

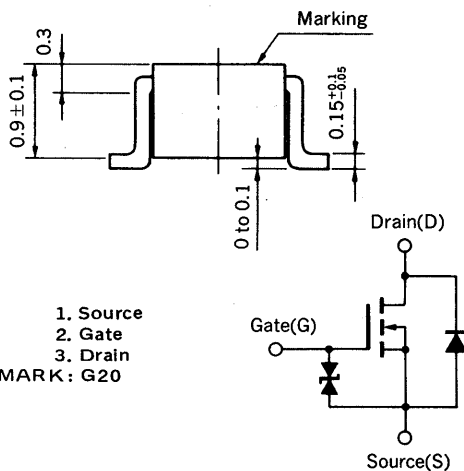
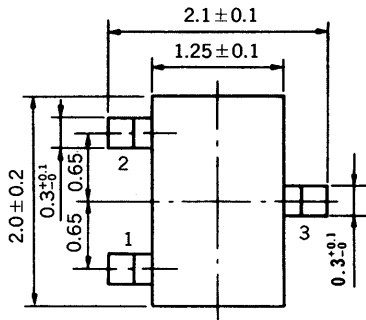
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P1 98.2

MOS FIELD EFFECT TRANSISTOR 2SK1658

N-CHANNEL MOS FET FOR SWITCHING

PACKAGE DIMENSIONS (Unit : mm)



(Diode in the figure is the parasitic diode.)

The 2SK1658 is an N-channel vertical type MOS FET which can be driven by 2.5 V power supply.

As the MOS FET is low Gate Leakage Current, it is suitable for appliances including Filter Circuit.

FEATURES

- Directly driven by ICs having a 3 V power supply.
- Has low Gate Leakage Current
 $I_{GSS} = \pm 5 \text{ nA MAX. @ } V_{GS} = \pm 3.0 \text{ V}$

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.

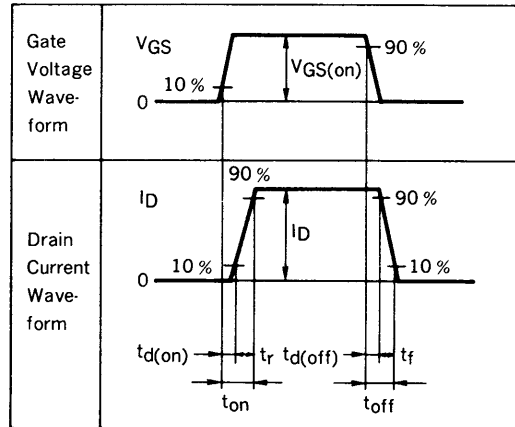
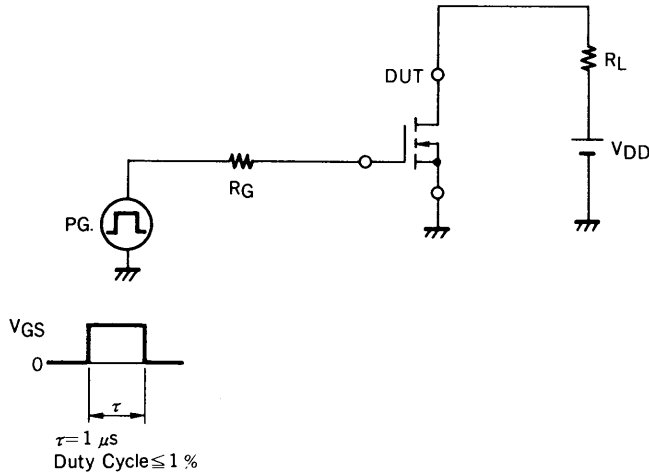
ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

