NEC

MOS FIELD EFFECT TRANSISTOR

2SK1398

N-CHANNEL MOS FET
FOR HIGH SPEED SWITCHING

★ DESCRIPTION

The 2SK1398 is N-channel MOS Field Effect Transistor designed for a high-speed switching device in digital circuits.

The 2SK1398 is driven by a 2.5-V power source, it is suitable for applications including headphone stereos which need power saving.

ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK1398	SST

FEATURES

- Directly driven by ICs having a 3-V power supply.
- Not necessary to consider driving current because of its high input impedance.
- Possible to reduce the number of parts by omitting the bias resistor.
- Can be used complementary with the 2SJ184.

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage (V_{GS}= 0 V)	V_{DSS}	50	V
Gate to Source Voltage (V_{DS}= 0 V)	V_{GSS}	±7.0	V
Drain Current (DC)	$I_{D(DC)}$	±100	mA
Drain Current (pulse) **Note**	$I_{D(pulse)}$	±200	mA
Total Power Dissipation	P_T	250	mW
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C

Note PW ≤ 10 ms, Duty cycle ≤ 50 %

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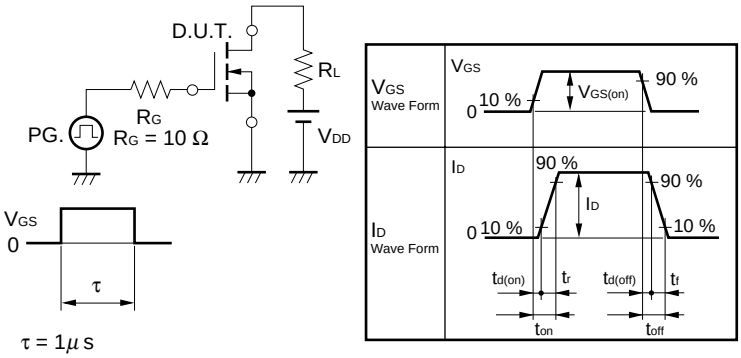
The mark ★ shows major revised points.

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Cut-off Current	I_{DSS}	V_{DS} = 50 V, V_{GS} = 0 V			10	μA
★ Gate Leakage Current	I_{GSS}	V_{GS} = ±7.0 V, V_{DS} = 0 V			±5.0	μA
Gate to Source Cut-off Voltage	$V_{GS(off)}$	V_{DS} = 3.0 V, I_D = 1.0 μA	0.9	1.2	1.5	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS} = 3.0 V, I_D = 10 mA	20	38		mS
Drain to Source On-state Resistance	$R_{DS(on)1}$	V_{GS} = 2.5 V, I_D = 10 mA		22	40	Ω
	$R_{DS(on)2}$	V_{GS} = 4.0 V, I_D = 10 mA		14	20	Ω
Input Capacitance	C_{iss}	V_{DS} = 3.0 V		8		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V		7		pF
Reverse Transfer Capacitance	C_{rss}	f = 1 MHz		3		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 3.0 V		15		ns
Rise Time	t_r	I_D = 20 mA		100		ns
Turn-off Delay Time	$t_{d(off)}$	$V_{GS(on)}$ = 3.0 V		30		ns
Fall Time	t_f	R_G = 10 Ω, R_L = 150 Ω		35		ns

