

MOS FIELD EFFECT TRANSISTOR  
**2SK1959**

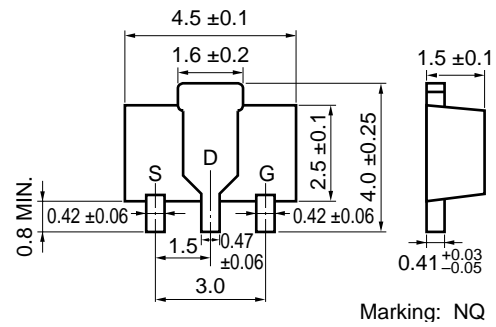
**N-CHANNEL MOS FET FOR HIGH-SPEED SWITCHING**

The 2SK1959 is an N-channel vertical MOSFET. Because it can be driven by a voltage as low as 1.5 V and it is not necessary to consider a drive current, this FET is ideal as an actuator for low-current portable systems such as headphone stereos and video cameras.

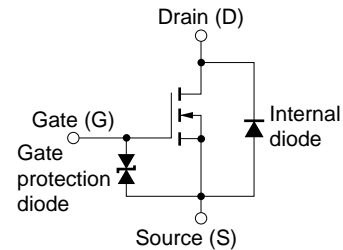
**FEATURES**

- Gate can be driven by 1.5 V
- Low ON resistance  
 $R_{DS(on)} = 3.2 \Omega \text{ MAX. @ } V_{GS} = 1.5 \text{ V, } I_D = 50 \text{ mA}$   
 $R_{DS(on)} = 0.5 \Omega \text{ MAX. @ } V_{GS} = 4.0 \text{ V, } I_D = 1.0 \text{ A}$

