To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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RENESAS

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MOS FIELD EFFECT TRANSISTOR
2SK3305B

SWITCHING
N-CHANNEL POWER MOSFET

DESCRIPTION

The 2SK3305B is N-channel MOSFET device that features a low gate charge and excellent switching characteristics, and designed for high voltage applications such as switching power supply, AC adapter.

FEATURES

- Low gate charge
  Q_G = 13 nC TYP. (V_{DD} = 400 V, V_{GS} = 10 V, I_D = 5.0 A)
- Gate voltage rating : ±30 V
- Low on-state resistance
  $R_{DS(on)}$ = 1.5 Ω MAX. (V_{GS} = 10 V, I_D = 2.5 A)
- Avalanche capability ratings

ORDERING INFORMATION

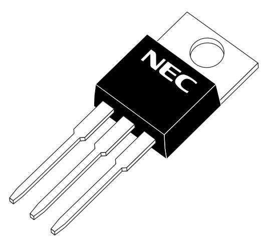
PART NUMBER	LEAD PLATING	PACKING	PACKAGE
2SK3305B-S19-AY Note	Pure Sn (Tin)	Tube 50 p/tube	TO-220AB (MP-25) typ. 1.9 g

Note Pb-free (This product does not contain Pb in external electrode.)

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage (V_{GS} = 0 V)	V_{DSS}	500	V
Gate to Source Voltage (V_{DS} = 0 V)	V_{GSS}	±30	V
Drain Current (DC) (T_C = 25°C)	$I_{D(DC)}$	±5	A
Drain Current (pulse) Note1	$I_{D(pulse)}$	±20	A
Total Power Dissipation (T_C = 25°C)	P_{T1}	75	W
Total Power Dissipation	P_{T2}	1.5	W
Channel Temperature	T_{ch}	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C
Single Avalanche Current Note2	I_{AS}	5.0	A
Single Avalanche Energy Note2	E_{AS}	125	mJ

(TO-220AB)



Notes 1. PW ≤ 10 μs, Duty Cycle ≤ 1%

2. Starting T_{ch} = 25°C, V_{DD} = 150 V, R_G = 25 Ω , V_{GS} = 20 → 0 V

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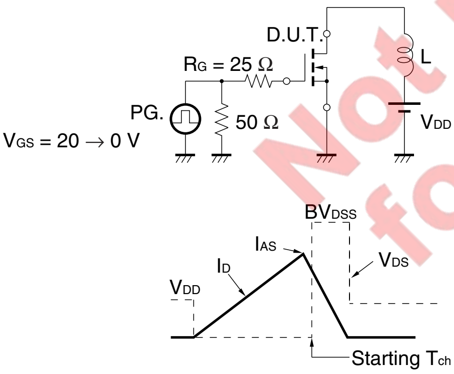
Printed in Japan

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

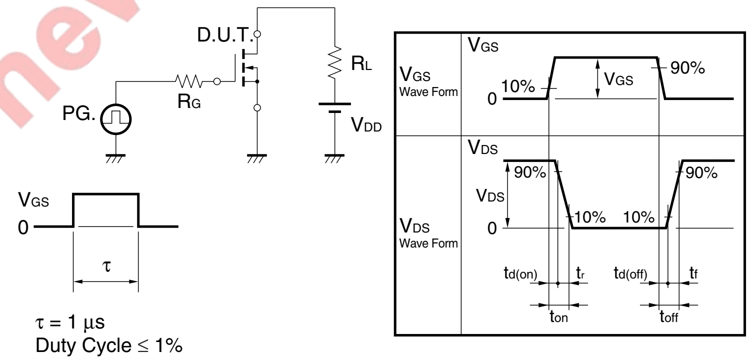
CHRACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 500 V, V_{GS} = 0 V			100	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±30 V, V_{DS} = 0 V			±100	nA
Gate Cut-off Voltage	$V_{GS(off)}$	V_{DS} = 10 V, I_D = 1 mA	2.5		3.5	V
Forward Transfer Admittance Note	| y_{fs} |	V_{DS} = 10 V, I_D = 2.5 A	1.0	2.2		S
Drain to Source On-state Resistance Note	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 2.5 A		1.2	1.5	Ω
Input Capacitance	C_{iss}	V_{DS} = 10 V		730		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V		120		pF
Reverse Transfer Capacitance	C_{rss}	f = 1 MHz		6		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 150 V, I_D = 2.5 A		13		ns
Rise Time	t_r	V_{GS} = 10 V		7.5		ns
Turn-off Delay Time	$t_{d(off)}$	R_G = 10 Ω		25		ns
Fall Time	t_f	R_L = 60 Ω		6.5		ns
Total Gate Charge	Q_G	V_{DD} = 400 V		13		nC
Gate to Source Charge	Q_{GS}	V_{GS} = 10 V		6		nC
Gate to Drain Charge	Q_{GD}	I_D = 5.0 A		4		nC
Body Diode Forward Voltage Note	$V_{F(S-D)}$	I_F = 5.0 A, V_{GS} = 0 V		0.9		V
Reverse Recovery Time	t_{rr}	I_F = 5.0 A, V_{GS} = 0 V		240		ns
Reverse Recovery Charge	Q_{rr}	di/dt = 100 A/μs		1200		nC

