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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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Phase-out/Discontinued

**N-CHANNEL MOS FIELD EFFECT TRANSISTOR
FOR SWITCHING**

DESCRIPTION

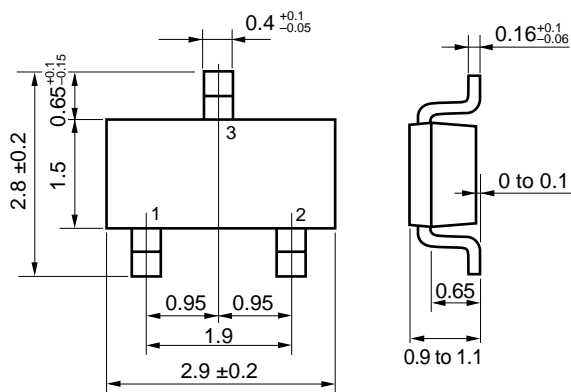
The 2SK3105 is a switching device which can be driven directly by a 4 V power source.

The 2SK3105 features a low on-state resistance and excellent switching characteristics, and is suitable for applications such as power switch of portable machine and so on.

FEATURES

- Can be driven by a 4 V power source
- Low on-state resistance
 $R_{DS(on)1} = 95 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 1.5 \text{ A)}$
 $R_{DS(on)2} = 135 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 1.5 \text{ A)}$
 $R_{DS(on)3} = 150 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.0 \text{ V, } I_D = 1.5 \text{ A)}$

PACKAGE DRAWING (Unit: mm)



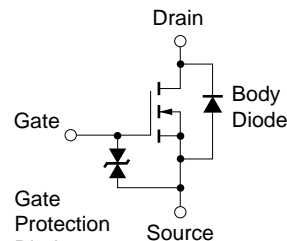
1 : Gate
2 : Source
3 : Drain

ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3105	SC-96 (Mini Mold Thin Type)

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EQUIVALENT CIRCUIT



Marking: XA

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage	V _{DSS}	30	V
Gate to Source Voltage	V _{GSS}	±20	V
Drain Current (DC)	I _{D(DC)}	±2.5	A
Drain Current (pulse) ^{Note1}	I _{D(pulse)}	±10	A
Total Power Dissipation	P _{T1}	0.2	W
Total Power Dissipation ^{Note2}	P _{T2}	1.25	W
Channel Temperature	T _{ch}	150	°C
Storage Temperature	T _{stg}	-55 to +150	°C

- Notes**
1. PW ≤ 10 μs, Duty Cycle ≤ 1%
 2. Mounted on FR-4 Board, t ≤ 5 sec.

