

To our customers,

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## Old Company Name in Catalogs and Other Documents

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

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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

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## SWITCHING

## N-CHANNEL POWER MOS FET

### DESCRIPTION

The 2SK3483 is N-channel MOS Field Effect Transistor designed for high current switching applications.

### FEATURES

- Low on-state resistance  
 $R_{DS(on)1} = 52 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 14 \text{ A)}$   
 $R_{DS(on)2} = 59 \text{ m}\Omega \text{ MAX. (} V_{GS} = 4.5 \text{ V, } I_D = 14 \text{ A)}$
- Low  $C_{iss}$ :  $C_{iss} = 2300 \text{ pF TYP.}$
- Built-in gate protection diode
- TO-251/TO-252 package

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

Drain to Source Voltage ( $V_{GS} = 0\text{V}$ )	$V_{DSS}$	100	V
Gate to Source Voltage ( $V_{DS} = 0\text{V}$ )	$V_{GSS}$	$\pm 20$	V
Drain Current (DC)	$I_{D(DC)}$	$\pm 28$	A
Drain Current (Pulse) <sup>Note1</sup>	$I_{D(pulse)}$	$\pm 60$	A
Total Power Dissipation ( $T_C = 25^\circ\text{C}$ )	$P_T$	40	W
Total Power Dissipation ( $T_A = 25^\circ\text{C}$ )	$P_T$	1.0	W
Channel Temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	$-55 \text{ to } +150$	$^\circ\text{C}$
Single Avalanche Current <sup>Note2</sup>	$I_{AS}$	25	A
Single Avalanche Energy <sup>Note2</sup>	$E_{AS}$	62.5	mJ

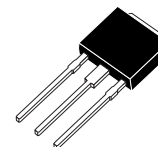
**Notes 1.**  $PW \leq 10 \mu\text{s}$ , Duty Cycle  $\leq 1\%$

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

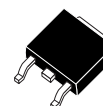
### ORDERING INFORMATION

PART NUMBER	PACKAGE
2SK3483	TO-251 (MP-3)
2SK3483-Z	TO-252 (MP-3Z)

(TO-251)



(TO-252)



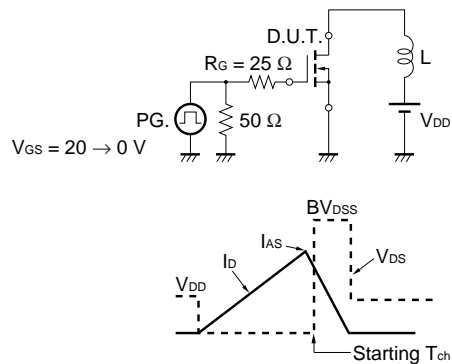
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# ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C)

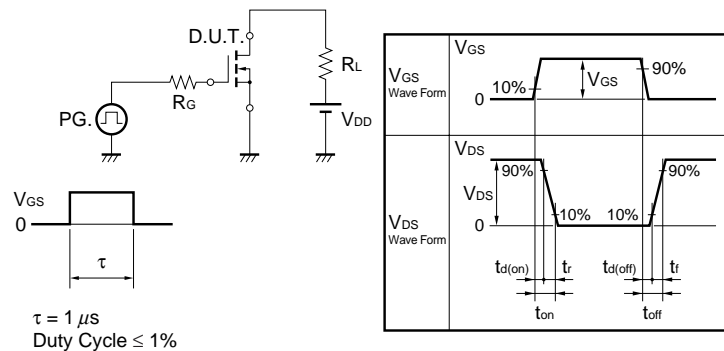
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 0 V			10	μA
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20 V, V <sub>DS</sub> = 0 V			±10	μA
Gate Cut-off Voltage	V <sub>GS(off)</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA	1.5	2.0	2.5	V
Forward Transfer Admittance <b>Note</b>	y <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 14 A	9.0	18		S
Drain to Source On-state Resistance <b>Note</b>	R <sub>DS(on)1</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 14 A		41	52	mΩ
	R <sub>DS(on)2</sub>	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 14 A		45	59	mΩ
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 10 V		2300		pF
Output Capacitance	C <sub>oss</sub>	V <sub>GS</sub> = 0 V		230		pF
Reverse Transfer Capacitance	C <sub>rss</sub>	f = 1 MHz		120		pF
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = 50 V, I <sub>D</sub> = 14 A		12		ns
Rise Time	t <sub>r</sub>	V <sub>GS</sub> = 10 V		9		ns
Turn-off Delay Time	t <sub>d(off)</sub>	R <sub>G</sub> = 0 Ω		53		ns
Fall Time	t <sub>f</sub>			5		ns
Total Gate Charge	Q <sub>G</sub>	V <sub>DD</sub> = 80 V		49		nC
Gate to Source Charge	Q <sub>GS</sub>	V <sub>GS</sub> = 10 V		7		nC
Gate to Drain Charge	Q <sub>GD</sub>	I <sub>D</sub> = 28 A		13		nC
Body Diode Forward Voltage <b>Note</b>	V <sub>F(S-D)</sub>	I <sub>F</sub> = 28 A, V <sub>GS</sub> = 0 V		1.0		V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 28 A, V <sub>GS</sub> = 0 V		73		ns
Reverse Recovery Charge	Q <sub>rr</sub>	di/dt = 100 A/μs		175		nC

