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MOS FIELD EFFECT TRANSISTOR

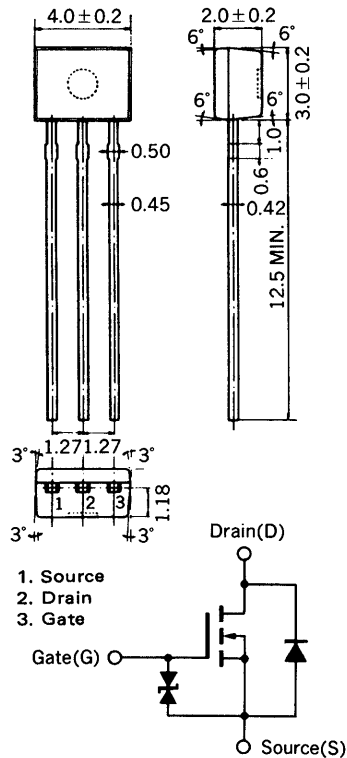
2SK1398



N-CHANNEL MOS FET

FOR HIGH SPEED SWITCHING

PACKAGE DIMENSIONS (Unit : mm)



(Diode in the figure is the parasitic diode.)

The 2SK1398 is an N-channel vertical type MOS FET which can be driven by 2.5 V power supply.

As the MOS FET is driven by low voltage and does not require consideration of driving current, it is suitable for appliances including VCR cameras and headphone stereos which need power saving.

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.

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.

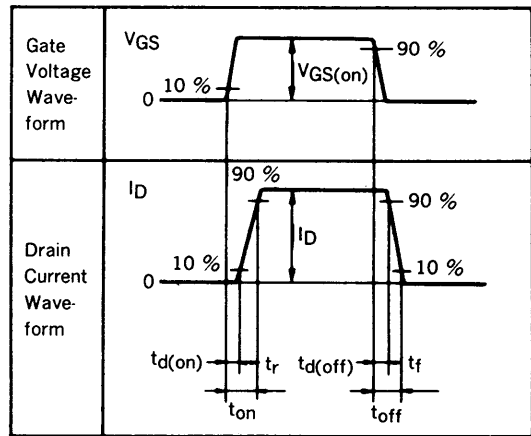
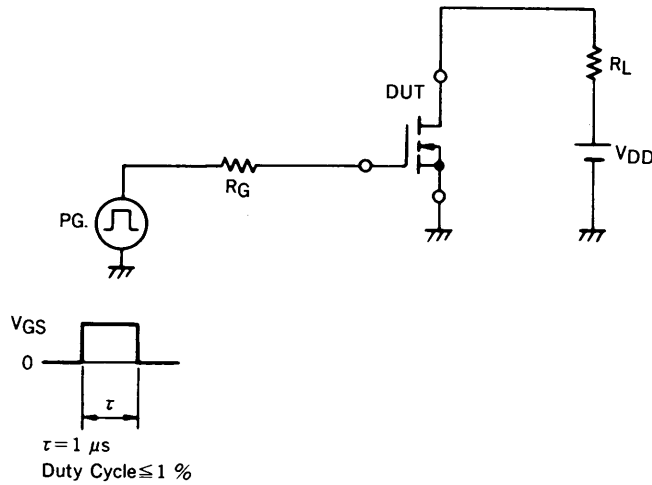
ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

PARAMETER	SYMBOL	RATINGS	UNIT	TEST CONDITIONS
Drain to Source Voltage	V _{DSS}	50	V	V _{GS} = 0
Gate to Source Voltage	V _{GSS}	±7.0	V	V _{DS} = 0
Drain Current	I _{D(DC)}	±100	mA	
Drain Current	I _{D(pulse)}	±200	mA	PW ≤ 10 ms, Duty Cycle ≤ 50 %
Total Power Dissipation	P _T	250	mW	
Channel Temperature	T _{ch}	150	°C	
Operating Temperature	T _{opt}	-55 to +80	°C	
Storage Temperature	T _{stg}	-55 to +150	°C	

