

## N-CHANNEL MOS FET FOR SWITCHING

The 2SK1824 is a N-channel vertical type MOS FET that is driven at 2.5 V. Because this MOS FET can be driven on a low voltage and because it is not necessary to consider the drive current, the 2SK1824 is ideal for driving the actuator of power-saving systems, such as VCR cameras and headphone stereo systems.

Moreover, the 2SK1824 is housed in a super small mini-mold package so that it can help increase the mounting density on the printed circuit board and lower the mounting cost, contributing to miniaturization of the application systems.

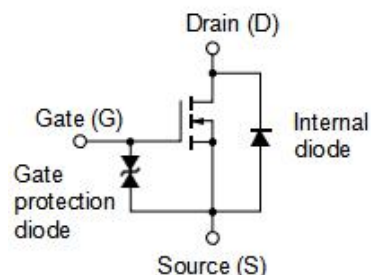
### FEATURES

- Small mounting area: about 60 % of the conventional mini-mold package (SOT-89)
- Can be automatically mounted
- Can be directly driven by 3-V IC

The internal diode in the right figure is a parasitic diode. The protection diode is to protect the product from damage due to static electricity. If there is a danger that an extremely high voltage will be applied across the gate and source in the actual circuit, a gate protection circuit such as an external constant-voltage diode is necessary.



### EQUIVALENT CIRCUIT



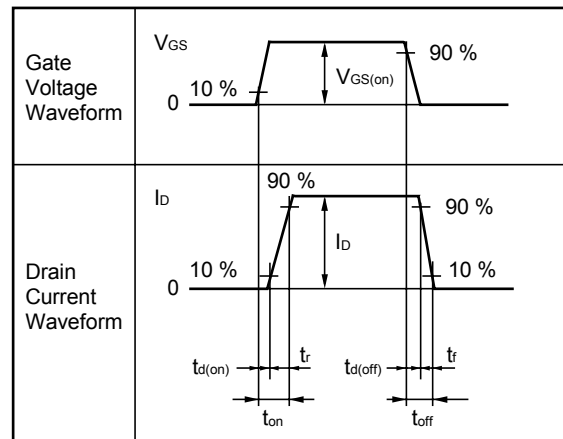
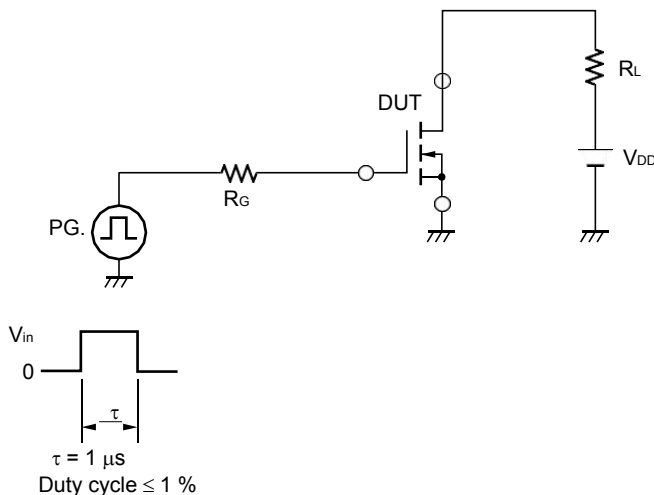
### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25\text{ }^\circ\text{C}$ )

PARAMETER	SYMBOL	TEST CONDITIONS	RATING	UNIT
Drain to Source Voltage	$V_{DS}$	$V_{GS} = 0$	30	V
Gate to Source Voltage	$V_{GS}$	$V_{DS} = 0$	$\pm 7$	V
Drain Current (DC)	$I_{D(DC)}$		$\pm 100$	mA
Drain Current (Pulse)	$I_{D(pulse)}$	$PW \leq 10\text{ ms}$ $Duty\ cycle \leq 50\%$	$\pm 200$	mA
Total Power Dissipation	$P_T$	3.0 cm <sup>2</sup> × 0.64 mm, ceramic substrate used	200	mW
Channel Temperature	$T_{ch}$		150	$^\circ\text{C}$
Operating Temperature	$T_{opt}$		-55 to +80	$^\circ\text{C}$
Storage Temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

