RENESAS

MOS FIELD EFFECT TRANSISTOR
2SK1588

N-CHANNEL MOSFET
FOR SWITCHING

DESCRIPTION

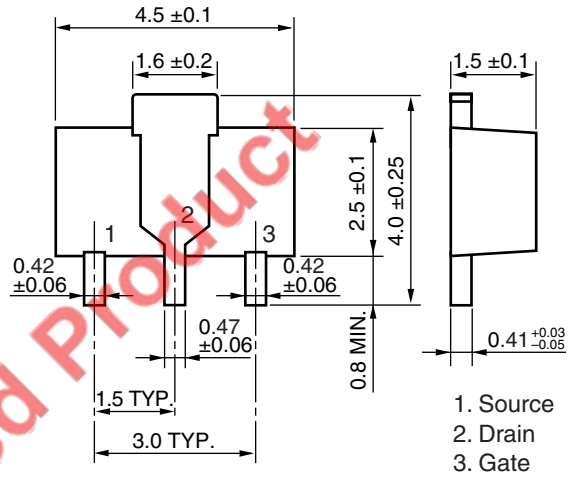
The 2SK1588 is an N-channel vertical type MOSFET which can be driven by 2.5 V power supply.

As the MOSFET is driven by low voltage and does not require consideration of driving current, it is suitable for appliances including VCR cameras and headphone stereos which need power saving.

FEATURES

- Directly driven by ICs having a 3 V power supply.
- Low on-state resistance
  $R_{DS(on)1}$ = 0.5 Ω MAX. (V_{GS} = 2.5 V, I_D = 1.0 A)
  $R_{DS(on)2}$ = 0.3 Ω MAX. (V_{GS} = 4.0 V, I_D = 1.5 A)

PACKAGE DRAWING (Unit: mm)



ORDERING INFORMATION

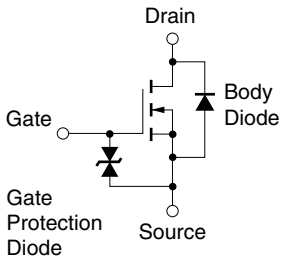
PART NUMBER	PACKAGE
2SK1588	SC-62 (Power Mini Mold)

Marking: NG

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage (V_{GS} = 0 V)	V_{DSS}	16	V
Gate to Source Voltage (V_{DS} = 0 V)	V_{GSS}	±16	V
Drain Current (DC)	$I_{D(DC)}$	±3.0	A
Drain Current (pulse) Note1	$I_{D(pulse)}$	±6.0	A
Total Power Dissipation Note2	P_T	2.0	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C

EQUIVALENT CIRCUIT



Notes 1. PW ≤ 10 ms, Duty Cycle ≤ 50%

2. Mounted on ceramic substrate of 16 cm^2 x 0.7 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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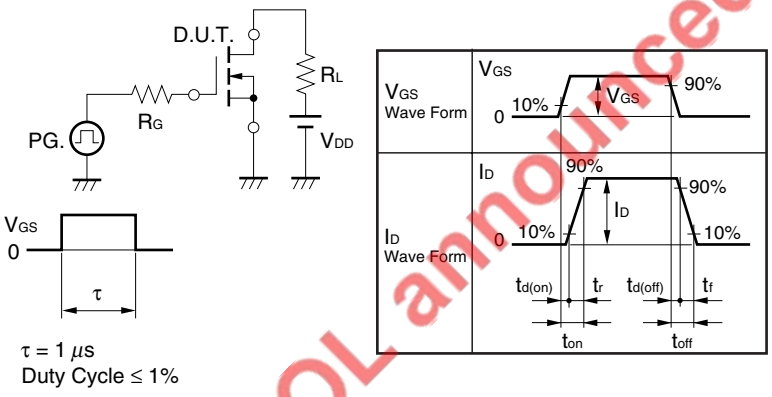
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 16 V, V_{GS} = 0 V			1.0	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±16 V, V_{DS} = 0 V			±5.0	μA
Gate Cut-off Voltage	$V_{GS(off)}$	V_{DS} = 5.0 V, I_D = 1.0 mA	0.8	1.0	1.6	V
Forward Transfer Admittance **Note**	$\|y_{fs}\|$	V_{DS} = 3.0 V, I_D = 1.0 A	0.4	3.0		S
Drain to Source On-state Resistance **Note**	$R_{DS(on)1}$	V_{GS} = 2.5 V, I_D = 1.0 A		0.25	0.5	Ω
	$R_{DS(on)2}$	V_{GS} = 4.0 V, I_D = 1.5 A		0.17	0.3	Ω
Input Capacitance	C_{iss}	V_{DS} = 3.0 V		240		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V		250		pF
Reverse Transfer Capacitance	C_{rss}	f = 1 MHz		60		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 3.0 V, I_D = 1.5 A		140		ns
Rise Time	t_r	V_{GS} = 3 V		650		ns
Turn-off Delay Time	$t_{d(off)}$	R_G = 10 Ω		120		ns
Fall Time	t_f			160		ns