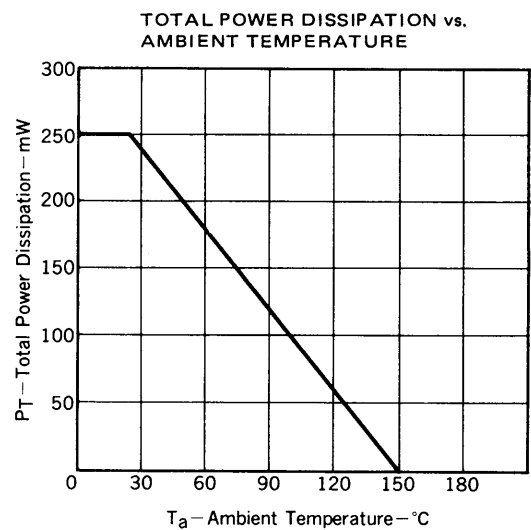
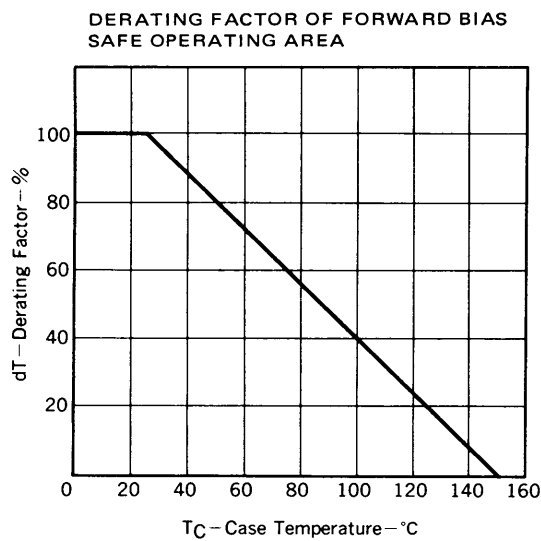
ELECTRICAL CHARACTERISTICS ($T_a = 25\text{ }^\circ\text{C}$)

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

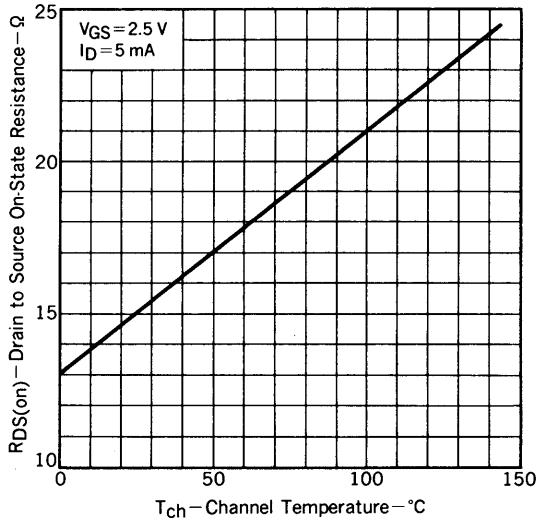
SWITCHING TIME MEASUREMENT CIRCUIT AND CONDITIONS



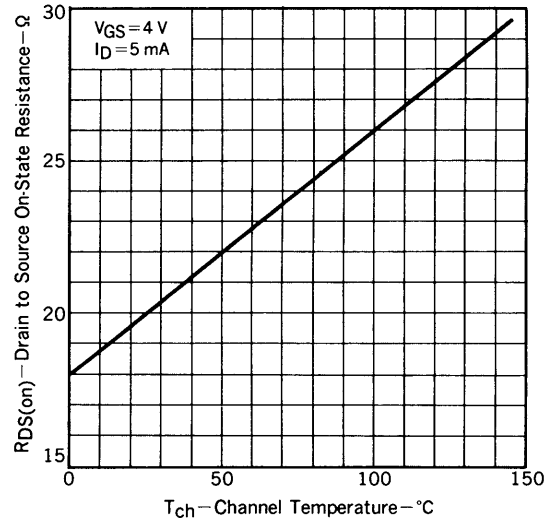
TYPICAL CHARACTERISTICS ($T_a = 25\text{ }^\circ\text{C}$)



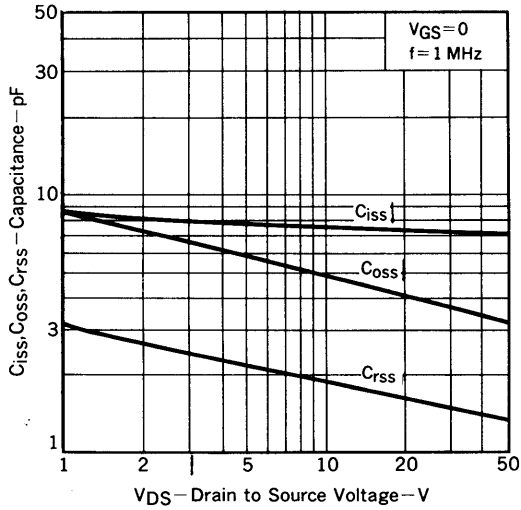
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



