

MOS FIELD EFFECT TRANSISTOR 2SK3507

SWITCHING N-CHANNEL POWER MOS FET INDUSTRIAL USE

DESCRIPTION

The 2SK3507 is N-channel MOS FET device that features a low on-state resistance and excellent switching characteristics, designed for low voltage high current applications such as DC/DC converter with synchronous rectifier.

FEATURES

- 4.5 V drive available
- Low on-state resistance,
 $R_{DS(on)1} = 50 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 11 \text{ A)}$
- Low gate charge
 $Q_G = 8 \text{ nC TYP. (} V_{DD} = 24 \text{ V, } V_{GS} = 10 \text{ V, } I_D = 22 \text{ A)}$
- Built-in gate protection diode
- Surface mount device available

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

Drain to Source Voltage ($V_{GS} = 0 \text{ V}$)	V_{DSS}	30	V
Gate to Source Voltage ($V_{DS} = 0 \text{ V}$)	V_{GSS}	± 16	V
Drain Current (DC) ($T_C = 25^\circ\text{C}$)	$I_{D(DC)}$	± 22	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	± 88	A
Total Power Dissipation ($T_C = 25^\circ\text{C}$)	P_{T1}	20	W
Total Power Dissipation ^{Note2}	P_{T2}	1.5	W
Total Power Dissipation ($T_A = 25^\circ\text{C}$)	P_{T3}	1.0	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

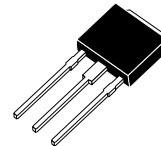
Notes1. $PW \leq 10 \mu\text{s}$, Duty Cycle $\leq 1\%$

2. $T_A = 25^\circ\text{C}$, mounted on FR-4 board of $1225 \text{ mm}^2 \times 1.6 \text{ mm}$

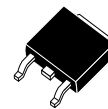
ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3507	TO-251
2SK3507-Z	TO-252

(TO-251)



(TO-252)

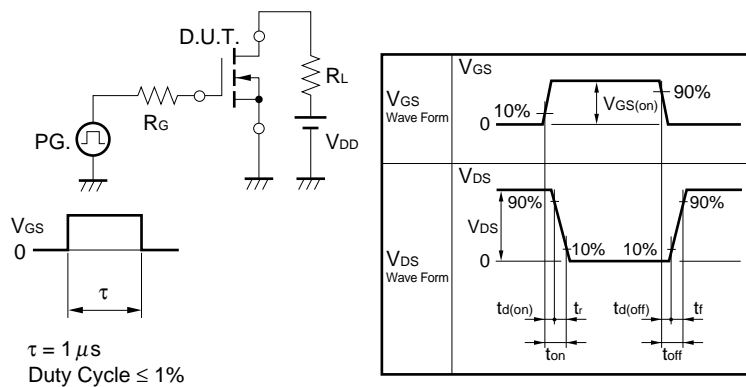


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 Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

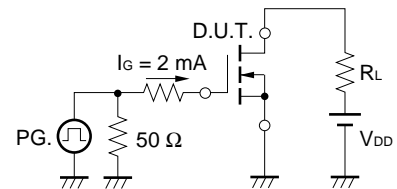
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain 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	1.5		2.5	V
Forward Transfer Admittance	y _{fs}	V _{DS} = 10 V, I _D = 11 A	2.5			S
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = 10 V, I _D = 11 A		40	50	mΩ
	R _{DS(on)2}	V _{GS} = 4.5 V, I _D = 11 A		55	73	mΩ
Input Capacitance	C _{iss}	V _{DS} = 10 V		250		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V		100		pF
Reverse Transfer Capacitance	C _{rss}	f = 1 MHz		50		pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 15 V, I _D = 11 A		18		ns
Rise Time	t _r	V _{GS(on)} = 10 V		8		ns
Turn-off Delay Time	t _{d(off)}	R _G = 10 Ω		48		ns
Fall Time	t _f			10		ns
Total Gate Charge	Q _G	V _{DD} = 24 V		8		nC
Gate to Source Charge	Q _{GS}	V _{GS} = 10 V		2		nC
Gate to Drain Charge	Q _{GD}	I _D = 22 A		3		nC
Body Diode Forward Voltage	V _{F(S-D)}	I _F = 22 A, V _{GS} = 0 V		1.0		V
Reverse Recovery Time	t _{rr}	I _F = 22 A, V _{GS} = 0 V		8.7		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		7.8		nC

TEST CIRCUIT 1 SWITCHING TIME

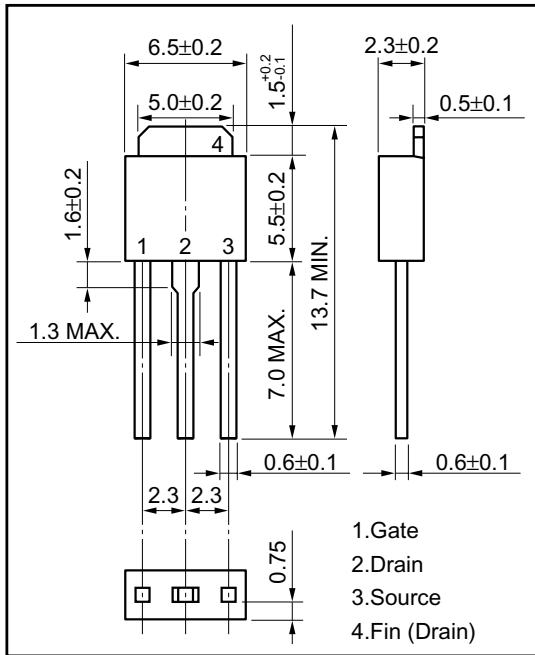


TEST CIRCUIT 2 GATE CHARGE

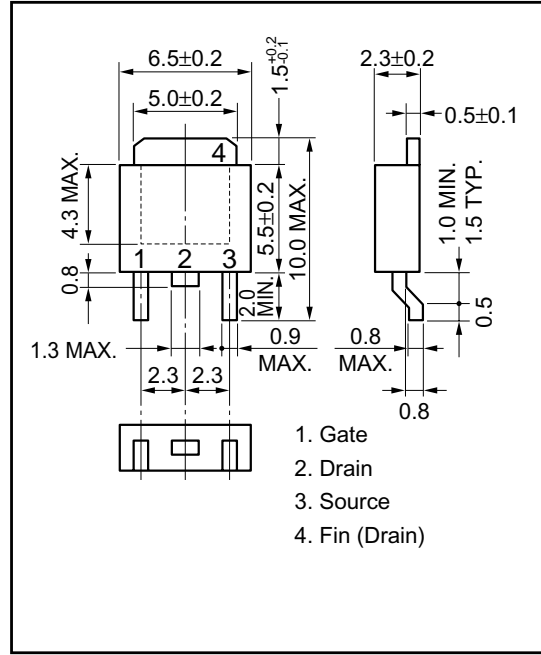


PACKAGE DRAWINGS (Unit : mm)

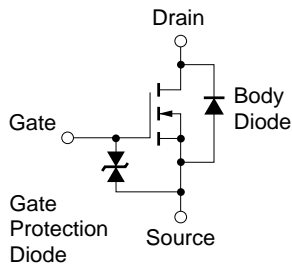
1)TO-251



2)TO-252



EQUIVALENT CIRCUIT



Caution Strong electric field, when exposed to this device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop generation of static electricity as much as possible, and quickly dissipate it once, when it has occurred.

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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