

MOS FIELD EFFECT TRANSISTORS

2SK2371/2SK2372

SWITCHING

N-CHANNEL POWER MOS FET

INDUSTRIAL USE

DESCRIPTION

The 2SK2371/2SK2372 is N-Channel MOS Field Effect Transistor designed for high voltage switching applications.

FEATURES

- Low On-Resistance
 2SK2367: $R_{DS(ON)} = 0.25 \Omega$ ($V_{GS} = 13 V, I_D = 10 A$)
 2SK2368: $R_{DS(ON)} = 0.27 \Omega$ ($V_{GS} = 13 V, I_D = 10 A$)
- Low C_{iss} $C_{iss} = 3600 pF$ TYP.
- High Avalanche Capability Ratings

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

Drain to Source Voltage (2SK2371/2SK2372)	V_{DSS}	450/500	V
Gate to Source Voltage	V_{GSS}	± 30	V
Drain Current (DC)	$I_{D(DC)}$	± 25	A
Drain Current (pulse)*	$I_{D(pulse)}$	± 100	A
Total Power Dissipation ($T_c = 25^\circ C$)	P_{T1}	160	W
Total Power Dissipation ($T_a = 25^\circ C$)	P_{T2}	3.0	W
Channel Temperature	T_{ch}	150	$^\circ C$
Storage Temperature	T_{stg}	$-55 \sim +150$	$^\circ C$
Single Avalanche Current**	I_{AS}	25	A
Single Avalanche Energy**	E_{AS}	446	mJ

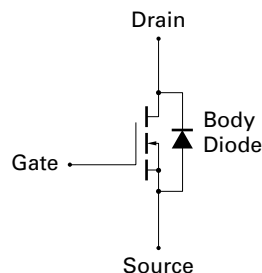
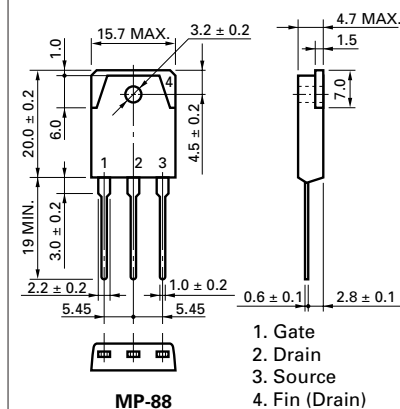
* $PW \leq 10 \mu s$, Duty Cycle $\leq 1\%$

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

The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device is actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

PACKAGE DIMENSIONS

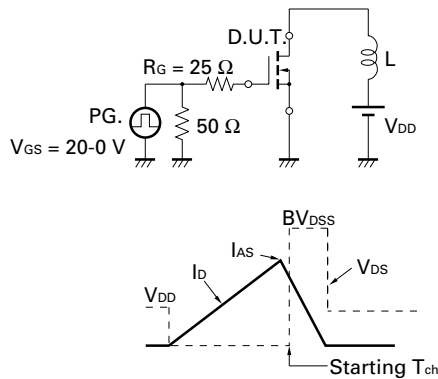
(in millimeters)



