

## N-CHANNEL MOSFET

## FOR SWITCHING

### DESCRIPTION

The 2SK1589, N-channel vertical type MOSFET, is a switching device which can be driven directly by the output of ICs having a 5 V power source.

As the MOSFET has low on-state resistance and excellent switching characteristics, it is suitable for driving actuators such as motors, relays, and solenoids.

### FEATURES

- Directly by ICs having a 5 V power source.
- Not necessary to consider driving current because of its high input impedance.

### ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK1589	SC-59 (Mini Mold)

Marking: G17

### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C)

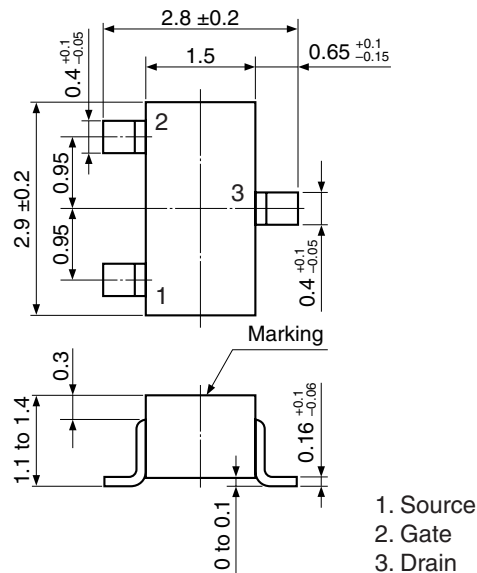
Drain to Source Voltage (V <sub>GS</sub> = 0 V)	V <sub>DSS</sub>	100	V
Gate to Source Voltage (V <sub>DS</sub> = 0 V)	V <sub>GSS</sub>	±20	V
Drain Current (DC)	I <sub>D(DC)</sub>	±100	mA
Drain Current (pulse) <sup>Note</sup>	I <sub>D(pulse)</sub>	±200	mA
Total Power Dissipation	P <sub>T</sub>	200	mW
Channel Temperature	T <sub>ch</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-55 to +150	°C

**Note** PW ≤ 10 ms, Duty Cycle ≤ 50%

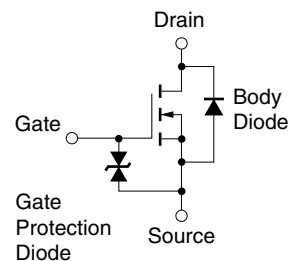
**Remark** The diode connected between the gate and source of the transistor serves as a protector against ESD.

When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

### PACKAGE DRAWING (Unit: mm)



### EQUIVALENT CIRCUIT



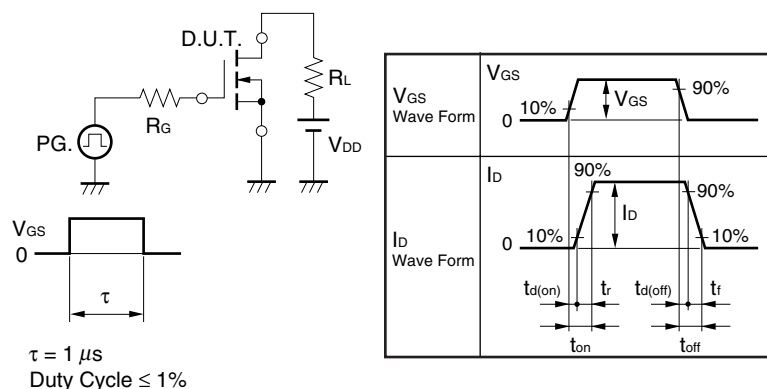
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### ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)

