

To our customers,

Old Company Name in Catalogs and Other Documents

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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

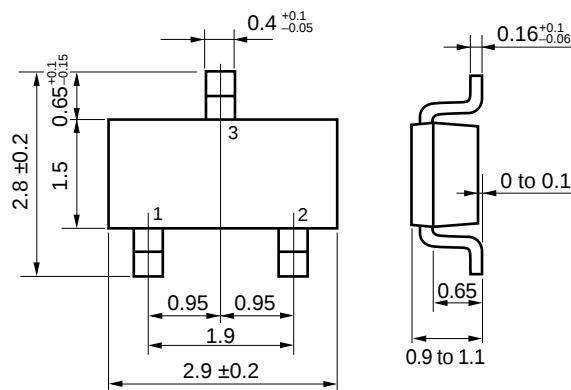
The 2SK3105 is a switching device which can be driven directly by a 4 V power source.

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)

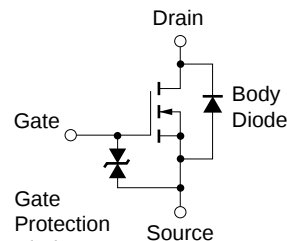


1 : Gate
2 : Source
3 : Drain

ORDERING INFORMATION

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

EQUIVALENT CIRCUIT



Marking: XA

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

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	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

- Notes 1.** $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1\%$
2. Mounted on FR-4 Board, $t \leq 5 \text{ sec.}$

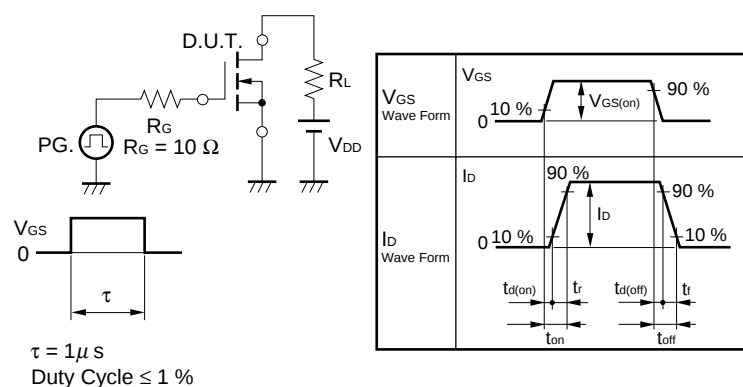
Remark The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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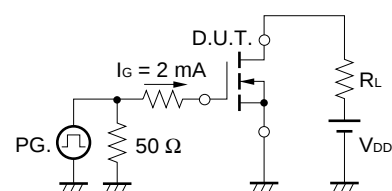
ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Cut-off Current	I_{DSS}	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$			-10	μA
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 16\text{ V}, V_{DS} = 0\text{ V}$			± 10	μA
Gate Cut-off Voltage	$V_{GS(off)}$	$V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$	1.0	1.6	2.5	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS} = 10\text{ V}, I_D = 1.5\text{ A}$	1	3.5		S
Drain to Source On-state Resistance	$R_{DS(on)1}$	$V_{GS} = 10\text{ V}, I_D = 1.5\text{ A}$		56	95	$\text{m}\Omega$
	$R_{DS(on)2}$	$V_{GS} = 4.5\text{ V}, I_D = 1.5\text{ A}$		82	135	$\text{m}\Omega$
	$R_{DS(on)3}$	$V_{GS} = 4.0\text{ V}, I_D = 1.5\text{ A}$		91	150	$\text{m}\Omega$
Input Capacitance	C_{iss}	$V_{DS} = 10\text{ V}$		211		pF
Output Capacitance	C_{oss}	$V_{GS} = 0\text{ V}$		95		pF
Reverse Transfer Capacitance	C_{rss}	$f = 1\text{ MHz}$		42		pF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 10\text{ V}$		12		ns
Rise Time	t_r	$I_D = 1.0\text{ A}$		44		ns
Turn-off Delay Time	$t_{d(off)}$	$V_{GS(on)} = 10\text{ V}$		28		ns
Fall Time	t_f	$R_G = 10\text{ }\Omega$		15		ns
Total Gate Charge	Q_G	$V_{DS} = 10\text{ V}$		2.1		nC
Gate to Source Charge	Q_{GS}	$I_D = 2.5\text{ A}$		0.61		nC
Gate to Drain Charge	Q_{GD}	$V_{GS} = 4.0\text{ V}$		0.84		nC
Diode Forward Voltage	$V_{F(S-D)}$	$I_F = 2.5\text{ A}, V_{GS} = 0\text{ V}$		0.81		V
Reverse Recovery Time	t_{rr}	$I_F = 2.5\text{ A}, V_{GS} = 0\text{ V}$		15		ns
Reverse Recovery Charge	Q_{rr}	$di/dt = 90\text{ A}/\mu\text{s}$		3.7		nC

