

SWITCHING
N-CHANNEL POWER MOS FET
INDUSTRIAL USE

DESCRIPTION

The 2SK3434 is N-channel MOS Field Effect Transistor designed for high current switching applications.

FEATURES

- Super low on-state resistance:
 $R_{DS(on)1} = 20 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 24 \text{ A)}$
- ★ $R_{DS(on)2} = 31 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.0 \text{ V, } I_D = 24 \text{ A)}$
- Low C_{iss} : $C_{iss} = 2100 \text{ pF TYP.}$
- Built-in gate protection diode

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)	$I_{D(DC)}$	±48	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	±192	A
★ Total Power Dissipation (T _C = 25°C)	P_T	56	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}	28	A
★ Single Avalanche Energy ^{Note2}	E_{AS}	78	mJ

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

2. Starting $T_{ch} = 25 \text{ }^\circ\text{C}$, $R_G = 25 \text{ }\Omega$, $V_{GS} = 20 \text{ V} \rightarrow 0 \text{ V}$

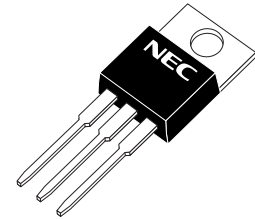
THERMAL RESISTANCE

★ Channel to Case	$R_{th(ch-C)}$	2.23	°C/W
Channel to Ambient	$R_{th(ch-A)}$	83.3	°C/W

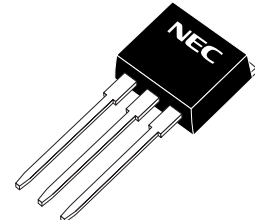
ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3434	TO-220AB
2SK3434-S	TO-262
2SK3434-Z	TO-220SMD

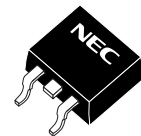
(TO-220AB)



(TO-262)



(TO-220SMD)



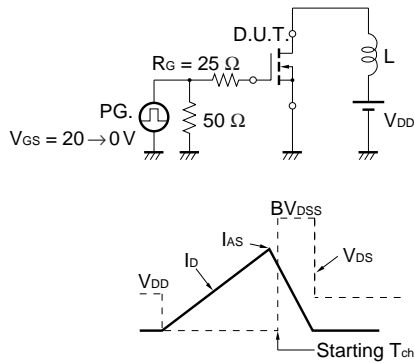
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Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

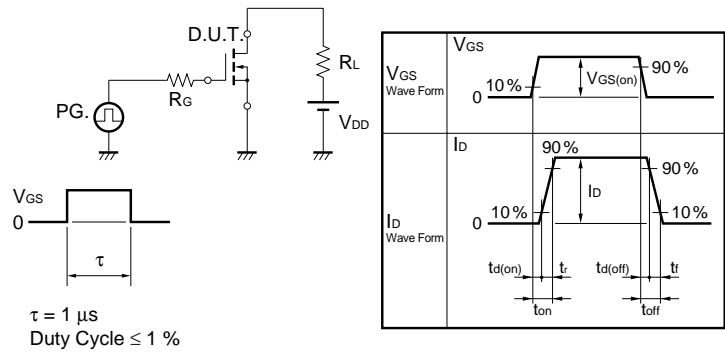
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
★ Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = 10 V, I _D = 24 A		16	20	mΩ
	R _{DS(on)2}	V _{GS} = 4.0 V, I _D = 24 A		22	31	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 = 24 A	13	27		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, V _{GS} = 0 V, f = 1 MHz		2100		pF
★ Output Capacitance	C _{oss}			340		pF
Reverse Transfer Capacitance	C _{rss}			170		pF
★ Turn-on Delay Time	t _{d(on)}	I _D = 24 A, V _{GS(on)} = 10 V, V _{DD} = 30 V, R _G = 10 Ω		40		ns
★ Rise Time	t _r			400		ns
★ Turn-off Delay Time	t _{d(off)}			120		ns
★ Fall Time	t _f			160		ns
Total Gate Charge	Q _G	I _D = 48 A, V _{DD} = 48 V, V _{GS} = 10 V		40		nC
Gate to Source Charge	Q _{GS}			7		nC
★ Gate to Drain Charge	Q _{GD}			11		nC
Body Diode Forward Voltage	V _{F(S-D)}	I _F = 48 A, V _{GS} = 0 V		1.0		V
★ Reverse Recovery Time	t _{rr}	I _F = 48 A, V _{GS} = 0 V, di/dt = 100 A/μs		43		ns
★ Reverse Recovery Charge	Q _{rr}			61		nC

