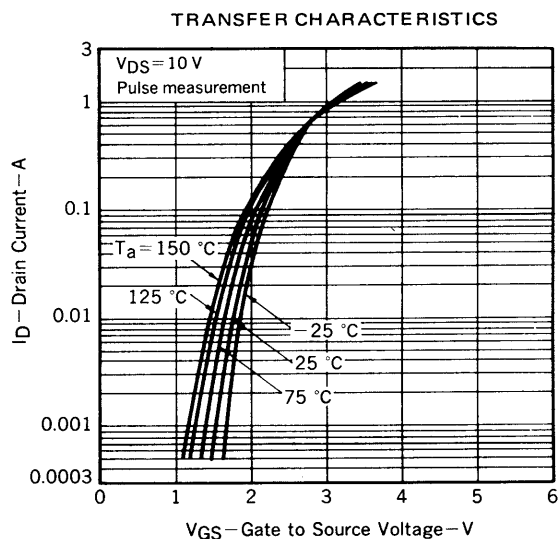
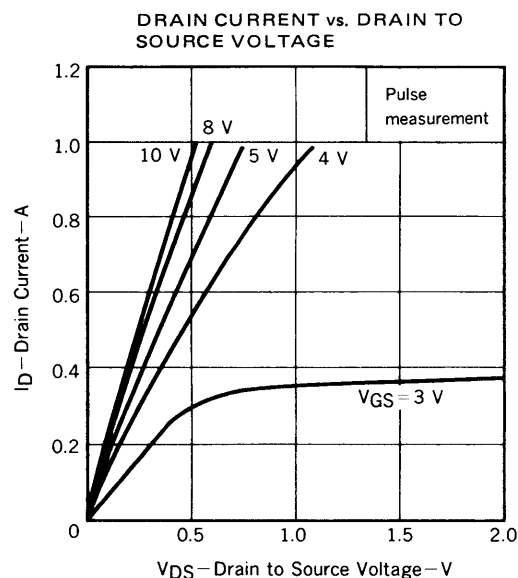
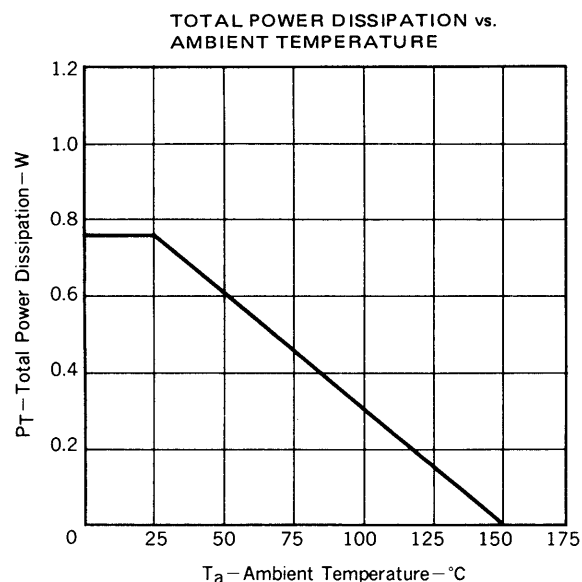
| PARAMETER                           | SYMBOL        | MIN. | TYP. | MAX.     | UNIT          | TEST CONDITIONS                                                                                                  |
|-------------------------------------|---------------|------|------|----------|---------------|------------------------------------------------------------------------------------------------------------------|
| Drain Cut-off Current               | $I_{DSS}$     |      |      | 10       | $\mu\text{A}$ | $V_{DS} = 30\text{ V}, V_{GS} = 0$                                                                               |
| Gate Leakage Current                | $I_{GSS}$     |      |      | $\pm 10$ | $\mu\text{A}$ | $V_{GS} = \pm 20\text{ V}, V_{DS} = 0$                                                                           |
| Gate Cut-off Voltage                | $V_{GS(off)}$ | 1.0  | 1.6  | 2.5      | V             | $V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$                                                                        |
| Forward Transfer Admittance         | $ Y_{fs} $    | 0.4  |      |          | S             | $V_{DS} = 10\text{ V}, I_D = 0.5\text{ A}$                                                                       |
| Drain to Source On-State Resistance | $R_{DS(on)1}$ |      | 0.6  | 1.0      | $\Omega$      | $V_{GS} = 4.0\text{ V}, I_D = 0.5\text{ A}$                                                                      |
| Drain to Source On-State Resistance | $R_{DS(on)2}$ |      | 0.4  | 0.7      | $\Omega$      | $V_{GS} = 10\text{ V}, I_D = 0.5\text{ A}$                                                                       |
| Input Capacitance                   | $C_{iss}$     |      | 130  |          | pF            | $V_{DS} = 5.0\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$                                                            |
| Output Capacitance                  | $C_{oss}$     |      | 70   |          | pF            |                                                                                                                  |
| Feedback Capacitance                | $C_{rss}$     |      | 30   |          | pF            |                                                                                                                  |
| Turn-On Delay Time                  | $t_{d(on)}$   |      | 12   |          | ns            | $V_{GS(on)} = 10\text{ V}, R_G = 10\ \Omega$<br>$V_{DD} = 25\text{ V}, I_D = 0.5\text{ A}$<br>$R_L = 50\ \Omega$ |
| Rise Time                           | $t_r$         |      | 44   |          | ns            |                                                                                                                  |
| Turn-Off Delay Time                 | $t_{d(off)}$  |      | 310  |          | ns            |                                                                                                                  |
| Fall Time                           | $t_f$         |      | 160  |          | ns            |                                                                                                                  |

