NEC

MOS FIELD EFFECT TRANSISTOR
2SK1580

N-CHANNEL MOS FET
FOR SWITCHING

DESCRIPTION

The 2SK1580 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 appliance including VCR cameras and headphone stereos which need power saving.

FEATURES

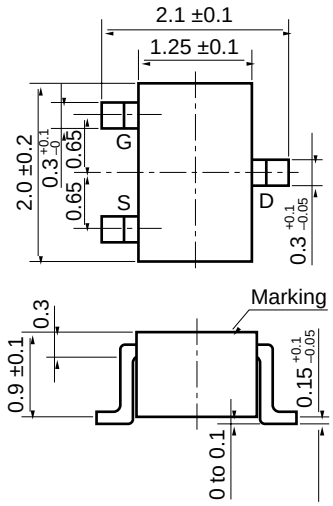
- Directly driven by ICs having a 3 V power supply.
- Not necessary to consider driving current because of its high input impedance.
- Possible to reduce the number of parts by omittng the bias resistor.

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

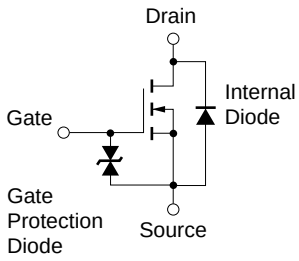
Drain to Source Voltage (V_{GS} = 0 V)	V_{DSS}	16	V
Gate to Source Voltage (V_{DS} = 0 V)	V_{GSS}	±16	V
Drain Current (DC) (T_C = 25°C)	$I_{D(DC)}$	±100	mA
Drain Current (pulse) Note1	$I_{D(pulse)}$	±200	mA
Total Power Dissipation (T_A = 25°C)	P_T	150	mW
Channel Temperature	T_{ch}	150	°C
Operating Temperature	T_{opt}	–55 to +80	°C
Storage Temperature	T_{stg}	–55 to +150	°C

Note1. PW ≤ 10 ms, Duty Cycle ≤ 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.

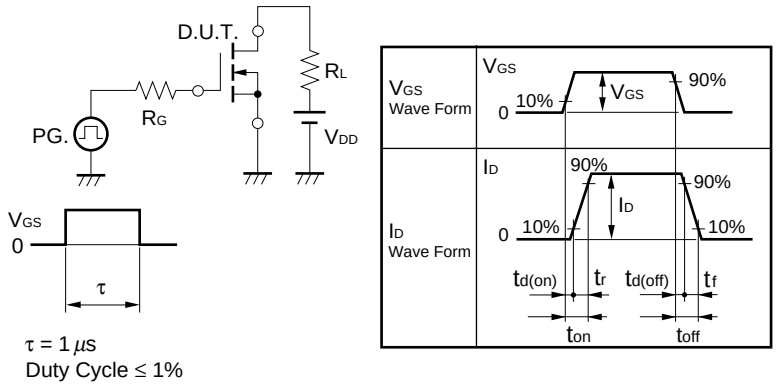
Document No. D13555EJ4V0DS00 (4th edition)
Date Published June 2001 NS CP (K)
Printed in Japan

The mark ★ shows major revised points.

★ ELECTRICAL CHARACTERISTICS (T_A = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 16 V, V_{GS} = 0 V			1.0	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±3.0 V, V_{DS} = 0 V			±5.0	nA
Gate Cut-off Voltage	$V_{GS(off)}$	V_{DS} = 3 V, I_D = 10 μA	0.8	1.1	1.6	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS} = 3 V, I_D = 10 mA	20	44		mS
Drain to Source On-state Resistance	$R_{DS(on)1}$	V_{GS} = 2.5 V, I_D = 1 mA		9	15	Ω
	$R_{DS(on)2}$	V_{GS} = 4.0 V, I_D = 1 mA		6	10	Ω
Input Capacitance	C_{iss}	V_{DS} = 3 V		18		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V		22		pF
Reverse Transfer Capacitance	C_{rss}	f = 1 MHz		4		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 3 V, I_D = 10 mA		27		ns
Rise Time	t_r	V_{GS} = 3 V		75		ns
Turn-off Delay Time	$t_{d(off)}$	R_G = 10 Ω		78		ns
Fall Time	t_f	R_L = 300 Ω		80		ns

