To our customers,

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Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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RENESAS

MOS FIELD EFFECT TRANSISTOR
2SK1658

N-CHANNEL MOSFET
FOR SWITCHING

DESCRIPTION

The 2SK1658 is an N -channel vertical type MOSFET which can be driven by 2.5 V power supply.

As the MOSFET is low Gate Leakage Current, it is suitable for appliances including Filter Circuit.

FEATURES

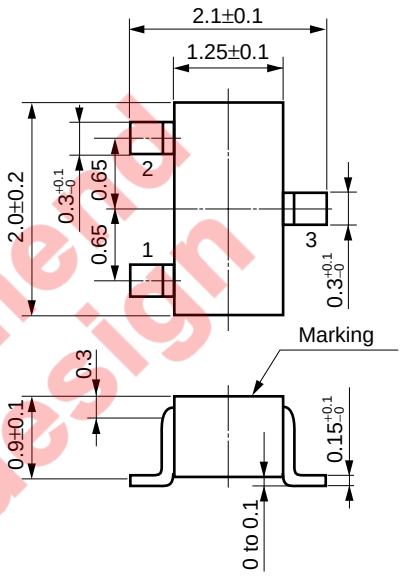
- Directly driven by ICs having a 3 V power supply.
- Has low Gate Leakage Current
  I_{GSS} = ±5 nA MAX. (V_{GS} = ±3.0 V)

ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK1658	SC-70 (SSP)

Marking: G20

PACKAGE DRAWING (Unit: mm)



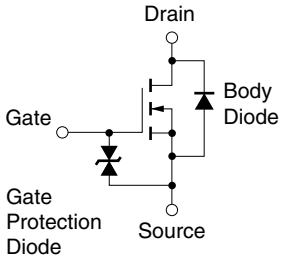
1. Source
2. Gate
3. Drain

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}	±7	V
Drain Current (DC)	$I_{D(DC)}$	±100	mA
Drain Current (pulse) Note	$I_{D(pulse)}$	±200	mA
Total Power Dissipation	P_T	150	mW
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C

Note PW ≤ 10 ms, Duty Cycle ≤ 50%

EQUIVALENT CIRCUIT



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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Date Published December 2005 NS CP(K)
Printed in Japan

The mark <R> shows major revised points.
The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

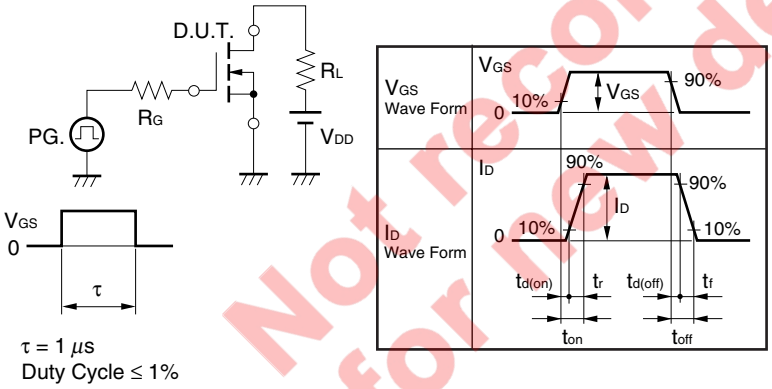
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

<R>

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0 V			10	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±3.0 V, V_{DS} = 0 V			±5.0	nA
Gate Cut-off Voltage	$V_{GS(off)}$	V_{DS} = 3.0 V, I_D = 1.0 μA	0.9	1.2	1.5	V
Forward Transfer Admittance **Note**	$\|y_{fs}\|$	V_{DS} = 3.0 V, I_D = 10 mA	20	40		mS
Drain to Source On-state Resistance **Note**	$R_{DS(on)1}$	V_{GS} = 2.5 V, I_D = 10 mA		25	45	Ω
	$R_{DS(on)2}$	V_{GS} = 4.0 V, I_D = 10 mA		18	25	Ω
Input Capacitance	C_{iss}	V_{DS} = 3.0 V		15		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V		10		pF
Reverse Transfer Capacitance	C_{rss}	f = 1 MHz		1.5		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 3.0 V, I_D = 10 mA		50		ns
Rise Time	t_r	V_{GS} = 3.0 V		23		ns
Turn-off Delay Time	$t_{d(off)}$	R_G = 10 Ω		34		ns
Fall Time	t_f			43		ns