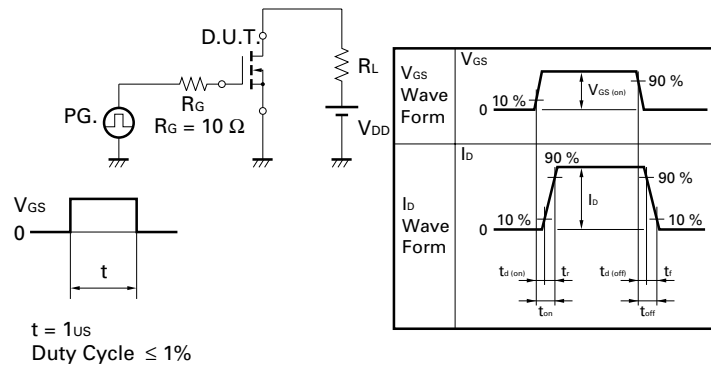
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Drain to Source On-Resistance	R _{DS(on)}		0.2	0.25	Ω	V _{GS} = 10 V
			0.22	0.27		I _D = 13 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}	8.0			S	V _{DS} = 10 V, I _D = 13 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}		3600		pF	V _{DS} = 10 V
Output Capacitance	C _{oss}		700		pF	V _{GS} = 0
Reverse Transfer Capacitance	C _{rss}		50		pF	f = 1 MHz
Turn-On Delay Time	t _{d(on)}		40		ns	I _D = 13 A
Rise Time	t _r		70		ns	V _{GS} = 10 V
Turn-Off Delay Time	t _{d(off)}		160		ns	V _{DD} = 150 V
Fall Time	t _f		60		ns	R _G = 10 Ω RL = 11.5 Ω
Total Gate Charge	Q _G		95		nC	I _D = 25 A
Gate to Source Charge	Q _{GS}		20		nC	V _{DD} = 400 V
Gate to Drain Charge	Q _{GD}		40		nC	V _{GS} = 10 V
Body Diode Forward Voltage	V _{F(S-D)}		1.0		V	I _F = 25 A, V _{GS} = 0
Reverse Recovery Time	t _{rr}		500		ns	I _F = 25 A, V _{GS} = 0
Reverse Recovery Charge	Q _{rr}		4.5		μC	di/dt = 50 A/μS

