

# MOS FIELD EFFECT TRANSISTOR

2SK2481

## SWITCHING N-CHANNEL POWER MOS FET INDUSTRIAL USE

### **DESCRIPTION**

The 2SK2481 is N-Channel MOS Field Effect Transistor designed for high voltage switching applications.

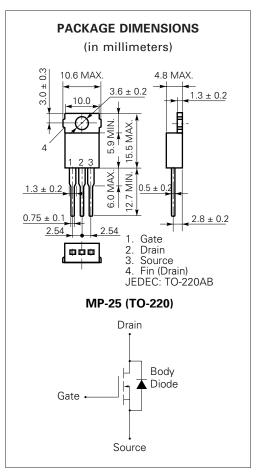
#### **FEATURES**

- Low On-Resistance  $R_{DS(on)} = 4.0 \ \Omega \ (V_{GS} = 10 \ V, \ I_{D} = 2.0 \ A)$
- Low Ciss Ciss = 900 pF TYP.
- High Avalanche Capability Ratings

### ABSOLUTE MAXIMUM RATINGS (TA = 25 °C)

Drain to Source Voltage	VDSS	900	V
Gate to Source Voltage	Vgss	±30	V
Drain Current (DC)	ID(DC)	$\pm 4.0$	Α
Drain Current (pulse)*	ID(pulse	±12	Α
Total Power Dissipation ( $T_c = 25$ °C)	P <sub>T1</sub>	70	W
Total Power Dissipation (T <sub>A</sub> = 25 °C)	P <sub>T2</sub>	1.5	W
Channel Temperature	$T_ch$	150	°C
Storage Temperature	$T_{stg}$	-55 to +150	°C
Single Avalanche Current**	las	4.0	Α
Single Avalanche Energy**	Eas	65.9	mJ

- \* PW  $\leq$  10  $\mu$ s, Duty Cycle  $\leq$  1 %
- \*\* Starting Tch = 25 °C, Rg = 25  $\Omega$ , Vgs = 20 V  $\rightarrow$  0



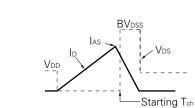


### **ELECTRICAL CHARACTERISTICS (TA = 25 °C)**

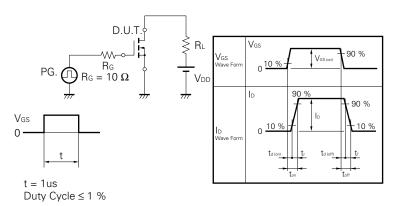
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source On-State Resistance	RDS(on)		3.2	4.0	Ω	Vgs = 10 V, ID = 2.0 A
Gate to Source Cutoff Voltage	V <sub>GS(off)</sub>	2.5		3.5	V	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA
Forward Transfer Admittance	l yfs l	1.0			S	V <sub>DS</sub> = 20 V, I <sub>D</sub> = 2.0 A
Drain Leakage Current	IDSS			100	μΑ	V <sub>DS</sub> = V <sub>DSS</sub> , V <sub>GS</sub> = 0
Gate to Source Leakage Current	Igss			±100	nA	$V_{GS} = \pm 30 \text{ V}, V_{DS} = 0$
Input Capacitance	Ciss		900		pF	V <sub>DS</sub> = 10 V
Output Capacitance	Coss		130		pF	V <sub>G</sub> S = 0
Reverse Transfer Capacitance	Crss		25		pF	f = 1 MHz
Turn-On Delay Time	td(on)		17		ns	ID = 2.0 A
Rise Time	tr		7		ns	V <sub>G</sub> S = 10 V
Turn-Off Delay Time	td(off)		63		ns	V <sub>DD</sub> = 150 V
Fall Time	tf		8		ns	$R_G = 10 \Omega$
Total Gate Charge	Qg		30		nC	ID = 4.0 A
Gate to Source Charge	Qgs		5		nC	V <sub>DD</sub> = 450 V
Gate to Drain Charge	QgD		13		nC	V <sub>G</sub> S = 10 V
Body Diode Forward Voltage	V <sub>F(S-D)</sub>		1.0		V	IF = 4.0 A, VGS = 0
Reverse Recovery Time	trr		710		ns	IF = 4.0 A, VGS = 0
Reverse Recovery Charge	Qrr		3.5		μC	$di/dt = 50 A/\mu s$

### Test Circuit 1 Avalanche Capability

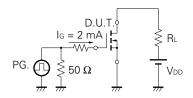
# $V_{GS} = 20 - 0 \text{ V}$ $V_{GS} = 20 - 0 \text{ V}$ $V_{DD}$ $V_{DD}$



### Test Circuit 2 Switching Time

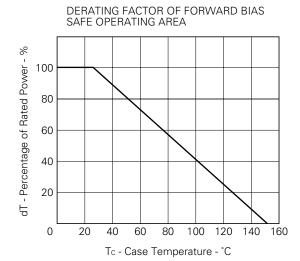


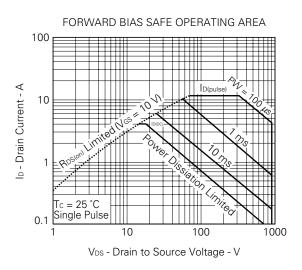
### **Test Circuit 3 Gate Charge**

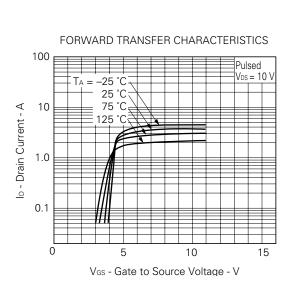


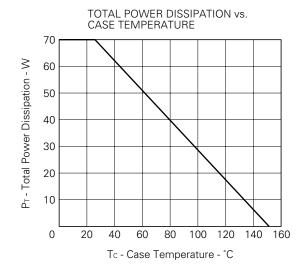
The application circuits and their parameters are for references only and are not intended for use in actual design-in's.

