NEC

MOS FIELD EFFECT TRANSISTOR
2SK2371, 2372

SWITCHING
N-CHANNEL POWER MOS FET

DESCRIPTION

These products are N-Channel MOS Field Effect Transistors designed for high voltage switching applications.

FEATURES

- Low on-state resistance
  2SK2371: $R_{DS(on)}$ = 0.25 Ω MAX. (V_{GS} = 13 V, I_D = 10 A)
  2SK2372: $R_{DS(on)}$ = 0.27 Ω MAX. (V_{GS} = 13 V, I_D = 10 A)
- Low input capacitance
  C_{iss} = 3600 pF TYP.
- High Avalanche Capability Ratings

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage (V_{GS} = 0 V) (2SK2371/2372)	V_{DSS}	450/500	V
Gate to Source Voltage (V_{DS} = 0 V)	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°C)	P_{T1}	160	W
Total Power Dissipation (T_A = 25°C)	P_{T2}	3.0	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C
Single Avalanche Current**	I_{AS}	25	A
Single Avalanche Energy**	E_{AS}	446	mJ

* PW ≤ 10 μs, Duty Cycle ≤ 1 %

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

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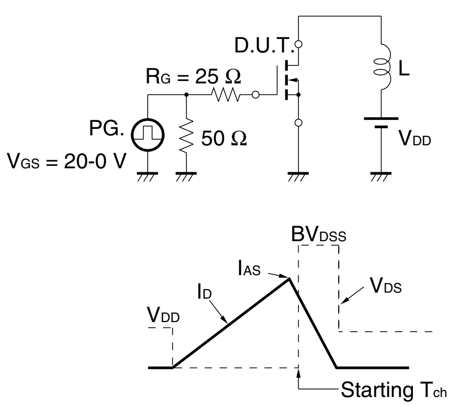
The mark <R> shows major revised points.
The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

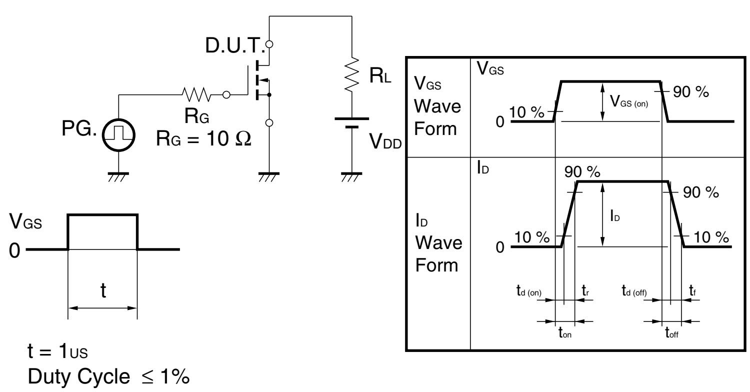
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS	
Drain to Source On-Resistance	$R_{DS\ (on)}$		0.20	0.25	Ω	V_{GS} = 10 V	2SK2371
			0.23	0.27		I_D = 13 A	2SK2372
Gate to Source Cutoff Voltage	$V_{GS\ (off)}$	2.5	3.0	3.5	V	V_{DS} = 10 V, I_D = 1 mA	
Forward Transfer Admittance	$\vert y_{fs} \vert$	8.0	13		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	
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	

