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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DATA SHEET

MOS FIELD EFFECT TRANSISTOR

2SK4082

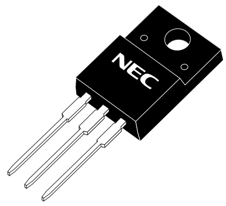
SWITCHING
N-CHANNEL POWER MOS FET

DESCRIPTION

The 2SK4082 is N-channel MOS FET 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

(Isolated TO-220)



- Low on-state resistance
  $R_{DS(on)}$ = 2.2 Ω MAX. (V_{GS} = 10 V, I_D = 1.8 A)
- Low gate charge
  Q_G = 13 nC TYP. (V_{DD} = 450 V, V_{GS} = 10 V, I_D = 3.5 A)
- Gate voltage rating: ±30 V
- Avalanche capability ratings

ORDERING INFORMATION

PART NUMBER	LEAD PLATING	PACKING	PACKAGE
2SK4082-S17-AY Note	Pure Sn (Tin)	Tube 50 p/tube	Isolated TO-220 (MP-45F) typ. 2.2 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}	600	V
Gate to Source Voltage (V_{DS} = 0 V)	V_{GSS}	±30	V
Drain Current (DC) (T_C = 25°C)	$I_{D(DC)}$	±3.5	A
Drain Current (pulse) Note1	$I_{D(pulse)}$	±14	A
Total Power Dissipation (T_C = 25°C)	P_{T1}	35	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 Note2	I_{AS}	2	A
Single Avalanche Energy Note2	E_{AS}	240	mJ

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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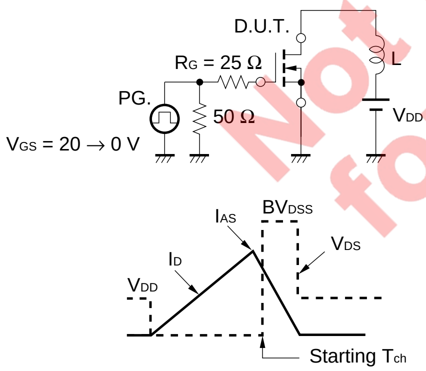
ELECTRICAL CHARACTERISTICS (T_A = 25°C)

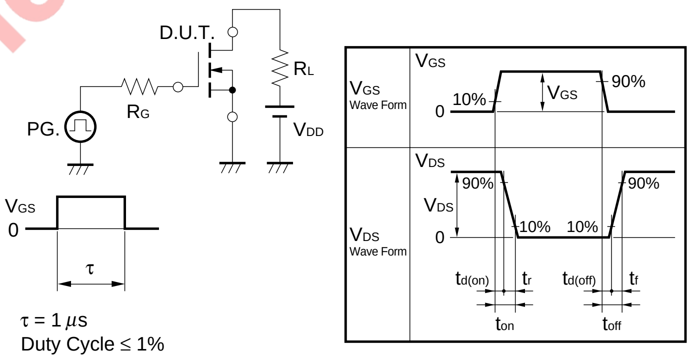
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 600 V, V_{GS} = 0 V			10	μA
Gate Leakage Current	I_{GSS}	V_{GS} = ±30 V, V_{DS} = 0 V			±100	nA
Gate to Source Cut-off Voltage	$V_{GS(off)}$	V_{DS} = 10 V, I_D = 1 mA	2.5	3.0	3.5	V
Forward Transfer Admittance Note	| y_{fs} |	V_{DS} = 10 V, I_D = 1.8 A	0.8			S
Drain to Source On-state Resistance Note	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 1.8 A		1.7	2.2	Ω
Input Capacitance	C_{iss}	V_{DS} = 10 V,		550		pF
Output Capacitance	C_{oss}	V_{GS} = 0 V,		250		pF
Reverse Transfer Capacitance	C_{rss}	f = 1 MHz		49		pF
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 150 V, I_D = 1.8 A,		13		ns
Rise Time	t_r	V_{GS} = 10 V,		10		ns
Turn-off Delay Time	$t_{d(off)}$	R_G = 10 Ω		26		ns
Fall Time	t_f			21		ns
Total Gate Charge	Q_G	V_{DD} = 450 V,		13		nC
Gate to Source Charge	Q_{GS}	V_{GS} = 10 V,		4.3		nC
Gate to Drain Charge	Q_{GD}	I_D = 3.5 A		5.2		nC
Body Diode Forward Voltage Note	$V_{F(S-D)}$	I_F = 3.5 A, V_{GS} = 0 V		0.87	1.5	V
Reverse Recovery Time	t_{rr}	I_F = 3.5 A, V_{GS} = 0 V,		220		ns
Reverse Recovery Charge	Q_{rr}	di/dt = 100 A/μs		840		nC