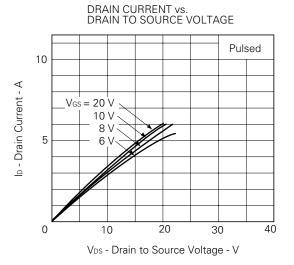
### TYPICAL CHARACTERISTICS (TA = 25 °C)





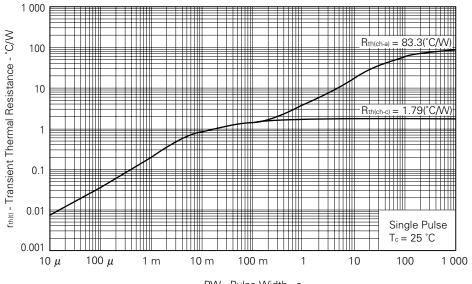






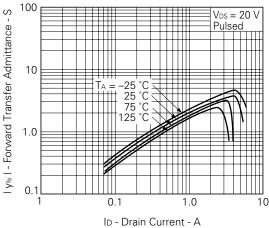


### TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH

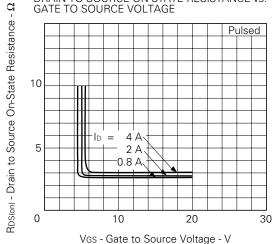


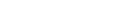
PW - Pulse Width - s

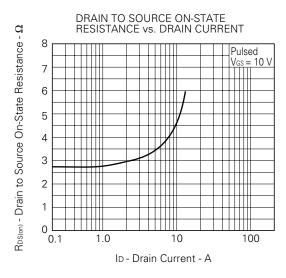
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



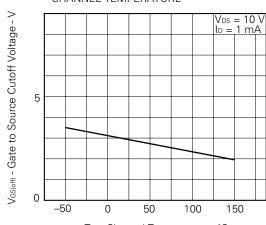
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



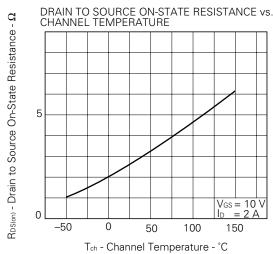


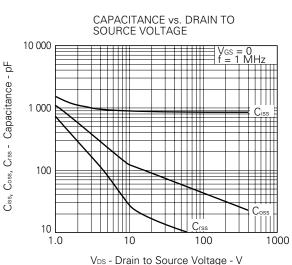


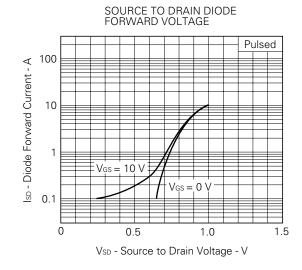
GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE

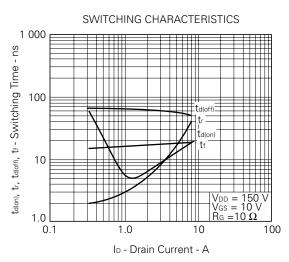


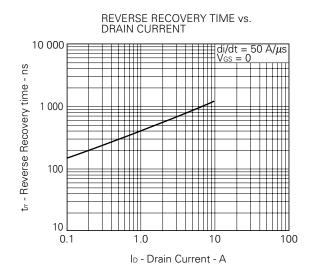
Tch - Channel Temperature - °C

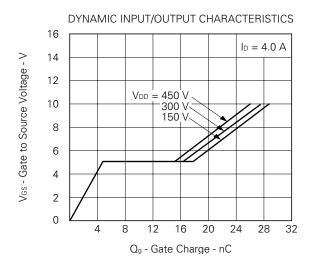




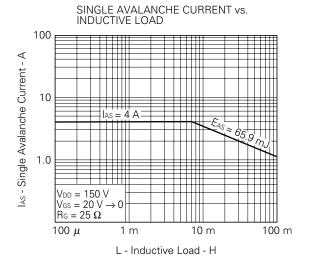


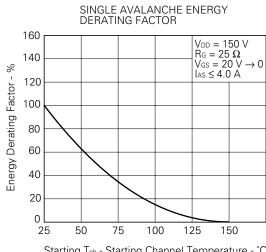














# REFERENCE

Document Name	Document No.
NEC semiconductor device reliability/quality control system.	TEI-1202
Quality grade on NEC semiconductor devices.	IEI-1209
Semiconductor device mounting technology manual.	IEI-1207
Semiconductor device package manual.	IEI-1213
Guide to quality assurance for semiconductor devices.	MEI-1202
Semiconductor selection guide.	MF-1134
Power MOS FET features and application switching power supply.	TEA-1034
Application circuits using Power MOS FET.	TEA-1035
Safe operating area of Power MOS FET.	TEA-1037

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