

N-CHANNEL MOSFET  
FOR HIGH-SPEED SWITCHING

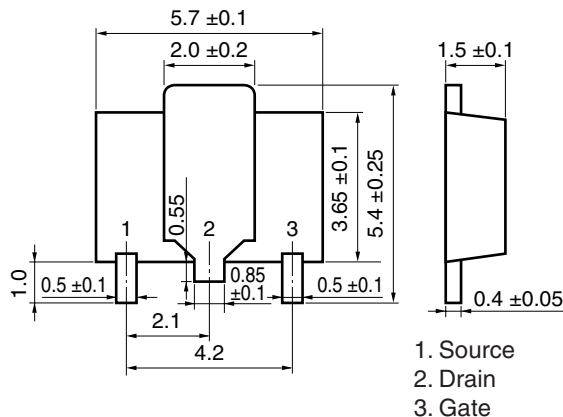
DESCRIPTION

The 2SK2053 is an N-channel vertical MOS FET. 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

- New package intermediate between small signal and power types
- Gate can be driven by 1.5 V
- Low ON resistance  
 $R_{DS(on)} = 0.40 \Omega \text{ MAX. (} V_{GS} = 1.5 \text{ V, } I_D = 0.5 \text{ A)}$   
 $R_{DS(on)} = 0.12 \Omega \text{ MAX. (} V_{GS} = 4.0 \text{ V, } I_D = 2.5 \text{ A)}$

PACKAGE DRAWING (Unit: mm)



ORDERING INFORMATION

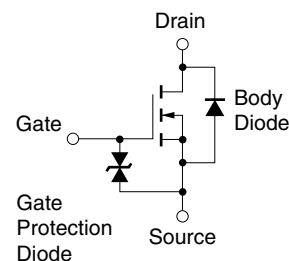
PART NUMBER	PACKAGE
2SK2053	SC-84 (MP-2)

Marking: NA1

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

Drain to Source Voltage ( $V_{GS} = 0 \text{ V}$ )	$V_{DSS}$	16	V
Gate to Source Voltage ( $V_{DS} = 0 \text{ V}$ )	$V_{GSS}$	$\pm 7.0$	V
Drain Current (DC)	$I_{D(DC)}$	$\pm 5.0$	A
Drain Current (pulse) <sup>Note1</sup>	$I_{D(pulse)}$	$\pm 10.0$	A
Total Power Dissipation <sup>Note2</sup>	$P_T$	2.0	W
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

EQUIVALENT CIRCUIT



Notes 1.  $PW \leq 10 \text{ ms}$ , Duty Cycle  $\leq 50\%$

2. Mounted on ceramic substrate of  $7.5 \text{ cm}^2 \times 0.7 \text{ mm}$

**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.

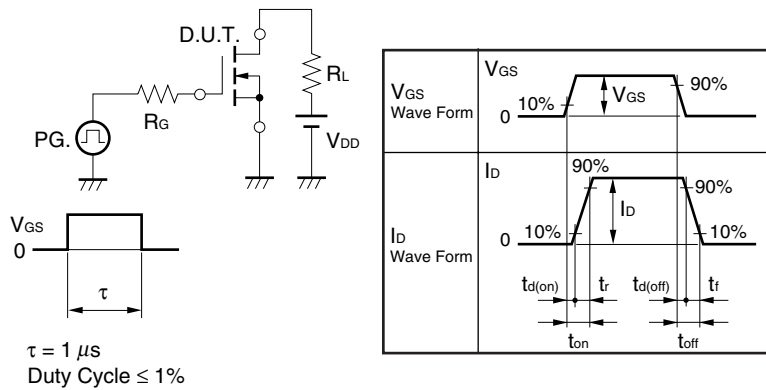
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**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)**

