NEC

MOS FIELD EFFECT TRANSISTOR

2SK1824

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.

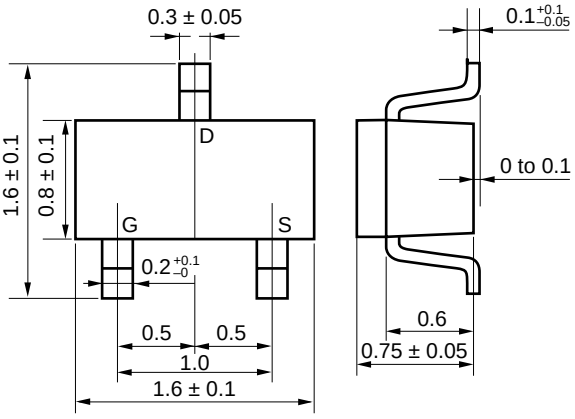
FEATURES

- Small mounting area: about 60 % of the conventional mini-mold package (SC-70)
- Can be automatically mounted
- Can be directly driven by 3-V IC

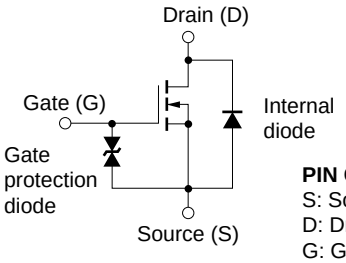
The internal diode in the right figure is a parasitic diode.

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.

PACKAGE DIMENSIONS (in mm)



EQUIVALENT CIRCUIT



PIN CONNECTIONS
S: Source
D: Drain
G: Gate

Marking: B1

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

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

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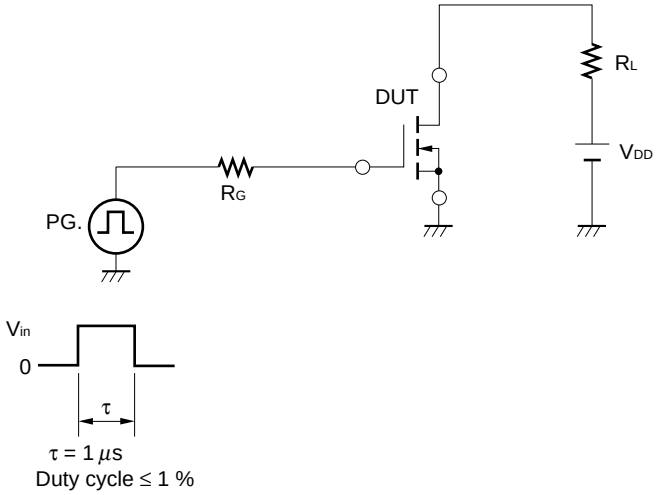
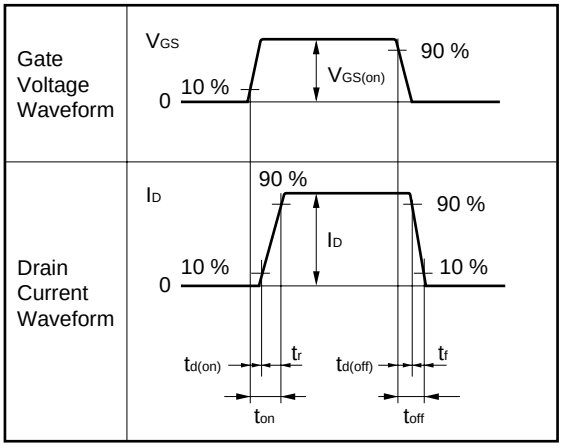
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Cut-Off Current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0			1.0	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±5 V, V_{DS} = 0		±0.1	±3	μA
Gate Cut-Off Voltage	$V_{GS(off)}$	V_{DS} = 3 V, I_D = 10 μA	0.8	1.0	1.5	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS} = 3 V, I_D = 10 mA	20	50		mS
Drain to Source On-State Resistance	$R_{DS(on)1}$	V_{GS} = 2.5 V, I_D = 1 mA		7	13	Ω
Drain to Source On-State Resistance	$R_{DS(on)2}$	V_{GS} = 4.0 V, I_D = 10 mA		5	8	Ω
Input Capacitance	C_{iss}	V_{DS} = 5.0 V, V_{GS} = 0, f = 1 MHz		16		pF
Output Capacitance	C_{oss}			14		pF
Reverse Transfer Capacitance	C_{rss}			2		pF
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 5V, I_D = 10 mA		15		ns
Rise Time	t_r	$V_{GS(on)}$ = 5 V, R_G = 10 Ω		20		ns
Turn-Off Delay Time	$t_{d(off)}$	R_L = 500 Ω		100		ns
Fall Time	t_f			100		ns

