

MOS FIELD EFFECT TRANSISTOR

2SK3204

SWITCHING

N-CHANNEL POWER MOS FET

INDUSTRIAL USE

DESCRIPTION

The 2SK3204 is N-Channel MOS Field Effect Transistor designed for high current switching applications.

★ ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3204	MP-10

★ FEATURES

- Low on-state resistance :
 $R_{DS(on)1} = 34 \text{ m}\Omega$ (MAX.) ($V_{GS} = 10 \text{ V}$, $I_D = 8 \text{ A}$)
 $R_{DS(on)2} = 50 \text{ m}\Omega$ (MAX.) ($V_{GS} = 4 \text{ V}$, $I_D = 8 \text{ A}$)
- Low C_{iss} : $C_{iss} = 940 \text{ pF}$ (TYP.)
- Built-in gate protection diode.

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

Drain to Source Voltage	V_{DSS}	60	V
Gate to Source Voltage	$V_{GSS(AC)}$	± 20	V
Gate to Source Voltage	$V_{GSS(DC)}$	+20, -10	V
Drain Current (DC)	$I_{D(DC)}$	± 15	A
Drain Current (pulse) ^{Note1}	$I_{D(pulse)}$	± 45	A
Total Power Dissipation ($T_A = 25 \text{ }^\circ\text{C}$)	P_T	1.8	W
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$
★ Single Avalanche Current ^{Note2}	I_{AS}	15	A
★ Single Avalanche Energy ^{Note2}	E_{AS}	22.5	mJ

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

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

THERMAL RESISTANCE

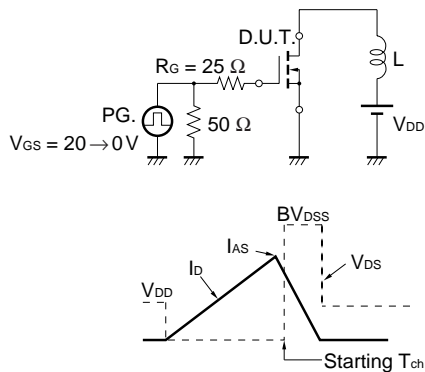
Channel to Ambient	$R_{th(ch-A)}$	69.4	$^\circ\text{C/W}$
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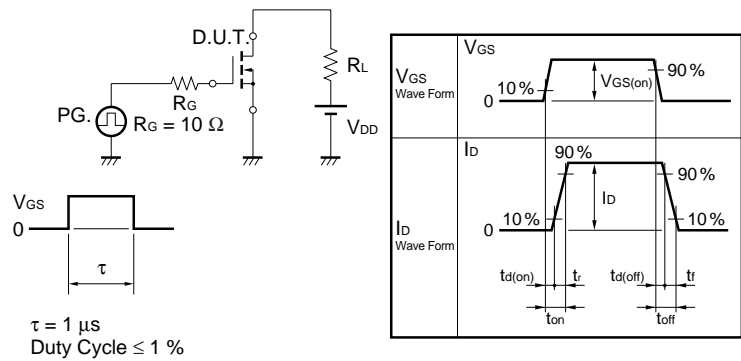
★ ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

PARAMETERS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain to Source On-state Resistance	R _{DS(on)1}	V _{GS} = 10 V, I _D = 8 A		25	34	mΩ
	R _{DS(on)2}	V _{GS} = 4 V, I _D = 8 A		35	50	mΩ
Gate to Source Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1 mA	1.0	1.5	2.0	V
Forward Transfer Admittance	y _{fs}	V _{DS} = 10 V, I _D = 8 A	8.0	14		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		940		pF
Output Capacitance	C _{oss}			290		pF
Reverse Transfer Capacitance	C _{rss}			120		pF
Turn-on Delay Time	t _{d(on)}	I _D = 8 A, V _{GS(on)} = 10 V, V _{DD} = 30 V, R _G = 10 Ω		17		ns
Rise Time	t _r			150		ns
Turn-off Delay Time	t _{d(off)}			58		ns
Fall Time	t _f			52		ns
Total Gate Charge	Q _G	I _D = 15 A, V _{DD} = 48 V, V _{GS(on)} = 10 V		25		nC
Gate to Source Charge	Q _{GS}			2.9		nC
Gate to Drain Charge	Q _{GD}			7.5		nC
Body Diode Forward Voltage	V _{F(S-D)}	I _F = 15 A, V _{GS} = 0 V		0.92		V
Reverse Recovery Time	t _{rr}	I _F = 15 A, V _{GS} = 0 V, di/dt = 100 A/μs		45		ns
Reverse Recovery Charge	Q _{rr}			81		nC

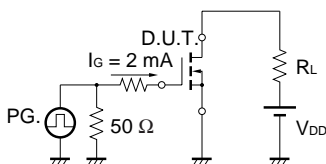
★ TEST CIRCUIT 1 AVALANCHE CAPABILITY



★ TEST CIRCUIT 2 SWITCHING TIME

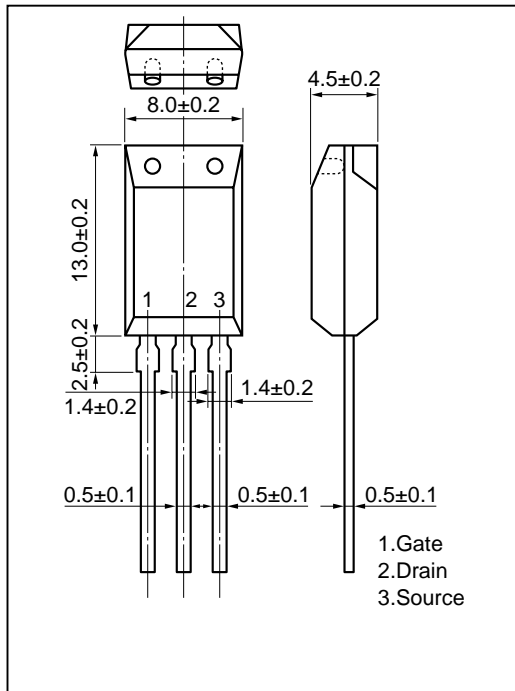


★ TEST CIRCUIT 3 GATE CHARGE

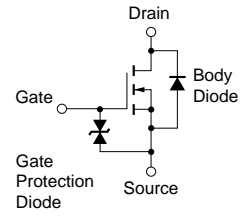


PACKAGE DRAWING (Unit : mm)

MP-10



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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