NEC

MOS FIELD EFFECT TRANSISTOR
2SK1589

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

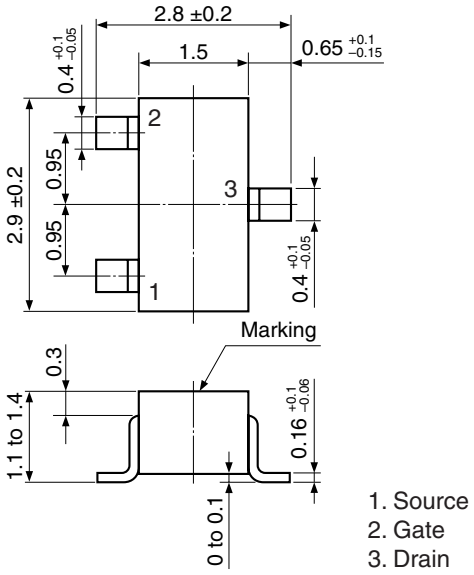
- Directly by ICs having a 5 V power source.
- Not necessary to consider driving current because of its high input impedance.

ORDERING INFORMATION

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

Marking: G17

PACKAGE DRAWING (Unit: mm)

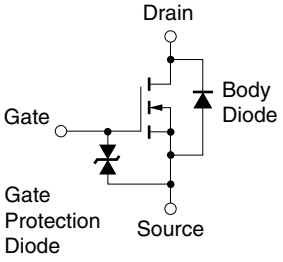


ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage (V_{GS} = 0 V)	V_{DSS}	100	V
Gate to Source Voltage (V_{DS} = 0 V)	V_{GSS}	±20	V
Drain Current (DC)	$I_{D(DC)}$	±100	mA
Drain Current (pulse) **Note**	$I_{D(pulse)}$	±200	mA
Total Power Dissipation	P_T	200	mW
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C

Note PW ≤ 10 ms, Duty Cycle ≤ 50%

EQUIVALENT CIRCUIT



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.

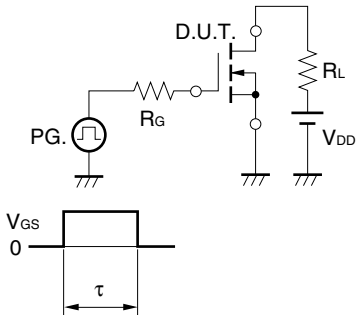
Document No. D17809EJ2V0DS00 (2nd edition)
(Previous No. TC-2355)
Date Published November 2005 NS CP(K)
Printed in Japan

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

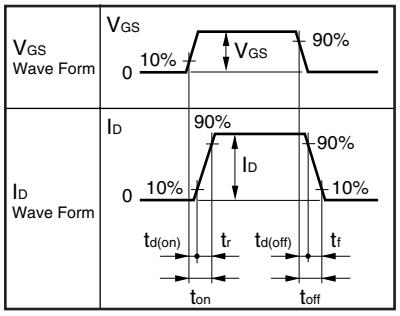
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 100 V, V_{GS} = 0 V			1.0	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0 V			±1.0	μA
Gate Cut-off Voltage	$V_{GS(off)}$	V_{DS} = 5.0 V, I_D = 1.0 μA	0.8	1.5	1.8	V
Forward Transfer Admittance **Note**	$\lvert y_{fs} \rvert$	V_{DS} = 5.0 V, I_D = 10 mA	20	38		mS
Drain to Source On-state Resistance **Note**	$R_{DS(on)1}$	V_{GS} = 4.0 V, I_D = 10 mA		19	30	Ω
	$R_{DS(on)2}$	V_{GS} = 10 V, I_D = 10 mA		15	25	Ω
Input Capacitance	C_{iss}	V_{DS} = 5.0 V		16		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V		12		pF
Reverse Transfer Capacitance	C_{rss}	f = 1 MHz		3.0		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 5.0 V, I_D = 10 mA		17		ns
Rise Time	t_r	V_{GS} = 5.0 V		10		ns
Turn-off Delay Time	$t_{d(off)}$	R_G = 10 Ω		68		ns
Fall Time	t_f			38		ns

