



MOS FIELD EFFECT TRANSISTOR

2SK3433

SWITCHING
N-CHANNEL POWER MOS FET
INDUSTRIAL USE

DESCRIPTION

The 2SK3433 is N-channel MOS Field Effect Transistor designed for high current switching applications.

FEATURES

- Super low on-state resistance:
 $R_{DS(on)1} = 26 \text{ m}\Omega \text{ MAX. (}V_{GS} = 10 \text{ V, } I_D = 20 \text{ A}\text{)}$
- ★ $R_{DS(on)2} = 41 \text{ m}\Omega \text{ MAX. (}V_{GS} = 4.0 \text{ V, } I_D = 20 \text{ A}\text{)}$ (TO-220AB)
- Low C_{iss} : $C_{iss} = 1500 \text{ pF TYP.}$
- Built-in gate protection diode

ORDERING INFORMATION

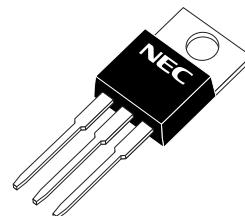
PART NUMBER	PACKAGE
2SK3433	TO-220AB
2SK3433-S	TO-262
2SK3433-Z	TO-220SMD

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

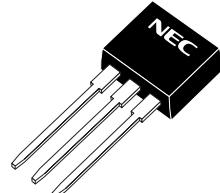
Drain to Source Voltage	V_{DSS}	60	V
Gate to Source Voltage	V_{GSS}	± 20	V
Drain Current (DC)	$I_{D(DC)}$	± 40	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	± 160	A
★ Total Power Dissipation (T _c = 25°C)	P_T	47	W
Total Power Dissipation (T _A = 25°C)	P_T	1.5	W
Channel Temperature	T _{ch}	150	°C
Storage Temperature	T _{stg}	-55 to +150	°C
★ Single Avalanche Current ^{Note2}	I _{AS}	21	A
★ Single Avalanche Energy ^{Note2}	E _{AS}	44	mJ

Notes 1. PW ≤ 10 μ s, Duty cycle ≤ 1 %

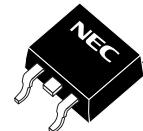
2. Starting T_{ch} = 25 °C, R_G = 25 Ω , V_{GS} = 20 V → 0 V



(TO-262)



(TO-220SMD)

**THERMAL RESISTANCE**

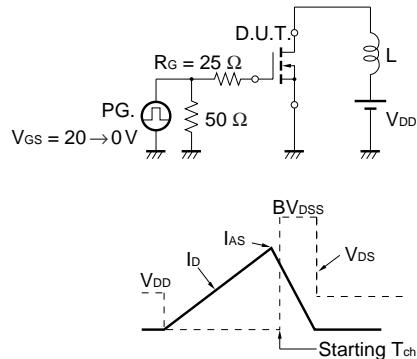
★ Channel to Case	R _{th(ch-C)}	2.66	°C/W
Channel to Ambient	R _{th(ch-A)}	83.3	°C/W

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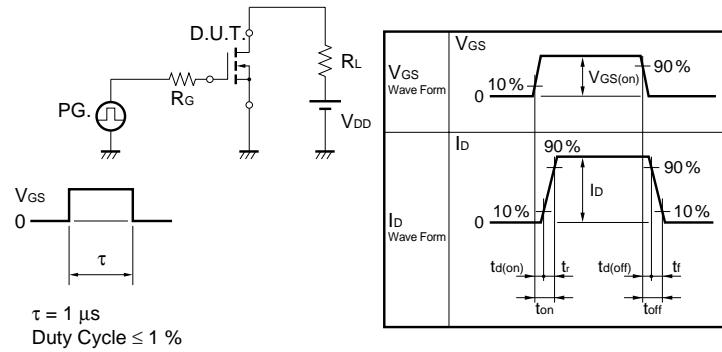
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ C$)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
★ Drain to Source On-state Resistance	$R_{DS(on)1}$	$V_{GS} = 10 V, I_D = 20 A$		22	26	$m\Omega$
	$R_{DS(on)2}$	$V_{GS} = 4.0 V, I_D = 20 A$		29	41	$m\Omega$
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} $	$V_{DS} = 10 V, I_D = 20 A$	11	22		S
Drain Leakage Current	I_{DSS}	$V_{DS} = 60 V, V_{GS} = 0 V$			10	μA
Gate to Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20 V, V_{DS} = 0 V$			± 10	μA
Input Capacitance	C_{iss}	$V_{DS} = 10 V, V_{GS} = 0 V, f = 1 MHz$		1500		pF
Output Capacitance	C_{oss}			250		pF
Reverse Transfer Capacitance	C_{rss}			120		pF
★ Turn-on Delay Time	$t_{d(on)}$	$I_D = 20 A, V_{GS(on)} = 10 V, V_{DD} = 30 V$ $R_G = 10 \Omega$		35		ns
★ Rise Time	t_r			320		ns
★ Turn-off Delay Time	$t_{d(off)}$			89		ns
★ Fall Time	t_f			120		ns
Total Gate Charge	Q_G	$I_D = 40 A, V_{DD} = 48 V, V_{GS} = 10 V$		30		nC
Gate to Source Charge	Q_{GS}			5		nC
Gate to Drain Charge	Q_{GD}			8		nC
Body Diode Forward Voltage	$V_{F(S-D)}$	$I_F = 40 A, V_{GS} = 0 V$		1.0		V
★ Reverse Recovery Time	t_{rr}	$I_F = 40 A, V_{GS} = 0 V$, $di/dt = 100 A/\mu s$		44		ns
★ Reverse Recovery Charge	Q_{rr}			60		nC