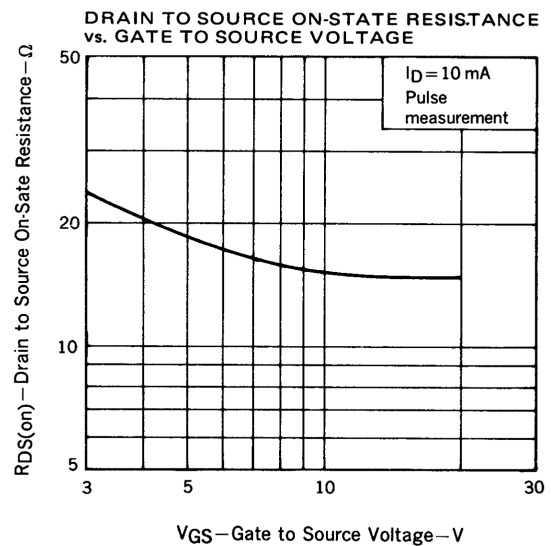
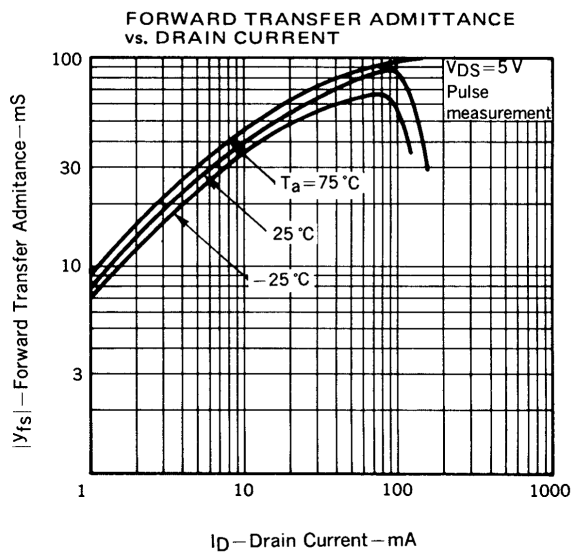
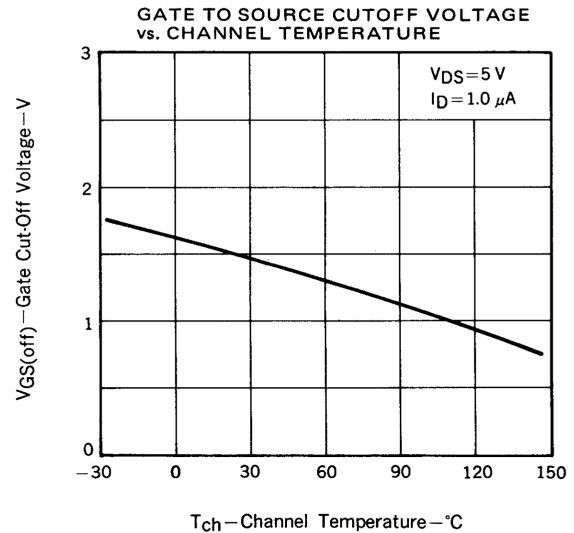
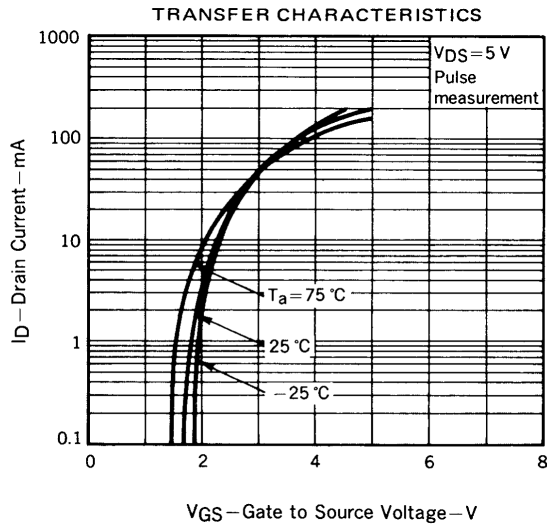
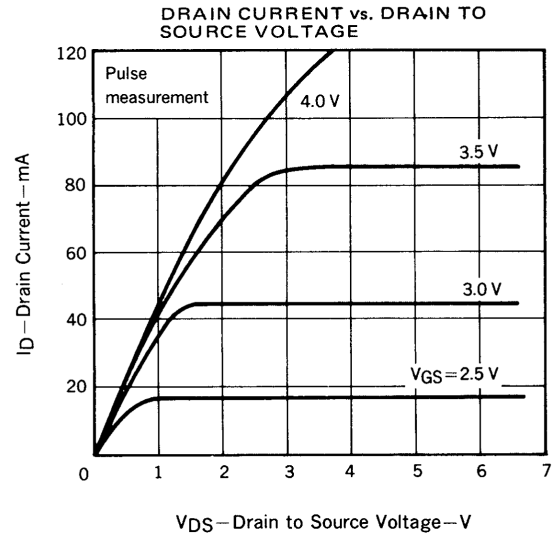
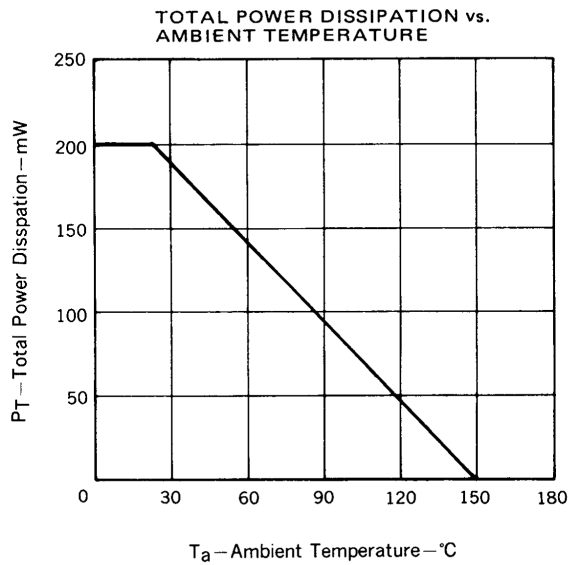
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 0 V			1.0	μA
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20 V, V <sub>DS</sub> = 0 V			±1.0	μA
Gate Cut-off Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> = 5.0 V, I <sub>D</sub> = 1.0 μA	0.8	1.5	1.8	V
Forward Transfer Admittance <b>Note</b>	y <sub>fs</sub>	V <sub>DS</sub> = 5.0 V, I <sub>D</sub> = 10 mA	20	38		mS
Drain to Source On-state Resistance <b>Note</b>	R <sub>DS(on)1</sub>	V <sub>GS</sub> = 4.0 V, I <sub>D</sub> = 10 mA		19	30	Ω
	R <sub>DS(on)2</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 10 mA		15	25	Ω
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 5.0 V V <sub>GS</sub> = 0 V f = 1 MHz		16		pF
Output Capacitance	C <sub>oss</sub>			12		pF
Reverse Transfer Capacitance	C <sub>rss</sub>			3.0		pF
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 5.0 V, I <sub>D</sub> = 10 mA V <sub>GS</sub> = 5.0 V R <sub>G</sub> = 10 Ω		17		ns
Rise Time	t <sub>r</sub>			10		ns
Turn-off Delay Time	t <sub>d(off)</sub>			68		ns
Fall Time	t <sub>f</sub>			38		ns

