

MOS FIELD EFFECT TRANSISTOR 2SK3577

N-CHANNEL MOS FIELD EFFECT TRANSISTOR FOR SWITCHING

DESCRIPTION

The 2SK3577 is a switching device which can be driven directly by a 2.5 V power source.

The device 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

- 2.5 V drive available
- Low on-state resistance

RDS(on)1 = 63 m Ω MAX. (VGS = 4.5 V, ID = 2.0 A)

 $R_{DS(on)2} = 65 \text{ m}\Omega \text{ MAX.} \text{ (Vgs} = 4.0 \text{ V, ID} = 2.0 \text{ A)}$

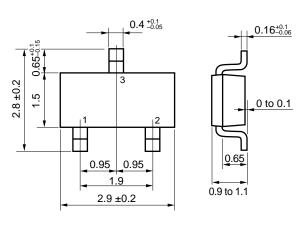
 $R_{DS(on)3} = 91 \text{ m}\Omega \text{ MAX.} \text{ (Vgs} = 2.5 \text{ V, ID} = 2.0 \text{ A)}$

ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3577	SC-96 (Mini Mold Thin Type)

Marking: XL

PACKAGE DRAWING (Unit: mm)

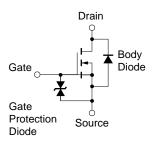


1 : Gate 2 : Source 3 : Drain

ABSOLUTE MAXIMUM RATINGS (TA = 25°C)

Drain to Source Voltage (Vos = 0 V)	Voss	30	V
Gate to Source Voltage (Vps = 0 V)	Vgss	±12	V
Drain Current (DC) (T _A = 25°C)	ID(DC)	±3.5	Α
Drain Current (pulse) Note1	D(pulse)	±14	Α
Total Power Dissipation (T _A = 25°C)	P _{T1}	0.2	W
Total Power Dissipation (T _A = 25°C) Note2	P _{T2}	1.25	W
Channel Temperature	Tch	150	°C
Storage Temperature	Tstg	-55 to +150	°C

EQUIVALENT CIRCUIT



- **Notes 1.** PW \leq 10 μ 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.

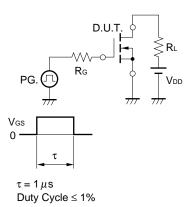
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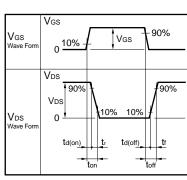


ELECTRICAL CHARACTERISTICS (TA = 25°C)

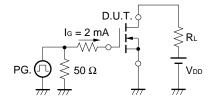
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CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	Ipss	V _{DS} = 30 V, V _{GS} = 0 V			10	μΑ
Gate Leakage Current	Igss	$V_{GS} = \pm 12 \text{ V}, V_{DS} = 0 \text{ V}$			±10	μΑ
Gate Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1.0 mA	0.5	1.0	1.5	V
Forward Transfer Admittance	yfs	V _{DS} = 10 V, I _D = 2.0 A	1.0	4.9		S
Drain to Source On-state Resistance	R _{DS(on)1}	Vgs = 4.5 V, ID = 2.0 A		50	63	mΩ
	RDS(on)2	Vgs = 4.0 V, ID = 2.0 A		52	65	mΩ
	R _{DS(on)3}	Vgs = 2.5 V, ID = 2.0 A		68	91	mΩ
Input Capacitance	Ciss	V _{DS} = 10 V		260		pF
Output Capacitance	Coss	Vgs = 0 V		60		pF
Reverse Transfer Capacitance	Crss	f = 1.0 MHz		35		pF
Turn-on Delay Time	t _{d(on)}	VDD = 10 V, ID = 2.0 A		28		ns
Rise Time	tr	Vgs = 4.0 V		200		ns
Turn-off Delay Time	t _{d(off)}	$R_G = 10 \Omega$		80		ns
Fall Time	tf			120		ns
Total Gate Charge	QG	VDD = 24 V		3.0		nC
Gate to Source Charge	Qgs	Vgs = 4.0 V		0.8		nC
Gate to Drain Charge	Q _{GD}	ID = 3.5 A		1.2		nC
Body Diode Forward Voltage	V _F (S-D)	IF = 3.5 A, VGS = 0 V		0.89		V

TEST CIRCUIT 1 SWITCHING TIME



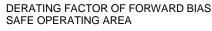


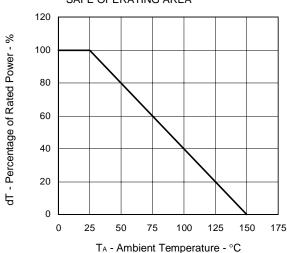
TEST CIRCUIT 2 GATE CHARGE



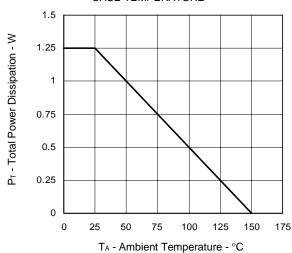


TYPICAL CHARACTERISTICS (TA = 25°C)

