

MOS FIELD EFFECT TRANSISTOR

2SK3481

SWITCHING N-CHANNEL POWER MOS FET

DESCRIPTION

The 2SK3481 is N-channel MOS Field Effect Transistor designed for high current switching applications.

FEATURES

- Super low on-state resistance:
- $R_{DS(on)1} = 50 \text{ m}\Omega \text{ MAX.} (V_{GS} = 10 \text{ V}, \text{ ID} = 15 \text{ A})$
- $R \mbox{DS(on)2}$ = 58 m Ω MAX. (VGs = 4.5 V, ID = 15 A)
- Low Ciss: Ciss = 2300 pF TYP.
- Built-in gate protection diode

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage (Vgs = 0 V)	Vdss	100	V
Gate to Source Voltage ($V_{DS} = 0 V$)	Vgss	±20	V
Drain Current (DC) (Tc = 25°C)	D(DC)	±30	А
Drain Current (pulse) ^{Note1}	D(pulse)	±60	А
Total Power Dissipation (Tc = 25°C)	P T1	56	W
Total Power Dissipation (T _A = 25°C)	P T2	1.5	W
Channel Temperature	Tch	150	°C
Storage Temperature	Tstg	-55 to +150	°C
Single Avalanche Current Note2	las	26	А
Single Avalanche Energy Note2	Eas	68	mJ

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

2. Starting T_{ch} = 25°C, V_{DD} = 50 V, R_G = 25 Ω , V_{GS} = 20 \rightarrow 0 V

THERMAL RESISTANCE

Channel to Case Thermal Resistance	Rth(ch-C)	2.23	°C/W
Channel to Ambient Thermal Resistance	Rth(ch-A)	83.3	°C/W

ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3481	TO-220AB
2SK3481-S	TO-262
2SK3481-ZJ	TO-263
2SK3481-Z	TO-220SMD ^{Note}

Note TO-220SMD package is produced only in Japan.

(TO-220AB)



(TO-262)



(TO-263, TO-220SMD)



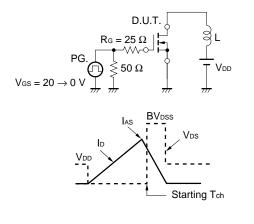
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ELECTRICAL CHARACTERISTICS (T_A = 25°C)

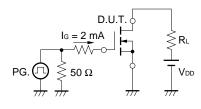
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	IDSS	$V_{DS} = 100 V, V_{GS} = 0 V$			10	μA
Gate Leakage Current	lgss	$V_{GS} = \pm 20 V, V_{DS} = 0 V$			±10	μA
Gate Cut-off Voltage	V _{GS(off)}	V _{DS} = 10 V, I _D = 1 mA	1.5	2.0	2.5	V
Forward Transfer Admittance	y _{fs}	$V_{DS} = 10 V$, $I_D = 15 A$	9	18		S
Drain to Source On-state Resistance	RDS(on)1	$V_{GS} = 10 V$, $I_D = 15 A$		40	50	mΩ
	RDS(on)2	$V_{GS} = 4.5 V, I_D = 15 A$		44	58	mΩ
Input Capacitance	Ciss	V _{DS} = 10 V		2300		pF
Output Capacitance	Coss	V _{GS} = 0 V		230		pF
Reverse Transfer Capacitance	Crss	f = 1 MHz		120		pF
Turn-on Delay Time	td(on)	V _{DD} = 50 V, I _D = 15 A		13		ns
Rise Time	tr	V _{GS} = 10 V		10		ns
Turn-off Delay Time	td(off)	$R_G = 0 \Omega$		53		ns
Fall Time	tr			5.0		ns
Total Gate Charge	QG	VDD = 80 V		48		nC
Gate to Source Charge	QGS	V _{GS} = 10 V		7.0		nC
Gate to Drain Charge	Qgd	ID = 30 A		12		nC
Body Diode Forward Voltage	VF(S-D)	IF = 30 A, VGS = 0 V		1.0		V
Reverse Recovery Time	trr	IF = 30 A, VGS = 0 V		70		ns
Reverse Recovery Charge	Qrr	di/dt = 100 A/ μs		160		nC

TEST CIRCUIT 1 AVALANCHE CAPABILITY

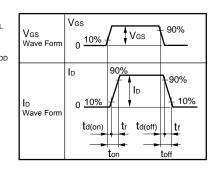
TEST CIRCUIT 2 SWITCHING TIME



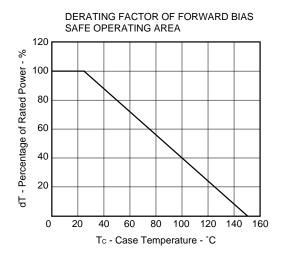
TEST CIRCUIT 3 GATE CHARGE

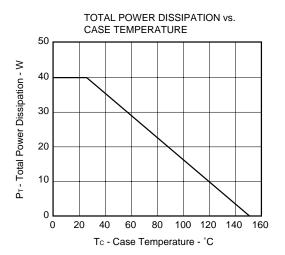


Data Sheet D15063EJ1V0DS

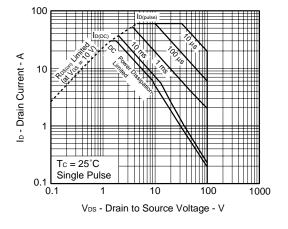


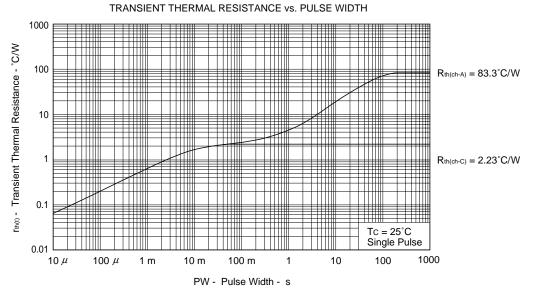
TYPICAL CHARACTERISTICS ($T_A = 25^{\circ}C$)