**Note** Pulsed

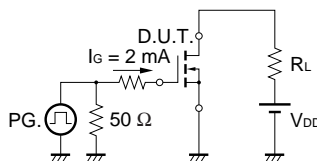
## TEST CIRCUIT 1 AVALANCHE CAPABILITY



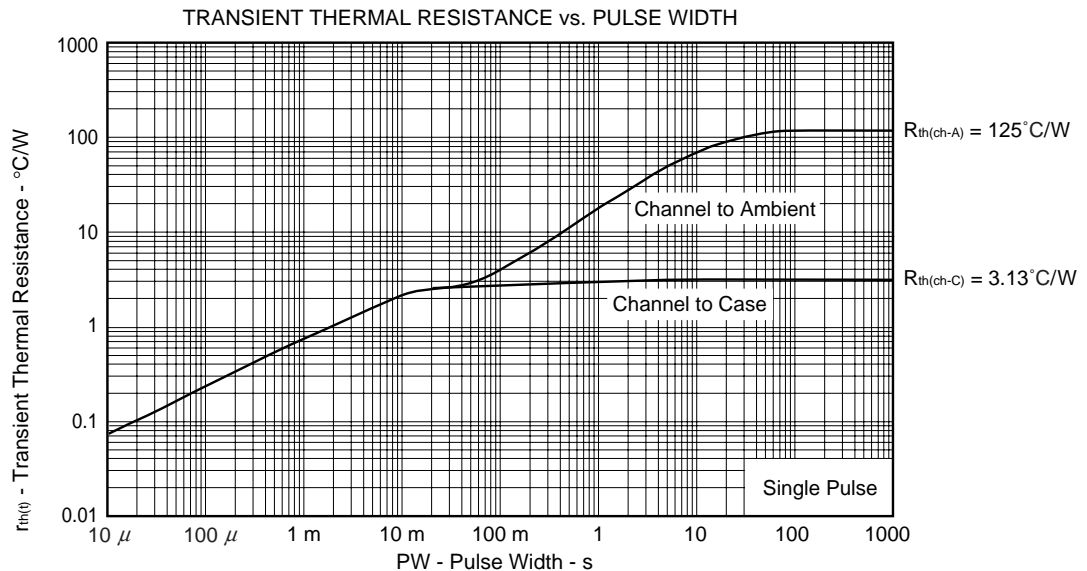
