

## N-CHANNEL MOS FET

## FOR SWITCHING

### DESCRIPTION

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

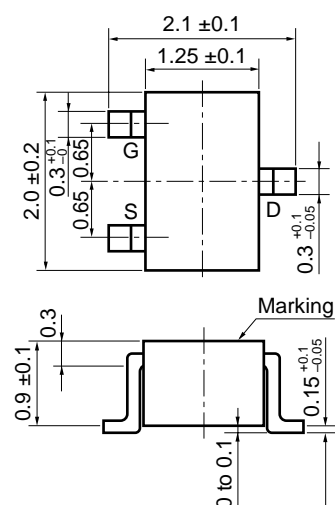
$$I_{GSS} = \pm 5 \text{ nA MAX. } (V_{GS} = \pm 3.0 \text{ V})$$

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

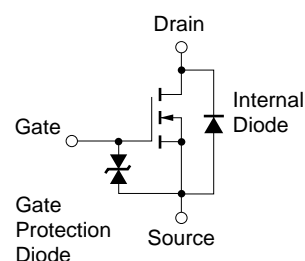
Drain to Source Voltage ( $V_{GS} = 0 \text{ V}$ )	$V_{DSS}$	30	V
Gate to Source Voltage ( $V_{DS} = 0 \text{ V}$ )	$V_{GSS}$	$\pm 7$	V
Drain Current (DC) ( $T_C = 25^\circ\text{C}$ )	$I_{D(DC)}$	$\pm 100$	mA
Drain Current (pulse) <sup>Note</sup>	$I_{D(pulse)}$	$\pm 200$	mA
Total Power Dissipation ( $T_A = 25^\circ\text{C}$ )	$P_T$	150	mW
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Operating Temperature	$T_{opt}$	$-55 \text{ to } +80$	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	$-55 \text{ to } +150$	$^\circ\text{C}$