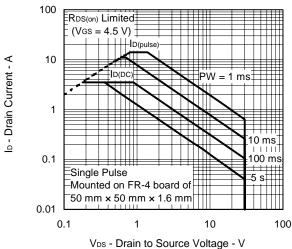




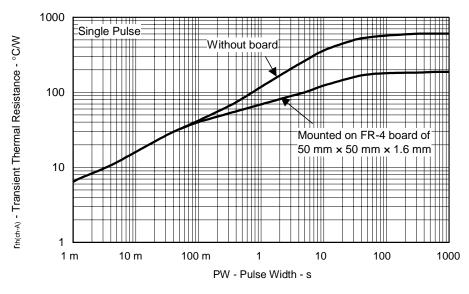
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



FORWARD BIAS SAFE OPERATING AREA



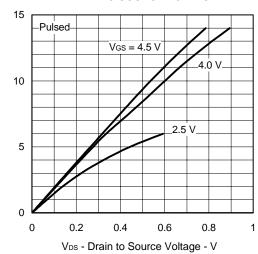
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



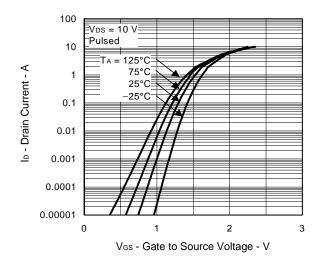
3

lo - Drain Current - A

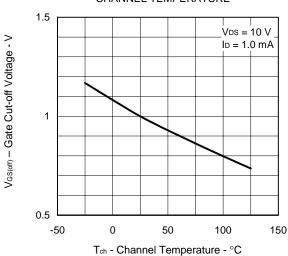
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



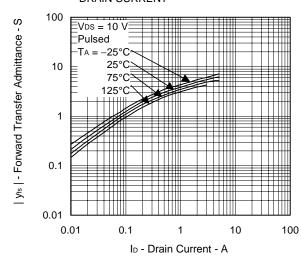
FORWARD TRANSFER CHARACTERISTICS



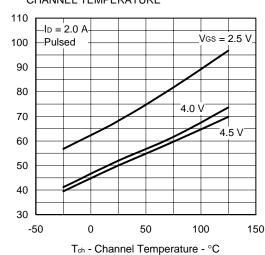
GATE CUT-OFF VOLTAGE vs. CHANNEL TEMPERATURE



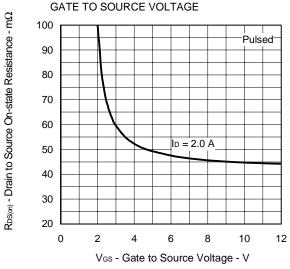
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



DRAIN TO SOURCE ON-STATE RESISTANCE vs.



RDS(m) - Drain to Source On-state Resistance - m\Omega

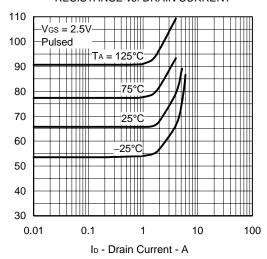




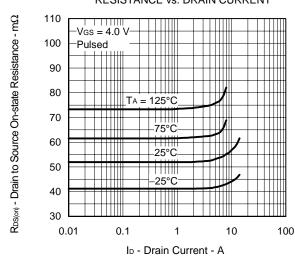
RDS(on) - Drain to Source On-state Resistance - m\Omega

don, tr, td(df), tr - Switching Time - ns

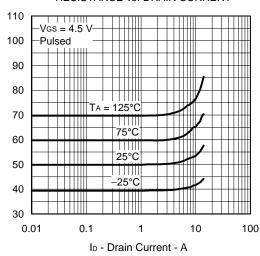
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



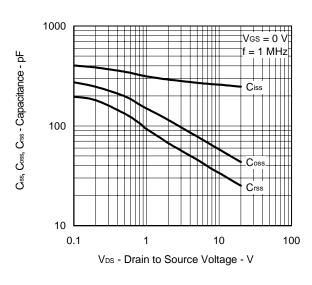
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



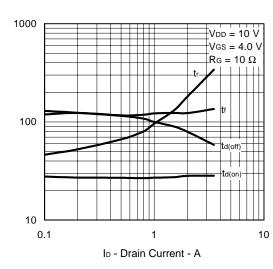
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



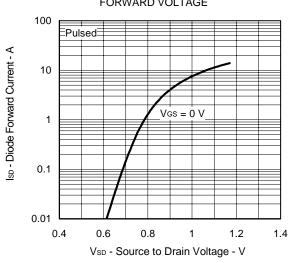
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



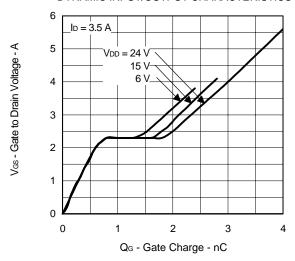
SWITCHING CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE



DYNAMIC INPUT/OUTPUT CHARACTERISTICS



[MEMO]

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