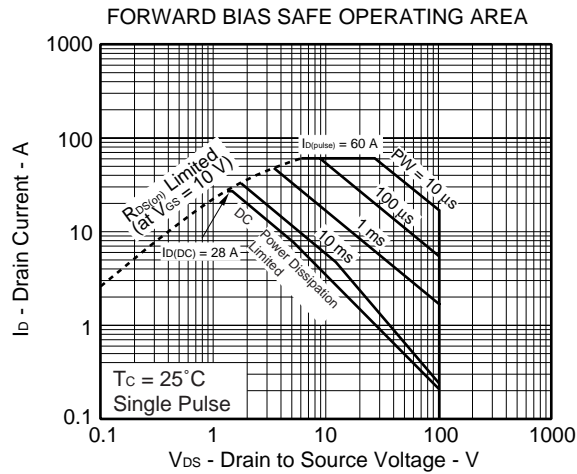
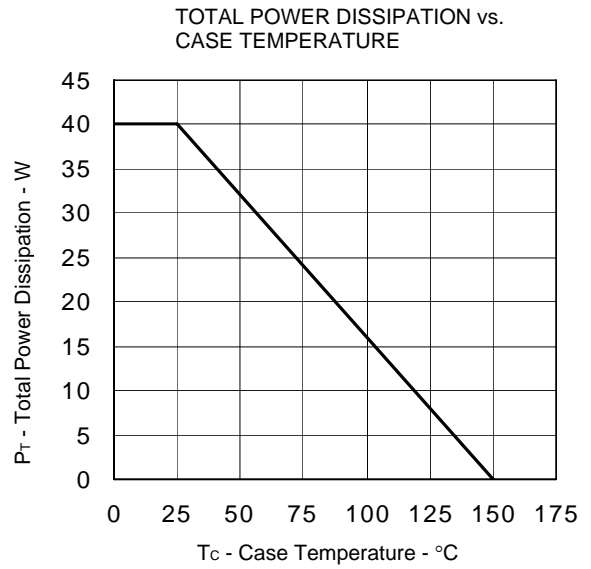
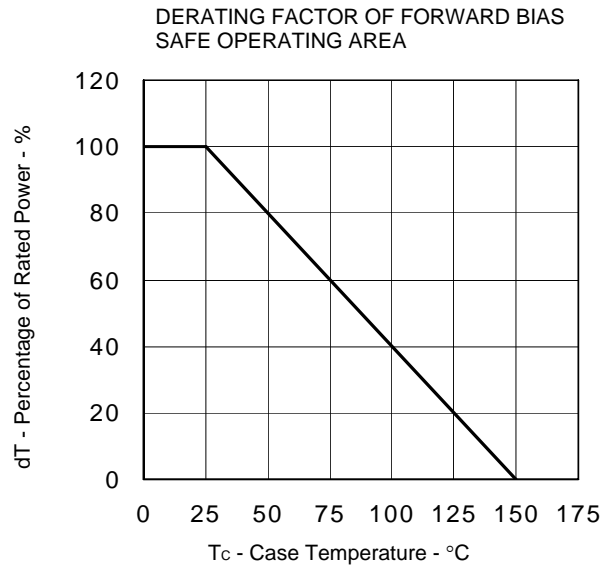
## TEST CIRCUIT 2 SWITCHING TIME