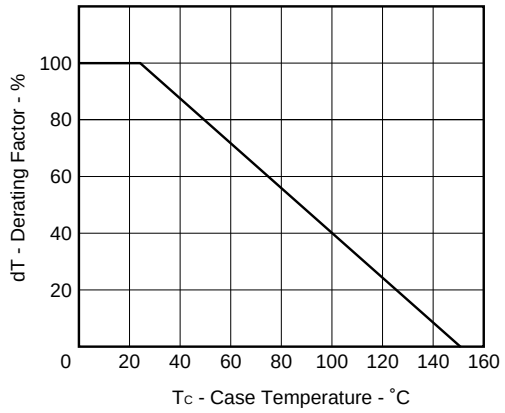
TEST CIRCUIT SWITCHING TIME



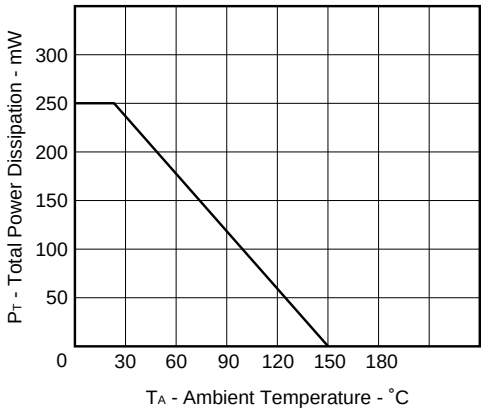
τ = 1μ s
Duty Cycle ≤ 1 %

TYPICAL CHARACTERISTICS (T_A = 25 °C)

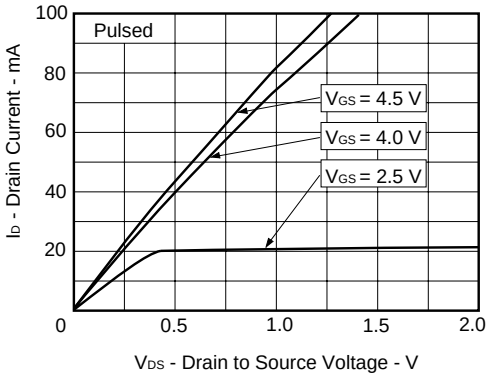
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



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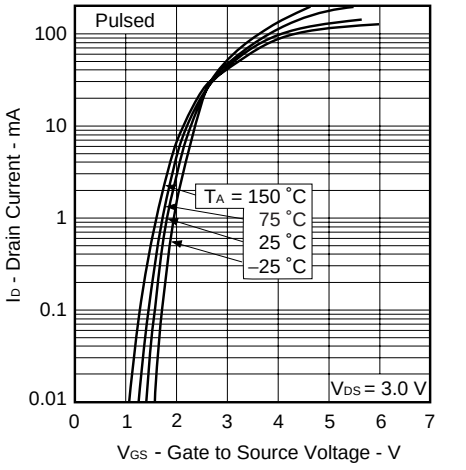
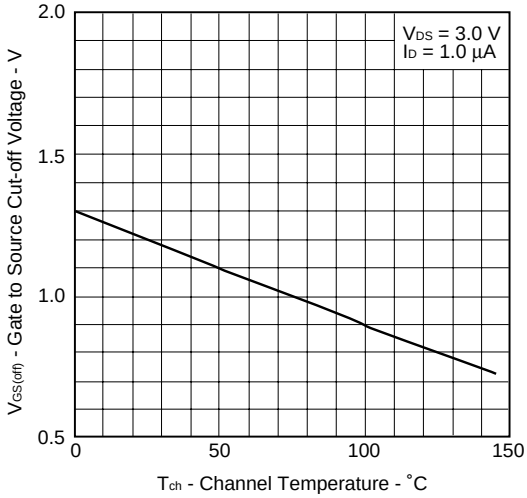
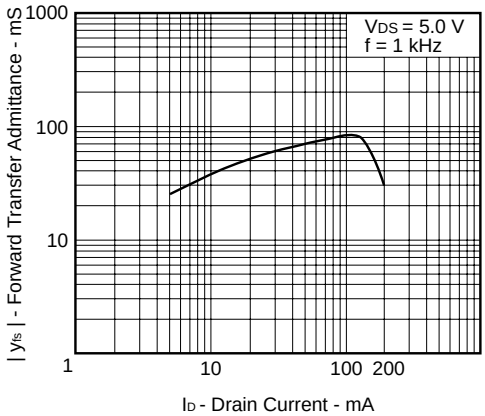
FORWARD TRANSFER CHARACTERISTICS



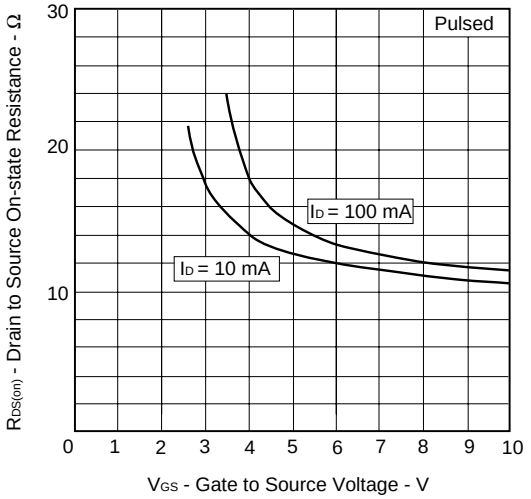
GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