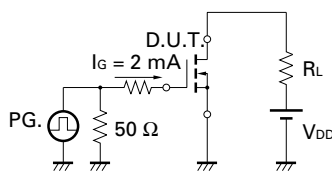
Test Circuit 1 Avalanche Capability



Test Circuit 2 Switching Time

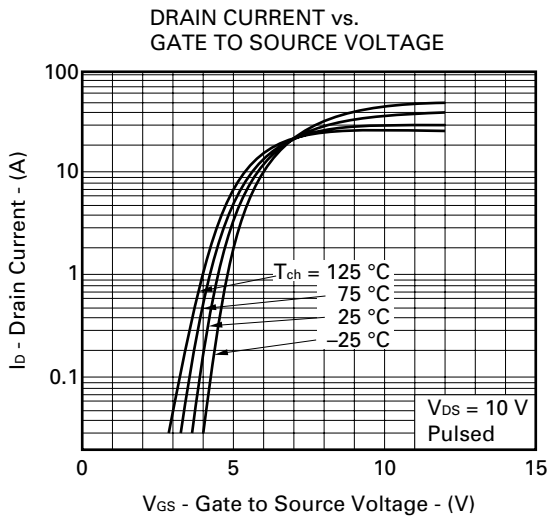
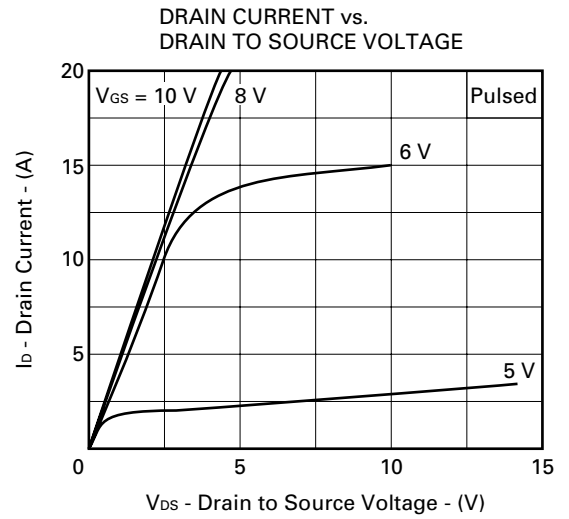
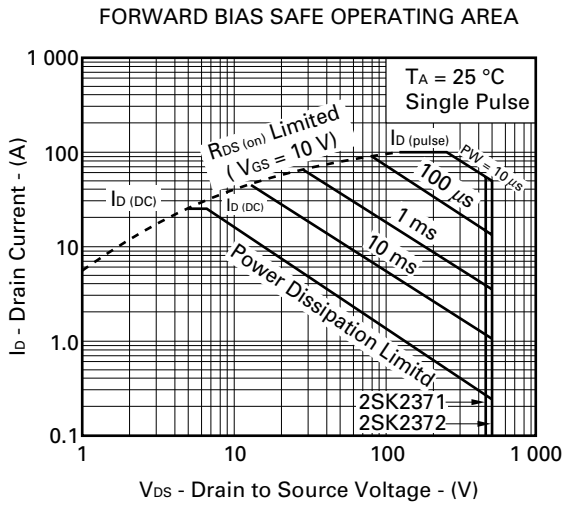
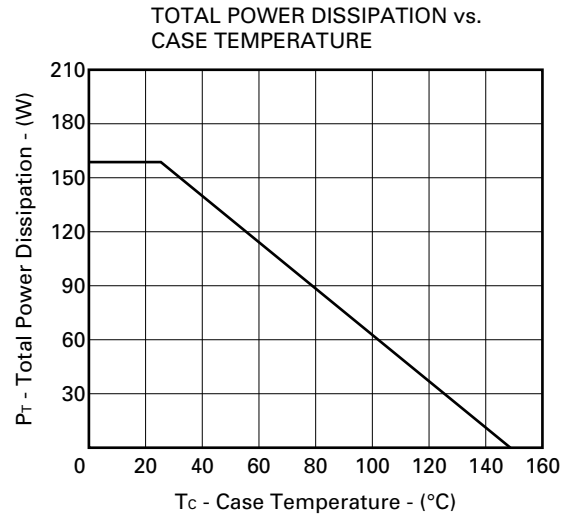
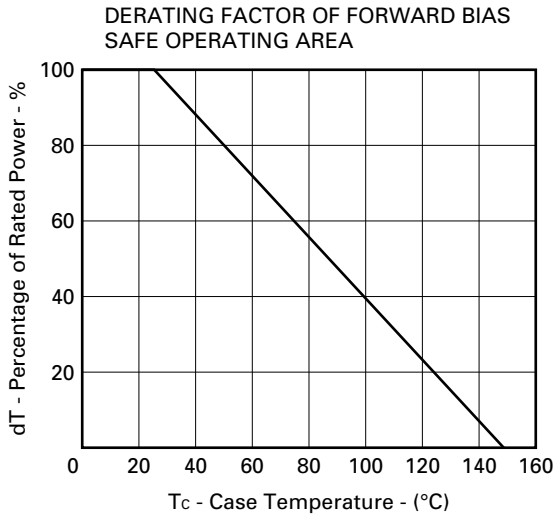


Test Circuit 3 Gate Charge

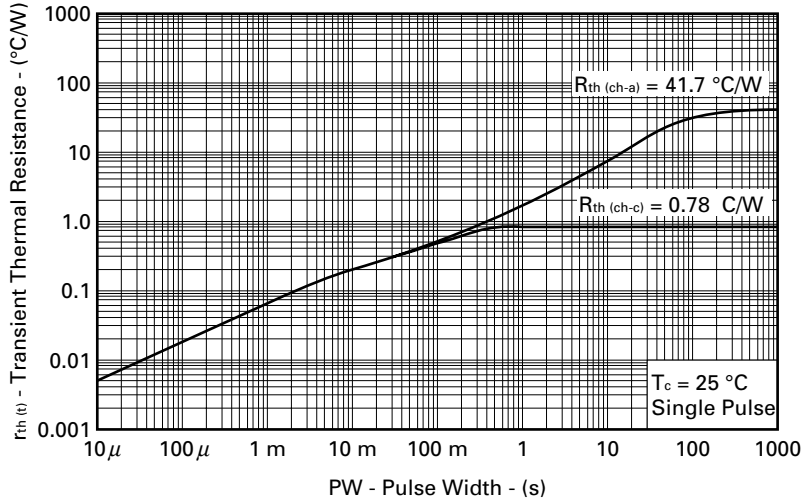


The application circuits and their parameters are for references only and are not intended for use in actual design-in's.

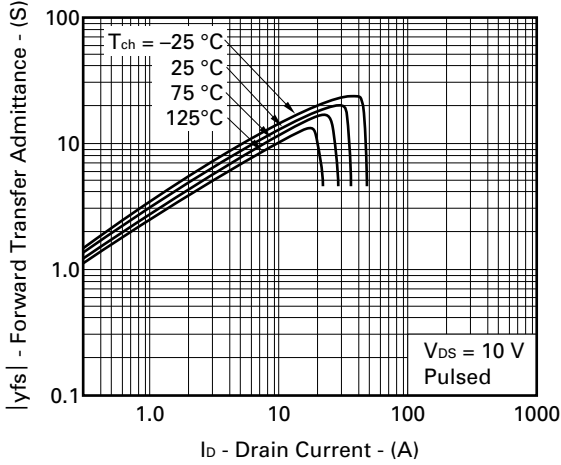
TYPICAL CHARACTERISTICS (T_A = 25 °C)



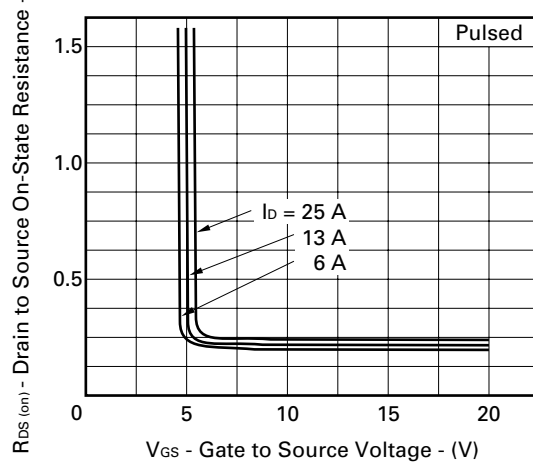
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



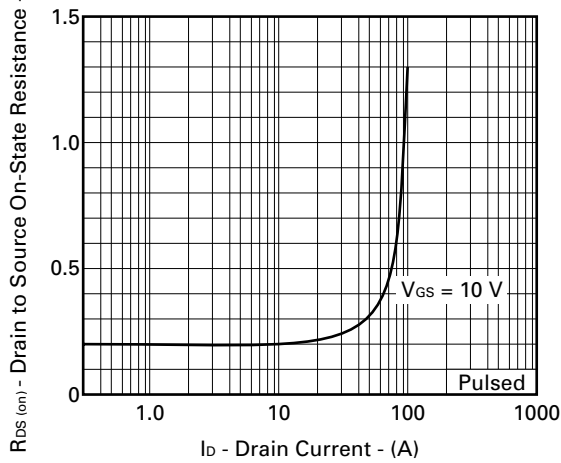
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



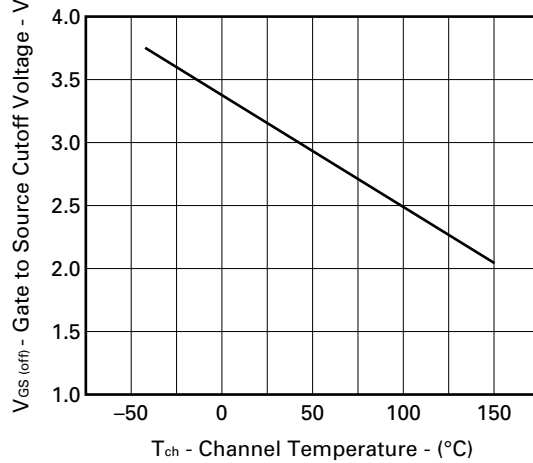
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



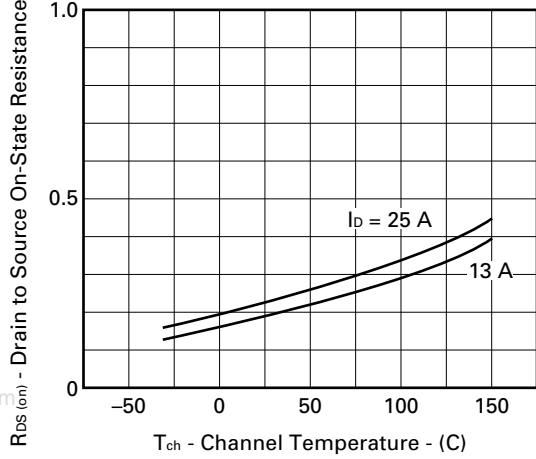
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



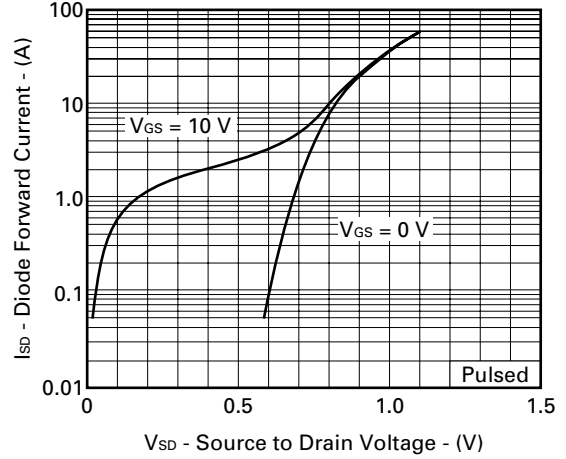
GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE



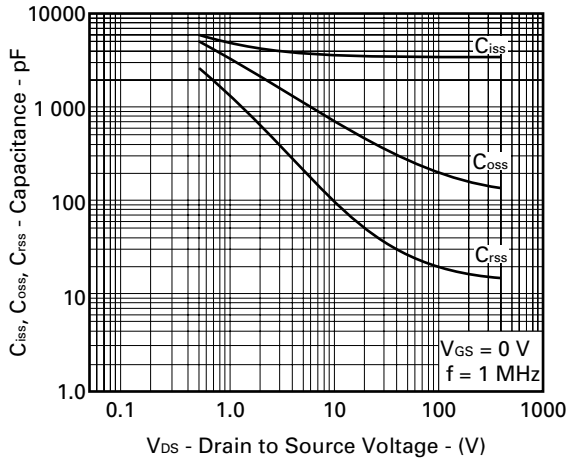
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



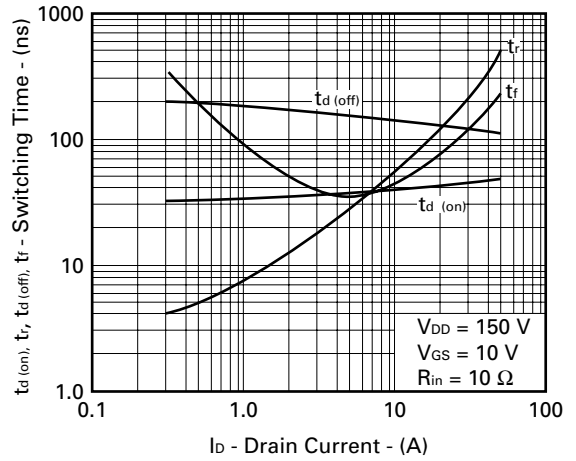
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