Note Pulsed

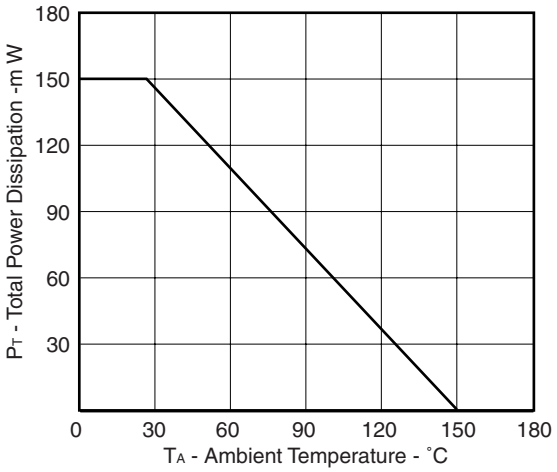
TEST CIRCUIT SWITCHING TIME



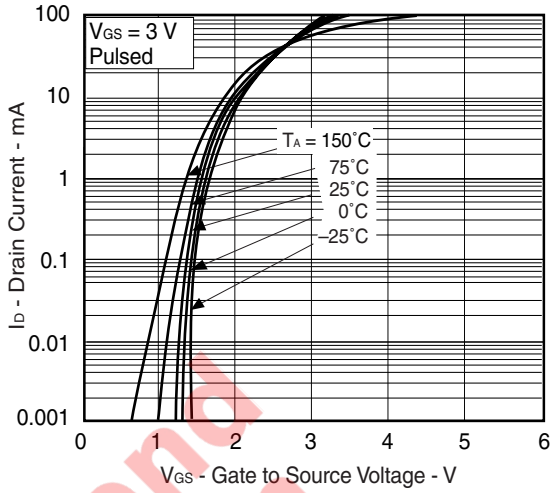
τ = 1 μs
Duty Cycle ≤ 1%

TYPICAL CHARACTERISTICS (T_A = 25°C)

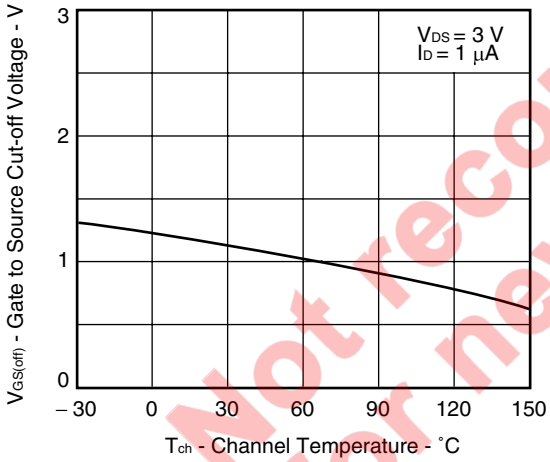
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



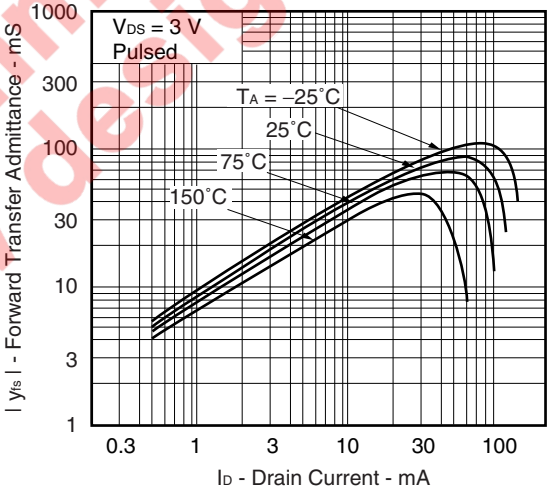
TRANSFER CHARACTERISTICS



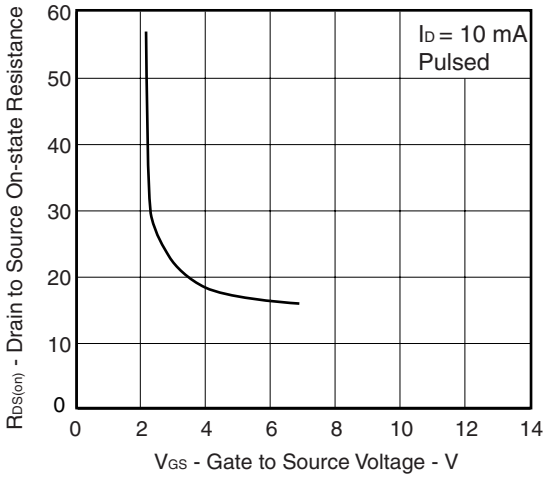
GATE TO SOURCE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