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

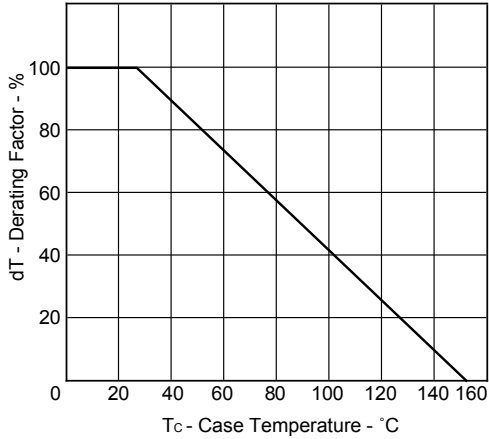
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Cut-Off Current	I <sub>DSS</sub>	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0			1.0	μA
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±5 V, V <sub>DS</sub> = 0		±0.1	±3	μA
Gate Cut-Off Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> = 3 V, I <sub>D</sub> = 10 μA	0.8	1.0	1.5	V
Forward Transfer Admittance	y <sub>fs</sub>	V <sub>DS</sub> = 3 V, I <sub>D</sub> = 10 mA	20	50		mS
Drain to Source On-State Resistance	R <sub>DS(on)1</sub>	V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 1 mA		7	13	Ω
Drain to Source On-State Resistance	R <sub>DS(on)2</sub>	V <sub>GS</sub> = 4.0 V, I <sub>D</sub> = 10 mA		5	8	Ω
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 5.0 V, V <sub>GS</sub> = 0, f = 1 MHz		16		pF
Output Capacitance	C <sub>oss</sub>			14		pF
Reverse Transfer Capacitance	C <sub>rss</sub>			2		pF
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 5V, I <sub>D</sub> = 10 mA V <sub>GS(on)</sub> = 5 V, R <sub>G</sub> = 10 Ω R <sub>L</sub> = 500 Ω		15		ns
Rise Time	t <sub>r</sub>			20		ns
Turn-Off Delay Time	t <sub>d(off)</sub>			100		ns
Fall Time	t <sub>f</sub>			100		ns

### SWITCHING TIME MEASUREMENT CIRCUIT AND CONDITIONS (Resistive Load)

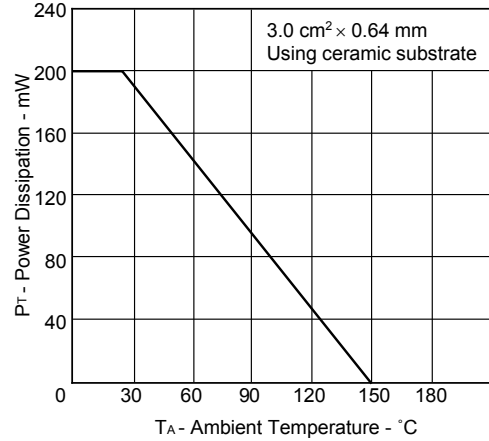


### TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)

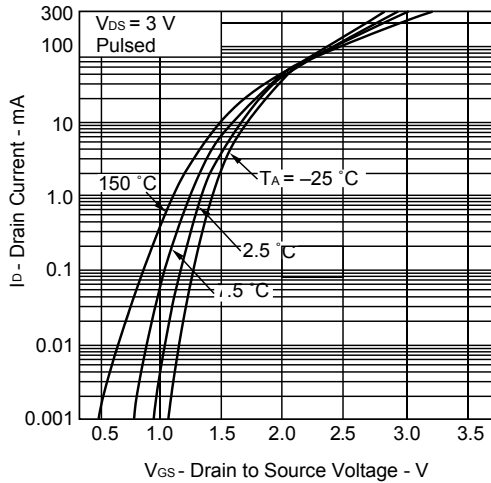
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



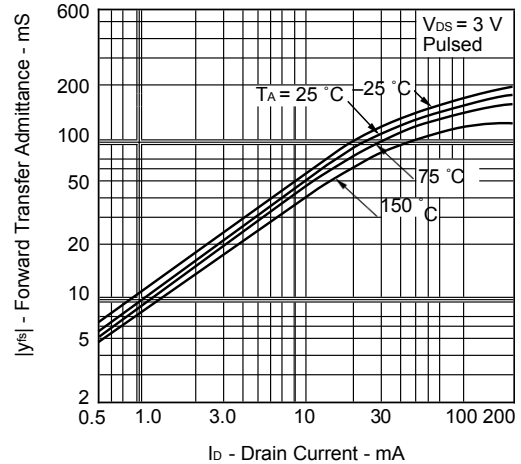
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