Note Pulsed

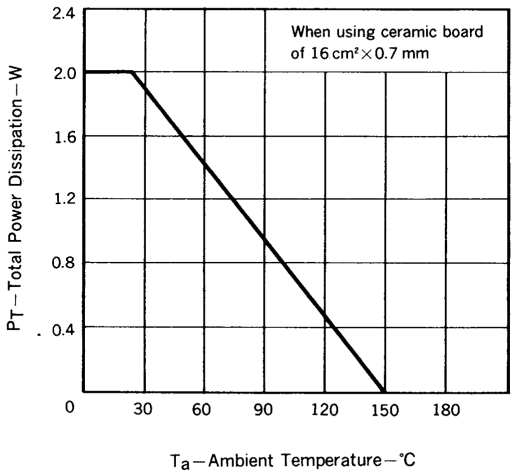
TEST CIRCUIT SWITCHING TIME



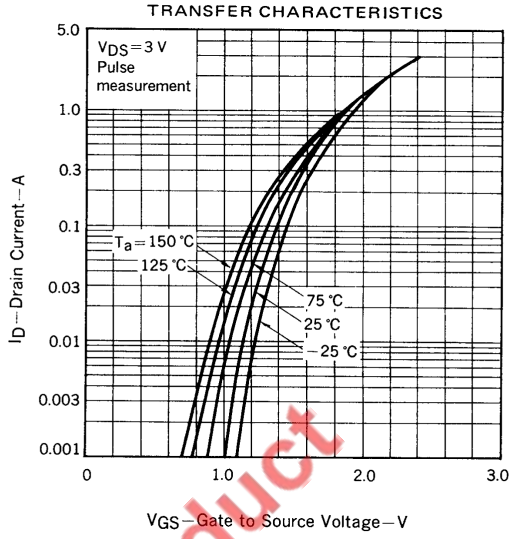
τ = 1 μs
Duty Cycle ≤ 1%

TYPICAL CHARACTERISTICS (T_A = 25°C)

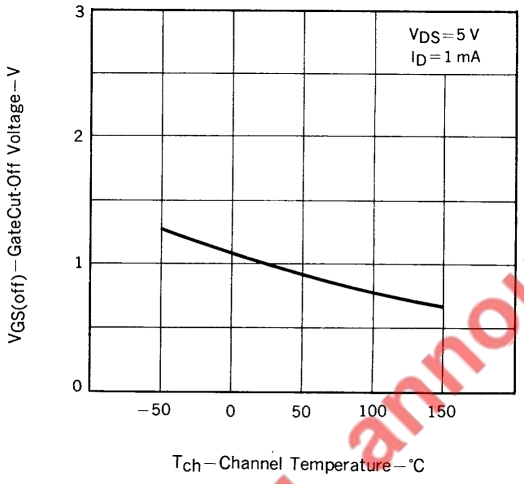
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