**Note.**  $PW \leq 10 \text{ ms}$ , Duty Cycle  $\leq 50\%$

### PACKAGE DRAWING (Unit : mm)



### EQUIVALENT CIRCUIT



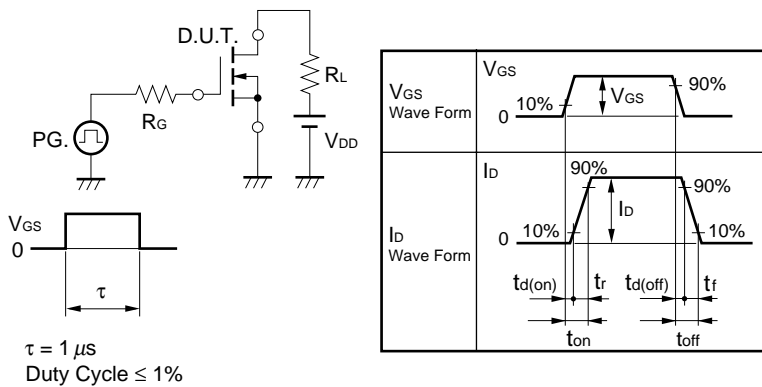
**Remark** The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device is actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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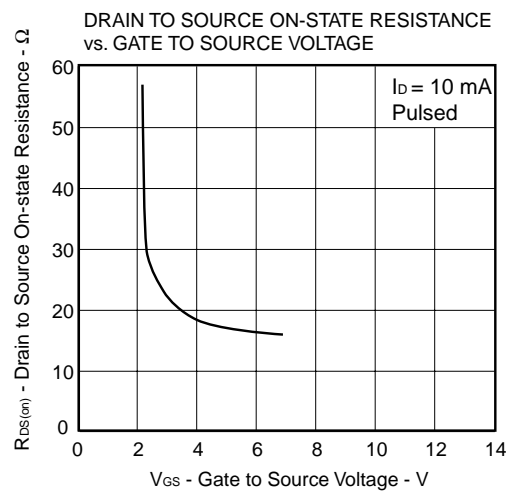
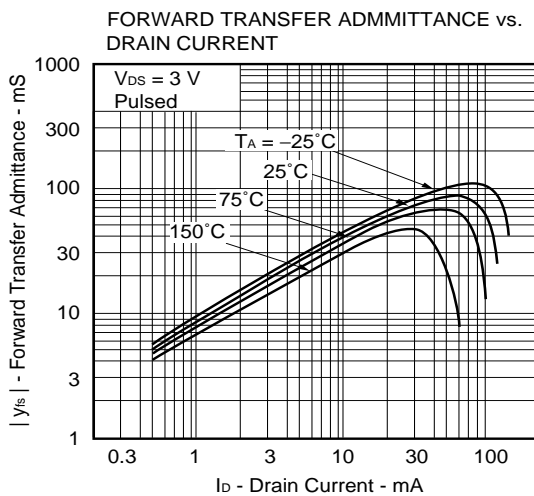
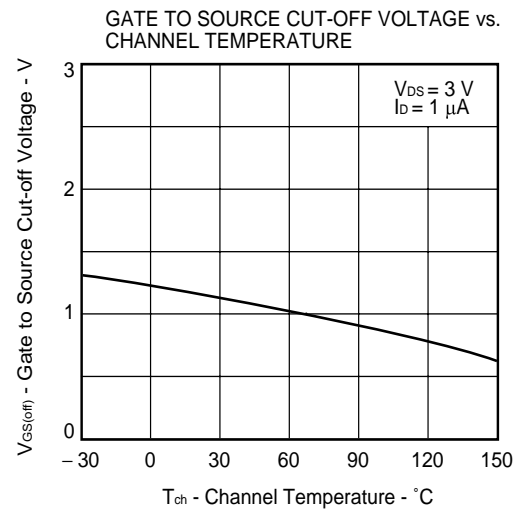
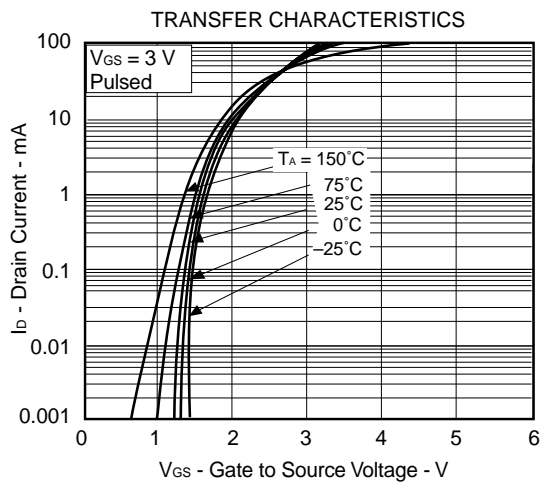
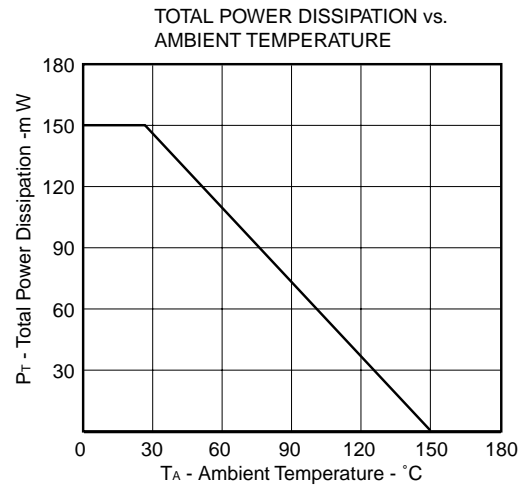
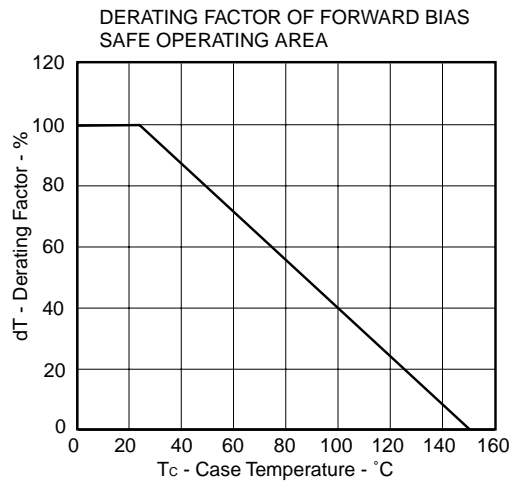
★ ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)