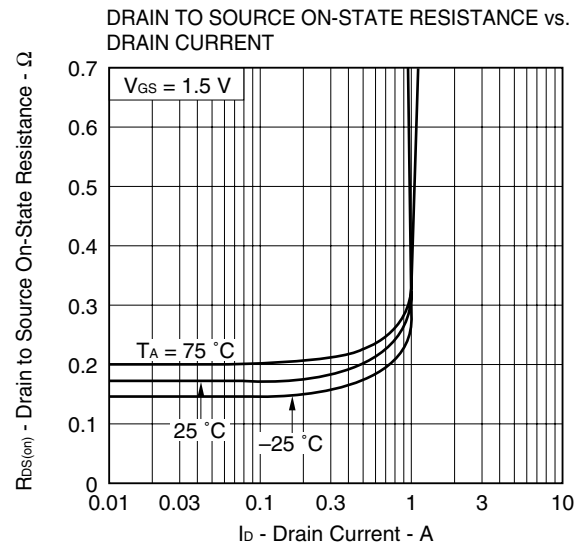
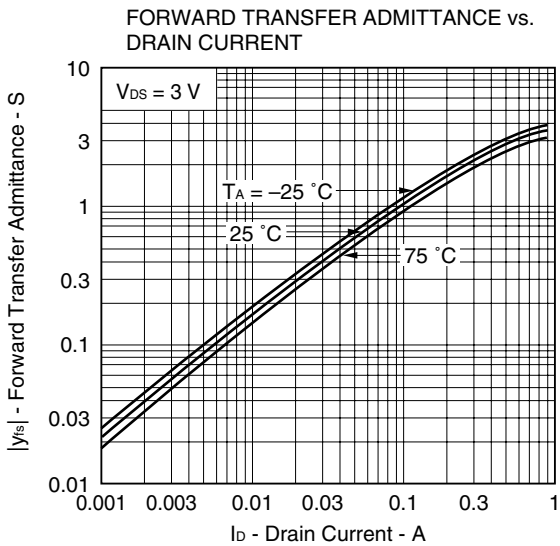
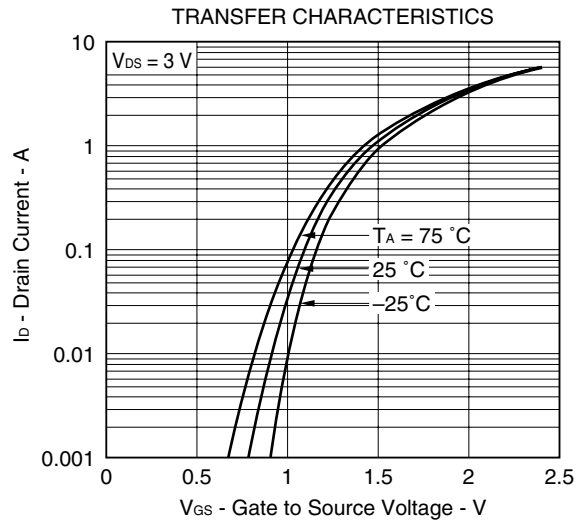
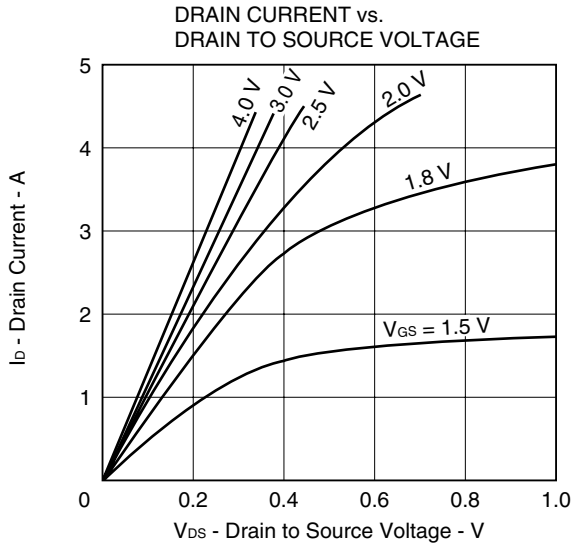
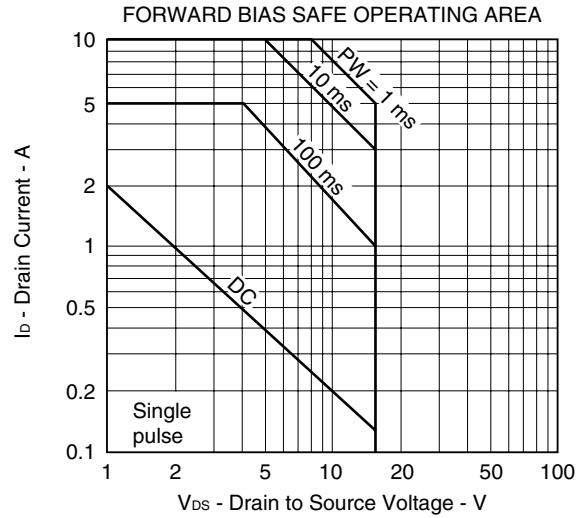
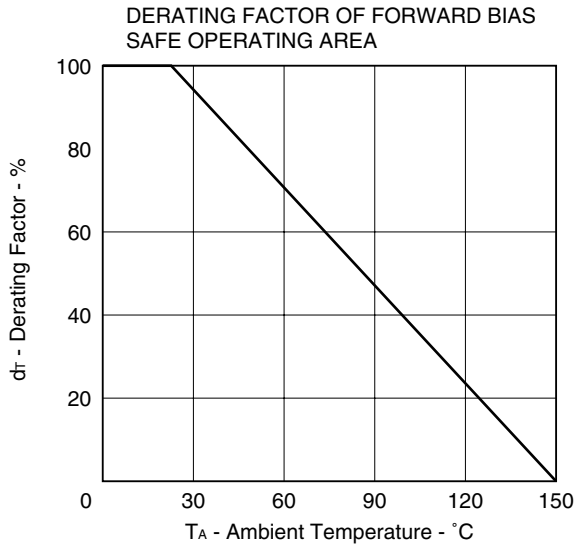
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 16 V, V <sub>GS</sub> = 0 V			1.0	μA
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±7.0 V, V <sub>DS</sub> = 0 V			±3.0	μA
Gate Cut-off Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> = 3 V, I <sub>D</sub> = 1 mA	0.5	0.8	1.1	V
Forward Transfer Admittance <sup>Note</sup>	y <sub>fs</sub>	V <sub>DS</sub> = 3 V, I <sub>D</sub> = 2.5 A	4			S
Drain to Source On-state Resistance <sup>Note</sup>	R <sub>DS(on)1</sub>	V <sub>GS</sub> = 1.5 V, I <sub>D</sub> = 0.5 A		0.19	0.40	Ω
	R <sub>DS(on)2</sub>	V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 2.5 A		0.08	0.15	Ω
	R <sub>DS(on)3</sub>	V <sub>GS</sub> = 4.0 V, I <sub>D</sub> = 2.5 A		0.06	0.12	Ω
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 3 V		730		pF
Output Capacitance	C <sub>oss</sub>	V <sub>GS</sub> = 0 V		640		pF
Reverse Transfer Capacitance	C <sub>rss</sub>	f = 1 MHz		230		pF
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 3 V, I <sub>D</sub> = 2.5 A		85		ns
Rise Time	t <sub>r</sub>	V <sub>GS</sub> = 3 V		450		ns
Turn-off Delay Time	t <sub>d(off)</sub>	R <sub>G</sub> = 10 Ω		280		ns
Fall Time	t <sub>f</sub>			310		ns