Note Pulsed

TEST CIRCUIT SWITCHING TIME

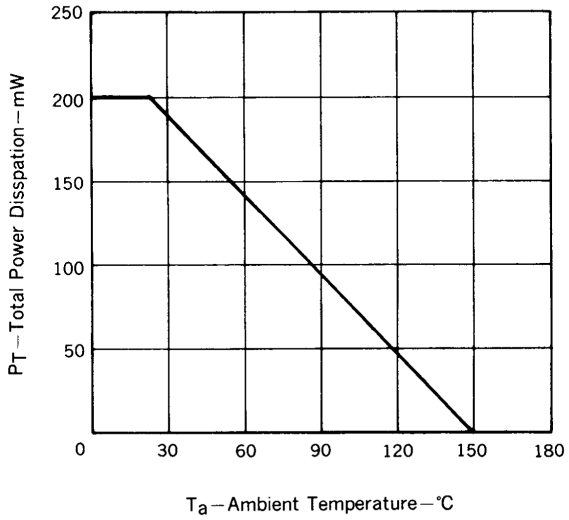


τ = 1 μs
Duty Cycle ≤ 1%

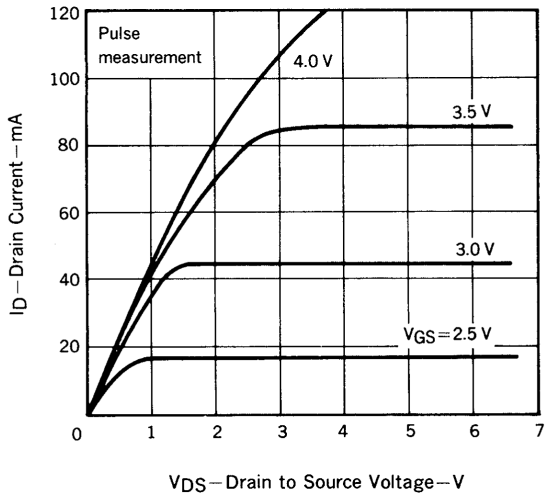


TYPICAL CHARACTERISTICS (T_A = 25°C)

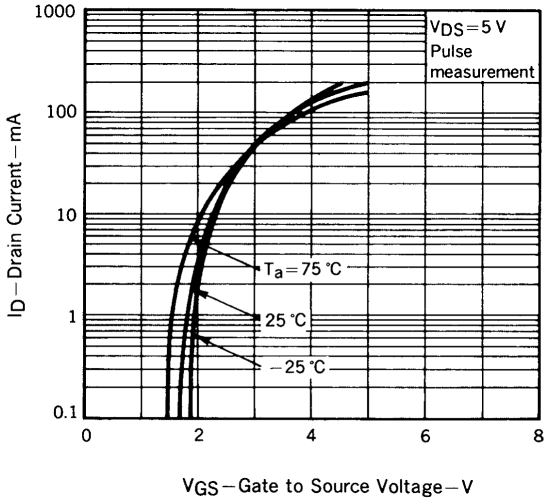
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



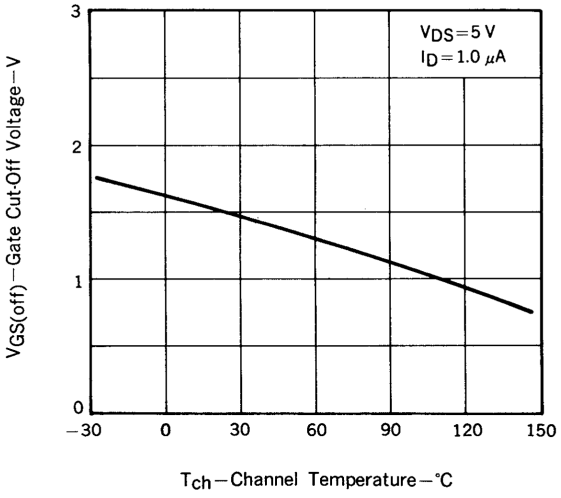
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