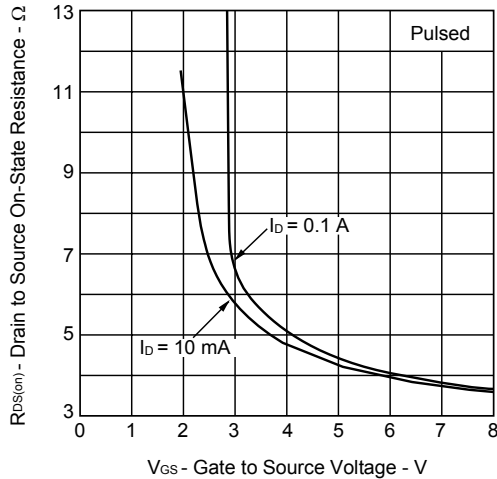
TRANSFER CHARACTERISTICS



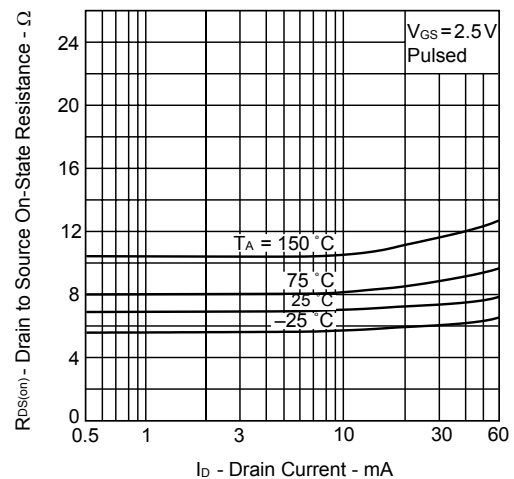
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT

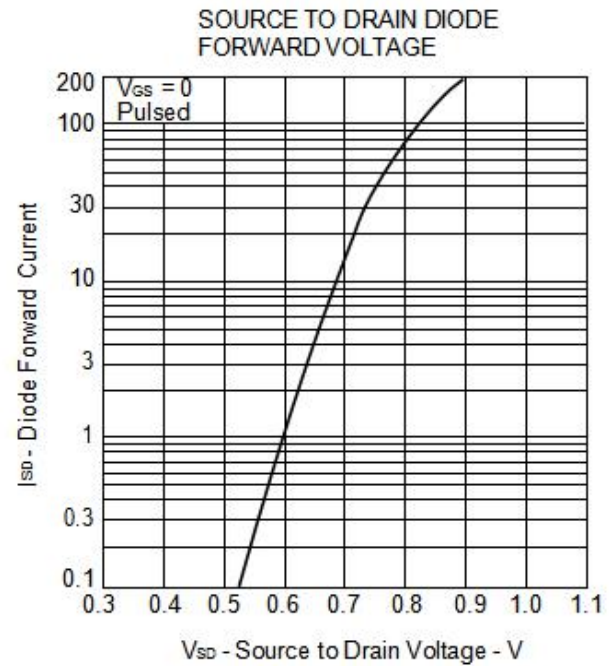
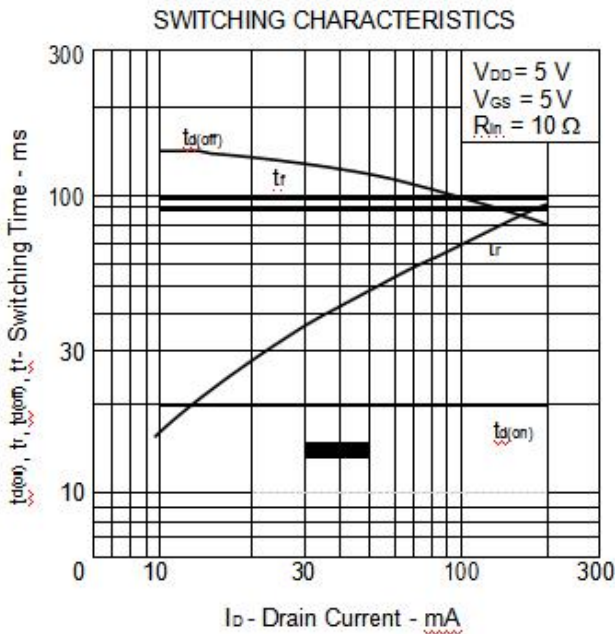
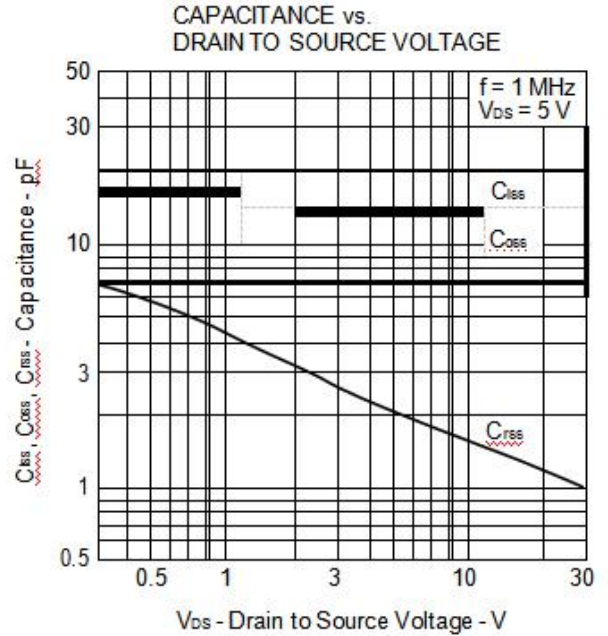
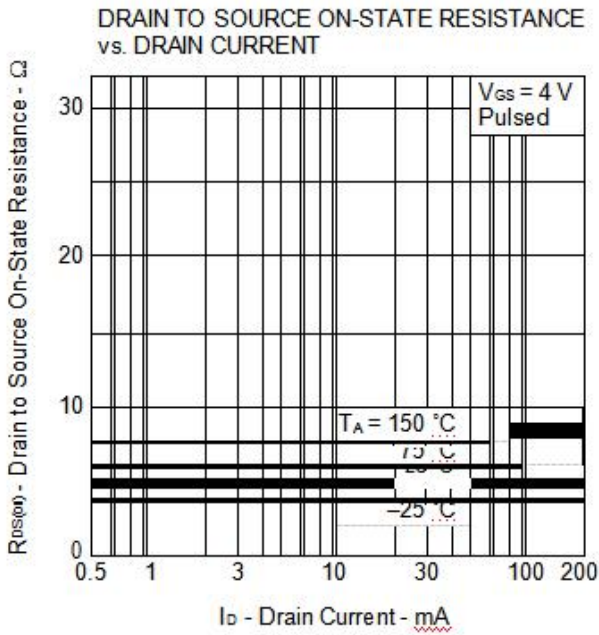


DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT







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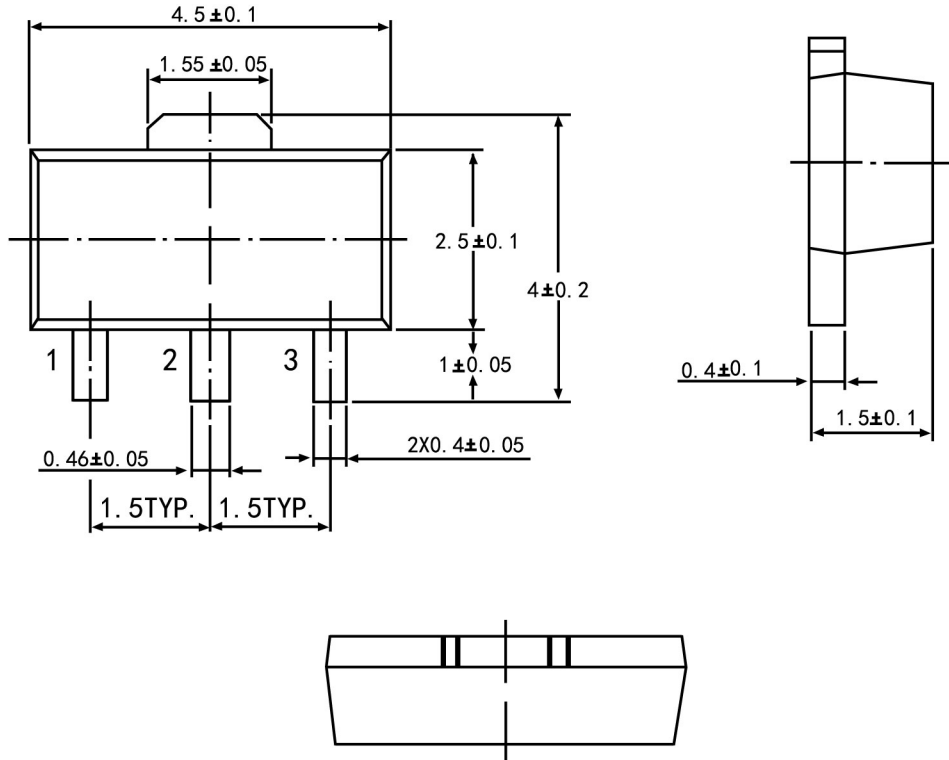
# SOT-89

## 2SK1824



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### SOT-89 PACKAGE OUTLINE



Symbol	Dimension in Millimeters	
	Min	Max
A	1.40	1.60
B	0.44	0.62
B1	0.35	0.54
C	0.35	0.44
D	4.40	4.60
D1	1.62	1.83
E	2.29	2.60
e	1.50 Typ	
H	3.94	4.25
H1	2.63	2.93
L	0.89	1.20
All Dimensions In mm		