NEC

MOS FIELD EFFECT TRANSISTOR
2SK1584

N-CHANNEL MOS FET
FOR SWITCHING

DESCRIPTION

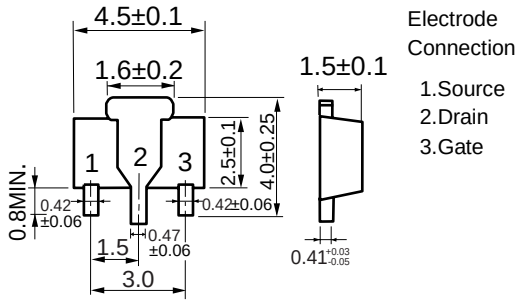
The 2SK1584 is a switching device which can be driven directly by a 5-V power source.

The 2SK1584 features a low on-state resistance and excellent switching characteristics, and is suitable for applications such as actuator driver.

FEATURES

- Can be driven by a 5-V power source.
- Low On-state resistance :
  $R_{DS(on)1}$ = 2.0 Ω MAX. (V_{GS} = 4 V, I_D = 0.3 A)
  $R_{DS(on)2}$ = 1.5 Ω MAX. (V_{GS} = 10 V, I_D = 0.3 A)

PACKAGE DRAWING (Unit : mm)

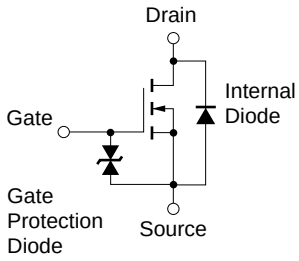


Marking : NH

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage (V_{GS} = 0 V)	V_{DSS}	30	V
Gate to Source Voltage (V_{DS} = 0 V)	V_{GSS}	±20	V
Drain Current (DC) (T_C = 25°C)	$I_{D(DC)}$	±500	mA
Drain Current (pulse) Note1	$I_{D(pulse)}$	±1.0	A
Total Power Dissipation (T_A = 25°C) Note2	P_T	2.0	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C

EQUIVALENT CIRCUIT



Notes1. PW ≤ 10 ms, Duty Cycle ≤ 50%

2. Mounted on ceramic board of 16 $cm^2 \times 0.7$ mm

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.

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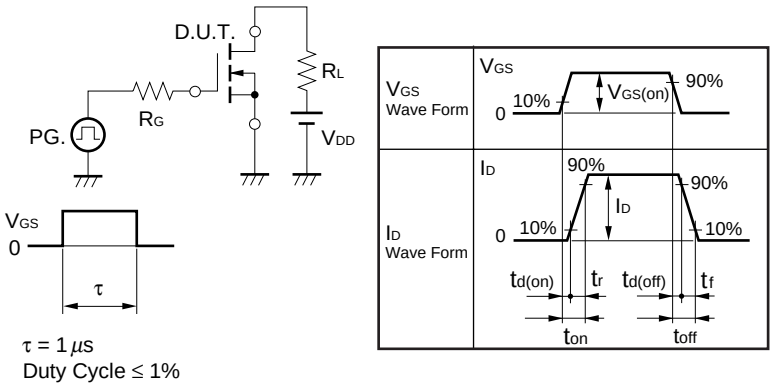
The mark ★ shows major revised points.

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0 V			1.0	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0 V			±10	μA
Gate Cut-off Voltage	$V_{GS(off)}$	V_{DS} = 10 V, I_D = 0.1 mA	1.3	1.85	2.5	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS} = 5 V, I_D = 0.5 A	350	440		mS
Drain to Source On-state Resistance	$R_{DS(on)1}$	V_{GS} = 4 V, I_D = 0.3 A		1.2	2.0	Ω
	$R_{DS(on)2}$	V_{GS} = 10 V, I_D = 0.3 A		0.65	1.5	Ω
Input Capacitance	C_{iss}	V_{DS} = 10 V		60		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V		50		pF
Reverse Transfer Capacitance	C_{rss}	f = 1 MHz		9		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 10 V, I_D = 0.3 A		80		ns
Rise Time	t_r	$V_{GS(on)}$ = 4 V		270		ns
Turn-off Delay Time	$t_{d(off)}$	R_G = 10 Ω		100		ns
Fall Time	t_f	R_L = 33 Ω		110		ns