Note Pulsed

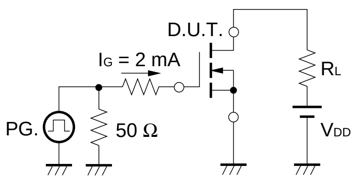
TEST CIRCUIT 1 AVALANCHE CAPABILITY



TEST CIRCUIT 2 SWITCHING TIME

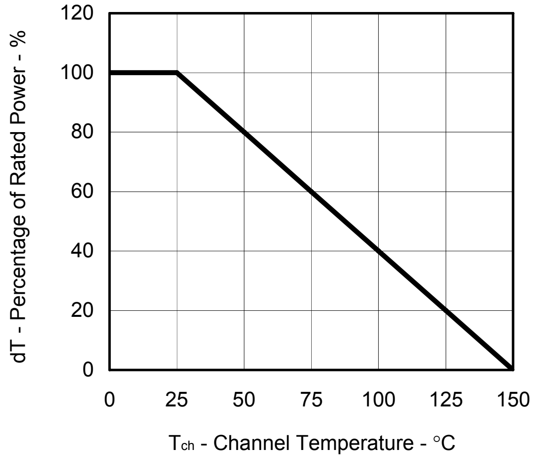


TEST CIRCUIT 3 GATE CHARGE

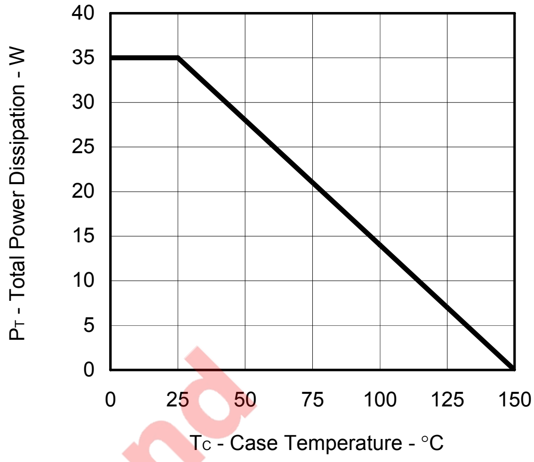


TYPICAL CHARACTERISTICS (TA = 25°C)

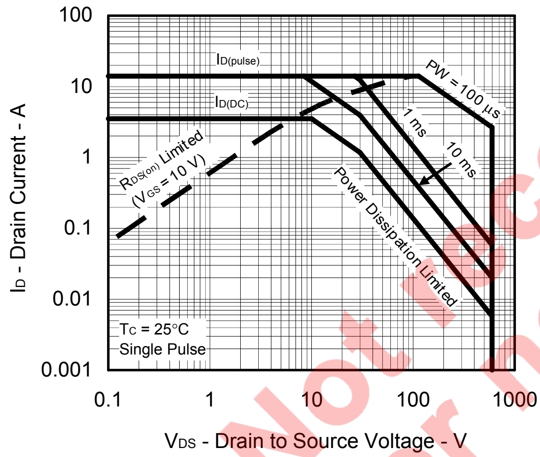
DERATING FACTOR OF FORWARD BIAS SAFE OPERATING AREA



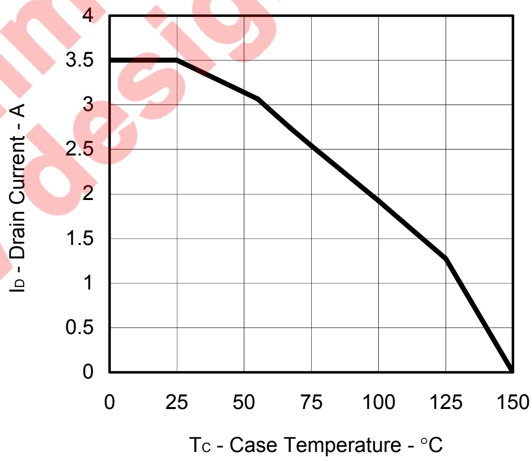
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



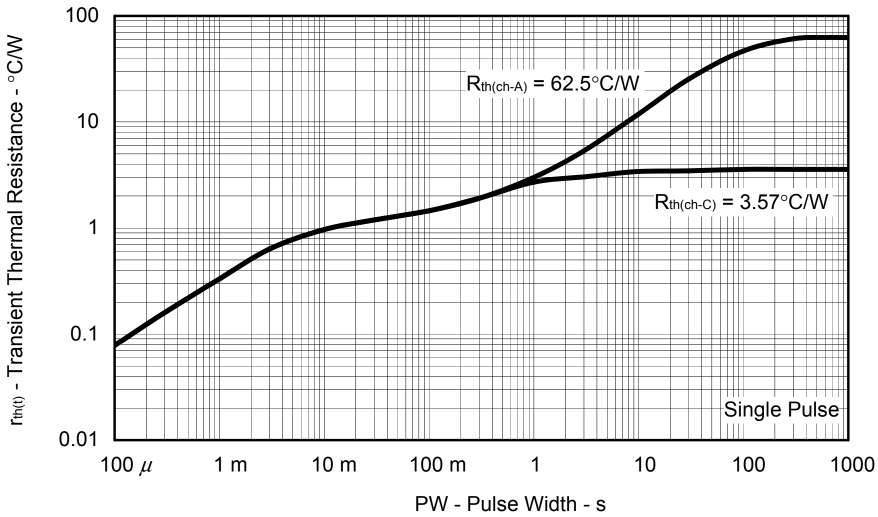
FORWARD BIAS SAFE OPERATING AREA



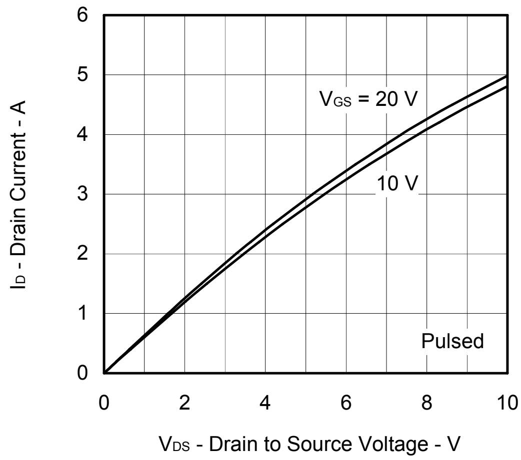
DRAIN CURRENT vs. CASE TEMPERATURE



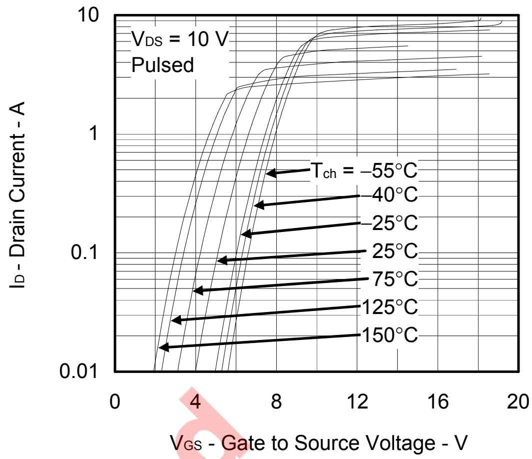
TRANSIENT THERMAL RESISTANCE vs. PULSE WIDTH



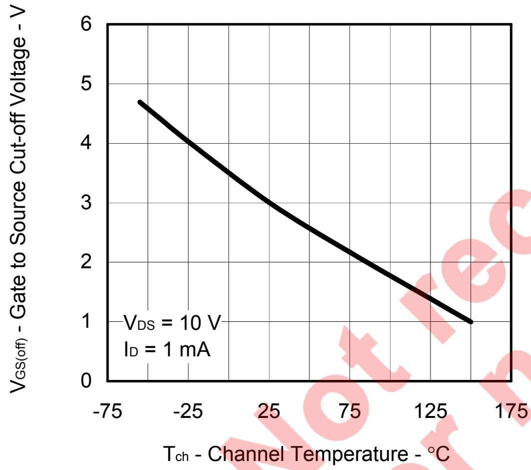
DRAIN CURRENT vs.
DRAIN TO SOURCE VOLTAGE



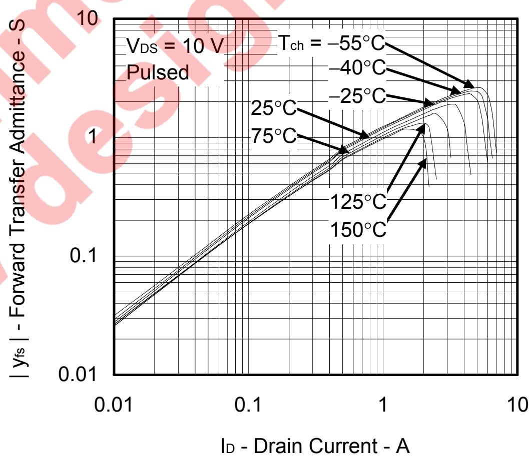
FORWARD TRANSFER CHARACTERISTICS



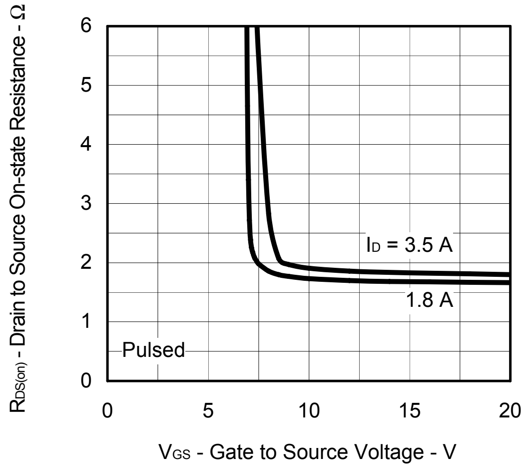
GATE TO SOURCE CUT-OFF VOLTAGE vs.
CHANNEL TEMPERATURE



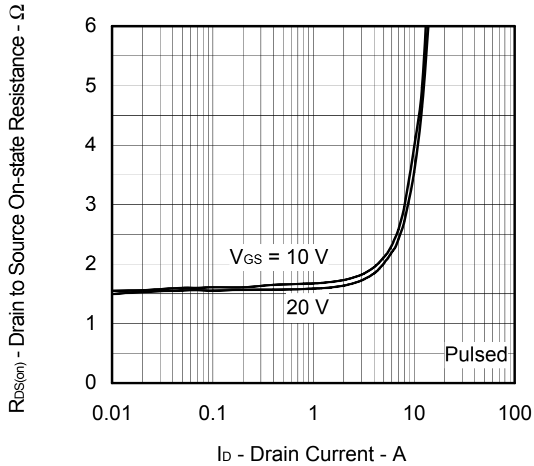
FORWARD TRANSFER ADMITTANCE vs.
DRAIN CURRENT



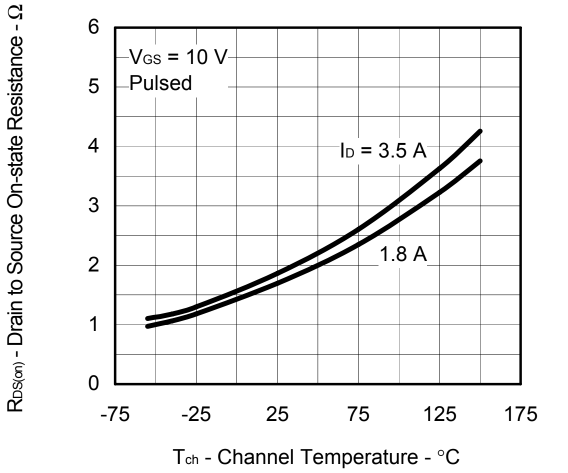
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
GATE TO SOURCE VOLTAGE