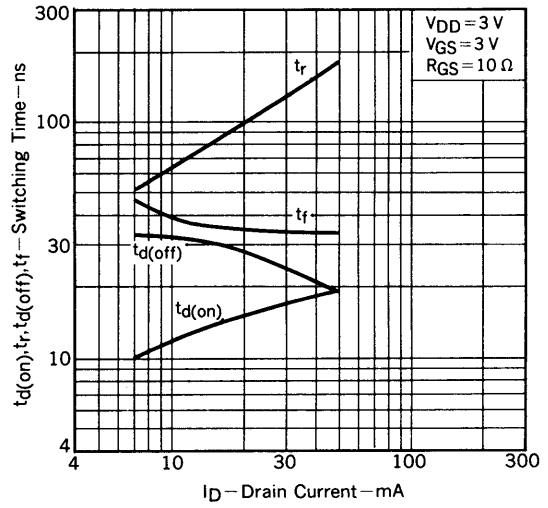
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



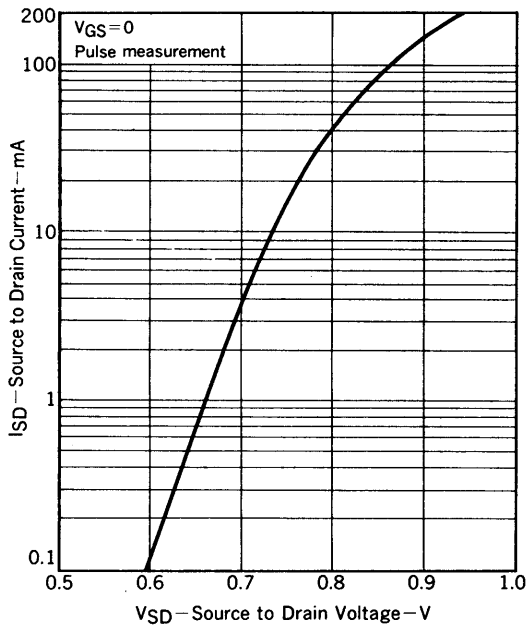
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



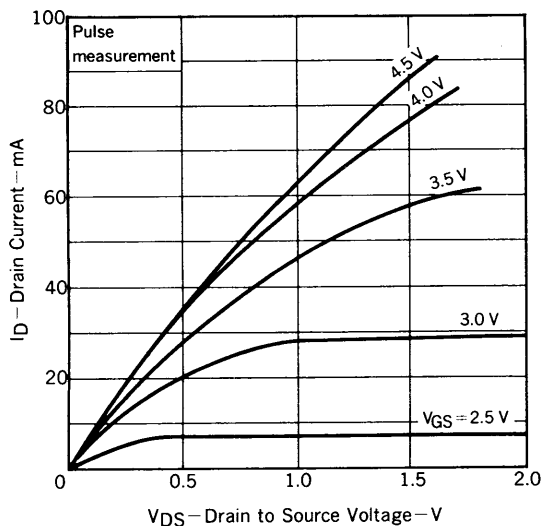
SWITCHING CHARACTERISTICS



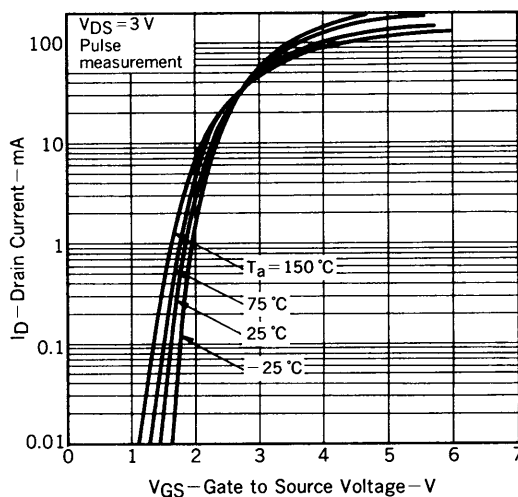
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



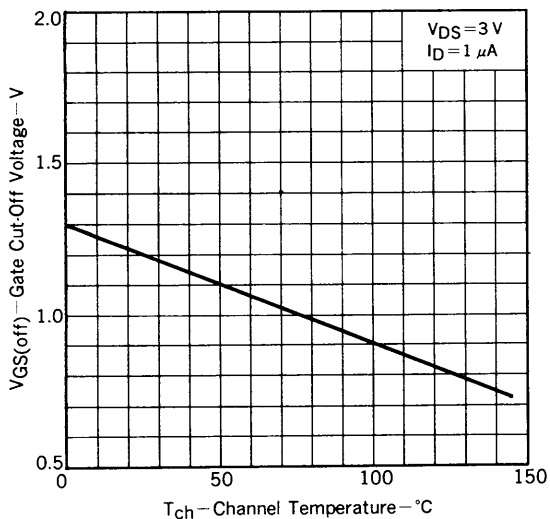
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



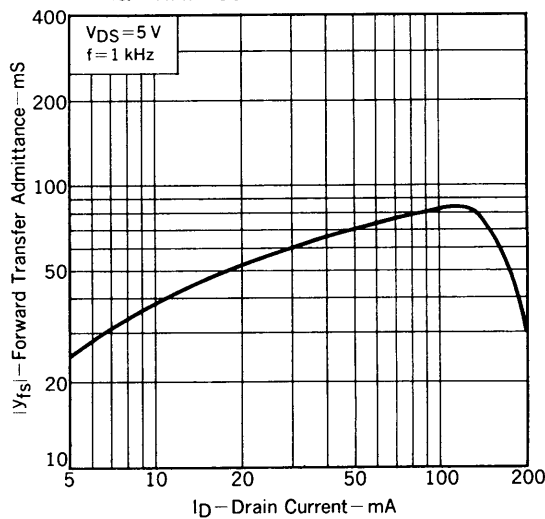
TRANSFER CHARACTERISTICS



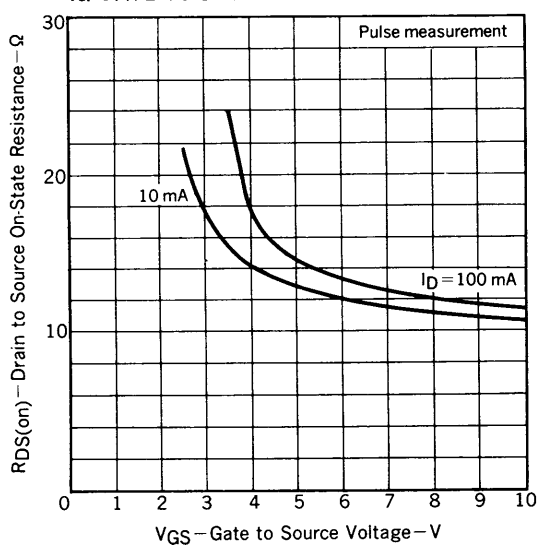
GATE TO SOURCE VOLTAGE vs. CHANNEL TEMPERATURE



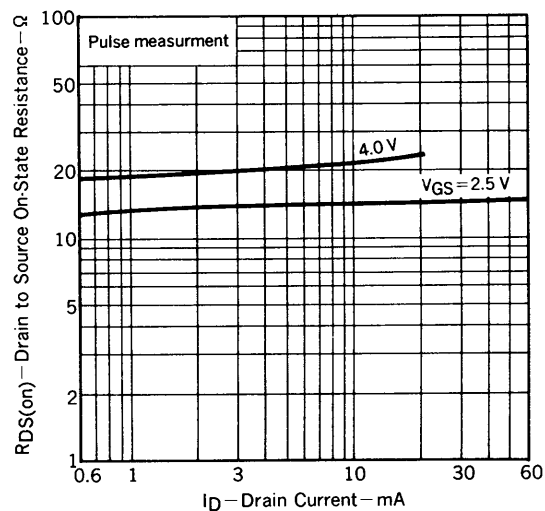
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



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



DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



RECOMMENDED SOLDERING CONDITIONS

Solder this product under the following recommended conditions.

For soldering methods or soldering conditions other than those recommended in the table, please consult our NEC sales-people.

Insert type

Soldering method	Soldering conditions	Recommended condition code
Wave soldering	Solder bath temperature: 260 °C max. Soldering time: 10 sec max.	

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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.