| PARAMETER | SYMBOL | RATINGS | UNIT | TEST CONDITIONS |
|-------------------------|---------------------|-------------|------------------|--|
| Drain to Source Voltage | V_{DSS} | 30 | V | $V_{GS} = 0$ |
| Gate to Source Voltage | V_{GSS} | ± 7 | V | $V_{DS} = 0$ |
| Drain Current | $I_D(\text{DC})$ | ± 100 | mA | |
| Drain Current | $I_D(\text{pulse})$ | ± 200 | mA | $PW \leq 10 \text{ ms, Duty Cycle} \leq 50 \%$ |
| Total Power Dissipation | P_T | 150 | mW | |
| Channel Temperature | T_{ch} | 150 | $^\circ\text{C}$ | |
| Operating Temperature | T_{opt} | -55 to +80 | $^\circ\text{C}$ | |
| Storage Temperature | T_{stg} | -55 to +150 | $^\circ\text{C}$ | |

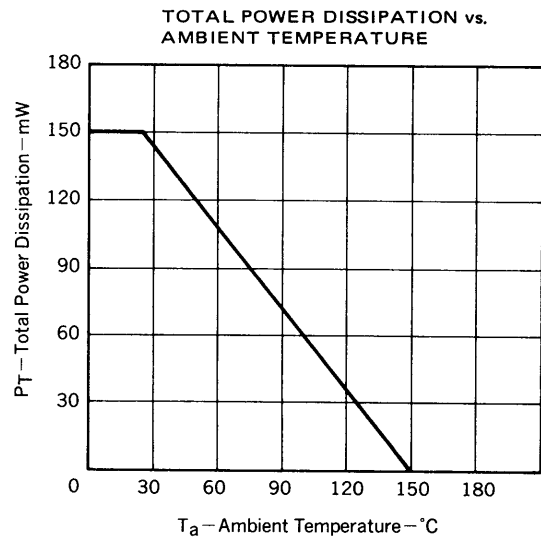
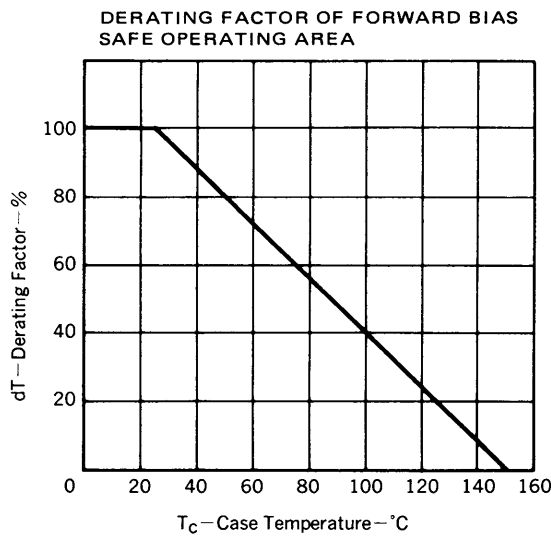
ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