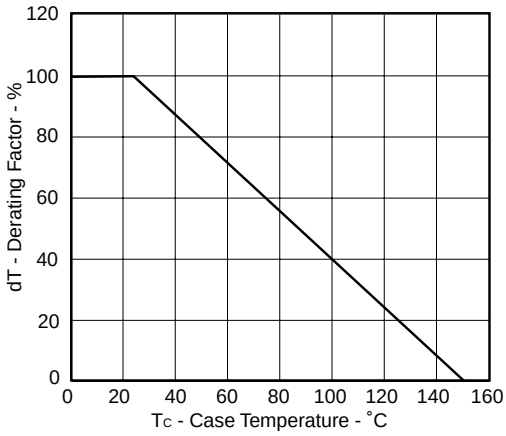
TEST CIRCUIT SWITCHING TIME



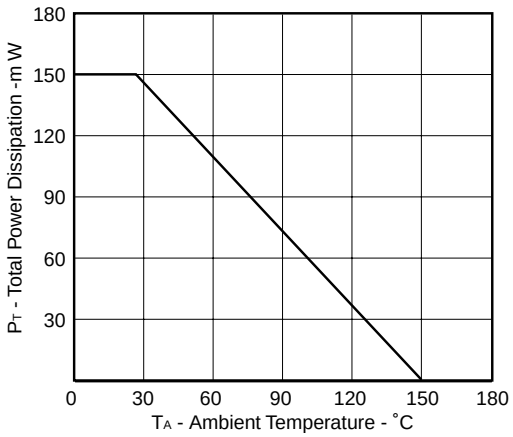
τ = 1 μs
Duty Cycle ≤ 1%

TYPICAL CHARACTERISTICS (T_A = 25°C)

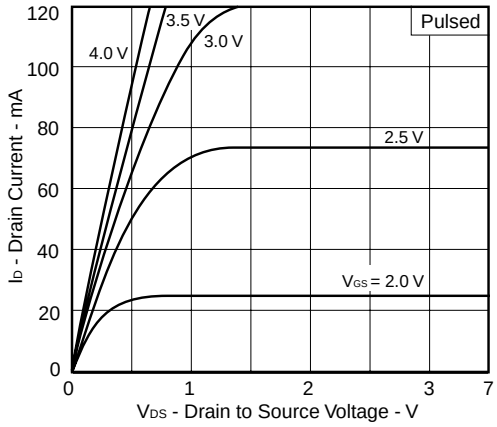
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



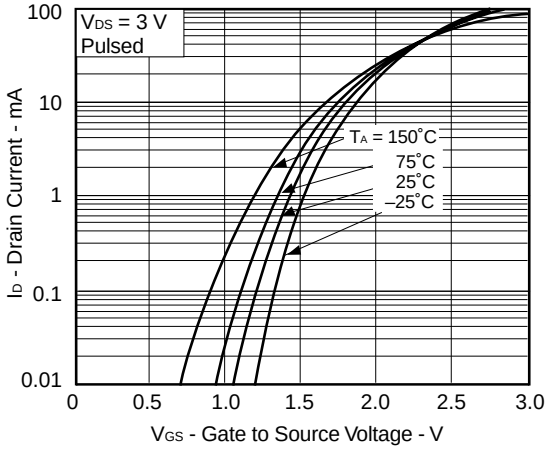
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



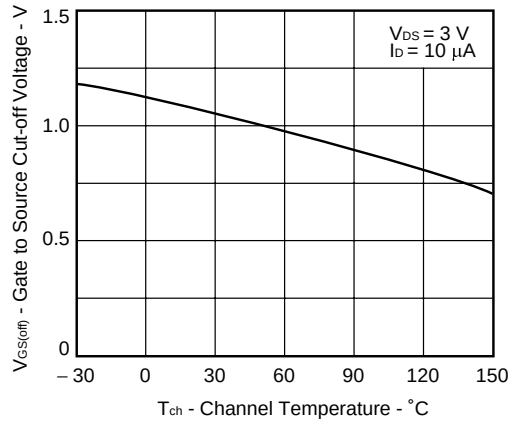
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