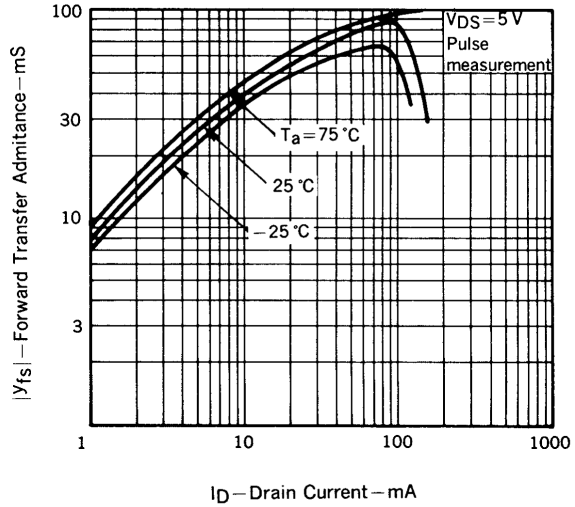
TRANSFER CHARACTERISTICS



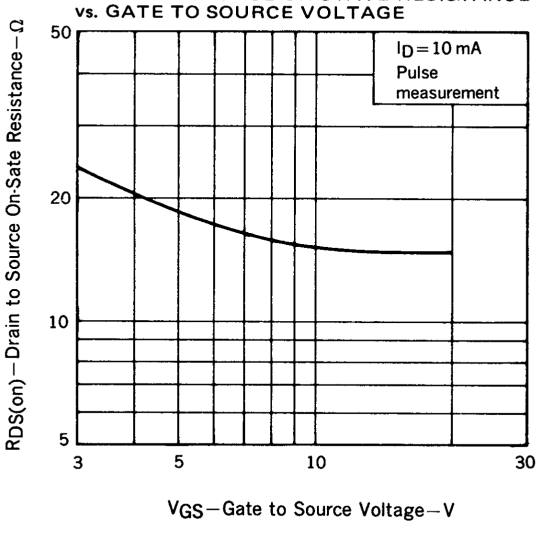
GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE



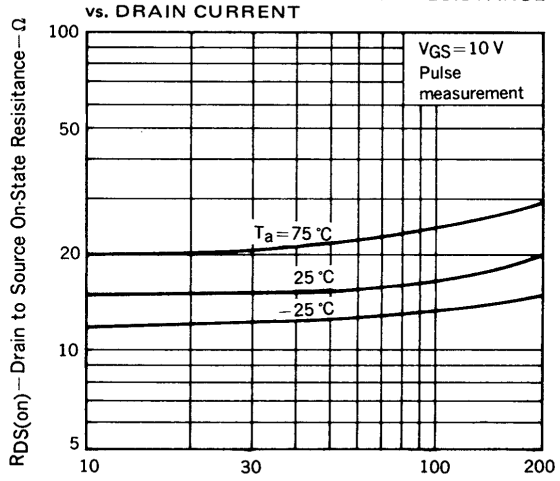
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



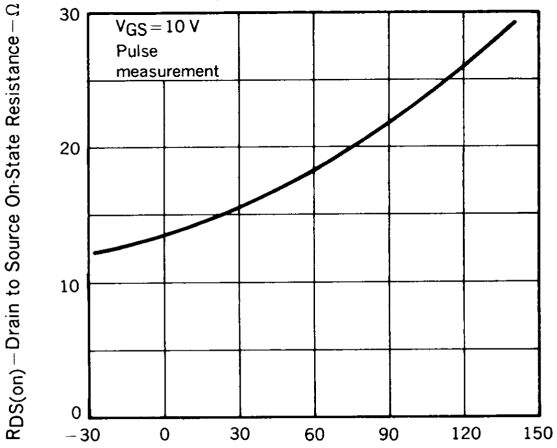
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



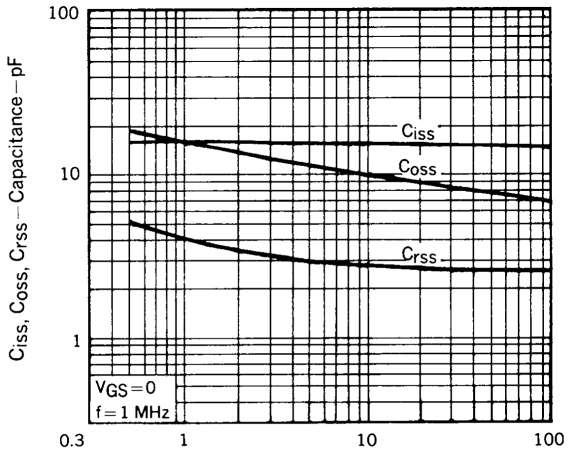
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



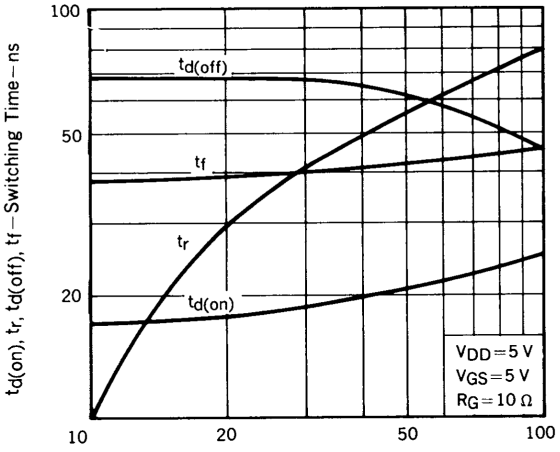
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE