NEC

MOS FIELD EFFECT TRANSISTOR

2SK2137

SWITCHING
N-CHANNEL POWER MOS FET
INDUSTRIAL USE

DESCRIPTION

The 2SK2137 is N-Channel MOS Field Effect Transistor designed for high voltage switching applications.

FEATURES

- Low On-Resistance
  2SK2137: $R_{DS(on)}$ = 2.4 Ω (V_{GS} = 10 V, I_D = 2.0 A)
- Low C_{iss} C_{iss} = 550 pF TYP.
- High Avalanche Capability Ratings
- Isolate TO-220 Package

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

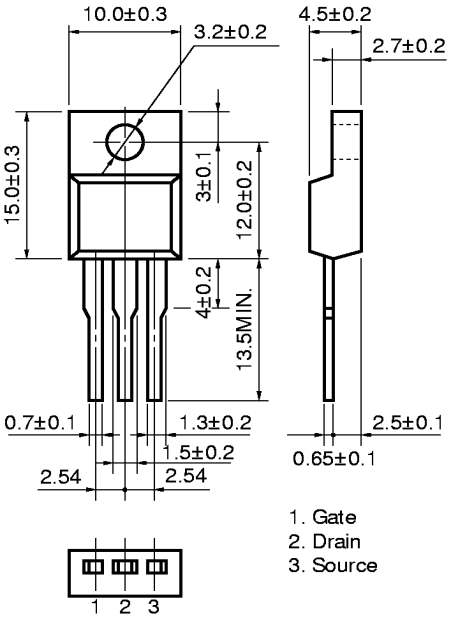
Drain to Source Voltage	V_{DSS}	600	V
Gate to Source Voltage	V_{GSS}	±30	V
Drain Current (DC)	$I_{D(DC)}$	±4.0	A
Drain Current (pulse)*	$I_{D(pulse)}$	±16	A
Total Power Dissipation (T_C = 25 °C)	P_{T1}	30	W
Total Power Dissipation (T_A = 25 °C)	P_{T2}	2.0	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C
Single Avalanche Current**	I_{AS}	4.0	A
Single Avalanche Energy**	E_{AS}	5.3	mJ

* PW ≤ 10 μs, Duty Cycle ≤ 1 %

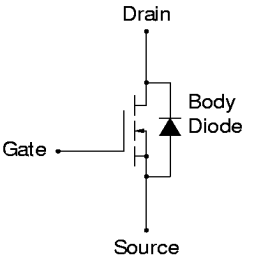
** Starting T_{ch} = 25 °C, R_G = 25 Ω, V_{GS} = 20 V → 0

PACKAGE DIMENSIONS

(in millimeters)



MP-45F (ISOLATED TO-220)



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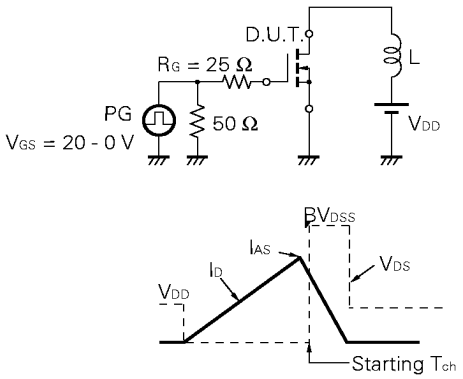
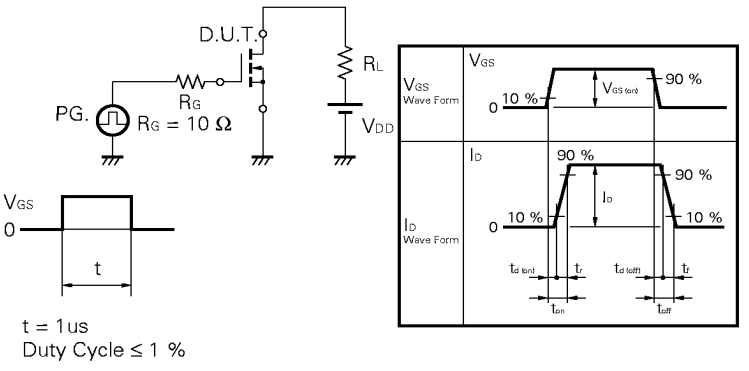
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Drain to Source On-State Resistance	$R_{DS(on)}$		1.7	2.4	Ω	V_{GS} = 10 V, I_D = 2.0 A
Gate to Source Cutoff Voltage	$V_{GS(off)}$	2.5		3.5	V	V_{DS} = 10 V, I_D = 1 mA
Forward Transfer Admittance	$\|y_{fs}\|$	1.0			S	V_{DS} = 10 V, I_D = 2.0 A
Drain Leakage Current	I_{DSS}			100	μA	V_{DS} = V_{DSS}, V_{GS} = 0
Gate to Source Leakage Current	I_{GSS}			±100	nA	V_{GS} = ±30 V, V_{DS} = 0
Input Capacitance	C_{iss}		550		pF	V_{DS} = 10 V
Output Capacitance	C_{oss}		130		pF	V_{GS} = 0
Reverse Transfer Capacitance	C_{rss}		25		pF	f = 1 MHz
Turn-On Delay Time	$t_{d(on)}$		11		ns	I_D = 2.0 A
Rise Time	t_r		6		ns	$V_{GS(on)}$ = 10 V
Turn-Off Delay Time	$t_{d(off)}$		45		ns	V_{DD} = 150 V
Fall Time	t_f		7		ns	R_G = 10 Ω R_L = 75 Ω
Total Gate Charge	Q_G		20		nC	I_D = 4.0 A
Gate to Source Charge	Q_{GS}		4		nC	V_{DD} = 480 V
Gate to Drain Charge	Q_{GD}		10		nC	V_{GS} = 10 V
Body Diode Forward Voltage	$V_{F(S-D)}$		1.0		V	I_F = 4.0 A, V_{GS} = 0
Reverse Recovery Time	t_{rr}		320		ns	I_F = 4.0 A, V_{GS} = 0
Reverse Recovery Charge	Q_{rr}		1.2		μC	di/dt = 50 A/μs

Test Circuit 1 Avalanche Capability

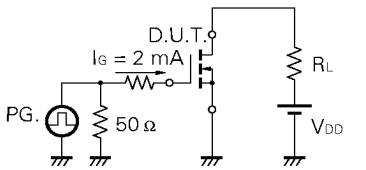


Test Circuit 2 Switching Time



t = 1 us
Duty Cycle ≤ 1 %

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.

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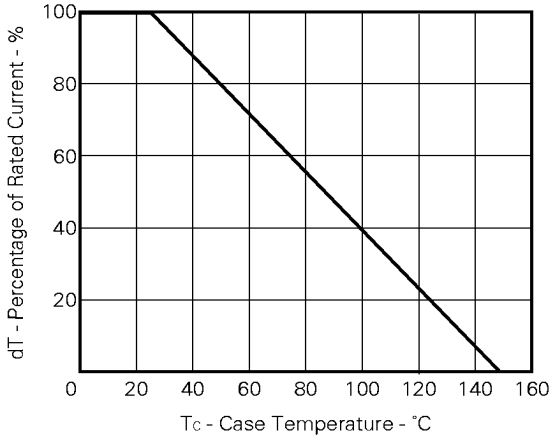
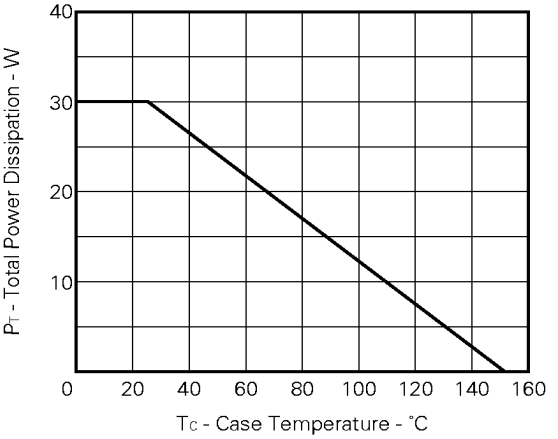
TYPICAL CHARACTERISTICS (T_A = 25 °C)

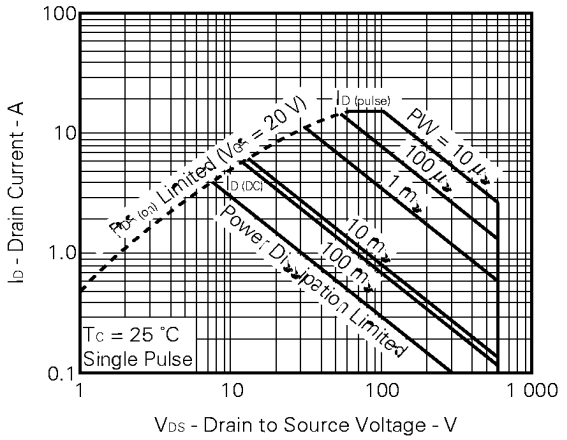
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



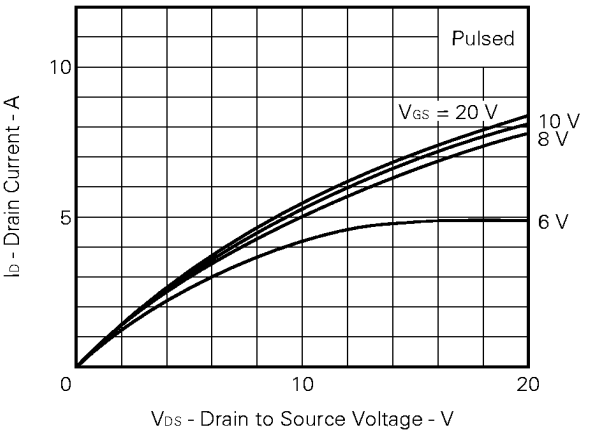
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



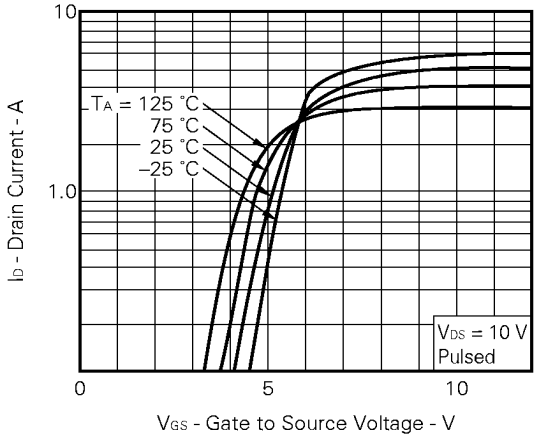
FORWARD BIAS SAFE OPERATING AREA



DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



DRAIN CURRENT vs. GATE TO SOURCE VOLTAGE



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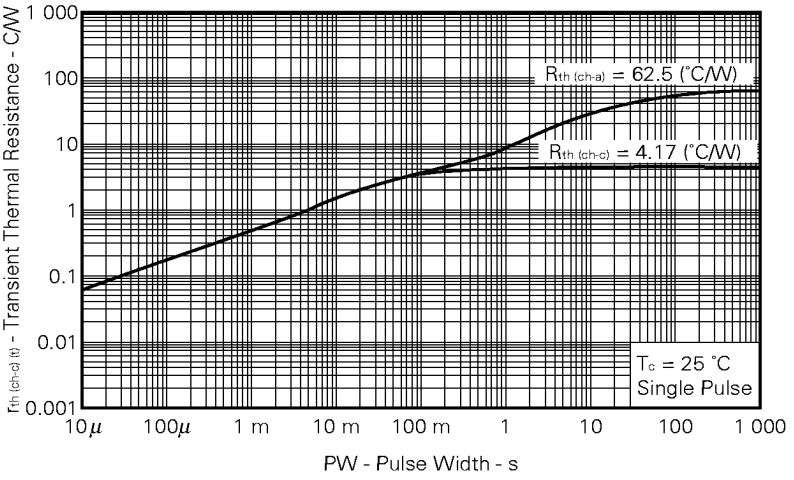
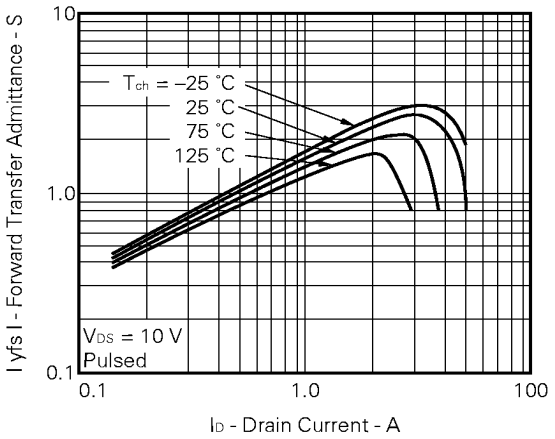
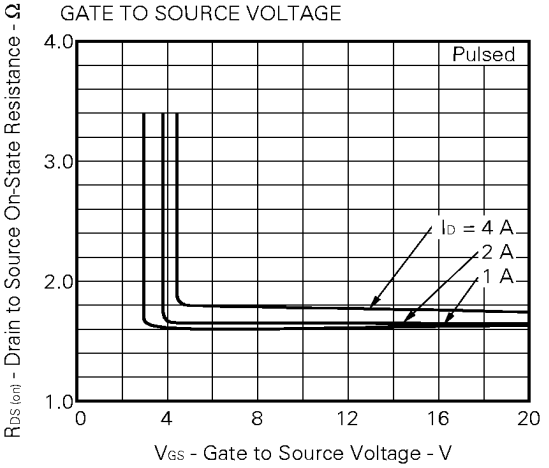
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



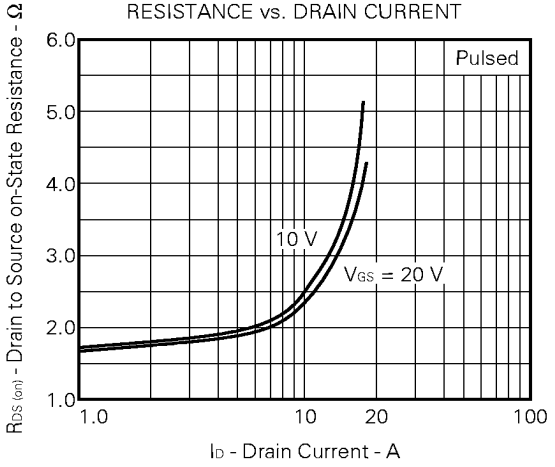
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



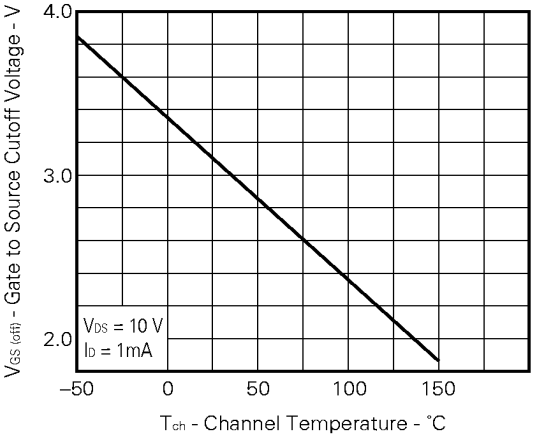
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE



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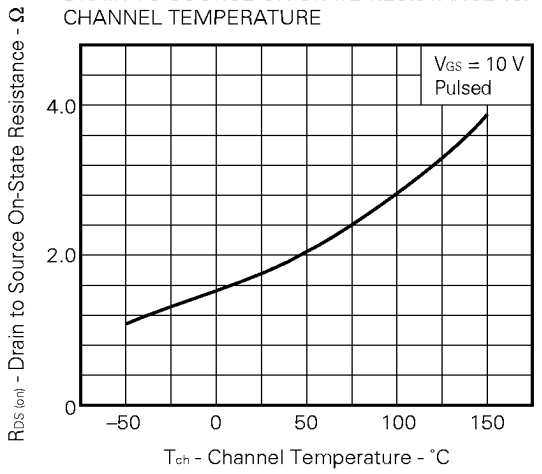
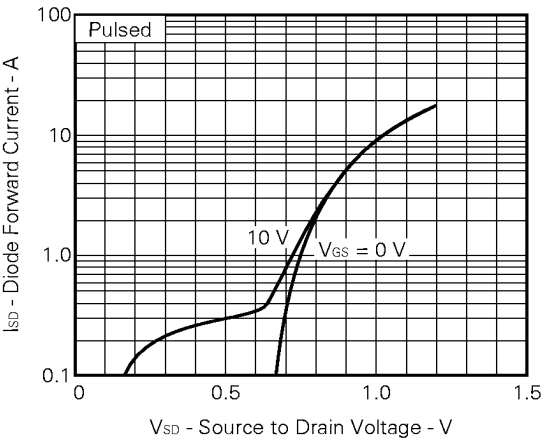
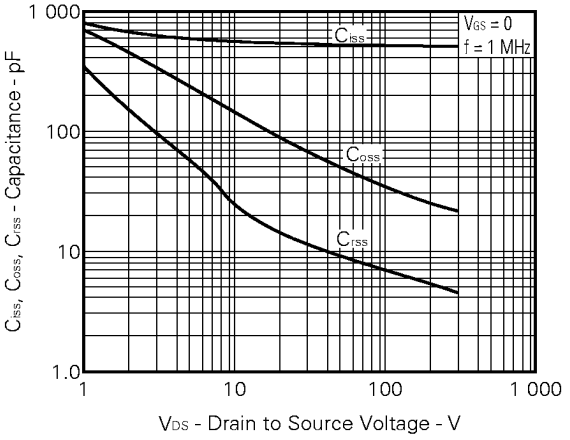
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



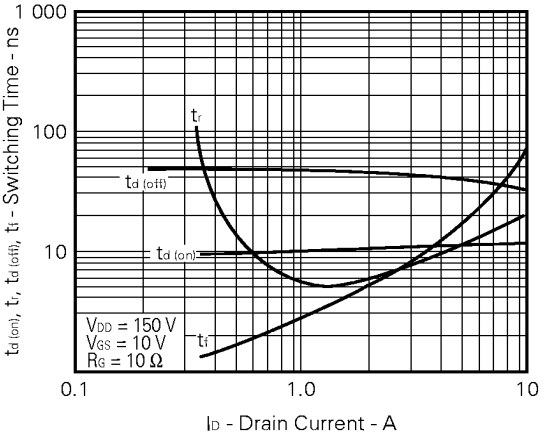
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



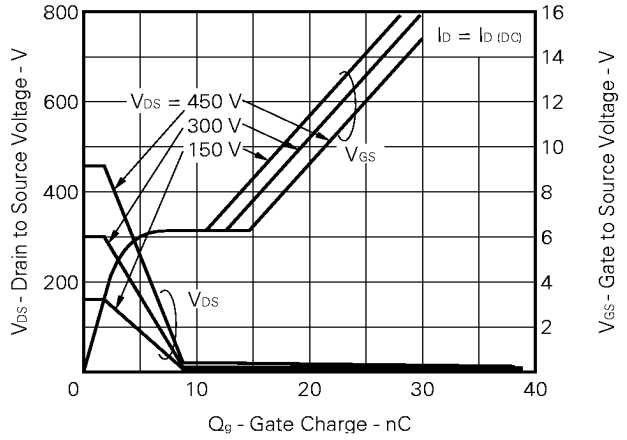
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



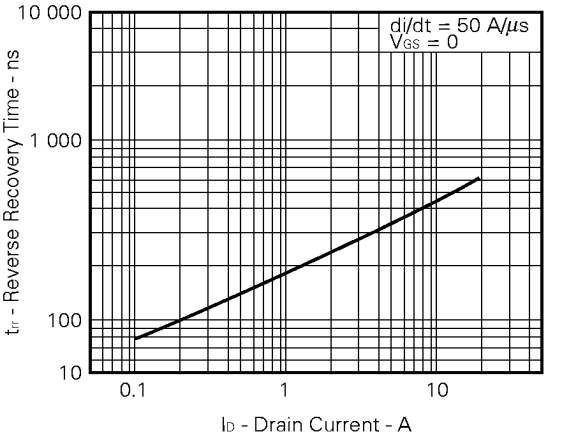
SWITCHING CHARACTERISTICS



DYNAMIC INPUT CHARACTERISTICS



REVERSE RECOVERY TIME vs. DRAIN CURRENT



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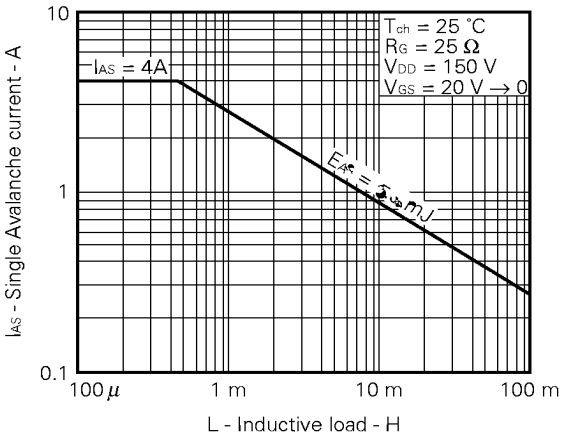
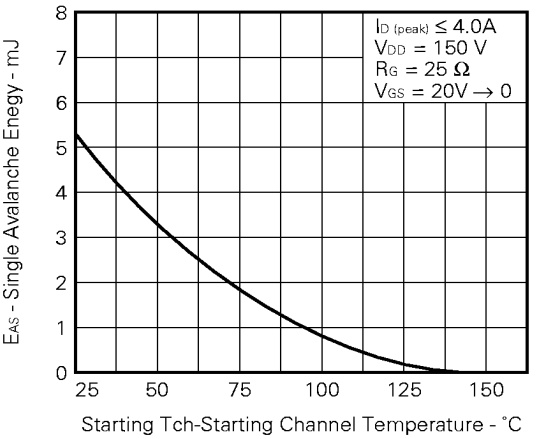
SINGLE AVALANCHE CURRENT vs.
INDUCTIVE LOAD



SINGLE AVALANCHE ENEGY vs.
STARTING CHANNEL TEMPERATURE



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