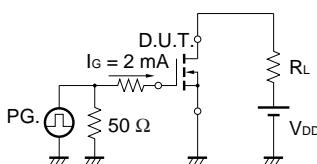
TEST CIRCUIT 1 AVALANCHE CAPABILITY



TEST CIRCUIT 2 SWITCHING TIME

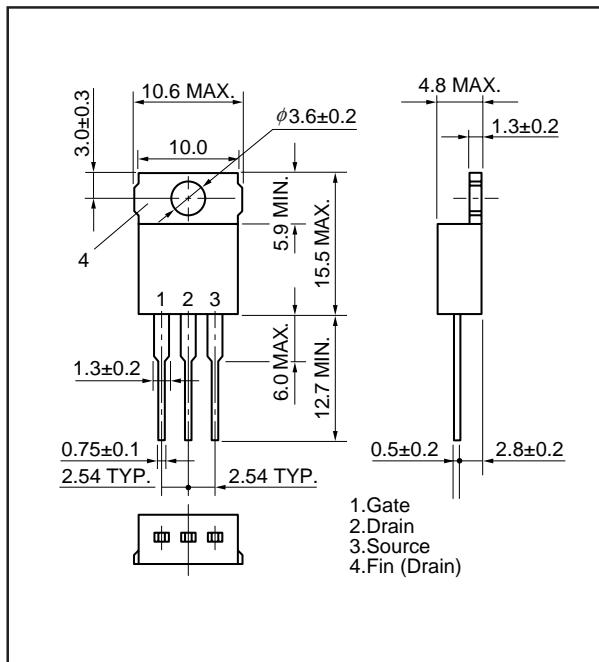


TEST CIRCUIT 3 GATE CHARGE

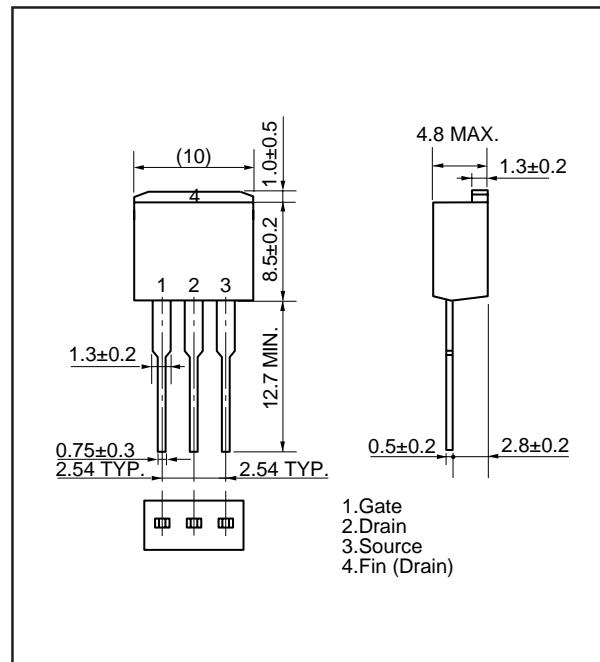


PACKAGE DRAWINGS (Unit: mm)

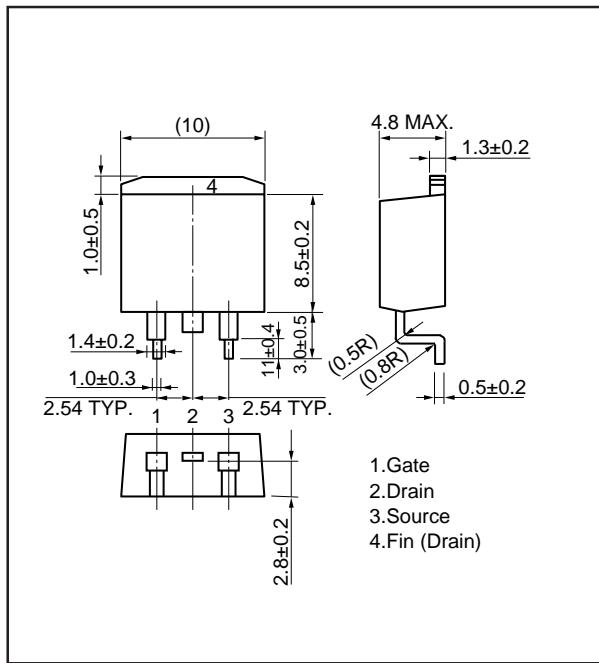
1) TO-220AB (MP-25)



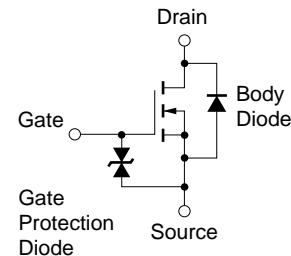
2) TO-262 (MP-25 Fin Cut)



3) TO-220SMD (MP-25Z)



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.

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