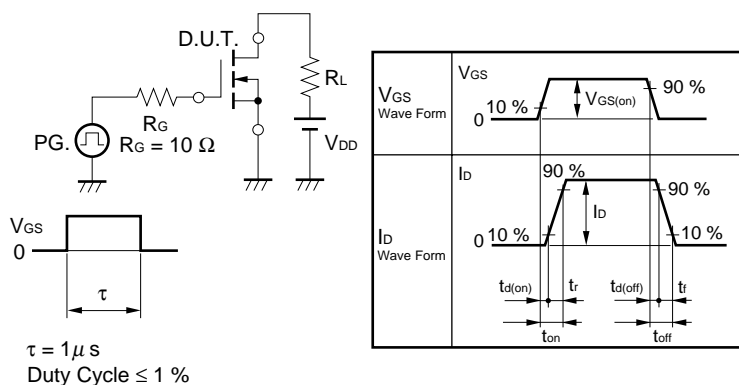
Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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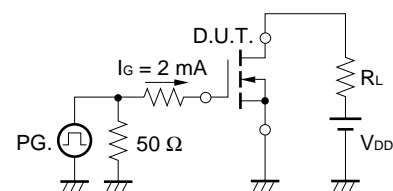
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Cut-off Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V			-10	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±16 V, V _{DS} = 0 V			±10	μA
Gate Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1 mA	1.0	1.6	2.5	V
Forward Transfer Admittance	y _{fs}	V _{DS} = 10 V, I _D = 1.5 A	1	3.5		S
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = 10 V, I _D = 1.5 A		56	95	mΩ
	R _{DS(on)2}	V _{GS} = 4.5 V, I _D = 1.5 A		82	135	mΩ
	R _{DS(on)3}	V _{GS} = 4.0 V, I _D = 1.5 A		91	150	mΩ
Input Capacitance	C _{iss}	V _{DS} = 10 V		211		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		95		pF
Reverse Transfer Capacitance	C _{rss}	f = 1 MHz		42		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 10 V		12		ns
Rise Time	t _r	I _D = 1.0 A		44		ns
Turn-off Delay Time	t _{d(off)}	V _{GS(on)} = 10 V		28		ns
Fall Time	t _f	R _G = 10 Ω		15		ns
Total Gate Charge	Q _G	V _{DS} = 10 V		2.1		nC
Gate to Source Charge	Q _{GS}	I _D = 2.5 A		0.61		nC
Gate to Drain Charge	Q _{GD}	V _{GS} = 4.0 V		0.84		nC
Diode Forward Voltage	V _{F(S-D)}	I _F = 2.5 A, V _{GS} = 0 V		0.81		V
Reverse Recovery Time	t _{rr}	I _F = 2.5 A, V _{GS} = 0 V		15		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 90 A/μs		3.7		nC