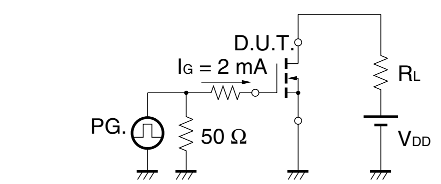
Test Circuit 1 Avalanche Capability



Test Circuit 2 Switching Time

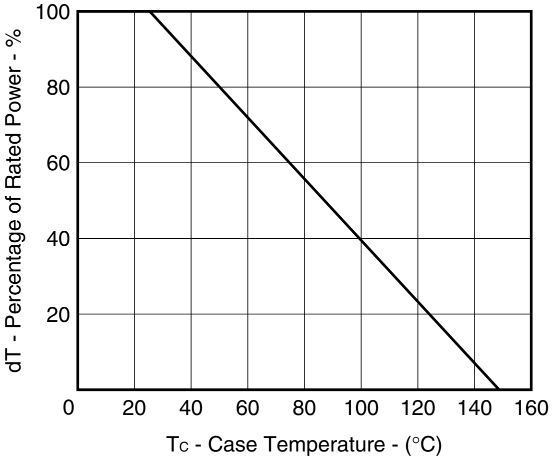


Test Circuit 3 Gate Charge

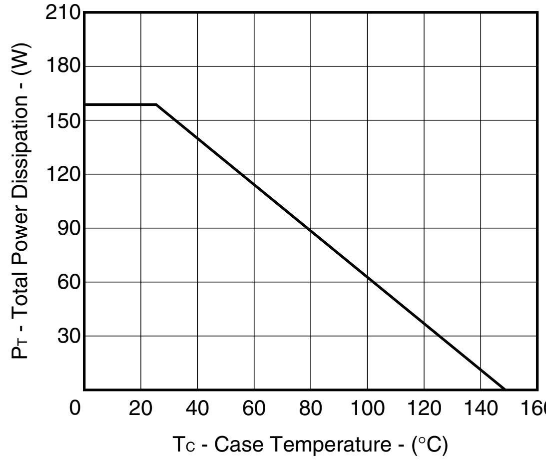


TYPICAL CHARACTERISTICS (T_A = 25°C)

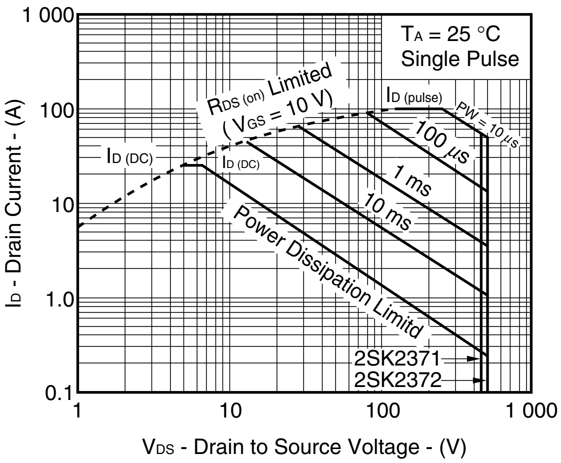
DERATING FACTOR OF FORWARD BIAS
SAFE OPERATING AREA



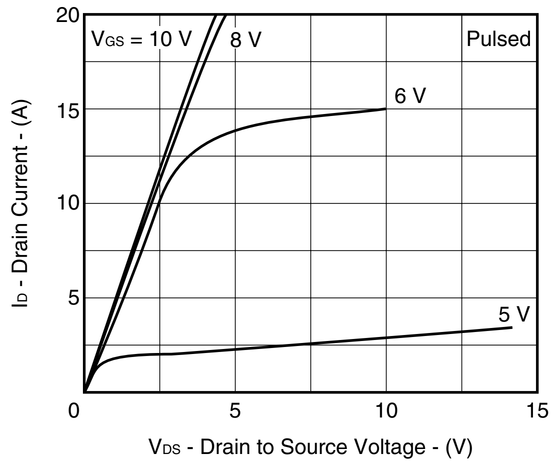
TOTAL POWER DISSIPATION vs.
CASE TEMPERATURE



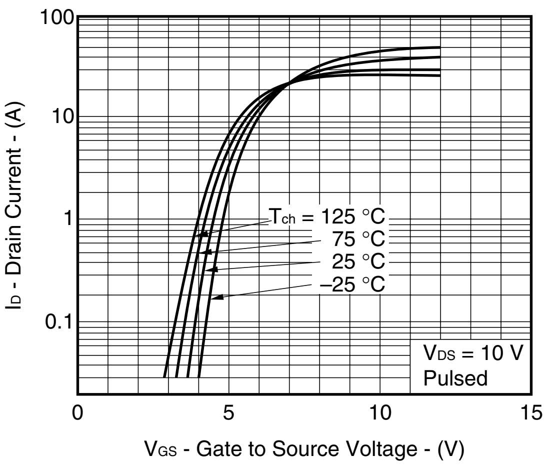
FORWARD BIAS SAFE OPERATING AREA



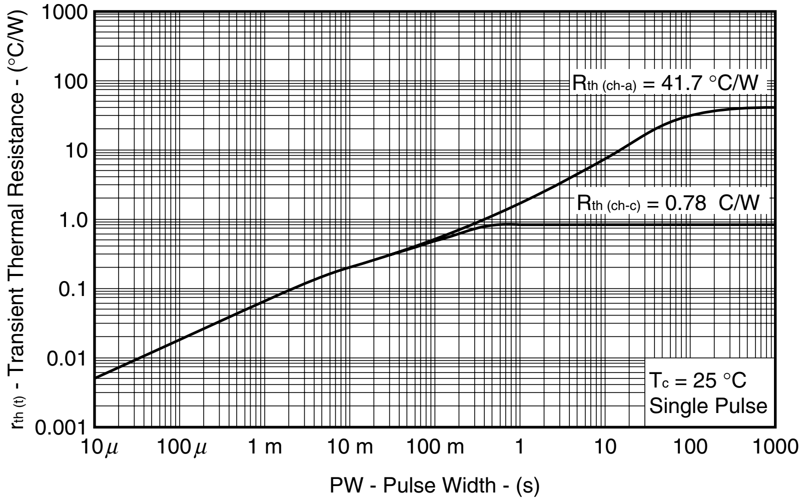
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



