

# MOS FIELD EFFECT TRANSISTOR 2SK3105

# 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

 $R_{DS(on)1} = 95 \text{ m}\Omega$  MAX. (Vgs = 10 V, ID = 1.5 A)

 $R_{DS(on)2} = 135 \text{ m}\Omega \text{ MAX.} \text{ (Vgs} = 4.5 \text{ V, ID} = 1.5 \text{ A)}$ 

RDS(on)3 = 150 m $\Omega$  MAX. (Vgs = 4.0 V, ID = 1.5 A)

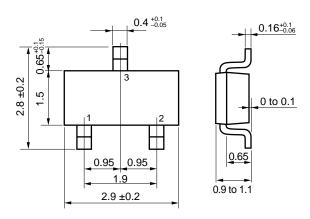
# ORDERING INFORMATION

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

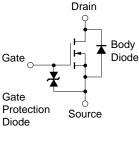
## ABSOLUTE MAXIMUM RATINGS (TA = 25°C)

Drain to Source Voltage	VDSS	30	V	
Gate to Source Voltage	Vgss	±20	V	
Drain Current (DC)	I <sub>D(DC)</sub>	±2.5	Α	
Drain Current (pulse) Note1	I <sub>D(pulse)</sub>	±10	Α	
Total Power Dissipation	P <sub>T1</sub>	0.2	W	
Total Power Dissipation Note2	P <sub>T2</sub>	1.25	W	
Channel Temperature	Tch	150	°C	
Storage Temperature	Tstg	-55 to +150	°C	

# PACKAGE DRAWING (Unit: mm)



- 1 : Gate 2 : Source 3 : Drain
- **EQUIVALENT CIRCUIT**



Marking: XA

- **Notes 1.** PW  $\leq$  10  $\mu$ s, Duty Cycle  $\leq$  1%
  - **2.** Mounted on FR-4 Board,  $t \le 5$  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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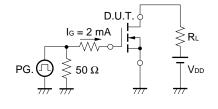
# **ELECTRICAL CHARACTERISTICS (TA = 25 °C)**

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain Cut-off Current	IDSS	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V			-10	μΑ
Gate Leakage Current	Igss	Vgs = ±16 V, Vps = 0 V			±10	μΑ
Gate Cut-off Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA	1.0	1.6	2.5	V
Forward Transfer Admittance	<b>y</b> fs	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1.5 A	1	3.5		S
Drain to Source On-state Resistance	RDS(on)1	V <sub>G</sub> S = 10 V, I <sub>D</sub> = 1.5 A		56	95	mΩ
	RDS(on)2	Vgs = 4.5 V, lb = 1.5 A		82	135	mΩ
	RDS(on)3	Vgs = 4.0 V, lb = 1.5 A		91	150	mΩ
Input Capacitance	Ciss	V <sub>DS</sub> = 10 V		211		pF
Output Capacitance	Coss	V <sub>G</sub> S = 0 V		95		pF
Reverse Transfer Capacitance	Crss	f = 1 MHz		42		pF
Turn-on Delay Time	td(on)	V <sub>DD</sub> = 10 V		12		ns
Rise Time	<b>t</b> r	I <sub>D</sub> = 1.0 A		44		ns
Turn-off Delay Time	td(off)	V <sub>GS(on)</sub> = 10 V		28		ns
Fall Time	<b>t</b> f	$R_G = 10 \Omega$		15		ns
Total Gate Charge	Q <sub>G</sub>	V <sub>DS</sub> = 10 V		2.1		nC
Gate to Source Charge	Qgs	ID = 2.5 A		0.61		nC
Gate to Drain Charge	Q <sub>GD</sub>	V <sub>GS</sub> = 4.0 V		0.84		nC
Diode Forward Voltage	V <sub>F(S-D)</sub>	IF = 2.5 A, VGS = 0 V		0.81		V
Reverse Recovery Time	trr	IF = 2.5 A, VGS = 0 V		15		ns
Reverse Recovery Charge	Qrr	$di/dt = 90 A/\mu s$		3.7		nC