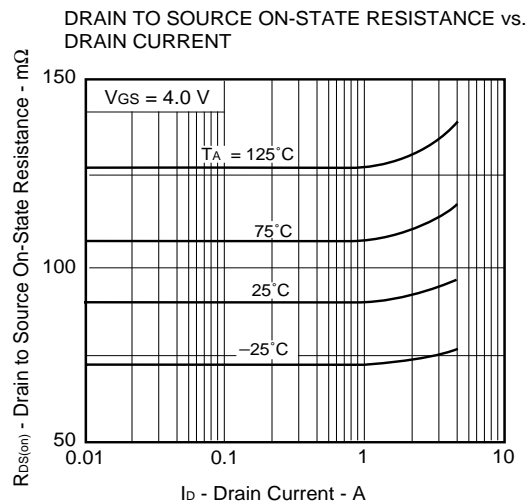
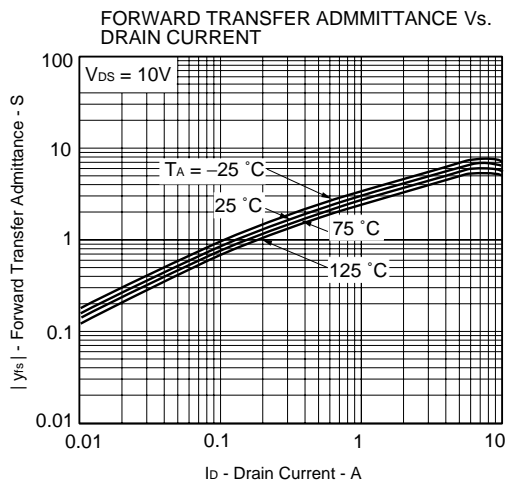
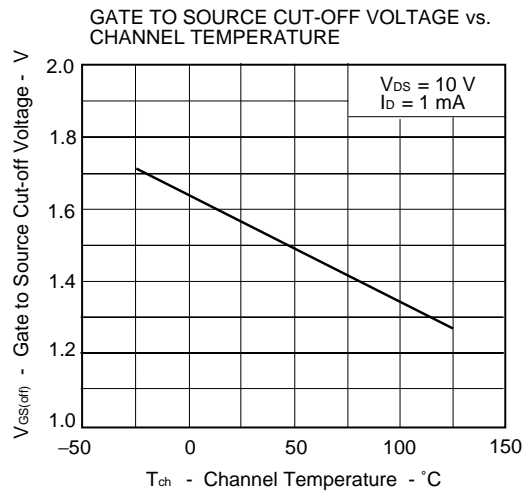
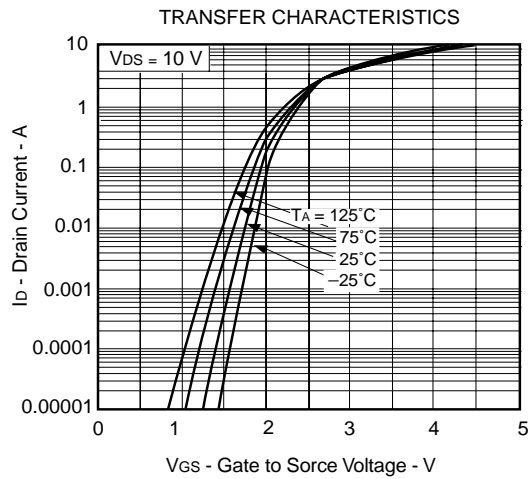
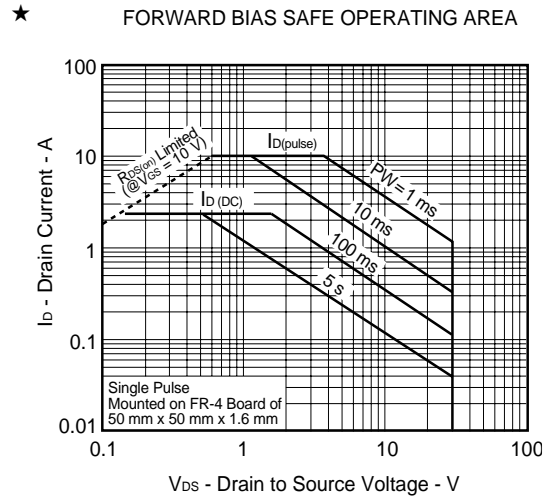
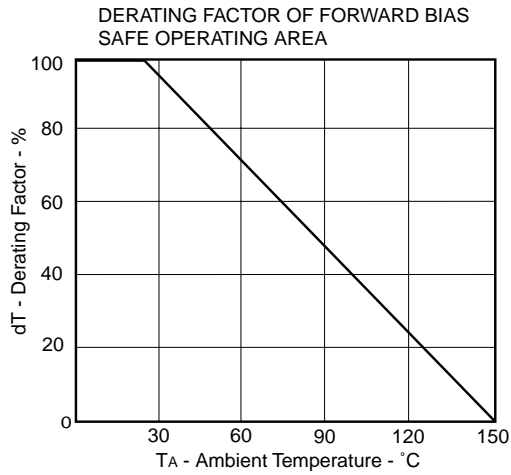
TEST CIRCUIT 1 SWITCHING TIME