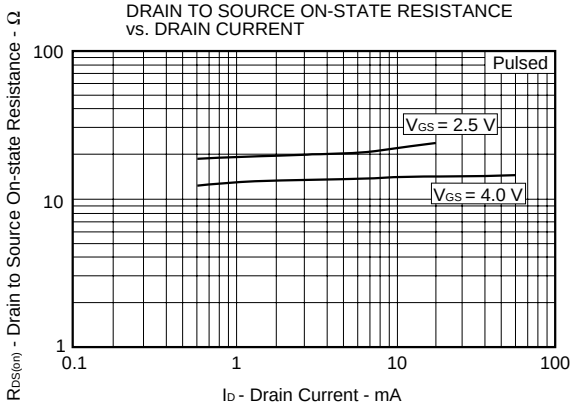
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



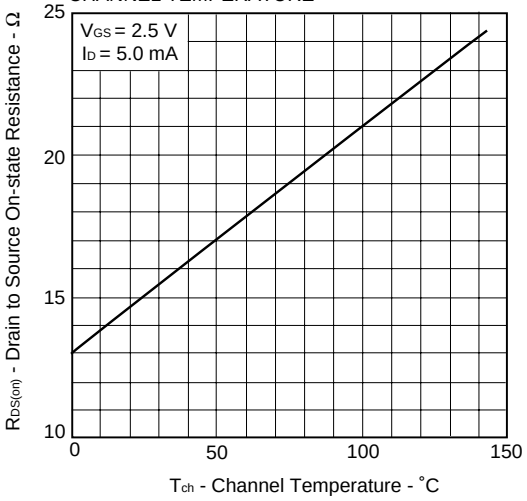
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



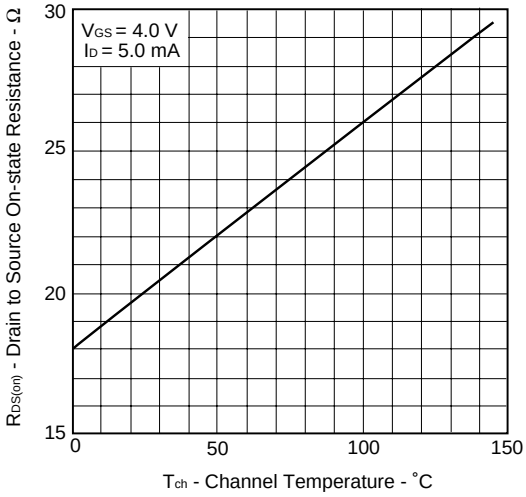
★ DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



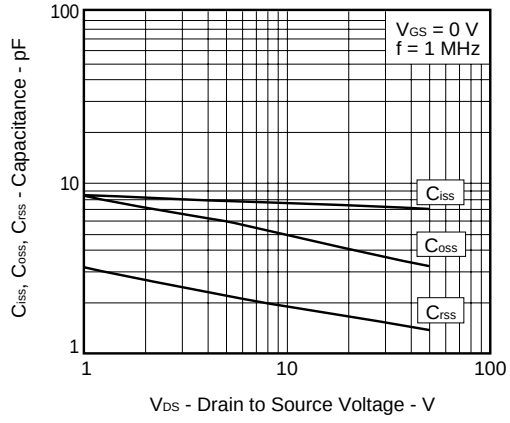
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



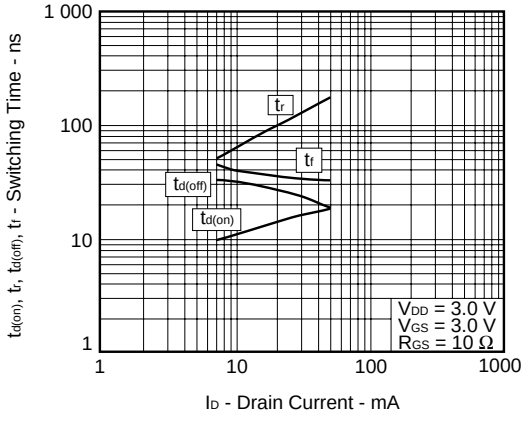
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