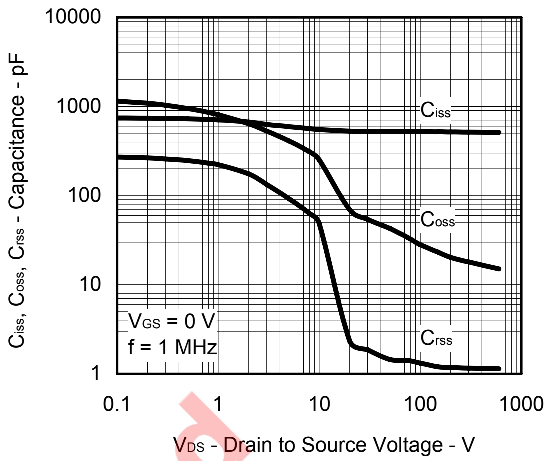
DRAIN TO SOURCE ON-STATE
RESISTANCE vs. DRAIN CURRENT



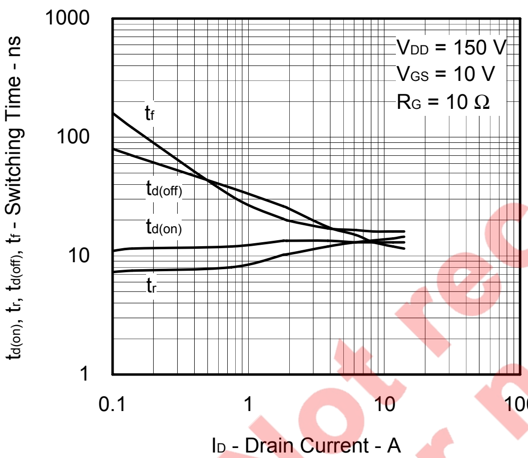
DRAIN TO SOURCE ON-STATE RESISTANCE vs.
CHANNEL TEMPERATURE



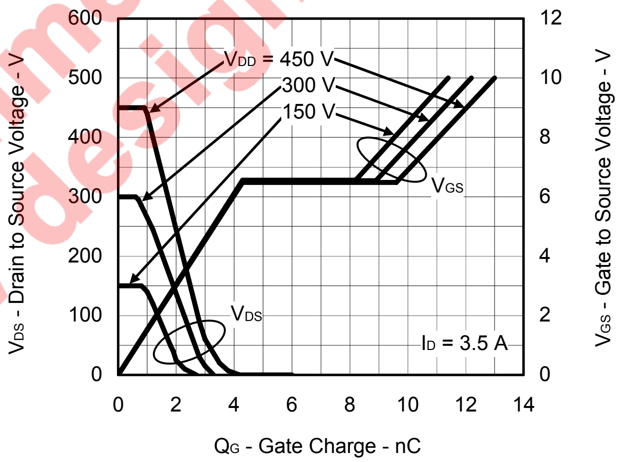
CAPACITANCE vs.
DRAIN TO SOURCE VOLTAGE



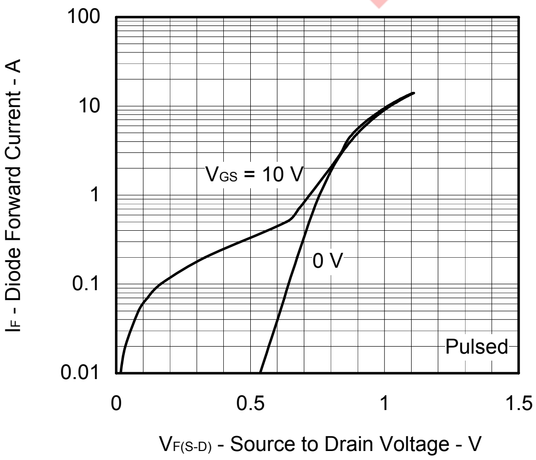
SWITCHING CHARACTERISTICS



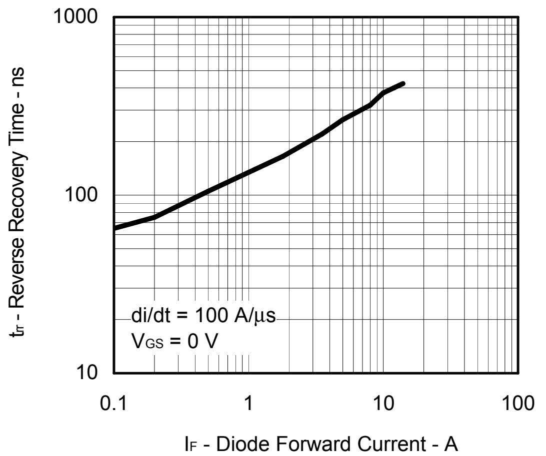
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