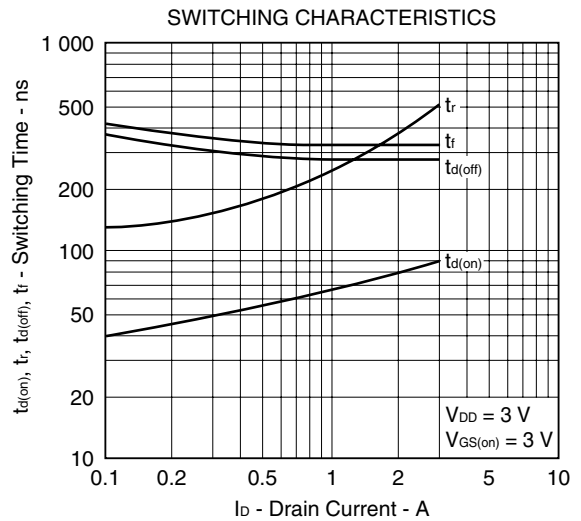
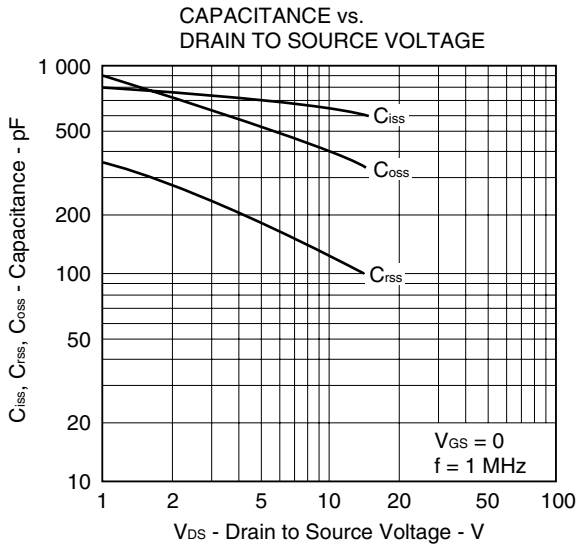
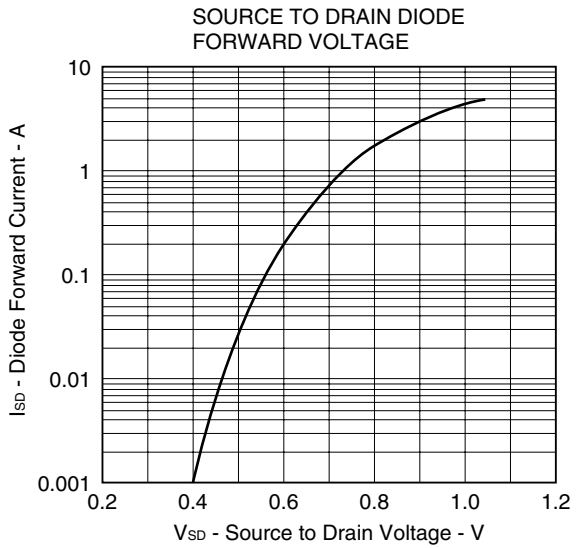
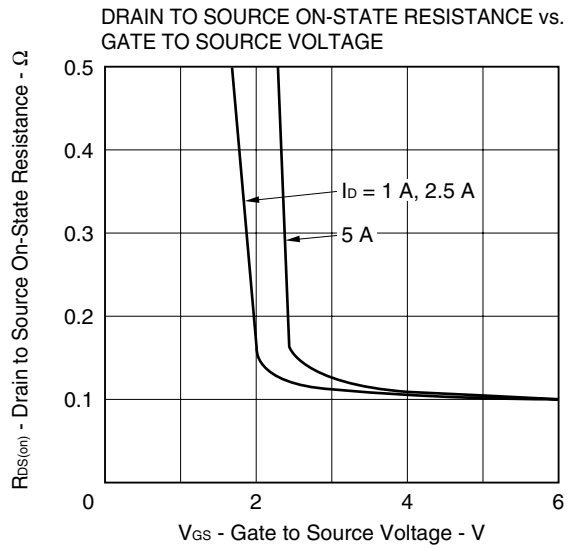
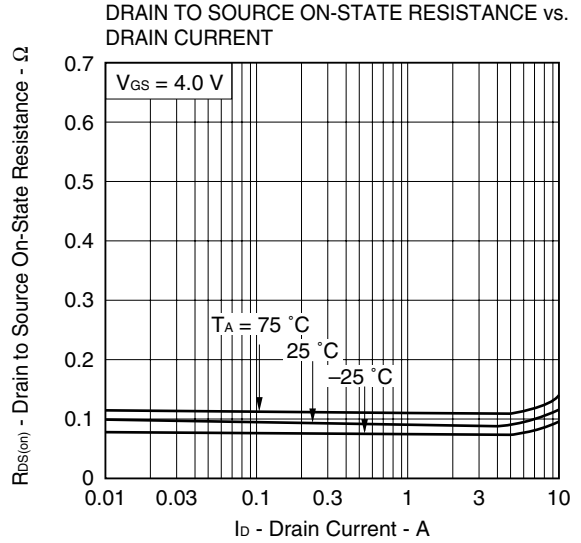
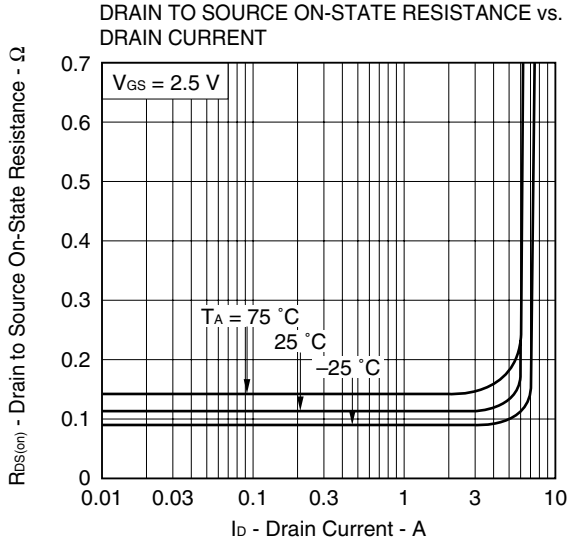
**Note** Pulsed

**TEST CIRCUIT SWITCHING TIME**



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





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