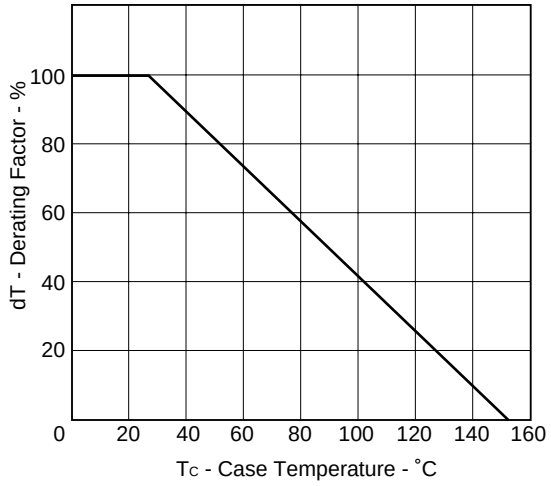
SWITCHING TIME MEASUREMENT CIRCUIT AND CONDITIONS (Resistive Load)



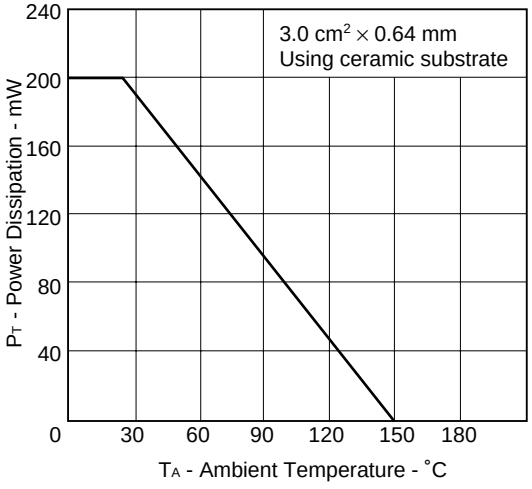


TYPICAL CHARACTERISTICS (T_A = 25 ˚C)

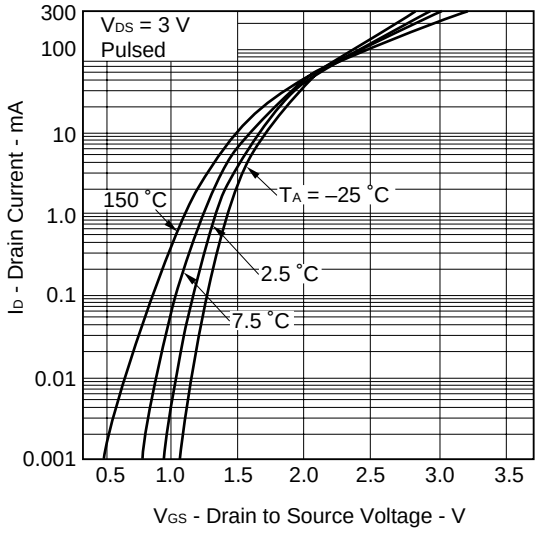
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



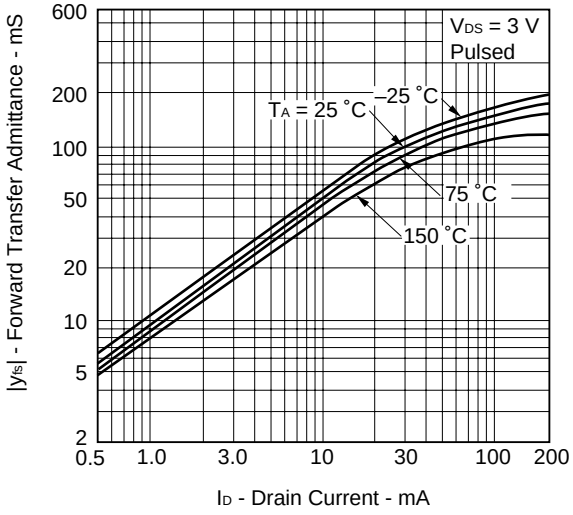
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



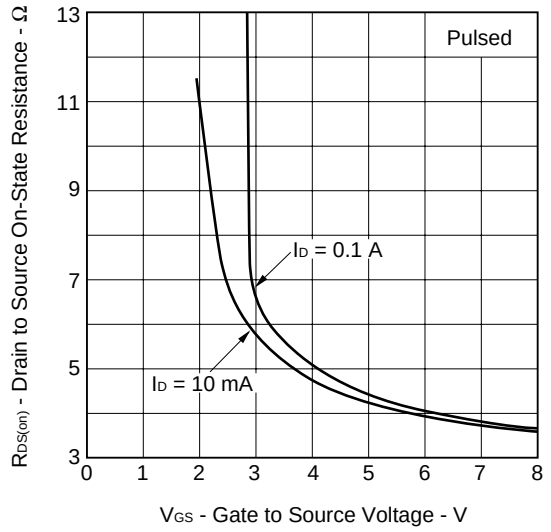
TRANSFER CHARACTERISTICS



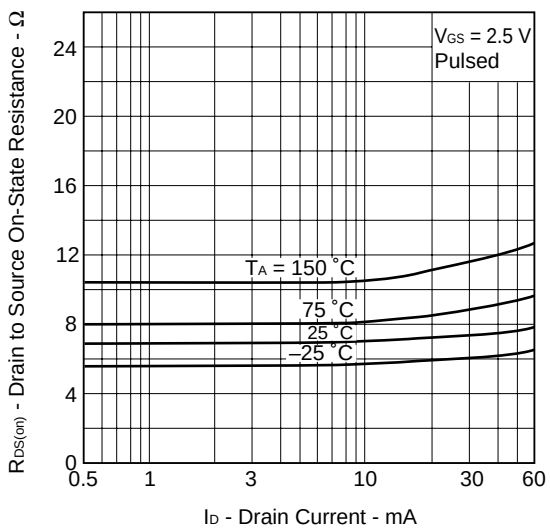
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