Note Pulsed

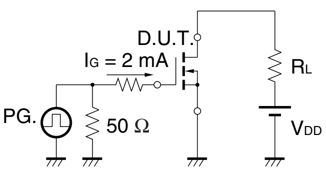
TEST CIRCUIT 1 AVALANCHE CAPABILITY



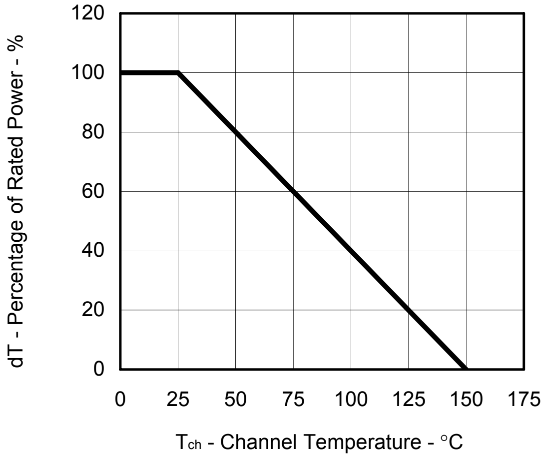
TEST CIRCUIT 2 SWITCHING TIME

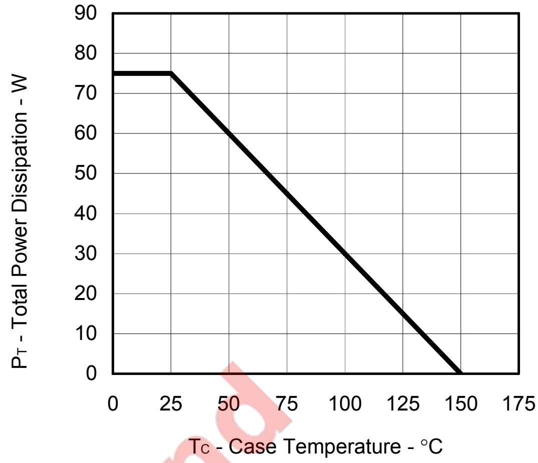


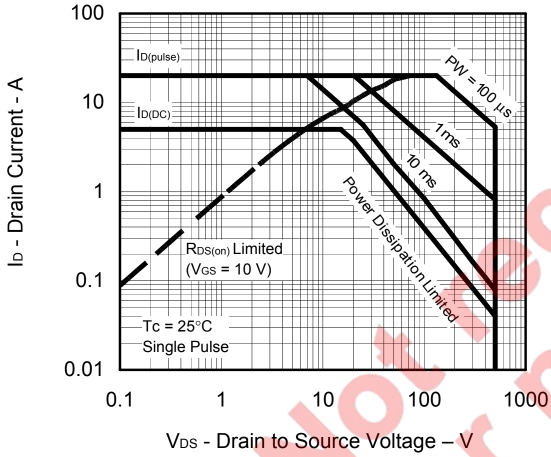
TEST CIRCUIT 3 GATE CHARGE

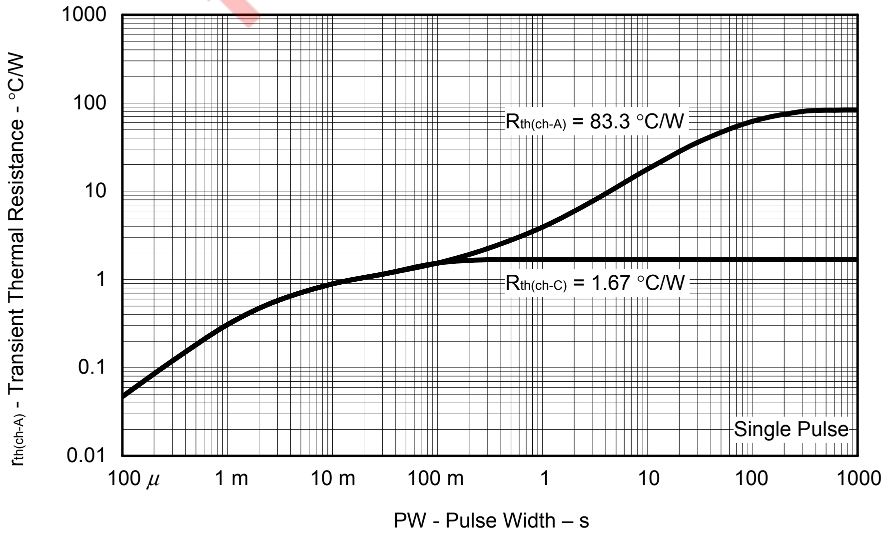


TYPICAL CHARACTERISTICS (T_A = 25°C)

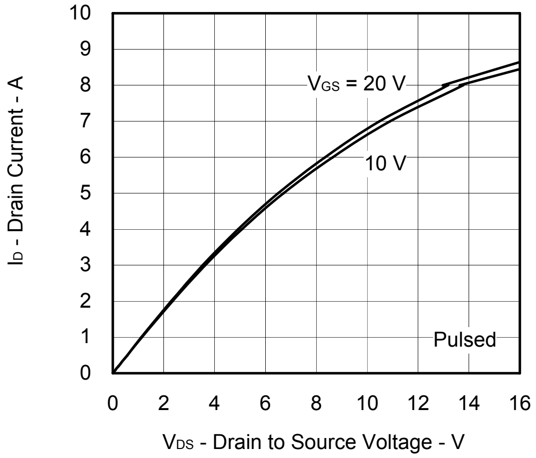




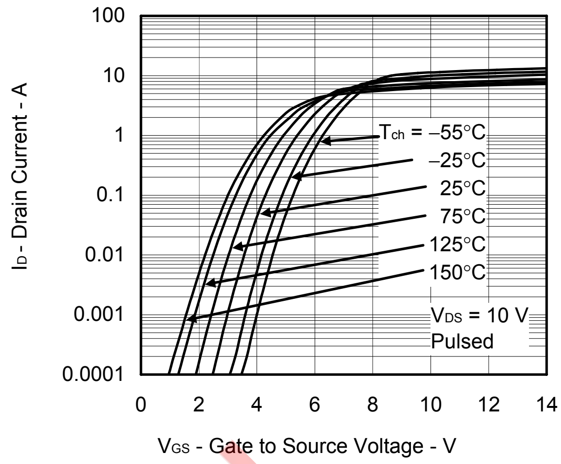




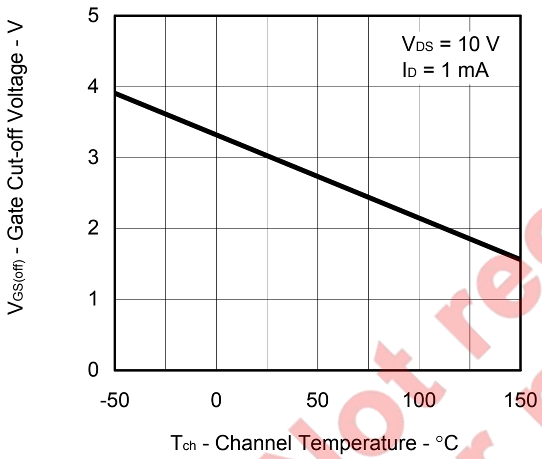
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