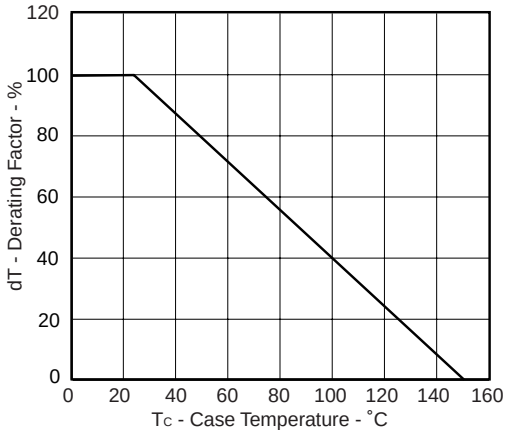
TEST CIRCUIT SWITCHING TIME



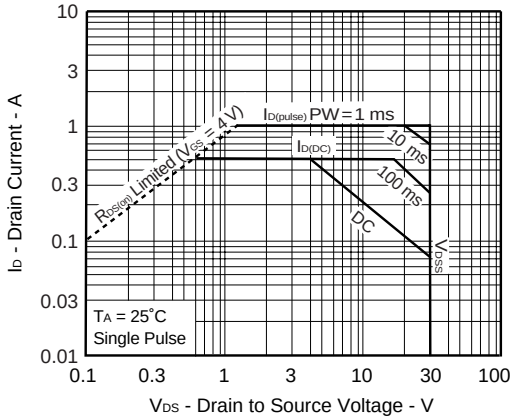
τ = 1 μs
Duty Cycle ≤ 1%

★ TYPICAL CHARACTERISTICS (T_A = 25°C)

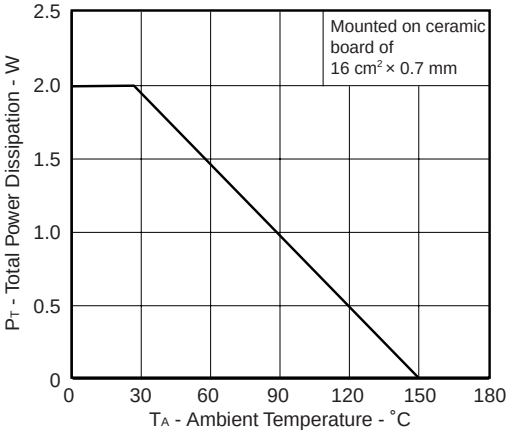
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



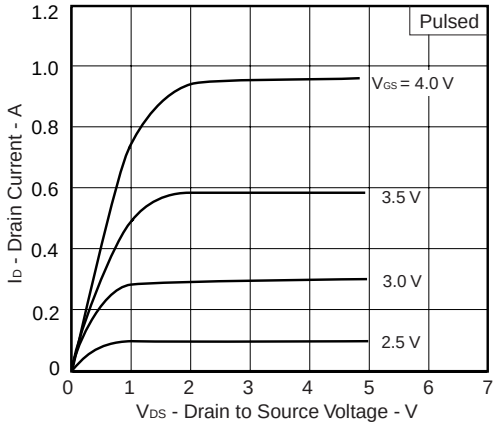
FORWARD BIAS SAFE OPERATING AREA



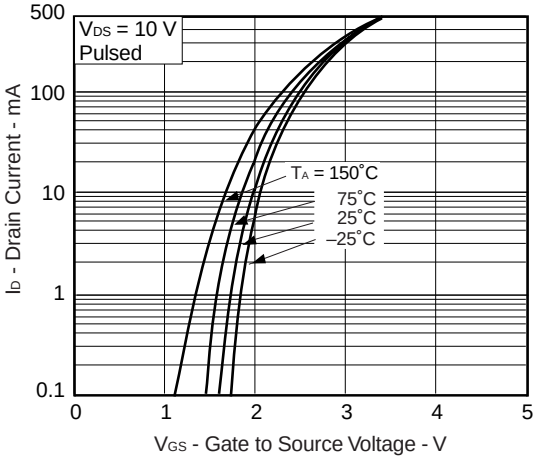
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



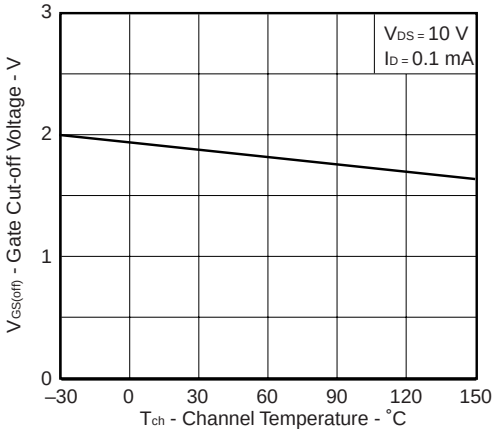
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