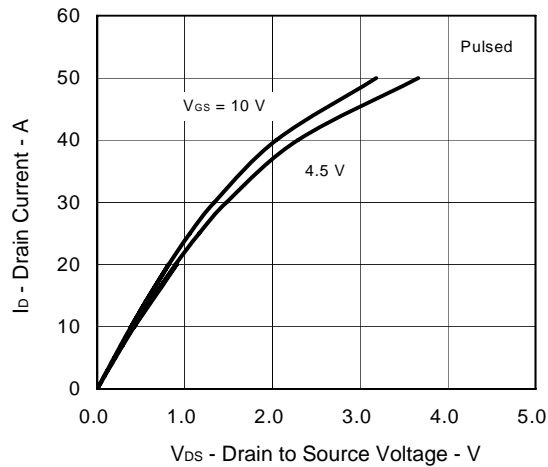
## TEST CIRCUIT 3 GATE CHARGE



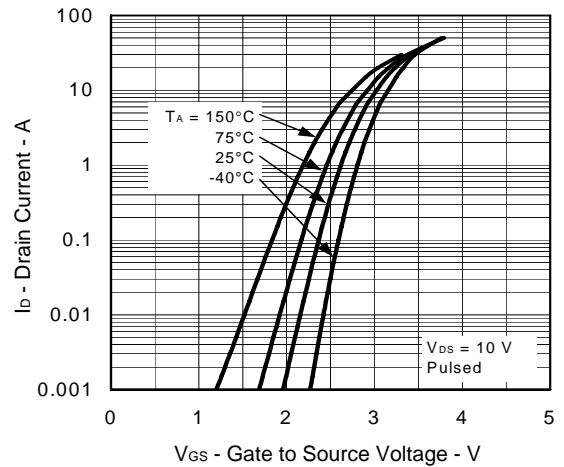
TYPICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )



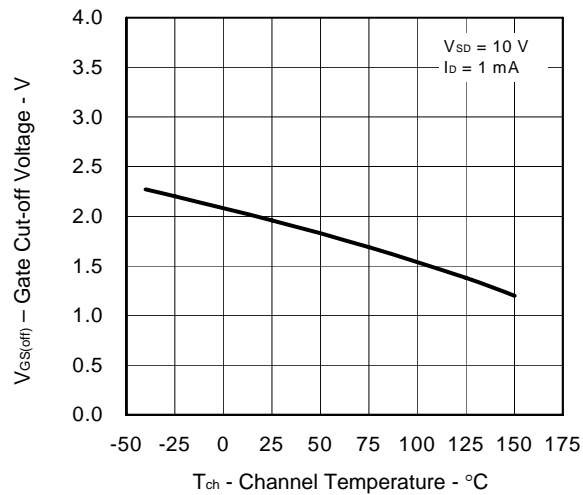
DRAIN CURRENT vs.  
DRAIN TO SOURCE VOLTAGE



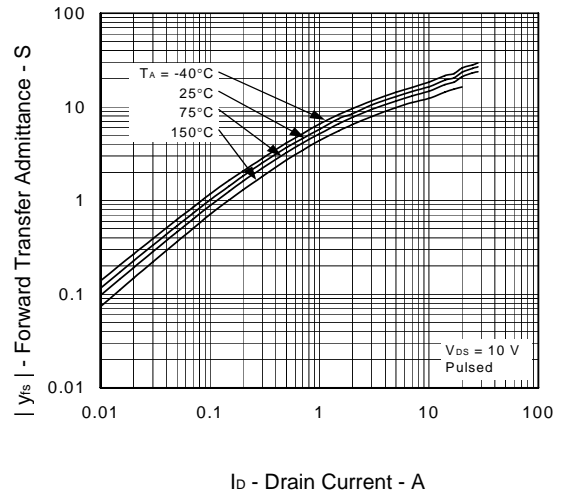
FORWARD TRANSFER CHARACTERISTICS



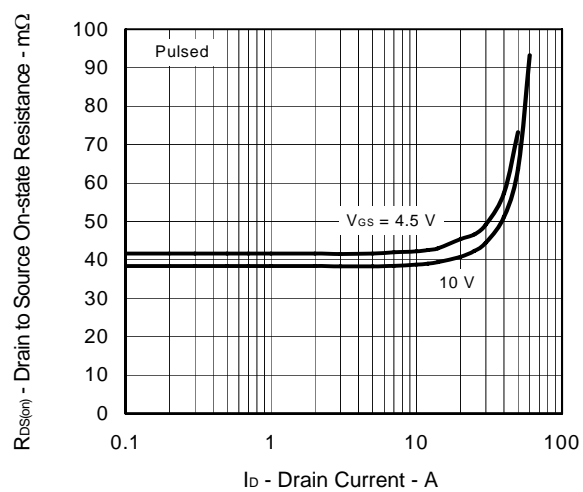
GATE CUT-OFF VOLTAGE vs.  
CHANNEL TEMPERATURE