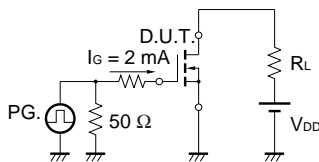
TEST CIRCUIT 1 AVALANCHE CAPABILITY



TEST CIRCUIT 2 SWITCHING TIME

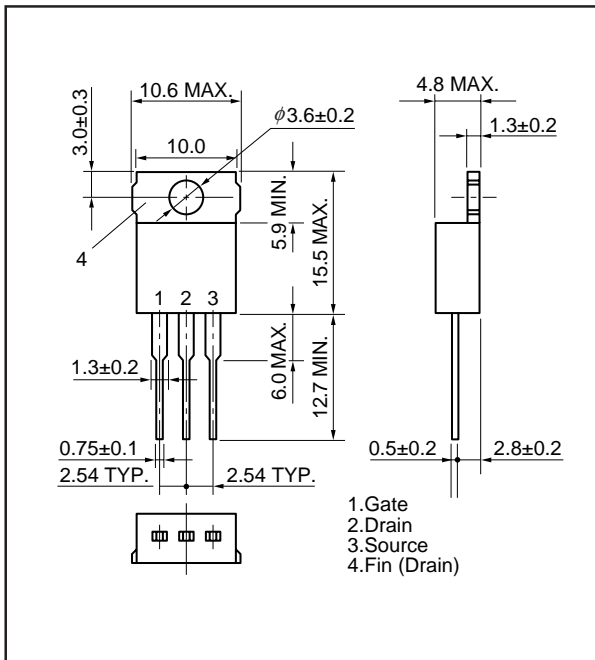


TEST CIRCUIT 3 GATE CHARGE

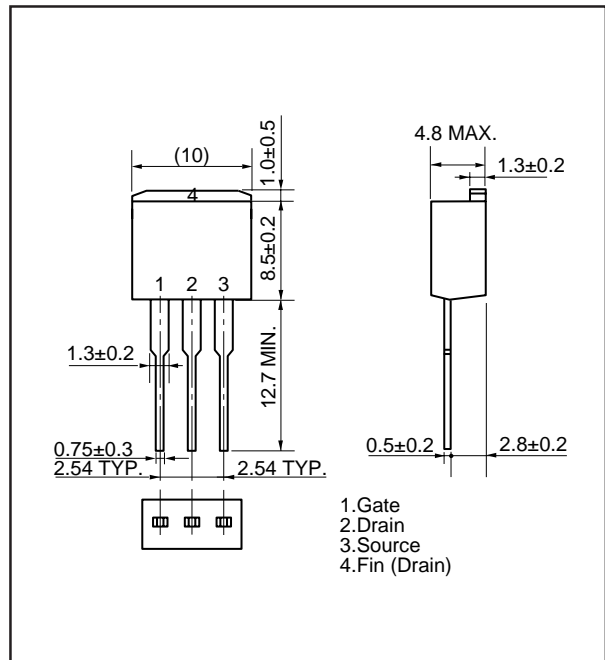


PACKAGE DRAWINGS (Unit: mm)

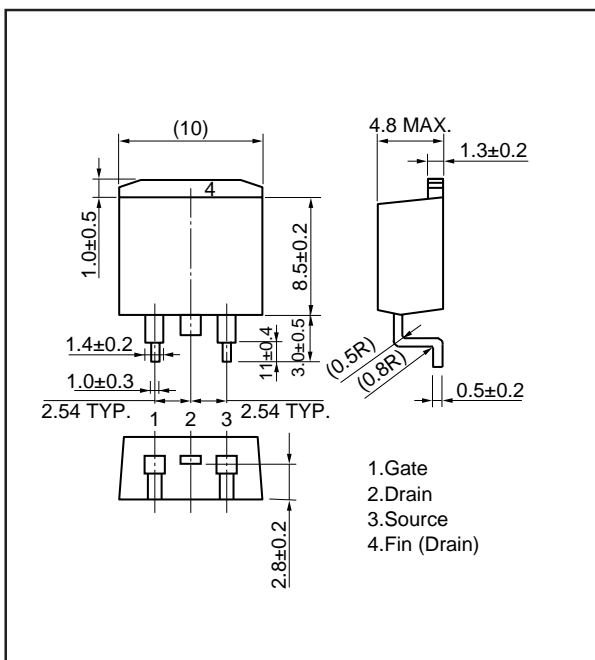
1) TO-220AB (MP-25)



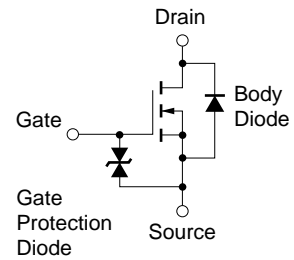
2) TO-262 (MP-25 Fin Cut)



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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