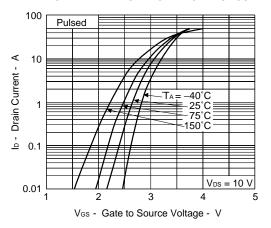
FORWARD BIAS SAFE OPERATING AREA



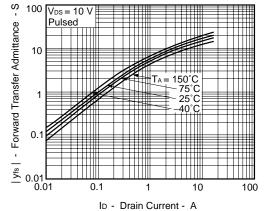


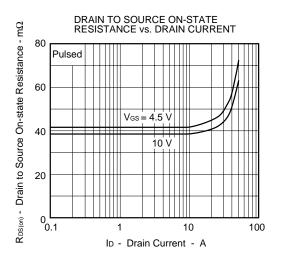
Data Sheet D15063EJ1V0DS

FORWARD TRANSFER CHARACTERISTICS

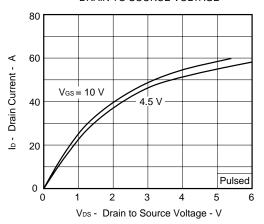




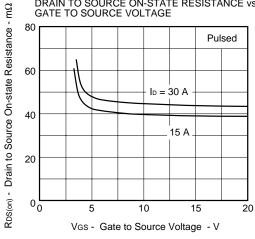




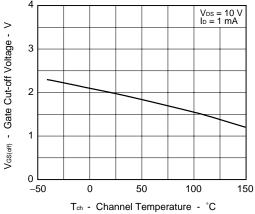
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE

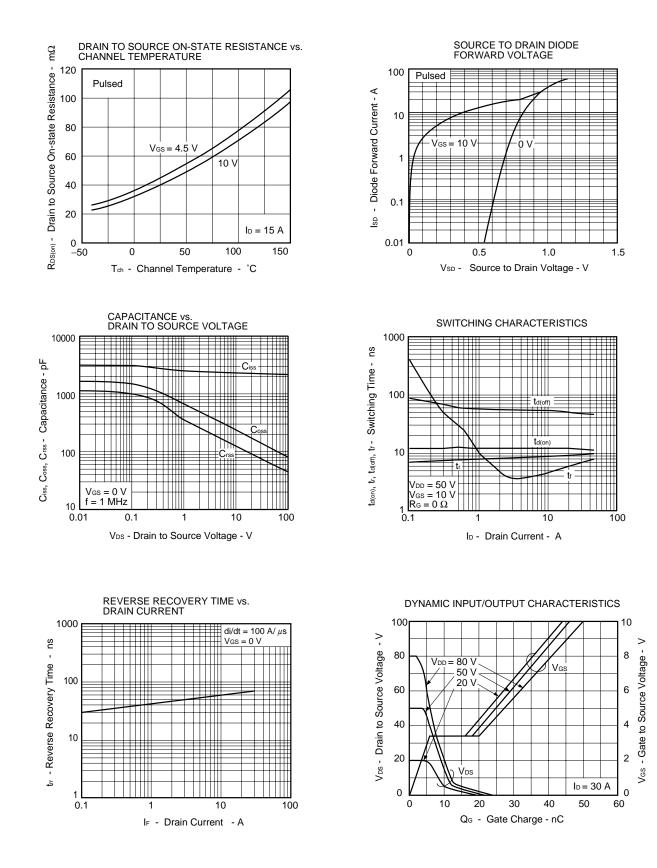


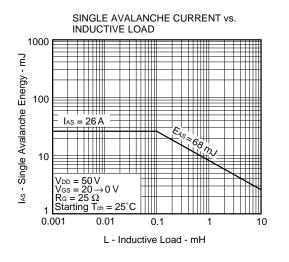
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE

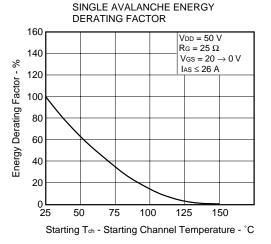






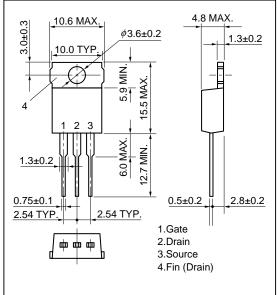




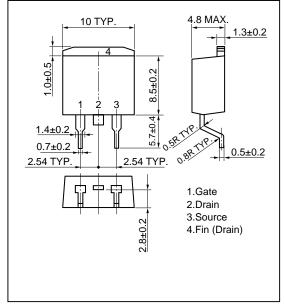


PACKAGE DRAWINGS (Unit: mm)

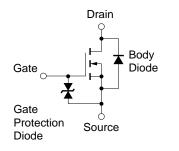
1) TO-220AB (MP-25)



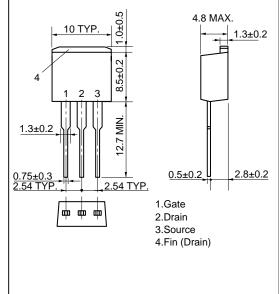
3) TO-263 (MP-25ZJ)



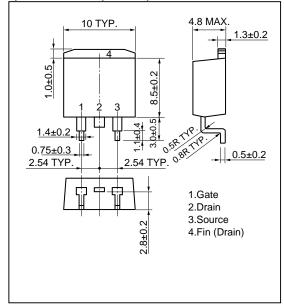
EQUIVALENT CIRCUIT



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



4) TO-220SMD (MP-25Z)^{Note}



Note This package is produced only in Japan.

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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