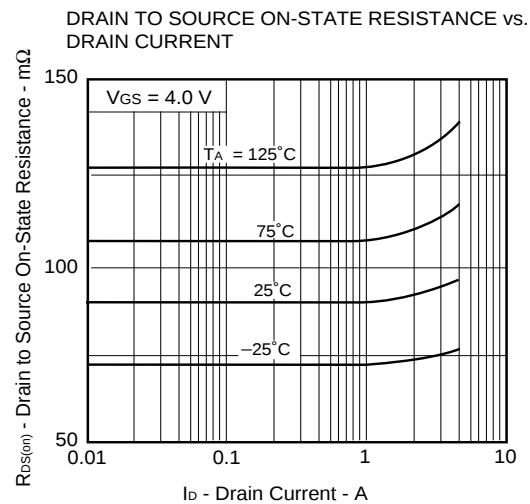
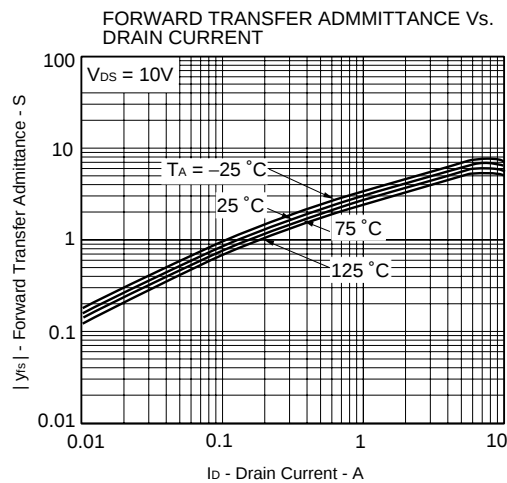
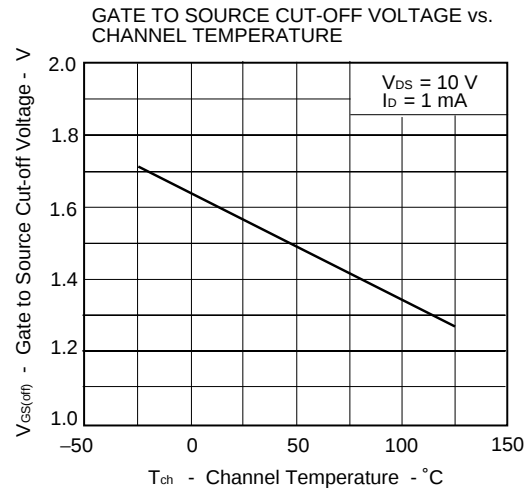
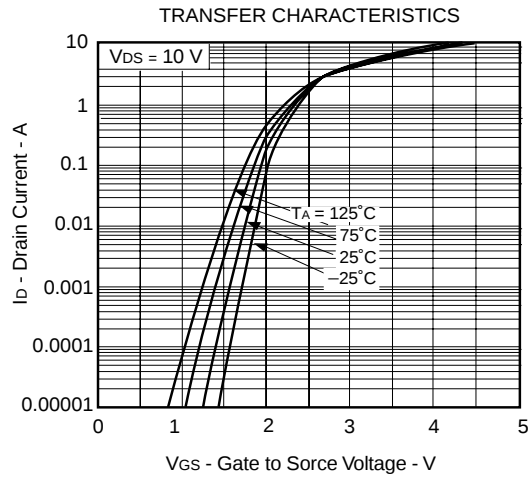
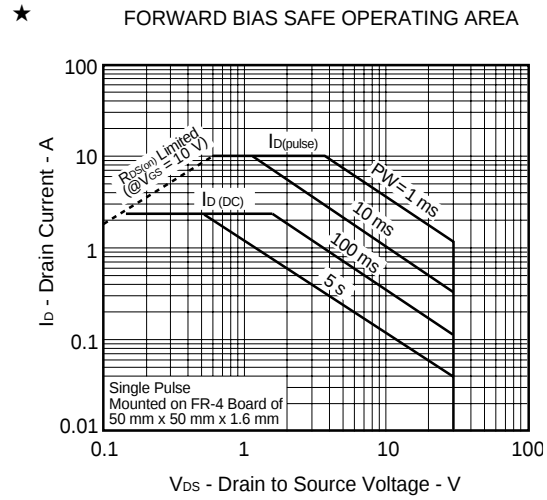
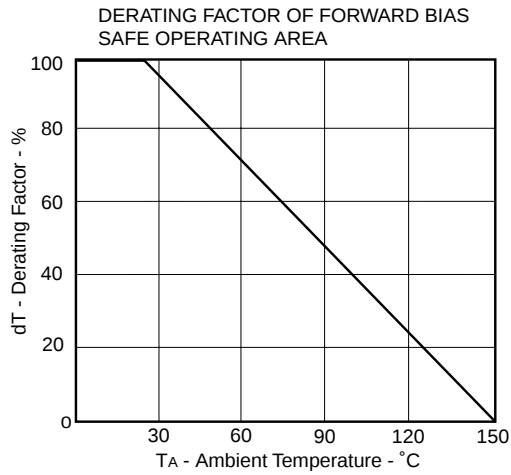
TEST CIRCUIT 1 SWITCHING TIME