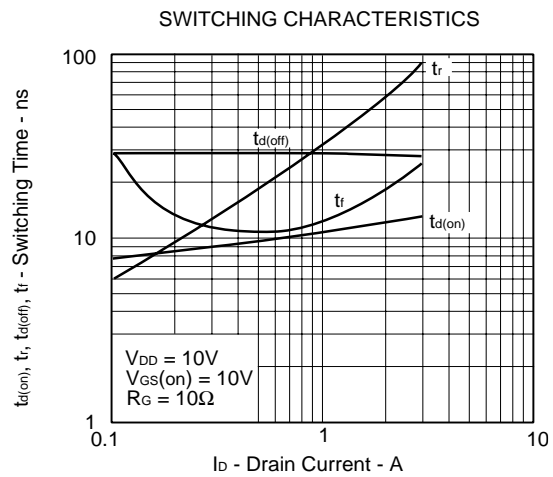
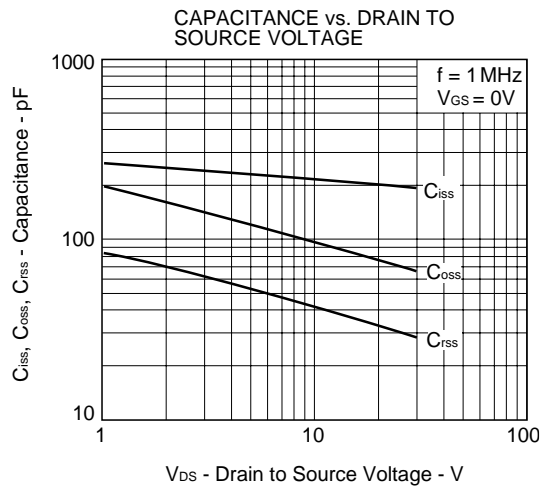
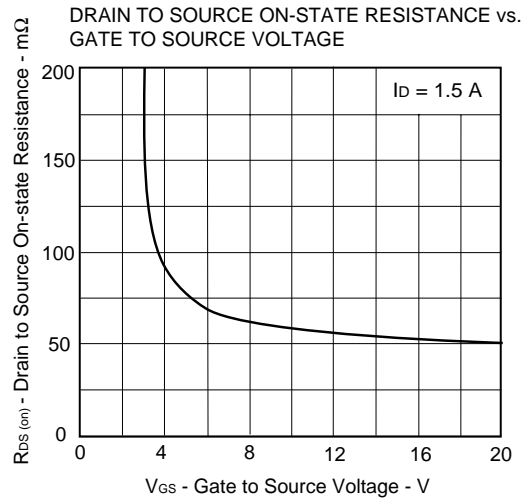
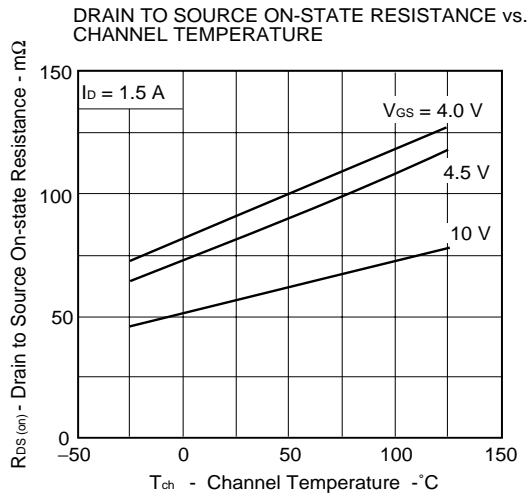
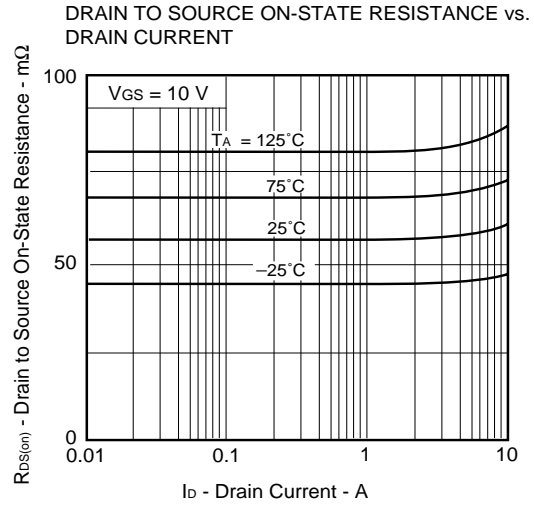
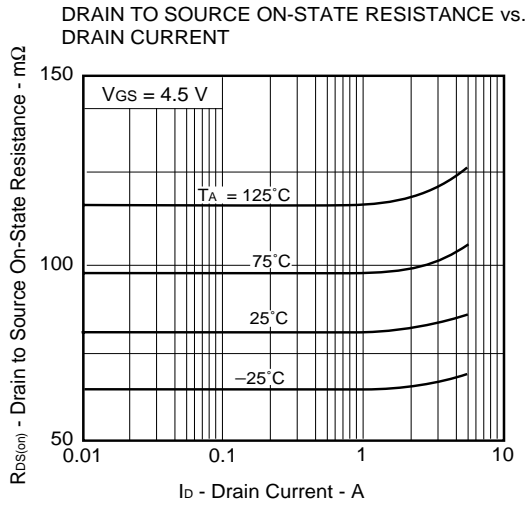