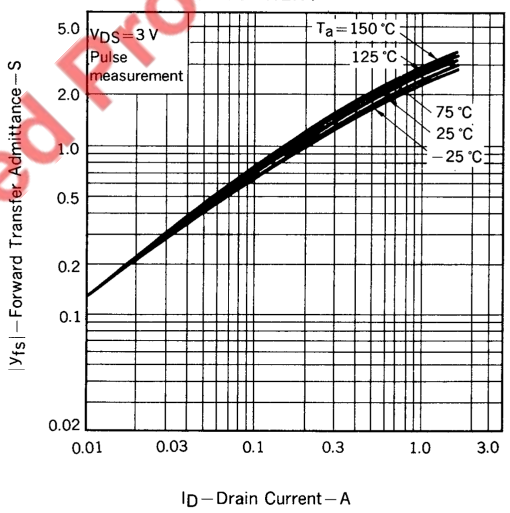
TRANSFER CHARACTERISTICS



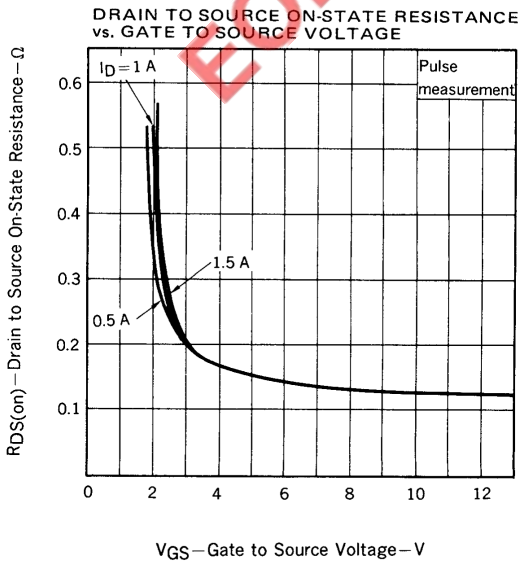
GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE



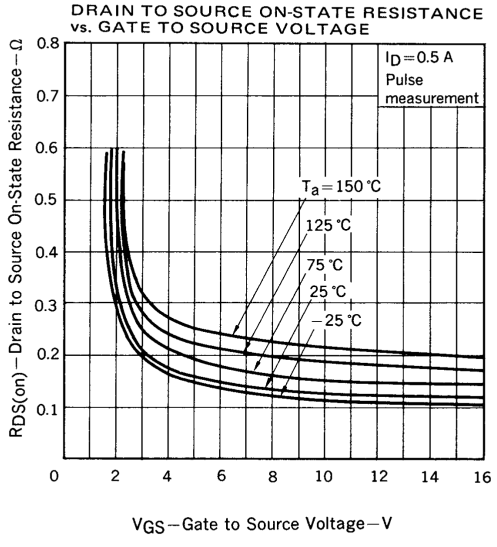
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



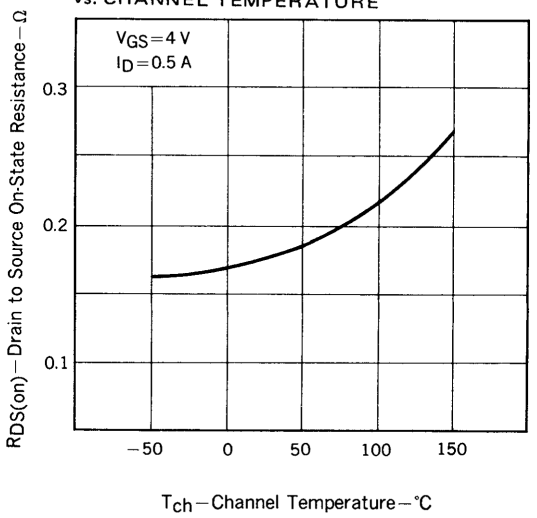
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