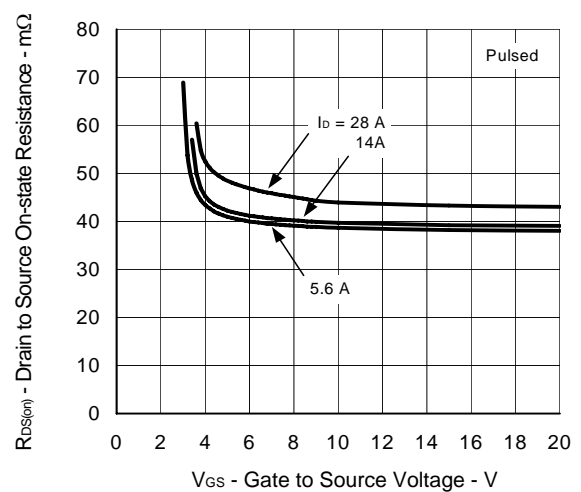
FORWARD TRANSFER ADMITTANCE vs.  
DRAIN CURRENT



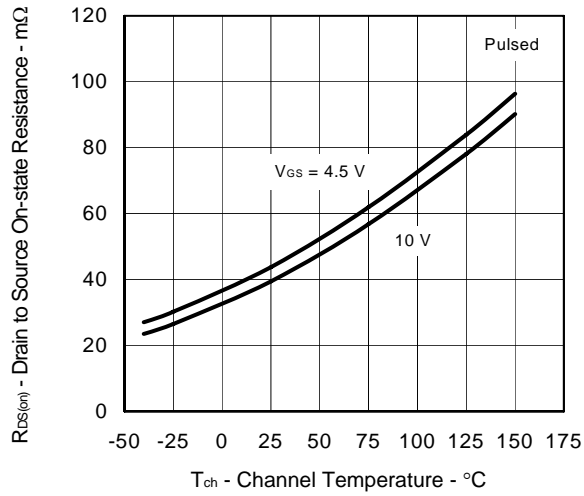
DRAIN TO SOURCE ON-STATE  
RESISTANCE vs. DRAIN CURRENT



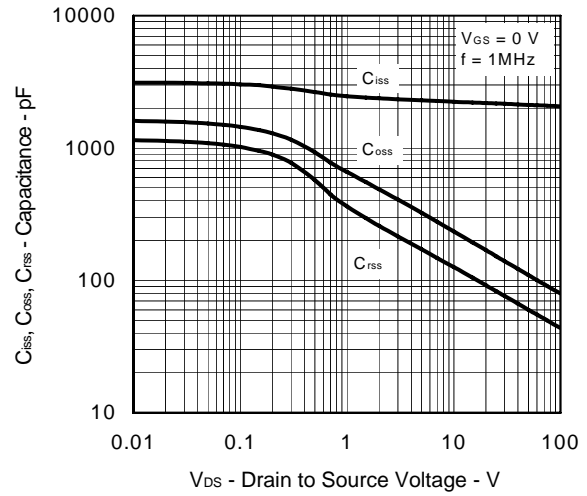
DRAIN TO SOURCE ON-STATE RESISTANCE vs.  
GATE TO SOURCE VOLTAGE



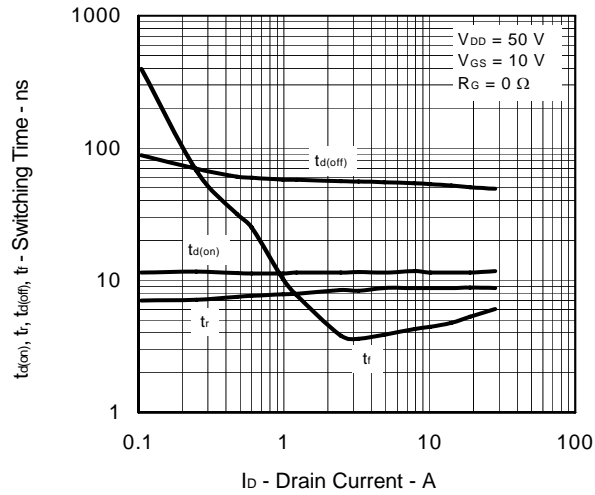
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



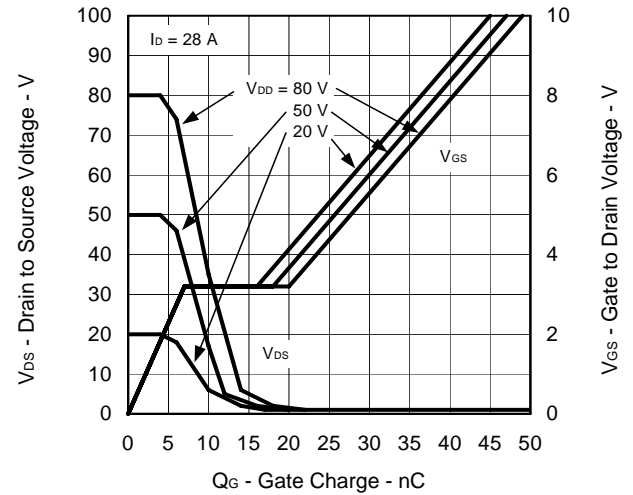
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



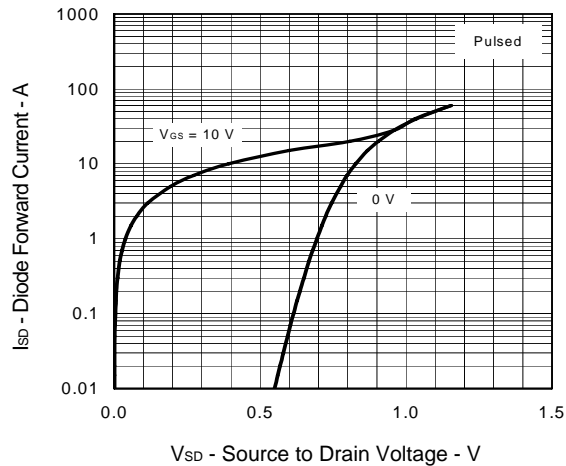
SWITCHING CHARACTERISTICS



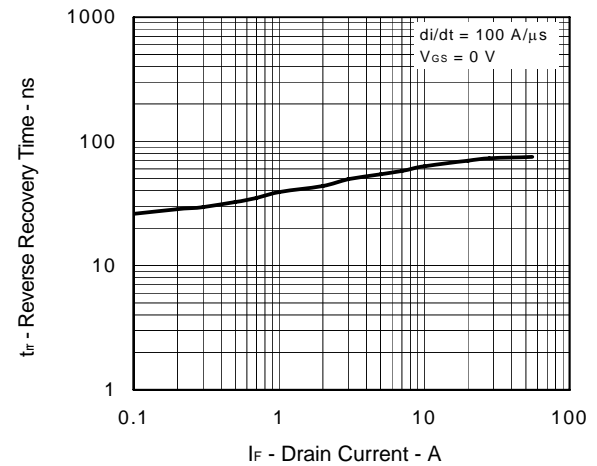
DYNAMIC INPUT/OUTPUT CHARACTERISTICS

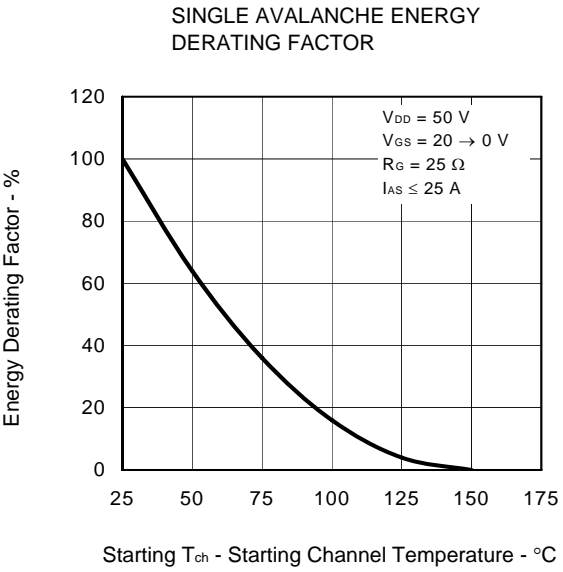
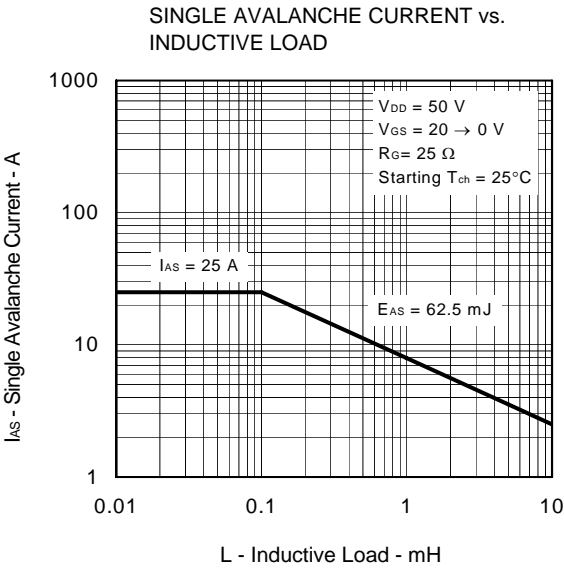