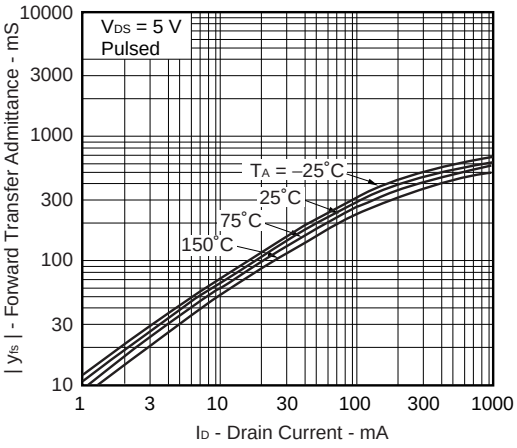
TRANSFER CHARACTERISTICS



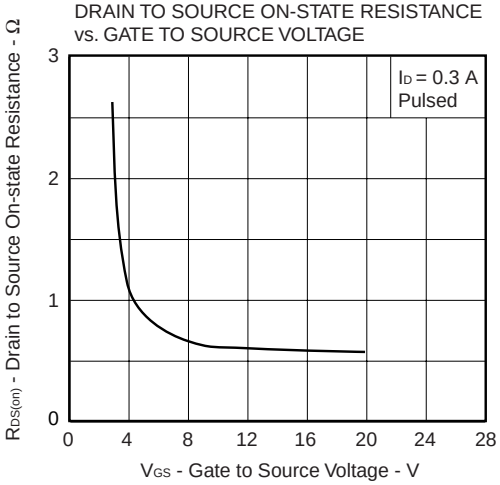
GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



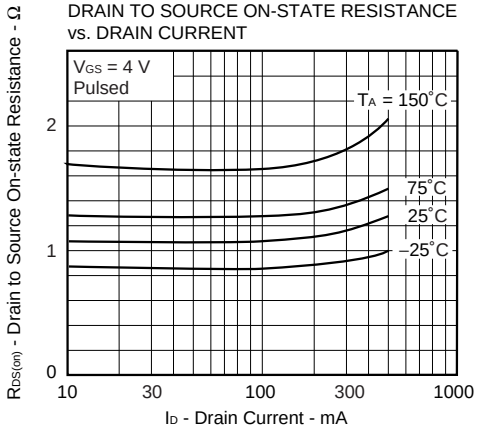
FORWARD TRANSFER ADMMITTANCE vs. DRAIN CURRENT



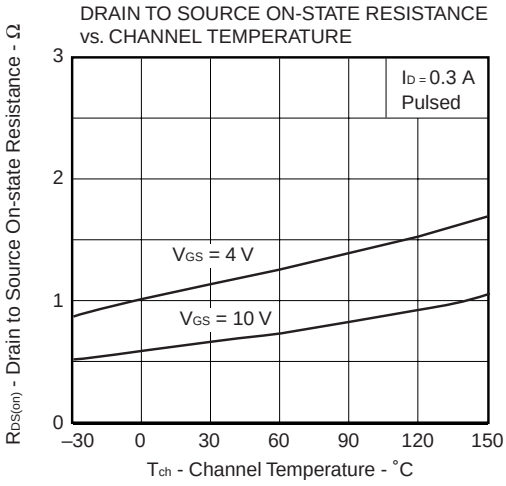
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



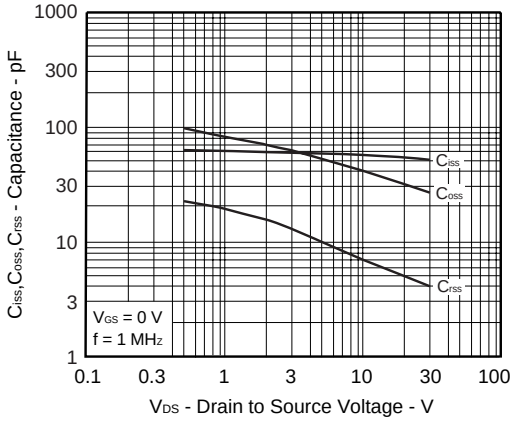
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



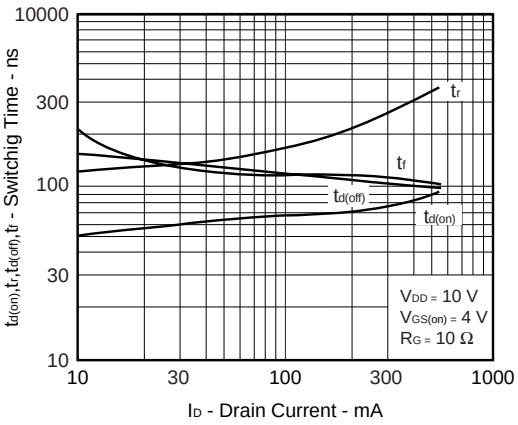
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



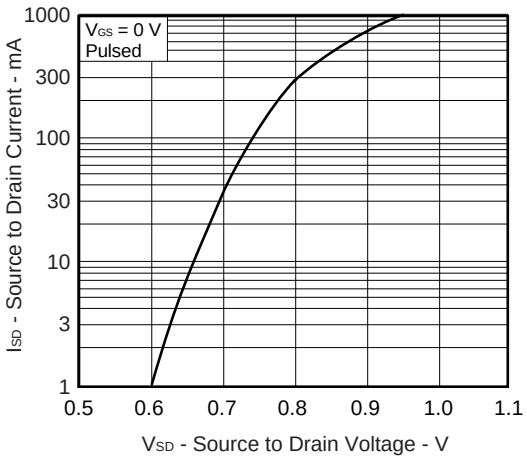
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



[MEMO]

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