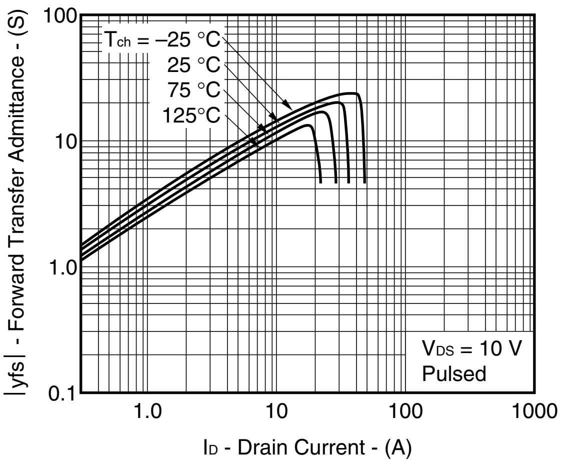
DRAIN CURRENT vs.
GATE TO SOURCE VOLTAGE



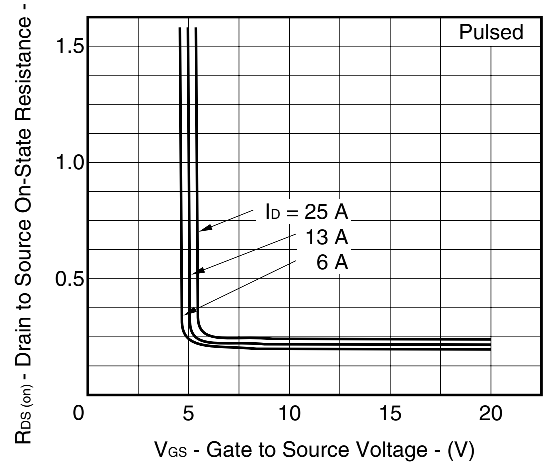
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



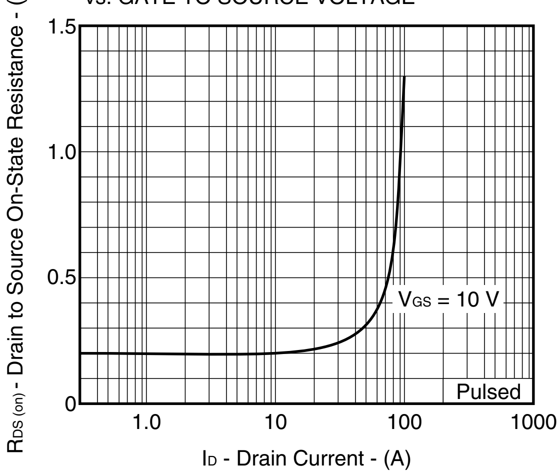
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



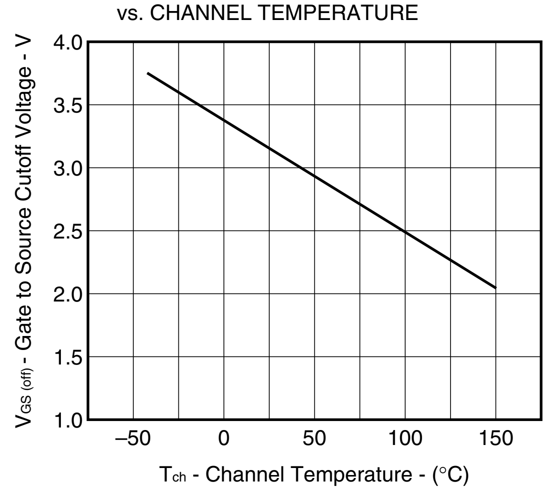
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