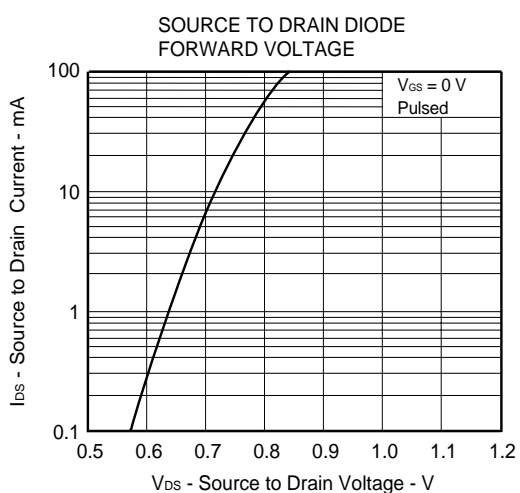
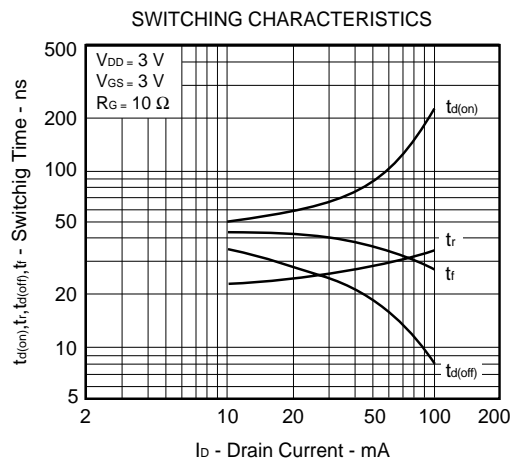
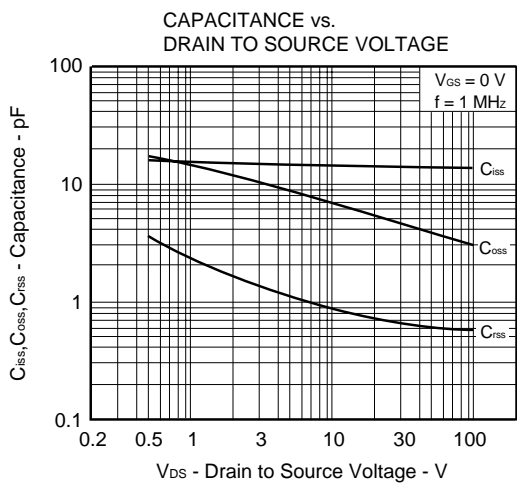
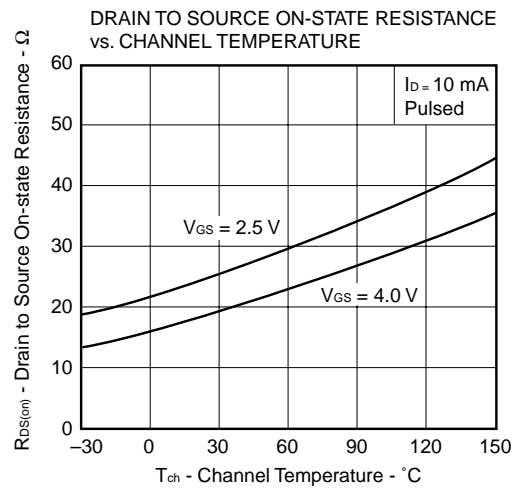
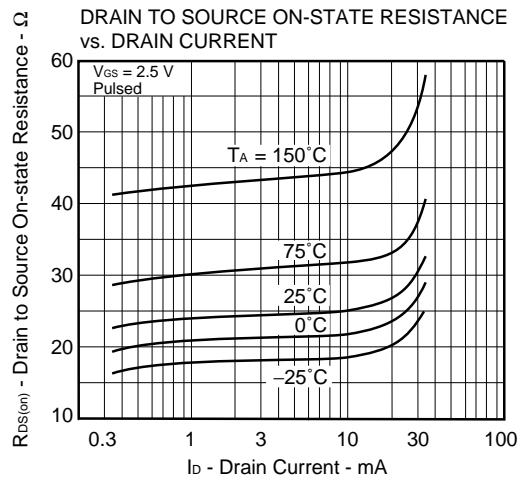
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V			10	μA
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±3.0 V, V <sub>DS</sub> = 0 V			±5.0	nA
Gate Cut-off Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> = 3.0 V, I <sub>D</sub> = 1.0 μA	0.9	1.2	1.5	V
Forward Transfer Admittance	y <sub>fs</sub>	V <sub>DS</sub> = 3.0 V, I <sub>D</sub> = 10 mA	20	40		mS
Drain to Source On-state Resistance	R <sub>DS(on)1</sub>	V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 10 mA		25	45	Ω
	R <sub>DS(on)2</sub>	V <sub>GS</sub> = 4.0 V, I <sub>D</sub> = 10 mA		18	25	Ω
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 3.0 V		15		pF
Output Capacitance	C <sub>oss</sub>	V <sub>GS</sub> = 0 V		10		pF
Reverse Transfer Capacitance	C <sub>rss</sub>	f = 1 MHz		1.5		pF
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 3.0 V, I <sub>D</sub> = 10 mA		50		ns
Rise Time	t <sub>r</sub>	V <sub>GS</sub> = 3.0 V		23		ns
Turn-off Delay Time	t <sub>d(off)</sub>	R <sub>G</sub> = 10 Ω		34		ns
Fall Time	t <sub>f</sub>	R <sub>L</sub> = 300 Ω		43		ns

TEST CIRCUIT SWITCHING TIME



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





## RECOMMENDED SOLDERING CONDITIONS

Recommended solder conditions for this product are described below.

For details on recommended soldering conditions, refer to Information Document “**Semiconductor Device Mounting Technology Manual**” (C10535E).

For soldering methods and conditions other than those recommended, consult NEC.

### Surface Mount Type

#### 2SK1658

Soldering Method	Soldering Conditions	Symbol of Recommended Conditions
Infrared reflow	Package peak temperature: 235°C, Time: 30 seconds MAX. (210°C MIN.), Number of times: 3 MAX.	IR35-00-3
VPS	Package peak temperature: 215°C, Time: 40 seconds MAX. (200°C MIN.), Number of times: 3 MAX.	VP15-00-3
Wave soldering	Soldering bath temperature: 260°C MAX., Time: 10 seconds MAX., Number of times: 1, Preheating temperature: 120°C MAX. (package surface temperature)	WS60-00-1

**Caution** Do not use two or more soldering methods in combination.

[MEMO]

[MEMO]

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