**PACKAGE DIMENSIONS (in mm)**



**EQUIVALENT CURCUIT**



**PIN CONNECTIONS**

- S: Source
- D: Drain
- G: Gate

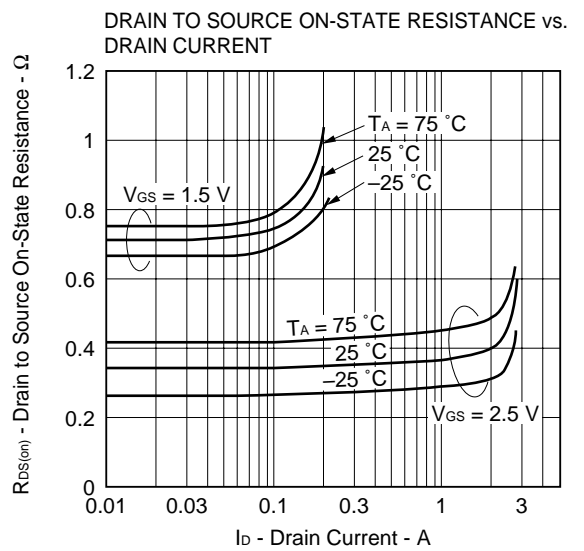
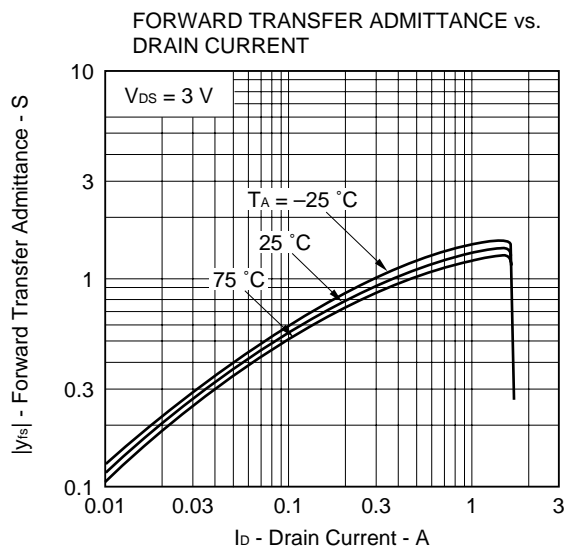
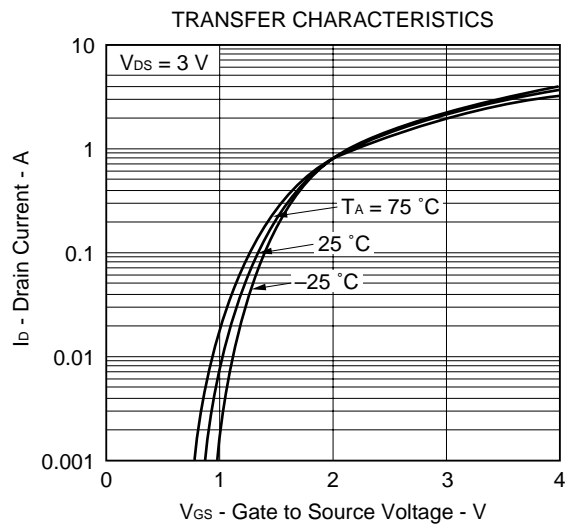
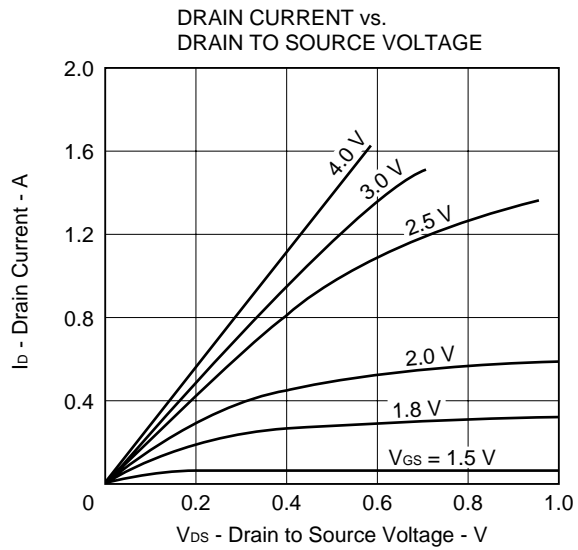
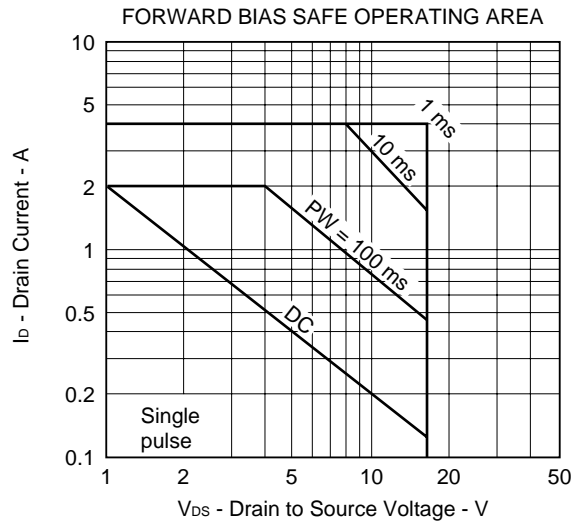
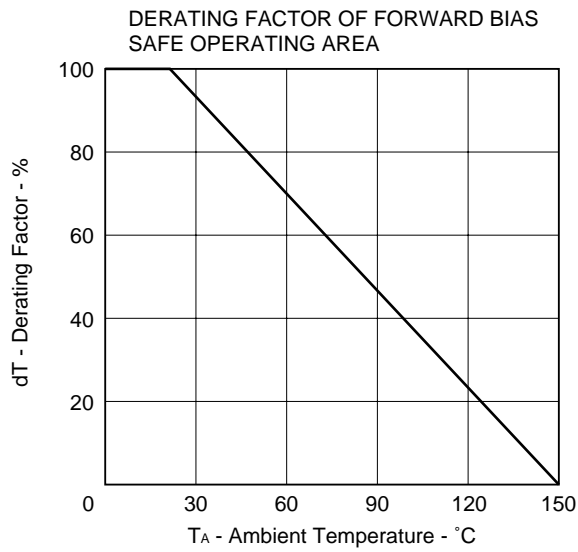
**ABSOLUTE MAXIMUM RATINGS (TA = 25 °C)**

PARAMETER	SYMBOL	TEST CONDITIONS	RATING	UNIT
Drain to Source Voltage	$V_{DSS}$	$V_{GS} = 0$	16	V
Gate to Source Voltage	$V_{GSS}$	$V_{DS} = 0$	$\pm 7.0$	V
Drain Current (DC)	$I_{D(DC)}$		$\pm 2.0$	A
Drain Current (Pulse)	$I_{D(pulse)}$	$PW \leq 10 \text{ ms, duty cycle} \leq 50 \%$	$\pm 4.0$	A
Total Power Dissipation	$P_T$	16 cm <sup>2</sup> × 0.7 mm ceramic substrate used	2.0	W
Channel Temperature	$T_{ch}$		150	°C
Storage Temperature	$T_{stg}$		-55 to +150	°C