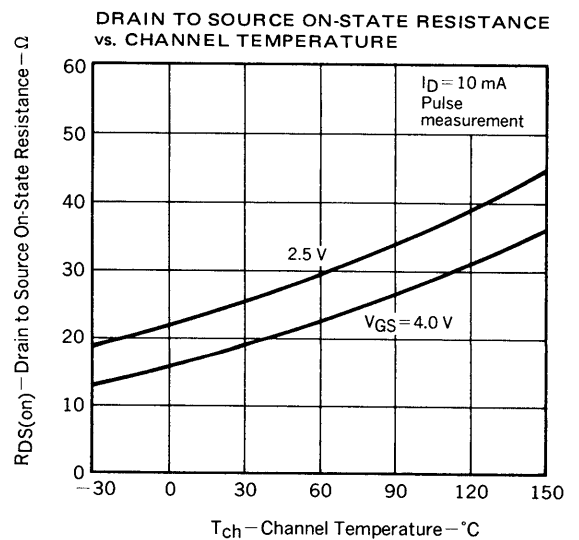
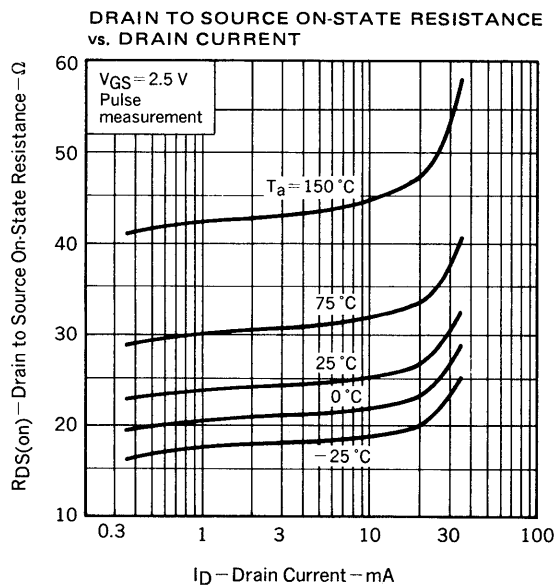
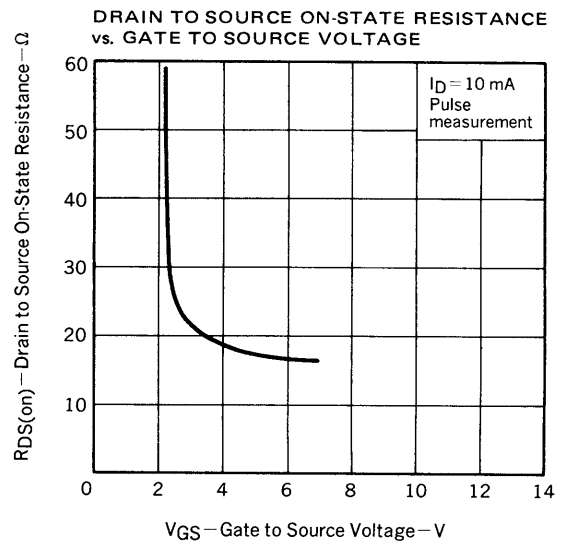
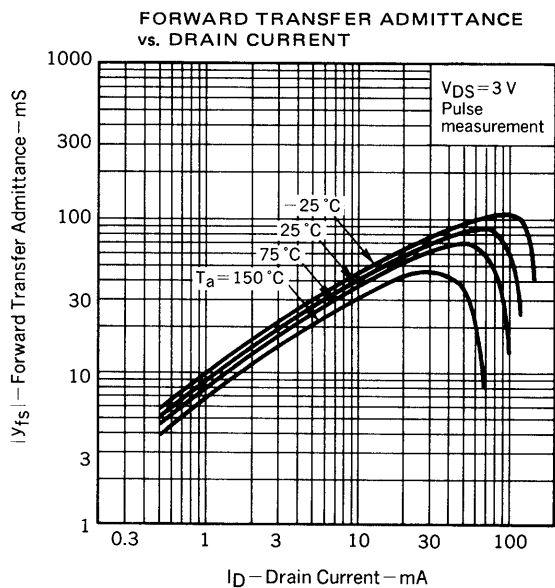
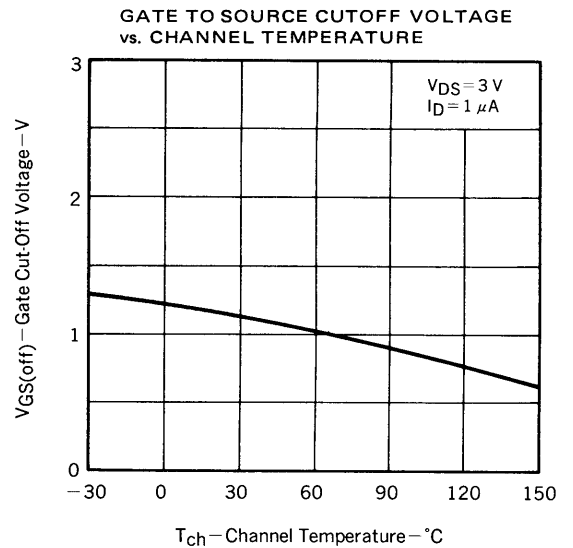
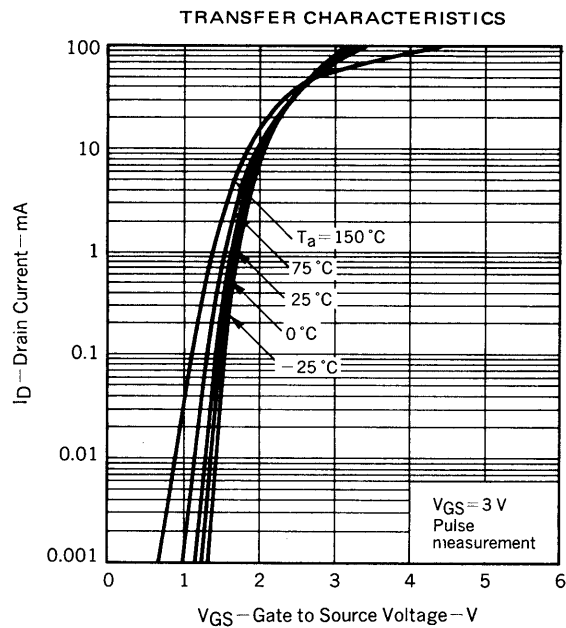
| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS |
|-------------------------------------|---------------|------|------|-----------|---------------|---|
| Drain Cut-off Current | I_{DSS} | | | 10 | μA | $V_{DS} = 30\text{ V}, V_{GS} = 0$ |
| Gate Leakage Current | I_{GSS} | | | ± 5.0 | μA | $V_{GS} = \pm 3.0\text{ V}, V_{DS} = 0$ |
| Gate Cut-off Voltage | $V_{GS(off)}$ | 0.9 | 1.2 | 1.5 | V | $V_{DS} = 3.0\text{ V}, I_D = 1.0\ \mu\text{A}$ |
| Forward Transfer Admittance | $ y_{fs} $ | 20 | 40 | | mS | $V_{DS} = 3.0\text{ V}, I_D = 10\text{ mA}$ |
| Drain to Source On-State Resistance | $R_{DS(on)1}$ | | 25 | 45 | Ω | $V_{GS} = 2.5\text{ V}, I_D = 10\text{ mA}$ |
| Drain to Source On-State Resistance | $R_{DS(on)2}$ | | 18 | 25 | Ω | $V_{GS} = 4.0\text{ V}, I_D = 10\text{ mA}$ |
| Input Capacitance | C_{iss} | | 15 | | pF | $V_{DS} = 3.0\text{ V}, V_{GS} = 0, f = 1\text{ MHz}$ |
| Output Capacitance | C_{oss} | | 10 | | pF | |
| Feedback Capacitance | C_{rss} | | 1.5 | | pF | |
| Turn-On Delay Time | $t_{d(on)}$ | | 50 | | ns | $V_{DD} = 3.0\text{ V}, I_D = 10\text{ mA}$ $V_{GS(on)} = 3\text{ V}, R_G = 10\ \Omega$ $R_L = 300\ \Omega$ |
| Rise Time | t_r | | 23 | | ns | |
| Turn-Off Delay Time | $t_{d(off)}$ | | 34 | | ns | |
| Fall Time | t_f | | 43 | | ns | |