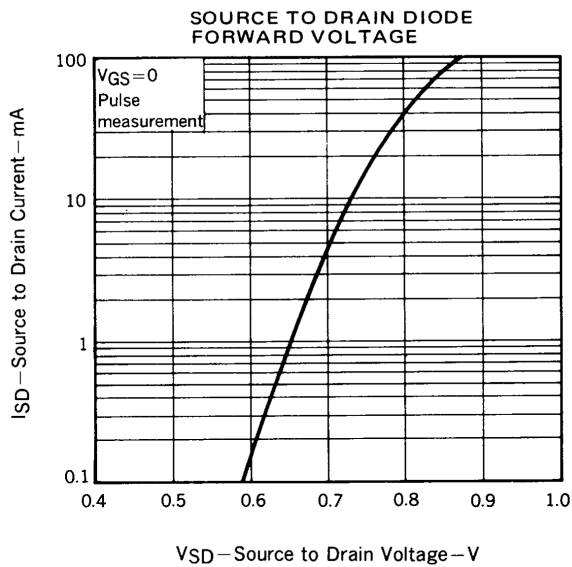
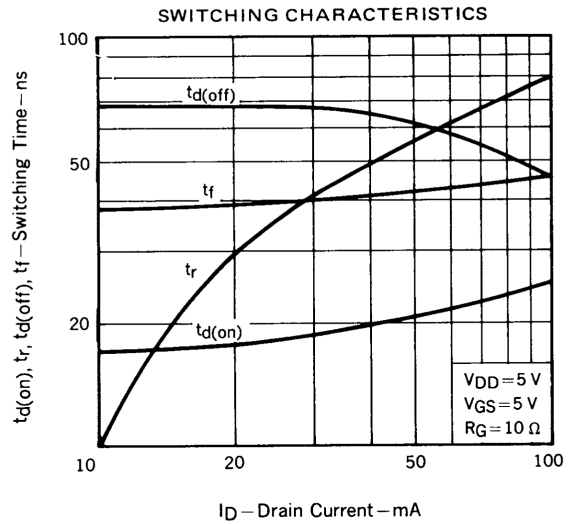
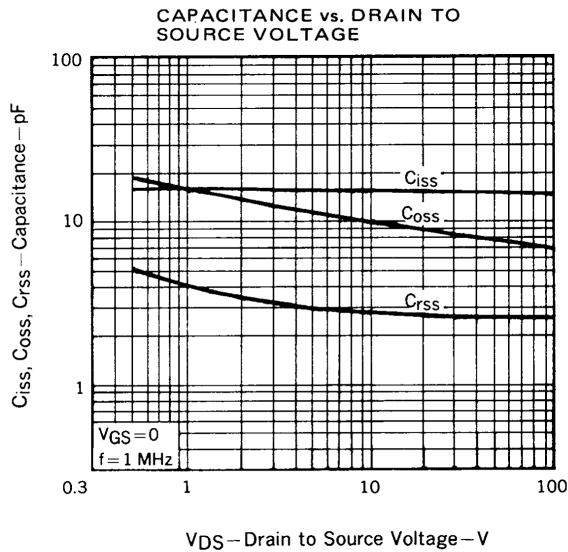
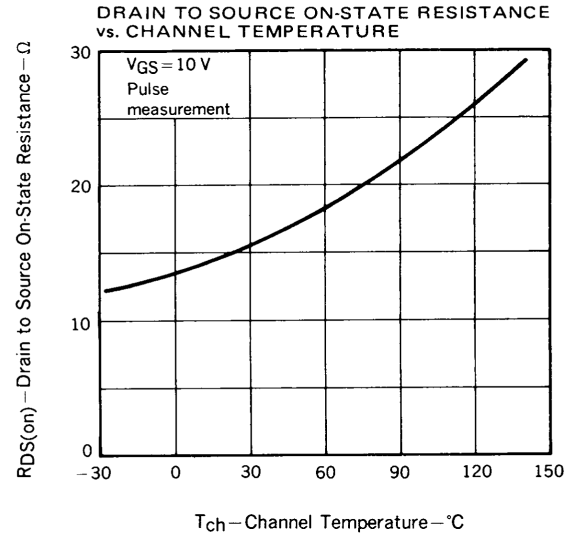
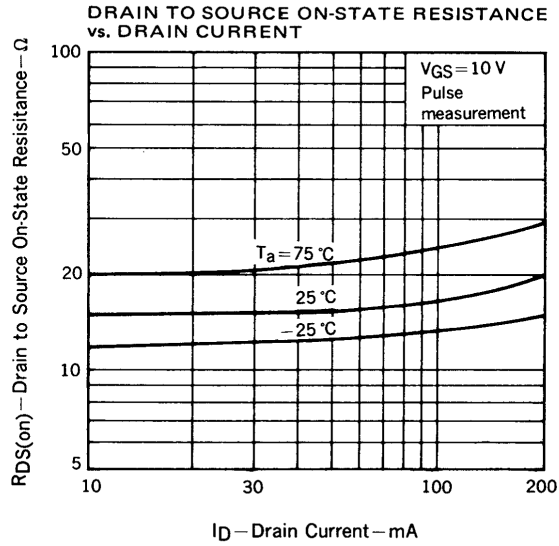
**Note Pulsed**

## TEST CIRCUIT SWITCHING TIME



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





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