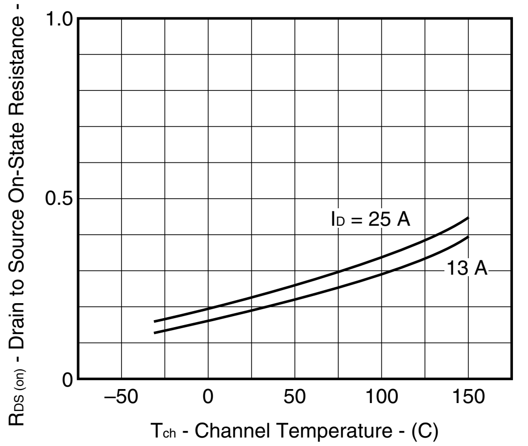
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



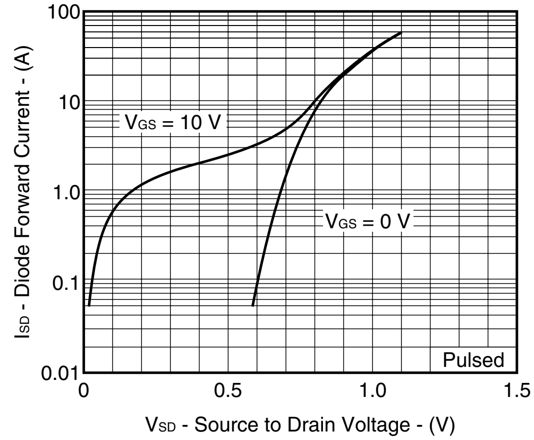
GATE TO SOURCE CUTOFF VOLTAGE vs. CHANNEL TEMPERATURE



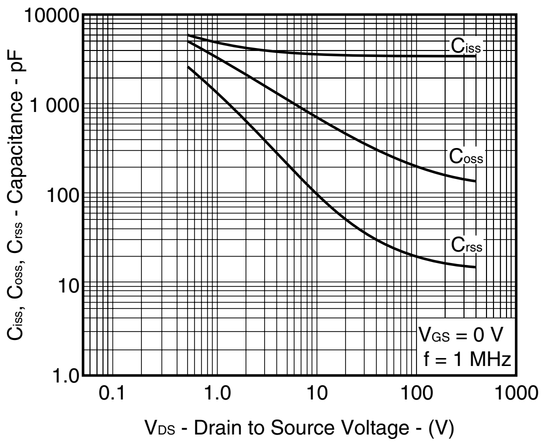
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



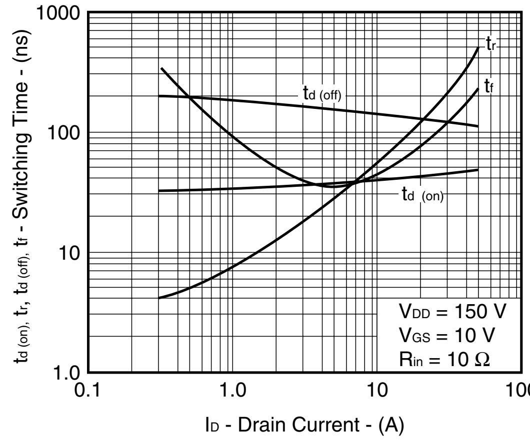
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



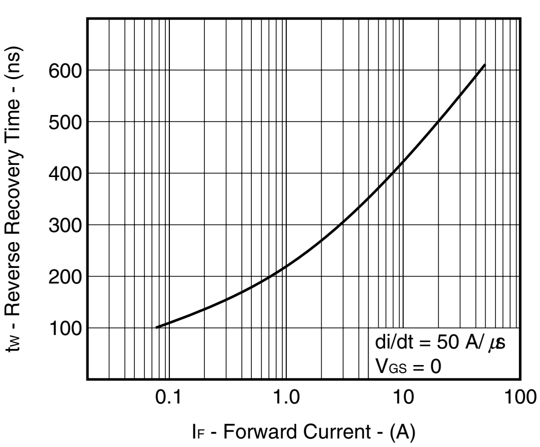
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