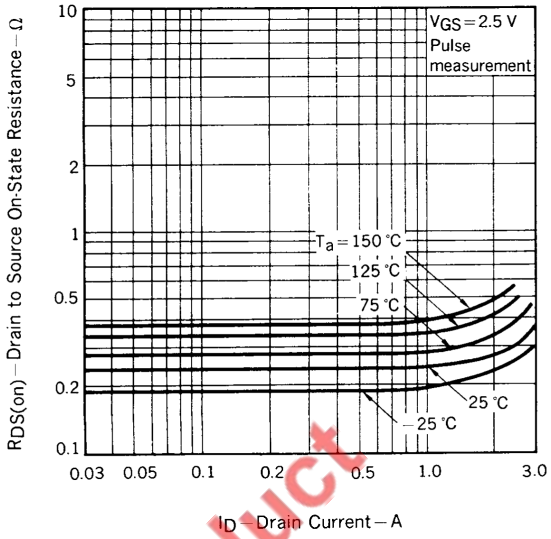
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



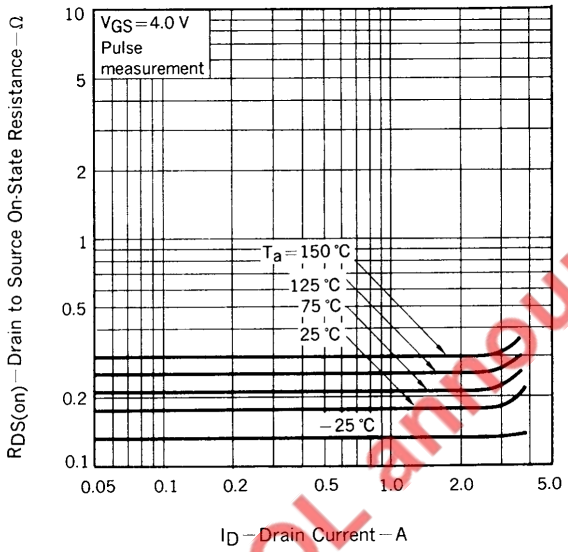
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



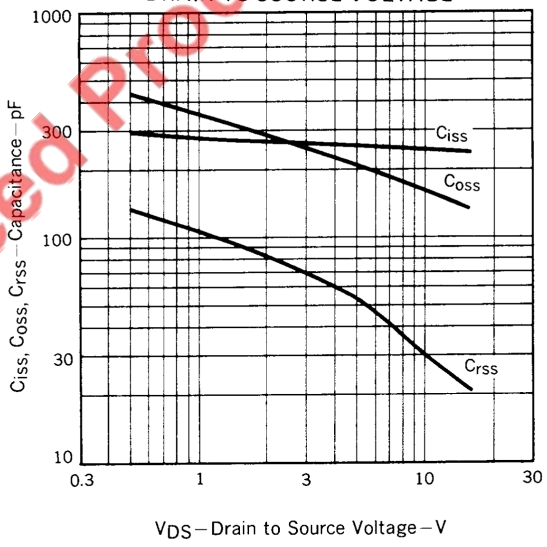
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



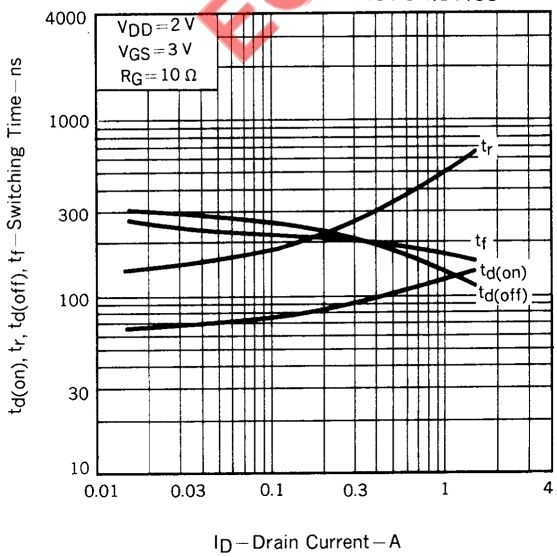
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE