NEC

MOS FIELD EFFECT TRANSISTOR
2SK3386

SWITCHING
N-CHANNEL POWER MOS FET
INDUSTRIAL USE

DESCRIPTION

The 2SK3386 is N-Channel MOS Field Effect Transistor designed for high current switching applications.

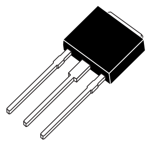
ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3386	TO-251
2SK3386-Z	TO-252

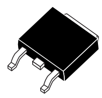
FEATURES

- Low On-state Resistance
- ★ $R_{DS(on)1}$ = 21 mΩ MAX. (V_{GS} = 10 V, I_D = 17 A)
- ★ $R_{DS(on)2}$ = 36 mΩ MAX. (V_{GS} = 4.0 V, I_D = 17 A)
- Low C_{iss} : C_{iss} = 2100 pF TYP.
- Built-in Gate Protection Diode
- TO-251/TO-252 package

(TO-251)



(TO-252)



ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

	Parameter	Symbol	Rating	Unit
	Drain to Source Voltage	V_{DSS}	60	V
	Gate to Source Voltage	V_{GSS}	±20	V
	Drain Current (DC)	$I_{D(DC)}$	±34	A
★	Drain Current (Pulse) Note1	$I_{D(pulse)}$	±120	A
★	Total Power Dissipation (T_C = 25°C)	P_T	40	W
	Total Power Dissipation (T_A = 25°C)	P_T	1.0	W
	Channel Temperature	T_{ch}	150	°C
	Storage Temperature	T_{stg}	–55 to +150	°C
★	Single Avalanche Current Note2	I_{AS}	28	A
★	Single Avalanche Energy Note2	E_{AS}	78	mJ

Notes 1. PW ≤ 10 μs, Duty cycle ≤ 1 %

2. Starting T_{ch} = 25 °C, R_G = 25 Ω, V_{GS} = 20 V → 0 V

THERMAL RESISTANCE

	Parameter	Symbol	Value	Unit
★	Channel to Case	$R_{th(ch-C)}$	3.13	°C/W
	Channel to Ambient	$R_{th(ch-A)}$	125	°C/W

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Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

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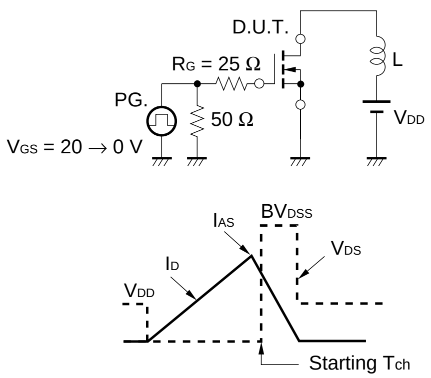
The mark ★ shows major revised points.

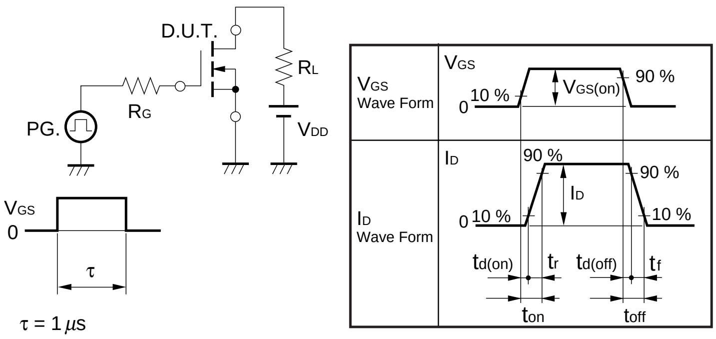
★ ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain to Source On-state Resistance	$R_{DS(on)1}$	V_{GS} = 10 V, I_D = 17 A		17	21	mΩ
	$R_{DS(on)2}$	V_{GS} = 4.0 V, I_D = 17 A		25	36	mΩ
Gate to Source Cut-off Voltage	$V_{GS(off)}$	V_{DS} = 10 V, I_D = 1 mA	1.5	2.0	2.5	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS} = 10 V, I_D = 17 A	10	19		S
Drain Leakage Current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V			10	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0 V			±10	μA
Input Capacitance	C_{iss}	V_{DS} = 10 V		2100		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V		340		pF
Reverse Transfer Capacitance	C_{rss}	f = 1 MHz		170		pF
Turn-on Delay Time	$t_{d(on)}$	I_D = 17 A		32		ns
Rise Time	t_r	$V_{GS(on)}$ = 10 V		310		ns
Turn-off Delay Time	$t_{d(off)}$	V_{DD} = 30 V		98		ns
Fall Time	t_f	R_G = 10 Ω		100		ns
Total Gate Charge	Q_G	I_D = 34 A		39		nC
Gate to Source Charge	Q_{GS}	V_{DD} = 48 V		7.0		nC
Gate to Drain Charge	Q_{GD}	$V_{GS(on)}$ = 10 V		12		nC
Body Diode Forward Voltage	$V_{F(S-D)}$	I_F = 34 A, V_{GS} = 0 V		0.87		V
Reverse Recovery Time	t_{rr}	I_F = 34 A, V_{GS} = 0 V		46		ns
Reverse Recovery Charge	Q_{rr}	di/dt = 100 A/μs		84		nC

TEST CIRCUIT 1 AVALANCHE CAPABILITY

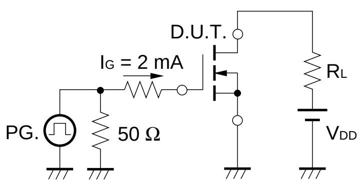


TEST CIRCUIT 2 SWITCHING TIME



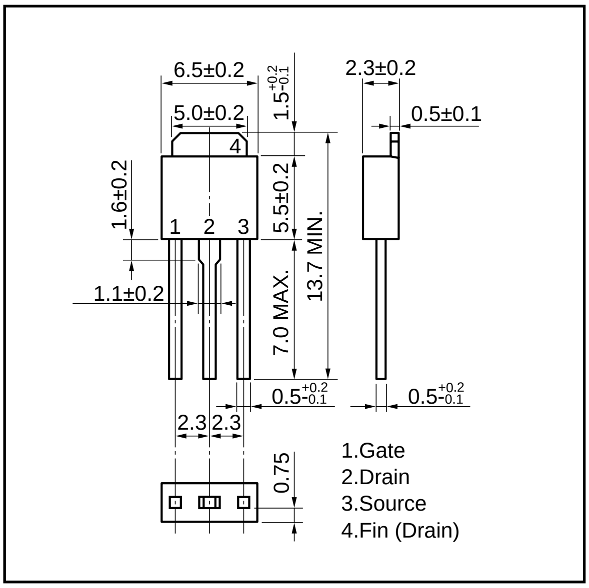
τ = 1 μs
Duty Cycle ≤ 1 %

TEST CIRCUIT 3 GATE CHARGE

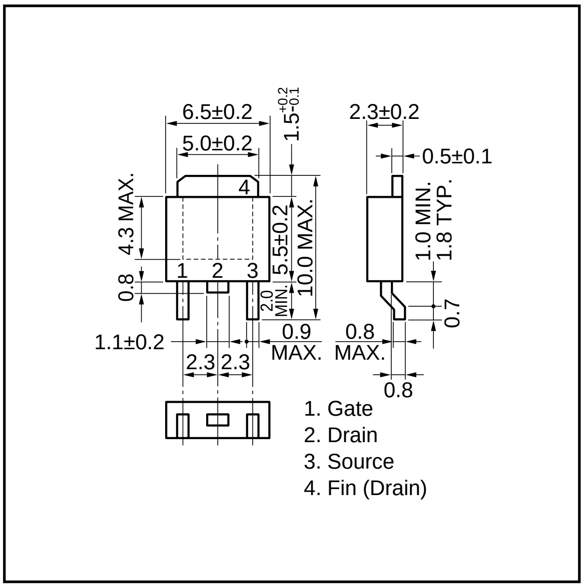


PACKAGE DRAWINGS (Unit : mm)

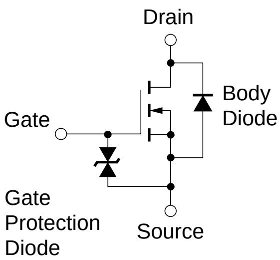
1) TO-251 (MP-3)



2) TO-252 (MP-3Z)



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.