SOURCE TO DRAIN DIODE FORWARD VOLTAGE



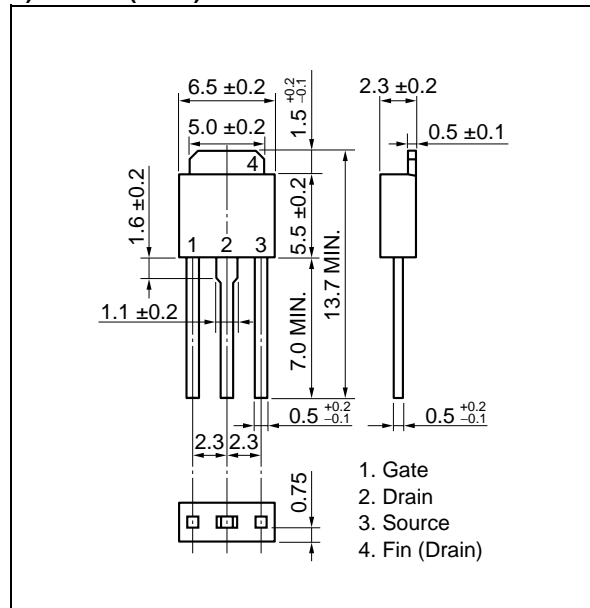
REVERSE RECOVERY TIME vs. DRAIN CURRENT



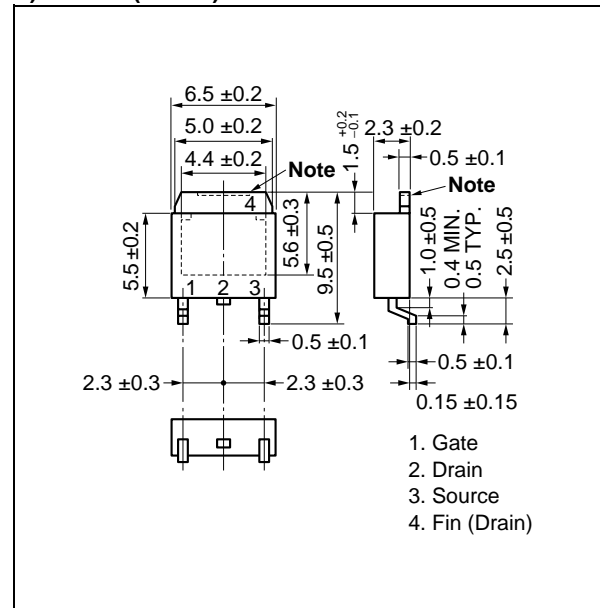


PACKAGE DRAWINGS (Unit: mm)

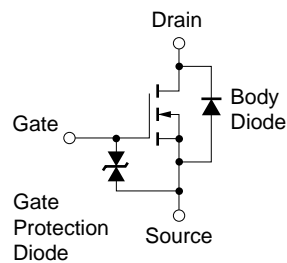
1) TO-251 (MP-3)



<R> 2) TO-252 (MP-3Z)



EQUIVALENT CIRCUIT



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

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