TEST CIRCUIT 2 GATE CHARGE

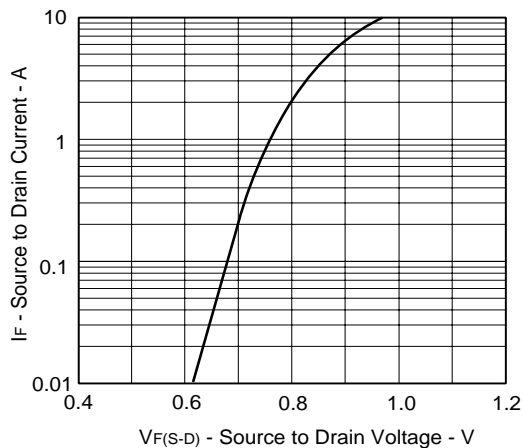


TYPICAL CHARACTERISTICS (T_A = 25°C)

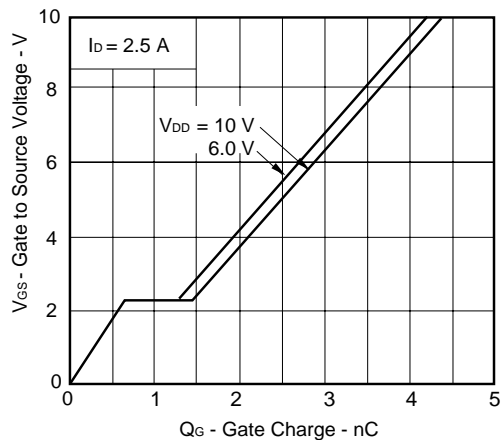




SOURCE TO DRAIN DIODE FORWARD VOLTAGE

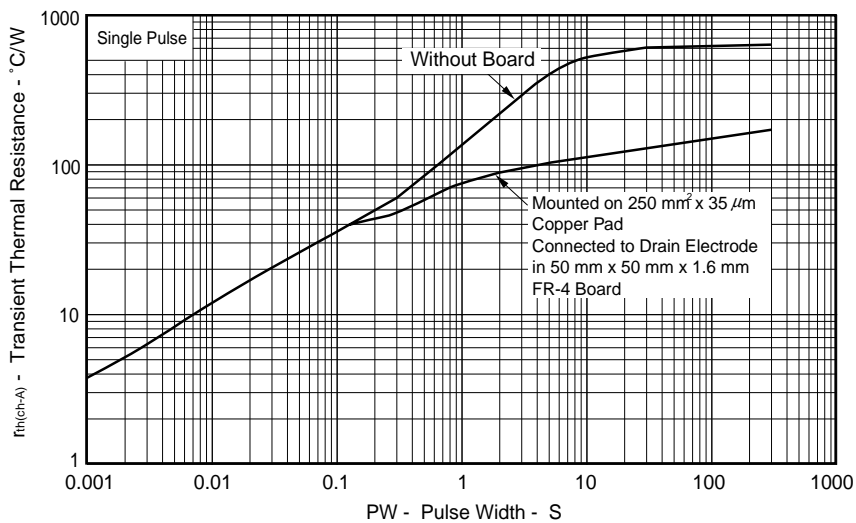


DYNAMIC INPUT CHARACTERISTICS



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TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



[MEMO]

[MEMO]

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