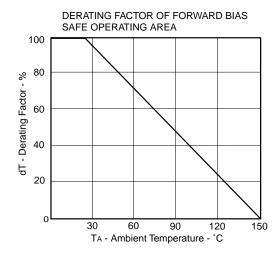
# **TEST CIRCUIT 1 SWITCHING TIME**

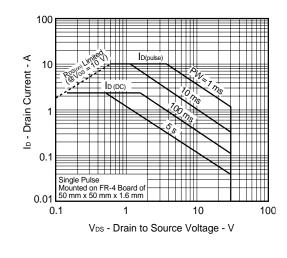
# PG. $\bigcap_{RG} R_G = 10 \ \Omega$ $\tau = 1 \mu \text{ s}$ Duty Cycle $\leq 1 \%$

# **TEST CIRCUIT 2 GATE CHARGE**

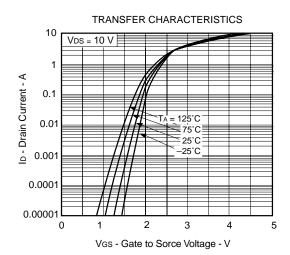


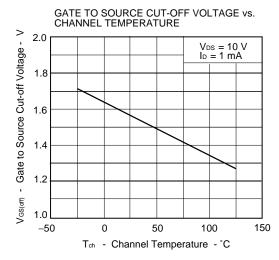
# TYPICAL CHARACTERISTICS (TA = 25°C)

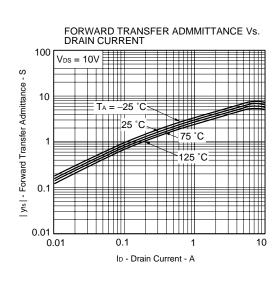


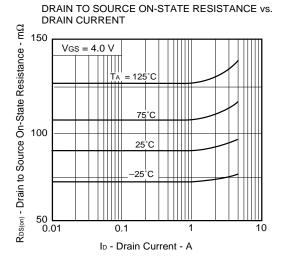


FORWARD BIAS SAFE OPERATING AREA

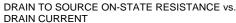


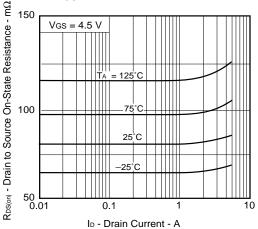




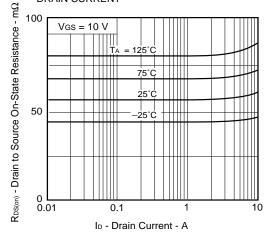


Data Sheet D13293EJ2V0DS 3

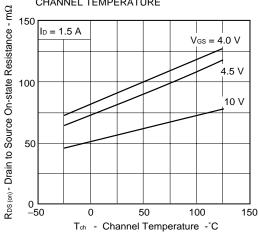




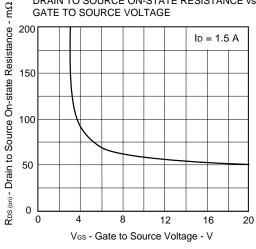
#### DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



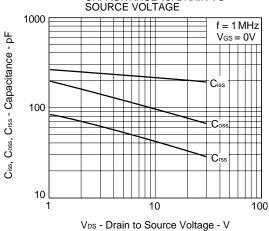
# DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



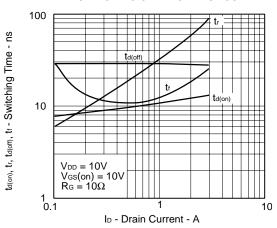
# DRAIN TO SOURCE ON-STATE RESISTANCE vs.



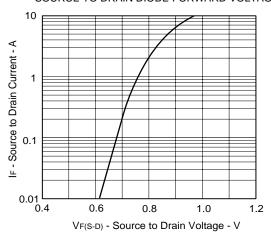
# CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE

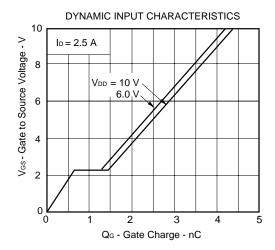


## SWITCHING CHARACTERISTICS

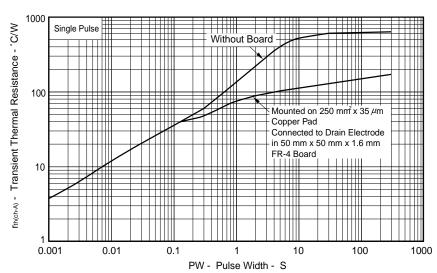


## SOURCE TO DRAIN DIODE FORWARD VOLTAGE





# TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



[MEMO]

**NEC** 2SK3105

[MEMO]

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