SWITCHING TIME MEASUREMENT CIRCUIT AND CONDITIONS

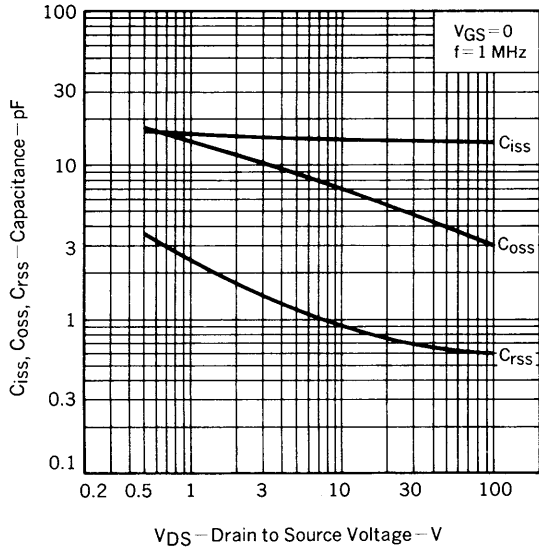


TYPICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

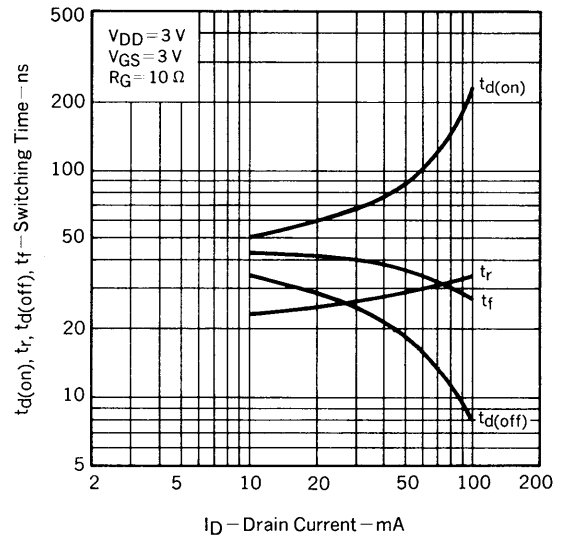




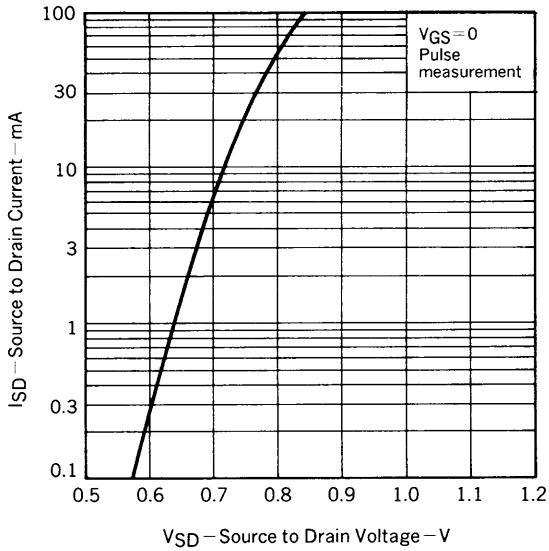
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



RECOMMENDED SOLDERING CONDITIONS

Mounting of this product by soldering should be done under the following conditions.
Please consult our representatives about soldering methods and conditions other than these.

SURFACE MOUNT TYPE

For details of the recommended soldering conditions, see the information document "SMT MANUAL" (IEI-1207).

| Soldering Method | Soldering Conditions | Symbol for Recommended Conditions |
|-----------------------|--|-----------------------------------|
| Infrared Reflow | Package peak temp.: 230 °C Soldering time: within 30 sec (above 210 °C) Soldering times: 1, Days limitation: none* | IR30-00 |
| Vapor Phase Soldering | Package peak temp.: 215 °C Soldering time: within 40 sec (above 200 °C) Soldering times: 1, Days limitation: none* | VP15-00 |
| Wave Soldering | Soldering bath temp.: below 260 °C Soldering time: within 10 sec Soldering times: 1, Days limitation: none* | WS60-00 |

*: Stored days under storage conditions at 25 °C and below 65 % R.H. after the dry-pack has been opened.

Note 1 Combination of soldering methods should be avoided.

[MEMO]

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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.