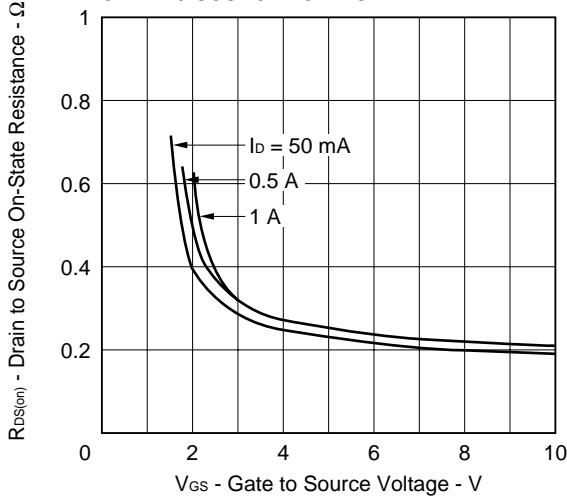
**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Cut-Off Current	I <sub>DSS</sub>	V <sub>DS</sub> = 16 V, V <sub>GS</sub> = 0			1.0	μA
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±7.0 V, V <sub>DS</sub> = 0			±3.0	μA
Gate Cut-Off Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> = 3 V, I <sub>D</sub> = 100 μA	0.5	0.8	1.1	V
Forward Transfer Admittance	y <sub>fs</sub>	V <sub>DS</sub> = 3 V, I <sub>D</sub> = 1.0 A	1.0			S
Drain to Source On-State Resistance	R <sub>DS(on)1</sub>	V <sub>GS</sub> = 1.5 V, I <sub>D</sub> = 50 mA		0.8	3.2	Ω
Drain to Source On-State Resistance	R <sub>DS(on)2</sub>	V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 0.5 A		0.36	0.6	Ω
Drain to Source On-State Resistance	R <sub>DS(on)3</sub>	V <sub>GS</sub> = 4.0 V, I <sub>D</sub> = 1.0 A		0.28	0.5	Ω
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 3 V, V <sub>GS</sub> = 0, f = 1.0 MHz		160		pF
Output Capacitance	C <sub>oss</sub>			150		pF
Reverse Transfer Capacitance	C <sub>rss</sub>			50		pF
Turn-ON Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 3 V, I <sub>D</sub> = 0.5 A, V <sub>GS(on)</sub> = 3 V, R <sub>G</sub> = 10 Ω, R <sub>L</sub> = 6 Ω		45		ns
Rise Time	t <sub>r</sub>			190		ns
Turn-OFF Delay Time	t <sub>d(off)</sub>			180		ns
Fall Time	t <sub>f</sub>			210		ns

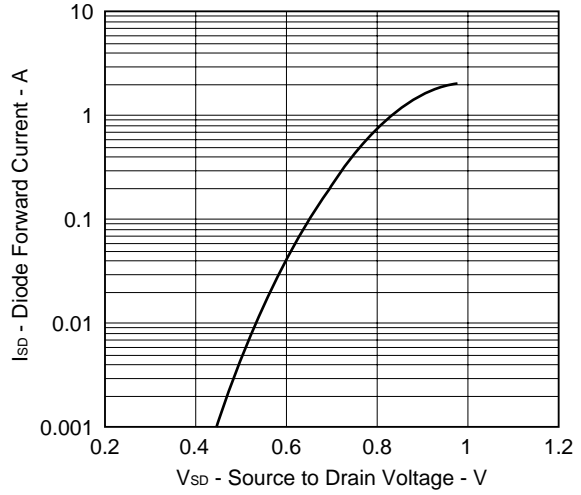
TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)



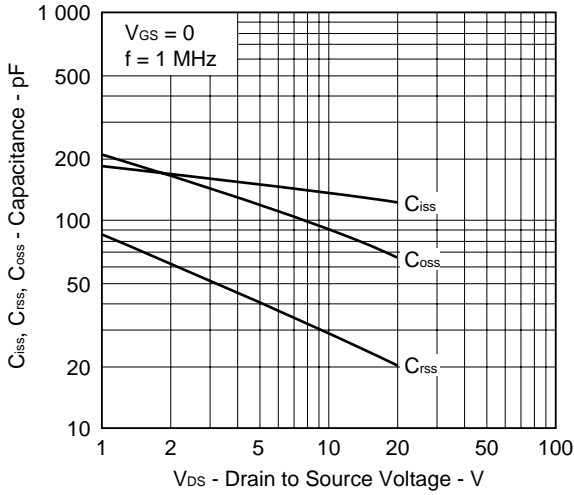
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



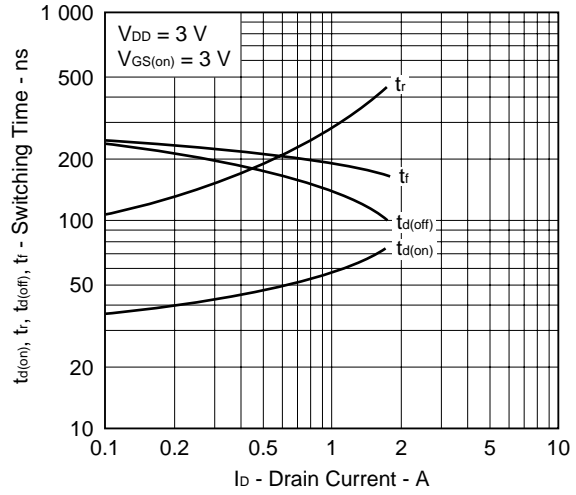
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS



**REFERENCE**

Document Name	Document No.
NEC semiconductor device reliability/quality control system	TEI-1202
Quality grade on NEC semiconductor devices	IEI-1209
Semiconductor device mounting technology manual	C10535E
Guide to quality assurance for semiconductor devices	MEI-1202
Semiconductor selection guide	X10679E

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Anti-radioactive design is not implemented in this product.