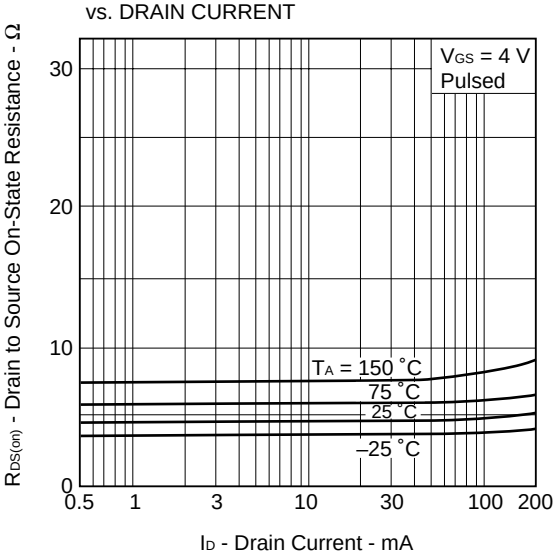
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



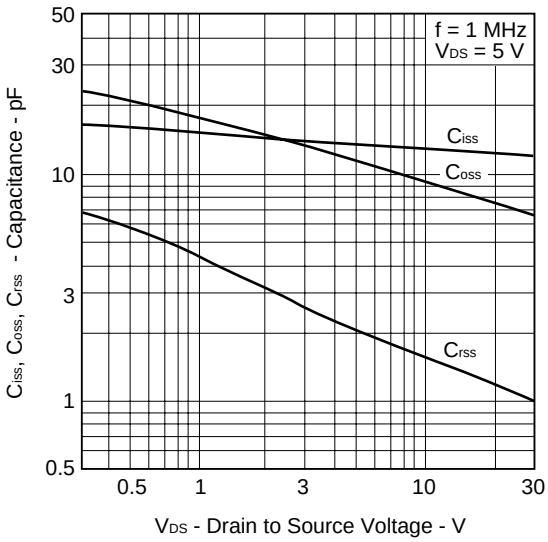
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



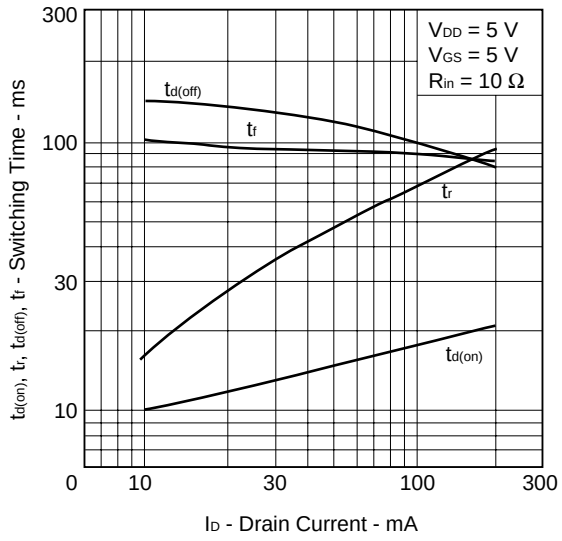
DRAIN TO SOURCE ON-STATE RESISTANCE
vs. DRAIN CURRENT



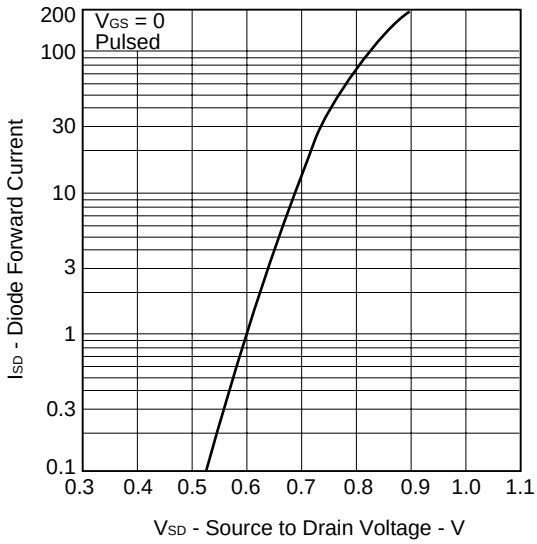
CAPACITANCE vs.
DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS



SOURCE TO DRAIN DIODE
FORWARD VOLTAGE



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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