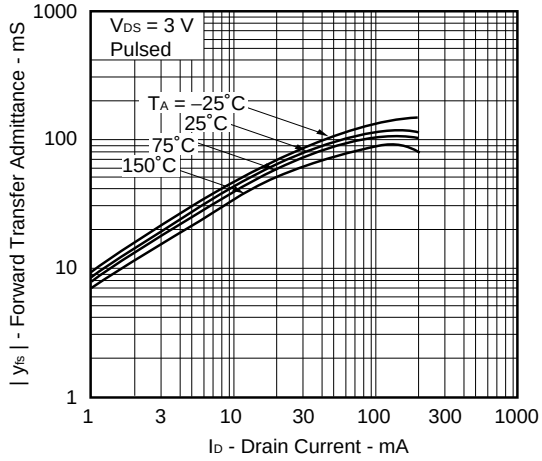
TRANSFER CHARACTERISTICS



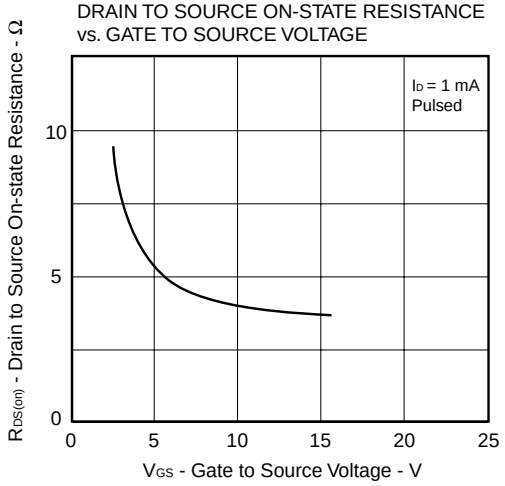
GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



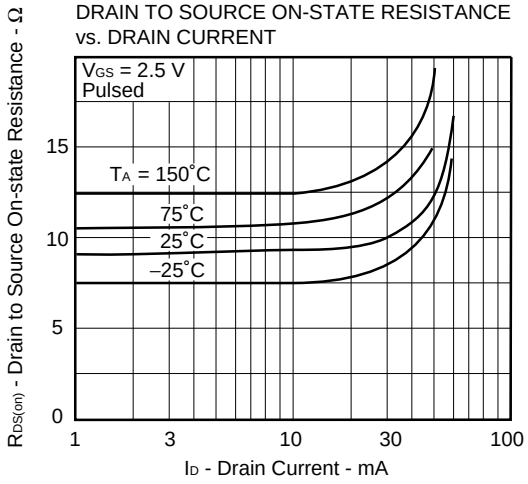
FORWARD TRANSFER ADMMITTANCE vs. DRAIN CURRENT



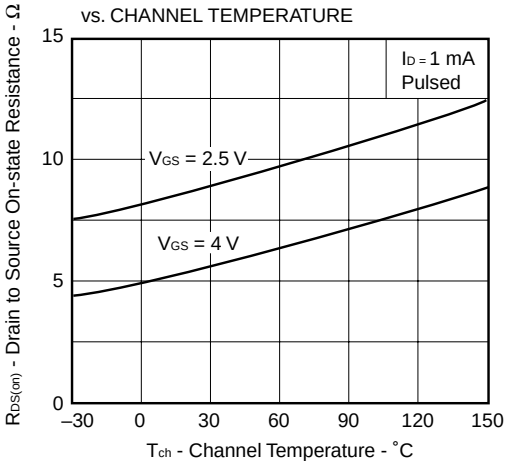
DRAIN TO SOURCE ON-STATE RESISTANCE
vs. GATE TO SOURCE VOLTAGE



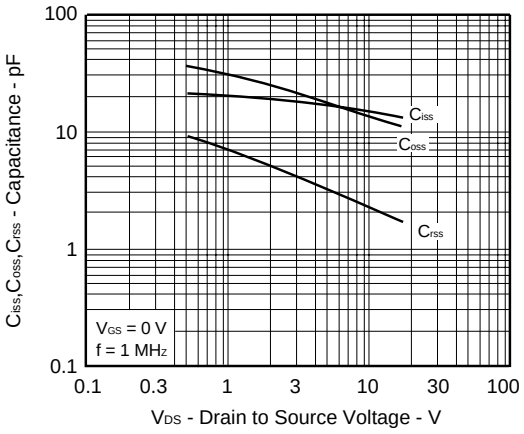
DRAIN TO SOURCE ON-STATE RESISTANCE
vs. DRAIN CURRENT



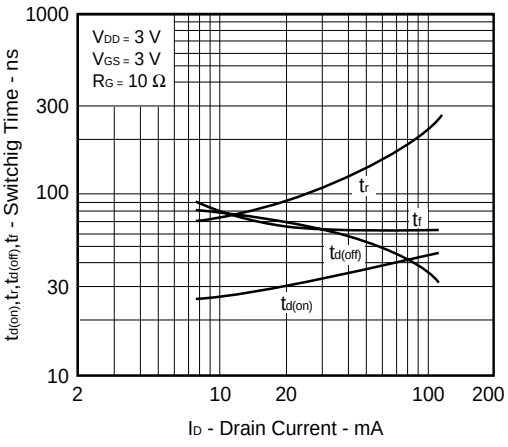
DRAIN TO SOURCE ON-STATE RESISTANCE
vs. CHANNEL TEMPERATURE



CAPACITANCE vs.
DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS



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