SWITCHING TIME MEASUREMENT CIRCUIT AND CONDITIONS

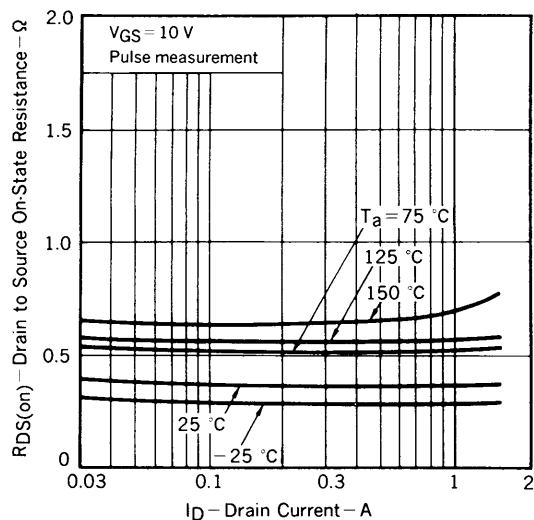


TYPICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

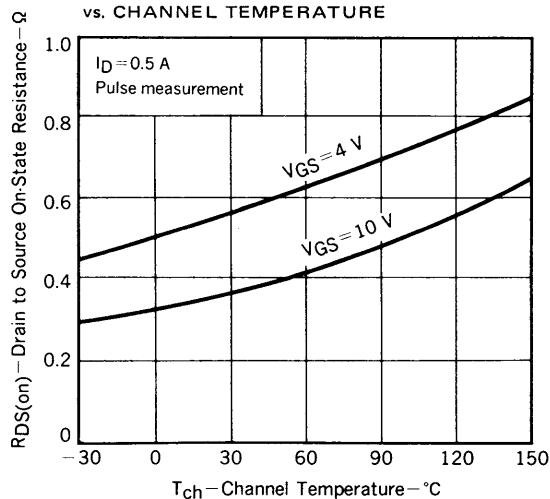




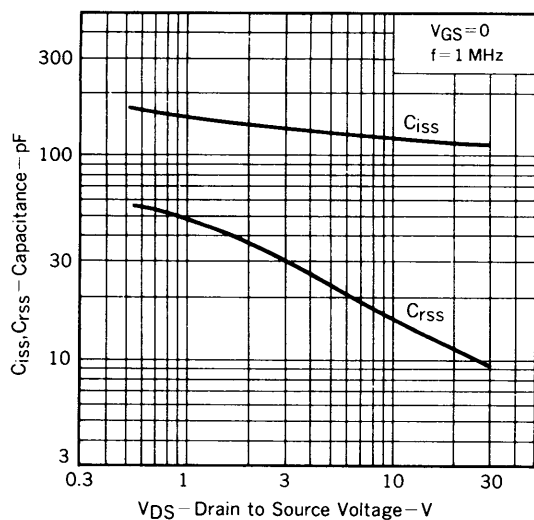
DRAIN TO SOURCE ON-STATE RESISTANCE  
vs. DRAIN CURRENT



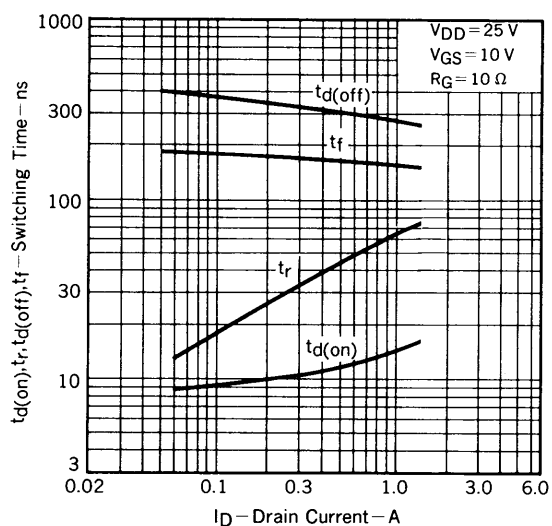
DRAIN TO SOURCE ON-STATE RESISTANCE  
vs. CHANNEL TEMPERATURE



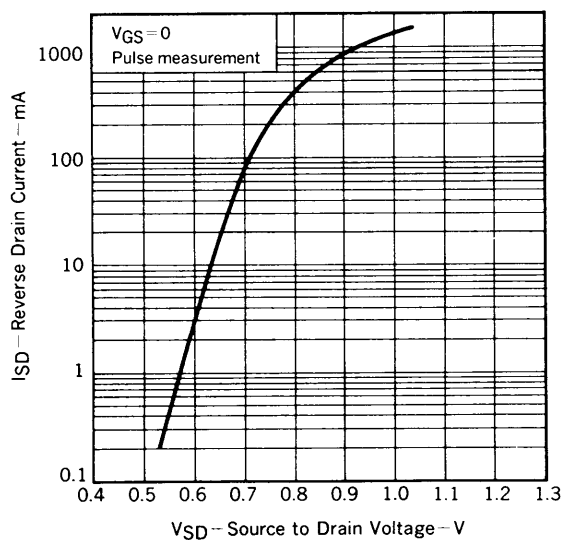
CAPACITANCE vs. DRAIN TO  
SOURCE VOLTAGE



SWITCHING CHARACTERISTICS



SOURCE TO DRAIN DIODE  
FORWARD VOLTAGE



**RECOMMENDED SOLDERING CONDITIONS**

Solder this product under the following recommended conditions.

For soldering methods or soldering conditions other than those recommended in the table, please consult our NEC salespeople.

**Insert type**

| Soldering method | Soldering conditions                                                | Recommended condition code |
|------------------|---------------------------------------------------------------------|----------------------------|
| Wave soldering   | Solder bath temperature: 260 °C max.<br>Soldering time: 10 sec max. |                            |

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Application examples recommended by NEC Corporation

Standard: Data processing and office equipment, Communication equipment (terminal, mobile). Test and Measurement equipment, Audio and Video equipment, Other consumer products, etc.

Special: Automotive and Transportation equipment, Communication equipment (trunk line), Train and Traffic control devices, industrial robots, Burning control systems, antidisaster systems, anticrime systems etc.



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