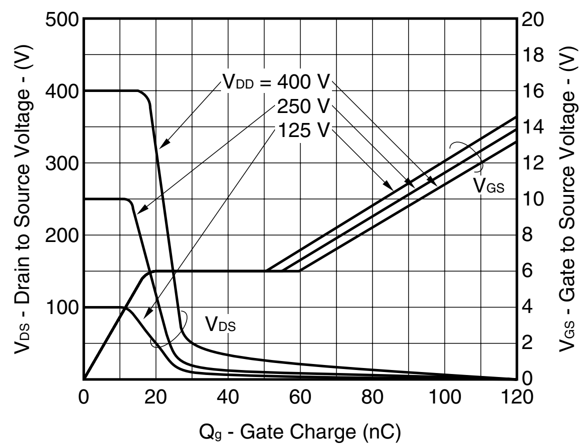
SWITCHING CHARACTERISTICS



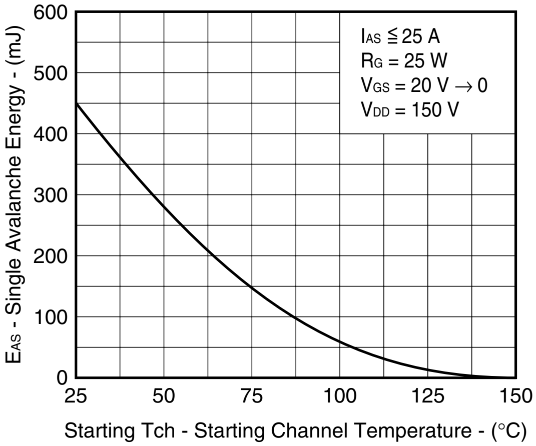
REVERSE RECOVERY TIME vs. REVERSE DRAIN CURRENT



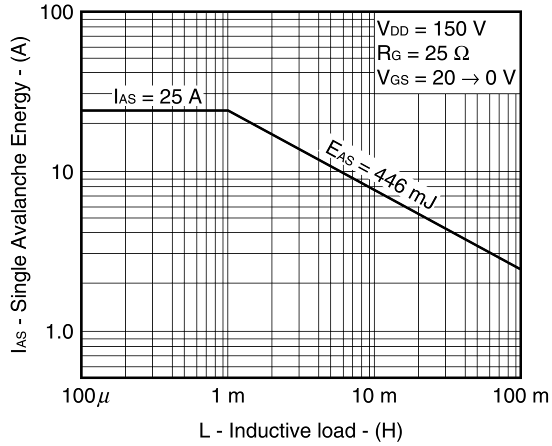
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SINGLE AVALANCHE ENERGY vs.
STARTING CHANNEL TEMPERATURE

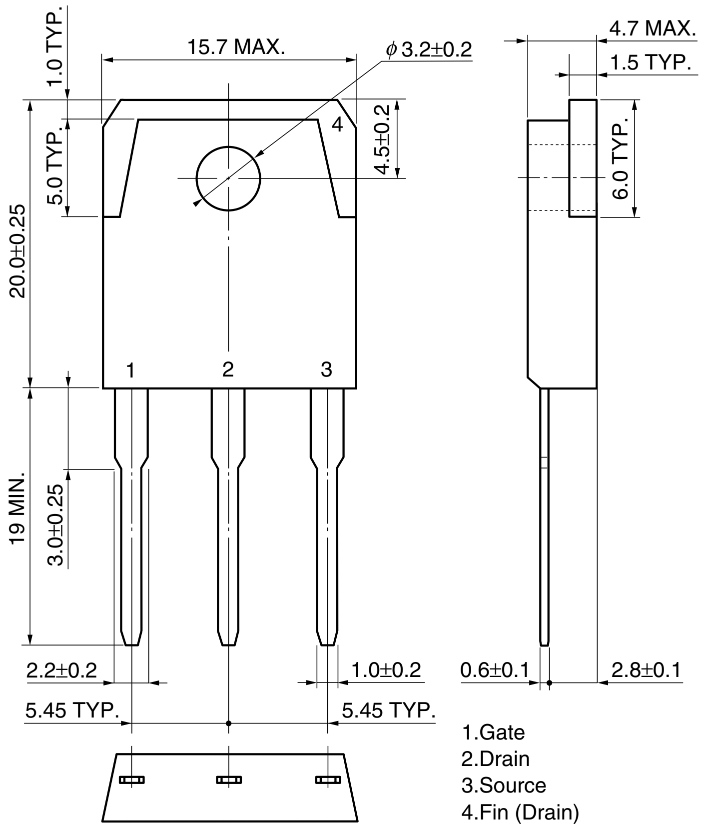


SINGLE AVALANCHE ENERGY vs.
INDUCTIVE LOAD

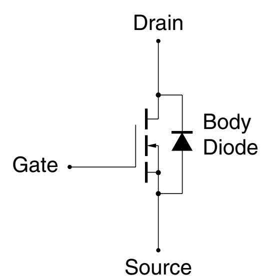


PACKAGE DRAWING (Unit: mm)

<R> **TO-3P (MP-88)**



EQUIVALENT CIRCUIT



Remark Strong electric field, when exposed to this device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop generation of static electricity as much as possible, and quickly dissipate it once, when it has occurred.