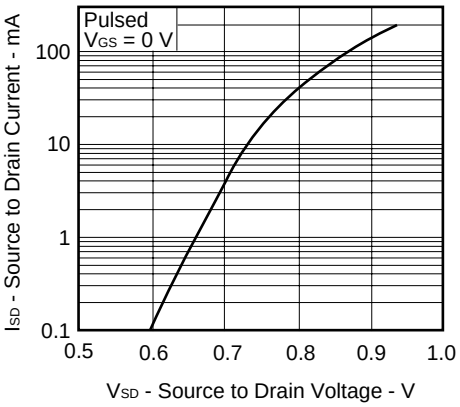
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS

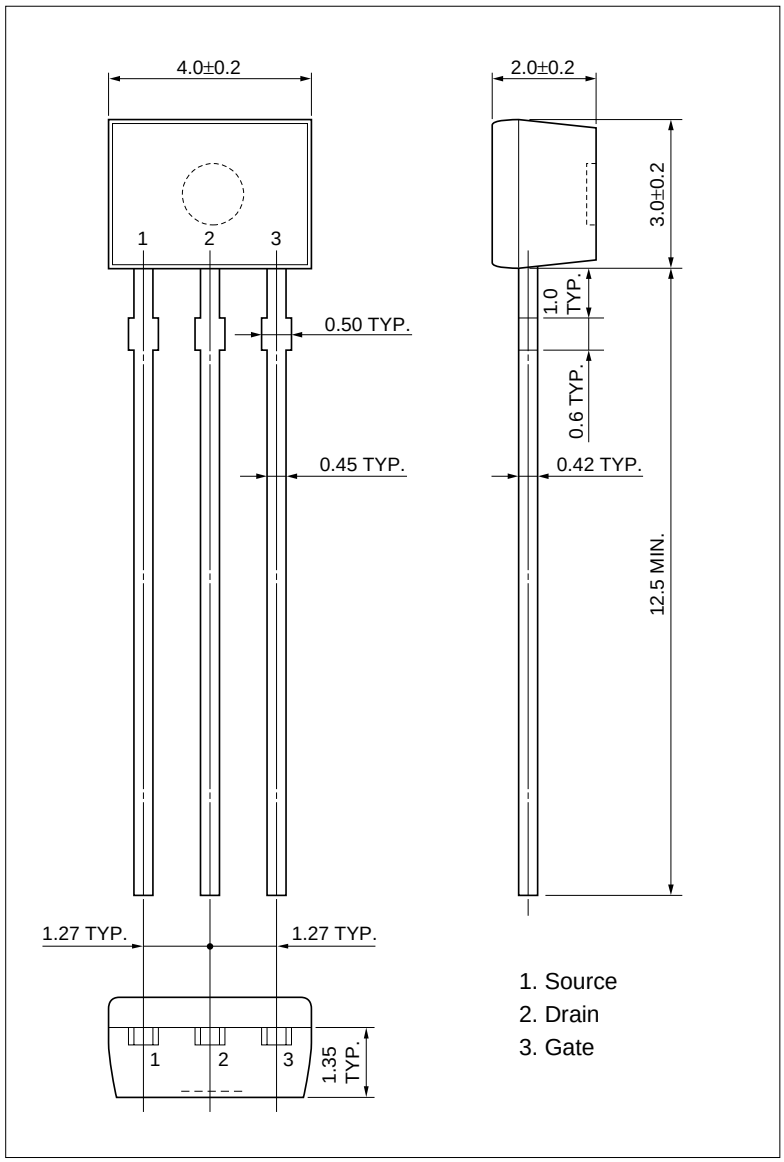


SOURCE TO DRAIN DIODE
FORWARD VOLTAGE

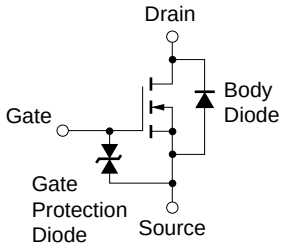


PACKAGE DRAWING (Unit: mm)

SST



EQUIVALENT CIRCUIT



Marking : G25

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.

[MEMO]

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