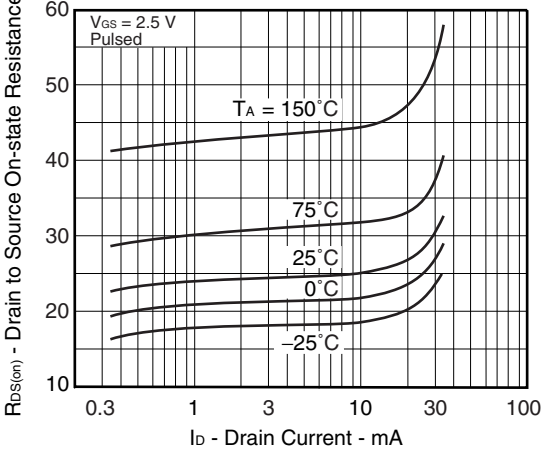
FORWARD TRANSFER ADMMITTANCE vs. DRAIN CURRENT



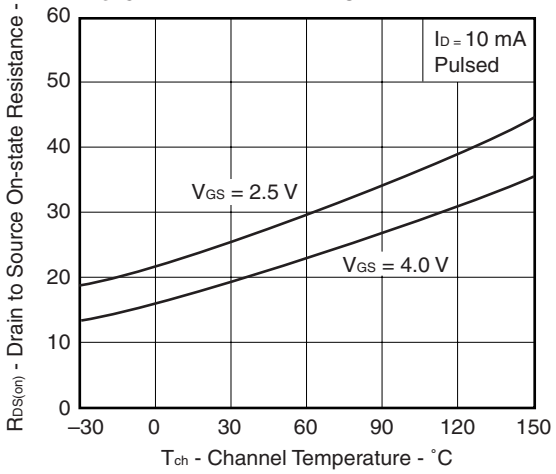
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



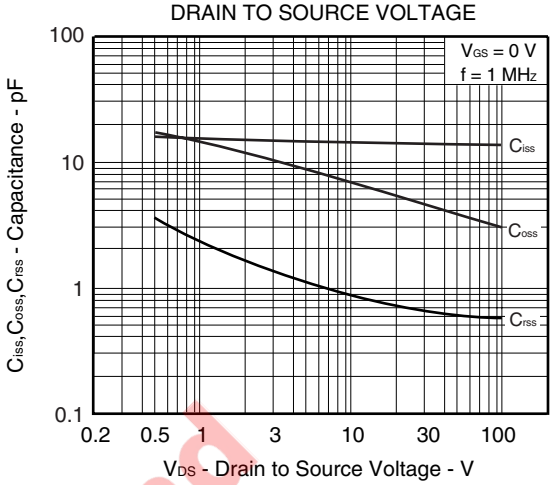
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



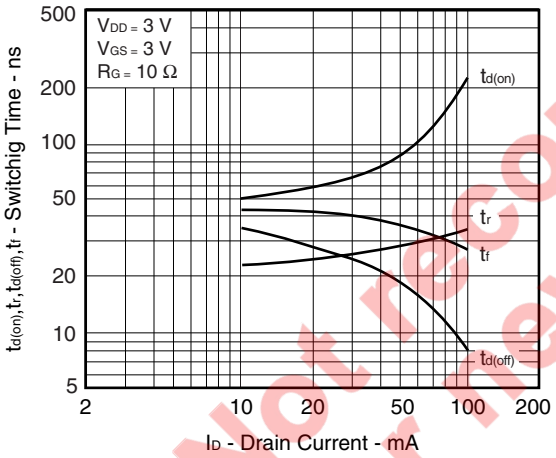
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



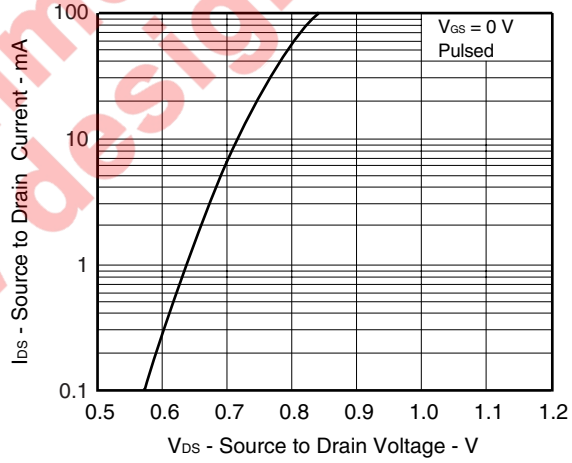
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



SWITCHING CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



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