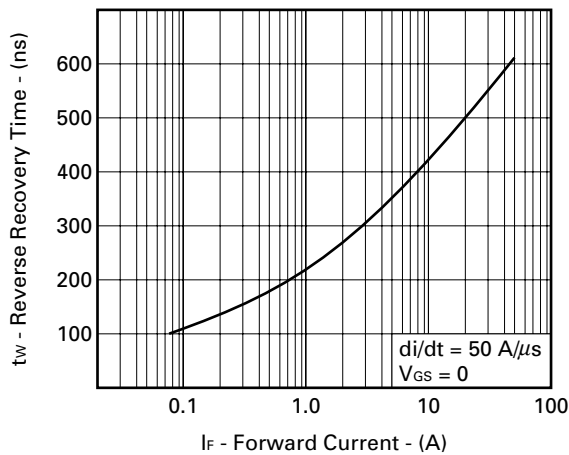
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



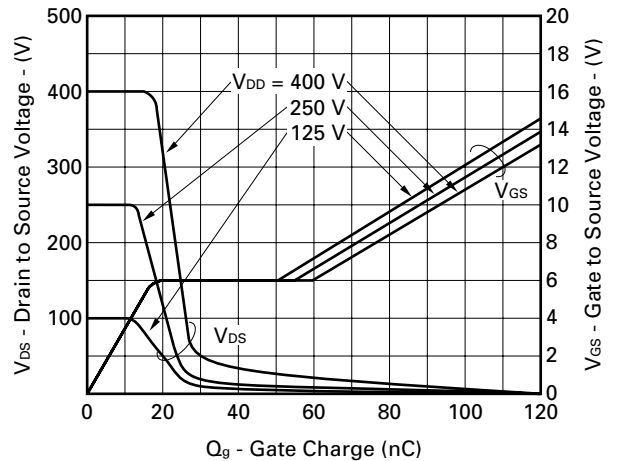
SWITCHING CHARACTERISTICS



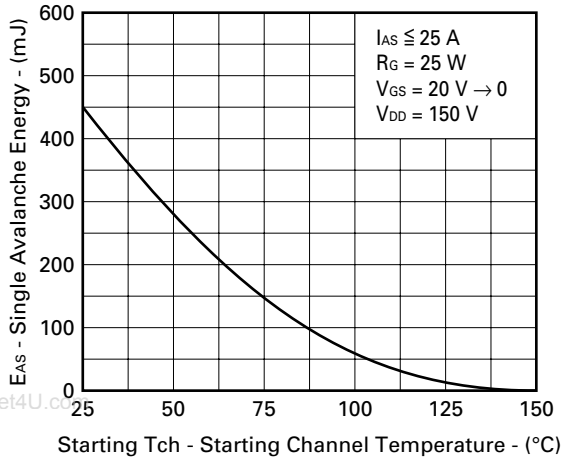
REVERSE RECOVERY TIME vs. REVERSE DRAIN CURRENT



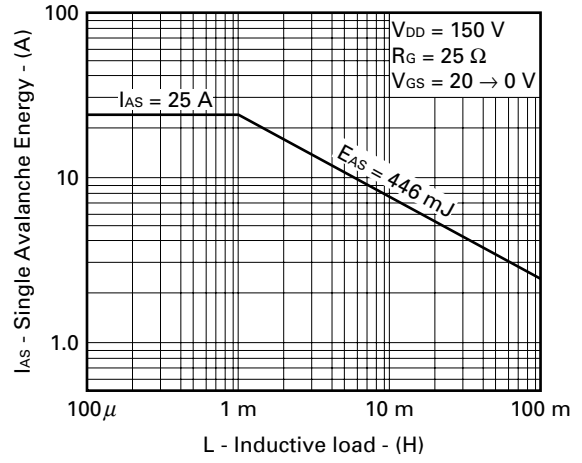
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SINGLE AVALANCHE ENERGY vs.
STARTING CHANNEL TEMPERATURE



SINGLE AVALANCHE ENERGY vs.
INDUCTIVE LOAD



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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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