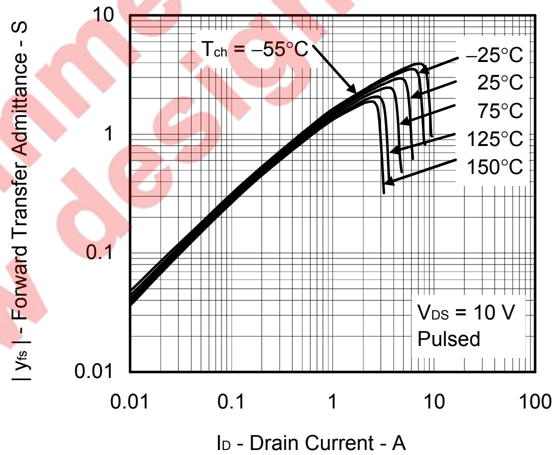
FORWARD TRANSFER CHARACTERISTICS



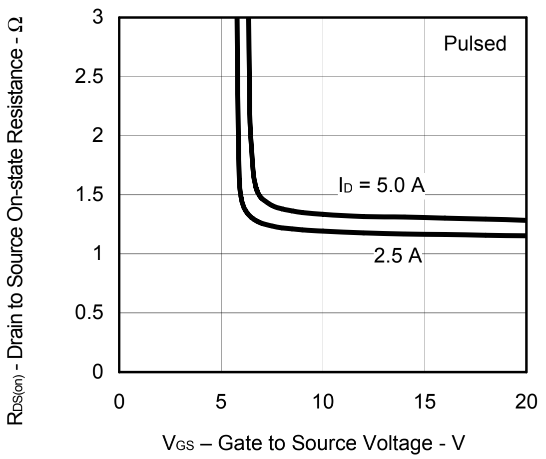
GATE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE



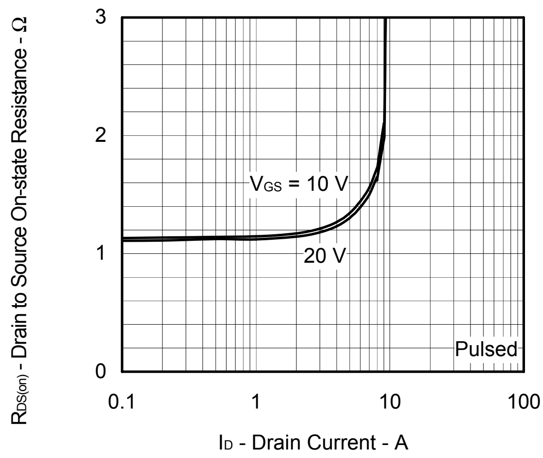
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



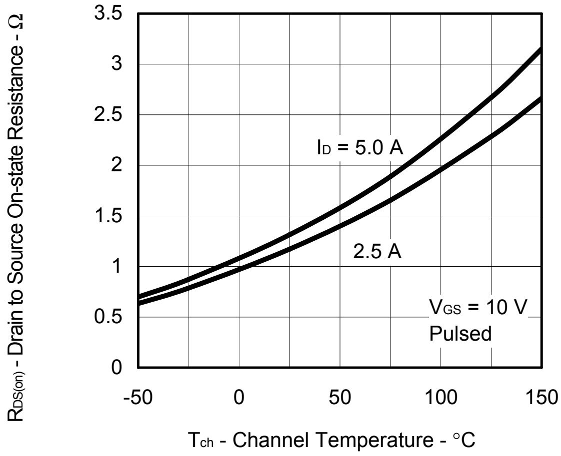
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