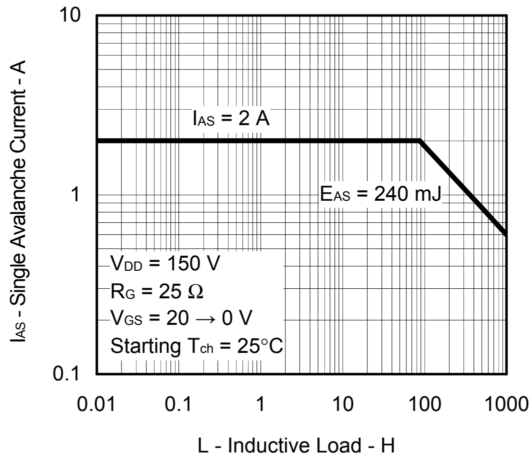
SOURCE TO DRAIN DIODE
FORWARD VOLTAGE



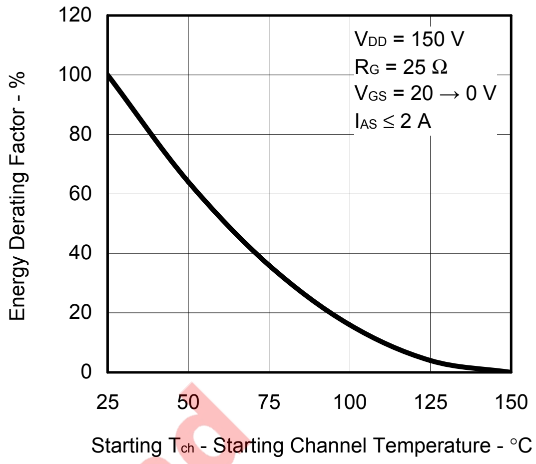
REVERSE RECOVERY TIME vs.
DIODE FORWARD CURRENT



SINGLE AVALANCHE CURRENT vs.
INDUCTIVE LOAD

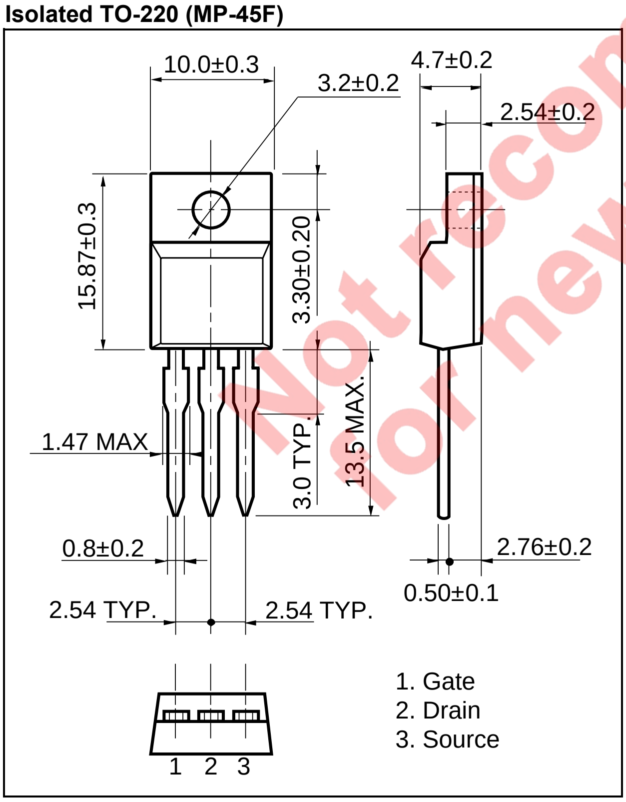


SINGLE AVALANCHE ENERGY
DERATING FACTOR

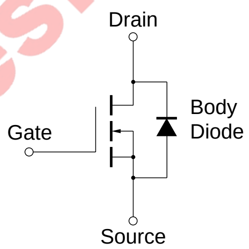


PACKAGE DRAWING (Unit: mm)

Isolated TO-220 (MP-45F)



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.