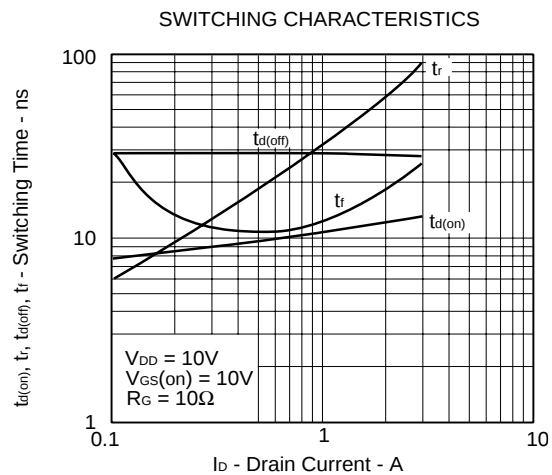
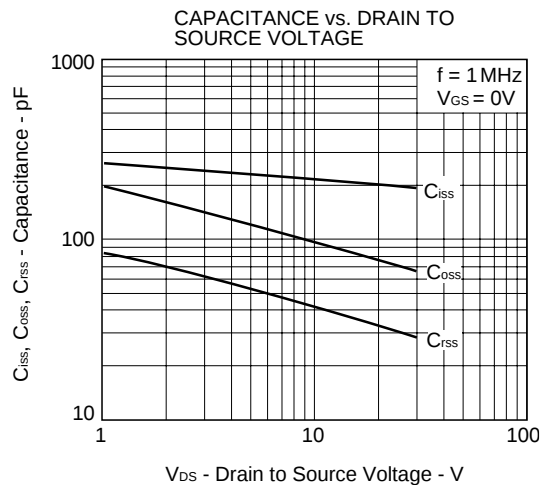
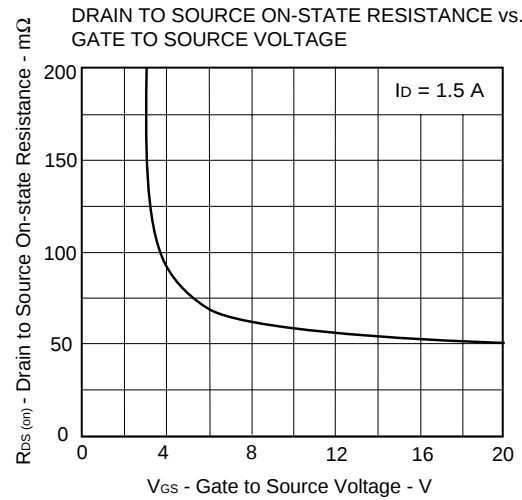
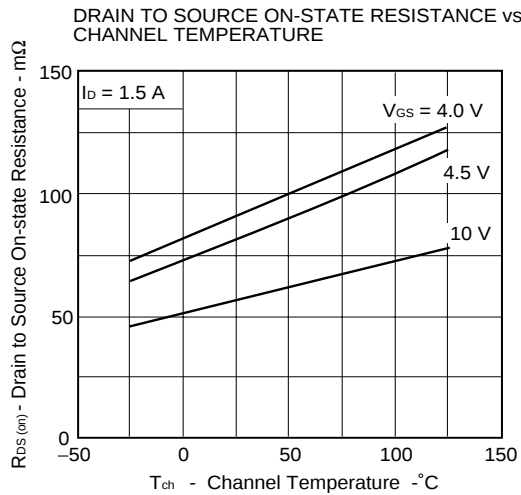
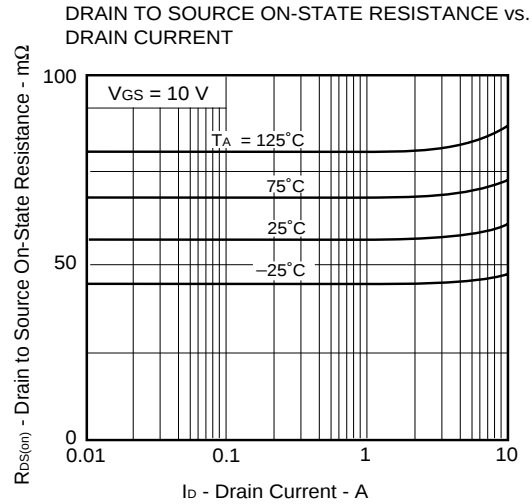
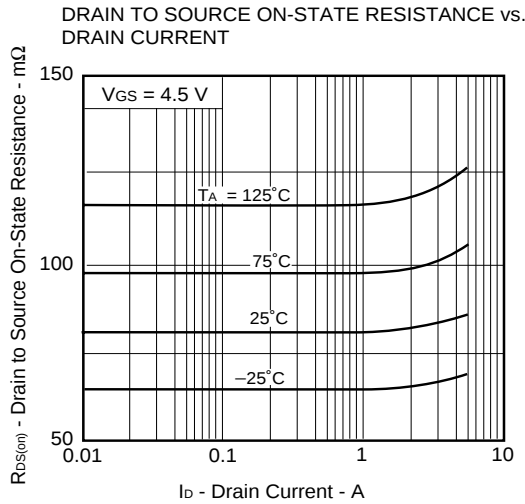