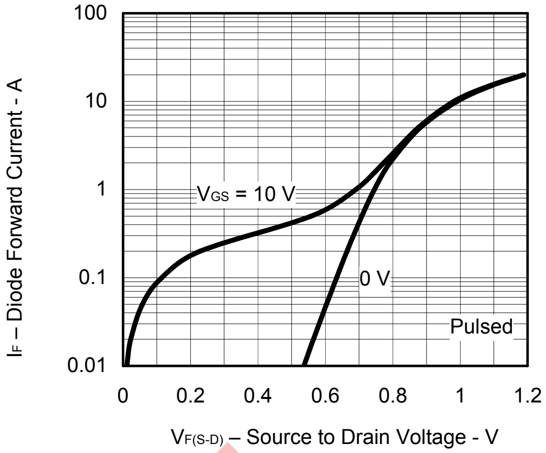
DRAIN TO SOURCE ON-STATE
RESISTANCE vs. DRAIN CURRENT



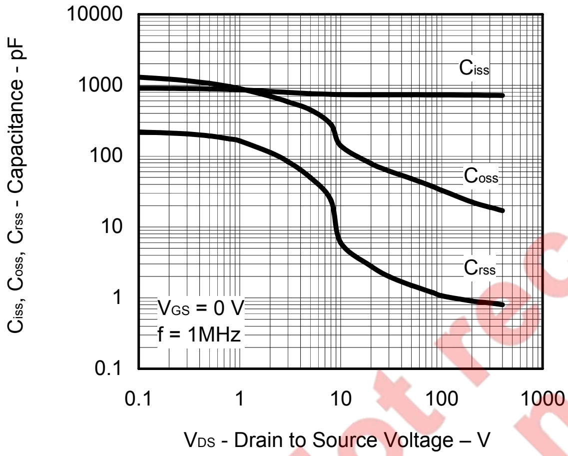
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



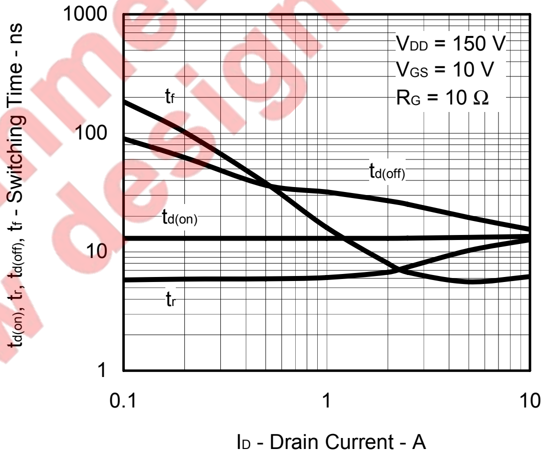
SOURCE TO DRAIN DIODE FORWARD VOLTAGE



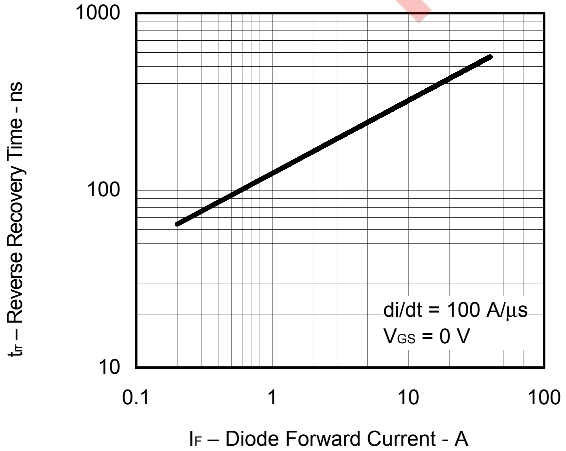
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



