

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

ABSOLUTE MAXIMUM RATINGS (TA = 25°C)

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	Drain to Source Voltage	VDSS	60	V
	Gate to Source Voltage	Vgss	±20	V
	Drain Current (DC)	D(DC)	±40	А
	Drain Current (pulse) Note1	D(pulse)	±160	А
k	Total Power Dissipation (Tc = 25°C)	Рт	47	W
	Total Power Dissipation ($T_A = 25^{\circ}C$)	Рт	1.5	W
	Channel Temperature	Tch	150	°C
	Storage Temperature	Tstg	–55 to +150	°C
k	Single Avalanche Current Note2	las	21	А
k	Single Avalanche Energy ^{Note2}	Eas	44	mJ

Notes 1. PW \leq 10 $\mu s,$ Duty cycle \leq 1 %

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

THERMAL RESISTANCE

\star	Channel to Case	Rth(ch-C)	2.66	°C/W
	Channel to Ambient	Rth(ch-A)	83.3	°C/W

ORDERING INFORMATION

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





(TO-220SMD)



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CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain to Source On-state Resistance	RDS(on)1	Vgs = 10 V, Id = 20 A		22	26	mΩ
	RDS(on)2	Vgs = 4.0 V, Id = 20 A		29	41	mΩ
Gate to Source Cut-off Voltage	V _{GS(off)}	Vds = 10 V, Id = 1 mA	1.5	2.0	2.5	V
Forward Transfer Admittance	y fs	Vds = 10 V, Id = 20 A	11	22		S
Drain Leakage Current	loss	Vds = 60 V, Vgs = 0 V			10	μA
Gate to Source Leakage Current	lgss	$V_{GS} = \pm 20 \text{ V}, V_{DS} = 0 \text{ V}$			±10	μA
nput Capacitance	Ciss	Vbs = 10 V, Vgs = 0 V, f = 1 MHz		1500		pF
Output Capacitance	Coss			250		pF
Reverse Transfer Capacitance	Crss			120		pF
Turn-on Delay Time	td(on)	$I_{D} = 20 \text{ A}, \text{ V}_{\text{GS(on)}} = 10 \text{ V}, \text{ V}_{\text{DD}} = 30 \text{ V},$		35		ns
Rise Time	tr	R _G = 10 Ω		320		ns
Turn-off Delay Time	td(off)			89		ns
Fall Time	tr			120		ns
Total Gate Charge	QG	$ID=40\;A$, $VDD=48\;V,VGs=10\;V$		30		nC
Gate to Source Charge	Q _{GS}			5		nC
Gate to Drain Charge	Qgd			8		nC
Body Diode Forward Voltage	VF(S-D)	IF = 40 A, VGS = 0 V		1.0		V
Reverse Recovery Time	trr	IF = 40 A, VGS = 0 V,		44		ns
Reverse Recovery Charge	Qrr	di/dt = 100 A/µs		60		nC

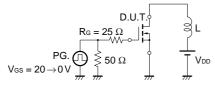
ELECTRICAL CHARACTERISTICS ($T_A = 25 \degree$ C)

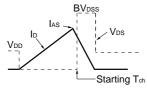
NEC

TEST CIRCUIT 1 AVALANCHE CAPABILITY

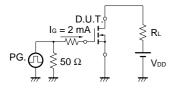
TEST CIRCUIT 2 SWITCHING TIME

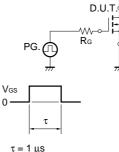
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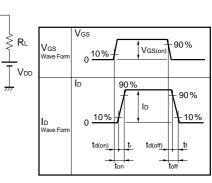


TEST CIRCUIT 3 GATE CHARGE





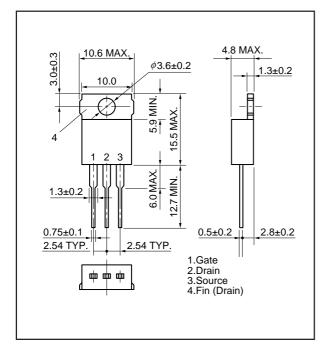
 $\begin{array}{l} \tau = 1 \; \mu s \\ \text{Duty Cycle} \leq 1 \; \% \end{array}$



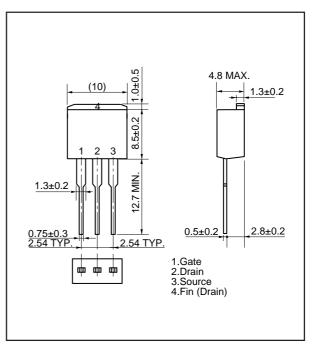
Preliminary Data Sheet D14602EJ1V0DS00

PACKAGE DRAWINGS (Unit: mm)

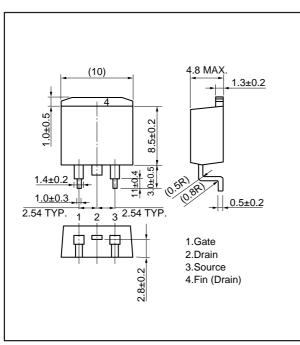
1) TO-220AB (MP-25)



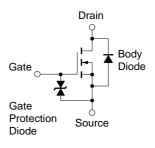
2) TO-262 (MP-25 Fin Cut)



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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