TEST CIRCUIT 2 GATE CHARGE

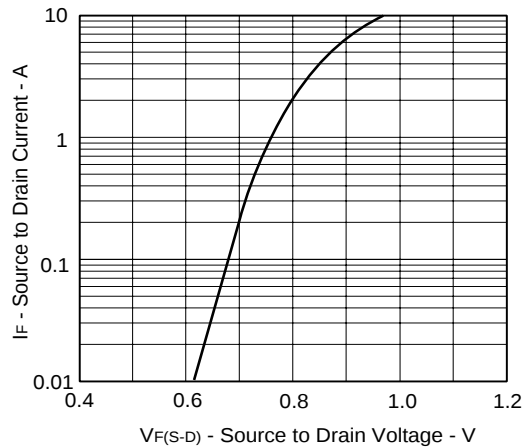


TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

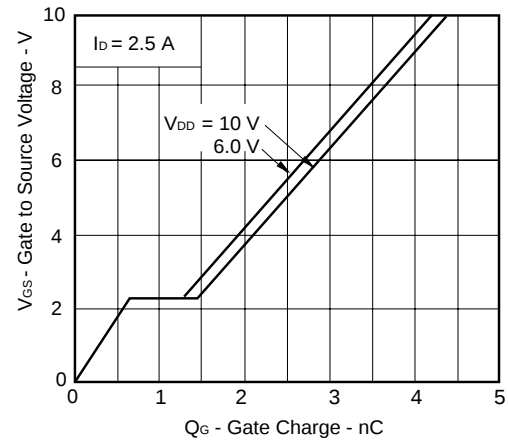




SOURCE TO DRAIN DIODE FORWARD VOLTAGE

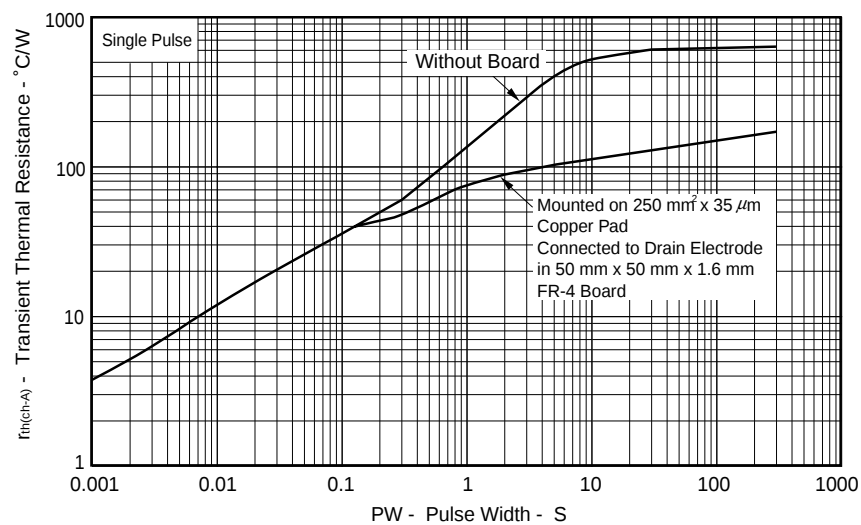


DYNAMIC INPUT CHARACTERISTICS



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TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



[MEMO]

[MEMO]

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