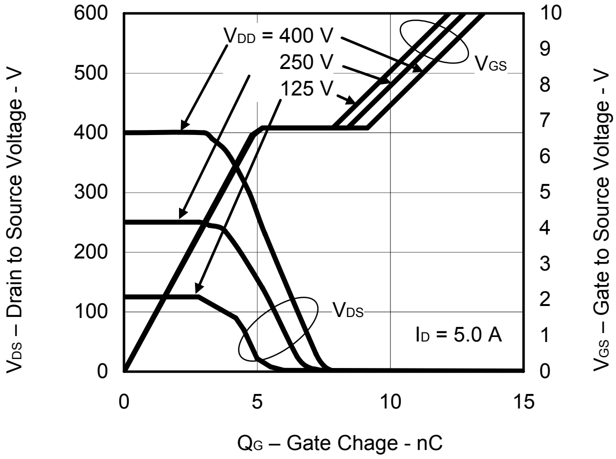
SWITCHING CHARACTERISTICS



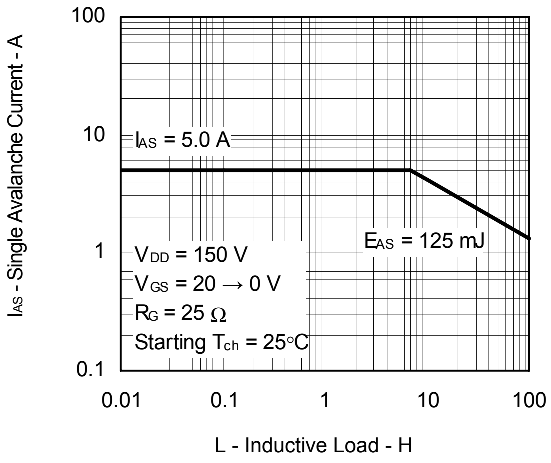
REVWESE RECOVERY TIME vs. DIODE FORWARD CURRENT



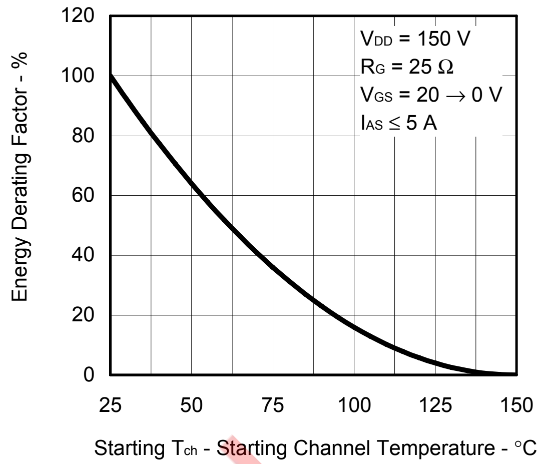
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SINGLE AVALANCHE CURRENT vs. INDUCTIVE LOAD

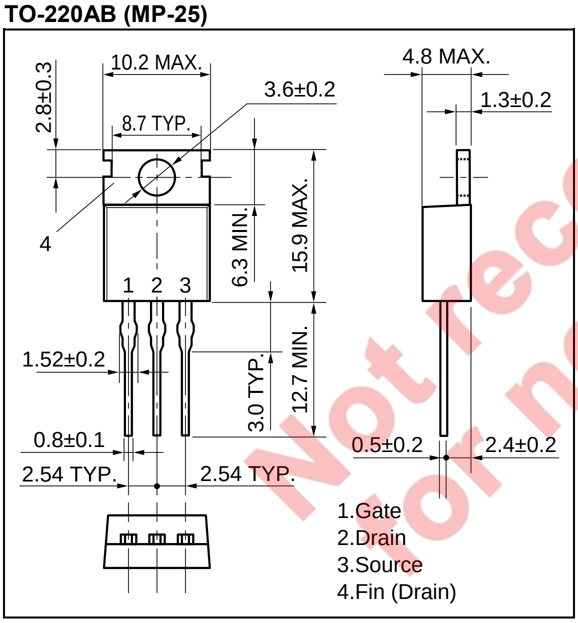


SINGLE AVALANCHE ENERGY DERATING FACTOR

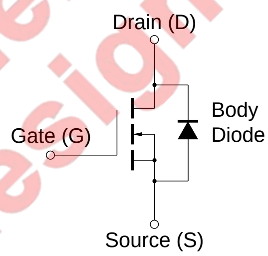


PACKAGE DRAWING (Unit: mm)

TO-220AB (MP-25)



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.

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